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Observer-based study of commercial line fishing in waters off New South Wales

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Non-technical summary

Observer-based study of commercial line fishing in water off New South Wales

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Commercial fishing, handline, longline, dropline, observer research, bycatch, discarding, catch rate, protected species

Summary

Commercial line fishing is a significant industry in the coastal waters of New South Wales (NSW), with an annual total retained catch of approximately 1,347 tonnes and worth approximately A$7.5 million at the first point of sale. It is managed as a component of the NSW Ocean Trap and Line fishery (OTLF) and involves a range of different line-fishing methods, including handline, trolling, dropline, setline and trotline, which are used to target a wide variety of species such as yellowtail kingfish, snapper, blue-eye trevalla, mackerels, tunas and sharks.

The Environmental Impact Statement (EIS) for the OTLF found that discarding of unwanted bycatch species in the OTLF, and particularly by line fishing, is poorly understood. It concluded that there is a need to identify the species being discarded and quantify the levels of discarding within the line-fishing component of the fishery. It was also concluded that discarding is a potentially moderate to high risk to stocks of primary, and key secondary target species, along with populations of non-target species, including protected and/or threatened species such as grey nurse shark, great white shark and black rockcod.

The most reliable source of data collection regarding commercial fishing activities is, arguably, via carefully designed, observer-based research programs. This type of research involves scientifically-trained observers accompanying commercial fishers on fishing trips done as part of normal fishing operations. Scientific data systematically recorded during those trips include their methodologies, catches and any interactions with unwanted organisms. Observer-based research represents a sound investment for both the fishing industry and its managing bodies as it provides reliable information on which to base important fisheries management decisions.

The primary objective of this study was to identify and quantify the species composition of retained and discarded catches for the main line-fishing methods used by fishers in the OTLF. Using the observer data collected in combination with fishing-effort data recorded via fisher-dependent catch returns we also aimed to calculate species-specific estimates of rates of retention and discarding, along with rates of interaction with rare and threatened species.

Observed fishing days were sought with OTLF fishers working throughout continental shelf waters off NSW, bounded by the latitudes of the coastal NSW/Queensland (28˚10' S) and NSW/Victoria (37˚30' S) state borders in the north and south, respectively. The field-sampling phase of the study was completed over two years, beginning on 1 September 2007 and ending on 31 August 2009. Observer sampling was restricted to three categories of line-fishing ‘methods’ (handline, set/trotline and dropline), which collectively comprised the majority of line fishing effort (~77%) and are suspected to be involved in the vast majority of interactions with protected and/or threatened species.

Given the total of 328 observer days resourced for the study, sampling effort was divided according to three latitudinal ‘regions’(North, Central and South), while the two-year duration of the study was partitioned into eight three-month sampling ‘periods’ roughly aligning with nominal climatic seasons (Spring, Summer, Autumn and Winter). Hence, there were 72 method/region/period sampling strata across which the 328 days of observer effort were allocated. The specific allocation of sampling effort among strata was weighted according to broad spatial, seasonal and inter-method patterns in variability that were evident in summaries of fisher-reported effort calculated for the 2003/04, 2004/05 and 2005/06 fiscal years, while maintaining a minimum of four replicate observer trips in each method/region/period sampling stratum. Consequently, additional replicate observer days were allocated (up to a maximum of eight days in total) for method/region/ season strata demonstrated to have historically been associated with substantially elevated fishing effort.

Three hundred and seven fisher days were observed, equalling approximately 94% of the original objective of 328 days. This sampling effort included 142 handline days (slightly more than the planned 136), 77 dropline days (~80% of 96) and 88 set/trotline days (~92% of 96). Of the 242 OTLF fishing businesses that lodged a line-fishing catch return (containing handline, dropline or set/trotline catch information) during the two years of the field sampling phase of this study, a total of 66 fishers (27%) actively participated in the study by hosting an observer. Levels of overall observer coverage achieved (i.e. proportion of the total reported fishing effort (fishing days) during the two-year study period actually observed) for handline, dropline and set/trotline were estimated to be 1.1%, 3.1% and 2.2%, respectively. To ensure sufficient sample sizes (fisher days) within strata for the calculation and reporting of catch and effort summaries, consecutive sampling periods involving spring and summer (and autumn and winter pairings) were combined post hoc to form a sequence of four ‘period groupings’ (P12, P34, P56 and P78), each covering six-months of sampling.

Fishing locations visited during observed OTLF line-fishing trips included handline locations in waters as shallow as 1–2 m in depth around rocky headlands, and demersal setline and dropline locations in waters as deep as 592 m, beyond the edge of the continental shelf. Intra-method (and inter-region) variability in target species and depths fished also had a clear influence on differences in the specifics of fishing gear design and operation. The types of gears fishers reported as handline during observed fisher days included various configurations of non-mechanical hand reels, rod and reel (manual and electric), and electronic deck reels in the cases of handlining done in deeper water. Multiple and concurrent deployments of handlines were common practices employed. The configuration of dropline gears was also quite variable, with lines connected to electronic reel/winch systems instead of free floats in some cases; although the traditional float, line and hooks configuration was by far the most common one. Observed dropline days involved the deployment of totals of between 12 and 750 baited hooks per fisher day, with averages of approximately 24 hooks per dropline deployed and 14 dropline deployments per day. In contrast, while observed set/trotline days involved the deployment of between 2 and 3,500 baited hooks per fisher day, the set/trotline gears deployed were generally configured similarly among operators. The large differences in the number of hooks retrieved per observed day were a consequence of the influences of weather (preventing gear retrieval), differences in target species, and legislative restrictions on the permitted number of hooks per line (depending on target species or region).

Broad patterns in spatial distribution of effort with respect to water depth differed among the three methods and were also highly dependent on region and target species. Clearly one of the main contributing factors influencing such patterns was variability in the presence and/or abundance of favoured marketable species at different latitudes and depths. Observed handline effort in the north and central regions was generally restricted to relatively shallow shelf waters (< 50 m depth) nearer the coast, with pelagic fish such as bonito and mackerel, and reef species such as snapper and yellowtail kingfish, commonly targeted, caught and retained. While most observed handline effort in the south region was in similarly shallow, coastal waters to target reef fish such as snapper and trevally, some effort in deeper waters at and beyond the edge of the continental shelf to target blue-eye trevalla was also recorded.

The vast majority of observed dropline deployments in the north and south regions were in waters > 60 m deep to target blue-eye trevalla or snapper, although gemfish, bigeye ocean perch and banded rockcod (locally known as 'bar cod') were also caught and retained. In the southern part of the central region and northern part of the south region (i.e. off Sydney) droplines were also used in much shallower water (10–40 m depth) to target yellowtail kingfish, wobbegong or whaler shark. Observed set/trotline effort in the north region was generally clustered in distinct mid-shelf areas (< 100 m depth), mainly to target snapper or large whaler shark species. While some similar targeting was evident in the central region, set/trotline gears were also frequently used in some shallow areas close to the coast (< 20 m depth) specifically to target wobbegong sharks. In contrast, while some set/trotline effort targeting snapper and gummy shark in mid-shelf areas in the south region was recorded, much of the observed set/trotline effort in the south was in relatively deeper outer shelf (> 100 m depth) and continental slope waters far offshore and directed towards species such as pink ling, bigeye ocean perch and species of swellshark.

Many non-target species were opportunistically retained for sale, particularly during observed fishing trips characterised by consistently low catches of the target (or preferred) species. Examples of these non-target species included: sweep, eastern red scorpionfish and yellowtail scad in the case of observed handline fishing days; spurdogs and dogfish (deep water shark species) for dropline; and some demersal shark and ray species for set/trotline. Estimated total catches for some of these species matched or exceeded those estimated for the main target species.

For the purpose of this study, 'bycatch' was defined as all animals captured and immediately discarded (or released), irrespective of condition (i.e. alive or dead) or likely fate. The overall bycatch ratio (expressed here as the proportion of the total catch (by number) that was subsequently discarded) for each of the three OTLF line-fishing categories examined was 15% for handline, 7% for dropline and 17% for set/trotline. These ratios are low compared to most comparable estimates generated via past observer-based research into other commercial methods used to target finfish in NSW (e.g. ~44% for estuarine finfish seines; up to 68% for some estuary gill nets) and elsewhere in the world (e.g. Bering Sea: 43–69% for setlines; 15–94% for traps; 21–82% for trawls).

Interactions between handline, dropline and set/trotline fishing gears and threatened and/or protected species during the observed fishing days were rare, with none observed to have resulted in confirmed mortality of those protected individuals. These instances of interaction included arguably minor and unavoidable interactions with a whale (making contact with the line of a handline deployed in deep water near the edge of the continental shelf) and a seabird (chasing and being hooked by a baited handline hook being retrieved), along with very infrequent captures (and releases) of protected fish (eastern blue devil, eastern blue groper and black rockcod). Totals of two grey nurse sharks and four great white sharks were hooked during the study, with all instances occurring during set/trotline fishing days specifically targeting large sharks and all sharks swimming away from the vessel upon release. It must be noted that in the case of this study, up-scaled estimates of total catch or bycatch in the cases of such rarely caught species are inherently highly questionable and of low reliability due to small sampling fractions (i.e. observer coverage) combined with the rarity and irregularity of captures or interactions. Nevertheless, further development of strategies and OTLF management measures to further reduce (or ideally eliminate) interactions with threatened and/or protected species are clearly required.

In conclusion, this study has provided a useful knowledge base on which to build upon with respect to the handline, dropline and set/trotline components of the OTLF. The information gathered will assist the formulation of management strategies that will help to ensure that, in future, stocks of species targeted (or opportunistically retained) by commercial line fishers in NSW waters are harvested sustainably, and that impacts on populations of non-target and protected species are reduced as much as possible. In order to continue building the knowledge bank to achieve these ends, it is recommended that, if possible, NSW DPI scientists be provided with a mandate to conduct observer-based sampling of catches for research purposes (via a combination of onboard observers and electronic technology), where such research is deemed necessary for the effective monitoring and management of stocks of aquatic and marine animals and fishing methods used to exploit them.

Introduction

NSW commercial Ocean Trap and Line Fishery (OTLF)

The Ocean Trap and Line Fishery (OTLF), managed by New South Wales Department of Primary Industries (NSW DPI), is one of eight major marine- and estuarine-based commercial fisheries in NSW. Commercial finfish trapping (demersal), a range of commercial line-fishing methods, and the northern-NSW dilly-net fishery for spanner crab (Ranina ranina), are all permitted in continental shelf and oceanic waters off the coast of New South Wales (NSW), Australia, as part of the OTLF (NSW DPI, 2006a). As at January 2010, around 326 fishing businesses held entitlements to operate in the OTLF (NSW DPI, 2011), with some holding multiple endorsements within the fishery and/or in other fisheries operating in waters off NSW (NSW DPI, 2006a). The vessels used in the OTLF range in size between 4 and 20 m in length, while the annual total retained catch in the fishery is estimated to be approximately 2,102 tonnes and be worth approximately A$12.5 million at the first point of sale.

The area of operation of the OTLF extends from the NSW coast out to the 4000-m isobath (depth contour), which is approximately 60–80 nautical miles (nm) offshore, but excludes many marine protected areas (MPAs – e.g. marine parks, aquatic reserves) (NSW DPI, 2006a). Coastal waters of NSW out to 3 nm offshore fall under the jurisdiction of the NSW State Government, while waters from 3 nm out to the 4000-m isobath are under the jurisdiction of the Australian Commonwealth Government. However, an Offshore Constitutional Settlement established in 1990 allows NSW to manage OTLF-endorsed fishing activities occurring in Commonwealth waters (refer to NSW DPI, 2006a for further details). Further to this, it is important to also note that some targeted finfish trapping and line fishing is done in waters off NSW by commercial fishers as part of fisheries managed by Australian Fisheries Management Authority (AFMA) – the Commonwealth Government fisheries management agency (AFMA, 2010). Specifically, these AFMA-managed fisheries are the Southern and Eastern Scalefish and Shark Fishery (SESSF), Eastern Tuna and Billfish Fishery (ETBF), and to a lesser extent the Eastern Skipjack Fishery (ESF) and Southern Bluefin Tuna fishery (SBT) (AFMA, 2010; NSW DPI, 2006a).

There are six general types of OTLF endorsement that determine the types of fishing gear endorsement-holders are permitted to use and in some cases the areas in which they can use them (Table 1; NSW DPI, 2006a). Three of these endorsement types relate to line fishing; two to spanner crab fishing; and one to demersal fish trapping. Fishing associated with the latter three endorsement types were not investigated as part of this study, although detailed information regarding them is available elsewhere (spanner crab – Kennelly and Scandol, 1999, 2002; demersal fish trap – Stewart and Ferrell, 2003, 2002, 2001).

Line-fishing component of the OTLF

The three OTLF line-fishing endorsements – ‘line west’, ‘line east’ and ‘school and gummy shark’ (Table 1) – accounted for approximately 94% of the annual total reported fishing effort (in fisher days) associated with the OTLF for the 2009/10 fiscal year. Despite this, there has been very little research dedicated to understanding the specific fishing gears used and catches by line fishers in the OTLF and most information to date has been derived via the compulsory monthly catch-and-effort reporting requirements (termed ‘catch returns’) of OTLF-endorsed fishers. Approximately 302 fishing businesses are currently licensed with one or more of the three line-fishing endorsements, with the annual total retained catch in the line-fishing component of the fishery estimated to be approximately 1,347 tonnes and be worth approximately A$7.5 million at the first point of sale (NSW DPI, 2011).

A range of different line-fishing methods are used to target a range of species in the OTLF (Figure 1; Table 2). According to the OTLF fishers’ catch returns over the past decade or so, 'handline' accounted for just over half (51.6%) of the reported line-fishing effort (in fisher days) between 1998/99 and 2007/08, while the great majority of the remaining effort was attributed to 'trolling' (17.5%), 'dropline' (12.8%), 'setline' (7.0%), 'trotline' (5.3%) and 'jigging' (3.5%) (Table 2; NSW DPI, 2011). Other line-fishing methods fishers reported relatively infrequently were 'driftline', 'poling' and 'longline'.

Table 1 Types of endorsements in the NSW Ocean Trap and Line Fishery. Note: this is a brief summary only – refer to NSW DPI, 2006a for further details.

Endorsement type	Summary of fishing-activity authorisation
Line fishing (west) – 'line west'	Taking of fish from ocean waters west of the 100-fathom (183-m) depth contour using line methods. Excludes the taking of some deeper-water species and school or gummy shark south of Moruya
Line fishing (east) – 'line east'	Taking of fish from ocean waters east of the 100-fathom (183-m) depth contour using line methods. Excludes the taking of school or gummy shark south of Moruya
School and gummy shark	Taking of school shark and gummy shark from ocean waters south of Moruya using line methods
Spanner crab (north)	Taking of spanner crab from ocean waters north of Yamba using spanner crab nets (dillies)
Spanner crab (south)	Taking of spanner crab from ocean waters south of Yamba using spanner crab nets (dillies)
Demersal fish trap	Taking of fish from ocean waters using bottom-set fish traps

Handlining generally refers to fishing from a stationary or very slow-moving vessel using handline, rod-and-reel and/or electric reel (NSW DPI, 2006a) (Figure 1A). Handlining is primarily used in shallow waters (i.e. down to 30-m deep) to target schooling pelagic (i.e. found near the surface or mid-water) or demersal (i.e. found near the seabed) species, but is also sometimes used on deeper grounds (i.e. down to 500-m deep; in the form of electric reel) as a substitute for droplining (see below). Trolling is similar to handlining but involves trailing a bait or lure positioned a substantial distance behind a vessel moving at speed, to target pelagic fishes such as species of mackerel and tuna (Table 2).

Droplining generally involves using a vertically-oriented line weighted to the seabed that has multiple hooks extending from the line (connected to the main line via 'snoods' of approximately 1 m in length) for up to 40 m upwards from the weighted end (Figure 1B). Sainsbury (1996) classifies this method as a type of longline (i.e. "vertical longline"). It is usually used in relatively deep water (i.e. > 100 m) to target deeper-water demersal species, but is sometimes used in shallower water to target yellowtail kingfish (*Seriola lalandi*).

Setlining and trotlining are similar to each other in that they both involve setting a horizontally-oriented, weighted groundline with multiple hooks attached (via snoods – see above) (Figures 1C and D), and are used at almost all depths > 5 m. By NSW DPI definition, for trotlines the groundline is positioned on or just above the seabed ('bottom-set') to target demersal species (Figure 1C), while for setlines it is suspended in midwater (i.e. well above the seabed and well below the surface) to target pelagic species (Figure 1D). In practice, however, it is now apparent that the terms are used more-or-less interchangeably among OTLF fishers depending on individual interpretation. It is also notable that fishing effort reported as 'longline' was most likely a result of misreporting of setlining or trotlining, as 'surface' longlining is not permitted in the OTLF. In any case, setlines and trotlines are, like droplines, classified as types of longlines (Sainsbury, 1996).

Figure 1 Diagrammatic representation of: A) various types of handlining; B) droplining; and C) bottom-set, and D) mid-water setlining / trotlining.

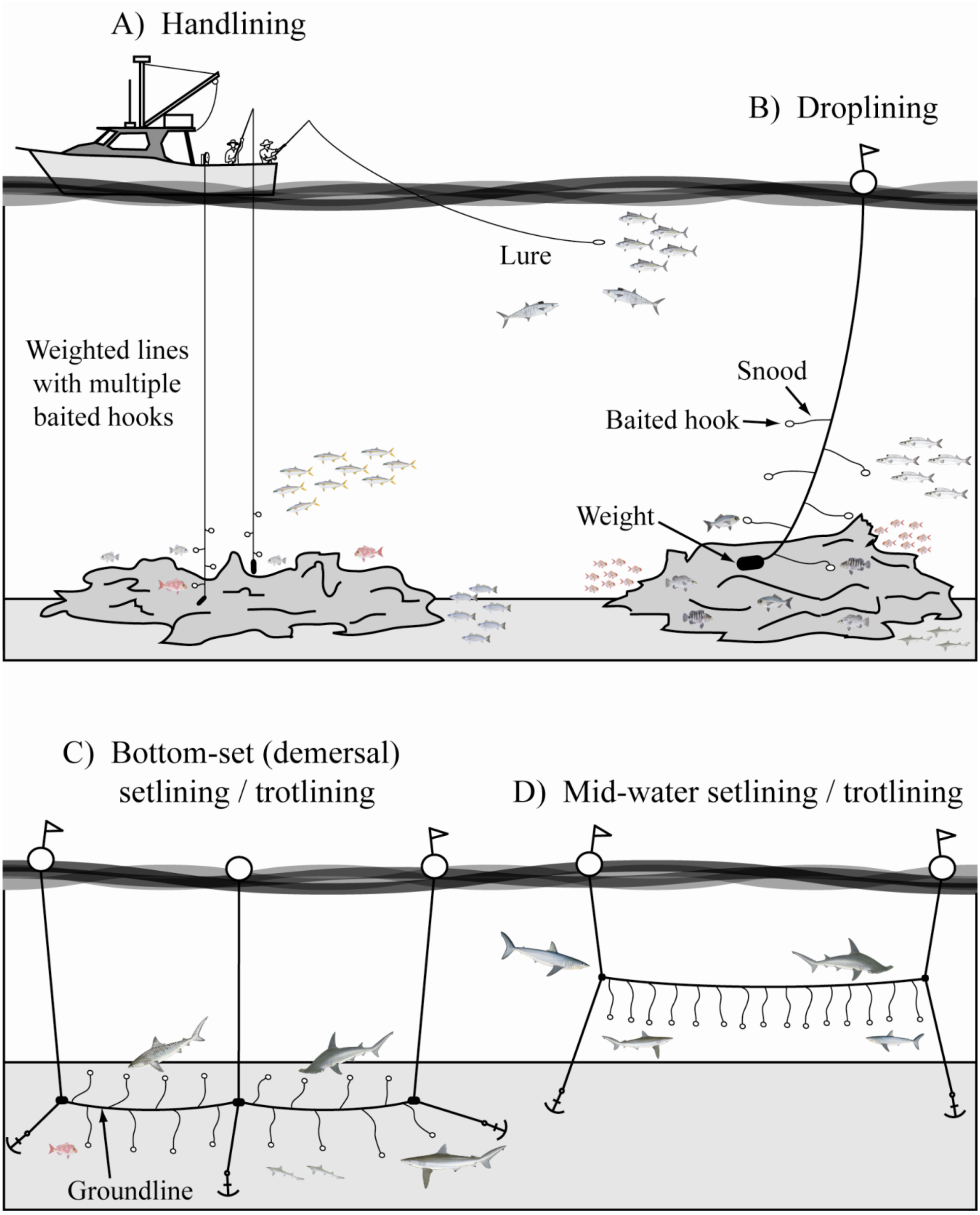


Table 2 **Line-fishing methods used in the OTLF and the main species (or groups) caught using them, as reported by OTLF fishers via monthly catch returns. Also presented are mean annual fishing effort for each method (total number of fisher days ± standard error, SE) over the past decade and their proportion to the mean annual effort for all line-fishing methods combined (expressed as %) (NSW DPI, 2011).**

Line-fishing method	Main species or groups retained	Mean annual fishing effort 1998/99 – 2007/08 in fisher days ± SE (proportion of total, %)
Handline	Yellowtail kingfish (*Seriola lalandi*) Mackerels and tunas (Family Scombridae) Snapper (*Pagrus auratus*) Tailor (*Pomatomus saltatrix*) Mulloway (*Argyrosomus hololepidotus*) Teraglin (*Atractoscion aequidens*) Silver trevally (*Pseudocaranx dentex*) Leatherjackets (Family Monacanthidae) Pearl perch (*Glaucosoma scapulare*) Banded rockcod (*Epinephelus ergastularius*) Silver sweep (*Scorpis lineolata*) Yellowtail scad (*Trachurus novaezelandiae*) Samson fish (*Seriola hippos*)	8,982 ± 526 (51.6%)
Troll	Mackerels and tunas, yellowtail kingfish, tailor	3,033 ± 288 (17.4%)
Dropline	Yellowtail kingfish, banded rockcod, Blue-eye trevalla (*Hyperoglyphe antarctica*) Bass groper (*Polyprion americanus*) Hapuku (*Polyprion oxygeneios*) Gemfish (*Rexea solandri*)	2,218 ± 192 (12.7%)
Setline	Snapper, morwongs (Family Cheilodactylidae) Gummy shark (Mustelus antarcticus) Draughtboard shark (Cephaloscyllium laticeps) Wobbegongs (Orectolobus spp.) Large sharks (species of whaler, hammerhead and mako – refer to Macbeth *et al.*, 2009 for details)	1,231 ± 84 (7.1%)
Trotline	Gummy shark, large sharks, snapper Ocean perches (Family Serranidae) Pink ling (Genypterus blacodes)	934 ± 53 (5.4%)
Jig	Yellowtail kingfish, mackerels and tunas	606 ± 55 (3.5%)
Driftline	Mackerels and tunas, snapper	187 ± 29 (1.1%)
Pole	Yellowtail kingfish, mackerels and tunas	134 ± 16 (0.8%)
Longline	Large sharks, yellowtail kingfish	79 ± 18 (0.5%)

The Environmental Impact Statement (EIS) for the OTLF found that discarding of unwanted bycatch species is poorly understood in the OTLF – particularly discarding associated with line fishing – and concluded that there is, therefore, a need to identify the species being discarded and quantify the levels of discarding within the line-fishing component of the fishery (NSW DPI, 2006b). In addition, the EIS concluded discarding to be a potentially moderate to high risk to primary and key secondary species, non-target species, and some protected and/or threatened species such as grey nurse shark (*Carcharias taurus*), great white shark (*Carcharodon carcharias*) and green sawfish (*Pristis zijsron*).

An improved understanding of the catch of sharks from commercial fisheries was a commitment made within the Australian National Plan of Action for the Conservation and Management of Sharks (DAFF, 2004). Such commitments were presented as a series of actions within the Operational Plan for the Sustainable Use of Tropical East Coast Australian Shark Resources, particularly Theme 3: Improve Data Collection and Handling. Although OTLF catch records indicate that a range of species of shark are targeted within the OTLF, the species composition of this shark catch has been very poorly understood (until recently – see Macbeth *et al.*, 2009). This, in combination with the aforementioned issue of protected and/or threatened shark species possibly being at risk from the OTLF, highlighted the urgency for fisher-independent, scientific data collection in the line-fishing component of the fishery.

Observer-based fisheries research

The most reliable source of data collection regarding commercial fishing activities is, arguably, via carefully designed, observer-based research programs (Saila, 1983; Alverson *et al.*, 1994; Kennelly, 1995, 1997; McVea and Kennelly, 2007). This type of research involves scientifically-trained observers accompanying commercial fishers on fishing trips done as part of normal fishing operations. Scientific data systematically recorded during those trips include their methodologies, catches and any interactions with unwanted organisms. When implemented effectively, such an approach reduces the potential biases, limitations and shortcomings associated with data compiled via fisher-dependent catch reporting such as the OTLF monthly catch returns (Kennelly, 1997). For this reason, observer-based research represents a sound investment for both the fishing industry and its managing bodies in terms of having reliable information on which to base important fisheries management decisions.

Over the past 20 years, at least some observer-based research has been completed in most applicable marine- and estuarine-based commercial fisheries in NSW. Observer research has been completed in fisheries such as Ocean Trawl (Kennelly, 1993; Liggins *et al.*, 1997; Kennelly *et al.*, 1998; Liggins, 2001), Ocean Haul (MRAG Americas, Inc., 2005), Estuary Prawn Trawl (Liggins and Kennelly, 1996; Liggins *et al.*, 1996), Estuary General (Andrew *et al.*, 1995; Gray, 2001, 2002; Gray and Kennelly, 2001, 2003; Gray *et al.*, 2001, 2003, 2004; Stewart *et al.*, 2005; Macbeth and Gray, 2008; Stewart, 2008), Lobster, and the fish trapping component of the OTLF (Stewart and Ferrell, 2001, 2002, 2003). However, despite the obvious applicability and necessity for it, this type of research had not, until recently, been attempted for the line-fishing component of the OTLF.

Objectives of this research

Given the above, the primary objective of this study was to identify and quantify the species composition of retained and discarded catches for the main line-fishing methods used by fishers in the OTLF. Using the observer data collected in combination with fishing-effort data recorded via fisher-dependent catch returns we also aimed to calculate, for each method, species-specific estimates of: observed catch rates for the retained and discarded catch components; total annual catches for the fishery; and rates of interaction with rare and threatened species. Finally, we aimed to gather information regarding the specific fishing methods being used and habitat types being exploited by OTLF fishers.

As a secondary objective, we aimed to begin addressing the serious lack of locally-derived biological information concerning most of those species of sharks and rays inhabiting NSW waters that are exploited by commercial fishers. The relatively high expense associated with the collection of suitably detailed data and samples from such animals via fishery-independent means highlights the value of observer-based research with respect to opportunistic sampling. A full inventory of biological data and samples collected from sharks and rays caught during fishing trips observed this study and the concurrently-run Commercial Shark-fishing Observer Project (refer to Macbeth *et al.*, 2009 for details).

Methods

Study area and time period

Observed fishing days were sought with OTLF fishers working throughout continental shelf waters off NSW, bounded by the latitudes of the coastal NSW/Queensland (28˚10' S) and NSW/Victoria (37˚30' S) state borders in the north and south, respectively (Figure 2). The field-sampling phase of the study was undertaken over two years – from 1 September 2007 to 31 August 2009.

Sampling design

Given that little was known about commercial line fishing in NSW waters other than low resolution spatial, temporal, methodological and catch information provided via fisher-dependent catch reporting, it was acknowledged that this study needed to address two general types of questions with respect to the objectives outlined in the Introduction. The first question is: what is the true nature and extent of discarding (and threatened species interactions) by commercial line fishers? To answer this, appropriately comprehensive sampling scopes with respect to spatial, temporal and fishing-method considerations were necessary. The second type of question is: how accurate and precise is the fisher-dependent catch reporting with respect to the line-fishing methods being used and the species being retained? For example, are some fishers reporting one method when they are, technically, using another? Or, how much variability in gear design is there within a given method category? Similar questions can be posed with respect to the reported catches. While the first question requires that sampling be done wide enough across the scope of line-fishing methods and spatial and temporal extents within the fishery, the second group of questions require appropriately high levels of replication with respect to the number of fishing days observed within a given spatial, temporal and/or fishing-method category. In designing this study, these issues were all carefully considered, with the final design aiming to reflect a balance between the two conflicting sampling requirements: scope vs. replication.

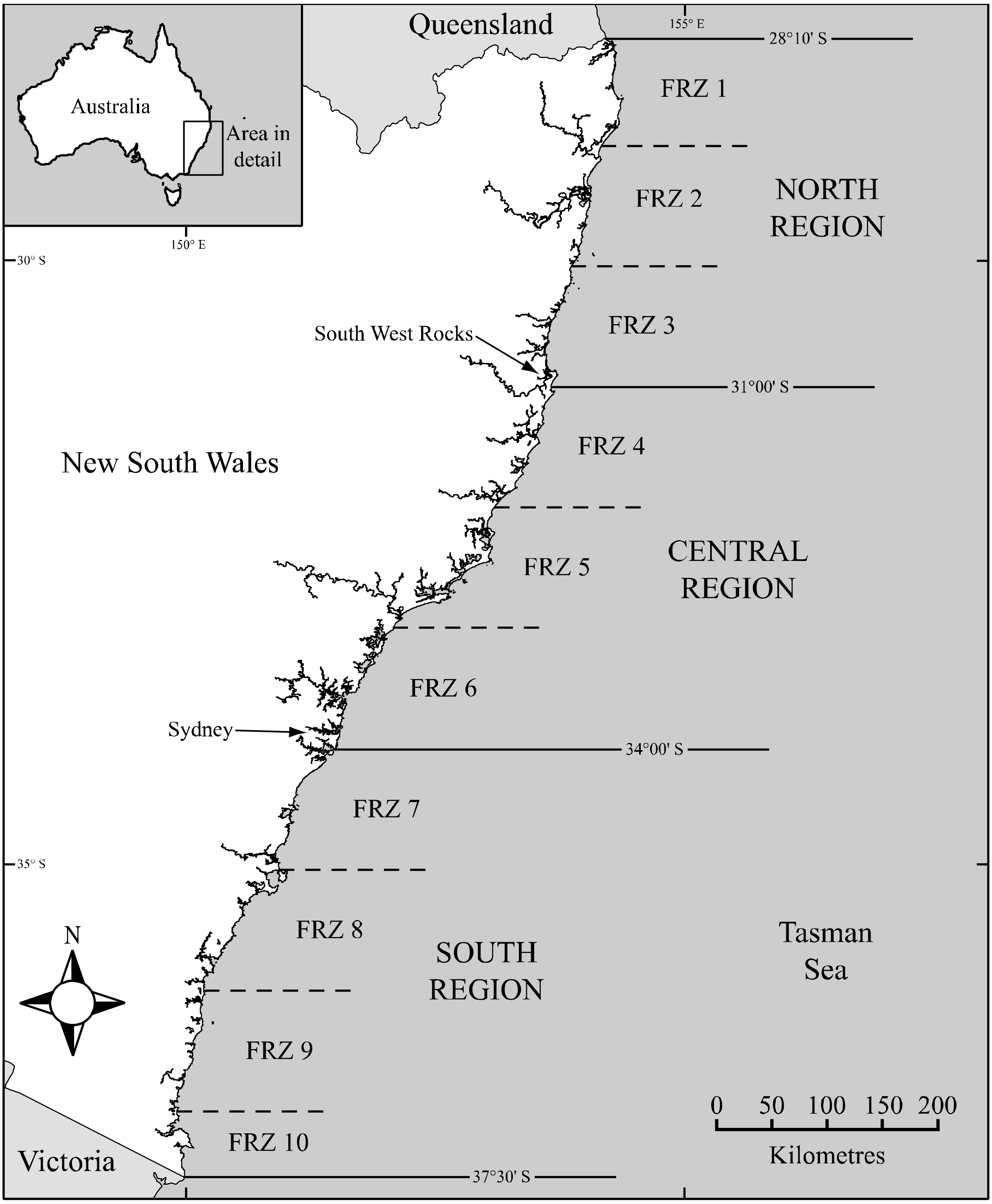
The sampling resources available for this two-year study in terms of the estimated average cost per observed fisher day, permitted an overall maximum of around 312 observed fisher days (i.e. 156 observed fisher days per year). The cost estimates were deliberately conservative to potentially allow for additional sampling effort where necessary. In order to address the questions posed above as best as possible, sampling effort was allocated among the line-fishing methods deemed most important with respect to reported fisher effort and catch and, in the case of each method addressed, according to an arbitrary spatial and temporal sampling design.

Ideally, a dedicated pilot study would have been done in an attempt to determine appropriate sample sizes (i.e. number of replicate observed fisher days) required for each fishing-method/spatial/temporal category (or sampling stratum)(Saila, 1983). However, along with the requirement for a wide scope of sampling strata (see above), time and resource constraints were such that it was decided to go ahead with a relatively simple design that provided: 1) a planned minimum of four replicate observed fisher days (i.e. n = 4) for any given sampling stratum; and 2) the flexibility for more replicates in a stratum should a greater weighting of sampling effort be appropriate (owing to relatively high reported fishing effort).

Line-fishing methods examined

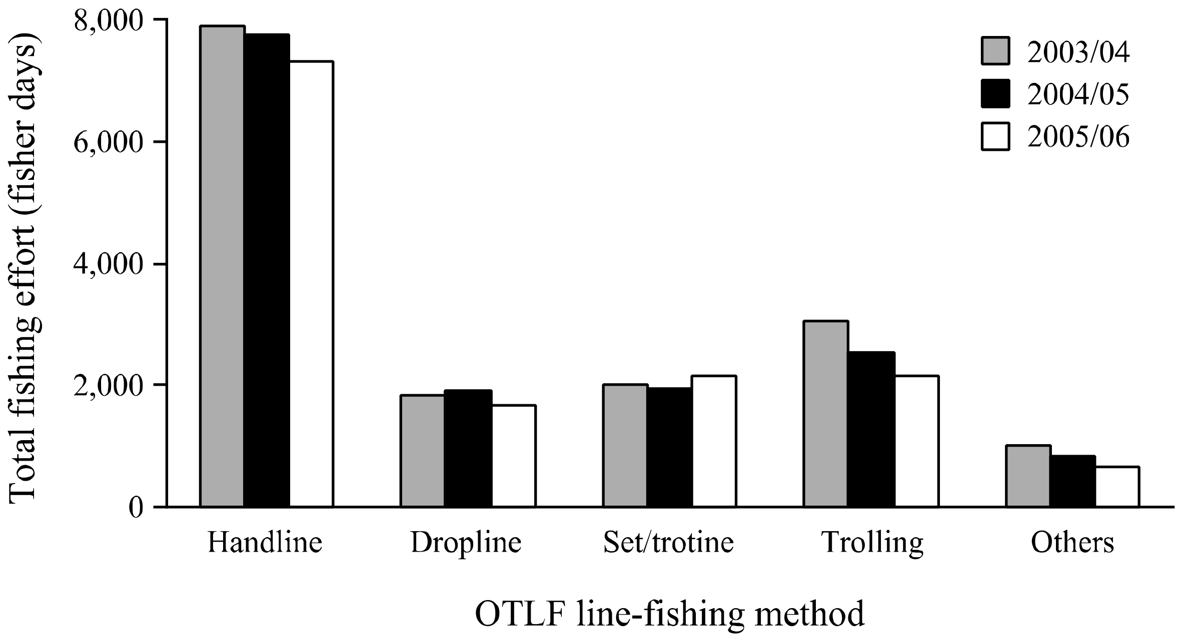
It was decided to concentrate all observer sampling effort on five line-fishing methods: handline, dropline, setline, trotline and longline. Analysis of fisher-dependent catch returns submitted during the 2003/04, 2004/05 and 2005/06 fiscal years, which were the three most recent completed years at the time the observer sampling plan was devised (and so were assumed to most representatively reflect current effort patterns), showed that those five line-fishing methods combined comprised approximately 77% (~ 52, 12, 7, 5 and 0.5%, respectively) of the total line-fishing effort for that three-year period (Figure 3) (NSW DPI, 2007). These percentages are very similar to those calculated for the decade between 1998/99 and 2007/08 and presented in Table 2, demonstrating a general consistency in this pattern of distribution of effort among years. For reasons outlined in the Introduction, setline, trotline and longline were combined into the one method category, 'set/trotline', giving a derived total of three 'methods' for the purposes of sampling design and reporting of results.

Figure 2 **Map of the New South Wales coast defining the latitudinal extents of the three 'Regions' – North, Central and South – used for the purpose of data reporting for this study. Also shown are the ten NSW DPI OTLF fisher-reporting zones (FRZ).**



Although trolling accounted for quite a large proportion (17%) of the total line-fishing effort (Figure 3), it was deemed of relatively low priority owing to the relatively narrow range of (mostly pelagic) species involved (NSW DPI, 2007; and see Table 2). In contrast, handline, dropline and set/trotline were reported to have caught the four widest ranges of demersal and pelagic species (NSW DPI, 2007; and see Table 2). Attempting to ensure enough sampling effort to obtain representative data regarding those three method categories was considered of highest priority.

Figure 3 **Total annual fishing effort (in fisher days) for five categories of OTLF line-fishing methods (handline, dropline, set/trotline, trolling, others) across three consecutive fiscal years (2003/04 – 2005/06).**



Spatial and temporal categories

Coastal/oceanic waters adjacent to the NSW coastline were categorised into three distinct ‘regions’ according to latitude (Figure 2). The ‘North’ region was bounded in the north by the line of latitude corresponding to the coastal NSW/Queensland border (28˚10' S) and in the south by the 31˚00' S line of latitude (near South West Rocks). The ‘Central’ region was bounded in the north and south by the lines of latitude 31˚00' S and 34˚00' S (near Sydney), respectively, while the ‘South’ region was bounded by 34˚00' S and 37˚30' S (coastal NSW/Victoria border), respectively. By design these regions neatly coincided with the fisher-reporting zones (FRZs – Figure 2), which correspond with the ten categories fishers traditionally selected from when filling out the spatial information on their monthly catch returns. This was valuable in terms of easily identifying spatial disparities in historical fishing effort and, therefore, determining appropriate spatial stratification within the overall sampling design.

The two-year duration of the field-sampling phase of the study was divided into eight distinct temporal ‘periods’ coinciding with the four calendar seasons in each year: spring (September to November); summer (December to February); autumn (March to May); and winter (June to August). As with the spatial categories, these month-based temporal categories assisted with respect to identifying temporal disparities in historical fishing effort via the monthly catch returns and, therefore, designing the sampling.

Allocation of sampling effort

Along with the disparity in fishing effort among methods shown in Figure 3, analysis of fishing effort information from the 2003/04, 2004/05 and 2005/06 fiscal years also revealed disparities in proportional fishing effort among regions and periods (Table 3). In an attempt to tailor the sampling design to the true recently-reported effort, a theoretical, three-factor matrix was generated, allocating the 156 available observed fishing days among the method/region/period combinations (per year) according to a weighting relative to the differences in reported fishing effort (Table 3). The final step involved the re-allocation of some of the 'theoretical' sampling effort to ensure that the minimum of four observer sampling days was scheduled in each period for each method in each region. Consequently, the minimum of four sampling days was applied for most method/ region/period strata, with eight sampling days planned in the case of handline for all eight periods in the north region and for the two autumn periods in the central region (Table 3). With this re-allocation, the total number of planned observed fisher days per annum increased from 156 to 164 (i.e. 328 in total across the two-year study) – a quantity deemed achievable given the conservative approach taken to costing.

Table 3 **Theoretical and final (in parentheses) allocation plans # for one-years-worth of observer sampling effort (i.e. 156 observed fisher days for theoretical), across three fishing-method categories (A – handline, B – dropline, and C – set/trotline), three regions (north, central and south) and four seasons (spring, summer, autumn and winter).**

	Sampling season (i.e. 'period' in one-year worth of sampling)				
Region	**Spring 07 / 08**	**Summer 08 / 09**	**Autumn 08 / 09**	**Winter 08 / 09**	**Subtotals**
A) Handline					
North	12 (8)	13 (8)	16 (8)	13 (8)	54 (32)
Central	6 (4)	9 (4)	13 (8)	7 (4)	35 (20)
South	2 (4)	5 (4)	5 (4)	4 (4)	16 (16)
B) Dropline					
North	1 (4)	1 (4)	2 (4)	2 (4)	6 (16)
Central	1 (4)	2 (4)	2 (4)	3 (4)	8 (16)
South	2 (4)	2 (4)	3 (4)	3 (4)	10 (16)
C) Set/trotline					
North	2 (4)	3 (4)	3 (4)	2 (4)	10 (16)
Central	1 (4)	2 (4)	2 (4)	1 (4)	6 (16)
South	2 (4)	3 (4)	3 (4)	3 (4)	11 (16)
Sub-totals	29 (40)	40 (40)	49 (44)	38 (40)	Total 156 (164)

\# The theoretical allocation refers to the distribution of a theoretical total of 156 sampling days available annually among sampling strata, with that distribution weighted according to information concerning relative reported fishing effort among the strata during the three fiscal years 2003/04, 2004/05 and 2005/06. The final allocation refers to the refined distribution of sampling effort after applying a minimum of four replicate observer sampling days to each method/region/period stratum.

Obtaining observer sampling trips

In order to satisfy one of the requirements stated in the memorandum of understanding associated with the project, it was planned that all observer sampling trips in the north region, and two-thirds of trips in the south region, were to be done by an external contractor – Cardno Ecology Lab Pty Ltd ('CEL'; formerly The Ecology Lab Pty Ltd). In practice this plan was generally followed, although the NSW DPI and CEL project managers and observers worked closely together where necessary to attempt to address shortfalls in observed fishing trips or other problems that arose. All observers were given identical tuition and ongoing support regarding the protocols, methodology and equipment associated with obtaining trips and onboard sampling, including a very high level of OH&S consideration. Refer to Appendix A for the CEL final report submitted following completion of the field sampling phase of the project.

Currently there are no provisions in the NSW fisheries regulations for scientific observers to obtain compulsory access to fishing trips done by commercial fishers, so this study was restricted to voluntary hosting of observers by fishers. Following a mail-out to all OTLF businesses and a series of port-meetings introducing the research program, a team of 10 scientific observers, comprising NSW DPI and CEL observers based at various locations along the NSW coast, was provided with the contact details of all OTLF fishing businesses in their area. Observers and project managers attempted to contact each OTLF fisher to further inform them about the project and to gauge their interest in participating. Where the fisher expressed willingness to host an observer, arrangements were made to obtain an observed trip at some point in the future and an observer-fisher relationship was cultivated with a view to obtaining multiple trips during the project. Where the fisher explicitly refused or effectively avoided participation, this response was recorded with a view to possibly re-contacting the fisher again at some point in the future. Whether an attempt was made to re-contact the fisher depended on the nature of the refusal.

Data and sample collection

Data and samples collected during the field-work phase of this study can be categorised into three types: fishing operation data; basic catch data; and biological data and samples from sharks.

Fishing operation data

Although the vast majority of observed fishing trips were single-day trips, the duration of fishing trips observed ranged between one and three calendar days, with each day considered a separate fishing day and the data recorded accordingly. Fishing day data simply comprised the name of the fisher and port, date of the fishing day (with gear retrievals between 0000 and 2359 hrs being allocated to that fishing day regardless of the gear-set date), and name of the observer. During each fishing day, operational data collected for each and every line retrieval comprised: fishing method; length of the groundline (for set/trotlines – see Figure 1C); total number of hooks on the line; bait used; fishing area (general GPS location to the nearest minute and depth); date and time of the start and finish of the line deployment; and date and time of the start and finish of the line retrieval. Any apparent habitat interactions were also recorded where possible.

Basic catch data

For each line retrieval, basic catch data collected for each organism brought to the side of the vessel (and subsequently retained or discarded) comprised: taxonomic identity; lengths (fork – FL – and total – TL – for all finfish, plus pre-caudal – PCL – for sharks; Figure 4A) where possible; whole weight (in kg) where possible; and immediate fate (retained or discarded). If the animal was released at the side of the vessel and lengths could not be measured, every effort was made to estimate the TL by eye as accurately as possible. Species names and standard common names used throughout this report are sourced from the Codes for Australian Aquatic Biota (CMAR, 2008). In many cases it proved logistically very difficult to obtain accurate and reliable measures of weight onboard the vessels (e.g. large sharks) and so the summaries of catches by weight are partially derived using published or unpublished length-weight relationships.

It is important to note that the condition of any animal brought to the side of the vessel and subsequently released without being brought onboard was subjective in that it was inherently very difficult for observers to definitively confirm the death of an animal. Therefore, in the case of any threatened or protected species (where such information may be perceived to have some objective value) observers were instructed to report on whether the animal was 'alive' or 'apparently dead', and also to provide very general comments on the apparent condition of the animal if possible. For example, observers noted whether the animal was providing much resistance to being brought to the side vessel or not, as well as its level of activity upon release.

Biological data and samples from sharks

Extra biological data and samples were collected (and archived) in the cases of all sharks and some rays caught according to a pre-determined sampling protocol. After the basic catch data were recorded, supplementary biological data were recorded in the following order of priority: 1) sex; 2) reproductive status (Table 4; Robbins, 2006); clasper length for males (Figure 4B) and uterus width(s) for females (Figure 4C); and 4) TL and sex of embryos (i.e. 'pups') found in the uteri of females.

Figure 4 Diagrammatic representation of: A) a typical shark showing the pre-caudal, fork and total length measurements (note: total and fork length measurements also applied in the case of all other finfish); B) the pelvic fin region of a male shark showing the clasper length measurement; and C) a section of a dissected female shark showing the uterus width measurement.

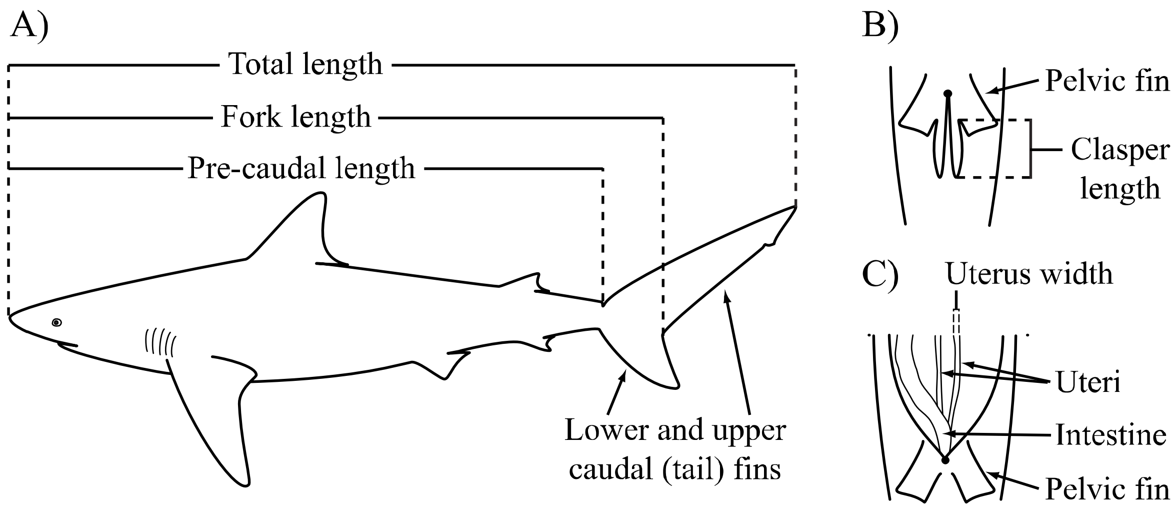


Table 4 Reproductive statuses for male and female sharks and rays as applied to those caught during this study (adapted from Robbins, 2006).

Reproductive status	Definition – description of visible characteristics
Females	
A	Sexually immature – uteri thin along entire length and empty
B	Maturing – uteri enlarged posteriorly and empty
C	Sexually mature – uteri enlarged along entire length and empty
D	Sexually mature – uteri contain yolky eggs but no visible embryos
E	Pregnant – uterus/uteri contain visible embryos (pups)
F	Post-birth – uterus/uteri large and flaccid
Males	
A	Sexually immature – claspers small and uncalcified (soft)
B	Maturing – claspers elongated, but not fully calcified
C	Sexually mature – claspers fully calcified (hard)

Following the recording of biological data according to the above protocol, biological samples were opportunistically taken from each shark caught for future laboratory determination of age (vertebrae) and for genetic studies (flesh samples). Flesh samples were also taken from pups where possible. Vertebrae were frozen as soon as practicable, while flesh samples were immediately preserved in vials filled with 90–95% ethanol.

Data summary, analysis and presentation

Owing to inherent differences and distinction from each other with respect to the fisher catch reporting, the three fishing-method categories – handline, dropline and set/trotline – were dealt with separately in terms of data summary and analysis. If an observed fisher day involved the use of more than one of the three method categories the observed day was counted as a sample for each method used and the data separated accordingly.

Reported fishing effort and observer coverage

Total reported OTLF line-fishing effort (in fisher days) for each method/spatial/temporal stratum within the two-year field sampling phase of the study was obtained via the fisher-dependent catch reporting system (NSW DPI, 2011). Estimates of observer coverage were calculated as the proportion of all reported trips that were observed and presented as a percentage.

Spatial distribution of coverage

Latitude and longitude data collected for each line deployment (dropline and set/trotline) or spatial collective of line deployments (handline) were plotted onto maps of the NSW coast and adjacent waters. Summaries of data concerning the depths at which these deployments were done were presented in the form of depth-class frequency histograms for each method × region combination.

Observed fishing effort (hook/gear deployments)

Data concerning fishing effort expended during observed line-fishing trips were summarised for each method/spatial/temporal stratum as mean and range of the total number of hooks deployed per observed fisher day, mean number of gear deployments per observed fisher day, and mean number of hooks per gear deployment.

Composition of observed catches

For each method category, retained and discarded catches were summarised by species according to: 1) the total number of retained, discarded and total (retained + discarded) individuals (across all observed fisher days); and 2) proportion (%) of the overall total catch (species combined); by region (and regions combined).

Catch composition data (number caught by species) from each observed fisher day were analysed to investigate differences among methods and regions in the structure of total catches using permutational multivariate analysis of variance (PERMANOVA – PRIMER 6 statistical package; Anderson, 2001; Clarke and Warwick, 2001; Anderson *et al.*, 2008). *Post hoc* pairwise tests were used where necessary to specify which methods or which regions differed from each other. Analyses were done using Bray-Curtis similarity measures calculated from raw catch data (i.e. catch per trip). Each analysis was based on 999 permutations. We specifically tested the hypotheses that: (1) total catch composition would differ among fishing methods and that these differences would be consistent between regions, and (2) catch composition would differ between regions and that these differences would be consistent between fishing methods.

Non-metric multidimensional scaling (MDS – PRIMER 6) was used to display multivariate patterns of assemblages, and similarity percentage analyses (SIMPER – PRIMER 6) were used to identify individual species that made the greatest contribution to significant dissimilarities between catches.

Estimation of catch rates for retained, discarded and total catches

For each species caught via each method, estimates of mean catch rate of retained, discarded and total (retained + discarded) individuals were calculated for each spatial/temporal sampling stratum, with standard error (SE) calculated conventionally for each mean. These catch rates are presented as the mean of number of individuals caught per fisher day across all replicate observed fisher days within a stratum. In contrast, means and SEs for logical combinations of strata (e.g. north, central and south regions combined = NSW; sub-annual temporal strata combined = annual) were generated using the standard stratified, randomised sampling method of calculating means and SEs for independently sampled strata (refer to Cochran, 1963).

Size-class frequency distributions for selected species

For each method, size-class frequency distributions were plotted for some of the frequently caught species in each region. For each species recorded during the study, overall mean size and range of sizes across all individuals (methods, regions and temporal strata combined) are also presented, along with the range of depths of water in which those individuals were caught.

Estimation of total annual retained and discarded catches

Up-scaling of total observed retained and discarded catches (by species) for a given method within each spatial/temporal sampling stratum was undertaken simply by multiplying estimated catch rates (See above) and the relevant, temporally-correlative, total fishing effort data (i.e. total number of reported fisher days obtained via fisher catch reports – NSW DPI, 2010). Estimates of total overall catches for logical combinations of strata (e.g. north, central and south regions combined = NSW; sub-annual temporal strata combined = annual) were generated using the standard stratified, randomised sampling method for scaling up totals and generating SEs for independently sampled strata (Cochran, 1963; Liggins and Kennelly, 1996).

Interactions with threatened and/or protected species

Species (or groups) listed as endangered, threatened and/or protected (at the time of sampling) that were observed to interact with OTLF line fishing operations are considered separately, with more detailed descriptions of interactions presented. Captures of other species (or groups) that have been listed as threatened (and therefore prohibited from being retained) since the completion of observer sampling for this study (e.g. some hammerhead shark and deep water dogfish species) are also addressed.

Results

Adherence to sampling design

A total of 307 fisher days, or approximately 94% of the original objective of 328 observed fisher days, was observed as part of this study. This included 142 handline days (slightly more than the planned 136), 77 dropline days (~80% of 96) and 88 set/trotline days (~92% of 96) (Table 5).

Table 5 Realised and prescribed (in parentheses) number of replicate observed fisher days for the three fishing-method categories (A – handline, B – dropline, and C – set/trotline), three regions (north, central and south) and eight sampling periods (Spring-2007 to Winter-2009).

	Sampling period								
Region	**Spr-07**	**Sum-08**	**Aut-08**	**Win-08**	**Spr-08**	**Sum-09**	**Aut-09**	**Win-09**	**All periods**
A) Handline									
North	11 (8)	8 (8)	10 (8)	9 (8)	9 (8)	10 (8)	11 (8)	8 (8)	76 (64)
Central	5 (4)	5 (4)	7 (8)	6 (4)	3 (4)	7 (4)	8 (8)	3 (4)	44 (40)
South	5 (4)	2 (4)	4 (4)	2 (4)	0 (4)	2 (4)	4 (4)	3 (4)	22 (32)
All NSW	21 (16)	15 (16)	21 (20)	17 (16)	12 (16)	19 (16)	23 (20)	14 (16)	142 (136)
B) Dropline									
North	5 (4)	0 (4)	7 (4)	4 (4)	3 (4)	4 (4)	2 (4)	5 (4)	30 (32)
Central	5 (4)	1 (4)	6 (4)	3 (4)	2 (4)	4 (4)	1 (4)	3 (4)	25 (32)
South	3 (4)	1 (4)	5 (4)	1 (4)	2 (4)	2 (4)	2 (4)	6 (4)	22 (32)
All NSW	13 (12)	2 (12)	18 (12)	8 (12)	7 (12)	10 (12)	5 (12)	14 (12)	77 (96)
C) Set/trotline									
North	3 (4)	4 (4)	3 (4)	7 (4)	3 (4)	4 (4)	4 (4)	4 (4)	32 (32)
Central	4 (4)	3 (4)	5 (4)	2 (4)	4 (4)	4 (4)	3 (4)	2 (4)	27 (32)
South	3 (4)	5 (4)	4 (4)	3 (4)	2 (4)	4 (4)	4 (4)	4 (4)	29 (32)
All NSW	10 (12)	12 (12)	12 (12)	12 (12)	9 (12)	12 (12)	11 (12)	10 (12)	88 (96)

Greater than the prescribed number of handline days was observed for most sampling periods in the north and central regions, while the opposite was the case in the south region. In the case of dropline, adherence to the sampling plan was relatively variable among sampling periods for all three regions, with 10 of the 24 region/period strata containing ≤ 2 of the four prescribed replicate fisher days. In contrast, adherence was more stable for set/trotline, with 20 of the 24 region/period strata containing between three and five of the four prescribed replicates.

In addition to the observer-based research done for this study, observed fisher days were done with OTLF fishers targeting large sharks using set/trotlines in the North and Central regions during the Spring-08, Summer-09, Autumn-09 and Winter-09 periods (i.e. period groupings P12 and P34 – see p28) as part of the separate, concurrently-run Commercial Shark-fishing Observer Project (Macbeth *et al.*, 2009). Given that those shark-targeting fisher days qualified for inclusion in this line-fishing observer study, some were included but only up to the prescribed level of four replicate set/trotline days per period per region. Given the large differences between levels of observer coverage here and those achieved by the shark-fishing study, the issue of data biasing was carefully considered in the decision to include only a small proportion of the observed shark-fishing trips.

Rates of participation by OTLF fishers

Of the 242 OTLF fishing businesses that lodged a line-fishing catch return (containing handline, dropline or set/trotline catch information) during the two years of the field sampling phase of this study, a total of 66 fishers (27%) actively participated in the study by hosting an observer. The participation rate was similar across the three regions (22–32%).

Fishers' responses (or lack thereof) to attempts to request an observed fishing trip could be grouped into a number of general categories according to their level of willingness to participate and/or stated reasons for not participating. By way of example, phone call logs and associated notes taken by all central region observers were categorised into seven general groupings (Table 6). The first two categories of Table 6 comprise central region fishers who participated by hosting an observer at least once during the study, accounting for 32% of central region fishers. A small subset of those fishers reversed initial willingness, citing unfavourable changes to fishing regulations (introduced during the period of the study) as the reason.

Table 6 Rate of participation or non-participation in this study by OTLF fishing businesses listed as based in the central region, with the latter further categorised into general categories of non-participation.

Types of participation or non-participation	Proportion of fishers
Took an observer on one or more trips – generally always willing	29%
Took an observer on one or more trips, but at some point decided not to participate citing frustration over new fishery management measures	3%
Expressed general willingness but, when contacted (on multiple occasions), 'wasn't planning to go fishing' any time soon, but didn't attempt to contact observer when going fishing, so did not participate	16%
Declined to participate, citing issues such as prohibitively small size of vessel, or current or historical fisheries management issues as reasons	6%
Politely declined, citing recent exit from OTLF fishery or lack of planned line-fishing as reasons	21%
Unable to be contacted despite numerous attempts. Phone messages left (where possible) but return calls not forthcoming	24%
Reported some line-fishing effort during study, but not on observer contact list of active OTLF line fishers owing to lack of recent historical effort prior to study	2%

Approximately 22% of central region fishers either declined to participate, citing small vessel size, general lack of interest or dissatisfaction with general management issues as reasons, or were demonstrably evasive of follow-up contact or arranging observed trips despite expressing initial willingness to participate (third and fourth categories in Table 6). A further 21% declined and cited exit from the OTLF or lack of planned line-fishing (subsequently confirmed by catch records) as reasons. Around one quarter of central region OTLF line fishers could not be contacted despite numerous efforts by observers to do so.

Owing to the low overall participation rate, it was sometimes necessary to observe multiple fisher days from the one fisher within a method/region/period sampling stratum to obtain the prescribed number of replicate observed fisher days. Of the 72 method/region/period strata, 51 strata contained two or more replicate fisher days from at least one fisher, with 16 of those 51 involving more than two trips with one fisher.

Summary strata for reporting

In order to ensure sufficient sample sizes (fisher days) within strata for the calculation of catch and effort summaries, each pair of consecutive periods involving spring and summer and each pair involving autumn and winter were combined to form a ‘period grouping’ covering six-months (Table 7). These groupings are obvious combinations in terms of the sequence of Periods sampled. Anecdotal evidence also suggests that the weather patterns during Autumn and Winter are generally more favourable for ocean fishing – a claim supported to some degree by patterns in reported fishing effort (Table 3).

Table 7 Definition of period groupings applied for reporting of results.

Period grouping	Sampling periods	Months (inclusive)
P12	Spr-07 and Sum-08	September 2007 – February 2008
P34	Aut-08 and Win-08	March 2008 – August 2008
P56	Spr-08 and Sum-09	September 2008 – February 2009
P78	Aut-09 and Win-09	March 2009 – August 2009

Given the above, for summary and reporting purposes each spatial/temporal sampling stratum for each of the three fishing methods is defined by Region × Grouping.

Reported fishing effort and observer coverage

Fisher-dependent catch reporting for the September 2007 – August 2009 field sampling phase of the study indicated that 13,207 handline, 2,523 dropline and 4,031 set/trotline fisher days were undertaken by OTLF fishers during that time (Table 8). Data in Table 8 were used to generate estimates of total annual retained and discarded catch presented in ‘Estimates of total retained and discarded catches’ (p56) and Appendix D.

Levels of overall observer coverage achieved were estimated to be 1.1% for handline, 3.1% for dropline and 2.2% for set/trotline (Table 9). In the cases of individual region/grouping strata, the ranges in level of observer coverage were 0.4–1.6%, 1.6–7.8% and 1.1–6.3% respectively. Observer coverage of handline days was relatively consistent among regions and among periods, but more variable in the cases of dropline and set/trotline days. In general, there was a slight underrepresentation in the cases of dropline days in the south region and set/trotline days in the north and south regions.

Table 8 Total number of fisher days reported by fishers via fisher-dependent catch reporting for the two-year field sampling phase of the study. Data are for the three fishing-method categories (A – handline, B – dropline, and C – set/trotline), three regions (north, central and south) and four period groupings (P12, P34, P56 and P78).

	Temporal grouping				
Region	**P12**	**P34**	**P56**	**P78**	**All periods**
A) Handline					
North	1423	1915	1309	1264	5911
Central	1334	1552	1105	1070	5061
South	428	486	521	800	2235
All NSW	3185	3953	2935	3134	13207
B) Dropline					
North	151	192	90	249	682
Central	182	164	183	187	716
South	253	356	191	325	1125
All NSW	586	712	464	761	2523
C) Set/trotline					
North	595	571	260	217	1643
Central	145	116	160	80	501
South	387	417	555	528	1887
All NSW	1127	1104	975	825	4031

Table 9 Number of observed fisher days and associated observer coverage (percentage observed of total reported fisher days; in parentheses) for the three fishing-method categories (A – handline, B – dropline, and C – set/trotline), three regions (north, central and south) and four period groupings (P12, P34, P56 and P78).

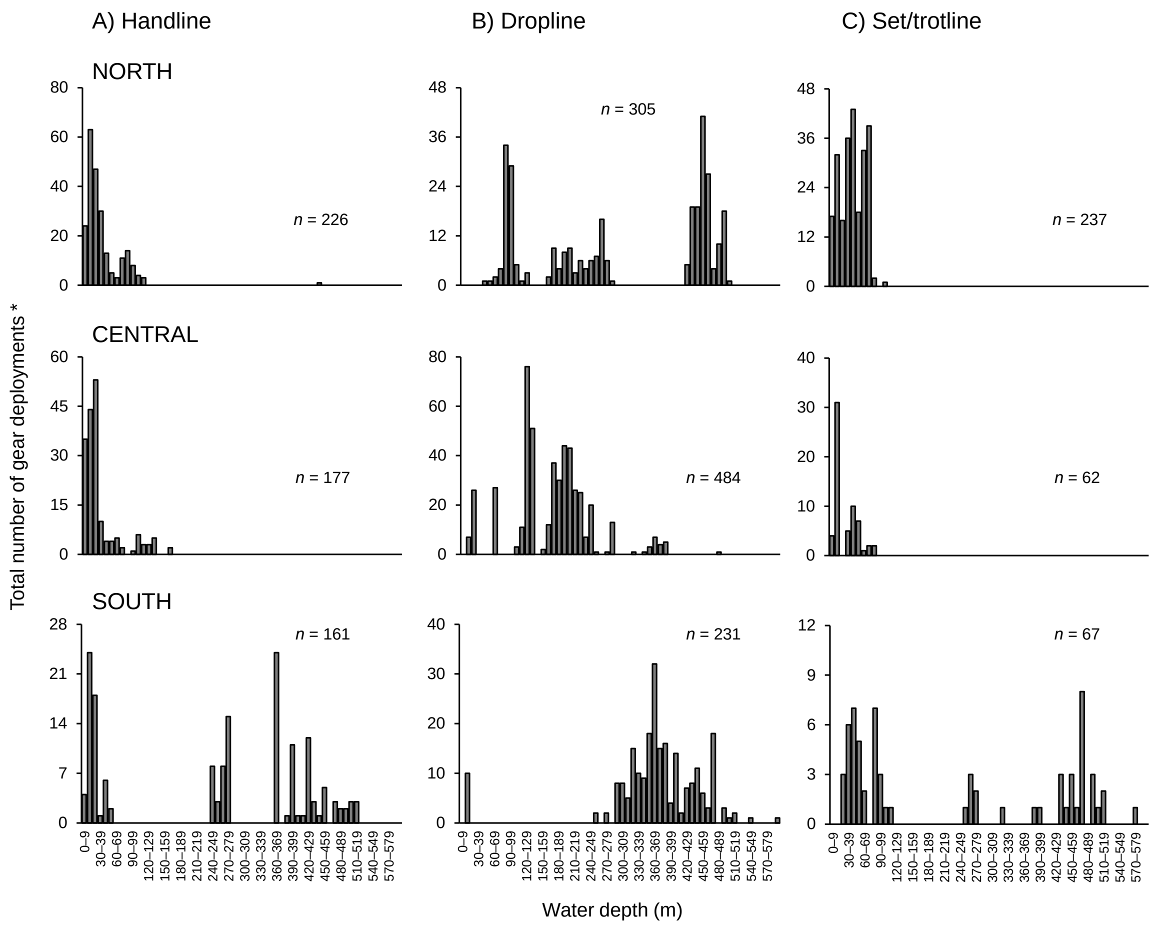
	Temporal grouping				
Region	**P12**	**P34**	**P56**	**P78**	**All periods**
A) Handline					
North	19 (1.3%)	19 (1.0%)	19 (1.5%)	19 (1.5%)	76 (1.3%)
Central	10 (0.7%)	13 (0.8%)	10 (0.9%)	11 (1.0%)	44 (0.9%)
South	7 (1.6%)	6 (1.2%)	2 (0.4%)	7 (0.9%)	22 (1.0%)
All NSW	36 (1.1%)	38 (1.0%)	31 (1.1%)	37 (1.2%)	142 (1.1%)
B) Dropline					
North	5 (3.3%)	11 (5.7%)	7 (7.8%)	7 (2.8%)	30 (4.4%)
Central	6 (3.3%)	9 (5.5%)	6 (3.3%)	4 (2.1%)	25 (3.5%)
South	4 (1.6%)	6 (1.7%)	4 (2.1%)	8 (2.5%)	22 (2.0%)
All NSW	15 (2.6%)	26 (3.7%)	17 (3.7%)	19 (2.5%)	77 (3.1%)
C) Set/trotline					
North	7 (1.2%)	10 (1.8%)	7 (2.7%)	8 (3.7%)	32 (1.9%)
Central	7 (4.8%)	7 (6.0%)	8 (5.0%)	5 (6.3%)	27 (5.4%)
South	8 (2.1%)	7 (1.7%)	6 (1.1%)	8 (1.5%)	29 (1.5%)
All NSW	22 (2.0%)	24 (2.2%)	21 (2.2%)	21 (2.5%)	88 (2.2%)

Spatial distribution of coverage

Fishing locations visited during observed OTLF line-fishing trips included handline locations in waters as shallow as 1-2 m in depth (i.e. around rocky headlands) and demersal setline and dropline locations in waters as deep as 592 m beyond the edge of the continental shelf (Figures 5 to 8; Appendix F).

The distances offshore and depths at which the three methods were used depended on region (Figure 5). In all three regions handline days were observed along the latitudinal length of the region (Figures 6 to 8), with locations fished in the north and central regions mostly in relatively shallow shelf waters (< 50 m depth) nearer the coast (Figure 5A). In the south region, however, handline effort was recorded not only at these shallower depths, but also in much deeper waters at and beyond the edge of the continental shelf (Figures 5A and 8).

Figure 5 Depth-class frequency distributions for all gear deployments during observed OTLF A) handline, B) dropline and C) set/trotline days. Data are separated according to the three regions (north, central and south). *, each handline gear deployment data point refers to one GPS fishing location (usually involving multiple gear deployments).



In the north region and northern half of the central region, observed dropline deployments were exclusively in waters > 60 m deep (Figure 5B), commonly far offshore and beyond the edge of the continental shelf (Figures 6 and 7). This general pattern was also apparent for the southern half of the south region (Figure 8). In contrast, in the southern part of the central region and northern part of the south region (i.e. off Sydney) droplines were also used in much shallower water (10–40 m depth) (Figures 7 and 8).

Figure 6 **Spatial distribution of handline, dropline and set/trotline fishing locations recorded during observed OTLF line-fishing trips done in the north region between September 2007 and August 2009.**

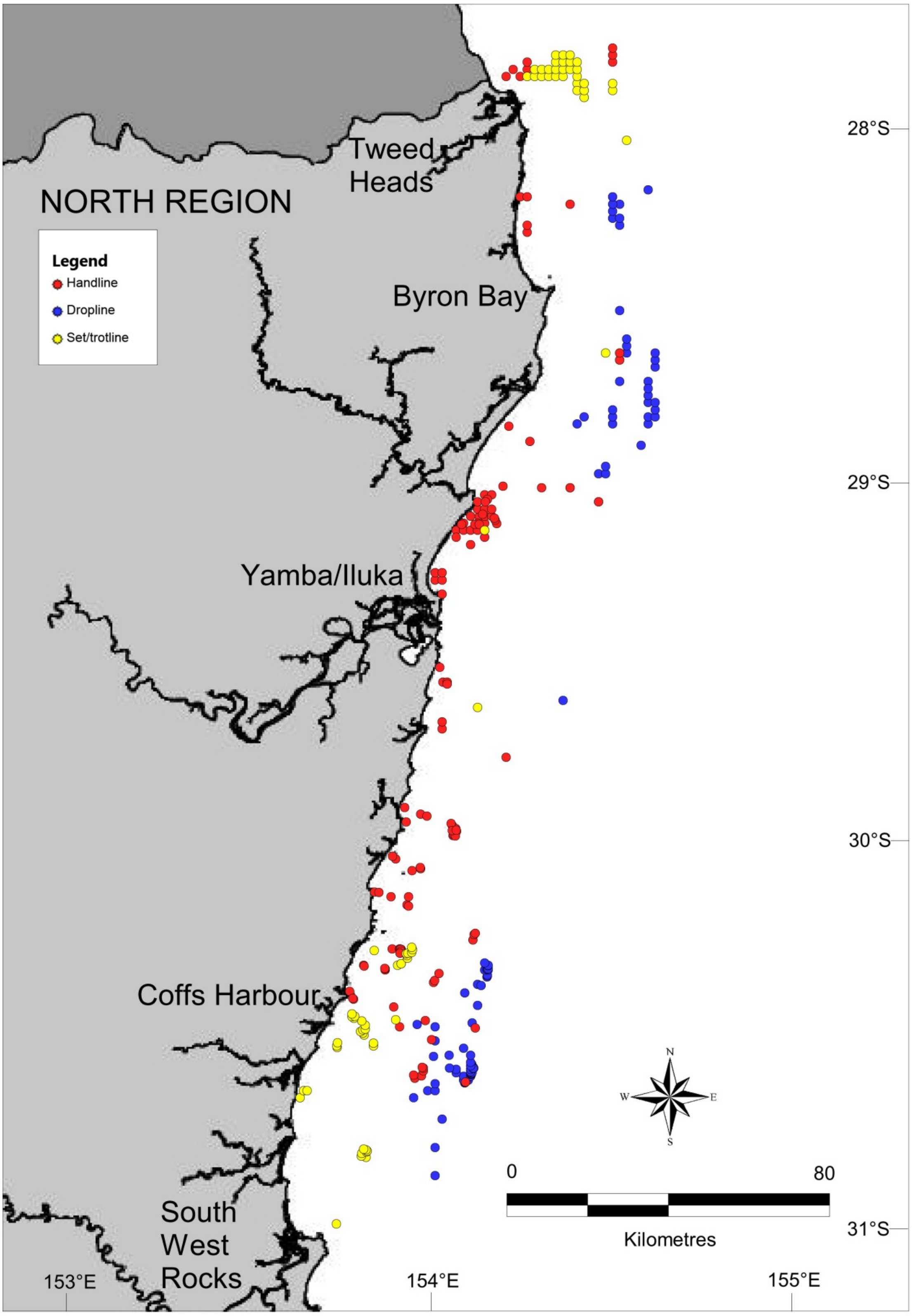


Figure 7 **Spatial distribution of handline, dropline and set/trotline fishing locations recorded during observed OTLF line-fishing trips done in the central region between September 2007 and August 2009.**

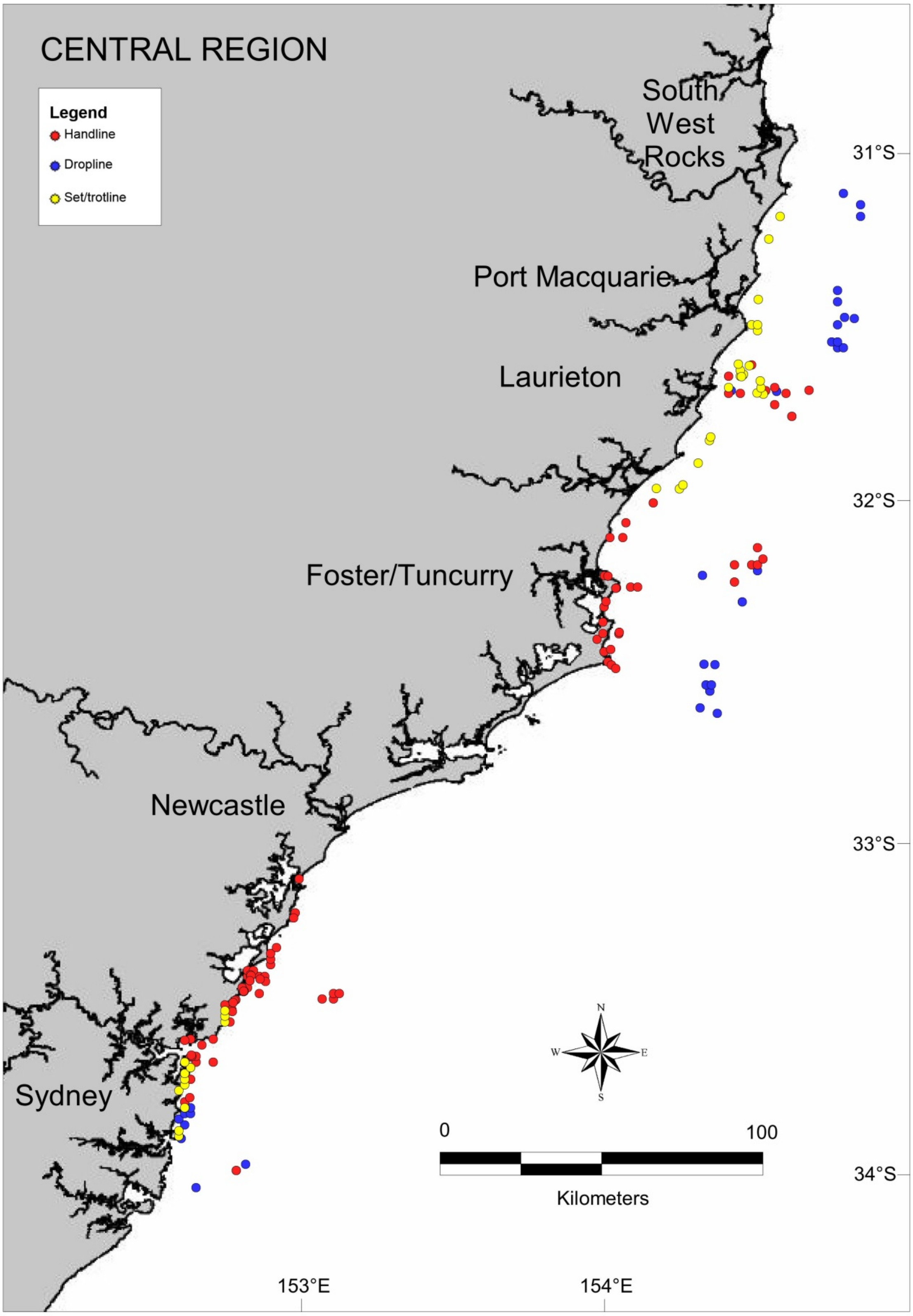
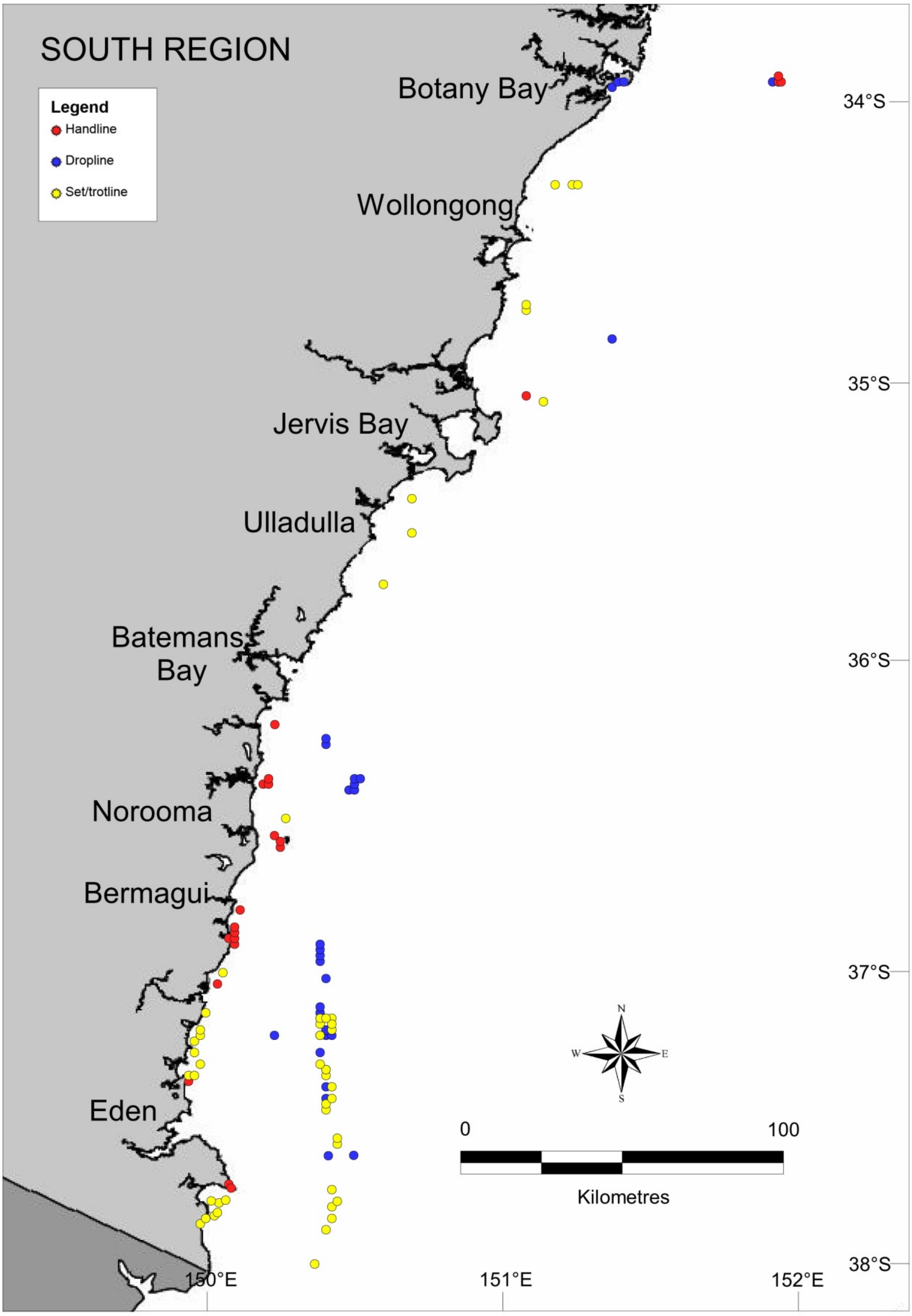


Figure 8 **Spatial distribution of handline, dropline and set/trotline fishing locations recorded during observed OTLF line-fishing trips done in the south region between September 2007 and August 2009.**



Spatial patterns in observed set/trotline effort differed from those for handline and dropline in the case of each region. In the north region, observed set/trotline effort was generally clustered in distinct mid-shelf areas (< 100 m depth; Figure 5C), including one cluster in the far north of the region and another less concentrated cluster offshore from Coffs Harbour (Figure 6). In the central region, set/trotlines were also used in certain mid-shelf areas, but effort was also clustered in certain shallow areas close to the coast (e.g. < 20 m depth off Sydney)(Figures 5C and 7). In the south region, set/trotlines were used in mid-shelf waters at depths > 20 m but, in the far south, also in much deeper continental slope waters far offshore (Figure 8).

Observed fishing effort (hook/gear deployments)

Uncertainty surrounding data regarding the numbers of handline deployments done during handline days meant that estimates concerning the numbers of gear and hook deployments per fisher day were highly unreliable and so these summaries are not presented.

The numbers of hooks deployed per fisher day differed considerably between dropline and set/trotline, and varied among and within regions for each of those methods (Table 10). There was also variability in the number of hooks per gear deployment between methods (as expected), with considerable variability among and within regions in the case of each method. This latter result was directly related to the wide variety in specifics of gear design employed by OTLF fishers within method categories and among regions, particularly in terms of the number of hooks per gear deployment (Table 10). This intra-method variability was in turn related to differences among fishers and regions in target species, types of fishing grounds and preferred gear design and operation.

Handline

As mentioned above, handline effort data at the within-fisher-day resolution were frequently unreliable, so summaries concerning total numbers of gear and hook deployments per observed fisher day (and overall tallies) were considered of very limited value. There were inherent difficulties associated with concurrently recording accurate deployment and catch data (i.e. measuring catch) while multiple handlines are being deployed in quick succession and catches are being retrieved and measured (also sometimes in quick succession) onboard small vessels. This was reflected in the inconsistencies within and among fisher days in the clarity and quality of the observer data.

The types of gears fishers reported as handline during observed fisher days included various configurations of non-mechanical hand reels, rod and reel (manual and electric), and electronic deck reels in the cases of handlining done in deeper water. Generally, one or two hooks per handline were common gear configurations, although up to eight hooks per line were sometimes used for bait-fishing and for handlining in deeper waters. Multiple and concurrent deployments of handlines was a common practice employed.

In general, the variety in configurations of handline gears was fairly consistent among regions and period groupings. The specifics regarding hook sizes and types used were generally related to the species or suite of species being targeted.

Dropline

In total, 1,059 deployments of dropline gear, involving 18,868 baited hooks, were completed during observed dropline trips. Overall (regions combined), dropline days involved the deployment of between 12 and 750 baited hooks per fisher day (Table 10). The maximum number of hooks deployed in a day was greatest in the south region (750 hooks) and least in the central region (350 hooks).

Table 10 Mean of the total number of hooks deployed per observed fisher day for the four period groupings (P12, P34, P56 and P78) and, along with the range, for all periods combined. Data are for the three regions (north, central and south) and regions combined (All NSW), for A) dropline and B) set/trotline. Mean numbers of gear deployments per observed fisher day and mean numbers of hooks per gear deployment are also shown.

Region	Mean of total no. hooks deployed / fisher day (SE)						Mean no. gear deployments / fisher day (SE)	Mean no. hooks / gear deployment (SE)
	P12	P34	P56	P78	All periods	(Range)		
A) Dropline								
North	155 (40)	225 (45)	167 (38)	224 (31)	200 (21)	(12 – 560)	10 (1)	22 (2)
Central	133 (33)	154 (28)	100 (25)	102 (19)	127 (14)	(21 – 350)	21 (3)	7 (1)
South	472 (135)	373 (115)	513 (52)	441 (42)	441 (42)	(60 – 750)	11 (1)	45 (3)
All NSW	231 (54)	234 (36)	224 (45)	289 (38)	245 (21)	(12 – 750)	14 (1)	24 (2)
B) Set/trotline								
North	235 (142)	169 (59)	121 (60)	370 (70)	223 (43)	(2 – 905)	7 (1)	113 (29)
Central	147 (30)	147 (14)	161 (15)	84 (12)	139 (11)	(42 – 250)	2 (1)	125 (14)
South	997 (169)	1531 (234)	1840 (528)	825 (192)	1253 (153)	(75 – 3500)	2 (0)	553 (35)
All NSW	484 (112)	560 (147)	627 (223)	475 (100)	537 (75)	(2 – 3500)	4 (1)	262 (27)

The mean number of gear deployments per fisher day (± SE) across all regions was 14 ± 1 deployments, with a mean of 24 ± 2 hooks per dropline deployed (Table 10). Mean gear deployments per day was similar for the north and south regions (10 ± 1 and 11 ± 1 deployments, respectively), but greater in the central region (24 ± 2 deployments). The mean number of hooks per dropline was highest in the south (45 ± 3 hooks) and lowest in the central region (7 ± 1 hooks), with the mean for the north similar to the overall mean (22 ± 2 hooks).

The configuration of dropline gears was variable among fishers and among regions, with target species and water depth the main influencing factors. Most droplining was conducted using traditional methodology (i.e. weighted line and float released from vessel; Figure 1), while some deep-water droplining involved lines being continuously connected to at least one electronic deck-reel fixed to the gunwale. Although this latter method might technically be categorised as handlining, it was being reported as droplining.

Set/trotline

In total, 367 deployments of setline (or trotline) gear, involving 47,246 baited hooks, were completed during observed set/trotline trips. Overall (regions combined), set/trotline days involved the deployment of between 2 and 3,500 baited hooks per fisher day (Table 10). The maximum number of hooks deployed in a day was greatest in the south region (3,500 hooks) and least in the central region (250 hooks).

At 4 ± 1 gear deployments per day, the mean number of set/trotline deployments per fisher day across all regions was fewer than for droplining, while in contrast, the mean of 262 ± 27 hooks per set/trotline was substantially greater than that for droplining (Table 10). Mean gear deployments per day was highest in the north region (7 ± 1 deployments), while the mean number of hooks per set/trotline was far higher in the south (553 ± 35 hooks) than in the central (125 ± 14 hooks) or north (113 ± 29 hooks).

Although set/trotline gears were generally configured similarly among fishers, differences in target species and legislative restrictions on the permitted number of hooks per line (e.g. no more than six hooks per setline permitted within 3 nm of the coast) drove much of the variability in this configuration. Some fishers in the north region set double-hook demersal lines attached to floats and reported this method as set/trotline, despite dropline (or ‘drumline’) being more accurate descriptive categories for the method.

Composition of observed catches

In total, 16,369 organisms, comprising a total of at least 198 different species (or higher taxonomic groups containing unidentified species), were caught during observed trips (Appendices B and C). Overall, 85.5% of this total catch (by number) was retained, with the remainder discarded as bycatch. Species are referred to as common names hereafter, with taxonomic information for each species (or group) provided in Appendix B.

Handline

In total, 8,211 organisms, comprising at least 105 different species (or groups), were caught during the 142 observed handline days (Appendix C-1), with 85.0% of that total catch (by number) across 83 species retained.

Retained catches

The species comprising the greatest proportions of the overall retained catch during observed handline trips (by number, all days combined) were yellowtail scad (14.9%), silver sweep (14.2%) and Australian bonito (12.2%), with silver trevally, snapper, tailor, yellowtail kingfish and teraglin also featuring in the top 10 (Table 11A). In the north region, snapper (22.3%), yellowtail scad 20.9%) and blue mackerel (17.3%) comprised the majority of the retained catch during observed handline trips. In the central region the top three retained species were silver sweep (27.5%), Australian bonito (21.6%) and yellowtail scad (15.7%), while in the south region they were silver trevally (42.9%), southern Maori wrasse (21.9%) and eastern red scorpionfish (9.4%).

Discarded catches

Overall, the discarded portion of observed handline catches comprised 59 different species, with yellowtail kingfish (29.7%), yellowtail scad (13.4%), snapper (10.9%) and eastern red scorpionfish (10.0%) accounting for the majority (by number, all days combined) (Table 11A). In the north region, yellowtail scad (29.9%), snapper (17.2%) and yellowtail kingfish (17.0%) comprised the majority of discards. In the central region the top three discard species were yellowtail kingfish (48.4%), tailor (10.2%) and silver sweep (10.0%), while in the south region they were eastern red scorpionfish (38.1%), yellowtail kingfish (20.1%) and green moray eel (9.5%).

Dropline

A total of 2,532 organisms, comprising at least 67 different species (or groups), was caught during the 77 dropline days observed (Appendix C-2), with 92.8% of that total catch (by number) across 54 species retained.

Retained catches

The species comprising the greatest proportions of the overall retained catch during observed dropline trips (by number, all days combined) were blue-eye trevalla (23.4%), gemfish (20.9%) and bigeye ocean perch (9.7%), with yellowtail kingfish, snapper, banded rockcod, redfish, pearl perch and small species of shark (eastern highfin spurdog and Philippine spurdog) also featuring in the top 10 (Table 11B). In the north region, blue-eye trevalla (19.9%), snapper (18.2%) and gemfish (16.5%) comprised the majority of the retained catch during observed dropline trips. In the central region the top three retained species were yellowtail kingfish (38.6%), banded rockcod (13.3%) and eastern highfin spurdog (13.3%), while in the south region they were blue-eye trevalla (32.7%), gemfish (32.5%) and bigeye ocean perch (18.7%).

Discarded catches

Overall, the discarded portion of observed dropline catches comprised 26 different species, with yellowtail kingfish accounting for over half (55.2% by number, all days combined) (Table 11B). In the north region, Philippine spurdog (27.3%), yellowtail kingfish (22.7%) and pearl perch (11.4%) comprised the majority of discards, while the top two discard species in the south region were whitefin swellshark (34.9%) and sawtail shark (18.6%). In the central region, yellowtail kingfish accounted for 94.8% of discards from dropline catches and was one of only five species discarded.

Set/trotline

In total, 5,626 organisms, comprising at least 119 different species (or groups), were caught during the 88 set/trotline days observed (Appendix C-3), with 82.8% of that total catch (by number) across 87 species retained.

Retained catches

The species comprising the greatest proportions of the overall retained catch during observed set/trotline trips (by number, all days combined) were bigeye ocean perch (18.5%), pink ling (14.4%) and gummy shark (12.1%), with snapper, ribaldo, eastern red scorpionfish, sandbar shark and species of swell shark also featuring in the top 10 (Table 11C). In the north region, snapper (40.4%), gummy shark (12.9%) and sandbar shark (12.2%) comprised the majority of the retained catch during observed set/trotline trips. In the central region the top three retained

Table 11 **Number and proportion (by number, as a%) of fish caught (retained + discarded), retained and discarded accounted for by the ten species most frequently caught via A) handline, B) dropline, and C) set/trotline during observed fisher days. Data were combined across all regions and temporal groupings. The proportion retained (by number) is shown for each species listed.**

	Caught		Retained		Discarded		Proportion
Species	**Number**	**%**	**Number**	**%**	**Number**	**%**	**retained**
A) Handline							
All Species combined	**8211**	**100**	**6978**	**100**	**1233**	**100**	**85.0%**
Yellowtail scad	1206	14.7	1041	14.9	165	13.4	86.3%
Silver sweep	1054	12.8	992	14.2	62	5.0	94.1%
Australian bonito	852	10.4	852	12.2	0	0	100%
Snapper	739	9.0	605	8.7	134	10.9	81.9%
Yellowtail kingfish	674	8.2	308	4.4	366	29.7	45.7%
Silver trevally	643	7.8	613	8.8	30	2.4	95.3%
Tailor	530	6.5	480	6.9	50	4.1	90.6%
Blue mackerel	451	5.5	450	6.4	1	0.1	99.8%
Eastern red scorpionfish	334	4.1	211	3	123	10	63.2%
Teraglin	322	3.9	306	4.4	16	1.3	95.0%
B) Dropline							
All Species combined	**2532**	**100**	**2349**	**100**	**183**	**100**	**92.8%**
Blue-eye trevalla	550	21.7	549	23.4	1	0.5	99.8%
Gemfish	495	19.5	491	20.9	4	2.2	99.2%
Yellowtail kingfish	306	12.1	205	8.7	101	55.2	67.0%
Bigeye ocean perch	230	9.1	227	9.7	3	1.6	98.7%
Snapper	131	5.2	129	5.5	2	1.1	98.5%
Banded rockcod	125	4.9	125	5.3	0	0	100%
Redfish	99	3.9	96	4.1	3	1.6	97.0%
Eastern highfin spurdog	92	3.6	90	3.8	2	1.1	97.8%
Pearl perch	53	2.1	48	2	5	2.7	90.6%
Philippine spurdog	38	1.5	26	1.1	12	6.6	68.4%
C) Set/trotline							
All Species combined	**5626**	**100**	**4661**	**100**	**965**	**100**	**82.8%**
Bigeye ocean perch	877	15.6	863	18.5	14	1.5	98.4%
Pink ling	671	11.9	671	14.4	0	0	100%
Snapper	577	10.3	515	11	62	6.4	89.3%
Gummy shark	570	10.1	566	12.1	4	0.4	99.3%
Whitefin swellshark	339	6.0	337	7.2	2	0.2	99.4%
Eastern fiddler ray	252	4.5	165	3.5	87	9	65.5%
Draughtboard shark	232	4.1	219	4.7	13	1.3	94.4%
Port Jackson shark	225	4.0	27	0.6	198	20.5	12.0%
Ribaldo	170	3.0	163	3.5	7	0.7	95.9%
Eastern red scorpionfish	107	1.9	106	2.3	1	0.1	99.1%

species were dusky shark (22.3%), spotted wobbegong (18.4%) and banded wobbegong (16.8%), while in the south region they were bigeye ocean perch (23.7%), pink ling (18.4%) and gummy shark (12.5%).

Discarded catches

Overall, the discarded portion of observed set/trotline catches comprised 72 different species, with Port Jackson shark (20.5%), eastern fiddler ray (9.0%), piked spurdog (7.2%), smooth stingray (6.7%) and eastern red scorpionfish (6.4%) accounting for around half (by number, all days combined) (Table 11C). In the north region, snapper (19.1%), eastern fiddler ray (18.8%) and ornate wobbegong (12.1%) comprised around half of discards, while the top two discard species in the central region were smooth stingray (62.9%) and Port Jackson shark (17.5%), and in the south region were Port Jackson shark (29.7%) and piked spurdog (11.6%).

Comparison of catch composition among gear types and regions

Overall, the structure/composition of retained catches differed significantly between all gear types within each region (Figure 9A), and between all regions for each gear type (Figure 10A) (PERMANOVA and pairwise tests, Appendix D-1). In the case of discarded catches, composition differed significantly between all gear types in the north and south regions, while in the central region, handline and dropline were significantly different from set/trotline but not significantly different from each other (Figure 9B, Appendix D-1). Composition of discarded catch was significantly different between all regions in the cases of dropline and set/trotline, while handline catches in the central and south regions were significantly different from those in the north region but not significantly different from each other (Figure 10B, Appendix D-1).

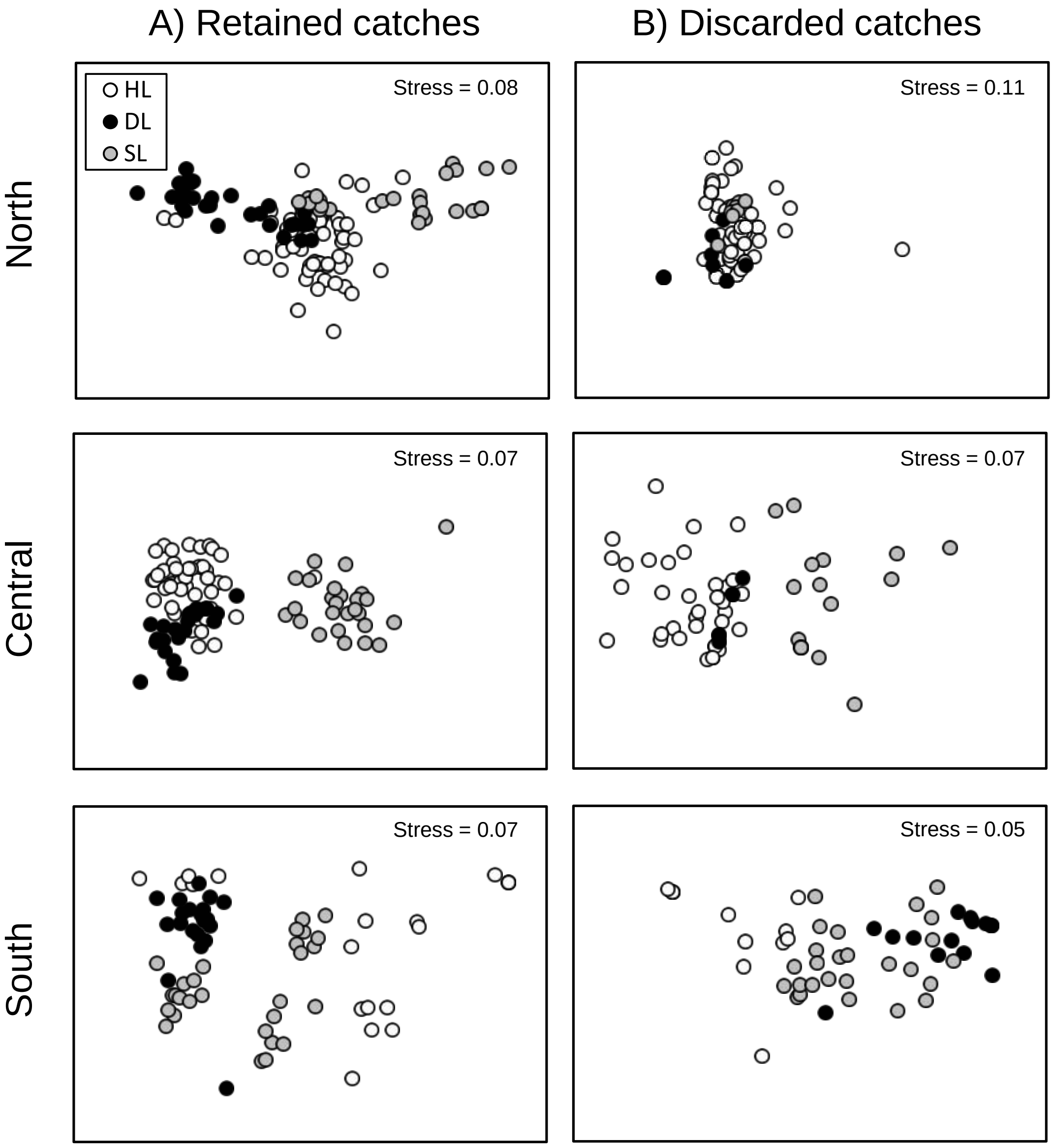
Lists of the top five species contributing the greatest to dissimilarity in composition of retained catch between gear types in each region, and between regions for each gear type, are presented in Appendix D-2, while equivalent lists for composition of discarded catch are presented in Appendix D-3. These SIMPER analyses found that different suites of species contributed to dissimilarity matrices in the cases of each comparison. Such differences in species contributions were ultimately responsible for the identified differences in the structure of catches among gear types and regions illustrated in Figures 9 and 10. For example, in the north and central regions, set/trotline catches were dominated be several species of shark, whereas the handline and dropline catches were dominated by different species of bony fish.

Geographic differences in the structures of total catches were apparent for each gear type (Appendices D-2 and D-3). For example, the dissimilarities in retained setline catches among regions were primarily driven by relatively large total retained catches of sandbar shark, snapper and eastern red scorpionfish in the north; spotted and banded wobbegong in the central region; and bigeye ocean perch, pink ling, gummy shark and swellsharks in the south. Similarly, relatively large retained dropline catches of snapper in the north, yellowtail kingfish in the central region, and blue-eye trevalla, gemfish and bigeye ocean perch in the south made significant contributions to dissimilarities among regions. For handline, relatively large retained catches contributing greatest to dissimilarity of catches among regions included snapper in the north; silver trevally and southern Maori wrasse in the south; and silver sweep and yellowtail scad in the central region.

Catch, retention and discard rates

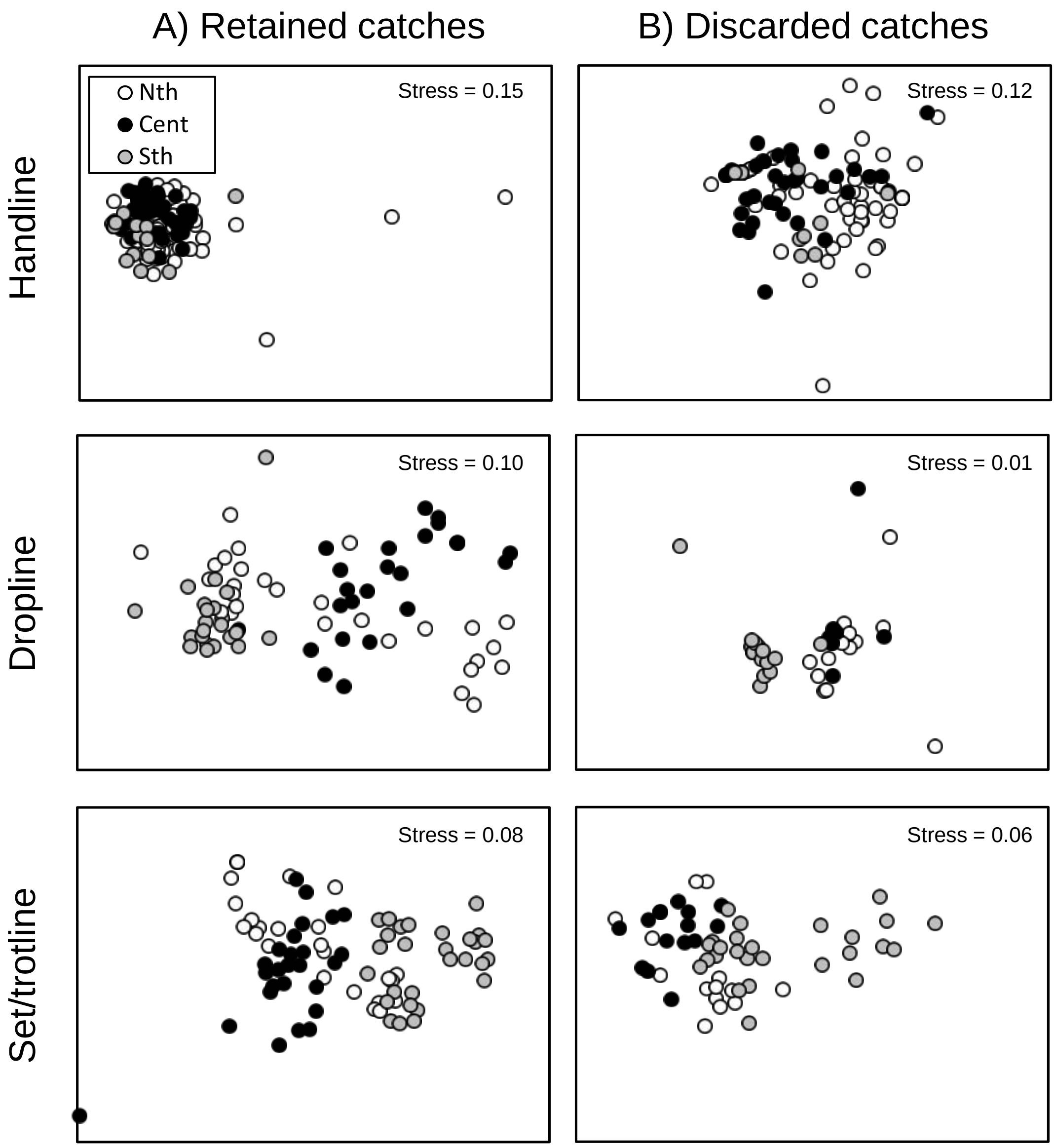
Summaries of total number of fish caught (i.e. retained + discarded) per observed fisher day (‘total catch rate’), number of fish caught that were retained per observed fisher day (‘retention rate’) and number of fish caught that were discarded per observed fisher day (‘discard rate’) by method, region and period grouping for the species most frequently recorded (Table 11) are presented in this section. Detailed catch rate data for all recorded species are presented in Appendix E.

Figure 9 **Non-metric MDS ordinations illustrating variability in catch composition (number by species per fishing day; raw data) among fishing methods (HL – handline, DL – dropline, SL – set/trotline) for A) retained and B) discarded catches in the north, central and south regions.**



In the case of each of the three methods, patterns in total catch rates of frequently caught species among regions and period groupings generally tended to follow patterns in targeting, with levels of targeting (i.e. the proportion of observed fisher days involving targeting of a given species) varying in intensity among regions and period groupings. Specific confirmed examples of this are given below. As data concerning targeting behaviour of fishers were not recorded, reliable estimates of 'directed catch rates' (i.e. catch rates of a given species calculated using only effort directed towards catching that species) cannot be generated. In terms of spatial and temporal comparisons, the utility of the 'non-directed' catch rate summaries presented here is somewhat limited due to inflated standard error estimates associated with mean catch rates. This was one tangible consequence of including all fisher days (for a given method/region/period grouping stratum) irrespective of targeting behaviour, while there are also other less tangible limitations. This issue will be discussed further in 'Discussion' p61.

Figure 10 Non-metric MDS ordinations illustrating variability in catch composition (number by species per fishing day; raw data) among regions (north, central and south) for A) retained and B) discarded catches via handline, dropline and set/trotline methods.



Handline

Total catch rates for the most frequently recorded handline species overall, yellowtail scad, were generally highest in the central region, with means (± SE) ranging between 2.8 ± 2.0 and 28.9 ± 10.9 fish per handline day during P34 and P12, respectively (Figure 11A). In the north region, mean total catch rate of yellowtail scad among period groupings ranged between 5.0 ± 2.5 (P34) and 11.6 ± 5.3 (P56) fish per handline day, while none were caught during observed handline days in the south region. There were no clear seasonal patterns in catch rates (i.e. spring/summer vs. autumn/winter) for this species.

Two species relatively frequently caught during observed handline days in all three regions were snapper and yellowtail kingfish (Figure 11). Total catch rates of snapper were generally highest in the north region, ranging between 6.3 ± 2.5 (P56) and 11.2 ± 3.0 (P78) fish per day, while total catch rates in the central and south regions were similar to each other, ranging between 0 (P56/south) and 5.8 ± 2.7 (P34/central) fish per day (Figure 11D). There were no clear seasonal patterns in catch rates. The mean discard rate of snapper was very similar to the mean retention rate in the central region during P34 (autumn/winter), while discard rate was considerably lower than retention rate for almost all other relevant region/period grouping combinations.

Mean total catch rates of yellowtail kingfish varied among region/period grouping combinations, ranging between 0.5 ± 0.3 (P56/north) and 14.6 ± 5.8 (P12/central) fish per day (Figure 11E). While there was evidence of possible seasonal differences in catch rates, the differences were not consistent across regions. Mean total catch rates were higher in autumn/winter than in spring/summer in the north region, while the opposite was apparent for the central region and there was no seasonal consistency evident for the south region. Mean discard rates were consistently higher than mean retention rates in the central region, while this was not the case in the north or south regions.

Strong spatial disparities in catch rates were apparent for other frequently caught handline species, with mean total catch rates in the central region of silver sweep (3.5 ± 2.7 (P34) to 58.3 ± 17.2 (P78) fish per day), Australian bonito (2.6 ± 2.5 (P12) to 27.8 ± 8.6 (P34) fish per day) and tailor (4.2 ± 3.3 (P78) to 23.3 ± 9.2 (P34) fish per day) far higher than in other regions (Figure 11B, C and G). In contrast, highest mean total catch rates were in the south region in the cases of silver trevally (0 (P34, P56 and P78) to 68.9 ± 46.8 (P12) fish per day) and eastern red scorpionfish (0.1 ± 0.1 (P78) to 29.7 ± 14.5 (P12) fish per day), and in the north region in the case of blue mackerel (2.5 ± 1.7 (P78) to 9.6 ± 8.5 (P56) fish per day) (Figure 11F, I and H). With the exception of a relatively large mean total catch for P34 in the central region (11.9 ± 8.4 fish per day), mean total catch rates of teraglin in the north and central regions were quite consistent across period groupings during which they were caught (means ranging between 1.4 and 2.5 fish per day) (Figure 11J).

Mutual exclusivity among species with respect to aspects of targeting methodology contributed to high variability in catches among observed handline days, as indicated by the large standard errors associated with non-directed mean catch rate estimates (Figure 11). For example, handline effort for most species covered above was done during daylight hours, while teraglin were generally targeted at night. Moving lures (i.e. ‘lead-lining’ and ‘lure flicking’) were used to target large pelagic species (bonito and kingfish), while baited hooks were commonly used for reef fish such as snapper and eastern red scorpionfish. Targeting of small baitfish (yellowtail scad and blue mackerel) and other reef fish (sweep) involved the use of small hooks, while larger hooks were used for larger target species. Therefore, the methodology used to catch the target species on any given handline day inherently prohibited (or at least greatly reduced) the chances of catching other species that would have been readily retained if caught.

Figure 11 **Mean handline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught handline species. Data are for north, central and south regions of NSW coastal waters and temporal period groupings (P12, P34, P56 and P78).**

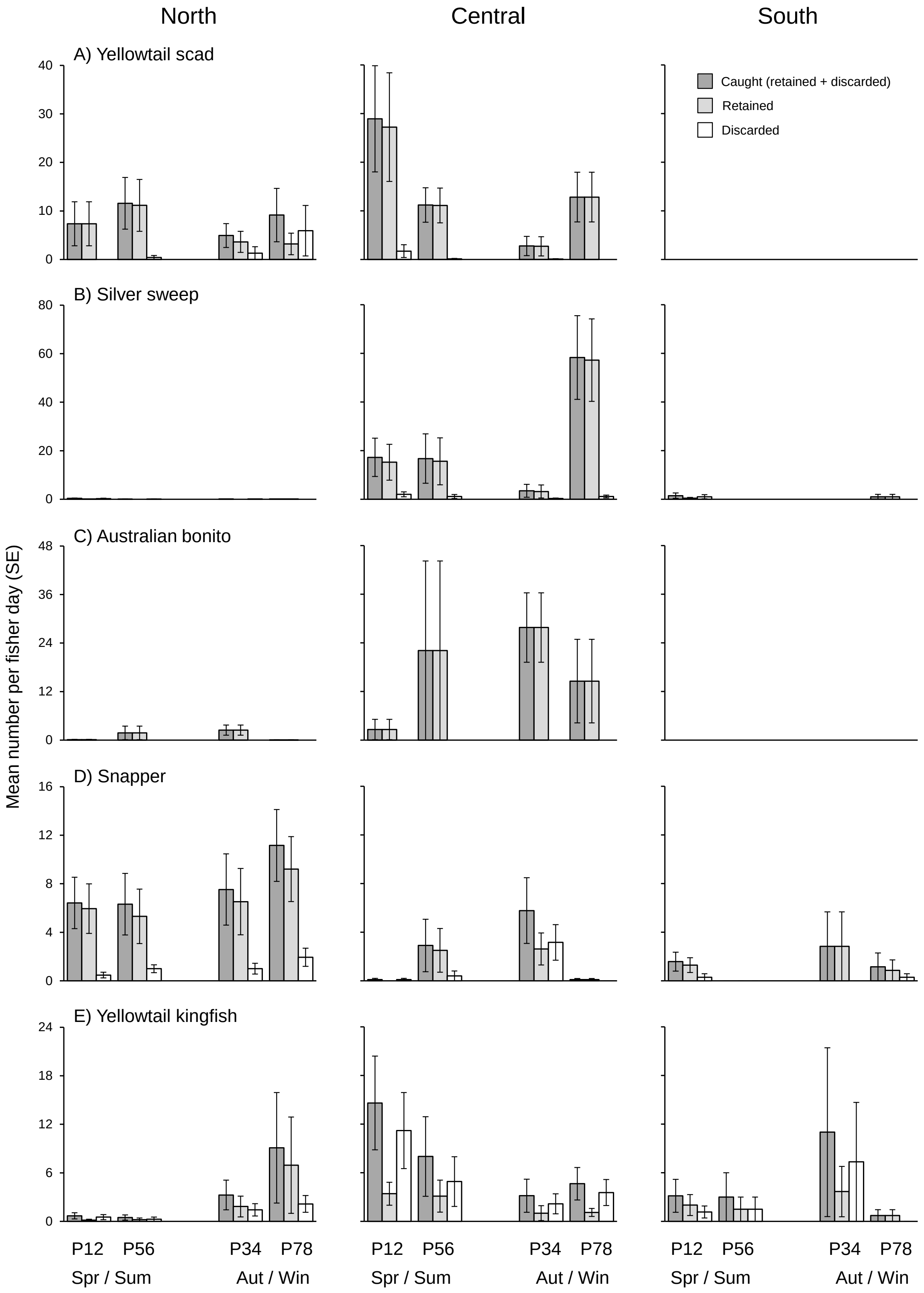
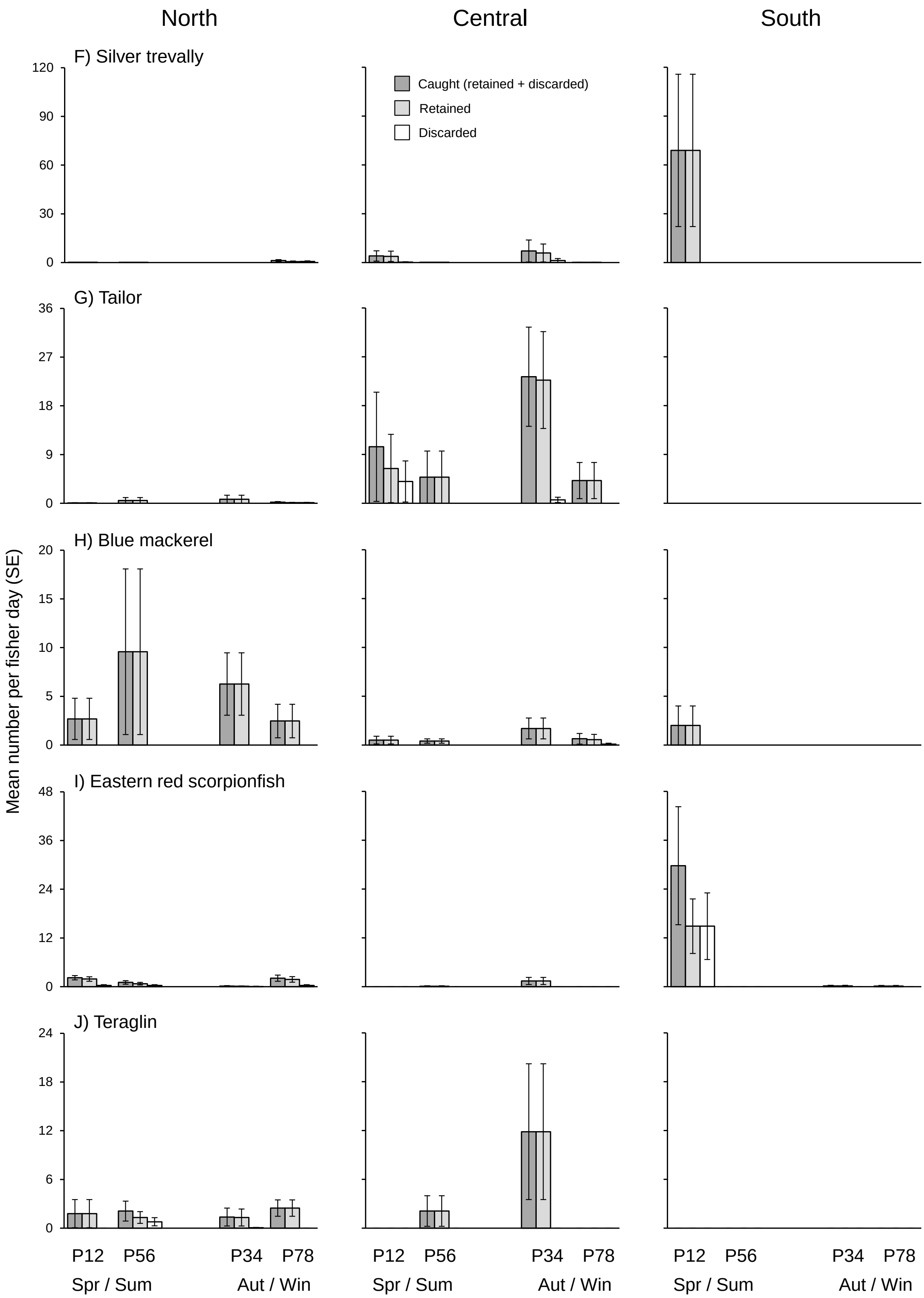


Figure 11 cont. Mean handline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught handline species. Data are for north, central and south regions of NSW waters and temporal period groupings (P12, P34, P56 and P78).



Dropline

Mean total catch rates for the most frequently recorded dropline species overall, blue-eye trevalla, were highest in the south region (12.5 ± 5.5 (P12) to 20.5 ± 10.0 (P56) fish per dropline day), followed by the north region (2.8 ± 1.8 (P12) to 7.3 ± 3.0 (P78) fish per day) (Figure 12A). Records of blue-eye trevalla catches during observed dropline days in the central region were relatively few and infrequent.

Dropline catch rates of gemfish were also highest in the south region, with mean total catch rates ranging between 9.4 ± 3.8 (P78) and 36.5 ± 11.8 (P56) fish per day (Figure 12B). Although a comparable total catch rate was evident for P78 in the north region (12.4 ± 8.4 fish per day), mean total catch rates were relatively low (< 2 fish per day) for all other period groupings in the north and central regions. The same general spatial pattern in catch rates was evident for bigeye ocean perch, with the higher mean total catch rates in the south region (3.7 ± 1.1 (P34) to 21.3 ± 15.4 (P12) fish per day) than in the north or central regions (means of < 1 fish per day) (Figure 12D).

Droplining in the central region was characterised by the highest mean total catch rates of yellowtail kingfish (4.3 ± 3.3 (P34) to 18.5 ± 7.3 (P56) fish per day) compared with means for period groupings for the north (< 1.3 fish per day) and south (none caught) regions (Figure 12C). Catch rates of this species in the central region were generally higher in spring/summer period groupings. Mean total catch rates of eastern highfin spurdog were also mostly highest in the central region (up to 7.7 ± 5.4 (P12) sharks per day), although during P78 the highest catch rate was in the north region (3.0 ± 2.7 sharks per day) (Figure 12H). As was the case for kingfish, none were caught in the south region.

Mean total catch rates of snapper via dropline were far higher in the north region (0.3 ± 0.3 (P78) to 7.6 ± 6.1 (P34) fish per day) than in the central region (< 0.3 fish per day), while none were recorded in dropline catches in the south region (Figure 12E). A similar spatial pattern in dropline catch rates was evident for pearl perch (0 (P78) to 2.8 ± 1.8 (P34) fish per day in the north region) and Philippine spurdog (0 (P56) to 3.0 ± 2.1 (P34) sharks per day in the north region), although in these cases none were caught in the central and south regions (Figure 12I and J).

Ranges in mean total catch rates for banded rockcod during observed dropline days done in the north and central regions were generally similar, with a collective minimum for the two regions of 0.2 ± 0.2 fish per day (P12/north) and maximum of 4.1 ± 2.9 fish per day (P78/north) (Figure 12F). No banded rockcod were recorded in dropline catches in the south region. Very similar ranges in mean total catch rates were evident for redfish in the north and central regions although, unlike banded rockcod, dropline catch rates of redfish in the south region were comparable to those in the other regions (Figure 12G).

One of the main influencing factors in the high variability in dropline catch rates among observed fishing days within region/period grouping strata was genuine spatial and temporal variability in catch of the targeted species. Species commonly targeted on the deeper reefs associated with the outer shelf (e.g. blue-eye trevalla, banded rockcod and, to a lesser extent, gemfish) tended to be caught sporadically, as indicated by the large standard errors associated with mean catch rate estimates in many of those cases (Figure 12). However, droplining is also used on relatively shallower reefs to target snapper and kingfish in the cases of the north and central regions, respectively, so mutual exclusivity of effort for the different dropline target species (i.e. different habitats fished) would have also influenced intra-strata variability in catches.

Figure 12 Mean dropline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught dropline species. Data are for north, central and south regions of NSW coastal waters and temporal period groupings (P12, P34, P56 and P78).

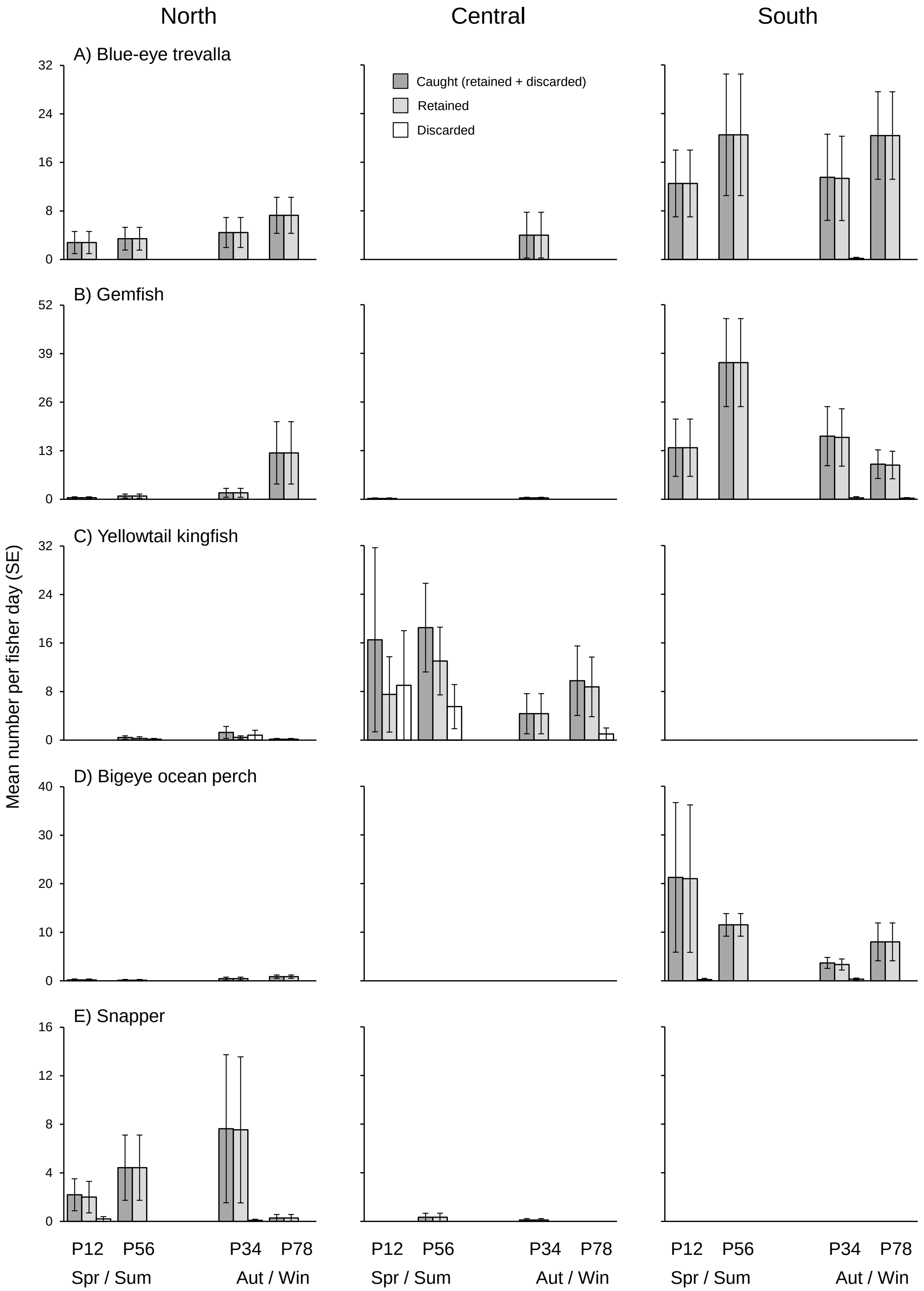
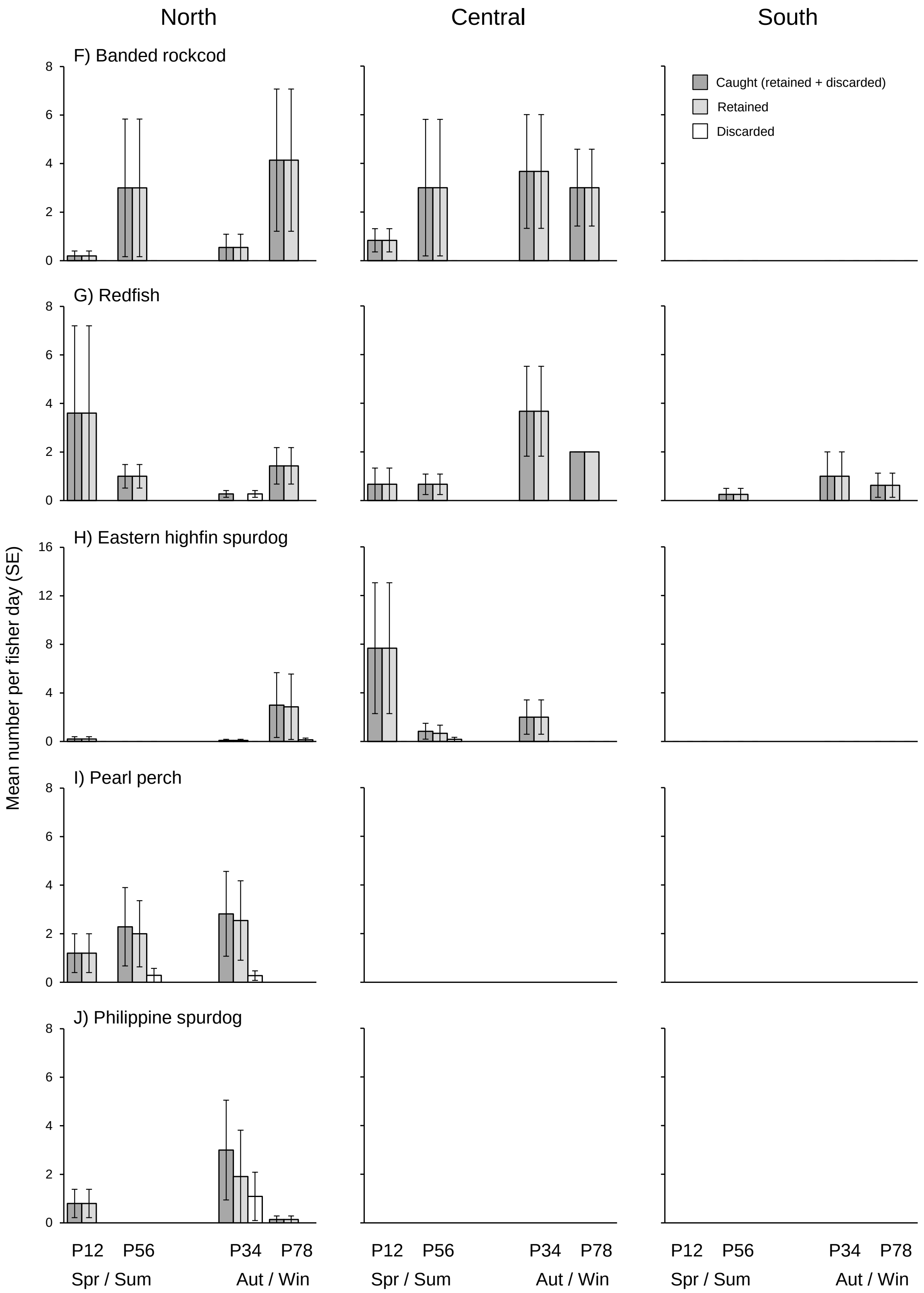


Figure 12 cont. Mean dropline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught dropline species. Data are for north, central and south regions of NSW waters and temporal period groupings (P12, P34, P56 and P78).



Set/trotline

Catch rates for the more frequently recorded set/trotline species overall were highest in the south region for all but two of the top ten species (Figure 13). Mean total catch rates in the south region for the two most frequently recorded set/trotline species overall, bigeye ocean perch and pink ling, ranged between 2.5 ± 2.5 (P78) and 71.5 ± 44.7 (P56) fish per set/trotline day for the former and between 0.9 ± 0.7 (P78) and 51.0 ± 25.2 (P34) fish per set/trotline day for the latter, with almost all fish retained (Figure 13A and B). Neither of these species, nor any of the following three species were recorded in observed set/trotline catches in the north and central regions. The same large scale spatial pattern in set/trotline catch rates was evident for medium-sized demersal shark species, whitefin swellshark (0.3 ± 0.3 (P78) to 30.2 ± 15.0 (P56) sharks per day) and draughtboard shark (1.3 ± 0.8 (P78) to 15.3 ± 14.6 (P23) sharks per day), with the vast majority of the total catch subsequently retained (Figure 13E and G). Similarly, ribaldo was caught using set/trotlines only in the south region, with mean total catches ranging between 0 (P78) and 16.2 ± 13.4 (P56) fish per day (Figure 13I).

Mean total set/trotline catch rates of snapper were generally slightly higher in the north region (5.6 ± 5.6 (P56) to 16.5 ± 7.4 (P34) fish per day) than in the south region (1.5 ± 1.5 (P12) to 9.4 ± 4.6 (P56) fish per day), with no snapper recorded in set/trotline catches in the central region (Figure 13C). The vast majority of snapper caught using set/trotlines were retained. An equivalent spatial pattern in set/trotline catch rates was evident for eastern red scorpionfish, with mean total catch rates in the north region (0.6 ± 0.6 (P12) to 5.1 ± 2.6 (P34) fish per day) generally exceeding those in the south region (0 (P34) to 2.6 ± 1.6 (P78) fish per day) (Figure 13J). In contrast, mean total catch rates of gummy shark were higher in the south region (5.1 ± 4.1 (P34) to 36.5 ± 33.2 (P56) sharks per day) than in the north region (0 (P34) to 7.6 ± 7.4 (P12) sharks per day), with some sparse records of gummy shark captures in the central region (Figure 13D). This spatial pattern was also the case for eastern fiddler ray, with mean total catch rates of 0.3 ± 0.2 (P56) to 12.1 ± 11.0 (P34) rays per day in the south region and 1.0 ± 1.0 (P56) to 2.6 ± 2.6 (P12) rays per day in the north region (Figure 13F).

Mean total catch rates of Port Jackson shark were highest in the south region (2.1 ± 2.1 (P34) to 15.8 ± 9.6 (P78) sharks per day), with relatively few records of captures in the north and central regions (Figure 13H). Unlike all other species caught using set/trotlines mentioned above, most Port Jackson sharks were discarded.

Almost all set/trotlining days observed in the central region involved almost exclusive targeting of either large whaler sharks or wobbegong (a medium-sized demersal shark species) which, in that region, tended to be caught in relatively small numbers (but economically viable weights) per fisher day. Consequently, although those shark species comprised the higher mean total catch rates for the central region (e.g. dusky shark and species of wobbegong; Appendix E-3B), they were not represented in the overall list of top ten set/trotline catches or catch rates presented above (i.e. Figures 11, 12 and 13; Table 11C). Targeting of large whaler sharks using set/trotlines was also prominent in the north region during the study. Observers were not, however, able to sample such activities during the first half of the sampling period (i.e. P12 and P34) for reasons discussed in ‘Discussion’, so overall catch rates of large shark species calculated via this specific study are clear underestimates. Macbeth *et al.* (2009) provides a detailed summary of results from an intensive, high-coverage observer-based study into targeting of large sharks in northern and central NSW waters that was undertaken concurrently with the second half of this study (i.e. 2008/09).

Figure 13 **Mean set/trotline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught set/trotline species. Data are for north, central and south regions of NSW coastal waters and temporal period groupings (P12, P34, P56 and P78).**

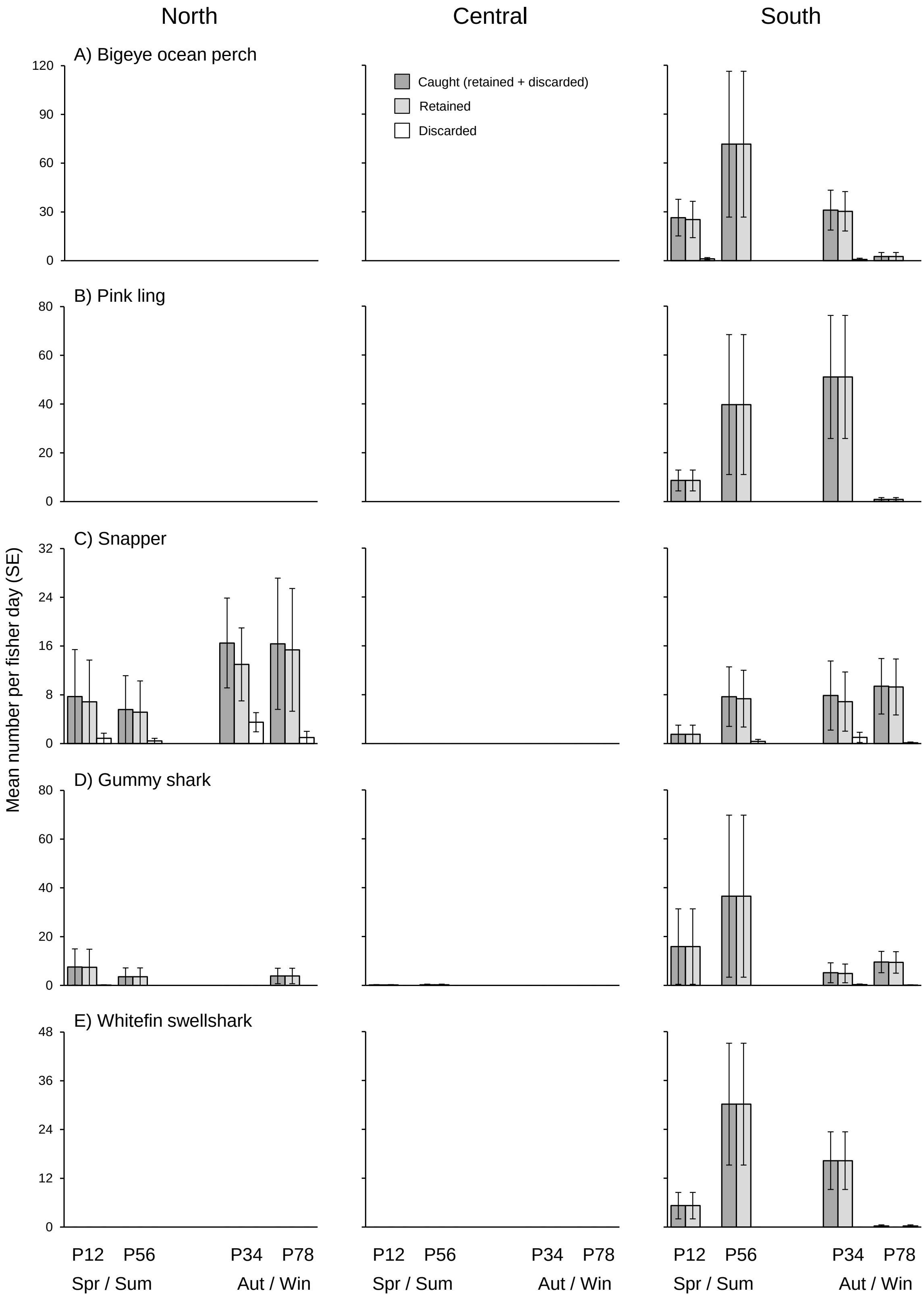
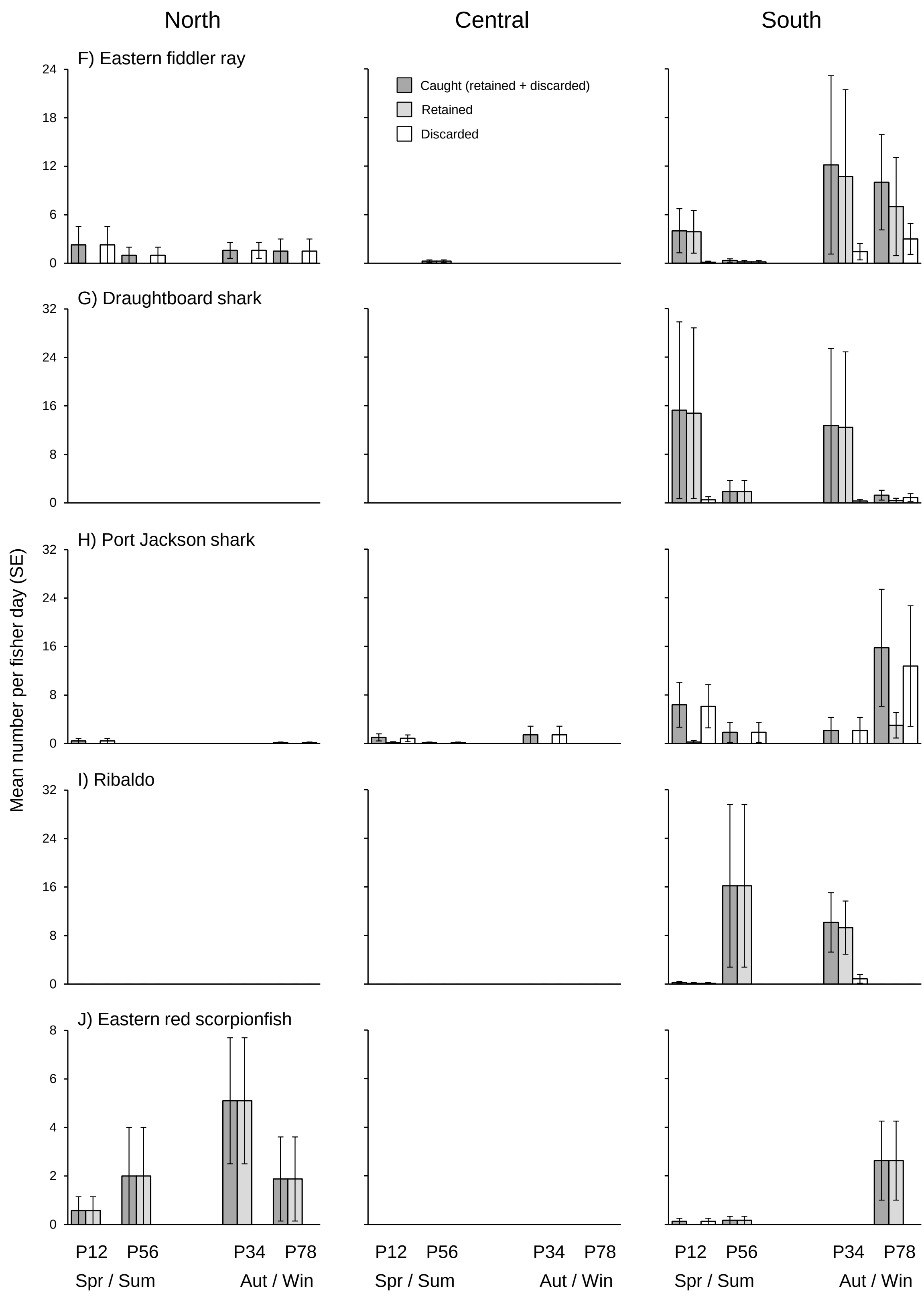


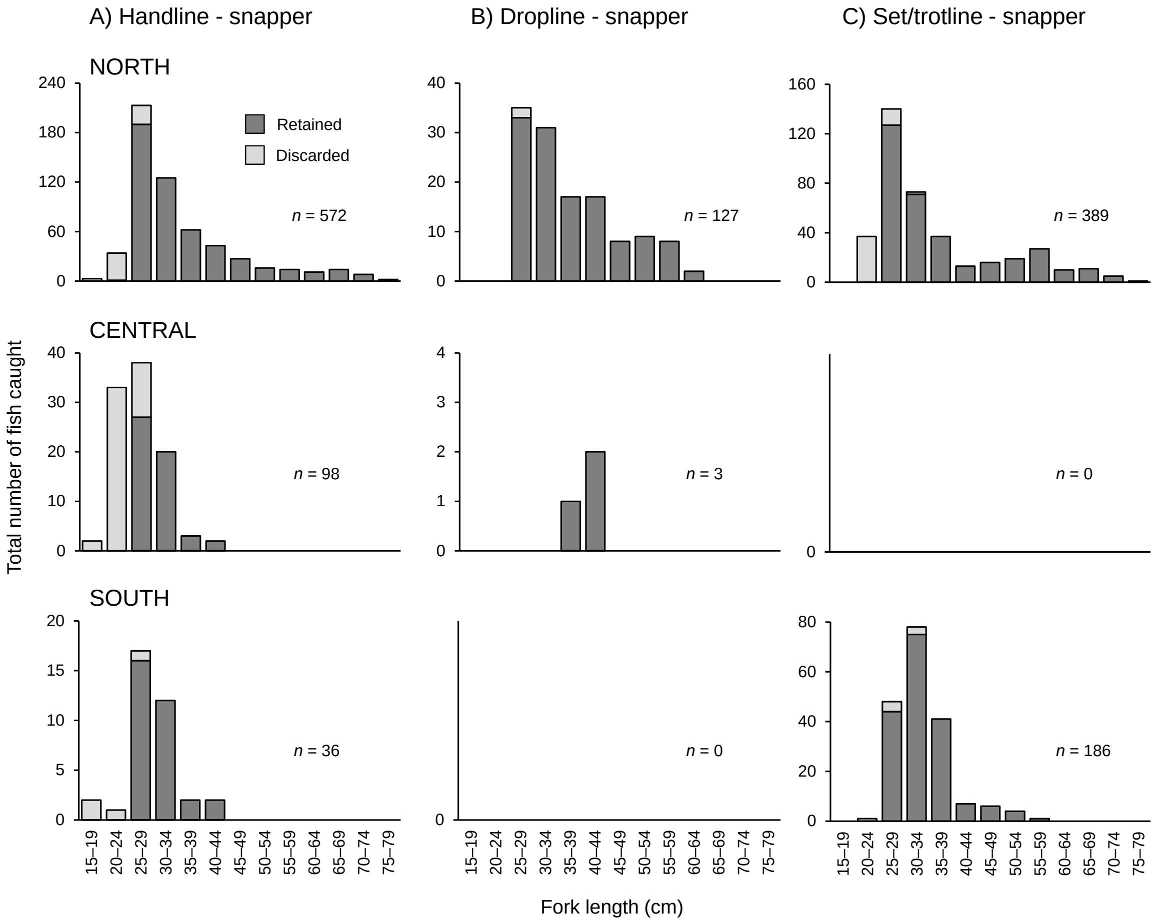
Figure 13 cont. Mean set/trotline catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species for the ten most frequently caught set/trotline species. Data are for north, central and south regions of NSW coastal waters and temporal period groupings (P12, P34, P56 and P78).



Size-class frequency distributions

Wide ranges of sizes were recorded for the species caught frequently during observed fishing trips, with differences in size-class frequency distributions among methods and among regions apparent in some cases. Size-class frequency distributions of snapper catches were similar among methods within the north region, with the modal size class 25–29 cm FL for each method (Figure 14). Fish of sizes up to the 75–79 cm FL size class were recorded for handline and set/trotline, and up to the 60–64 cm FL size class for dropline, in that region.

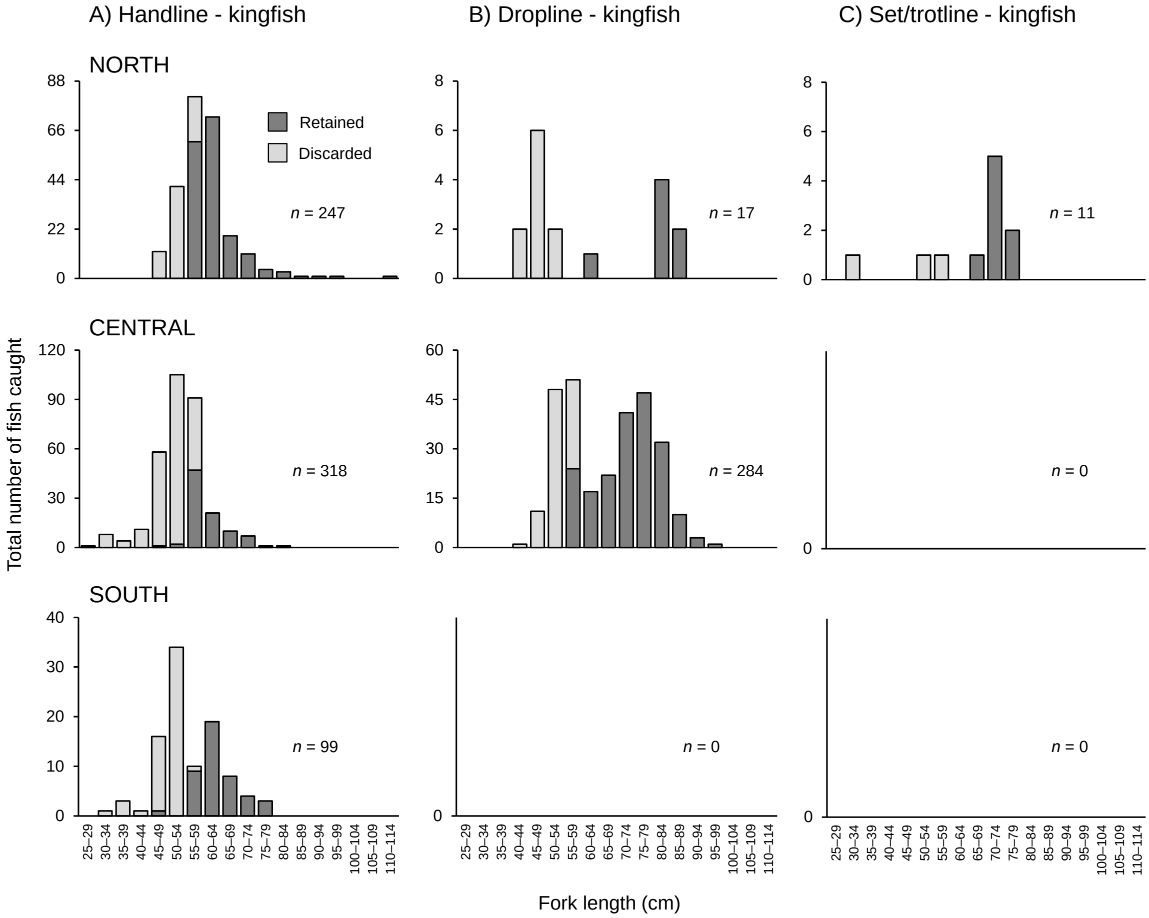
Figure 14 Size-class frequency distributions for all snapper caught (and subsequently retained or discarded) during observed OTLF A) handline, B) dropline and C) set/trotline days. Data are separated according to north, central and south regions.



Size-class distributions of snapper catches for the handline method were, however, less similar among regions, with proportionally fewer larger snapper (> 35 cm FL) comprising catches in the central and south regions compared with the north region (Figure 14). The modal size class for set/trotline snapper catches in the south region (30–34 cm FL) was slightly larger than that for the north region.

Size-class frequency distributions for total yellowtail kingfish catches were substantially different among methods (Figure 15). Handline catches were unimodal, with the modal size class in each region (50–54 cm FL) slightly smaller than the FL corresponding to the minimum legal total length (MLL = 65 cm TL) for the species (i.e. ~57 cm FL) (Figure 15A).

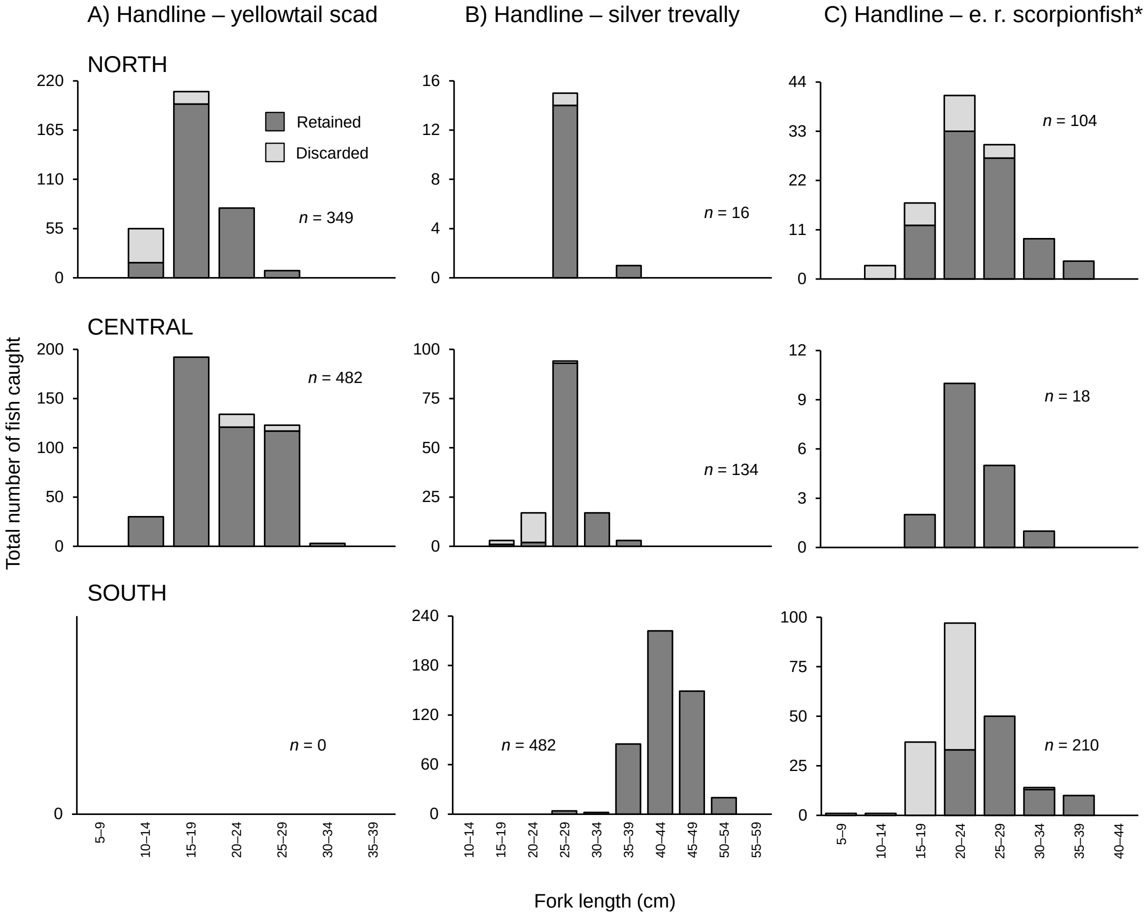
Figure 15 Size-class frequency distributions for all yellowtail kingfish caught (and subsequently retained or discarded) during observed OTLF A) handline, B) dropline and C) set/trotline days. Data are separated according to north, central and south regions.



In contrast, where observed, total dropline and set/trotline kingfish catches showed distinct evidence of bimodality, with the additional second mode involving a cohort of larger-sized fish (i.e. 75–90 cm FL) (Figure 15B and C). Though this general observation can be considered equivocal for the north region due to limited sample sizes, the pattern was clear for dropline catches in the central region.

Size-class frequency distributions for the most frequently caught handline species, yellowtail scad, were similar for the north and central regions (none were observed in the south region), with the modal size class being 15–19 cm FL in both cases (Figure 16A). Similarly, the size structures of handline catches of eastern red scorpionfish were similar among the three regions, with a modal size class of 20–24 cm FL (Figure 16C). While in the north and central regions the considerable majority of handline-caught eastern red scorpionfish of sizes between 15 and 24 cm FL were retained, in the south region most 15–24 cm FL fish were discarded.

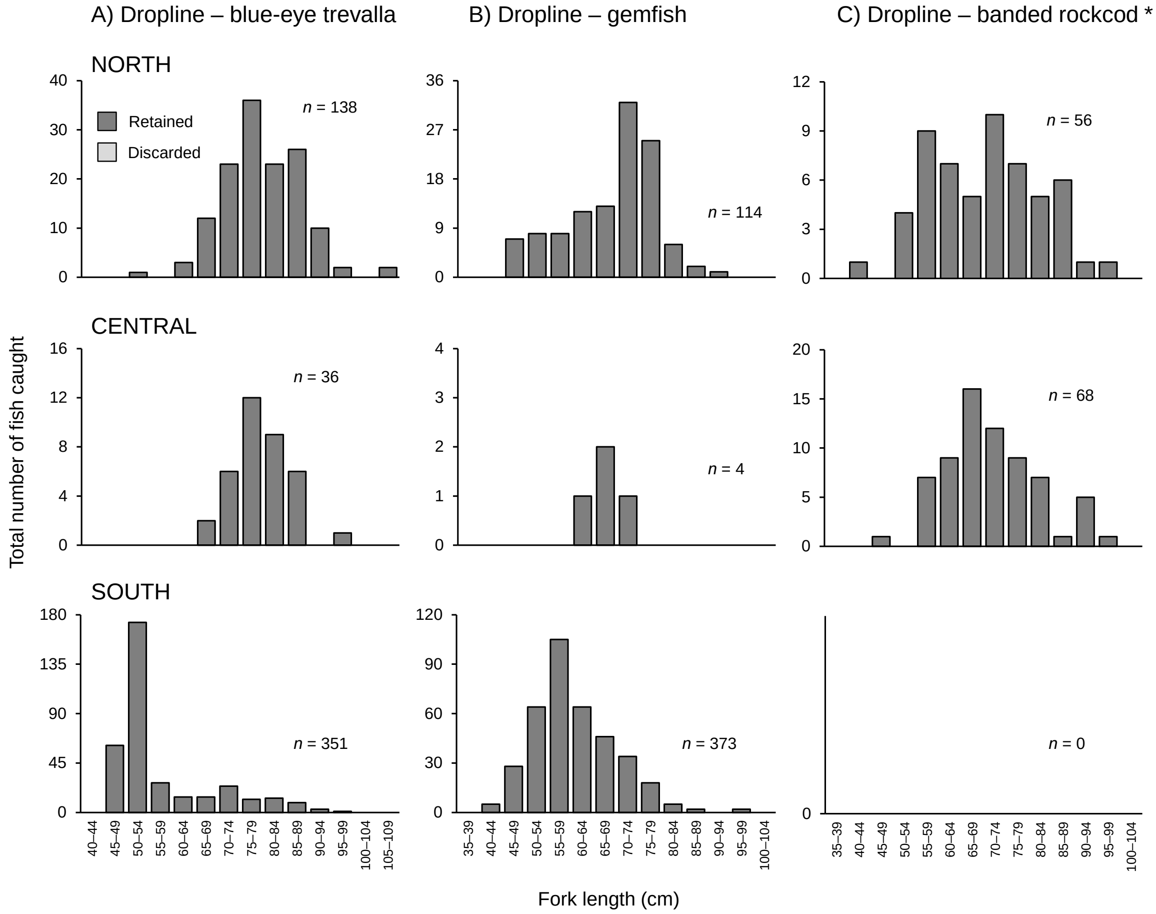
Figure 16 Size-class frequency distributions for all A) yellowtail scad, B) silver trevally and C) eastern red scorpionfish caught (and subsequently retained or discarded) during observed OTLF handline days. Data are separated according to north, central and south regions. *, FL = TL



Handline catches of silver trevally showed considerable inter-region difference in size structure (Figure 16B). The modal size class of catches in the south region was 40–44 cm FL, while it was 25–29 cm FL for catches in the north and central regions.

Size-class frequency distributions for the most frequently caught dropline species, blue-eye trevalla, were generally similar for the north and central regions, with the modal size class being 75–79 cm FL in both cases (Figure 17A). In the south region, however, the modal size class for this species was much smaller (50–54 cm FL) and more numerically dominant, despite the range of sizes being similarly as wide as for the regions to the north.

Figure 17 Size-class frequency distributions for all A) blue-eye trevalla, B) gemfish and C) banded rockcod caught (and subsequently retained or discarded) during observed OTLF dropline days. Data are separated according to north, central and south regions. *, FL = TL

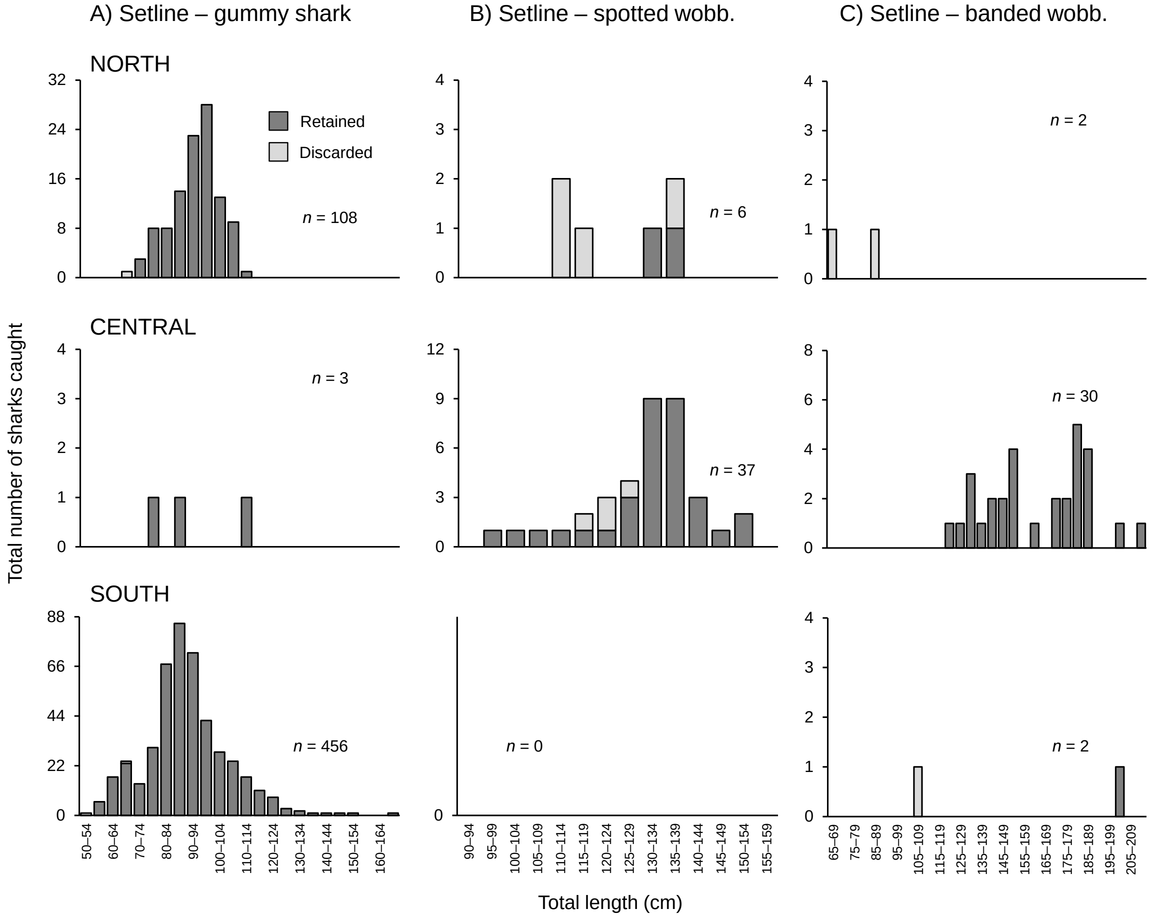


The modal size class of dropline-caught gemfish was also smaller in the south region (55–59 cm FL) than in the north region (70–74 cm FL), despite the size ranges being very similar (Figure 17B). In the case of the central region an insufficient sample size prevented reliable interpretation of size structure.

The size structures of dropline-caught banded rockcod were similar for the north and central regions, with modes of 70–74 cm and 65–69 cm FL, respectively (Figure 17C). Ranges in size classes were also similar, at 40–44 to 95–99 cm FL and 45–49 to 95–99 cm FL, respectively.

Size-class frequency distributions for catches of large species of whaler shark targeted using setlines in the north and central regions are presented by Macbeth *et al.* (2009). The range in size classes of gummy shark (a small- to medium-sized shark species) caught via set/trotline in the north region was 65–69 to 110–114 cm FL, with a modal size class of 95–99 cm FL (Figure 18A). The general shape of the size-class frequency distribution of gummy shark catches in the south region was similar and had a similar modal size class (85–89 cm FL), although the range in size classes caught was substantially wider (50–54 to 165–169 cm FL) than that in the north.

Figure 18 Size-class frequency distributions for all A) gummy shark, B) spotted wobbegong and C) banded wobbegong caught (and subsequently retained or discarded) during observed OTLF set/trotline days. Data are separated according to north, central and south regions.

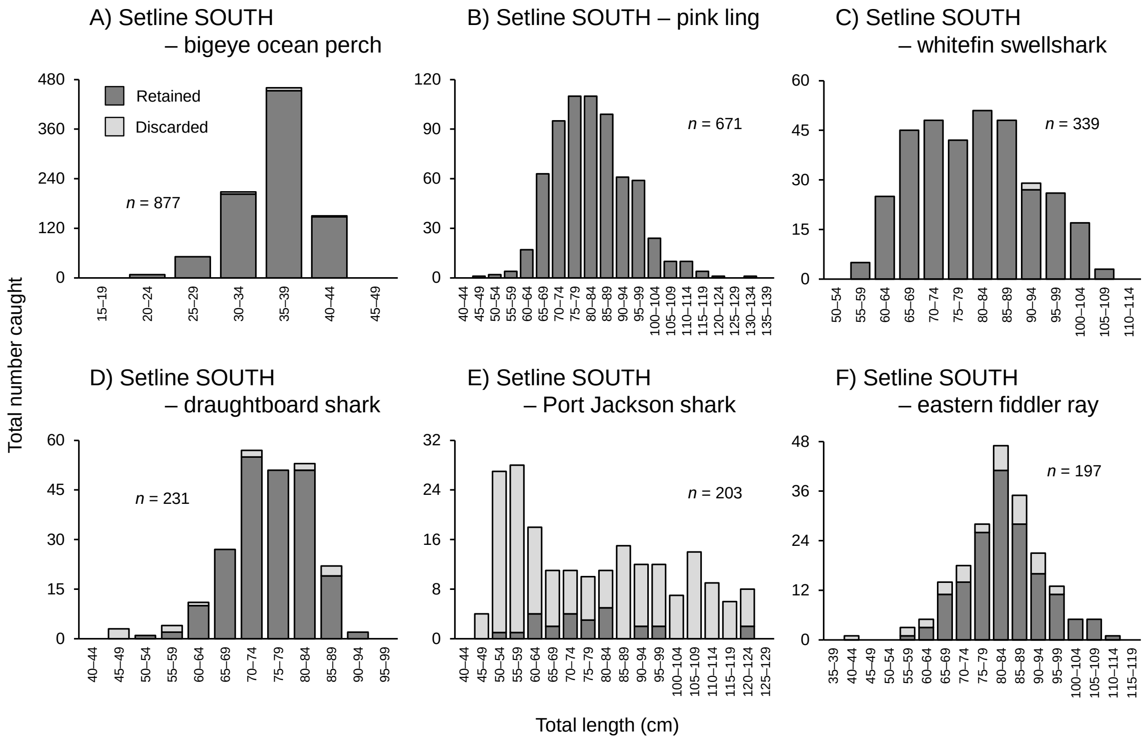


A wide range of size classes of both spotted wobbegong (95–99 to 150–154 cm FL; mode 130-139 cm FL) and banded wobbegong (120–124 to 210–214 cm FL; mode 180-184 cm FL) were caught during observed set/trotline days in the central region (Figure 18B and C). These captures represented observed setline days specifically targeting wobbegong. Although known to occur in the north and south regions, no wobbegong-targeting setline days were observed along those parts of the coast.

With the relatively (and permissibly) large number of hooks deployed per setline fisher day in the south region (Table 10), catches per day of a range of species could be quite high (Figure 13), including catches of some bycatch species. In addition to snapper and gummy shark presented above, other finfish were also observed to be exploited in significant quantities across a wide range of sizes (Figure 19). Bigeye ocean perch was caught at sizes within the 20–24 to 40–44 cm FL size-class range (mode 35–39 cm FL; Figure 19A), while the range of size classes at which pink ling were caught was 45–49 to 130–135 cm FL (mode 75–84 cm FL; Figure 19B).

Catches of two species of morphologically similar swellshark – whitefin swellshark and draughtboard shark – observed during set/trotline days in the south region involved similar size ranges (55–59 to 105–109 cm and 45–49 to 90–95 cm FL, respectively) and modes (80–85 and 70–75 cm FL, respectively) (Figure 19C and D). Eastern fiddler rays within the size range 40–45 to 110–115 cm FL (mode 80–85 cm FL) were caught on setlines in the south region and mostly retained (Figure 19F), while similar numbers of another medium-sized shark species, Port Jackson shark, were also caught (range 45–49 to 120–125 cm FL; mode 55–59 cm FL), but mostly discarded (Figure 19E).

Figure 19 Size-class frequency distributions for all A) bigeye ocean perch, B) pink ling, C) whitefin swellshark, D) draughtboard shark, E) Port Jackson shark and F) eastern shovelnose ray caught (and subsequently retained or discarded) during observed OTLF set/trotline days done in the south region.



Estimates of total retained and discarded catches

Up-scaling using the corresponding OTLF fisher effort reporting records, the estimated total number (± SE) of all fish (includes all species of fish, sharks and squid recorded during observed fisher days) caught and retained via the handline method in NSW waters (regions combined) during the 12 months encapsulating period groupings P12 and P34 was approximately 386,000 ± 35,590 fish (Table 12A). During the second 12 month period (P56 and P78 combined) the total retained handline catch was estimated to be lower, at approximately 274,570 ± 34,590 fish. These totals comprised, respectively, an estimated 57,900 ± 17,030 and 44,640 ± 10,120 yellowtail scad, 51,450 ± 13,930 and 42,390 ± 26,890 Australian bonito, 26,950 ± 6,490 and 22,150 ± 4,950 snapper, and 12,480 ± 3,770 and 15,000 ± 7,930 yellowtail kingfish.

The estimate of total handline discards (species combined) for each of those two years was considerably lower than the estimated total retained catch , at 74,000 ± 12,070 and 39,200 ± 8,250 fish, respectively (Table 12A). These totals comprised, respectively, an estimated 25,810 ± 7,620 and 13,060 ± 4,110 discarded yellowtail kingfish, and 7,740 ± 2,450 and 4,440 ± 1,150 discarded snapper.

Table 12 **Estimated total annual retained and discarded A) handline, B) dropline and C) set/trotline catches (by number; ± SE) for the top ten most-frequently-caught species and for all species combined. Estimates are for north, central and south regions combined (i.e. All NSW) and estimated separately for the first year (P12 + P34) and second year (P56 + P78) of the 24-month study. Figures rounded to nearest 10.**

Estimated total catch	Year 1 (P12 + P34)		Year 2 (P56 + P78)	
(All NSW)	Retained	Discarded	Retained	Discarded
A) Handline				
All Species combined	**386000 ± 34590**	**74000 ± 12070**	**274570 ± 36400**	**39200 ± 8250**
Yellowtail scad	57900 ± 17030	4910 ± 3070	44640 ± 10120	8180 ± 6600
Silver sweep	25500 ± 10670	4150 ± 1480	79360 ± 21050	2450 ± 1100
Australian bonito	51450 ± 13930	0 ± 0	42390 ± 26890	0 ± 0
Snapper	26950 ± 6490	7740 ± 2450	22150 ± 4950	4440 ± 1150
Yellowtail kingfish	12480 ± 3770	25810 ± 7620	15000 ± 7930	13060 ± 4110
Silver trevally	43840 ± 22190	2180 ± 1930	1010 ± 470	800 ± 500
Tailor	45240 ± 16260	6290 ± 5100	10600 ± 6430	130 ± 90
Blue mackerel	19960 ± 7100	0 ± 0	16690 ± 11350	100 ± 100
Eastern red scorpionfish	11490 ± 3270	6910 ± 3510	3450 ± 990	810 ± 340
Teraglin	23450 ± 13340	100 ± 100	7170 ± 2610	1030 ± 660
B) Dropline				
All Species combined	**42290 ± 6930**	**3510 ± 1770**	**46520 ± 6190**	**2420 ± 750**
Blue-eye trevalla	9840 ± 2950	60 ± 60	12660 ± 3120	0 ± 0
Gemfish	9830 ± 3350	120 ± 120	13110 ± 3290	80 ± 50
Yellowtail kingfish	2160 ± 1250	1800 ± 1650	4080 ± 1380	1210 ± 690
Bigeye ocean perch	6620 ± 3850	180 ± 100	5020 ± 1340	0 ± 0
Snapper	1770 ± 1170	50 ± 30	530 ± 260	0 ± 0
Banded rockcod	890 ± 410	0 ± 0	2410 ± 970	0 ± 0
Redfish	1620 ± 730	50 ± 30	1190 ± 270	0 ± 0
Eastern highfin spurdog	1770 ± 1010	0 ± 0	830 ± 680	70 ± 50
Pearl perch	670 ± 340	50 ± 40	180 ± 120	30 ± 30
Philippine spurdog	490 ± 380	210 ± 190	40 ± 40	0 ± 0
C) Set/trotline				
All Species combined	**128510 ± 21200**	**26650 ± 6280**	**171340 ± 44830**	**27990 ± 6690**
Bigeye ocean perch	22400 ± 6650	730 ± 410	41000 ± 24870	0 ± 0
Pink ling	24600 ± 10640	0 ± 0	22480 ± 15900	0 ± 0
Snapper	14940 ± 5720	2930 ± 1090	13630 ± 4360	580 ± 310
Gummy shark	12610 ± 7600	200 ± 150	27020 ± 18600	70 ± 70
Whitefin swellshark	8820 ± 3210	0 ± 0	16740 ± 8310	130 ± 130
Eastern fiddler ray	5970 ± 4580	2920 ± 1530	3830 ± 3200	2260 ± 1090
Draughtboard shark	10890 ± 7510	310 ± 230	1220 ± 1040	460 ± 340
Port Jackson shark	120 ± 100	3810 ± 1670	1580 ± 1110	7800 ± 5320
Ribaldo	3920 ± 1820	410 ± 300	8970 ± 7430	0 ± 0
Eastern red scorpionfish	3250 ± 1520	50 ± 50	2410 ± 1080	0 ± 0

The estimated total number (± SE) of all fish caught and retained via dropline in NSW waters during the first year and second year of the study was approximately 42,290 ± 6,930 and 46,520 ± 6,190 fish, respectively (Table 12B). These totals comprised, respectively, an estimated 9,840 ± 2,950 and 12,660 ± 3,120 blue-eye trevalla, 9,830 ± 3,350 and 13,110 ± 3,290 gemfish, 6,620 ± 3,850 and 5,020 ± 1,340 bigeye ocean perch, and 2,160 ± 1,250 and 4,080 ± 1,380 yellowtail kingfish. The estimate of total dropline discards (species combined) for each of the two years was around one magnitude lower than estimated total retained catch , at 3,510 ± 1,770 and 2,420 ± 750 fish, respectively. These comprised, respectively, an estimated 1,800 ± 1,650 and 1,210 ± 690 discarded yellowtail kingfish, with much lower estimates of discards for other dropline species.

The estimated total number (± SE) of all fish caught and retained via set/trotline in NSW waters was approximately 128,510 ± 21,200 fish during the first year and 171,340 ± 44,830 fish during the second year of the study (Table 12C). These totals comprised, respectively, an estimated 22,400 ± 6,650 and 41,000 ± 24,870 bigeye ocean perch, 24,600 ± 10,640 and 22,480 ± 15,900 pink ling, 14,940 ± 5,720 and 13,630 ± 4,360 snapper, 12,610 ± 7,600 and 27,020 ± 18,600 gummy shark, and 8,820 ± 3,210 and 16,740 ± 8,310 whitefin swellshark. The estimates of total set/trotline discards (species combined) were 26,650 ± 6,280 and 27,990 ± 6,690 fish, respectively, comprising, respectively, an estimated 3,810 ± 1,670 and 7,800 ± 5,320 discarded Port Jackson shark and 2,930 ± 1,090 and 580 ± 310 discarded snapper.

Interactions with threatened and/or protected species

Instances of interaction between fishing gears and species listed as threatened and/or protected (at the time of sampling) were rare during line-fishing trips observed as part of this study. These interactions comprised hooking incidents involving grey nurse shark (*Carcharias taurus*), great white shark (*Carcharodon carcharias*), eastern blue devil (*Paraplesiops bleekeri*), black rockcod (*Epinephelus daemelii*), eastern blue groper (*Achoerodus viridis*) and short-tailed shearwater (*Puffinus tenuirostris*, also known as mutton bird). In addition, a humpback whale (*Megaptera novaeangliae*) swam into a deployed line on one confirmed occasion. Catch and catch-rate summaries for the fish and shark species mentioned are presented in Appendices C, E and F.

A total of two grey nurse sharks were caught during observed fishing days, each recorded during separate set/trotline fisher days within the central region × P56 stratum. Both were hooked during overnight gear-sets and released alive upon gear retrieval. Anecdotal accounts from observers indicated that both sharks swam down and away from the vessel upon release. Using OTLF fisher effort reporting records, these captures can be up-scaled to an estimate of the total annual discarded catch (to the nearest 10) for the set/trotline method in NSW waters of 40 ± 30 grey nurse sharks during that second year of the 24-month study. Notably, using the same estimation method the total catch of grey nurse sharks for the first year was estimated to be zero.

A number of important assumptions and caveats associated with these estimates and those below for other rarely-encountered species are outlined and discussed in detail in 'Interactions with grey nurse shark and other protected species' p65 and 'Reliability of estimates of total catch' p66. It must be noted here, though, that the reliability of estimates of total annual catch or bycatch in the cases of relatively rarely caught species (such as, for example, here for grey nurse shark and below for great white shark and dogfish species) should be considered highly questionable due to the small sampling fractions (i.e. observer coverage) involved, combined with the rarity and non-regularity of captures or interactions. This statistical uncertainty is illustrated by the relatively large SE estimated for grey nurse shark above (i.e. 30 sharks), which should be interpreted as an estimated total number of grey nurse sharks caught and released by set/trotline fishers for the second year of somewhere between 10 and 70 sharks (but none during the first year).

Four great white sharks were recorded during this study – two in the central region (P34 and P56) and one each in the north (P78) and south (P56) regions – with all hooked via set/trotline. Notes from observers indicated that all were alive upon release. These captures correspond to estimates of the total annual discarded catch for the set/trotline method in NSW waters of 20 ± 20 and 140 ± 100 great white sharks during the first and second year of the study, respectively.

During additional fisher days observed as part of the separate, concurrently-run Commercial Shark-fishing Observer Project, there were some additional instances of hooking interaction with grey nurse sharks, great white sharks and green turtles (*Chelonia mydas*) involving set/trotline gears specifically targeting large sharks (refer to Macbeth *et al.*, 2009 for details). It is worth noting that the five grey nurse shark interactions recorded as part of that study includes the two reported here, while the seven great white shark interactions recorded as part as the shark-fishing study includes three of the four reported here (i.e. those from the north and central regions).

Two eastern blue devils were caught and discarded during one set/trotline fisher day within the north region × P78 stratum, while a total of three instances of discarding of eastern blue groper were recorded during two separate set/trotline fisher days within the north region × P34 stratum – two on one day and one on another. Total annual discarded set/trotline catch for these species in NSW waters were estimated as 50 ± 50 eastern blue devils (year 2; zero for year 1) and 170 ± 120 eastern blue groper (year 1; zero for year 2). One black rockcod was caught and discarded during a handline fisher day within the north region × P78 stratum, corresponding with an estimate of total annual discarded handline catch for the set/trotline method in NSW waters of 70 ± 70 fish during year 2 of the study (zero for year 1).

A short-tailed shearwater was hooked through the beak during a handline day observed within the central region × P12 stratum. The incident occurred in close proximity to the vessel and was caused by the bird diving to chase a baited hook during gear retrieval. The bird was retrieved to the vessel, manually de-hooked and immediately released alive. It was then observed to fly a short distance from the vessel, only to land and sit on the surface of the water. Visual monitoring of its behaviour indicated that the bird was not at all distressed by the encounter after release.

A humpback whale swam into the line component of a heavily weighted handline deployed in deep water during a fisher day observed within the central region × P12 stratum. The interaction was brief, confirmed by the sudden deviation of the vertical drop of the line as the whale swam underneath the vessel. The vertical drop of the line corrected itself as the whale continued along its travel path, with further visual monitoring indicating that the animal was not noticeably distressed by the encounter.

Some species from two families of shark – hammerheads (Family Sphyrnidae) and deepwater dogfishes (Family Centrophoridae) – have been classified as threatened since the completion of the field sampling phase of this study and are now, effectively, protected species. These are scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), southern dogfish (*Centrophorus zeehaani*) and Harrisson's dogfish (*Centrophorus harrissoni*). Catch and catch-rate summaries for the latter three species are presented in Appendices C, E and F.

Two great hammerheads were caught and retained on separate set/trotline fisher days done in the central region – one during year 1(P34) and one during year 2 (P78) – corresponding with an estimate of total annual set/trotline catch in NSW waters of 20 ± 20 for each of the two years of the study. Macbeth *et al.* (2009) presents more detailed set/trotline catch data for great hammerhead. While scalloped hammerhead was not observed during line-fishing days sampled as part of this study, this species was frequently recorded during OTLF set/trotline days observed as part of the Commercial Shark-fishing Observer Project (refer to Macbeth *et al.*, 2009 for details).

Captures of southern dogfish were observed only in the south region, with 15 caught and discarded during one set/trotline day (P78), two caught and retained during another set/trotline day (P34), and three caught and retained during three separate dropline days (P12 and P78 × 2). These captures can be up-scaled to estimates of total annual interactions with set/trotline gears in NSW waters during the study (to the nearest 10) of 120 ± 120 and 990 ± 990 sharks for years 1 and 2, respectively. For dropline, estimates were calculated as 60 ± 60 and 80 ± 50 sharks for years 1 and 2, respectively. Harrisson's dogfish were recorded only in dropline catches in the north region, with < 3 individuals caught per fisher day on two days in each of P12, P34 and P78, and with all retained. Estimates of total annual dropline interactions with this species in NSW waters during the study were calculated as 230 ± 110 and 140 ± 90 for years 1 and 2 of the study, respectively.

Discussion

Whether done over shorter timeframes (i.e. over 1–3 years) such as in the cases of this study and many others (e.g. Liggins *et al.*, 1996; Liggins *et al.*, 1997; Gray, 2002; Stewart *et al.*, 2005; Begg *et al.*, 2007), or undertaken as ongoing monitoring over longer timeframes (e.g. British Columbian ocean trawl: 10+ years, 100% coverage – Haigh and Schnute, 2007; Gulf of Mexico shrimp trawl: 13 years – Nance, 2007), scientific sampling of catches by independent fisheries observers is arguably the most reliable source of data concerning commercial fishing activities (McVea and Kennelly, 2007). When implemented effectively, observer-based research minimises the potential biases, limitations and shortcomings associated with the compilation and interpretation of data collected via voluntary or compulsory fisher-dependent catch reporting programs (Van Atten, 2007). When considered in terms of increasing responsibility and accountability expected of the fishing industry and the regulatory bodies that manage fisheries, formal observer programs can be well worth the initial and ongoing investment by both industry and government.

Fisher participation

The effectiveness of observer-based research strategies in obtaining representative information about fisheries can be substantially compromised if co-operation by the fishers is on a voluntary basis only (Carlson *et al.*, 2007). The 27% cooperation rate of OTLF fishers in this study is very low in comparison with other, well developed fisheries; a fact that inherently compromises the representativeness of the derived catch rate and total catch estimates (see ‘Representativeness of sampling’ p61 and ‘Reliability of estimates of total catch’ p66). Many fisheries around the world – primarily (but not exclusively) associated with fully developed countries including Canada, U.S. and New Zealand – already have some form of compulsory observer arrangement in place, although the purposes of these are usually not only for scientific assessment of stocks or bycatches, but also to ensure strict compliance to fishery regulations (McVea and Kennelly, 2007). Further, some fisheries systematically achieve 100% observer coverage for all or a specifically defined part of the fishery via a ‘no observer – no fishing trip’ policy (e.g. North Pacific U.S. groundfish fisheries – Loefflad *et al.*, 2007; British Columbian groundfish trawl fishery – Sinclair, 2007; Namibian fisheries in south-eastern Atlantic waters – Voges and Kruger, 2007; south-eastern U.S. shark fisheries – Bethae and Baremore, 2007; NOAA, 2009). In contrast, levels of observer coverage in fisheries in the European Union that are locally deemed acceptable are suitably achieved via a voluntary system, although there are plans to change to mandatory coverage (Borges, 2007). Indeed, the relative merits of voluntary vs. compulsory observer programs and limited vs. extensive levels of observer coverage are constructively debated among the world’s commercial fishers, fisheries managers and scientists on an ongoing basis (e.g. Borges, 2007; Buston, 2007; Carlson *et al.*, 2007; Erikson, 2007; Loefflad *et al.*, 2007; Sinclair, 2007). It is clear that the most useful strategy for any given fishery should be determined on a case-by-case basis according to considerations such as: total value of the fishery; number and type of vessels; extent of interactions with protected and/or non-target species; and source and availability of funding.

Representativeness of sampling

With the overall levels of observer coverage achieved for each of the three fishing-method categories in this study very low by modern expectations (1.1% for handline, 3.1% for dropline and 2.2% for set/trotline), there is an inherently higher risk of any unforeseen and/or unavoidable biases in the sampling to impact general representativeness compared to the theoretical case of levels of coverage being higher (e.g. > 10%). However, this inaugural observer-based sampling program in the line-fishing component of the OTLF was conceived primarily to gather basic information across a range of considerably differing line-fishing methods operating highly frequently and across stratified spatial and temporal scopes, with finite sampling resources befitting the relatively low value, artisanal characteristics of the fishery. The considerable intra-method variation observed with respect to target species and specific gear configurations (see ‘Variability in line fishing methods, targeting and catch composition’ p63) is a very important finding in terms of better designing more targeted observer-based research programs for each of the various line-fishing methods. For each of the line-fishing methods, higher coverage combined with stratification of sampling according to intra-method variability would improve representativeness and, therefore, accuracy of catch rate and total catch estimates (see recommendation p67).

Fogarty *et al.* (2007) stated that “observer programs with < 100% coverage cannot accurately sample the fleet if the vessel selection procedure for deploying observers is biased.” Although the proportion of OTLF line-fishers volunteering to host observers here (27%) was fairly low, this would not have been overly problematic if the subset of cooperative fishers was reasonably representative of the range of methods, target species and fishing grounds associated with the entire fleet. However, refusals to participate by specific subsets of OTLF fishers for specific reasons did compromise the general representativeness of this study as a whole.

The first example of this involved the unwillingness of most set/trotline fishers targeting large sharks in the north region to host observers during the first 12 months of the study (i.e. P12 and P34; September 2007 to August 2008). This resulted in estimates of total catches of large shark species to be extremely low compared with levels reported by the fishers via their catch reporting (Macbeth *et al.*, 2009; NSW DPI 2011). This was rectified to some degree via the introduction in September 2008 of a permit for large-shark targeting, which stipulated that permit holders must allow an observer to accompany them when requested. As a consequence, the estimates of total catches of large shark species derived via observed fisher days were closer to reality for the duration of the second half of the study (i.e. P56 and P78; September 2008 to August 2009).

The most important aspect of gaining observer access to catches of large sharks was in obtaining reliable information concerning species composition of catches, which was absent in the case of the north region prior to the introduction of the shark permit system mentioned above. Systematic misidentification of large shark species by fishers (Macbeth *et al.*, 2009), combined with the fact that large-shark fisheries are notoriously susceptible to stock collapse (e.g. Morgan *et al.*, 2009), means that obtaining ongoing estimates of the level of catch in this the large-shark sub-fishery on a species-by-species basis has been and is of obvious ongoing importance within the management framework of the OTLF.

The second example involved fishers who rescinded their willingness to participate at some point during the 24-month duration of the study in response to some change in the conditions of their OTLF endorsement. With changes to minimal legal sizes and/or maximum possession limits for certain species introduced during the study, fishers targeting those species became unwilling to participate due to frustration and/or the perception that increased transparency of catches would result in negative outcomes for the fishers’ operations. When multiple (if not all) fishers targeting a given species opt out of participating mid-way through a two-year observer study, the reliability of catch and catch rate estimates for that species can become seriously compromised.

To maximise the value of observer-based research, a legislative framework associated with licensing of commercial fishing operations providing fisheries scientists with a mandate to conduct observer research on any vessel at any time, such as that imposed via the sandbar shark permit during 2008/09 (Macbeth *et al.*, 2009), would clearly be of great benefit. Such progress in NSW would require collaboration involving: 1) NSW DPI in providing suitably trained and equipped observers; 2) commercial fishers and their insurers in accepting the concept of compulsory hosting of observers (when requested); and 3) NSW RMS/Waterways in providing an avenue for trained and equipped observers to do their job while satisfying marine safety guidelines. There would, of course, be some logical exceptions to compulsory hosting of observers, such as in the case of very small commercial fishing vessels with prohibitively limited deck space (Baremore, 2007; Vestre, 2007). Most operators of commercial fishing vessels in NSW do, however, have the capability to make arrangements that would allow an observer onboard without too much disruption to fishing activities.

Variability in line-fishing methods, targeting and catch composition

Perhaps the most important aspect of the handline, dropline and set/trotline components of the OTLF sampled during this study was the variability in gear configuration and method of operation within those line-fishing reporting categories. 'Dropline' (or 'vertical longline' – Sainsbury, 1996) technically refers to the specific method of fully deploying a weighted and floated, multi-hook line, which in waters off NSW is most commonly used in deeper water to target species such as blue-eye trevalla, banded rockcod and yellowtail kingfish. However, some fishers targeting the same deeper water species on the same fishing grounds used electronic deck-reels to deploy and retrieve similarly configured bottom rigging such that floats were not required and the gear was connected to the vessel (i.e. via the deck reel) at all times. The important observation here was that some of the fishers using the latter method were reporting it (technically correctly) as handline, while others were, understandably and possibly more usefully, reporting it as dropline. Similar issues were evident for methods reported as setline or trotline, with various inconsistencies among fishers identified (see 'Observed fishing effort' p34).

Similarly, within each method category there were considerable differences in targeting behaviour and, consequently, gears used and catch compositions among fishers within regions and among regions. Clearly one of the main contributing factors influencing such differences was variability in the presence and/or abundance of favoured marketable species at different latitudes and depths. For example, the apparently higher abundance of large migratory carcharhinids such as sandbar and blacktip shark in the north and central regions resulted in a substantial proportion of the observed setline and trotline effort being directed towards them. In contrast, in the south region much of the observed set/trotline effort was directed towards relatively deeper water species such as pink ling, bigeye ocean perch and species of swellshark. Targeting of wobbegong using setlines in shallow water around headlands (< 15 m deep) in the central region was prevalent, with restrictions on setline configuration and use within 3 nm of the coast (i.e. no more than six hooks per setline and no more than ten setlines concurrently deployed), combined with differences in shallow vs. deeper water species, inherently contributing to overall variability in setline configuration and daily catch rates. While snapper were commonly targeted and caught via setline in the north and south regions, no setline trips targeting snapper in the central region were observed, although such targeting is known to occur. Similar examples of spatial variability in methodology, targeting and catches were evident for handline (e.g. Australian bonito) and dropline (e.g. yellowtail kingfish), illustrating the inherent limitations of low observer coverage in highly diverse fisheries.

Line-fishing bycatch in the OTLF

Discarding behaviour could be grouped into three general categories according to species, size limits and marketability. First, substantial proportions of some highly marketable (and/or targeted) species were discarded due to their sub-legal size (e.g. snapper and yellowtail kingfish) or exceedance of daily catch limits (e.g. gemfish). Second, the vast majority of other species caught were, at the discretion of the fisher, sometimes retained and sometimes discarded (e.g. eastern red scorpionfish and some shark species), depending on the level of success in catching the more desirable and/or marketable species. The final category comprised unmarketable species (e.g. ballonfish and porcupinefish) and threatened and/or protected (i.e. prohibited) species (see 'Interactions with grey nurse shark and other protected species' p65), for which all individuals were discarded.

An unknown proportion of discarded teleost bycatch would likely have died (on the hook or following release) from barotrauma if caught from depth (i.e. > 30 m) or hook-related injury (Lenanton *et al.*, 2009; Grixti *et al.*, 2010; Roberts *et al.*, 2011; Broadhurst *et al.*, 2012; Butcher *et al.*, 2012), or a combination of both. Similarly, large carcharhinid species released alive following capture by set/trotline in the OTLF have been demonstrated to sometimes die from the capture-and-release ordeal, either on the hook prior to gear retrieval (Macbeth *et al.*, 2009; Butcher *et al.*, 2015) or within hours of release (Barnes *et al.* 2015). Given this, estimates of fishing mortality inflicted upon populations of those species derived from retained catches of legal-size fish, or even survival status (i.e. alive or dead) of discards upon release, are likely underestimated either slightly or substantially, depending on the line-fishing method, location of fishing and the resilience of individuals of the species involved. In order to most diligently estimate overall fishing mortality for any given species, all sources should be considered (where available), including estimates of post-release mortality.

For the purpose of deriving estimates in this study, ‘bycatch’ was defined as all animals captured and immediately discarded (or released), irrespective of condition (i.e. alive or dead) or likely fate. Fish captured and temporarily retained as bait, such as yellowtail scad or blue mackerel, were classified as retained catch regardless of their ultimate fate (i.e. they may have been used as bait or discarded, commonly in poor condition, at the end of the day). It is important to clearly define such terminology, as usage has varied among published studies, hindering reliable inter-fishery comparisons of bycatch rates (per unit of time and/or gear) or ratios (bycatch per unit of total catch or retained catch) (Alverson *et al.*, 1994; Bartram and Kaneko, 2004).

For similar reasons, the distinction between bycatch rates or ratios derived via catch weights or via number of individuals is of equal importance. Trawl fisheries targeting small species such as shrimps may have large differences between bycatch ratios generated by weight and by number, primarily due to the commonly wide ranges of sizes of bycatch individuals caught. Lower disparity would generally be expected for line fisheries given the influence of hook size on size selectivity of such gears (irrespective of species). All catch quantities, and hence bycatch rates and ratios, for the three OTLF line-fishing categories examined in this study were calculated for number of individuals rather than weights.

Overall bycatch ratios (expressed here as the proportion of the total catch (by number) that was subsequently discarded) for the three OTLF line-fishing categories examined were 15% for handline, 7% for dropline and 17% for set/trotline. These ratios are low compared to most estimates generated via past observer-based research on many other commercial methods in NSW waters, with overall mortality rates of discards also, arguably, likely to be comparatively low (depending on fishing method and species). For example, the most recent estimate for the Ocean Prawn Trawl fishery was ~75% by weight (Kennelly *et al.*, 1998), although the proportion would have certainly been much lower if calculated by number (see previous paragraph). Estimated bycatch ratios for Clarence River prawn trawling ranged from 16–31% by weight (Liggins and Kennelly, 1996). Estimates for estuarine methods have included: 44% by number for finfish beach seines (Gray *et al.*, 2001); 44–68% by number for flathead gill nets (Gray *et al.*, 2004); and 7–47% by weight for various non-trawl prawn-catching methods (Andrew *et al.*, 1995; Gray, 2001; Gray *et al.*, 2003).

Comparable bycatch ratio estimates (by number) for a range of US Bering Sea commercial fisheries, derived from catch data collected by scientific observers during 1992 (Alverson *et al.*, 1994), were also substantially higher than those estimated here for OTLF line-fishing. Bycatch ratios for demersal longlines targeting species such as Pacific cod (*Gadus macrocephalus*), sablefish (*Anoplpoma fimbria*) and/or turbot (*Reinhardtius hippoglossoides*) in the Bering Sea were estimated at 43–69%, while ratios were estimated at 15–94% for finfish pot (i.e. trap) methods and 21–82% for finfish trawl methods. It should be noted, however, that these examples involve data collected 15 years prior to the current study.

Interactions with grey nurse shark and other protected species

The rare instances of interaction between OTLF line-fishing gear and protected species observed during this study included arguably minor and unavoidable interactions with a whale and a seabird, and infrequent captures (and releases) of protected finfish (grey nurse shark, great white shark, eastern blue devil and black rockcod) (refer to results of 'Interactions with threatened and/or protected species' p58 for details). Though no observed interactions with marine turtles were observed during this study, rare instances of hooking of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles have been confirmed via other research involving the component of the OTLF that specifically targets large sharks using set/trotlines (Macbeth *et al.*, 2009; Broadhurst *et al.*, 2014). While passive and/or minor, incidental interactions with seabirds were not a focus of this study, this issue has since risen in prominence. Therefore, future observer-based research in the OTLF will be required to include the recording of such data as formal protocol.

In the case of the protected sharks, interactions were exclusively concentrated according to particular OTLF gear-types (i.e. set/trotline) and targeting behaviours (specifically targeting large whaler sharks). These shark-targeting gears have similarly been shown by other fishery-dependent (Macbeth *et al.*, 2009) and -independent (Broadhurst *et al.*, 2014) studies to capture grey nurse shark and great white shark across a wide range of depths in northern NSW waters. Estimates of total annual bycatch of grey nurse shark across the entire setline component of the OTLF for each of the two years of this study were highly disparate and, in one case, with low associated precision (i.e. no sharks in the first year and 40 ± 30 sharks during the second year), indicating questionable reliability of either estimate. This highlights the limited value of small sampling fractions (i.e. observer coverage) such as those associated with this observer study for estimation of total catch or bycatch, particularly in the cases of relatively rarely captured species (see 'Reliability of estimates of total catch' p66). However, irrespective of this inherent uncertainty, if the estimate for the second year of the study is close to the true capture rate then the frequency of interaction of large-shark setlining with grey nurse shark must be considered to be of concern given the paucity of information regarding post-release mortality of this species (see below). Further, the current system of self-reporting of grey nurse shark interactions by commercial fishers, which has yielded very few reports over the period of implementation, would need to be reconsidered as a primary source of such information.

Notably, the two interactions with grey nurse sharks observed during this study (and the three additional interactions observed during the separate, dedicated Commercial Shark-fishing Observer Project; Macbeth *et al.*, 2009) did not result in confirmed mortalities, with the sharks released alive. There is, however, no way of knowing if those individuals completely recovered from their capture-and-release ordeal. Notably, Macbeth *et al.* (2009) found that although all grey nurse sharks observed to be hooked by OTLF setline gear targeting large sharks were alive upon capture and release, 25% of those for which hooking position was recorded were gut-hooked (1 of 4 sharks), with the remainder mouth-hooked.

Information concerning rates and position of hooking in the eastern Australian grey nurse shark population presented by other studies provides further context to these results. Independent estimates concerning the proportion of grey nurse sharks in the eastern Australian population displaying evidence of hook interactions (recorded via SCUBA, photographic analysis and/or other methods) have included: 4.5% (9 of 201 sharks) and 6.2% (21 of 339 sharks) (Cardno Ecology Lab, 2010); between 3% and 17% (across ten surveys of between 120 and 292 sharks, Otway *et al.*, 2003); 17% (113 of 673 sharks, Bansemer, 2009); and 29.2% (7 of 24 tagged sharks showing evidence of being hooked/released while at liberty, Otway and Burke, 2004).

Autopsies performed on grey nurse sharks accidentally caught and killed over a period of time showed that 75% (6 of 8) were internally hooked (Otway and Burke, 2004), with some of those sharks gut-hooked (Otway unpub. data). With gut-hooking in particular thought to be highly, if not 100% lethal to grey nurse sharks (Otway pers. comm.), any incidence of hooking in the OTLF is concerning and should be avoided as a matter of course for the protection of the species (Otway *et al.*, 2004). Depending on whether the east coast grey nurse shark population was to be scientifically demonstrated to be increasing, decreasing or static at the current estimated level of interactions with commercial (and recreational) fishing gears, a range of commensurate OTLF management options are available for development and implementation.

Reliability of estimates of total catch

The accuracy and precision of estimates pertaining to 'up-scaling' of information collected during observed trips to estimate total catches for the fishery (or, in this case, specific methods within the fishery) are reliant on two potentially controllable components of the calculations. First, the accuracy and completeness of the fisher-dependent catch records are important in providing estimates of total effort (in fisher days). Incomplete catch records will most likely result in underestimation of total catch or interactions with threatened and/or protected species such as grey nurse shark. Second, the representativeness of the sampled days in terms of levels of fisher participation (and observer coverage), gears used and species targeted can result in underestimation or overestimation of catches, depending on the type and extent of sampling biases encountered. Any biases or unaccounted-for changes associated with those two components are almost certain to have detrimental consequences with respect to accuracy of estimates of catch rates and total catches calculated to represent those for each spatial/temporal sampling stratum and those for strata combined (Koopman *et al.*, 2007).

For example, the abovementioned reticence of set/trotline fishers targeting large sharks in the north region to host observers for the first half of this study is likely to have resulted in an underestimation of total interactions with grey nurse sharks, as evidenced by the relatively higher catch rates recorded by Butcher *et al.* (2015). While it is now known that such interactions do occur in this north region subset of the set/trotline component of the OTLF, those under-represented large-shark setline days were still part of the calculation via the fisher-dependent effort reporting used for the total estimated catch up-scaling procedure. Given the importance of interactions with grey nurse shark and other threatened and/or protected species to the future management of the OTLF, it would obviously be wise to ensure as much accurate effort data as possible is available. Further, it is important that spatial and/or temporal inconsistencies in representativeness of sampling are carefully considered before estimates of interactions across the fishery are made.

Conversely, owing to the same inconsistency in representativeness of sampled set/trotline days in the north region, it is likely that estimates of total retained and discarded catch of snapper via set/trotline generated here are overestimates. The proportion of observed set/trotline days targeting snapper in the north region during the first half of the study was overrepresented as a consequence of observer effort defaulting to those snapper setliners willing to host observers. Average catch rates from those observed days were also assumed for the mostly non-observed large-shark setline days as part of the calculation to estimate total catches. With snapper very rarely caught by setlines targeting large sharks due to the differing gear configurations (e.g. hook size) and fishing grounds (Macbeth *et al.*, 2009), catches of snapper in this case were inherently overestimated.

Conclusions and recommendations

On the basis of the above findings, the following conclusions and recommendations are made:

1. Observer-based research programs provide an effective strategy for collecting reliable catch and biological data pertaining to commercial fishing activities, although their effectiveness can be limited if co-operation of the commercial operators is on a voluntary basis only. Therefore, if possible, NSW DPI scientists should be provided with a mandate to conduct observer-based sampling of catches for research purposes (via a combination of onboard observers and electronic technology), where such research is deemed necessary for the effective monitoring and management of stocks of aquatic and marine animals.

2. Levels of discarding and the proportion of bycatch in total catches are generally low in the line-fishing component of the OTLF compared with other commercial fishing methods used in NSW waters. Notwithstanding this, the issue of rates of post-release mortality should be formally reviewed for each of the line-fishing methods separately, with subsequent review and informed revision of fishery management arrangements undertaken with a view to reducing mortalities of discards.

3. Overall there were few physical interactions between fishing gears and threatened and/or protected marine species during the observed fishing trips. There were infrequent captures of grey nurse sharks and great white sharks, and very rare, isolated incidents involving interactions with marine mammals and birds. Nonetheless, NSW DPI and industry should work together to investigate strategies to minimise the probability of such physical interactions. While passive interactions (i.e. no physical contact) between seabirds, reptiles and mammals and fishing operations were not considered during this study, physical and passive interaction between seabirds and fishing gear has become a very topical issue. These concerns have led to the development and implementation of Sea-Bird Management Systems in all commonwealth fisheries and many state jurisdictions. Future observer-based research in the line-fishing component of the OTLF should be updated to include protocols and associated training of staff in identification of all such interactions.

4. The data collected during this inaugural observer study in the line-fishing component of the OTLF will be very useful for designing future observer-based research programs for the various line-fishing methods used in the fishery. The first step in this process would be to retrospectively assess the accuracy of estimates of retained catch rate and total annual retained catches generated by this study via comparison with estimates derived from catch and effort data submitted by fishers (catch returns). Armed with this information, the second step would be to apply standard modelling techniques to data collected in this current study to determine the most likely sampling regimes for achieving nominally-prescribed, acceptable levels of accuracy and precision around estimates of retained catch rate and total annual retained catches for future observer-based research.

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Appendices

Appendix A – Observer-Based Survey of Commercial Line Fishing in Oceanic Waters off NSW – Details of Survey Coverage. Prepared by Cardno Ecology Lab for NSW DPI, Dec 2010.

Cardno Ecology Lab

Shaping the Future

Marine and Freshwater Studies

Observer-Based Survey of Commercial Line Fishing in Oceanic Waters off NSW

Details of Survey Coverage

Job Number 14/0708 Final

Prepared for

Industry and Investment NSW

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Executive Summary

Cardno Ecology Lab Pty Ltd was contracted by Industry and Investment NSW (I&I NSW), formally NSW Department of Primary Industry (DPI) to collect data for the Commercial Line-fishing Observer Program from 192 commercial line-fishing trips in two regions (North and South) between September 2007 and August 2009. These data, collected by trained observers, were to include information about handlining, setlining / trotlining and droplining gear deployment and retrieval, retained and discarded catch and included collections of biological samples. To collect these data, observers were permanently based in the North and South regions of the fishery.

Generally only small numbers of active fishers using any of these methods were potentially available for the survey. This was due to irregular and seasonal fishing and some non-participation and led to difficulties in reaching the target number of trips in some seasons.

A total of 191 of the required 192 trips were completed in the program. These included some trips undertaken within another region (the Central region), as well as some trips undertaken as part of the Commercial Shark-fishing Observer Project which had significant overlap in scope with the Commercial Line-fishing Observer Program.

Biological samples were collected and preserved according to the guidelines provided by I&I NSW. On some trips where sharks (particularly gummy sharks) were targeted, the rate at which sharks were landed and processed did not allow the observer to obtain samples from the entire catch.

Photographs of catch taken by observers have been provided to I&I NSW.

An assessment of the project against performance indicators for 'data collection' and 'data entry and despatch' (as specified in the 'Agreement for Services') showed a general compliance of requirements, however there were instances where only partial compliance was attained. In these instances, timely and appropriate communication between Cardno Ecology Lab and I&I NSW was undertaken to resolve these issues.

Table of Contents

1 Introduction

Cardno Ecology Lab Pty Ltd was contracted by the Industry and Investment NSW (I&I), formally NSW Department of Primary Industry (DPI) to collect data from 192 commercial line-fishing trips as part of the Commercial Line-fishing Observer Program. These included:

- 128 trips in a North region, Tweed Heads to South West Rocks inclusive;
- 64 trips in a South region, Currarong to the Victorian border.

These trips were to be undertaken in eight seasons over two years:

- Spring 2007 (August – November);
- Summer 2007/2008 (December – February);
- Autumn 2008 (March – May);
- Winter 2008 (June – August);
- Spring 2008 (September –November);
- Summer 2008/2009 (December – February);
- Autumn 2009 (March – May); and
- Winter 2009 (June – August).

These data, collected by trained observers, included information about handlining, setlining / trotlining and droplining gear deployment and retrieval, retained and discarded catch and involved collections of biological samples of sharks.

The specifications for data collection (including the distribution of sampling effort), project deliverables and scheduling were specified in the 'Agreement for Services'. Performance indicators for the project were also specified. This final report consolidates informal reporting to I&I NSW of the coverage of the total of eight seasons of the survey, describes problems that have affected collection of data and assesses the project against the performance indicators.

2 General Operations at Sea

At sea, few operating problems were encountered by any of the observers. The most common problem was that the weights and/or sizes of some fish had to be estimated occasionally, or at worst, were not recorded. This occurred when:

- Fish (e.g. rays) to be discarded were cut off at the side of the boat because they were too large to bring onboard;
- Fish were to be kept for live bait and fishers indicated that they were not to be handled in case they became damaged;
- Fisher and/or observer wanted undersized fish to be returned to sea as soon as possible to avoid the slow process of weighing and/or measuring that could potentially cause mortality; or
- Large fish (particularly undersized kingfish that were to be returned to the sea alive) could not be kept still enough for effective measurement.

Difficulties were also experienced by observers in the collection of biological samples of sharks on targeted shark trips when large numbers of individuals were caught and processed faster than samples could be collected by observers.

3 Survey Design

The sampling design specified that for the North region, 16 observer trips (eight handlining, four droplining and four setlining) were to be done in each season (Appendix B of the 'Agreement for Services'). In the South region, eight trips (three handlining, two to three droplining and two to three setlining) were to be done in each season. In addition, trips were to be distributed evenly across three fisher-reporting (FR) zones in the North region and two in the South region and no more than two trips per season were to be done with any given fisher (Appendix F of the 'Agreement for Services').

To achieve this, four observers were permanently-based in the North region and one (sometimes two) in the South region. Nevertheless, mid-way through the first season major logistical difficulties were encountered in trying to distribute sampling effort across FR zones and in limiting the number of trips with individual fishers. To address these difficulties, advice was sought from I&I NSW (Will MacBeth) about having a flexible approach to collecting data for the survey. I&I NSW advised that a more opportunistic approach to obtaining trips could be used if observers found it impossible to obtain trips from particular fishers (using particular methods) in some FR zones. In addition, in the South region, approval was also given for trips to be done in a third FR zone (Botany Bay – Greenwell Point). The advice also applied to situations where a run of bad weather or fishing conditions limited the time available to complete the required number of trips in a season. A degree of flexibility was also introduced into the duration of each season, with seasons extended for a period of up to two weeks due to bad weather, fishing conditions and fisher activity. Furthermore, Cardno Ecology Lab undertook trips in the Central region throughout the program that were credited to the total allocation of trips, on an informal exchange basis for trips undertaken in the North and South regions by observers employed by I&I NSW. Observers in the North region participating in the I&I NSW managed Commercial Shark-fishing Observer Project, which had a significant overlap in scope with the Commercial Line-fishing Observer Program, were on some occasions paid by Cardno Ecology Lab and these trips were credited to the total allocation of trips.

The advice was given in good faith and on the understanding that the original sampling design would be adhered to as best as possible.

4 Survey Coverage

One hundred and ninety one observer trips out of the required 192 (the overall target) were accounted for in the program. Of these trips; 119 were in the North region, 55 were in the South region, and 13 were in the Central region (total of 187 trips). The distribution of these trips by season, method and fishery zone is presented in Table 1. Four trips from the Commercial Shark-fishing Observer Project were paid for by Cardno Ecology Lab and credited to the trip allocation for the Commercial Line-fishing Observer Program. The outstanding trip was intended to be a Commercial Shark-fishing Observer Project trip in which the observer was to invoice Cardno Ecology Lab, however this invoice has not been received, and therefore this trip is not credited to the total trip allocation for the program.

The following sections describe coverage in the North, Central and South regions throughout the program and trips also undertaken for the Commercial Shark-fishing Observer Project. The collection of biological samples and photographs is also discussed.

4.1 North Region

In the first year of the survey, fourteen observer trips (two less than the target) were done in Spring 2007 and fifteen (one less than the target) in Summer 2007/2008) (Table 1a). The shortfall for Spring 2007 comprised one setlining trip. In Summer 2007/2008, only two of the required four droplining trips were done although an extra (fifth) setlining trip (above the four required) was also done. In Autumn, Winter and Spring 2008, all sixteen trips (eight handlining, four droplining and four setlining) were done.

In the second year of the survey, the full compliment of 16 trips were undertaken in Spring 2008 and Summer 2008/2009, although in summer there was a shortfall of one droplining trip, and an extra handline trip. In Autumn 2009 and Winter of 2009, a total of 14 trips and 12 trips were undertaken respectively. In both seasons no setline trips were undertaken, and in Winter only three out of four dropline trips were undertaken. Two additional handline trips were undertaken in Autumn and one additional handline trip in Winter.

Details of all trips done in the North region, including date, fisher, port, method and observer, are shown in Table 2.

North region handlining trips were undertaken with 22 different fishers over the two-year program (Table 3a). Numbers of handline trips undertaken with each fisher throughout the program ranged from 1 to 12. Eight dropliners and seven setliners were used throughout the program, with the numbers of trips undertaken with each fisher ranging from 1 to 10 for droplining and 1 to 11 for setlining.

4.2 South Region

Targets for the South region (8 trips) were achieved in Spring 2007, Autumn 2008 and Winter 2009 (Table 1b). At the request of I&I NSW, two additional trips were undertaken in Spring 2007 and Autumn 2008 seasons and credited to Cardno Ecology Lab's total number of trips. Targets were not reached in Summer 2007/2008, Winter 2008, Spring 2008, Summer 2008/2009, and Autumn 2009 (Table 1b). Details of all trips done in the South region are shown in Table 2. In general, there were significant shortfalls in the number of handline trips undertaken, with some shortfall in dropline trips, and general attainment of targeted trips for setlining.

Trips were distributed, as best as possible, across FR zones (Table 1b). However, in most seasons, trips of a given method could not be done in all zones. The majority of trips were undertaken in the southern most zone between Tuross Head and Eden.

Handlining trips were done with six different fishers, droplining trips were done with three fishers and setlining trips were done with nine fishers throughout the program (Table 3b).

Numbers of trips undertaken with each fisher ranged from one to three for handlining, one to 15 for droplining and one to 9 for setlining throughout the program.

4.3 Central Region

The original scope of Cardno Ecology Lab's involvement in the Commercial Line-fishing Observer Program did not include undertaking observer trips within the Central region. However throughout the program, opportunities were taken when available to undertake trips in the Central region on an informal exchange basis with I&I NSW. These are summarised in Table 3c.

One dropline trip was undertaken in Summer 2007/2008. Twelve handling trips were undertaken throughout Summer 2008/2009, Autumn 2009 and Winter 2009 (Table 1c). These handlining trips were all undertaken with a single fisher.

Details of all trips done in the Central region, including date, fisher, port, method and observer, are shown in Table 2.

4.4 Commercial Shark-fishing Observer Project

Four trips undertaken in the North region as part of the Commercial Shark-fishing Observer Project were invoiced to Cardno Ecology Lab and credited to the total number of trips attained in the Commercial Line-fishing Observer Program. The details of these trips have not been incorporated into the data presented in tables 1, 2 and 3, as they are not part of the Commercial Line-fishing Observer Program. These are summarised below:

Date of Trip	Observer	Fisher-reporting Zone	Fisher
1 June 2009	Observer 4	FR zone 3	Fisher 26
1 June 2009	Observer 2	FR zone 3	Fisher 73
25 June 2009	Observer 3	FR zone 1	Fisher 25
26 June 2009	Observer 3	FR zone 1	Fisher 25

4.5 Collection of Biological Samples and Photographs

Biological samples were collected and preserved according to the guidelines provided by I&I NSW. On some trips where sharks (particularly gummy sharks) were targeted the rate at which sharks were landed and processed did not allow the observer to obtain samples from the entire catch. Ten biological (cartilage and skin) samples were also lost as a result of power outage and subsequent freezer failure. These were collected by Observer 5 on a setlining trip in the South region on 24 October, 2007. Corresponding flesh samples were preserved in alcohol and were not affected. The corresponding sample codes for these samples are:

- SF241007-125
- SF241007-126
- SF241007-139
- SF241007-140
- SF241007-144
- SF241007-147
- SF241007-151
- SF241007-153
- SF241007-156
- SF241007-172

Some specimens were transferred to I&I NSW via Cardno Ecology Lab, while others were retained by observers and transferred directly to I&I NSW as part of the Commercial Shark-fishing Observer Project. It is understood that Observer 4 retains a small number of samples, and that these will be transferred to I&I NSW in association with other samples for different programs.

Photographs of catch taken by observers have been provided to I&I NSW.

5 Problems Affecting Survey Coverage

The survey was affected by irregular and seasonal fishing and because some fishers refused to take observers with them. There was also a degree of uneven distribution of observer effort throughout the program that was the result of: (1) proactive participation by some fishers; (2) variable individual fishing effort throughout the fishery; (3) observer availability; (4) observer program overlap; or a combination of these reasons.

The details of correspondence between observers and fishers in regards to organising trips were kept in ‘call logs’. Appended are two examples of these (Appendix 1) which are referred to in the following sections.

5.1 Irregular and Seasonal Fishing

Observers were provided with lists of fishers who had lodged handlining, droplining or setlining / trotlining catch returns in previous years.

Despite being ‘active’ throughout the duration of the program, very few fishers worked regularly throughout this period. Indeed, many fishers lodged only a few returns per month, or in some months, none at all. It was difficult for observers to organise trips with these fishers as decisions to go fishing with a particular type of gear were dependent on an assessment of conditions on the morning prior to departure or whilst at sea.

Further, some methods were distinctly seasonal. For example, droplining was not commonly done in spring or summer (particularly in the northern region) apparently because of the strength of the current at that time, while handlining was not as common in spring in the southern region.

The call logs presented in Appendix 1 indicate the difficulties observers had in organising trips when many fishers in an area were not fishing regularly.

5.2 Non-Participation by Fishers

The number of fishers that actively participated in the program by taking observers on trips represented varying proportions of the active fleet in different FR zones and for different methods, however there was far from 100% coverage. The level of coverage was partly affected by a high level of non-participation in the survey by fishers (i.e. unwillingness of fishers to take observers on board). Factors affecting participation are listed below:

- Some vessels were not surveyed to carry an extra person (i.e. the observer);
- Participation was voluntary, hence fishers were under no obligation to take observers with them. A proportion of active fishers did not allow observers to come on trips. Some of the reasons given were that:
  - having an extra person onboard would be an inconvenience; and
  - fishers were unsure of I&I NSW’s motives for collecting the data (i.e. they were worried that their good-will would not be reciprocated and the data may be used against them). Historical precedence was cited where, in a recent university research program,

information about wobbegongs was collected. Some fishers believed that the information collected by these researchers, and possibly earlier on in the present I&I NSW observer program, was the basis for implementation of what they considered to be unreasonable fishing restrictions for wobbegongs. There have been other unpopular changes to Ocean Trap and Line Fishery regulations that have occurred co-incidentally with (some fishers believe as a consequence of) this observer project, including: an increase to the size-limit for kingfish; the introduction of a quota for sharks; and a limit to the number of hooks to be used on setlines.

There is little direct evidence in the observers' call logs (Appendix 1) of fishers refusing to participate in the project. However, some fishers, despite indicating that they would be happy to have observers on board, never went fishing when an observer was able to go. Further, in contrast to what the observers may have heard, some fishers indicated that they were currently not fishing or were using another method.

5.3 Proactive-Participation by Fishers

There were instances throughout the program when a fisher was a supporter of the program and had a good working relationship with an observer, and proactively encouraged observer participation. These fishers allowed observers to ensure a trip was undertaken when others fishers where less cooperative or unavailable, although the effect of this was a biased distribution of observer effort to those proactive fishers.

5.4 Variable Effort by Individual Fishers

Within each fishing area, and with each method, some fishers did operate with a significantly higher level of effort. Fishers participating in the program who had a higher level of effort were in consequence available on more occasions. As such, these fishers had a greater observer coverage than others, and this is likely to be reflected in the catch return forms.

5.5 Observer Availability

The amount of work and associated income from the Commercial Line-fishing Observer Program was such that observers were employed on a casual basis. All of the participating observers maintained other employment, as well as sustaining other commitments such as family. It was not reasonable to expect 100 percent availability from observers given the level of employment offered. The result of this was that there were periods throughout the program in which observers were unavailable while fishing activities were occurring.

5.6 Observer Program Overlap

In the Northern region, throughout the Summer 2008/2009, Autumn 2009 and Winter 2009 seasons, I&I NSW was operating the Commercial Shark-fishing Observer Project. There was substantial overlap in scope between the Commercial Shark-fishing Observer Project and Commercial Line-fishing Observer Program. Furthermore, the observers participating in the Commercial Line-fishing Observer Program were also involved with the Commercial Shark-fishing Observer Project. This resulted in reduced observer effort for the Commercial Line-fishing Observer Program as the Commercial Shark-fishing Observer Project was more financially rewarding. This can be seen in the number of setline trips obtained in Autumn and Winter of 2009 (zero) compared with all other seasons.

This situation was discussed and understood by I&I NSW (Will Macbeth) and Cardno Ecology Lab, and arrangement was made to make up the resultant short fall in trips from the Central region, and by Cardno Ecology Lab paying observers for some of the Commercial Shark-fishing Observer Project trips.

6 Assessment Against Performance Indicators for the Project

An assessment of the project against performance indicators for 'data collection' and 'data entry and despatch' (as specified in the 'Agreement for Services') is summarized in Table 4.

Performance indicators for *'Data Collection'*

Extent to which sampling strategies are complied with; the necessary biological samples are collected and appropriately preserved; and the data quality is achieved.

Cardno Ecology Lab has complied with most of the 'standards' for *Data Collection*. However, in seven out of eight seasons in the northern region, it was not possible to reach the target number of trips without using a given fisher three times, or in the one instance, four and five times. Hence, Cardno Ecology Lab only 'partially' complied with the standard to 'Complete observer trips with commercial line fishers so that no more than two trips are done in any given season with any given fisher'. Approval to deviate from this standard when necessary was given by I&I NSW mid-way through the first season (Section 3).

Further, it was not possible to spread observer trips equally among FR zones within regions for each method due to a small pool of fishers making themselves available to observers and because of irregular and seasonal fishing (Section 5). Hence, Cardno Ecology Lab only 'partially' complied with the standard to 'Complete observer trips with commercial line fishers according to the sampling-design specifications given in Appendix C of the Agreement'. Approval to deviate from this standard when necessary was given by I&I NSW mid-way through the first season (Section 3).

Finally, it was not possible to collect all required biological samples, as in some instances, particularly during targeted gummy shark operations, sharks were landed and processed faster than could samples could be collected by the observer. Hence Cardno Ecology Lab only 'partially' complied with the standard to 'Collect, accurately label and appropriately preserve all required biological samples and photographs'. Approval to deviate from this standard when necessary was given by I&I NSW mid-way through the first season (Section 3).

Performance indicators for *'Data Entry and Despatch'*

Extent to which data are: entered into the Access database; accurately entered; and delivered in paper and electronic form to NSW DPI in a timely fashion.

Performance indicators referring to *Data Entry* were not applicable as mid-way through the first season, I&I NSW indicated that it would handle data entry.

Cardno Ecology Lab only 'partially' complied with the standard for *Despatch* (i.e. 'Waterproof raw datasheets and electronic database received by I&I NSW by the 15th day of the month following the month during which the observer trips were done'). This was not possible for logistical reasons, however all data has been received by I&I NSW at the conclusion of the program.

7 Acknowledgements

Participating observers: Jonathan Yantsch, Damian Young, Glen Cuthbert, Mathew Birch, Steve Lindfield, Jeff and Brett Nemec, Kane Organ, Christian McDonald and Doug Hazell. We appreciate commercial Trap & Line fishermen allowing observers onboard their vessels. Dr Will Macbeth and Pascal Geraghty (I&I NSW) are thanked for logistical support when required. This report was written by Dr Craig Blount and Doug Hazell, reviewed by Dr Craig Blount and Dr Peggy O'Donnell. Craig Blount and Doug Hazell prepared the tables.

8 Tables

Table 1: Summary of observer trips by method, Fisher-reporting (FR) zone and season.

A. North region

Season	Fisher-reporting Zone	Method			
		Handlining	Dropling	Setlining	Total
Spring 2007	FR zone 1 (Tweed Heads - Ballina)	1		2	3
	FR zone 2 (Evans Head - Red Rock)	6	1		7
	FR zone 3 (Corindi Beach - South West Rocks)	1	3		4
	Total	8	4	2	**14**
Summer 2007/2008	FR zone 1 (Tweed Heads - Ballina)	2	1	3	6
	FR zone 2 (Evans Head - Red Rock)	2			2
	FR zone 3 (Corindi Beach - South West Rocks)	4	1	2	7
	Total	8	2	5	**15**
Autumn 2008	FR zone 1 (Tweed Heads - Ballina)	2	1	3	6
	FR zone 2 (Evans Head - Red Rock)	2			2
	FR zone 3 (Corindi Beach - South West Rocks)	4	3	1	8
	Total	8	4	4	**16**
Winter 2008	FR zone 1 (Tweed Heads - Ballina)	1	1	1	3
	FR zone 2 (Evans Head - Red Rock)	4	1		5
	FR zone 3 (Corindi Beach - South West Rocks)	3	2	3	8
	Total	8	4	4	**16**
Spring 2008	FR zone 1 (Tweed Heads - Ballina)		1	3	4
	FR zone 2 (Evans Head - Red Rock)	7	1		8
	FR zone 3 (Corindi Beach - South West Rocks)	1	2	1	8
	Total	8	4	4	**16**
Summer 2007/2008	FR zone 1 (Tweed Heads - Ballina)		1	1	2
	FR zone 2 (Evans Head - Red Rock)	8	1		9
	FR zone 3 (Corindi Beach - South West Rocks)	1	1	3	5
	Total	9	3	4	**16**
Autumn 2009	FR zone 1 (Tweed Heads - Ballina)		2		2
	FR zone 2 (Evans Head - Red Rock)	6			6
	FR zone 3 (Corindi Beach - South West Rocks)	4	2		6
	Total	10	4		**14**
Winter 2009	FR zone 1 (Tweed Heads - Ballina)				0
	FR zone 2 (Evans Head - Red Rock)	7			7
	FR zone 3 (Corindi Beach - South West Rocks)	2	3		5
	Total				**12**

continued…

Table 1:
Continued.

B. South region

Season	Fisher-reporting Zone	Method			
		Handlining	Droplining	Setlining	Total
Spring 2007	FR zone 7 (Botany Bay - Greenwell Point)	2			2
	FR zone 8 (Currarong - Moruya)			1	1
	FR zones 9 and 10 (Tuross Head - Eden)	2	2	3	7
	Total	4	2	4	**10**
Summer 2007/2008	FR zone 7 (Botany Bay - Greenwell Point)	1		1	2
	FR zone 8 (Currarong - Moruya)				0
	FR zones 9 and 10 (Tuross Head - Eden)	1	1	3	5
	Total	2	1	4	**7**
Autumn 2008	FR zone 7 (Botany Bay - Greenwell Point)			1	1
	FR zone 8 (Currarong - Moruya)		1	1	2
	FR zones 9 and 10 (Tuross Head - Eden)	2	2	3	7
	Total	2	3	5	**10**
Winter 2008	FR zone 7 (Botany Bay - Greenwell Point)	1			1
	FR zone 8 (Currarong - Moruya)				0
	FR zones 9 and 10 (Tuross Head - Eden)		1	2	3
	Total	1	1	2	**4**
Spring 2008	FR zone 7 (Botany Bay - Greenwell Point)				0
	FR zone 8 (Currarong - Moruya)				0
	FR zones 9 and 10 (Tuross Head - Eden)		2	2	4
	Total	0	2	2	**4**
Summer 2007/2008	FR zone 7 (Botany Bay - Greenwell Point)			2	2
	FR zone 8 (Currarong - Moruya)				0
	FR zones 9 and 10 (Tuross Head - Eden)	1	2	1	4
	Total	1	2	3	**6**
Autumn 2009	FR zone 7 (Botany Bay - Greenwell Point)				0
	FR zone 8 (Currarong - Moruya)			2	2
	FR zones 9 and 10 (Tuross Head - Eden)		2	2	4
	Total		2	4	**6**
Winter 2009	FR zone 7 (Botany Bay - Greenwell Point)				0
	FR zone 8 (Currarong - Moruya)			1	1
	FR zones 9 and 10 (Tuross Head - Eden)	2	4	1	7
	Total				**8**

continued…

Table 1:
Continued.

C. Central region

Season	Fisher-reporting Zone	Method			
		Handlining	Droplining	Setlining	Total
Spring 2008	FR zone 6 (Hunter River - Botany Bay)		1		**1**
Summer 2007/2008	FR zone 6 (Hunter River - Botany Bay)	5			**5**
Autumn 2009	FR zone 6 (Hunter River - Botany Bay)	6			**6**
Winter 2009	FR zone 6 (Hunter River - Botany Bay)	1			**1**

Table 2: Details of each observer trip. For the purpose of confidentiality, the names of fishers have not been reported.

A. North region Spring 2007 (September - November)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	18/09/2007	Observer 1	FR zone 2	Fisher 1	
	19/09/2007	Observer 1	FR zone 2	Fisher 3	
	02/11/2007	Observer 3	FR zone 1	Fisher 13	
	12/11/2007	Observer 1	FR zone 2	Fisher 1	
	13/11/2007	Observer 1	FR zone 2	Fisher 1	
	29/11/2007	Observer 1	FR zone 2	Fisher 1	
	29/11/2007	Observer 3	FR zone 1	Fisher 11	Setline also used this trip
	30/11/2007	Observer 1	FR zone 2	Fisher 1	
Droplining	14/11/2007	Observer 4	FR zone 3	Fisher 12	
	21/11/2007	Observer 3	FR zone 2	Fisher 10	Handline also used this trip
	27/11/2007	Observer 4	FR zone 3	Fisher 12	
	30/11/2007	Observer 4	FR zone 3	Fisher 20	
Setlining	14/11/2007	Observer 3	FR zone 1	Fisher 25	
	15/11/2007	Observer 3	FR zone 1	Fisher 11	

Continued…

Table 2: Continued.

B. South Region — Spring 2007 (September - November)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	26/11/2007	Observer 5	FR zone 7	Fisher 29	
	27/11/2007	Observer 5	FR zone 7	Fisher 29	Will no longer cooperate - kingfish size limits
	28/11/2007	Observer 5	FR zone 9	Fisher 27	
	29/11/2007	Observer 5	FR zone 9	Fisher 27	
Droplining	07/10/2007	Observer 5	FR zone 9	Fisher 33	
	09/11/2007	Observer 5	FR zone 9	Fisher 33	
Setlining	24/10/2007	Observer 5	FR zone 10	Fisher 38	
	22/10/2007	Observer 5	FR zone 10	Fisher 36	
	13/11/2007	Observer 5	FR zone 8	Fisher 37	
	05/12/2007	Observer 5	FR zone 10	Fisher 36	

Continued…

Table 2: Continued.

C. North Region — Summer 2007-2008 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	12/02/2008	Observer 4	FR zone 3	Fisher 15	
	19/02/2008	Observer 4	FR zone 3	Fisher 21	
	26/02/2008	Observer 3	FR zone 1	Fisher 10	
	26/02/2008	Observer 3	FR zone 1	Fisher 22	
	26/02/2008	Observer 1	FR zone 2	Fisher 3	
	27/02/2008	Observer 1	FR zone 2	Fisher 3	
	27/02/2008	Observer 4	FR zone 3	Fisher 12	
	28/02/2008	Observer 4	FR zone 3	Fisher 7	
Droplining	07/03/2008	Observer 2	FR zone 3	Fisher 23	
	14/03/2008	Observer 3	FR zone 1	Fisher 24	
Setlining	19/12/2007	Observer 7	FR zone 1	Fisher 11	
	01/02/2007	Observer 3	FR zone 1	Fisher 25	
	22/02/2008	Observer 4	FR zone 3	Fisher 26	
	24/02/2008	Observer 4	FR zone 3	Fisher 21	
	05/03/2008	Observer 3	FR zone 1	Fisher 11	Handline used also

Continued…

Table 2: Continued.

D. Central Region — Summer 2007-2008 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	21/02/2008	Observer 9	FR zone 6	Fisher 45	

Continued…

Table 2: Continued.

E. South Region — Summer 2007-2008 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	12/12/2007	Observer 5	FR zone 9	Fisher 27	
	04/03/2008	Observer 9	FR zone 7	Fisher 30	
Droplining	15/01/2008	Observer 5	FR zone 9	Fisher 33	
Setlining	11/12/2007	Observer 5	FR zone 10	Fisher 40	
	17/01/2008	Observer 5	FR zone 10	Fisher 38	
	30/01/2008	Observer 5	FR zone 7	Fisher 42	
	31/01/2008	Observer 5	FR zone 10	Fisher 40	

Continued…

Table 2: Continued.

F. North Region — Autumn 2008 (March - May)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	20/03/2008	Observer 2	FR zone 3	Fisher 6	
	28/03/2008	Observer 2	FR zone 2	Fisher 8	
	30/03/2008	Observer 3	FR zone 1	Fisher 16	
	02/05/2008	Observer 3	FR zone 1	Fisher 13	Dropline also used this trip
	13/05/2008	Observer 2	FR zone 3	Fisher 4	
	14/05/2008	Observer 4	FR zone 3	Fisher 7	
	25/05/2008	Observer 2	FR zone 3	Fisher 6	
	29/05/2008	Observer 1	FR zone 2	Fisher 1	
Droplining	30/04/2008	Observer 4	FR zone 3	Fisher 12	
	06/05/2008	Observer 4	FR zone 3	Fisher 23	
	05/05/2008	Observer 3	FR zone 1	Fisher 16	
	27/05/2008	Observer 2	FR zone 3	Fisher 23	
Setlining	11/04/2008	Observer 3	FR zone 1	Fisher 11	
	21/05/2008	Observer 3	FR zone 1	Fisher 11	
	05/06/2008	Observer 3	FR zone 1	Fisher 11	
	06/06/2008	Observer 4	FR zone 3	Fisher 21	

Continued…

Table 2: Continued.

G. South Region — Autumn 2008 (March - May)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	09/04/2008	Observer 5	FR zone 9	Fisher 28	
	30/05/2008	Observer 5	FR zone 9	Fisher 28	
Droplining	08/04/2008	Observer 5	FR zone 9	Fisher 33	
	02/05/2008	Observer 5	FR zone 7	Fisher 35	
	20/05/2008	Observer 5	FR zone 9	Fisher 33	
Setlining	01/04/2008	Observer 5	FR zone 10	Fisher 36	Dropline trip also
	01/05/2008	Observer 5	FR zone 7	Fisher 41	
	5/05/2008	Observer 5	FR zone 8	Fisher 37	
	23/05/2008	Observer 5	FR zone 10	Fisher 36	
	02/06/2008	Observer 5	FR zone 10	Fisher 38	

Continued…

Table 2: Continued.

H. North Region

Winter 2008 (June - August)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	20/06/2008	Observer 2	FR zone 3	Fisher 4	
	02/07/2008	Observer 2	FR zone 2	Fisher 8	
	19/07/2008	Observer 3	FR zone 1	Fisher 11	setline also used
	13/08/2008	Observer 2	FR zone 3	Fisher 4	
	08/08/2008	Observer 1	FR zone 2	Fisher 1	
	09/08/2008	Observer 1	FR zone 2	Fisher 1	
	10/08/2008	Observer 1	FR zone 2	Fisher 1	
	13/08/2008	Observer 4	FR zone 3	Fisher 15	
Dropling	11/07/2008	Observer 3	FR zone 1	Fisher 13	
	12/07/2008	Observer 3	FR zone 1	Fisher 16	
	15/07/2008	Observer 2	FR zone 3	Fisher 23	
	31/07/2008	Observer 4	FR zone 3	Fisher 12	
Setlining	12/06/2008	Observer 4	FR zone 3	Fisher 21	
	12/08/2008	Observer 4	FR zone 3	Fisher 21	
	13/08/2008	Observer 3	FR zone 1	Fisher 11	
	29/08/2008	Observer 4	FR zone 3	Fisher 20	

Continued…

Table 2: Continued.

I. South Region — Winter 2008 (June - August)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	16/07/2008	Observer 9	FR zone 7	Fisher 30	
Droplining	17/06/2008	Observer 5	FR zone 9	Fisher 33	
Setlining	12/06/2008	Observer 5	FR zone 10	Fisher 36	
	19/06/2008	Observer 5	FR zone 10	Fisher 36	

Continued…

Table 2: Continued.

J. North Region   Spring 2008 (September - November)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	18/09/2008	Observer 2	FR zone 2	Fisher 8	
	01/10/2008	Observer 2	FR zone 2	Fisher 2	
	12/10/2008	Observer 3	FR zone 2	Fisher 2	
	10/10/2008	Observer 4	FR zone 3	Fisher 12	
	29/10/2008	Observer 2	FR zone 2	Fisher 14	
	16/11/2008	Observer 3	FR zone 2	Fisher 2	
	17/11/2008	Observer 1	FR zone 2	Fisher 1	
	18/11/2008	Observer 1	FR zone 2	Fisher 1	
Droplining	17/10/2008	Observer 2	FR zone 3	Fisher 23	
	25/11/2008	Observer 3	FR zone 1	Fisher 13	
	26/11/2008	Observer 3	FR zone 2	Fisher 10	
	01/12/2008	Observer 2	FR zone 3	Fisher 23	
Setlining	09/10/2008	Observer 3	FR zone 1	Fisher 11	
	20/10/2008	Observer 3	FR zone 1	Fisher 11	
	30/10/2008	Observer 4	FR zone 3	Fisher 12	
	06/12/2008	Observer 3	FR zone 1	Fisher 11	

Continued…

Table 2: Continued.

K. South Region — Spring 2008 (September - November)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Dropline	09/10/2008	Observer 5	FR zone 9	Fisher 33	
	24/10/2008	Observer 5	FR zone 9	Fisher 33	
Setlining	24/09/2008	Observer 5	FR zone 10	Fisher 36	
	25/09/2008	Observer 5	FR zone 10	Fisher 36	

Continued…

Table 2: Continued.

L. North Region — Summer 2008-2009 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	19/12/2008	Observer 1	FR zone 2	Fisher 3	
	30/12/2008	Observer 2	FR zone 2	Fisher 2	
	6/01/2009	Observer 2	FR zone 2	Fisher 18	
	9/01/2009	Observer 3	FR zone 2	Fisher 2	
	14/01/2009	Observer 4	FR zone 3	Fisher 7	
	14/01/2009	Observer 1	FR zone 2	Fisher 10	
	15/01/2009	Observer 1	FR zone 2	Fisher 3	
	20/01/2008	Observer 1	FR zone 2	Fisher 3	
	26/01/2009	Observer 3	FR zone 2	Fisher 10	
Dropllining	7/12/2008	Observer 3	FR zone 1	Fisher 13	
	31/12/2008	Observer 1	FR zone 2	Fisher 1	
	28/01/2009	Observer 2	FR zone 3	Fisher 23	
Setlining	31/01/2009	Observer 3	FR zone 1	Fisher 11	
	24/02/2009	Observer 4	FR zone 3	Fisher 21	
	7/03/2009	Observer 4	FR zone 3	Fisher 15	
	8/03/2009	Observer 4	FR zone 3	Fisher 21	

Continued…

Table 2: Continued.

M. Central Region Summer 2008-2009 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	21/12/2008	Observer 8	FR zone 6	Fisher 44	
	25/12/2008	Observer 8	FR zone 6	Fisher 44	
	26/12/2008	Observer 8	FR zone 6	Fisher 44	
	31/12/2008	Observer 8	FR zone 6	Fisher 44	
	1/01/2009	Observer 8	FR zone 6	Fisher 44	

Continued…

Table 2: Continued.

N. South Region — Summer 2008-2009 (December - February)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	15/03/2009	Observer 10	FR zone 9	Fisher 28	
Droplining	11/12/2008	Observer 5	FR zone 9	Fisher 33	
	18/12/2008	Observer 10	FR zone 9	Fisher 33	
Setlining	17/12/2008	Observer 5	FR zone 10	Fisher 36	
	12/01/2009	Observer 5	FR zone 7	Fisher 35	
	27/02/2009	Observer 6	FR zone 7	Fisher 43	

Continued…

Table 2: Continued.

O. North Region — Autumn 2009 (March - May)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	17/03/2009	Observer 4	FR zone 3	Fisher 17	
	17/03/2009	Observer 1	FR zone 2	Fisher 3	
	25/03/2009	Observer 2	FR zone 3	Fisher 4	
	26/03/2009	Observer 2	FR zone 2	Fisher 14	
	27/03/2009	Observer 3	FR zone 2	Fisher 2	
	13/04/2009	Observer 3	FR zone 2	Fisher 9	
	28/04/2009	Observer 2	FR zone 2	Fisher 2	
	29/04/2009	Observer 4	FR zone 3	Fisher 20	
	14/05/2009	Observer 3	FR zone 2	Fisher 2	
	27/05/2009	Observer 2	FR zone 3	Fisher 6	
Droplining	11/04/2009	Observer 3	FR zone 1	Fisher 13	
	12/04/2009	Observer 3	FR zone 1	Fisher 13	
	5/06/2009	Observer 4	FR zone 3	Fisher 23	
	6/06/2009	Observer 4	FR zone 3	Fisher 23	

Continued…

Table 2: Continued.

P. Central Region — Autumn 2009 (March - May)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	5/04/2009	Observer 8	FR zone 6	Fisher 44	
	8/04/2009	Observer 8	FR zone 6	Fisher 44	
	9/04/2009	Observer 8	FR zone 6	Fisher 44	
	11/04/2009	Observer 8	FR zone 6	Fisher 44	
	13/04/2009	Observer 8	FR zone 6	Fisher 44	
	15/04/2009	Observer 8	FR zone 6	Fisher 44	

Continued…

Table 2: Continued.

Q. South Region — Autumn 2009 (March - May)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Dropline	15/04/2009	Observer 10	FR zone 9	Fisher 33	
	7/06/2009	Observer 10	FR zone 9	Fisher 33	
Setlining	2/05/2009	Observer 10	FR zone 9	Fisher 37	
	17/05/2009	Observer 9	FR zone 9	Fisher 39	
	18/05/2009	Observer 9	FR zone 9	Fisher 39	
	19/05/2009	Observer 9	FR zone 9	Fisher 37	

Continued…

Table 2: Continued.

R. North Region — Winter 2009 (June - August)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	1/06/2009	Observer 1	FR zone 2	Fisher 5	
	5/06/2009	Observer 1	FR zone 2	Fisher 5	
	6/06/2009	Observer 1	FR zone 2	Fisher 5	
	8/06/2009	Observer 1	FR zone 2	Fisher 5	
	27/06/2009	Observer 3	FR zone 2	Fisher 9	
	28/06/2009	Observer 3	FR zone 2	Fisher 9	
	2/07/2009	Observer 4	FR zone 3	Fisher 6	
	8/07/2009	Observer 4	FR zone 3	Fisher 19	
	15/07/2009	Observer 3	FR zone 2	Fisher 2	
Droplining	15/07/2009	Observer 4	FR zone 3	Fisher 12	
	4/08/2009	Observer 4	FR zone 3	Fisher 23	
	5/08/2009	Observer 4	FR zone 3	Fisher 12	

Continued…

Table 2: Continued.

S. Central Region — Winter 2009 (June - August)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	18/08/2009	Observer 8	FR zone 6	Fisher 44	

Continued…

Table 2: Continued.

T. South Region — Winter 2009 (June - August)

Method	Date	Observer	Fisher-reporting Zone	Fisher	Notes
Handlining	1/08/2009	Observer 5	FR zone 9	Fisher 31	
	2/08/2009	Observer 5	FR zone 10	Fisher 32	
Droplining	27/06/2009	Observer 10	FR zone 9	Fisher 33	
	20/07/2009	Observer 5	FR zone 10	Fisher 34	
	28/07/2009	Observer 5	FR zone 9	Fisher 33	
	9/08/2009	Observer 5	FR zone 9	Fisher 33	
Setlining	19/07/2009	Observer 5	FR zone 9	Fisher 39	
	15/08/2009	Observer 5	FR zone 8	Fisher 37	

Continued…

Table 3: Number of observer trips with individual fishers. For the purpose of confidentiality, the names of fishers have not been reported.

A. North Region

Method	Fisher	Number of trips								
		Spring 07	Summer 07/08	Autumn 08	Winter 08	Spring 08	Summer 08/09	Autumn 09	Winter 09	**Total**
Handlining	Fisher 1	5		1	3	2	1			**12**
	Fisher 2					3	2	3	1	**9**
	Fisher 3	1	2				3	1		**7**
	Fisher 4			1	2			1		**4**
	Fisher 5								4	**4**
	Fisher 6			2				1	1	**4**
	Fisher 7		1	1			1			**3**
	Fisher 8			1	1	1				**3**
	Fisher 9							1	2	**3**
	Fisher 10		1				1			**2**
	Fisher 11	1			1					**2**
	Fisher 12		1			1				**2**
	Fisher 13	1		1						**2**
	Fisher 14					1		1		**2**
	Fisher 15		1		1					**2**
	Fisher 16			1						**1**
	Fisher 17							1		**1**
	Fisher 18						1			**1**
	Fisher 19								1	**1**
	Fisher 20							1		**1**
	Fisher 21		1							**1**
	Fisher 22		1							**1**
	No. Fishers = 22						**No. Trips =**			**68**
Droplining	Fisher 23		1	2	1	2	1	2	1	**10**
	Fisher 12	2		1	1				2	**6**
	Fisher 13				1	1	1	2		**5**
	Fisher 10	1				1				**2**
	Fisher 16			1	1					**2**
	Fisher 20	1								**1**
	Fisher 24		1							**1**
	Fisher 1						1			**1**
	No. Fishers = 8						**No. Trips =**			**28**
Setlining	Fisher 11	1	2	3	1	3	1			**11**
	Fisher 21		1	1	2		2			**6**
	Fisher 25	1	1							**2**
	Fisher 26		1							**1**
	Fisher 20				1					**1**
	Fisher 12					1				**1**
	Fisher 15						1			**1**
	No. Fishers = 7						**No. Trips =**			**23**

continued…

Table 3 (continued):

B. South Region

Method	Fisher	Number of trips Spring 07	Summer 07/08	Autumn 08	Winter 08	Spring 08	Summer 08/09	Autumn 09	Winter 09	**Total**
Handlining	Fisher 27	2	1							**3**
	Fisher 28			2			1			**3**
	Fisher 29	2								**2**
	Fisher 30		1		1					**2**
	Fisher 31								1	**1**
	Fisher 32								1	**1**
	No. Fishers = 6								**No. Trips =**	**12**
Droplining	Fisher 33	2	1	2	1	2	2	2	3	**15**
	Fisher 34								1	**1**
	Fisher 35			1						**1**
	No. Fishers = 3								**No. Trips =**	**17**
Setlining	Fisher 36	2		2	2	2	1			**9**
	Fisher 37	1		1				2	1	**5**
	Fisher 38	1	1	1						**3**
	Fisher 39							2	1	**3**
	Fisher 40		2							**2**
	Fisher 41			1						**1**
	Fisher 42		1							**1**
	Fisher 35						1			**1**
	Fisher 43						1			**1**
	No. Fishers = 9								**No. Trips =**	**26**

continued…

Table 3 (continued):

C. Central Region

Method	Fisher	Number of trips								
		Spring 07	Summer 07/08	Autumn 08	Winter 08	Spring 08	Summer 08/09	Autumn 09	Winter 09	**Total**
Handlining	Fisher 44 **No. Fishers = 1**						5	6	1	**12**
Dropling	Fisher 45 **No. Fishers = 1**		1							**1**

Table 4: Performance Indciators for the survey (Appendix F of the "Agreement for Services").

Activity	Outcome	Performance Indicator	Standard	Compliance (Y/N/Partial/NA)	Comments
Data Collection	Source of accurate, fisher-independent data reflecting retained and discarded catches from commercial dropline, setline, trotline and handline fishing operations off the NSW coast.	Extent to which: sampling strategies are complied with; the necessary biological samples are collected and appropriately preserved; and data quality is achieved.	Complete Observer Trips with commercial line fishers so that no more than two trips are done in any given season with any given fisher	Partial	Approval given from DPI for greater flexibility due to small pool of fishers (Sections 3 & 5).
			Complete Observer Trips with commercial line fishers according to the sampling-design specifications given in Appendix C of the Agreement.	Partial	Approval given from DPI for greater flexibility due to irregular and seasonal fishing in some seasons (Sections 3 & 5).
			Collect and record data or biological samples as per the specifications given in section G.3 of the Agreement.	Y	
			Accurately identify at least 90% of individuals caught (retained or discarded) to species level.	Y	
			Collect, accurately label and appropriately preserve all required biological samples and photographs.	Partial	In some instances not all shark samples were collected due to large numbers of sharks being caught and processed (Sections 2 & 4). Frozen shark skin and cartilage samples collected from one trip were lost due to power failure (Section 4).
Data Entry and Dispatch	Fully and accurately completed datasheets and accurately compiled electronic database received by DPI before given deadlines.	Extent to which data are: entered into the Access database; accurately entered; and delivered in paper and electronic form to NSW DPI in a timely fashion.	All data on waterproof paper sheets entered into the electronic database provided.	N/A	DPI to enter all data into database.
			Data entry error rate of < 0.01%.	N/A	DPI to enter all data into database.
			Waterproof raw datasheets and electronic database received by NSW DPI by the 15th day of the month following the month during which the observer trips were done.	Partial	Logistics of obtaining checked data from some observers within short periods of time impossible if observers have other commitments.

Appendix B – List of species recorded during this observer-based study of commercial line fishing in waters off NSW.

Presence (X)/absence data are shown for handline, dropline and set/trotline trips done in the North (N), Central (C) and South (S) regions.

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Alfonsino	*Beryx splendens*	Berycidae				X		X			
Amberjack	*Seriola dumerili*	Carangidae	X	X		X					
Australian bonito	*Sarda australis*	Scombridae	X	X							
Australian sawtail	*Prionurus microlepidotus*	Acanthuridae		X							
Balloonfish	*Sphoeroides pachygaster*	Tetraodontidae				X					
Banded rockcod	*Epinephelus ergastularius*	Serranidae	X	X		X	X				
Banded seaperch	*Hypoplectrodes nigroruber*	Serranidae			X						
Banded wobbegong	*Orectolobus halei*	Orectolobidae	X	X			X	X	X	X	X
Barracouta	*Thyrsites atun*	Gempylidae			X		X	X			X
Bass groper	*Polyprion americanus*	Acropomatidae				X	X	X			X
Bearded rock cod	*Pseudophycis barbata*	Moridae									X
Bigeye ocean perch	*Helicolenus barathri*	Sebastidae	X		X	X		X			X
Bigeye thresher	*Alopias superciliosus*	Alopiidae						X			
Bight skate	*Dipturus gudgeri*	Rajidae									X
Black rabbitfish	*Siganus nebulosus*	Siganidae		X							
Black rockcod	*Epinephelus daemelii*	Serranidae	X								
Black shark	*Dalatias licha*	Dalatiidae									X
Black stingray	*Dasyatis thetidis*	Dasyatidae							X	X	X
Black-banded seaperch	*Hypoplectrodes annulatus*	Serranidae			X				X		
Blackspot goatfish	*Parupeneus rubescens*	Mullidae	X	X		X					
Blacktip bullseye	*Pempheris affinis*	Pempheridae	X								

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Blacktip rockcod	*Epinephelus fasciatus*	Serranidae	X								
Blacktip shark complex	*Carcharhinus limbatus/tilstoni*	Carcharhinidae	X						X	X	
Blind shark	*Brachaelurus waddi*	Brachaeluridae	X						X		
Blue grenadier	*Macruronus novaezelandiae*	Merlucciidae						X			
Blue mackerel	*Scomber australasicus*	Scombridae	X	X	X						X
Blue sprat	*Spratelloides robustus*	Clupeidae	X								
Blue-eye trevalla	*Hyperoglyphe antarctica*	Centrolophidae	X		X	X	X	X			X
Bluespotted flathead	*Platycephalus caeruleopunctatus*	Platycephalidae		X	X				X	X	X
Bluethroat wrasse	*Notolabrus tetricus*	Labridae			X						
Bluntnose sixgill shark	*Hexanchus griseus*	Hexanchidae									X
Broadgilled hagfish	*Eptatretus cirrhatus*	Myxinidae									X
Broadnose shark	*Notorynchus cepedianus*	Hexanchidae									X
Bronze whaler	*Carcharhinus brachyurus*	Carcharhinidae							X	X	X
Bull shark	*Carcharhinus leucas*	Carcharhinidae							X	X	
Cobia	*Rachycentron canadum*	Rachycentridae								X	
Coffin ray	*Hypnos monopterygium*	Torpedinidae	X						X		
Collar carpetshark	*Parascyllium collare*	Parascyllidae							X		X
Common gurnard perch	*Neosebastes scorpaenoides*	Neosebastidae									X
Common jack mackerel	*Trachurus declivis*	Carangidae			X						
Common pike eel	*Muraenesox bagio*	Muraenesocidae									X
Common sawshark	*Pristiophorus cirratus*	Pristiophoridae									X
Crested hornshark	*Heterodontus galeatus*	Heterodontidae							X		
Crimsonband wrasse	*Notolabrus gymnogenis*	Labridae		X	X				X		

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Diamondfish	*Monodactylus argenteus*	Monodactylidae		X							
Draughtboard shark	*Cephaloscyllium laticeps*	Scyliorhinidae									X
Dusky shark	*Carcharhinus obscurus*	Carcharhinidae	X					X	X	X	
Eastern Australian salmon	*Arripis trutta*	Arripidae	X	X							
Eastern blue devil	*Paraplesiops bleekeri*	Plesiopidae							X		
Eastern blue groper	*Achoerodus viridis*	Labridae							X		
Eastern conger	*Conger wilsoni*	Congridae							X		
Eastern fiddler ray	*Trygonorrhina fasciata*	Rhinobatidae	X	X	X				X	X	X
Eastern frogfish	*Batrachomoeus dubius*	Batrachoididae							X		
Eastern highfin spurdog	*Squalus albifrons*	Squalidae		X		X	X			X	
Eastern kelpfish	*Chironemus marmoratus*	Chironemidae			X						
Eastern longnose spurdog	*Squalus grahami*	Squalidae				X	X				
Eastern Moses snapper	*Lutjanus russelli*	Lutjanidae	X								
Eastern orange perch	*Lepidoperca pulchella*	Serranidae		X							
Eastern pigfish	*Bodianus unimaculatus*	Labridae	X				X		X		X
Eastern pomfred	*Schuettea scalaripinnis*	Monodactylidae		X							
Eastern red scorpionfish	*Scorpaena cardinalis*	Scorpaenidae	X	X	X	X			X		X
Eastern shovelnose ray	*Aptychotrema rostrata*	Rhinobatidae	X			X			X		X
Eastern wirrah	*Acanthistius ocellatus*	Serranidae	X	X	X				X	X	X
Endeavour dogfish	*Centrophorus moluccensis*	Centrophoridae				X		X			X
Estuary cobbler	*Cnidoglanis macrocephalus*	Plotosidae							X		
False fusilier	*Paracaesio xanthura*	Lutjanidae	X								
Flame snapper	*Etelis coruscans*	Lutjanidae				X					

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Foxfish	*Bodianus frenchii*	Labridae							X		
Frigate mackerel	*Auxis thazard*	Scombridae	X								
Frostfish	*Lepidopus caudatus*	Trichiuridae						X			
Gemfish	*Rexea solandri*	Gempylidae			X	X	X	X			X
Goldspotted sweetlips	*Plectorhinchus flavomaculatus*	Haemulidae	X						X		
Great hammerhead	*Sphyrna mokarran*	Sphyrnidae								X	
Great white shark	*Carcharodon carcharias*	Lamnidae							X	X	X
Green moray	*Gymnothorax prasinus*	Muraenidae			X			X	X		X
Grey morwong	*Nemadactylus douglasii*	Cheilodactylidae	X	X	X	X	X		X		X
Grey nurse shark	*Carcharias taurus*	Odontaspididae								X	
Grey spotted catshark	*Asymbolus analis*	Scyliorhinidae		X	X						X
Gummy shark	*Mustelus antarcticus*	Triakidae	X	X		X		X	X	X	X
Halfbanded seaperch	*Hypoplectrodes maccullochi*	Serranidae	X	X	X						
Hapuku	*Polyprion oxygeneios*	Acropomatidae			X	X	X	X			X
Harrisson's dogfish	*Centrophorus harrissoni*	Centrophoridae				X					
Highfin amberjack	*Seriola rivoliana*	Carangidae		X							
Imperador	*Beryx decadactylus*	Berycidae						X			
Jackass morwong	*Nemadactylus macropterus*	Cheilodactylidae						X			X
King morwong	*Nemadactylus sp.*	Cheilodactylidae					X				
Largetooth beardie	*Lotella rhacina*	Moridae			X	X					X
Latchet	*Pterygotrigla polyommata*	Triglidae									X
Leaping bonito	*Cybiosarda elegans*	Scombridae		X							
Longfin gemfish	*Rexea antefurcata*	Gempylidae						X			

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Longfin perch	*Caprodon longimanus*	Serranidae		X		X	X				
Longfin pike	*Dinolestes lewini*	Dinolestidae	X	X	X						X
Longspine flathead	*Platycephalus longispinis*	Platycephalidae	X								X
Luderick	*Girella tricuspidata*	Kyphosidae								X	
Mackerel tuna	*Euthynnus affinis*	Scombridae	X	X							
Mado	*Atypichthys strigatus*	Kyphosidae	X	X	X						X
Mahi mahi	*Coryphaena hippurus*	Coryphaenidae	X	X		X					
Mandarin shark	*Cirrhigaleus australis*	Ariidae				X	X				
Maori rockcod	*Epinephelus undulatostriatus*	Serranidae	X								
Maray	*Etrumeus teres*	Clupeidae	X								
Marbled flathead	*Platycephalus marmoratus*	Platycephalidae	X						X		
Melbourne skate	*Dipturus whitleyi*	Rajidae									X
Moller's lanternshark	*Etmopterus molleri*	Dalatiidae									X
Mosaic moray	*Enchelycore ramosa*	Muraenidae							X		
Mulloway	*Argyrosomus hololepidotus*	Sparidae	X	X							
Ocean blue-eye trevalla	*Schedophilus velaini*	Centrolophidae					X				
Ocean jacket	*Nelusetta ayraudi*	Monacanthidae	X	X			X	X			X
Ogilby's ghostshark	*Hydrolagus ogilbyi*	Chimaeridae									X
Oilfish	*Ruvettus pretiosus*	Gempylidae						X			
Onespot puller	*Chromis hypsilepis*	Pomacentridae		X							
Orange spotted catshark	*Asymbolus rubiginosus*	Scyliorhinidae									X
Ornate wobbegong	*Orectolobus ornatus*	Orectolobidae							X		
Owston's dogfish	*Centroscymnus owstonii*	Dalatiidae									X

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Pearl perch	*Glaucosoma scapulare*	Glaucosomatidae	X	X		X			X		
Philippine spurdog	*Squalus montalbani*	Squalidae				X					
Piked spurdog	*Squalus megalops*	Squalidae						X			X
Pink ling	*Genypterus blacodes*	Ophidiidae						X			X
Port Jackson shark	*Heterodontus portusjacksoni*	Heterodontidae		X			X	X	X	X	X
Purple rockcod	*Epinephelus cyanopodus*	Serranidae	X								
Rainbow runner	*Elagatis bipinnulata*	Carangidae		X							
Red gurnard	*Chelidonichthys kumu*	Triglidae									X
Red morwong	*Cheilodactylus fuscus*	Cheilodactylidae								X	
Redfish	*Centroberyx affinis*	Berycidae	X	X	X	X	X	X	X		X
Redthroat emperor	*Lethrinus miniatus*	Lethrinidae	X								
Reef ocean perch	*Helicolenus percoides*	Sebastidae	X								X
Remora	*Remora remora*	Echeneidae							X		
Ribaldo	*Mora moro*	Moridae						X			X
Rock ling	*Genypterus tigerinus*	Ophidiidae									X
Rosy snapper	*Pristipomoides filamentosus*	Lutjanidae	X								
Saddled swellshark	*Cephaloscyllium variegatum*	Scyliorhinidae				X	X				
Samson fish	*Seriola hippos*	Carangidae	X	X		X	X		X		
Sand flathead	*Platycephalus bassensis*	Platycephalidae	X		X						X
Sandbar shark	*Carcharhinus plumbeus*	Carcharhinidae							X		
Sawtail shark	*Figaro boardmani*							X			X
Sawtooth moray	*Gymnothorax prionodon*	Muraenidae				X					
Scalloped hammerhead	*Sphyrna lewini*	Sphyrnidae							X		

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
School shark	*Galeorhinus galeus*	Triakidae	X								X
Senator wrasse	*Pictilabrus laticlavius*	Labridae		X							
Sergeant Baker	*Aulopus purpurissatus*	Aulopidae	X	X	X	X			X		X
Serpent eel	*Ophisurus serpens*	Ophichthidae									X
Sharphead perch	*Lepidoperca magna*	Serranidae					X	X			
Sharpnose sevengill shark	*Heptranchias perlo*	Hexanchidae						X			X
Shortfin mako	*Isurus oxyrinchus*	Lamnidae						X	X	X	X
Silky shark	*Carcharhinus falciformis*	Carcharhinidae							X		
Silver sweep	*Scorpis lineolata*	Kyphosidae	X	X	X				X		X
Silver trevally	*Pseudocaranx dentex*	Carangidae	X	X	X						
Sixspine leatherjacket	*Meuschenia freycineti*	Monacanthidae			X				X		
Skipjack tuna	*Katsuwonus pelamis*	Scombridae	X	X	X	X	X				
Smallscale bullseye	*Pempheris compressa*	Pempheridae	X								
Smooth hammerhead	*Sphyrna zygaena*	Sphyrnidae							X	X	X
Smooth stingray	*Dasyatis brevicaudata*	Dasyatidae		X	X				X	X	X
Snapper	*Pagrus auratus*	Sparidae	X	X	X	X	X		X		X
Snipe eel	*Nemichthys scolopaceus*	Nemichthyidae						X			X
Southern calamari squid	*Sepioteuthis australis*	Scatophagidae		X							
Southern dogfish	*Centrophorus zeehaani*	Centrophoridae						X			X
Southern eagle ray	*Myliobatis australis*	Myliobatidae									X
Southern Maori-wrasse	*Ophthalmolepis lineolatus*	Labridae	X	X	X				X		
Southern whiptail	*Caelorinchus australis*	Macrouridae									X
Spanish mackerel	*Scomberomorus commerson*	Scombridae	X								

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Spinner shark	*Carcharhinus brevipinna*	Carcharhinidae	X						X	X	
Spotted mackerel	*Scomberomorus munroi*	Scombridae	X								
Spotted wobbegong	*Orectolobus maculatus*	Orectolobidae	X	X			X		X	X	
Stout whiting	*Sillago robusta*	Sillaginidae	X								
Striped marlin	*Tetrapturus audax*	Istiophoridae		X							
Striped seapike	*Sphyraena obtusata*	Sphyraenidae	X	X							
Swallowtail dart	*Trachinotus coppingeri*	Carangidae	X								
Sydney skate	*Raja australis*	Rajidae									X
Tailor	*Pomatomus saltatrix*	Pomatomidae	X	X							
Taiwan gulper shark	*Centrophorus niaukang*	Centrophoridae				X					
Tarwhine	*Rhabdosargus sarba*	Sparidae	X						X		
Teraglin	*Atractoscion aequidens*	Sciaenidae	X	X		X					
Thresher shark	*Alopias vulpinus*	Alopiidae						X		X	
Tiger flathead	*Neoplatycephalus richardsoni*	Pataecidae									X
Tiger shark	*Galeocerdo cuvier*	Carcharhinidae							X	X	
Toothed whiptail	*Lepidorhynchus denticulatus*	Macrouridae									X
Unid. carpetshark	*Parascyllium* sp.	Parascyllidae									X
Unid. conger	*Conger* sp.	Congridae						X			
Unid. cucumberfish	*Paraulopus* sp.	Paraulopidae			X						
Unid. deepwater perch	Unidentified teleost	Unknown				X					
Unid. eagle ray	Family Myliobatidae	Myliobatidae									X
Unid. moray	Family Muraenidae	Muraenidae							X		
Unid. perch	*Caesioperca* sp.	Serranidae			X						

			Handline			Dropline			Set/trotline		
Common Name	**Scientific Name**	**Taxonomic Family**	**N**	**C**	**S**	**N**	**C**	**S**	**N**	**C**	**S**
Unid. porcupinefish	Family Diodontidae	Diodontidae									X
Unid. shovelnose ray	Family Rhinobatidae	Rhinobatidae							X		
Unid. skate	*Dipturus* sp.	Rajidae									X
Unid. stingray	Family Dasyatidae	Dasyatidae				X					
Unid. whaler shark	Family Carcharhinidae	Carcharhinidae					X				
Unid. wrasse	Family Labridae	Labridae	X								
Velvet leatherjacket	*Meuschenia scaber*	Monacanthidae			X						
Venus tuskfish	*Choerodon venustus*	Labridae	X						X		
Whitefin swellshark	*Cephaloscyllium albipinnum*	Paralichthyidae						X			X
White-spotted guitarfish	*Rhynchobatus djiddensis*	Rhinidae	X								
Yellowfin bream	*Acanthopagrus australis*	Sparidae	X	X							
Yellowfin tuna	*Thunnus albacares*	Scombridae	X								
Yellow-finned leatherjacket	*Meuschenia trachylepis*	Monacanthidae							X		
Yellowtail kingfish	*Seriola lalandi*	Carangidae	X	X	X	X	X		X		
Yellowtail scad	*Trachurus novaezelandiae*	Carangidae	X	X							
Zebra shark	*Stegostoma fasciatum*	Stegostomatidae									X

Appendix C – Total number of retained, discarded and total (i.e. retained + discarded) fish observed by species and by region for each of three NSW commercial line-fishing methods: handline; dropline; and set/trotline.

Data are presented for C-1) handline; C-2) dropline; and C-3) set/trotline, in the north, central and south regions of NSW coastal waters, and these regions combined (All NSW). Proportion (%) of the total catch (all species combined) for each column is shown in parentheses.

Appendix C-1 – Handline		**North**			**Central**			**South**			**All NSW**	
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All Species combined	**2301 (100)**	**489 (100)**	**2790 (100)**	**3553 (100)**	**471 (100)**	**4024 (100)**	**1124 (100)**	**273 (100)**	**1397 (100)**	**6978 (100)**	**1233 (100)**	**8211 (100)**
Yellowtail scad	482 (20.9)	146 (29.9)	628 (22.5)	559 (15.7)	19 (4)	578 (14.4)				1041 (14.9)	165 (13.4)	1206 (14.7)
Silver sweep	4 (0.2)	8 (1.6)	12 (0.4)	978 (27.5)	47 (10)	1025 (25.5)	10 (0.9)	7 (2.6)	17 (1.2)	992 (14.2)	62 (5.0)	1054 (12.8)
Australian bonito	84 (3.7)		84 (3)	768 (21.6)		768 (19.1)				852 (12.2)		852 (10.4)
Snapper	513 (22.3)	84 (17.2)	597 (21.4)	60 (1.7)	46 (9.8)	106 (2.6)	32 (2.8)	4 (1.5)	36 (2.6)	605 (8.7)	134 (10.9)	739 (9.0)
Yellowtail kingfish	174 (7.6)	83 (17)	257 (9.2)	90 (2.5)	228 (48.4)	318 (7.9)	44 (3.9)	55 (20.1)	99 (7.1)	308 (4.4)	366 (29.7)	674 (8.2)
Silver trevally	15 (0.7)	12 (2.5)	27 (1)	116 (3.3)	18 (3.8)	134 (3.3)	482 (42.9)		482 (34.5)	613 (8.8)	30 (2.4)	643 (7.8)
Tailor	27 (1.2)	2 (0.4)	29 (1)	453 (12.7)	48 (10.2)	501 (12.5)				480 (6.9)	50 (4.1)	530 (6.5)
Blue mackerel	399 (17.3)		399 (14.3)	37 (1)	1 (0.2)	38 (0.9)	14 (1.2)		14 (1)	450 (6.4)	1 (0.1)	451 (5.5)
Eastern red scorpionfish	86 (3.7)	19 (3.9)	105 (3.8)	19 (0.5)		19 (0.5)	106 (9.4)	104 (38.1)	210 (15)	211 (3)	123 (10)	334 (4.1)
Teraglin	131 (5.7)	16 (3.3)	147 (5.3)	175 (4.9)		175 (4.3)				306 (4.4)	16 (1.3)	322 (3.9)
Southern Maori-wrasse		2 (0.4)	2 (0.1)	16 (0.5)	2 (0.4)	18 (0.4)	246 (21.9)	9 (3.3)	255 (18.3)	262 (3.8)	13 (1.1)	275 (3.3)
Pearl perch	146 (6.3)	23 (4.7)	169 (6.1)	10 (0.3)	1 (0.2)	11 (0.3)				156 (2.2)	24 (1.9)	180 (2.2)
Ocean jacket	1 (<0.1)	1 (0.2)	2 (0.1)	100 (2.8)		100 (2.5)				101 (1.4)	1 (0.1)	102 (1.2)
Gemfish							62 (5.5)		62 (4.4)	62 (0.9)		62 (0.8)
Redfish	15 (0.7)	1 (0.2)	16 (0.6)	35 (1)	6 (1.3)	41 (1)		3 (1.1)	3 (0.2)	50 (0.7)	10 (0.8)	60 (0.7)
Eastern wirrah	3 (0.1)	1 (0.2)	4 (0.1)	5 (0.1)		5 (0.1)	30 (2.7)	14 (5.1)	44 (3.1)	38 (0.5)	15 (1.2)	53 (0.6)
Sergeant Baker	3 (0.1)	19 (3.9)	22 (0.8)	4 (0.1)	13 (2.8)	17 (0.4)	4 (0.4)	3 (1.1)	7 (0.5)	11 (0.2)	35 (2.8)	46 (0.6)
Longfin pike	7 (0.3)		7 (0.3)	17 (0.5)	7 (1.5)	24 (0.6)	7 (0.6)	3 (1.1)	10 (0.7)	31 (0.4)	10 (0.8)	41 (0.5)
Mackerel tuna	11 (0.5)		11 (0.4)	21 (0.6)		21 (0.5)				32 (0.5)		32 (0.4)

Appendix C-1 – Handline	North			Central			South			All NSW		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Mulloway	30 (1.3)		30 (1.1)	2 (0.1)		2 (<0.1)				32 (0.5)		32 (0.4)
Grey morwong	19 (0.8)		19 (0.7)	3 (0.1)		3 (0.1)	8 (0.7)	1 (0.4)	9 (0.6)	30 (0.4)	1 (0.1)	31 (0.4)
Mado		13 (2.7)	13 (0.5)	4 (0.1)	7 (1.5)	11 (0.3)		4 (1.5)	4 (0.3)	4 (0.1)	24 (1.9)	28 (0.3)
Green moray								26 (9.5)	26 (1.9)		26 (2.1)	26 (0.3)
Sixspine leatherjacket							24 (2.1)	2 (0.7)	26 (1.9)	24 (0.3)	2 (0.2)	26 (0.3)
Yellowfin bream	6 (0.3)	5 (1)	11 (0.4)	12 (0.3)	3 (0.6)	15 (0.4)				18 (0.3)	8 (0.6)	26 (0.3)
Crimsonband wrasse				2 (0.1)		2 (<0.1)	15 (1.3)	7 (2.6)	22 (1.6)	17 (0.2)	7 (0.6)	24 (0.3)
Striped seapike	15 (0.7)	1 (0.2)	16 (0.6)	5 (0.1)	1 (0.2)	6 (0.1)				20 (0.3)	2 (0.2)	22 (0.3)
Spotted mackerel	20 (0.9)		20 (0.7)							20 (0.3)		20 (0.2)
Blue-eye trevalla	3 (0.1)		3 (0.1)				14 (1.2)		14 (1)	17 (0.2)		17 (0.2)
Skipjack tuna	8 (0.3)		8 (0.3)	4 (0.1)		4 (0.1)	3 (0.3)		3 (0.2)	15 (0.2)		15 (0.2)
Bluethroat wrasse							12 (1.1)	2 (0.7)	14 (1)	12 (0.2)	2 (0.2)	14 (0.2)
Halfbanded seaperch	1 (<0.1)	2 (0.4)	3 (0.1)		3 (0.6)	3 (0.1)		8 (2.9)	8 (0.6)	1 (<0.1)	13 (1.1)	14 (0.2)
Smallscale bullseye		13 (2.7)	13 (0.5)								13 (1.1)	13 (0.2)
Leaping bonito				12 (0.3)		12 (0.3)				12 (0.2)		12 (0.1)
Spinner shark	12 (0.5)		12 (0.4)							12 (0.2)		12 (0.1)
Blacktip bullseye		11 (2.2)	11 (0.4)								11 (0.9)	11 (0.1)
Maori rockcod	11 (0.5)		11 (0.4)							11 (0.2)		11 (0.1)
Tarwhine	7 (0.3)	4 (0.8)	11 (0.4)							7 (0.1)	4 (0.3)	11 (0.1)
Blacktip shark complex	9 (0.4)		9 (0.3)							9 (0.1)		9 (0.1)
Bluespotted flathead				4 (0.1)		4 (0.1)	5 (0.4)		5 (0.4)	9 (0.1)		9 (0.1)
Spotted wobbegong		3 (0.6)	3 (0.1)	6 (0.2)		6 (0.1)				6 (0.1)	3 (0.2)	9 (0.1)
Onespot puller					7 (1.5)	7 (0.2)					7 (0.6)	7 (0.1)

Appendix C-1 – Handline	North			Central			South			All NSW		
Species	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Samson fish	4 (0.2)	1 (0.2)	5 (0.2)	2 (0.1)		2 (<0.1)				6 (0.1)	1 (0.1)	7 (0.1)
Dusky shark	6 (0.3)		6 (0.2)							6 (0.1)		6 (0.1)
Grey spotted catshark					1 (0.2)	1 (<0.1)	1 (0.1)	4 (1.5)	5 (0.4)	1 (<0.1)	5 (0.4)	6 (0.1)
Southern calamari squid				6 (0.2)		6 (0.1)				6 (0.1)		6 (0.1)
Amberjack	4 (0.2)		4 (0.1)	1 (<0.1)		1 (<0.1)				5 (0.1)		5 (0.1)
Banded rockcod	2 (0.1)		2 (0.1)	3 (0.1)		3 (0.1)				5 (0.1)		5 (0.1)
Banded wobbegong		1 (0.2)	1 (<0.1)	4 (0.1)		4 (0.1)				4 (0.1)	1 (0.1)	5 (0.1)
Blind shark		5 (1)	5 (0.2)								5 (0.4)	5 (0.1)
Eastern Australian salmon	1 (<0.1)		1 (<0.1)	3 (0.1)		3 (0.1)				4 (0.1)		4 (<0.1)
Eastern fiddler ray	1 (<0.1)		1 (<0.1)		2 (0.4)	2 (<0.1)		1 (0.4)	1 (0.1)	1 (<0.1)	3 (0.2)	4 (<0.1)
Eastern kelpfish								4 (1.5)	4 (0.3)		4 (0.3)	4 (<0.1)
Highfin amberjack				3 (0.1)	1 (0.2)	4 (0.1)				3 (<0.1)	1 (0.1)	4 (<0.1)
Spanish mackerel	4 (0.2)		4 (0.1)							4 (0.1)		4 (<0.1)
Stout whiting	2 (0.1)	2 (0.4)	4 (0.1)							2 (<0.1)	2 (0.2)	4 (<0.1)
Yellowfin tuna	4 (0.2)		4 (0.1)							4 (0.1)		4 (<0.1)
Black-banded seaperch								3 (1.1)	3 (0.2)		3 (0.2)	3 (<0.1)
Blackspot goatfish	1 (<0.1)	1 (0.2)	2 (0.1)	1 (<0.1)		1 (<0.1)				2 (<0.1)	1 (0.1)	3 (<0.1)
Blue sprat	3 (0.1)		3 (0.1)							3 (<0.1)		3 (<0.1)
Eastern Moses snapper	3 (0.1)		3 (0.1)							3 (<0.1)		3 (<0.1)
Eastern orange perch				3 (0.1)		3 (0.1)				3 (<0.1)		3 (<0.1)
Eastern pigfish	3 (0.1)		3 (0.1)							3 (<0.1)		3 (<0.1)
Eastern pomfred					3 (0.6)	3 (0.1)					3 (0.2)	3 (<0.1)
Largetooth beardie							1 (0.1)	2 (0.7)	3 (0.2)	1 (<0.1)	2 (0.2)	3 (<0.1)

Appendix C-1 – Handline	North			Central			South			All NSW		
Species	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Longfin perch				3 (0.1)		3 (0.1)				3 (<0.1)		3 (<0.1)
Longspine flathead	1 (<0.1)	2 (0.4)	3 (0.1)							1 (<0.1)	2 (0.2)	3 (<0.1)
Mahi mahi		1 (0.2)	1 (<0.1)		2 (0.4)	2 (<0.1)					3 (0.2)	3 (<0.1)
Smooth stingray					2 (0.4)	2 (<0.1)		1 (0.4)	1 (0.1)		3 (0.2)	3 (<0.1)
Venus tuskfish	3 (0.1)		3 (0.1)							3 (<0.1)		3 (<0.1)
Bigeye ocean perch	1 (<0.1)		1 (<0.1)				1 (0.1)		1 (0.1)	2 (<0.1)		2 (<0.1)
Eastern highfin spurdog				2 (0.1)		2 (<0.1)				2 (<0.1)		2 (<0.1)
Frigate mackerel	2 (0.1)		2 (0.1)							2 (<0.1)		2 (<0.1)
Gummy shark	1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)				2 (<0.1)		2 (<0.1)
Reef ocean perch	2 (0.1)		2 (0.1)							2 (<0.1)		2 (<0.1)
Rosy snapper	1 (<0.1)	1 (0.2)	2 (0.1)							1 (<0.1)	1 (0.1)	2 (<0.1)
Sand flathead		1 (0.2)	1 (<0.1)					1 (0.4)	1 (0.1)		2 (0.2)	2 (<0.1)
Swallowtail dart	1 (<0.1)	1 (0.2)	2 (0.1)							1 (<0.1)	1 (0.1)	2 (<0.1)
Velvet leatherjacket								2 (0.7)	2 (0.1)		2 (0.2)	2 (<0.1)
Australian sawtail				1 (<0.1)		1 (<0.1)				1 (<0.1)		1 (<0.1)
Banded seaperch								1 (0.4)	1 (0.1)		1 (0.1)	1 (<0.1)
Barracouta								1 (0.4)	1 (0.1)		1 (0.1)	1 (<0.1)
Black rabbitfish					1 (0.2)	1 (<0.1)					1 (0.1)	1 (<0.1)
Black rockcod		1 (0.2)	1 (<0.1)								1 (0.1)	1 (<0.1)
Blacktip rockcod		1 (0.2)	1 (<0.1)								1 (0.1)	1 (<0.1)
Coffin ray		1 (0.2)	1 (<0.1)								1 (0.1)	1 (<0.1)
Common jack mackerel							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Diamondfish					1 (0.2)	1 (<0.1)					1 (0.1)	1 (<0.1)

Appendix C-1 – Handline	North			Central			South			All NSW		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Eastern shovelnose ray	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
False fusilier	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
Goldspotted sweetlips	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
Hapuku							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Maray	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
Marbled flathead	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
Port Jackson shark					1 (0.2)	1 (<0.1)					1 (0.1)	1 (<0.1)
Purple rockcod		1 (0.2)	1 (<0.1)								1 (0.1)	1 (<0.1)
Rainbow runner				1 (<0.1)		1 (<0.1)				1 (<0.1)		1 (<0.1)
Redthroat emperor	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
School shark	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
Senator wrasse				1 (<0.1)		1 (<0.1)				1 (<0.1)		1 (<0.1)
Striped marlin				1 (<0.1)		1 (<0.1)				1 (<0.1)		1 (<0.1)
Unid. cucumberfish							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Unid. perch								1 (0.4)	1 (0.1)		1 (0.1)	1 (<0.1)
Unid. wrasse	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)
White-spotted guitarfish	1 (<0.1)		1 (<0.1)							1 (<0.1)		1 (<0.1)

Appendix C-2 – Dropline	**North**			**Central**			**South**			**Total**		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All Species combined	**693 (100)**	**44 (100)**	**737 (100)**	**510 (100)**	**96 (100)**	**606 (100)**	**1146 (100)**	**43 (100)**	**1189 (100)**	**2349 (100)**	**183 (100)**	**2532 (100)**
Blue-eye trevalla	138 (19.9)		138 (18.7)	36 (7.1)		36 (5.9)	375 (32.7)	1 (2.3)	376 (31.6)	549 (23.4)	1 (0.5)	550 (21.7)
Gemfish	114 (16.5)		114 (15.5)	4 (0.8)		4 (0.7)	373 (32.5)	4 (9.3)	377 (31.7)	491 (20.9)	4 (2.2)	495 (19.5)
Yellowtail kingfish	8 (1.2)	10 (22.7)	18 (2.4)	197 (38.6)	91 (94.8)	288 (47.5)				205 (8.7)	101 (55.2)	306 (12.1)
Bigeye ocean perch	13 (1.9)		13 (1.8)				214 (18.7)	3 (7)	217 (18.3)	227 (9.7)	3 (1.6)	230 (9.1)
Snapper	126 (18.2)	2 (4.5)	128 (17.4)	3 (0.6)		3 (0.5)				129 (5.5)	2 (1.1)	131 (5.2)
Banded rockcod	57 (8.2)		57 (7.7)	68 (13.3)		68 (11.2)				125 (5.3)		125 (4.9)
Redfish	35 (5.1)	3 (6.8)	38 (5.2)	49 (9.6)		49 (8.1)	12 (1)		12 (1)	96 (4.1)	3 (1.6)	99 (3.9)
Eastern highfin spurdog	22 (3.2)	1 (2.3)	23 (3.1)	68 (13.3)	1 (1)	69 (11.4)				90 (3.8)	2 (1.1)	92 (3.6)
Pearl perch	48 (6.9)	5 (11.4)	53 (7.2)							48 (2)	5 (2.7)	53 (2.1)
Philippine spurdog	26 (3.8)	12 (27.3)	38 (5.2)							26 (1.1)	12 (6.6)	38 (1.5)
Endeavour dogfish	22 (3.2)		22 (3)				12 (1)		12 (1)	34 (1.4)		34 (1.3)
Eastern longnose spurdog	14 (2)		14 (1.9)	14 (2.7)	1 (1)	15 (2.5)				28 (1.2)	1 (0.5)	29 (1.1)
Whitefin swellshark							12 (1)	15 (34.9)	27 (2.3)	12 (0.5)	15 (8.2)	27 (1.1)
Pink ling							25 (2.2)		25 (2.1)	25 (1.1)		25 (1)
Piked spurdog							20 (1.7)	4 (9.3)	24 (2)	20 (0.9)	4 (2.2)	24 (0.9)
Barracouta				1 (0.2)		1 (0.2)	21 (1.8)		21 (1.8)	22 (0.9)		22 (0.9)
Bass groper	15 (2.2)		15 (2)	3 (0.6)		3 (0.5)	2 (0.2)		2 (0.2)	20 (0.9)		20 (0.8)
Frostfish							20 (1.7)		20 (1.7)	20 (0.9)		20 (0.8)
Imperador							16 (1.4)		16 (1.3)	16 (0.7)		16 (0.6)
Hapuku	1 (0.1)		1 (0.1)	7 (1.4)		7 (1.2)	7 (0.6)		7 (0.6)	15 (0.6)		15 (0.6)
Harrisson's dogfish	14 (2)		14 (1.9)							14 (0.6)		14 (0.6)
Jackass morwong							13 (1.1)		13 (1.1)	13 (0.6)		13 (0.5)

Appendix C-2 – Dropline	North			Central			South			Total		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Ocean blue-eye trevalla				13 (2.5)		13 (2.1)				13 (0.6)		13 (0.5)
Grey morwong	10 (1.4)		10 (1.4)	2 (0.4)		2 (0.3)				12 (0.5)		12 (0.5)
Sharphead perch				10 (2)		10 (1.7)	1 (0.1)	1 (2.3)	2 (0.2)	11 (0.5)	1 (0.5)	12 (0.5)
King morwong				11 (2.2)		11 (1.8)				11 (0.5)		11 (0.4)
Teraglin	10 (1.4)		10 (1.4)							10 (0.4)		10 (0.4)
Sawtail shark								8 (18.6)	8 (0.7)		8 (4.4)	8 (0.3)
Skipjack tuna	2 (0.3)		2 (0.3)	5 (1)		5 (0.8)				7 (0.3)		7 (0.3)
Gummy shark	2 (0.3)		2 (0.3)				4 (0.3)		4 (0.3)	6 (0.3)		6 (0.2)
Ocean jacket				5 (1)		5 (0.8)	1 (0.1)		1 (0.1)	6 (0.3)		6 (0.2)
Banded wobbegong				4 (0.8)		4 (0.7)	1 (0.1)		1 (0.1)	5 (0.2)		5 (0.2)
Dusky shark							5 (0.4)		5 (0.4)	5 (0.2)		5 (0.2)
Saddled swellshark		4 (9.1)	4 (0.5)	1 (0.2)		1 (0.2)				1 (<0.1)	4 (2.2)	5 (0.2)
Mandarin shark	2 (0.3)		2 (0.3)	2 (0.4)		2 (0.3)				4 (0.2)		4 (0.2)
Port Jackson shark					2 (2.1)	2 (0.3)		2 (4.7)	2 (0.2)		4 (2.2)	4 (0.2)
Longfin perch	1 (0.1)		1 (0.1)	2 (0.4)		2 (0.3)				3 (0.1)		3 (0.1)
Sergeant Baker		3 (6.8)	3 (0.4)								3 (1.6)	3 (0.1)
Southern dogfish							3 (0.3)		3 (0.3)	3 (0.1)		3 (0.1)
Spotted wobbegong				3 (0.6)		3 (0.5)				3 (0.1)		3 (0.1)
Alfonsino	1 (0.1)		1 (0.1)				1 (0.1)		1 (0.1)	2 (0.1)		2 (0.1)
Eastern red scorpionfish	2 (0.3)		2 (0.3)							2 (0.1)		2 (0.1)
Flame snapper	2 (0.3)		2 (0.3)							2 (0.1)		2 (0.1)
Oilfish							2 (0.2)		2 (0.2)	2 (0.1)		2 (0.1)
Samson fish	1 (0.1)		1 (0.1)	1 (0.2)		1 (0.2)				2 (0.1)		2 (0.1)

Appendix C-2 – Dropline	North			Central			South			Total		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Snipe eel								2 (4.7)	2 (0.2)		2 (1.1)	2 (0.1)
Taiwan gulper shark	2 (0.3)		2 (0.3)							2 (0.1)		2 (0.1)
Unid. conger							2 (0.2)		2 (0.2)	2 (0.1)		2 (0.1)
Amberjack	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Balloonfish		1 (2.3)	1 (0.1)								1 (0.5)	1 (<0.1)
Bigeye thresher								1 (2.3)	1 (0.1)		1 (0.5)	1 (<0.1)
Blackspot goatfish	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Blue grenadier							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Eastern pigfish				1 (0.2)		1 (0.2)				1 (<0.1)		1 (<0.1)
Eastern shovelnose ray		1 (2.3)	1 (0.1)								1 (0.5)	1 (<0.1)
Green moray							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Largetooth beardie	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Longfin gemfish							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Mahi mahi	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Ribaldo							1 (0.1)		1 (0.1)	1 (<0.1)		1 (<0.1)
Sawtooth moray		1 (2.3)	1 (0.1)								1 (0.5)	1 (<0.1)
Shortfin mako								1 (2.3)	1 (0.1)		1 (0.5)	1 (<0.1)
Thresher shark								1 (2.3)	1 (0.1)		1 (0.5)	1 (<0.1)
Unid. deepwater perch	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Unid. stingray		1 (2.3)	1 (0.1)								1 (0.5)	1 (<0.1)
Unid. whaler shark					1 (1)	1 (0.2)					1 (0.5)	1 (<0.1)

Appendix C-3 – Set/trotline		**North**			**Central**			**South**			**Total**	
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All Species combined	**834 (100)**	**272 (100)**	**1106 (100)**	**179 (100)**	**97 (100)**	**276 (100)**	**3648 (100)**	**596 (100)**	**4244 (100)**	**4661 (100)**	**965 (100)**	**5626 (100)**
Bigeye ocean perch							863 (23.7)	14 (2.3)	877 (20.7)	863 (18.5)	14 (1.5)	877 (15.6)
Pink ling							671 (18.4)		671 (15.8)	671 (14.4)		671 (11.9)
Snapper	337 (40.4)	52 (19.1)	389 (35.2)				178 (4.9)	10 (1.7)	188 (4.4)	515 (11.0)	62 (6.4)	577 (10.3)
Gummy shark	108 (12.9)	1 (0.4)	109 (9.9)	3 (1.7)		3 (1.1)	455 (12.5)	3 (0.5)	458 (10.8)	566 (12.1)	4 (0.4)	570 (10.1)
Whitefin swellshark							337 (9.2)	2 (0.3)	339 (8.0)	337 (7.2)	2 (0.2)	339 (6.0)
Eastern fiddler ray		51 (18.8)	51 (4.6)	2 (1.1)		2 (0.7)	163 (4.5)	36 (6.0)	199 (4.7)	165 (3.5)	87 (9)	252 (4.5)
Draughtboard shark							219 (6.0)	13 (2.2)	232 (5.5)	219 (4.7)	13 (1.3)	232 (4.1)
Port Jackson shark		4 (1.5)	4 (0.4)	1 (0.6)	17 (17.5)	18 (6.5)	26 (0.7)	177 (29.7)	203 (4.8)	27 (0.6)	198 (20.5)	225 (4.0)
Ribaldo							163 (4.5)	7 (1.2)	170 (4)	163 (3.5)	7 (0.7)	170 (3.0)
Eastern red scorpionfish	84 (10.1)		84 (7.6)				22 (0.6)	1 (0.2)	23 (0.5)	106 (2.3)	1 (0.1)	107 (1.9)
Sandbar shark	102 (12.2)	1 (0.4)	103 (9.3)							102 (2.2)	1 (0.1)	103 (1.8)
Blue mackerel							84 (2.3)	13 (2.2)	97 (2.3)	84 (1.8)	13 (1.3)	97 (1.7)
Grey morwong	25 (3.0)	1 (0.4)	26 (2.4)				69 (1.9)		69 (1.6)	94 (2)	1 (0.1)	95 (1.7)
Piked spurdog							16 (0.4)	69 (11.6)	85 (2)	16 (0.3)	69 (7.2)	85 (1.5)
Dusky shark	26 (3.1)	1 (0.4)	27 (2.4)	40 (22.3)		40 (14.5)				66 (1.4)	1 (0.1)	67 (1.2)
Smooth stingray		1 (0.4)	1 (0.1)	2 (1.1)	61 (62.9)	63 (22.8)		3 (0.5)	3 (0.1)	2 (<0.1)	65 (6.7)	67 (1.2)
Redfish	9 (1.1)		9 (0.8)				40 (1.1)	14 (2.3)	54 (1.3)	49 (1.1)	14 (1.5)	63 (1.1)
Reef ocean perch							40 (1.1)	19 (3.2)	59 (1.4)	40 (0.9)	19 (2)	59 (1.0)
Red gurnard							55 (1.5)	1 (0.2)	56 (1.3)	55 (1.2)	1 (0.1)	56 (1.0)
Bluespotted flathead	5 (0.6)		5 (0.5)	5 (2.8)		5 (1.8)	33 (0.9)	4 (0.7)	37 (0.9)	43 (0.9)	4 (0.4)	47 (0.8)
Sergeant Baker		29 (10.7)	29 (2.6)				13 (0.4)	2 (0.3)	15 (0.4)	13 (0.3)	31 (3.2)	44 (0.8)
Spotted wobbegong	2 (0.2)	4 (1.5)	6 (0.5)	33 (18.4)	4 (4.1)	37 (13.4)				35 (0.8)	8 (0.8)	43 (0.8)

Appendix C-3 – Set/trotline	North			Central			South			Total		
Species	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Green moray		30 (11)	30 (2.7)				2 (0.1)	10 (1.7)	12 (0.3)	2 (<0.1)	40 (4.1)	42 (0.7)
Tiger flathead							38 (1)	3 (0.5)	41 (1)	38 (0.8)	3 (0.3)	41 (0.7)
Grey spotted catshark								38 (6.4)	38 (0.9)		38 (3.9)	38 (0.7)
Banded wobbegong		2 (0.7)	2 (0.2)	30 (16.8)		30 (10.9)	1 (<0.1)	2 (0.3)	3 (0.1)	31 (0.7)	4 (0.4)	35 (0.6)
Ornate wobbegong	1 (0.1)	33 (12.1)	34 (3.1)							1 (<0.1)	33 (3.4)	34 (0.6)
Eastern shovelnose ray	19 (2.3)		19 (1.7)				5 (0.1)	5 (0.8)	10 (0.2)	24 (0.5)	5 (0.5)	29 (0.5)
Bight skate							17 (0.5)	9 (1.5)	26 (0.6)	17 (0.4)	9 (0.9)	26 (0.5)
Spinner shark	12 (1.4)		12 (1.1)	13 (7.3)		13 (4.7)				25 (0.5)		25 (0.4)
Sawtail shark								23 (3.9)	23 (0.5)		23 (2.4)	23 (0.4)
Blind shark	1 (0.1)	21 (7.7)	22 (2)							1 (<0.1)	21 (2.2)	22 (0.4)
Black stingray		3 (1.1)	3 (0.3)		5 (5.2)	5 (1.8)		13 (2.2)	13 (0.3)		21 (2.2)	21 (0.4)
Bronze whaler	1 (0.1)		1 (0.1)	13 (7.3)		13 (4.7)	7 (0.2)		7 (0.2)	21 (0.5)		21 (0.4)
Tiger shark	9 (1.1)	2 (0.7)	11 (1)	5 (2.8)	4 (4.1)	9 (3.3)				14 (0.3)	6 (0.6)	20 (0.4)
Largetooth beardie							6 (0.2)	11 (1.8)	17 (0.4)	6 (0.1)	11 (1.1)	17 (0.3)
Southern dogfish							2 (0.1)	15 (2.5)	17 (0.4)	2 (<0.1)	15 (1.6)	17 (0.3)
Blue-eye trevalla							16 (0.4)		16 (0.4)	16 (0.3)		16 (0.3)
Southern whiptail							1 (<0.1)	14 (2.3)	15 (0.4)	1 (<0.1)	14 (1.5)	15 (0.3)
Smooth hammerhead	4 (0.5)		4 (0.4)	8 (4.5)	1 (1)	9 (3.3)	1 (<0.1)		1 (<0.1)	13 (0.3)	1 (0.1)	14 (0.2)
Unid. carpetshark								14 (2.3)	14 (0.3)		14 (1.5)	14 (0.2)
Endeavour dogfish							13 (0.4)		13 (0.3)	13 (0.3)		13 (0.2)
Jackass morwong							13 (0.4)		13 (0.3)	13 (0.3)		13 (0.2)
Pearl perch	10 (1.2)	2 (0.7)	12 (1.1)							10 (0.2)	2 (0.2)	12 (0.2)
Venus tuskfish	12 (1.4)		12 (1.1)							12 (0.3)		12 (0.2)

Appendix C-3 – Set/trotline	North			Central			South			Total		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Shortfin mako	6 (0.7)		6 (0.5)	4 (2.2)		4 (1.4)		1 (0.2)	1 (<0.1)	10 (0.2)	1 (0.1)	11 (0.2)
Yellowtail kingfish	8 (1)	3 (1.1)	11 (1)							8 (0.2)	3 (0.3)	11 (0.2)
Blacktip shark complex	4 (0.5)		4 (0.4)	6 (3.4)		6 (2.2)				10 (0.2)		10 (0.2)
Collar carpetshark		1 (0.4)	1 (0.1)					9 (1.5)	9 (0.2)		10 (1)	10 (0.2)
Eastern wirrah	2 (0.2)		2 (0.2)	2 (1.1)		2 (0.7)	6 (0.2)		6 (0.1)	10 (0.2)		10 (0.2)
Scalloped hammerhead	10 (1.2)		10 (0.9)							10 (0.2)		10 (0.2)
Silver sweep	8 (1)		8 (0.7)				1 (<0.1)		1 (<0.1)	9 (0.2)		9 (0.2)
Snipe eel							2 (0.1)	7 (1.2)	9 (0.2)	2 (<0.1)	7 (0.7)	9 (0.2)
Southern eagle ray							6 (0.2)	2 (0.3)	8 (0.2)	6 (0.1)	2 (0.2)	8 (0.1)
Common gurnard perch							7 (0.2)		7 (0.2)	7 (0.2)		7 (0.1)
Melbourne skate							4 (0.1)	3 (0.5)	7 (0.2)	4 (0.1)	3 (0.3)	7 (0.1)
Serpent eel								7 (1.2)	7 (0.2)		7 (0.7)	7 (0.1)
Sharpnose sevengill shark							7 (0.2)		7 (0.2)	7 (0.2)		7 (0.1)
Common sawshark							6 (0.2)		6 (0.1)	6 (0.1)		6 (0.1)
Eastern frogfish		6 (2.2)	6 (0.5)								6 (0.6)	6 (0.1)
Eastern pigfish	5 (0.6)		5 (0.5)				1 (<0.1)		1 (<0.1)	6 (0.1)		6 (0.1)
Gemfish							6 (0.2)		6 (0.1)	6 (0.1)		6 (0.1)
Bull shark	2 (0.2)		2 (0.2)	3 (1.7)		3 (1.1)				5 (0.1)		5 (0.1)
Crimsonband wrasse	5 (0.6)		5 (0.5)							5 (0.1)		5 (0.1)
Marbled flathead	5 (0.6)		5 (0.5)							5 (0.1)		5 (0.1)
Ocean jacket							5 (0.1)		5 (0.1)	5 (0.1)		5 (0.1)
Toothed whiptail								5 (0.8)	5 (0.1)		5 (0.5)	5 (0.1)
Black-banded seaperch		4 (1.5)	4 (0.4)								4 (0.4)	4 (0.1)

Appendix C-3 – Set/trotline	North			Central			South			Total		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Foxfish	4 (0.5)		4 (0.4)							4 (0.1)		4 (0.1)
Great white shark		1 (0.4)	1 (0.1)		2 (2.1)	2 (0.7)		1 (0.2)	1 (<0.1)		4 (0.4)	4 (0.1)
Latchet							4 (0.1)		4 (0.1)	4 (0.1)		4 (0.1)
Unid. moray		4 (1.5)	4 (0.4)								4 (0.4)	4 (0.1)
Barracouta							3 (0.1)		3 (0.1)	3 (0.1)		3 (0.1)
Eastern blue groper		3 (1.1)	3 (0.3)								3 (0.3)	3 (0.1)
Hapuku							3 (0.1)		3 (0.1)	3 (0.1)		3 (0.1)
Mosaic moray		3 (1.1)	3 (0.3)								3 (0.3)	3 (0.1)
Orange spotted catshark								3 (0.5)	3 (0.1)		3 (0.3)	3 (0.1)
Thresher shark				3 (1.7)		3 (1.1)				3 (0.1)		3 (0.1)
Bass groper							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)
Bearded rock cod							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)
Broadgilled hagfish								2 (0.3)	2 (<0.1)		2 (0.2)	2 (<0.1)
Broadnose shark							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)
Eastern blue devil		2 (0.7)	2 (0.2)								2 (0.2)	2 (<0.1)
Eastern conger		2 (0.7)	2 (0.2)								2 (0.2)	2 (<0.1)
Goldspotted sweetlips	2 (0.2)		2 (0.2)							2 (<0.1)		2 (<0.1)
Great hammerhead				2 (1.1)		2 (0.7)				2 (<0.1)		2 (<0.1)
Grey nurse shark					2 (2.1)	2 (0.7)					2 (0.2)	2 (<0.1)
Longspine flathead								2 (0.3)	2 (<0.1)		2 (0.2)	2 (<0.1)
Luderick				2 (1.1)		2 (0.7)				2 (<0.1)		2 (<0.1)
Ogilby's ghostshark							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)
School shark							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)

Appendix C-3 – Set/trotline	North			Central			South			Total		
Species	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Unid. skate							2 (0.1)		2 (<0.1)	2 (<0.1)		2 (<0.1)
Zebra shark								2 (0.3)	2 (<0.1)		2 (0.2)	2 (<0.1)
Black shark							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Bluntnose sixgill shark							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Cobia				1 (0.6)		1 (0.4)				1 (<0.1)		1 (<0.1)
Coffin ray		1 (0.4)	1 (0.1)								1 (0.1)	1 (<0.1)
Common pike eel							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Crested hornshark		1 (0.4)	1 (0.1)								1 (0.1)	1 (<0.1)
Eastern highfin spurdog					1 (1)	1 (0.4)					1 (0.1)	1 (<0.1)
Estuary cobbler		1 (0.4)	1 (0.1)								1 (0.1)	1 (<0.1)
Longfin pike							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Mado								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Moller's lanternshark								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Owston's dogfish							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Red morwong				1 (0.6)		1 (0.4)				1 (<0.1)		1 (<0.1)
Remora		1 (0.4)	1 (0.1)								1 (0.1)	1 (<0.1)
Rock ling							1 (<0.1)		1 (<0.1)	1 (<0.1)		1 (<0.1)
Samson fish	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Sand flathead								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Sharphead perch								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Silky shark	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Sixspine leatherjacket	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Southern Maori-wrasse		1 (0.4)	1 (0.1)								1 (0.1)	1 (<0.1)

Appendix C-3 – Set/trotline	North			Central			South			Total		
Species	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Sydney skate								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Tarwhine	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Unid. eagle ray								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Unid. porcupinefish								1 (0.2)	1 (<0.1)		1 (0.1)	1 (<0.1)
Unid. shovelnose ray	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)
Yellow-finned leatherjacket	1 (0.1)		1 (0.1)							1 (<0.1)		1 (<0.1)

Appendix D – Results of multivariate analyses of retained and discarded catch composition data (number caught by species) by fishing method (handline, dropline and set/trotline) and region (north, central and south).

Data were analysed using permutational multivariate analysis of variance (PERMANOVA) and similarity percentages (SIMPER) analysis.

APPENDIX D-1: Results of PERMANOVA of catch composition data (number caught by species) for A) retained and B) discarded catches. Data were analysed by fishing method (handline, dropline and set/trotline) and region (north, central and south). *Post hoc* pairwise comparisons are presented where appropriate.

Source of variation	df	MS	Pseudo-F	*p*-(perm)	Pairwise Comparisons
A) Retained catches					
Method	2	43511	11.318	<0.0001	North: HL≠DL≠SL
Region	2	34544	8.9855	<0.0001	Central: HL≠DL≠SL
Method x Region	4	21327	5.5475	<0.0001	South: HL≠DL≠SL
Residual	281	3844.4			HL: North≠Central≠South
Total	289				DL: North≠Central≠South
					SL: North≠Central≠South
B) Discarded catches					
Method	2	22233	5.4667	<0.0001	North: HL≠DL≠SL
Region	2	16479	4.0518	<0.0001	Central: HL=DL≠SL
Method x Region	4	10636	2.6152	<0.0001	South: HL≠DL≠SL
Residual	190	4067			HL: North≠Central=South
Total	198				DL: North≠Central≠South
					SL: North≠Central≠South

APPENDIX D-2: Results of SIMPER analyses of retained catch composition data (number caught by species) to determine the main species contributing to dissimilarity between pairs of fishing methods (handline, dropline and set/trotline) for each region (north, central and south), and pairs of regions for each fishing method.

Region: North	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) Handline vs. Dropline	**Average dissimilarity = 94.06**			
snapper	17.36	0.84	18.46	18.46
blue-eye trevalla	10.33	0.71	10.98	29.44
yellowtail scad	8.12	0.45	8.64	38.07
pearl perch	6.62	0.53	7.04	45.11
blue mackerel	6.51	0.37	6.92	52.03
B) Handline vs. Setline	**Average dissimilarity = 94.76**			
snapper	23.17	1.02	24.45	24.45
sandbar shark	9.91	0.54	10.46	34.91
yellowtail scad	8.13	0.43	8.58	43.49
blue mackerel	6.54	0.36	6.9	50.39
eastern red scorpionfish	6.09	0.7	6.43	56.83
C) Dropline vs. Setline	**Average dissimilarity = 97.70**			
snapper	20.38	0.87	20.86	20.86
blue-eye trevalla	12.36	0.67	12.65	33.51
sandbar shark	10.9	0.56	11.16	44.67
gemfish	6.34	0.45	6.49	51.16
pearl perch	4.55	0.4	4.66	55.82

Region: Central	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) Handline vs. Dropline	**Average dissimilarity = 96.52**			
silver sweep	16.35	0.6	16.94	16.94
Australian bonito	12.25	0.52	12.69	29.63
yellowtail scad	11.99	0.64	12.42	42.05
yellowtail kingfish	11.34	0.7	11.75	53.8
tailor	9.58	0.48	9.93	63.73
B) Handline vs. Setline	**Average dissimilarity = 99.62**			
silver sweep	18.22	0.6	18.29	18.29
yellowtail scad	14.21	0.65	14.27	32.56
Australian bonito	13.89	0.54	13.95	46.51
tailor	11.12	0.49	11.17	57.67
teraglin	5.6	0.3	5.63	63.3
C) Dropline vs. Setline	**Average dissimilarity = 99.83**			
yellowtail kingfish	27.01	0.83	27.05	27.05
banded rockcod	12.08	0.57	12.1	39.15
redfish	7.91	0.71	7.93	47.08
dusky shark	7.85	0.63	7.86	54.94
eastern highfin spurdog	7.17	0.4	7.19	62.12

Region: South	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) Handline vs. Dropline	**Average dissimilarity = 93.03**			
blue-eye trevalla	20	1.17	21.5	21.5
gemfish	19.61	1.08	21.08	42.58
bigeye ocean perch	10.83	0.81	11.64	54.22
southern Maori-wrasse	8.51	0.55	9.15	63.37
silver trevally	7.86	0.34	8.45	71.82
B) Handline vs. Setline	**Average dissimilarity = 98.10**			
bigeye ocean perch	14.81	0.73	15.09	15.09
pink ling	8.91	0.64	9.08	24.17
gummy shark	8.71	0.47	8.88	33.05
snapper	7.72	0.58	7.87	40.93
silver trevally	6.66	0.33	6.79	47.71
C) Dropline vs. Setline	**Average dissimilarity = 93.76**			
bigeye ocean perch	15.22	1.01	16.24	16.24
blue-eye trevalla	11.48	1.09	12.25	28.48
gemfish	11.28	0.98	12.03	40.51
pink ling	8.51	0.67	9.08	49.59
gummy shark	7.81	0.47	8.33	57.92

Method: Handline	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) North vs. Central	**Average dissimilarity = 93.93**			
silver sweep	15.55	0.59	16.56	16.56
yellowtail scad	14.09	0.75	15.01	31.56
Australian bonito	12.47	0.55	13.28	44.84
tailor	9.36	0.49	9.96	54.81
snapper	8.67	0.66	9.23	64.04
B) North vs. South	**Average dissimilarity = 96.07**			
snapper	13.9	0.71	14.47	14.47
southern Maori-wrasse	10.59	0.57	11.03	25.5
silver trevally	9.04	0.36	9.41	34.9
gemfish	7.76	0.45	8.07	42.97
yellowtail scad	7.45	0.42	7.75	50.73
C) Central vs. South	**Average dissimilarity = 97.52**			
silver sweep	15.26	0.59	15.65	15.65
Australian bonito	11.13	0.5	11.41	27.06
yellowtail scad	10.87	0.6	11.14	38.21
silver trevally	9.32	0.4	9.55	47.76
tailor	8.65	0.45	8.87	56.63

Method: Dropline	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) North vs. Central	**Average dissimilarity = 95.06**			
yellowtail kingfish	19.08	0.75	20.07	20.07
blue-eye trevalla	13.39	0.75	14.09	34.16
banded rockcod	10.45	0.63	10.99	45.15
snapper	8.41	0.49	8.85	53.99
redfish	6.76	0.64	7.11	61.11
B) North vs. South	**Average dissimilarity = 85.85**			
gemfish	21.51	1.19	25.06	25.06
blue-eye trevalla	20.7	1.3	24.12	49.18
bigeye ocean perch	11.49	0.85	13.39	62.56
snapper	4.99	0.43	5.81	68.38
redfish	2.37	0.4	2.76	71.14
C) Central vs. South	**Average dissimilarity = 97.66**			
blue-eye trevalla	23.26	1.37	23.82	23.82
gemfish	21.35	1.16	21.86	45.68
bigeye ocean perch	12.06	0.88	12.35	58.03
yellowtail kingfish	11.66	0.66	11.94	69.97
banded rockcod	4.72	0.48	4.83	74.8

Method: Setline	(Retained)			
Species	Av.Diss	Diss/SD	Contrib%	Cum.%
A) North vs. Central	**Average dissimilarity = 94.47**			
sandbar shark	16.22	0.64	17.17	17.17
snapper	15.64	0.66	16.56	33.73
dusky shark	11.17	0.66	11.82	45.55
spotted wobbegong	5.96	0.47	6.3	51.85
spinner shark	5.32	0.56	5.63	57.48
B) North vs. South	**Average dissimilarity = 95.52**			
bigeye ocean perch	15.76	0.74	16.5	16.5
snapper	12.71	0.82	13.31	29.8
gummy shark	10.49	0.56	10.98	40.78
pink ling	9.37	0.65	9.81	50.6
whitefin swellshark	4.87	0.64	5.1	55.7
C) Central vs. South	**Average dissimilarity = 99.58**			
bigeye ocean perch	18.35	0.77	18.43	18.43
gummy shark	10.66	0.51	10.7	29.13
pink ling	10.49	0.68	10.53	39.66
snapper	9.92	0.59	9.96	49.62
whitefin swellshark	5.42	0.65	5.45	55.07

APPENDIX D-3: Results of SIMPER analyses of discarded catch composition data (number caught by species) to determine the main species contributing to dissimilarity between pairs of fishing methods (handline, dropline and set/trotline) for each region (north, central and south), and pairs of regions for each fishing method.

Region: North	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) Handline vs. Dropline	**Average dissimilarity = 94.66**			
snapper	17.78	0.77	18.78	18.78
yellowtail kingfish	16.6	0.6	17.54	36.32
pearl perch	8.52	0.59	9	45.32
Sergeant Baker	6.25	0.55	6.6	51.92
yellowtail scad	5.63	0.29	5.95	57.88
B) Handline vs. Setline	**Average dissimilarity = 95.29**			
snapper	16.75	0.9	17.58	17.58
yellowtail kingfish	8.94	0.45	9.38	26.96
Sergeant Baker	8.18	0.6	8.58	35.54
eastern fiddler ray	7.84	0.66	8.23	43.77
ornate wobbegong	4.54	0.52	4.76	48.53
C) Dropline vs. Setline	**Average dissimilarity = 98.90**			
snapper	11.4	0.73	11.53	11.53
Sergeant Baker	9.28	0.54	9.39	20.91
eastern fiddler ray	8.81	0.67	8.91	29.82
black stingray	5.31	0.36	5.37	35.2
ornate wobbegong	5.03	0.52	5.09	40.29

Region: Central	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) Handline vs. Dropline	**Average dissimilarity = 83.86**			
yellowtail kingfish	44.29	1.43	52.82	52.82
silver sweep	8.05	0.46	9.59	62.41
snapper	7.62	0.4	9.08	71.49
tailor	3.81	0.28	4.55	76.04
Sergeant Baker	2.72	0.35	3.24	79.28
B) Handline vs. Setline	**Average dissimilarity = 99.63**			
yellowtail kingfish	30.5	0.95	30.62	30.62
smooth stingray	15.48	0.72	15.53	46.15
silver sweep	9.17	0.49	9.2	55.35
snapper	8.66	0.42	8.7	64.05
Port Jackson shark	5.47	0.46	5.5	69.54
C) Dropline vs. Setline	**Average dissimilarity = 99.11**			
yellowtail kingfish	44.68	1.14	45.08	45.08
smooth stingray	19.82	0.76	20	65.08
Port Jackson shark	7.43	0.45	7.5	72.57
eastern highfin spurdog	4.69	0.37	4.73	77.31
tiger shark	3.98	0.3	4.02	81.32

Region: South	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) Handline vs. Dropline	**Average dissimilarity = 100.00**			
yellowtail kingfish	22.63	0.67	22.63	22.63
eastern red scorpionfish	12.55	0.58	12.55	35.19
whitefin swellshark	11.25	0.63	11.25	46.44
sawtail shark	4.47	0.34	4.47	50.91
snapper	4.37	0.31	4.37	55.28
B) Handline vs. Setline	**Average dissimilarity = 99.05**			
Port Jackson shark	11.8	0.55	11.91	11.91
yellowtail kingfish	11.64	0.52	11.75	23.66
eastern red scorpionfish	10.02	0.57	10.12	33.78
grey spotted catshark	3.96	0.4	4	37.78
green moray	3.79	0.66	3.83	41.61
C) Dropline vs. Setline	**Average dissimilarity = 97.68**			
Port Jackson shark	15.49	0.63	15.86	15.86
sawtail shark	7.24	0.48	7.41	23.27
whitefin swellshark	6.72	0.58	6.88	30.15
piked spurdog	5.93	0.34	6.07	36.22
southern whiptail	5.33	0.36	5.46	41.68

Method: Handline	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) North vs. Central	**Average dissimilarity = 89.51**			
yellowtail kingfish	28.53	1.02	31.87	31.87
snapper	14.26	0.76	15.93	47.8
silver sweep	8.11	0.52	9.06	56.86
yellowtail scad	5.76	0.35	6.44	63.3
Sergeant Baker	4.29	0.55	4.79	68.08
B) North vs. South	**Average dissimilarity = 92.59**			
yellowtail kingfish	22.39	0.75	24.18	24.18
eastern red scorpionfish	13.8	0.69	14.91	39.09
snapper	11.93	0.67	12.88	51.97
yellowtail scad	4.4	0.27	4.75	56.72
Sergeant Baker	3.87	0.5	4.18	60.9
C) Central vs. South	**Average dissimilarity = 89.15**			
yellowtail kingfish	29.2	0.98	32.75	32.75
eastern red scorpionfish	11.05	0.57	12.4	45.15
snapper	7.94	0.45	8.9	54.05
silver sweep	7.16	0.46	8.03	62.09
tailor	3.3	0.27	3.71	65.79

Method: Dropline	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) North vs. Central	**Average dissimilarity = 96.27**			
yellowtail kingfish	50.76	1.28	52.72	52.72
eastern highfin spurdog	5.72	0.39	5.94	58.67
Philippine spurdog	5.65	0.33	5.87	64.54
pearl perch	5.35	0.38	5.55	70.09
eastern longnose spurdog	4.81	0.35	5	75.09
B) North vs. South	**Average dissimilarity = 100.00**			
whitefin swellshark	19.46	0.8	19.46	19.46
sawtail shark	7.03	0.4	7.03	26.49
Philippine spurdog	6.9	0.36	6.9	33.39
pearl perch	6.78	0.43	6.78	40.18
piked spurdog	6.13	0.49	6.13	46.3
C) Central vs. South	**Average dissimilarity = 99.94**			
yellowtail kingfish	47.46	1.2	47.49	47.49
whitefin swellshark	14.08	0.68	14.09	61.58
sawtail shark	5.35	0.36	5.36	66.94
piked spurdog	4.35	0.43	4.35	71.29
eastern highfin spurdog	4.14	0.34	4.14	75.43

Method: Setline	(Discarded)			
Species	**Av.Diss**	**Diss/SD**	**Contrib%**	**Cum.%**
A) North vs. Central	**Average dissimilarity = 96.34**			
smooth stingray	16.57	0.71	17.2	17.2
snapper	9.84	0.66	10.21	27.42
eastern fiddler ray	8.37	0.66	8.69	36.11
Sergeant Baker	6.91	0.45	7.18	43.28
Port Jackson shark	6.18	0.43	6.42	49.7
B) North vs. South	**Average dissimilarity = 96.80**			
Port Jackson shark	11.95	0.57	12.35	12.35
snapper	7.85	0.74	8.11	20.46
eastern fiddler ray	7.79	0.78	8.05	28.51
Sergeant Baker	4.41	0.48	4.56	33.07
green moray	4.22	0.86	4.36	37.42
C) Central vs. South	**Average dissimilarity = 98.07**			
Port Jackson shark	16.56	0.7	16.89	16.89
smooth stingray	12.13	0.65	12.37	29.26
southern whiptail	4.99	0.35	5.09	34.35
grey spotted catshark	4.66	0.41	4.75	39.1
sawtail shark	4.65	0.35	4.74	43.83

APPENDIX E - Mean catch rates (number caught per fisher day ± SE) of retained, discarded and total (i.e. retained + discarded) fish by species by region and by period grouping for each of three NSW commercial line-fishing methods: handline; dropline; and set/trotline.

Data are presented for E-1) handline; E-2) dropline; and E-3) set/trotline, for temporal period groupings (P12, P34, P56 and P78) and groupings combined, within A) north, B) central and C) south regions of NSW coastal waters, and D) all regions combined (NSW overall).

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Handline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	25.26 (5.35)	3.58 (0.75)	28.84 (5.88)	28.89 (5)	5.68 (1.64)	34.58 (5.53)	35.11 (12.32)	3.84 (1.11)	38.95 (12.3)	31.84 (6.33)	12.63 (5.34)	44.47 (8.67)	30.03 (3.68)	6.26 (1.3)	36.28 (4.01)
Yellowtail scad	7.37 (4.53)	0	7.37 (4.53)	3.63 (2.16)	1.32 (1.32)	4.95 (2.46)	11.16 (5.35)	0.42 (0.42)	11.58 (5.32)	3.21 (2.22)	5.95 (5.2)	9.16 (5.51)	6.11 (1.82)	1.79 (1.19)	7.9 (2.14)
Snapper	5.95 (2.04)	0.47 (0.23)	6.42 (2.12)	6.53 (2.74)	1 (0.45)	7.53 (2.93)	5.32 (2.24)	1 (0.32)	6.32 (2.54)	9.21 (2.68)	1.95 (0.75)	11.16 (2.97)	6.69 (1.27)	1.08 (0.23)	7.77 (1.37)
Blue mackerel	2.68 (2.12)	0	2.68 (2.12)	6.26 (3.2)	0	6.26 (3.2)	9.58 (8.5)	0	9.58 (8.5)	2.47 (1.72)	0	2.47 (1.72)	5.33 (2.24)	0	5.33 (2.24)
Yellowtail kingfish	0.16 (0.12)	0.53 (0.31)	0.68 (0.38)	1.84 (1.29)	1.42 (0.76)	3.26 (1.83)	0.21 (0.21)	0.26 (0.26)	0.47 (0.33)	6.95 (5.96)	2.16 (1.04)	9.11 (6.83)	2.17 (1.34)	1.11 (0.35)	3.27 (1.58)
Pearl perch	1.95 (1.25)	0.37 (0.14)	2.32 (1.32)	3.68 (2.03)	0.63 (0.32)	4.32 (2.27)	1.21 (0.97)	0.21 (0.16)	1.42 (1.01)	0.84 (0.55)	0	0.84 (0.55)	2.11 (0.76)	0.34 (0.11)	2.45 (0.84)
Teraglin	1.79 (1.73)	0	1.79 (1.73)	1.32 (1.05)	0.05 (0.05)	1.37 (1.1)	1.32 (0.72)	0.79 (0.5)	2.11 (1.22)	2.47 (1)	0	2.47 (1)	1.68 (0.6)	0.19 (0.11)	1.87 (0.65)
Eastern red scorpionfish	1.89 (0.55)	0.32 (0.19)	2.21 (0.54)	0.11 (0.11)	0.05 (0.05)	0.16 (0.12)	0.74 (0.33)	0.32 (0.19)	1.05 (0.44)	1.79 (0.69)	0.32 (0.19)	2.11 (0.75)	1.04 (0.22)	0.23 (0.08)	1.27 (0.23)
Australian bonito	0.11 (0.11)	0	0.11 (0.11)	2.47 (1.26)	0	2.47 (1.26)	1.79 (1.68)	0	1.79 (1.68)	0.05 (0.05)	0	0.05 (0.05)	1.23 (0.55)	0	1.23 (0.55)
Tailor	0.05 (0.05)	0	0.05 (0.05)	0.74 (0.74)	0	0.74 (0.74)	0.53 (0.53)	0	0.53 (0.53)	0.11 (0.07)	0.11 (0.07)	0.21 (0.1)	0.39 (0.27)	0.02 (0.02)	0.41 (0.27)
Mulloway	0.26 (0.21)	0	0.26 (0.21)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	1.26 (1.16)	0	1.26 (1.16)	0.35 (0.25)	0	0.35 (0.25)
Sergeant Baker	0	0.42 (0.19)	0.42 (0.19)	0.16 (0.09)	0.42 (0.23)	0.58 (0.23)	0	0.16 (0.09)	0.16 (0.09)	0	0	0	0.05 (0.03)	0.27 (0.09)	0.32 (0.09)
Silver trevally	0.16 (0.12)	0	0.16 (0.12)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.58 (0.34)	0.63 (0.4)	1.21 (0.64)	0.17 (0.08)	0.14 (0.09)	0.31 (0.14)
Spotted mackerel	0.47 (0.47)	0	0.47 (0.47)	0.37 (0.32)	0	0.37 (0.32)	0.05 (0.05)	0	0.05 (0.05)	0.16 (0.16)	0	0.16 (0.16)	0.28 (0.16)	0	0.28 (0.16)
Grey morwong	0.32 (0.17)	0	0.32 (0.17)	0.32 (0.15)	0	0.32 (0.15)	0.21 (0.14)	0	0.21 (0.14)	0.16 (0.12)	0	0.16 (0.12)	0.26 (0.08)	0	0.26 (0.08)
Redfish	0.42 (0.42)	0.05 (0.05)	0.47 (0.42)	0.05 (0.05)	0	0.05 (0.05)	0.32 (0.32)	0	0.32 (0.32)	0	0	0	0.19 (0.12)	0.01 (0.01)	0.2 (0.12)
Mado	0	0.21 (0.12)	0.21 (0.12)	0	0.32 (0.27)	0.32 (0.27)	0	0	0	0	0.16 (0.12)	0.16 (0.12)	0	0.19 (0.09)	0.19 (0.09)
Striped seapike	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0.63 (0.63)	0.05 (0.05)	0.68 (0.63)	0.05 (0.05)	0	0.05 (0.05)	0.18 (0.14)	0.01 (0.01)	0.19 (0.14)
Mackerel tuna	0.05 (0.05)	0	0.05 (0.05)	0.47 (0.23)	0	0.47 (0.23)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.18 (0.08)	0	0.18 (0.08)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Handline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Silver sweep	0.11 (0.07)	0.26 (0.17)	0.37 (0.17)	0	0.11 (0.11)	0.11 (0.11)	0	0.05 (0.05)	0.05 (0.05)	0.11 (0.11)	0	0.11 (0.11)	0.05 (0.03)	0.11 (0.05)	0.16 (0.06)
Smallscale bullseye	0	0	0	0	0	0	0	0	0	0	0.68 (0.68)	0.68 (0.68)	0	0.15 (0.15)	0.15 (0.15)
Spinner shark	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.58 (0.58)	0	0.58 (0.58)	0	0	0	0.14 (0.13)	0	0.14 (0.13)
Tarwhine	0.11 (0.07)	0.16 (0.16)	0.26 (0.17)	0.05 (0.05)	0.05 (0.05)	0.11 (0.07)	0	0	0	0.21 (0.16)	0	0.21 (0.16)	0.09 (0.04)	0.06 (0.04)	0.14 (0.06)
Blacktip bullseye	0	0	0	0	0	0	0	0.47 (0.47)	0.47 (0.47)	0	0.11 (0.11)	0.11 (0.11)	0	0.13 (0.11)	0.13 (0.11)
Maori rockcod	0	0	0	0	0	0	0	0	0	0.58 (0.53)	0	0.58 (0.53)	0.12 (0.11)	0	0.12 (0.11)
Yellowfin bream	0	0	0	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.21 (0.12)	0.26 (0.15)	0.47 (0.26)	0.07 (0.04)	0.06 (0.03)	0.12 (0.06)
Blacktip shark complex	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.42 (0.42)	0	0.42 (0.42)	0	0	0	0.11 (0.09)	0	0.11 (0.09)
Longfin pike	0	0	0	0.26 (0.26)	0	0.26 (0.26)	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.11 (0.09)	0	0.11 (0.09)
Skipjack tuna	0.16 (0.16)	0	0.16 (0.16)	0.11 (0.11)	0	0.11 (0.11)	0.05 (0.05)	0	0.05 (0.05)	0.11 (0.11)	0	0.11 (0.11)	0.11 (0.06)	0	0.11 (0.06)
Dusky shark	0	0	0	0.11 (0.07)	0	0.11 (0.07)	0.21 (0.12)	0	0.21 (0.12)	0	0	0	0.08 (0.04)	0	0.08 (0.04)
Blind shark	0	0.21 (0.12)	0.21 (0.12)	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0.07 (0.03)	0.07 (0.03)
Samson fish	0.05 (0.05)	0.05 (0.05)	0.11 (0.11)	0.11 (0.07)	0	0.11 (0.07)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.06 (0.03)	0.01 (0.01)	0.07 (0.04)
Stout whiting	0	0.11 (0.11)	0.11 (0.11)	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0.06 (0.04)
Amberjack	0	0	0	0	0	0	0.21 (0.21)	0	0.21 (0.21)	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Eastern wirrah	0.11 (0.07)	0	0.11 (0.07)	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0.11 (0.07)	0.04 (0.02)	0.01 (0.01)	0.05 (0.02)
Spanish mackerel	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.16 (0.16)	0	0.16 (0.16)	0.05 (0.04)	0	0.05 (0.04)
Yellowfin tuna	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.11 (0.07)	0	0.11 (0.07)	0.05 (0.03)	0	0.05 (0.03)
Blue-eye trevalla	0.16 (0.12)	0	0.16 (0.12)	0	0	0	0	0	0	0	0	0	0.04 (0.03)	0	0.04 (0.03)
Eastern Moses snapper	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0.04 (0.03)	0	0.04 (0.03)
Eastern pigfish	0.11 (0.07)	0	0.11 (0.07)	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.04 (0.02)	0	0.04 (0.02)
Halfbanded seaperch	0.05 (0.05)	0.05 (0.05)	0.11 (0.11)	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0.03 (0.02)	0.04 (0.03)
Longspine flathead	0	0.11 (0.11)	0.11 (0.11)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.01 (0.01)	0.03 (0.03)	0.04 (0.03)
Spotted wobbegong	0	0.16 (0.16)	0.16 (0.16)	0	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)
Venus tuskfish	0.11 (0.07)	0	0.11 (0.07)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.04 (0.02)	0	0.04 (0.02)
Blue sprat	0	0	0	0	0	0	0	0	0	0.16 (0.16)	0	0.16 (0.16)	0.03 (0.03)	0	0.03 (0.03)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Handline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Frigate mackerel	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.03 (0.02)	0	0.03 (0.02)
Ocean jacket	0	0	0	0.05 (0.05)	0.05 (0.05)	0.11 (0.07)	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0.03 (0.02)
Rosy snapper	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0.02 (0.02)	0.03 (0.02)
Swallowtail dart	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0.02 (0.02)	0.03 (0.02)
Banded rockcod	0	0	0	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Blackspot goatfish	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0.01 (0.01)	0.01 (0.01)	0.02 (0.02)
Eastern Australian salmon	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Purple rockcod	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Reef ocean perch	0	0	0	0	0	0	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.02 (0.02)	0	0.02 (0.02)
Southern Maori-wrasse	0	0	0	0	0	0	0	0	0	0	0.11 (0.07)	0.11 (0.07)	0	0.02 (0.02)	0.02 (0.02)
Banded wobbegong	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0.01 (0.01)	0.01 (0.01)
Bigeye ocean perch	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Black rockcod	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Blacktip rockcod	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0.01 (0.01)	0.01 (0.01)
Coffin ray	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Eastern fiddler ray	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Eastern shovelnose ray	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
False fusilier	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Goldspotted sweetlips	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Gummy shark	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Mahi mahi	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Maray	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Marbled flathead	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Redthroat emperor	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Sand flathead	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
School shark	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Handline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Unid. wrasse	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0.01 (0.01)	0.01 (0.01)
White-spotted guitarfish	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
B) Handline – Central	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	68.6 (15.37)	20.5 (6.02)	89.1 (18.02)	90.23 (11.18)	9.15 (2.19)	99.38 (11.29)	67 (20.35)	8.7 (3.53)	75.7 (20.95)	93.09 (19.59)	5.45 (1.93)	98.55 (20.08)	80.06 (8.07)	11.26 (1.93)	91.33 (8.57)
Silver sweep	15.2 (7.37)	2 (1.03)	17.2 (7.88)	3.15 (2.67)	0.31 (0.17)	3.46 (2.67)	15.6 (9.65)	1.1 (0.82)	16.7 (10.17)	57.18 (16.94)	1.09 (0.58)	58.27 (17.23)	20.47 (4.66)	1.09 (0.35)	21.56 (4.81)
Australian bonito	2.6 (2.49)	0	2.6 (2.49)	27.77 (8.57)	0	27.77 (8.57)	22.1 (22.1)	0	22.1 (22.1)	14.55 (10.33)	0	14.55 (10.33)	17.1 (5.95)	0	17.1 (5.95)
Yellowtail scad	27.2 (11.16)	1.7 (1.32)	28.9 (10.92)	2.69 (1.98)	0.08 (0.08)	2.77 (1.98)	11.1 (3.58)	0.1 (0.1)	11.2 (3.54)	12.82 (5.11)	0	12.82 (5.11)	13.13 (3.29)	0.49 (0.35)	13.62 (3.23)
Tailor	6.4 (6.29)	4 (3.78)	10.4 (10.07)	22.69 (8.93)	0.62 (0.47)	23.31 (9.15)	4.8 (4.8)	0	4.8 (4.8)	4.18 (3.33)	0	4.18 (3.33)	10.58 (3.44)	1.24 (1.01)	11.82 (4.06)
Yellowtail kingfish	3.4 (1.41)	11.2 (4.69)	14.6 (5.78)	1 (0.92)	2.15 (1.24)	3.15 (2.04)	3.1 (1.97)	4.9 (3.07)	8 (4.91)	1.09 (0.49)	3.55 (1.6)	4.64 (2.01)	2.11 (0.64)	5.43 (1.5)	7.54 (2.01)
Teraglin	0	0	0	11.85 (8.35)	0	11.85 (8.35)	2.1 (1.89)	0	2.1 (1.89)	0	0	0	4.09 (2.59)	0	4.09 (2.59)
Silver trevally	3.8 (3.17)	0.2 (0.2)	4 (3.15)	5.85 (5.52)	1.23 (1.23)	7.08 (6.75)	0.1 (0.1)	0	0.1 (0.1)	0.09 (0.09)	0	0.09 (0.09)	2.84 (1.89)	0.43 (0.38)	3.27 (2.23)
Ocean jacket	6.9 (6.9)	0	6.9 (6.9)	0.85 (0.69)	0	0.85 (0.69)	1.4 (1.29)	0	1.4 (1.29)	0.55 (0.31)	0	0.55 (0.31)	2.5 (1.85)	0	2.5 (1.85)
Snapper	0	0.1 (0.1)	0.1 (0.1)	2.62 (1.32)	3.15 (1.46)	5.77 (2.7)	2.5 (1.8)	0.4 (0.4)	2.9 (2.16)	0.09 (0.09)	0	0.09 (0.09)	1.37 (0.56)	1.08 (0.46)	2.45 (0.95)
Redfish	0	0	0	1.69 (1.11)	0.23 (0.23)	1.92 (1.1)	1.1 (0.99)	0.2 (0.2)	1.3 (1.19)	0.18 (0.12)	0.09 (0.09)	0.27 (0.19)	0.8 (0.4)	0.13 (0.09)	0.93 (0.43)
Blue mackerel	0.5 (0.4)	0	0.5 (0.4)	1.69 (1.07)	0	1.69 (1.07)	0.4 (0.22)	0	0.4 (0.22)	0.55 (0.55)	0.09 (0.09)	0.64 (0.54)	0.85 (0.37)	0.02 (0.02)	0.87 (0.37)
Longfin pike	0.1 (0.1)	0	0.1 (0.1)	1.08 (0.66)	0.54 (0.54)	1.62 (0.8)	0.1 (0.1)	0	0.1 (0.1)	0.09 (0.09)	0	0.09 (0.09)	0.4 (0.21)	0.17 (0.17)	0.56 (0.25)
Mackerel tuna	0	0	0	1.62 (0.9)	0	1.62 (0.9)	0	0	0	0	0	0	0.5 (0.27)	0	0.5 (0.27)
Southern Maori-wrasse	1.2 (0.8)	0.2 (0.13)	1.4 (0.86)	0.31 (0.31)	0	0.31 (0.31)	0	0	0	0	0	0	0.41 (0.23)	0.05 (0.04)	0.46 (0.25)
Eastern red scorpionfish	0	0	0	1.38 (0.87)	0	1.38 (0.87)	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.45 (0.27)	0	0.45 (0.27)
Sergeant Baker	0.1 (0.1)	0.3 (0.21)	0.4 (0.22)	0.08 (0.08)	0.23 (0.12)	0.31 (0.13)	0.2 (0.2)	0.3 (0.21)	0.5 (0.27)	0	0.36 (0.24)	0.36 (0.24)	0.09 (0.06)	0.29 (0.1)	0.39 (0.11)
Yellowfin bream	0	0	0	0.92 (0.47)	0.23 (0.17)	1.15 (0.52)	0	0	0	0	0	0	0.28 (0.15)	0.07 (0.05)	0.35 (0.16)

APPENDIX E-1 B) Handline – Central	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Leaping bonito	0	0	0	0.77 (0.36)	0	0.77 (0.36)	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0.28 (0.12)	0	0.28 (0.12)
Mado	0	0.2 (0.2)	0.2 (0.2)	0.31 (0.31)	0.15 (0.1)	0.46 (0.39)	0	0.3 (0.3)	0.3 (0.3)	0	0	0	0.09 (0.09)	0.17 (0.09)	0.26 (0.15)
Pearl perch	0	0	0	0.23 (0.17)	0.08 (0.08)	0.31 (0.24)	0.7 (0.7)	0	0.7 (0.7)	0	0	0	0.22 (0.16)	0.02 (0.02)	0.25 (0.17)
Spotted wobbegong	0.6 (0.6)	0	0.6 (0.6)	0	0	0	0	0	0	0	0	0	0.16 (0.16)	0	0.16 (0.16)
Onespot puller	0	0	0	0	0	0	0	0.7 (0.6)	0.7 (0.6)	0	0	0	0	0.15 (0.13)	0.15 (0.13)
Striped seapike	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0.5 (0.5)	0	0.5 (0.5)	0	0	0	0.11 (0.11)	0.03 (0.03)	0.14 (0.11)
Southern calamari squid	0	0	0	0.31 (0.21)	0	0.31 (0.21)	0	0	0	0.18 (0.12)	0	0.18 (0.12)	0.13 (0.07)	0	0.13 (0.07)
Banded wobbegong	0.4 (0.4)	0	0.4 (0.4)	0	0	0	0	0	0	0	0	0	0.11 (0.11)	0	0.11 (0.11)
Eastern wirrah	0	0	0	0.31 (0.31)	0	0.31 (0.31)	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.11 (0.1)	0	0.11 (0.1)
Bluespotted flathead	0	0	0	0.15 (0.1)	0	0.15 (0.1)	0.2 (0.13)	0	0.2 (0.13)	0	0	0	0.09 (0.04)	0	0.09 (0.04)
Highfin amberjack	0	0	0	0.15 (0.15)	0	0.15 (0.15)	0	0.1 (0.1)	0.1 (0.1)	0.09 (0.09)	0	0.09 (0.09)	0.07 (0.05)	0.02 (0.02)	0.09 (0.06)
Skipjack tuna	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0.2 (0.2)	0	0.2 (0.2)	0.09 (0.09)	0	0.09 (0.09)	0.09 (0.05)	0	0.09 (0.05)
Eastern pomfred	0	0.3 (0.3)	0.3 (0.3)	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)
Eastern Australian salmon	0	0	0	0.23 (0.23)	0	0.23 (0.23)	0	0	0	0	0	0	0.07 (0.07)	0	0.07 (0.07)
Grey morwong	0	0	0	0.15 (0.1)	0	0.15 (0.1)	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.07 (0.04)	0	0.07 (0.04)
Halfbanded seaperch	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0.2 (0.2)	0.2 (0.2)	0	0	0	0	0.07 (0.05)	0.07 (0.05)
Banded rockcod	0	0	0	0	0	0	0	0	0	0.27 (0.19)	0	0.27 (0.19)	0.06 (0.04)	0	0.06 (0.04)
Eastern orange perch	0	0	0	0	0	0	0	0	0	0.27 (0.27)	0	0.27 (0.27)	0.06 (0.06)	0	0.06 (0.06)
Longfin perch	0	0	0	0	0	0	0	0	0	0.27 (0.27)	0	0.27 (0.27)	0.06 (0.06)	0	0.06 (0.06)
Crimsonband wrasse	0	0	0	0.15 (0.15)	0	0.15 (0.15)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Eastern fiddler ray	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0.05 (0.03)	0.05 (0.03)
Eastern highfin spurdog	0	0	0	0	0	0	0	0	0	0.18 (0.12)	0	0.18 (0.12)	0.04 (0.03)	0	0.04 (0.03)
Mahi mahi	0	0	0	0	0	0	0	0	0	0	0.18 (0.18)	0.18 (0.18)	0	0.04 (0.04)	0.04 (0.04)
Mulloway	0	0	0	0	0	0	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Samson fish	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.04 (0.03)	0	0.04 (0.03)
Smooth stingray	0	0	0	0	0	0	0	0.2 (0.13)	0.2 (0.13)	0	0	0	0	0.04 (0.03)	0.04 (0.03)

APPENDIX E-1 B) Handline – Central	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Amberjack	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Diamondfish	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Senator wrasse	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Australian sawtail	0	0	0	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Black rabbitfish	0	0	0	0	0	0	0	0	0	0	0.09 (0.09)	0.09 (0.09)	0	0.02 (0.02)	0.02 (0.02)
Blackspot goatfish	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Grey spotted catshark	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Gummy shark	0	0	0	0	0	0	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.02 (0.02)	0	0.02 (0.02)
Port Jackson shark	0	0	0	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Rainbow runner	0	0	0	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Striped marlin	0	0	0	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.02 (0.02)	0	0.02 (0.02)

APPENDIX E-1 C) Handline – South	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All species combined	127.71 (41.67)	29.57 (15.52)	157.29 (46.47)	17.5 (5.45)	7.83 (7.83)	25.33 (12.34)	1.5 (1.5)	2 (1)	3.5 (2.5)	17.43 (9.3)	2.14 (1.06)	19.57 (10.17)	34.85 (8.73)	8.6 (3.45)	43.45 (10)
Silver trevally	68.86 (46.8)	0	68.86 (46.8)	0	0	0	0	0	0	0	0	0	13.19 (8.96)	0	13.19 (8.96)
Southern Maori-wrasse	25.29 (12.76)	0.86 (0.55)	26.14 (13.2)	0	0	0	0	0	0	9.86 (7.32)	0.43 (0.43)	10.29 (7.24)	8.37 (3.58)	0.32 (0.19)	8.69 (3.62)
Eastern red scorpionfish	14.86 (6.69)	14.86 (8.18)	29.71 (14.5)	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	2.93 (1.28)	2.85 (1.57)	5.78 (2.78)
Yellowtail kingfish	2 (1.29)	1.14 (0.74)	3.14 (2.03)	3.67 (3.11)	7.33 (7.33)	11 (10.41)	1.5 (1.5)	1.5 (1.5)	3 (3)	0.71 (0.71)	0	0.71 (0.71)	1.79 (0.84)	2.16 (1.64)	3.95 (2.41)
Gemfish	1.43 (1.43)	0	1.43 (1.43)	8.67 (4.26)	0	8.67 (4.26)	0	0	0	0	0	0	2.16 (0.96)	0	2.16 (0.96)
Snapper	1.29 (0.61)	0.29 (0.29)	1.57 (0.78)	2.83 (2.83)	0	2.83 (2.83)	0	0	0	0.86 (0.86)	0.29 (0.29)	1.14 (1.14)	1.17 (0.7)	0.16 (0.12)	1.33 (0.75)
Eastern wirrah	3.57 (2.18)	2 (1.29)	5.57 (3.44)	0	0	0	0	0	0	0.71 (0.47)	0	0.71 (0.47)	0.94 (0.45)	0.38 (0.25)	1.32 (0.68)
Crimsonband wrasse	1 (0.65)	1 (0.72)	2 (0.95)	0	0	0	0	0	0	1.14 (0.99)	0	1.14 (0.99)	0.6 (0.37)	0.19 (0.14)	0.79 (0.4)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Handline – South	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Sixspine leatherjacket	3.14 (1.58)	0	3.14 (1.58)	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0.29 (0.29)	0.14 (0.14)	0.43 (0.43)	0.7 (0.32)	0.09 (0.06)	0.79 (0.34)
Green moray	0	3.71 (1.97)	3.71 (1.97)	0	0	0	0	0	0	0	0	0	0	0.71 (0.38)	0.71 (0.38)
Silver sweep	0.43 (0.3)	1 (0.85)	1.43 (1.11)	0	0	0	0	0	0	1 (1)	0	1 (1)	0.44 (0.36)	0.19 (0.16)	0.63 (0.42)
Bluethroat wrasse	0.43 (0.43)	0.29 (0.18)	0.71 (0.57)	0	0	0	0	0	0	1.29 (0.64)	0	1.29 (0.64)	0.54 (0.24)	0.05 (0.04)	0.6 (0.25)
Blue-eye trevalla	0.43 (0.43)	0	0.43 (0.43)	1.83 (0.98)	0	1.83 (0.98)	0	0	0	0	0	0	0.48 (0.23)	0	0.48 (0.23)
Grey morwong	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0	0	0	0.86 (0.46)	0.14 (0.14)	1 (0.53)	0.36 (0.17)	0.05 (0.05)	0.41 (0.2)
Blue mackerel	2 (2)	0	2 (2)	0	0	0	0	0	0	0	0	0	0.38 (0.38)	0	0.38 (0.38)
Halfbanded seaperch	0	0.57 (0.3)	0.57 (0.3)	0	0	0	0	0	0	0	0.57 (0.57)	0.57 (0.57)	0	0.31 (0.21)	0.31 (0.21)
Longfin pike	1 (0.85)	0.29 (0.18)	1.29 (0.81)	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0	0	0.19 (0.16)	0.09 (0.05)	0.28 (0.16)
Sergeant Baker	0.43 (0.2)	0	0.43 (0.2)	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0.14 (0.14)	0.29 (0.18)	0.43 (0.3)	0.13 (0.06)	0.14 (0.08)	0.27 (0.12)
Skipjack tuna	0	0	0	0	0	0	0	0	0	0.43 (0.43)	0	0.43 (0.43)	0.15 (0.15)	0	0.15 (0.15)
Bluespotted flathead	0.71 (0.42)	0	0.71 (0.42)	0	0	0	0	0	0	0	0	0	0.14 (0.08)	0	0.14 (0.08)
Grey spotted catshark	0.14 (0.14)	0.57 (0.57)	0.71 (0.71)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.11 (0.11)	0.14 (0.14)
Barracouta	0	0	0	0	0	0	0	0.5 (0.5)	0.5 (0.5)	0	0	0	0	0.12 (0.12)	0.12 (0.12)
Eastern kelpfish	0	0.57 (0.37)	0.57 (0.37)	0	0	0	0	0	0	0	0	0	0	0.11 (0.07)	0.11 (0.07)
Mado	0	0.57 (0.43)	0.57 (0.43)	0	0	0	0	0	0	0	0	0	0	0.11 (0.08)	0.11 (0.08)
Black-banded seaperch	0	0.43 (0.43)	0.43 (0.43)	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)
Largetooth beardie	0.14 (0.14)	0.29 (0.29)	0.43 (0.43)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.05 (0.05)	0.08 (0.08)
Redfish	0	0.43 (0.3)	0.43 (0.3)	0	0	0	0	0	0	0	0	0	0	0.08 (0.06)	0.08 (0.06)
Velvet leatherjacket	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0.08 (0.06)	0.08 (0.06)
Sand flathead	0	0	0	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0.05 (0.05)	0.05 (0.05)
Hapuku	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Unid. cucumberfish	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Banded seaperch	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Bigeye ocean perch	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Common jack mackerel	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Handline – South	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Eastern fiddler ray	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Smooth stingray	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Unid. perch	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Handline – NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	57.18 (8.86)	14.16 (3.29)	71.34 (10.14)	51.58 (5.06)	7.31 (1.52)	58.89 (5.4)	41.15 (9.43)	5.34 (1.43)	46.49 (9.62)	49.07 (7.54)	7.5 (2.27)	56.58 (8.12)	50.02 (6.22)	8.57 (1.9)	58.59 (6.77)
Yellowtail scad	14.68 (5.09)	0.71 (0.55)	15.4 (5)	2.82 (1.31)	0.67 (0.64)	3.48 (1.42)	9.16 (2.74)	0.23 (0.19)	9.38 (2.72)	5.67 (1.96)	2.4 (2.1)	8.07 (2.83)	7.76 (2.07)	0.99 (0.67)	8.76 (2.2)
Silver sweep	6.47 (3.09)	1.09 (0.45)	7.56 (3.31)	1.24 (1.05)	0.17 (0.09)	1.41 (1.05)	5.87 (3.63)	0.44 (0.31)	6.31 (3.83)	19.82 (5.79)	0.37 (0.2)	20.19 (5.89)	7.94 (1.86)	0.5 (0.19)	8.44 (1.94)
Australian bonito	1.14 (1.04)	0	1.14 (1.04)	12.1 (3.42)	0	12.1 (3.42)	9.12 (8.35)	0	9.12 (8.35)	4.99 (3.53)	0	4.99 (3.53)	7.11 (2.53)	0	7.11 (2.53)
Yellowtail kingfish	1.76 (0.62)	5.08 (1.97)	6.84 (2.44)	1.74 (0.82)	2.44 (1.09)	4.17 (1.75)	1.53 (0.8)	2.23 (1.19)	3.76 (1.93)	3.36 (2.42)	2.08 (0.69)	5.44 (2.84)	2.08 (0.99)	2.94 (1.01)	5.02 (1.89)
Tailor	2.7 (2.63)	1.68 (1.58)	4.38 (4.22)	9.27 (3.52)	0.24 (0.19)	9.51 (3.61)	2.04 (1.82)	0	2.04 (1.82)	1.47 (1.14)	0.04 (0.03)	1.51 (1.14)	4.23 (1.44)	0.49 (0.39)	4.71 (1.68)
Snapper	2.83 (0.92)	0.29 (0.12)	3.12 (0.95)	4.54 (1.47)	1.72 (0.61)	6.26 (1.81)	3.31 (1.21)	0.6 (0.21)	3.91 (1.39)	3.96 (1.1)	0.86 (0.31)	4.82 (1.23)	3.72 (0.9)	0.92 (0.3)	4.64 (1.11)
Silver trevally	10.92 (6.43)	0.08 (0.08)	11 (6.43)	2.3 (2.17)	0.48 (0.48)	2.78 (2.65)	0.06 (0.04)	0	0.06 (0.04)	0.26 (0.14)	0.25 (0.16)	0.52 (0.26)	3.4 (2.28)	0.23 (0.18)	3.62 (2.43)
Blue mackerel	1.68 (1)	0	1.68 (1)	3.7 (1.61)	0	3.7 (1.61)	4.42 (3.79)	0	4.42 (3.79)	1.18 (0.72)	0.03 (0.03)	1.21 (0.72)	2.78 (1.21)	0.01 (0.01)	2.78 (1.21)
Teraglin	0.8 (0.78)	0	0.8 (0.78)	5.29 (3.32)	0.03 (0.03)	5.31 (3.32)	1.38 (0.78)	0.35 (0.23)	1.73 (0.89)	1 (0.4)	0	1 (0.4)	2.32 (1.26)	0.09 (0.05)	2.4 (1.28)
Eastern red scorpionfish	2.84 (0.93)	2.14 (1.1)	4.98 (1.96)	0.62 (0.34)	0.03 (0.03)	0.64 (0.35)	0.37 (0.15)	0.14 (0.08)	0.51 (0.2)	0.76 (0.28)	0.13 (0.08)	0.89 (0.31)	1.13 (0.42)	0.58 (0.3)	1.72 (0.68)
Southern Maori-wrasse	3.9 (1.75)	0.2 (0.09)	4.1 (1.81)	0.12 (0.12)	0	0.12 (0.12)	0	0	0	2.52 (1.87)	0.15 (0.11)	2.67 (1.85)	1.57 (0.7)	0.08 (0.05)	1.66 (0.71)
Pearl perch	0.87 (0.56)	0.16 (0.06)	1.03 (0.59)	1.88 (0.99)	0.34 (0.16)	2.21 (1.1)	0.8 (0.51)	0.09 (0.07)	0.9 (0.52)	0.34 (0.22)	0	0.34 (0.22)	1.03 (0.4)	0.16 (0.06)	1.19 (0.44)
Ocean jacket	2.89 (2.89)	0	2.89 (2.89)	0.36 (0.27)	0.03 (0.03)	0.38 (0.27)	0.53 (0.49)	0	0.53 (0.49)	0.19 (0.11)	0	0.19 (0.11)	0.97 (0.72)	0.01 (0.01)	0.97 (0.72)
Redfish	0.19 (0.19)	0.08 (0.05)	0.27 (0.19)	0.69 (0.43)	0.09 (0.09)	0.78 (0.43)	0.55 (0.4)	0.08 (0.08)	0.63 (0.47)	0.06 (0.04)	0.03 (0.03)	0.09 (0.07)	0.39 (0.21)	0.07 (0.05)	0.46 (0.23)
Gemfish	0.19 (0.19)	0	0.19 (0.19)	1.07 (0.52)	0	1.07 (0.52)	0	0	0	0	0	0	0.37 (0.16)	0	0.37 (0.16)
Sergeant Baker	0.1 (0.05)	0.31 (0.12)	0.41 (0.13)	0.11 (0.05)	0.32 (0.12)	0.42 (0.13)	0.08 (0.08)	0.18 (0.09)	0.26 (0.11)	0.04 (0.04)	0.2 (0.1)	0.23 (0.11)	0.08 (0.04)	0.26 (0.09)	0.34 (0.1)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Handline – NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Longfin pike	0.18 (0.12)	0.04 (0.02)	0.21 (0.12)	0.55 (0.29)	0.23 (0.21)	0.78 (0.34)	0.04 (0.04)	0	0.04 (0.04)	0.07 (0.05)	0	0.07 (0.05)	0.23 (0.15)	0.08 (0.07)	0.31 (0.16)
Eastern wirrah	0.53 (0.29)	0.27 (0.17)	0.8 (0.46)	0.12 (0.12)	0	0.12 (0.12)	0	0	0	0.23 (0.13)	0.02 (0.02)	0.26 (0.13)	0.22 (0.12)	0.07 (0.05)	0.29 (0.16)
Mackerel tuna	0.02 (0.02)	0	0.02 (0.02)	0.86 (0.37)	0	0.86 (0.37)	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.27 (0.14)	0	0.27 (0.14)
Grey morwong	0.18 (0.09)	0	0.18 (0.09)	0.21 (0.09)	0	0.21 (0.09)	0.09 (0.06)	0	0.09 (0.06)	0.31 (0.13)	0.04 (0.04)	0.35 (0.15)	0.2 (0.08)	0.01 (0.01)	0.21 (0.08)
Mado	0	0.25 (0.12)	0.25 (0.12)	0.12 (0.12)	0.21 (0.13)	0.33 (0.2)	0	0.11 (0.11)	0.11 (0.11)	0	0.06 (0.05)	0.06 (0.05)	0.04 (0.04)	0.17 (0.09)	0.2 (0.11)
Yellowfin bream	0	0	0	0.36 (0.19)	0.09 (0.07)	0.45 (0.2)	0.05 (0.05)	0	0.05 (0.05)	0.08 (0.05)	0.11 (0.06)	0.19 (0.1)	0.14 (0.07)	0.05 (0.03)	0.19 (0.09)
Mulloway	0.12 (0.1)	0	0.12 (0.1)	0	0	0	0.1 (0.08)	0	0.1 (0.08)	0.51 (0.47)	0	0.51 (0.47)	0.17 (0.13)	0	0.17 (0.13)
Crimsonband wrasse	0.13 (0.09)	0.13 (0.1)	0.27 (0.13)	0.06 (0.06)	0	0.06 (0.06)	0	0	0	0.29 (0.25)	0	0.29 (0.25)	0.12 (0.08)	0.03 (0.02)	0.15 (0.09)
Striped seapike	0.05 (0.05)	0.04 (0.04)	0.09 (0.06)	0	0	0	0.47 (0.34)	0.02 (0.02)	0.49 (0.34)	0.02 (0.02)	0	0.02 (0.02)	0.12 (0.11)	0.02 (0.02)	0.14 (0.11)
Sixspine leatherjacket	0.42 (0.21)	0	0.42 (0.21)	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0.07 (0.07)	0.04 (0.04)	0.11 (0.11)	0.12 (0.05)	0.01 (0.01)	0.13 (0.06)
Green moray	0	0.5 (0.27)	0.5 (0.27)	0	0	0	0	0	0	0	0	0	0	0.12 (0.06)	0.12 (0.06)
Spotted mackerel	0.21 (0.21)	0	0.21 (0.21)	0.18 (0.15)	0	0.18 (0.15)	0.02 (0.02)	0	0.02 (0.02)	0.06 (0.06)	0	0.06 (0.06)	0.12 (0.07)	0	0.12 (0.07)
Leaping bonito	0	0	0	0.3 (0.14)	0	0.3 (0.14)	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0.11 (0.05)	0	0.11 (0.05)
Skipjack tuna	0.07 (0.07)	0	0.07 (0.07)	0.08 (0.06)	0	0.08 (0.06)	0.1 (0.08)	0	0.1 (0.08)	0.18 (0.12)	0	0.18 (0.12)	0.11 (0.07)	0	0.11 (0.07)
Blue-eye trevalla	0.13 (0.08)	0	0.13 (0.08)	0.23 (0.12)	0	0.23 (0.12)	0	0	0	0	0	0	0.1 (0.05)	0	0.1 (0.05)
Bluethroat wrasse	0.06 (0.06)	0.04 (0.02)	0.1 (0.08)	0	0	0	0	0	0	0.33 (0.16)	0	0.33 (0.16)	0.09 (0.04)	0.01 (0.01)	0.1 (0.04)
Halfbanded seaperch	0.02 (0.02)	0.14 (0.06)	0.17 (0.07)	0	0.03 (0.03)	0.03 (0.03)	0	0.08 (0.08)	0.08 (0.08)	0	0.15 (0.15)	0.15 (0.15)	0.01 (0.01)	0.09 (0.06)	0.1 (0.07)
Spotted wobbegong	0.25 (0.25)	0.07 (0.07)	0.32 (0.26)	0	0	0	0	0	0	0	0	0	0.06 (0.06)	0.02 (0.02)	0.08 (0.08)
Smallscale bullseye	0	0	0	0	0	0	0	0	0	0	0.28 (0.28)	0.28 (0.28)	0	0.07 (0.07)	0.07 (0.07)
Blacktip bullseye	0	0	0	0	0	0	0	0.21 (0.21)	0.21 (0.21)	0	0.04 (0.04)	0.04 (0.04)	0	0.06 (0.05)	0.06 (0.05)
Bluespotted flathead	0.1 (0.06)	0	0.1 (0.06)	0.06 (0.04)	0	0.06 (0.04)	0.08 (0.05)	0	0.08 (0.05)	0	0	0	0.06 (0.03)	0	0.06 (0.03)
Maori rockcod	0	0	0	0	0	0	0	0	0	0.23 (0.21)	0	0.23 (0.21)	0.06 (0.05)	0	0.06 (0.05)
Onespot puller	0	0	0	0	0	0	0	0.26 (0.22)	0.26 (0.22)	0	0	0	0	0.06 (0.05)	0.06 (0.05)
Spinner shark	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.26 (0.26)	0	0.26 (0.26)	0	0	0	0.06 (0.06)	0	0.06 (0.06)
Tarwhine	0.05 (0.03)	0.07 (0.07)	0.12 (0.08)	0.03 (0.03)	0.03 (0.03)	0.05 (0.04)	0	0	0	0.08 (0.07)	0	0.08 (0.07)	0.04 (0.02)	0.02 (0.02)	0.06 (0.03)
Banded wobbegong	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0.04 (0.04)	0.01 (0.01)	0.05 (0.05)

APPENDIX E-1 D) Handline – NSW	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Blacktip shark complex	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.19 (0.19)	0	0.19 (0.19)	0	0	0	0.05 (0.04)	0	0.05 (0.04)
Samson fish	0.02 (0.02)	0.02 (0.02)	0.05 (0.05)	0.08 (0.05)	0	0.08 (0.05)	0	0	0	0.05 (0.04)	0	0.05 (0.04)	0.04 (0.02)	0.01 (0.01)	0.05 (0.03)
Southern calamari squid	0	0	0	0.12 (0.08)	0	0.12 (0.08)	0	0	0	0.06 (0.04)	0	0.06 (0.04)	0.05 (0.03)	0	0.05 (0.03)
Dusky shark	0	0	0	0.05 (0.04)	0	0.05 (0.04)	0.09 (0.05)	0	0.09 (0.05)	0	0	0	0.04 (0.02)	0	0.04 (0.02)
Amberjack	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Banded rockcod	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.09 (0.07)	0	0.09 (0.07)	0.03 (0.03)	0	0.03 (0.03)
Blind shark	0	0.09 (0.05)	0.09 (0.05)	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0	0	0	0.03 (0.02)	0.03 (0.02)
Eastern Australian salmon	0	0	0	0.12 (0.09)	0	0.12 (0.09)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Eastern fiddler ray	0	0.02 (0.02)	0.02 (0.02)	0	0.03 (0.03)	0.03 (0.03)	0	0.04 (0.04)	0.04 (0.04)	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0.02 (0.02)	0.03 (0.02)
Eastern pomfred	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Grey spotted catshark	0.02 (0.02)	0.08 (0.08)	0.1 (0.1)	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0	0	0 (0)	0.03 (0.03)	0.03 (0.03)
Highfin amberjack	0	0	0	0.06 (0.06)	0	0.06 (0.06)	0	0.04 (0.04)	0.04 (0.04)	0.03 (0.03)	0	0.03 (0.03)	0.03 (0.02)	0.01 (0.01)	0.03 (0.02)
Stout whiting	0	0.05 (0.05)	0.05 (0.05)	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.02 (0.02)	0.01 (0.01)	0.03 (0.02)
Barracouta	0	0	0	0	0	0	0	0.09 (0.09)	0.09 (0.09)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Blackspot goatfish	0.02 (0.02)	0	0.02 (0.02)	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.02 (0.02)
Blue sprat	0	0	0	0	0	0	0	0	0	0.06 (0.06)	0	0.06 (0.06)	0.02 (0.02)	0	0.02 (0.02)
Eastern kelpfish	0	0.08 (0.05)	0.08 (0.05)	0	0	0	0	0	0	0	0	0	0	0.02 (0.01)	0.02 (0.01)
Eastern Moses snapper	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.02 (0.01)	0	0.02 (0.01)
Eastern orange perch	0	0	0	0	0	0	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.02 (0.02)	0	0.02 (0.02)
Eastern pigfish	0.05 (0.03)	0	0.05 (0.03)	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0	0	0	0.02 (0.01)	0	0.02 (0.01)
Longfin perch	0	0	0	0	0	0	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.02 (0.02)	0	0.02 (0.02)
Longspine flathead	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.01 (0.01)	0.01 (0.01)	0.02 (0.01)
Mahi mahi	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0.06 (0.06)	0.06 (0.06)	0	0.02 (0.02)	0.02 (0.02)
Smooth stingray	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0.08 (0.05)	0.08 (0.05)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Spanish mackerel	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.06 (0.06)	0	0.06 (0.06)	0.02 (0.02)	0	0.02 (0.02)
Venus tuskfish	0.05 (0.03)	0	0.05 (0.03)	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.02 (0.01)	0	0.02 (0.01)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Handline – NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Yellowfin tuna	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.04 (0.03)	0	0.04 (0.03)	0.02 (0.01)	0	0.02 (0.01)
Australian sawtail	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Bigeye ocean perch	0.04 (0.03)	0	0.04 (0.03)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Black rabbitfish	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0.01 (0.01)	0.01 (0.01)
Black rockcod	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Black-banded seaperch	0	0.06 (0.06)	0.06 (0.06)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Blacktip rockcod	0	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0.01 (0.01)	0.01 (0.01)
Coffin ray	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Diamondfish	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Eastern highfin spurdog	0	0	0	0	0	0	0	0	0	0.06 (0.04)	0	0.06 (0.04)	0.01 (0.01)	0	0.01 (0.01)
Eastern shovelnose ray	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
False fusilier	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Frigate mackerel	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Goldspotted sweetlips	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Gummy shark	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.01 (0.01)	0	0.01 (0.01)
Hapuku	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Largetooth beardie	0.02 (0.02)	0.04 (0.04)	0.06 (0.06)	0	0	0	0	0	0	0	0	0	0 (0)	0.01 (0.01)	0.01 (0.01)
Maray	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Marbled flathead	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Port Jackson shark	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Purple rockcod	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Rainbow runner	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Redthroat emperor	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Reef ocean perch	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)	0.01 (0.01)	0	0.01 (0.01)
Rosy snapper	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Sand flathead	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0.04 (0.04)	0.04 (0.04)	0	0.01 (0.01)	0.01 (0.01)

APPENDIX E-1	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Handline – NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
School shark	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Senator wrasse	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Striped marlin	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Swallowtail dart	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Unid. cucumberfish	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Unid. wrasse	0	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0.01 (0.01)	0.01 (0.01)
Velvet leatherjacket	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)	0	0.01 (0.01)	0.01 (0.01)
White-spotted guitarfish	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Banded seaperch	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0	<0.01 (<0.01)	<0.01 (<0.01)
Common jack mackerel	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0	0	0	<0.01 (<0.01)	0	<0.01 (<0.01)
Unid. perch	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0	<0.01 (<0.01)	<0.01 (<0.01)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Dropline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	14.2 (3.31)	0.6 (0.4)	14.8 (3.17)	22.09 (6.66)	3.09 (1.38)	25.18 (7.46)	20.43 (5.21)	0.71 (0.42)	21.14 (5.42)	33.71 (8.99)	0.29 (0.18)	34 (8.87)	24.37 (3.91)	1.2 (0.41)	25.57 (3.99)
Gemfish	0.4 (0.24)	0	0.4 (0.24)	1.73 (1.19)	0	1.73 (1.19)	0.86 (0.55)	0	0.86 (0.55)	12.43 (8.36)	0	12.43 (8.36)	5.23 (3.07)	0	5.23 (3.07)
Blue-eye trevalla	2.8 (1.83)	0	2.8 (1.83)	4.45 (2.46)	0	4.45 (2.46)	3.43 (1.88)	0	3.43 (1.88)	7.29 (2.97)	0	7.29 (2.97)	4.99 (1.37)	0	4.99 (1.37)
Snapper	2 (1.3)	0.2 (0.2)	2.2 (1.32)	7.55 (6.02)	0.09 (0.09)	7.64 (6.11)	4.43 (2.69)	0	4.43 (2.69)	0.29 (0.29)	0	0.29 (0.29)	3.26 (1.76)	0.07 (0.05)	3.33 (1.78)
Banded rockcod	0.2 (0.2)	0	0.2 (0.2)	0.55 (0.55)	0	0.55 (0.55)	3 (2.84)	0	3 (2.84)	4.14 (2.93)	0	4.14 (2.93)	2.11 (1.14)	0	2.11 (1.14)
Redfish	3.6 (3.6)	0	3.6 (3.6)	0	0.27 (0.14)	0.27 (0.14)	1 (0.49)	0	1 (0.49)	1.43 (0.75)	0	1.43 (0.75)	1.45 (0.85)	0.08 (0.04)	1.53 (0.85)
Pearl perch	1.2 (0.8)	0	1.2 (0.8)	2.55 (1.64)	0.27 (0.19)	2.82 (1.75)	2 (1.36)	0.29 (0.29)	2.29 (1.61)	0	0	0	1.25 (0.53)	0.11 (0.07)	1.36 (0.56)
Eastern highfin spurdog	0.2 (0.2)	0	0.2 (0.2)	0.09 (0.09)	0	0.09 (0.09)	0	0	0	2.86 (2.69)	0.14 (0.14)	3 (2.67)	1.11 (0.98)	0.05 (0.05)	1.17 (0.98)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Dropline – North	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Philippine spurdog	0.8 (0.58)	0	0.8 (0.58)	1.91 (1.91)	1.09 (1)	3 (2.05)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.77 (0.56)	0.31 (0.28)	1.07 (0.59)
Endeavour dogfish	0.4 (0.24)	0	0.4 (0.24)	0.73 (0.63)	0	0.73 (0.63)	0	0	0	1.71 (0.68)	0	1.71 (0.68)	0.92 (0.31)	0	0.92 (0.31)
Bass groper	0.6 (0.6)	0	0.6 (0.6)	0.18 (0.12)	0	0.18 (0.12)	0.43 (0.3)	0	0.43 (0.3)	1 (0.38)	0	1 (0.38)	0.61 (0.2)	0	0.61 (0.2)
Harrisson's dogfish	0.8 (0.58)	0	0.8 (0.58)	0.55 (0.37)	0	0.55 (0.37)	0	0	0	0.57 (0.37)	0	0.57 (0.37)	0.54 (0.21)	0	0.54 (0.21)
Bigeye ocean perch	0.2 (0.2)	0	0.2 (0.2)	0.45 (0.31)	0	0.45 (0.31)	0.14 (0.14)	0	0.14 (0.14)	0.86 (0.34)	0	0.86 (0.34)	0.5 (0.16)	0	0.5 (0.16)
Yellowtail kingfish	0	0	0	0.45 (0.25)	0.82 (0.82)	1.27 (0.99)	0.29 (0.29)	0.14 (0.14)	0.43 (0.3)	0.14 (0.14)	0	0.14 (0.14)	0.22 (0.09)	0.25 (0.23)	0.47 (0.29)
Eastern longnose spurdog	0.2 (0.2)	0	0.2 (0.2)	0	0	0	1.86 (1.86)	0	1.86 (1.86)	0	0	0	0.29 (0.25)	0	0.29 (0.25)
Grey morwong	0	0	0	0.36 (0.28)	0	0.36 (0.28)	0.86 (0.59)	0	0.86 (0.59)	0	0	0	0.22 (0.11)	0	0.22 (0.11)
Teraglin	0	0	0	0.09 (0.09)	0	0.09 (0.09)	1.29 (1.29)	0	1.29 (1.29)	0	0	0	0.2 (0.17)	0	0.2 (0.17)
Saddled swellshark	0	0	0	0	0.27 (0.19)	0.27 (0.19)	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0.13 (0.08)	0.13 (0.08)
Sergeant Baker	0	0.2 (0.2)	0.2 (0.2)	0	0.18 (0.12)	0.18 (0.12)	0	0	0	0	0	0	0	0.1 (0.06)	0.1 (0.06)
Eastern red scorpionfish	0.4 (0.4)	0	0.4 (0.4)	0	0	0	0	0	0	0	0	0	0.09 (0.09)	0	0.09 (0.09)
Gummy shark	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.08 (0.06)	0	0.08 (0.06)
Mandarin shark	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.08 (0.06)	0	0.08 (0.06)
Taiwan gulper shark	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.08 (0.06)	0	0.08 (0.06)
Flame snapper	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.14 (0.14)	0	0.14 (0.14)	0.07 (0.06)	0	0.07 (0.06)
Alfonsino	0	0	0	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.05 (0.05)	0	0.05 (0.05)
Unid. deepwater perch	0	0	0	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.05 (0.05)	0	0.05 (0.05)
Longfin perch	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Samson fish	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Sawtooth moray	0	0.2 (0.2)	0.2 (0.2)	0	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)
Skipjack tuna	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.04 (0.03)	0	0.04 (0.03)
Amberjack	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Eastern shovelnose ray	0	0	0	0	0.09 (0.09)	0.09 (0.09)	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Balloonfish	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Blackspot goatfish	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.02 (0.02)	0	0.02 (0.02)

APPENDIX E-2 A) Dropline – North	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Hapuku	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Largetooth beardie	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Mahi mahi	0	0	0	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Unid. stingray	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.02 (0.02)	0.02 (0.02)

APPENDIX E-2 B) Dropline – Central	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All species combined	21 (7.36)	9.5 (9.3)	30.5 (15.34)	23.33 (5.65)	0.11 (0.11)	23.44 (5.68)	19 (6.11)	5.67 (3.59)	24.67 (6.8)	15 (4.3)	1 (1)	16 (5.05)	19.46 (2.98)	4.15 (2.55)	23.61 (4.65)
Yellowtail kingfish	7.5 (6.21)	9 (9)	16.5 (15.14)	4.33 (3.3)	0	4.33 (3.3)	13 (5.58)	5.5 (3.64)	18.5 (7.3)	8.75 (4.92)	1 (1)	9.75 (5.72)	8.51 (2.6)	3.95 (2.48)	12.46 (4.59)
Eastern highfin spurdog	7.67 (5.38)	0	7.67 (5.38)	2 (1.41)	0	2 (1.41)	0.67 (0.67)	0.17 (0.17)	0.83 (0.65)	0	0	0	2.58 (1.41)	0.04 (0.04)	2.62 (1.41)
Banded rockcod	0.83 (0.48)	0	0.83 (0.48)	3.67 (2.34)	0	3.67 (2.34)	3 (2.8)	0	3 (2.8)	3 (1.58)	0	3 (1.58)	2.6 (0.99)	0	2.6 (0.99)
Redfish	0.67 (0.67)	0	0.67 (0.67)	3.67 (1.85)	0	3.67 (1.85)	0.67 (0.42)	0	0.67 (0.42)	2 (0)	0	2 (0)	1.7 (0.47)	0	1.7 (0.47)
Blue-eye trevalla	0	0	0	4 (3.76)	0	4 (3.76)	0	0	0	0	0	0	0.92 (0.86)	0	0.92 (0.86)
Eastern longnose spurdog	0	0.17 (0.17)	0.17 (0.17)	1.56 (1.08)	0	1.56 (1.08)	0	0	0	0	0	0	0.36 (0.25)	0.04 (0.04)	0.4 (0.25)
Ocean blue-eye trevalla	0.67 (0.33)	0	0.67 (0.33)	1 (0.67)	0	1 (0.67)	0	0	0	0	0	0	0.4 (0.17)	0	0.4 (0.17)
King morwong	0.67 (0.42)	0	0.67 (0.42)	0.78 (0.32)	0	0.78 (0.32)	0	0	0	0	0	0	0.35 (0.13)	0	0.35 (0.13)
Hapuku	1 (1)	0	1 (1)	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.28 (0.26)	0	0.28 (0.26)
Ocean jacket	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.17 (0.17)	0	0.17 (0.17)	0.75 (0.48)	0	0.75 (0.48)	0.26 (0.13)	0	0.26 (0.13)
Sharphead perch	0	0	0	1.11 (1.11)	0	1.11 (1.11)	0	0	0	0	0	0	0.25 (0.25)	0	0.25 (0.25)
Skipjack tuna	0	0	0	0	0	0	0.83 (0.83)	0	0.83 (0.83)	0	0	0	0.21 (0.21)	0	0.21 (0.21)
Banded wobbegong	0.67 (0.67)	0	0.67 (0.67)	0	0	0	0	0	0	0	0	0	0.17 (0.17)	0	0.17 (0.17)
Spotted wobbegong	0.5 (0.5)	0	0.5 (0.5)	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)
Gemfish	0.17 (0.17)	0	0.17 (0.17)	0.33 (0.17)	0	0.33 (0.17)	0	0	0	0	0	0	0.12 (0.06)	0	0.12 (0.06)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
B) Dropline – Central	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Bass groper	0.33 (0.21)	0	0.33 (0.21)	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.11 (0.06)	0	0.11 (0.06)
Longfin perch	0	0	0	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0.25 (0.25)	0	0.25 (0.25)	0.11 (0.08)	0	0.11 (0.08)
Snapper	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.33 (0.33)	0	0.33 (0.33)	0	0	0	0.11 (0.09)	0	0.11 (0.09)
Port Jackson shark	0	0.33 (0.33)	0.33 (0.33)	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)
Barracouta	0	0	0	0	0	0	0	0	0	0.25 (0.25)	0	0.25 (0.25)	0.07 (0.07)	0	0.07 (0.07)
Grey morwong	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.07 (0.05)	0	0.07 (0.05)
Mandarin shark	0	0	0	0.22 (0.22)	0	0.22 (0.22)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Saddled swellshark	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Samson fish	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Eastern pigfish	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Unid. whaler shark	0	0	0	0	0.11 (0.11)	0.11 (0.11)	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Dropline – South	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	57.5 (16.62)	0.5 (0.5)	58 (16.87)	38.5 (14.26)	2.67 (1.2)	41.17 (15.08)	76.5 (16.58)	1.5 (0.29)	78 (16.49)	47.38 (14.14)	2.38 (0.92)	49.75 (14.62)	51.79 (7.68)	1.9 (0.48)	53.69 (7.93)
Gemfish	13.75 (7.65)	0	13.75 (7.65)	16.5 (7.66)	0.33 (0.33)	16.83 (7.9)	36.5 (11.77)	0	36.5 (11.77)	9.13 (3.69)	0.25 (0.16)	9.38 (3.83)	17.15 (3.74)	0.18 (0.12)	17.32 (3.8)
Blue-eye trevalla	12.5 (5.5)	0	12.5 (5.5)	13.33 (6.95)	0.17 (0.17)	13.5 (7.09)	20.5 (10)	0	20.5 (10)	20.38 (7.21)	0	20.38 (7.21)	16.4 (3.69)	0.05 (0.05)	16.45 (3.71)
Bigeye ocean perch	21 (15.15)	0.25 (0.25)	21.25 (15.39)	3.33 (1.15)	0.33 (0.21)	3.67 (1.12)	11.5 (2.33)	0	11.5 (2.33)	8 (3.9)	0	8 (3.9)	10.04 (3.63)	0.16 (0.09)	10.2 (3.68)
Whitefin swellshark	0	0.25 (0.25)	0.25 (0.25)	0	1 (0.45)	1 (0.45)	2 (2)	0.5 (0.5)	2.5 (1.89)	0.5 (0.5)	0.75 (0.62)	1.25 (0.73)	0.48 (0.37)	0.67 (0.25)	1.16 (0.41)
Frostfish	4.5 (4.5)	0	4.5 (4.5)	0	0	0	0.25 (0.25)	0	0.25 (0.25)	0.13 (0.13)	0	0.13 (0.13)	1.09 (1.01)	0	1.09 (1.01)
Pink ling	1.25 (0.75)	0	1.25 (0.75)	0	0	0	1.75 (0.85)	0	1.75 (0.85)	1.63 (0.56)	0	1.63 (0.56)	1.05 (0.28)	0	1.05 (0.28)
Piked spurdog	0.5 (0.5)	0	0.5 (0.5)	0.67 (0.67)	0.17 (0.17)	0.83 (0.65)	0	0.25 (0.25)	0.25 (0.25)	1.75 (1.05)	0.25 (0.16)	2 (1.12)	0.83 (0.39)	0.17 (0.08)	1 (0.4)
Barracouta	0	0	0	0	0	0	0	0	0	2.63 (1.52)	0	2.63 (1.52)	0.76 (0.44)	0	0.76 (0.44)

APPENDIX E-2 C) Dropline – South	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Imperador	0.25 (0.25)	0	0.25 (0.25)	1 (0.82)	0	1 (0.82)	1.25 (0.63)	0	1.25 (0.63)	0.5 (0.38)	0	0.5 (0.38)	0.73 (0.31)	0	0.73 (0.31)
Endeavour dogfish	3 (3)	0	3 (3)	0	0	0	0	0	0	0	0	0	0.67 (0.67)	0	0.67 (0.67)
Jackass morwong	0.25 (0.25)	0	0.25 (0.25)	0.5 (0.5)	0	0.5 (0.5)	1 (0.58)	0	1 (0.58)	0.63 (0.32)	0	0.63 (0.32)	0.56 (0.22)	0	0.56 (0.22)
Redfish	0	0	0	1 (1)	0	1 (1)	0.25 (0.25)	0	0.25 (0.25)	0.63 (0.5)	0	0.63 (0.5)	0.54 (0.35)	0	0.54 (0.35)
Hapuku	0	0	0	0.33 (0.21)	0	0.33 (0.21)	0.75 (0.48)	0	0.75 (0.48)	0.25 (0.25)	0	0.25 (0.25)	0.31 (0.13)	0	0.31 (0.13)
Sawtail shark	0	0	0	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0.88 (0.64)	0.88 (0.64)	0	0.31 (0.19)	0.31 (0.19)
Dusky shark	0	0	0	0.83 (0.83)	0	0.83 (0.83)	0	0	0	0	0	0	0.26 (0.26)	0	0.26 (0.26)
Gummy shark	0	0	0	0.33 (0.33)	0	0.33 (0.33)	0.25 (0.25)	0	0.25 (0.25)	0.13 (0.13)	0	0.13 (0.13)	0.18 (0.12)	0	0.18 (0.12)
Southern dogfish	0.25 (0.25)	0	0.25 (0.25)	0	0	0	0	0	0	0.25 (0.16)	0	0.25 (0.16)	0.13 (0.07)	0	0.13 (0.07)
Port Jackson shark	0	0	0	0	0.33 (0.33)	0.33 (0.33)	0	0	0	0	0	0	0	0.11 (0.11)	0.11 (0.11)
Oilfish	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.09 (0.06)	0	0.09 (0.06)
Snipe eel	0	0	0	0	0	0	0	0.5 (0.29)	0.5 (0.29)	0	0	0	0	0.08 (0.05)	0.08 (0.05)
Unid. conger	0	0	0	0	0	0	0.5 (0.29)	0	0.5 (0.29)	0	0	0	0.08 (0.05)	0	0.08 (0.05)
Bass groper	0	0	0	0	0	0	0	0	0	0.25 (0.25)	0	0.25 (0.25)	0.07 (0.07)	0	0.07 (0.07)
Alfonsino	0.25 (0.25)	0	0.25 (0.25)	0	0	0	0	0	0	0	0	0	0.06 (0.06)	0	0.06 (0.06)
Banded wobbegong	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Ocean jacket	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Sharphead perch	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Sharpnose sevengill shark	0	0	0	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)
Bigeye thresher	0	0	0	0	0	0	0	0.25 (0.25)	0.25 (0.25)	0	0	0	0	0.04 (0.04)	0.04 (0.04)
Blue grenadier	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.04 (0.04)	0	0.04 (0.04)
Green moray	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.04 (0.04)	0	0.04 (0.04)
Longfin gemfish	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.04 (0.04)	0	0.04 (0.04)
Ribaldo	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.04 (0.04)	0	0.04 (0.04)
Shortfin mako	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.04 (0.04)	0.04 (0.04)
Thresher shark	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.04 (0.04)	0.04 (0.04)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Dropline – NSW	**(spring/summer)**			**(autumn/winter)**			**(spring/summer)**			**(autumn/winter)**			**(24 months)**		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All species combined	35.01 (7.58)	3.32 (2.9)	38.33 (8.74)	30.58 (7.47)	2.19 (0.71)	32.77 (7.91)	42.95 (7.31)	2.99 (1.42)	45.94 (7.37)	34.95 (6.8)	1.35 (0.47)	36.3 (7)	35.2 (5.33)	2.35 (1.05)	37.55 (5.93)
Gemfish	6.09 (3.3)	0	6.09 (3.3)	8.79 (3.84)	0.17 (0.17)	8.96 (3.96)	15.19 (4.84)	0	15.19 (4.84)	7.96 (3.16)	0.11 (0.07)	8.07 (3.19)	9.09 (2.51)	0.08 (0.05)	9.17 (2.54)
Blue-eye trevalla	6.12 (2.42)	0	6.12 (2.42)	8.79 (3.64)	0.08 (0.08)	8.87 (3.71)	9.1 (4.13)	0	9.1 (4.13)	11.09 (3.23)	0	11.09 (3.23)	8.92 (2.26)	0.02 (0.02)	8.94 (2.27)
Bigeye ocean perch	9.12 (6.54)	0.11 (0.11)	9.23 (6.65)	1.79 (0.58)	0.17 (0.11)	1.96 (0.56)	4.76 (0.96)	0	4.76 (0.96)	3.7 (1.67)	0	3.7 (1.67)	4.61 (1.66)	0.07 (0.04)	4.69 (1.68)
Yellowtail kingfish	2.33 (1.93)	2.8 (2.8)	5.12 (4.7)	1.12 (0.76)	0.22 (0.22)	1.34 (0.8)	5.18 (2.2)	2.2 (1.44)	7.38 (2.88)	2.2 (1.21)	0.25 (0.25)	2.44 (1.41)	2.47 (0.76)	1.19 (0.77)	3.66 (1.38)
Banded rockcod	0.31 (0.16)	0	0.31 (0.16)	0.99 (0.56)	0	0.99 (0.56)	1.77 (1.24)	0	1.77 (1.24)	2.09 (1.03)	0	2.09 (1.03)	1.31 (0.59)	0	1.31 (0.59)
Redfish	1.13 (0.95)	0	1.13 (0.95)	1.34 (0.66)	0.07 (0.04)	1.42 (0.66)	0.56 (0.22)	0	0.56 (0.22)	1.23 (0.33)	0	1.23 (0.33)	1.12 (0.52)	0.02 (0.01)	1.14 (0.52)
Eastern highfin spurdog	2.43 (1.67)	0	2.43 (1.67)	0.49 (0.33)	0	0.49 (0.33)	0.26 (0.26)	0.07 (0.07)	0.33 (0.26)	0.93 (0.88)	0.05 (0.05)	0.98 (0.87)	1.03 (0.67)	0.03 (0.03)	1.06 (0.67)
Snapper	0.52 (0.34)	0.05 (0.05)	0.57 (0.34)	2.06 (1.62)	0.02 (0.02)	2.08 (1.65)	0.99 (0.54)	0	0.99 (0.54)	0.09 (0.09)	0	0.09 (0.09)	0.91 (0.5)	0.02 (0.01)	0.93 (0.51)
Endeavour dogfish	1.4 (1.3)	0	1.4 (1.3)	0.2 (0.17)	0	0.2 (0.17)	0	0	0	0.56 (0.22)	0	0.56 (0.22)	0.55 (0.38)	0	0.55 (0.38)
Whitefin swellshark	0	0.11 (0.11)	0.11 (0.11)	0	0.5 (0.22)	0.5 (0.22)	0.82 (0.82)	0.21 (0.21)	1.03 (0.78)	0.21 (0.21)	0.32 (0.26)	0.53 (0.31)	0.22 (0.16)	0.3 (0.11)	0.52 (0.18)
Frostfish	1.94 (1.94)	0	1.94 (1.94)	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0.05 (0.05)	0	0.05 (0.05)	0.49 (0.45)	0	0.49 (0.45)
Pink ling	0.54 (0.32)	0	0.54 (0.32)	0	0	0	0.72 (0.35)	0	0.72 (0.35)	0.69 (0.24)	0	0.69 (0.24)	0.47 (0.12)	0	0.47 (0.12)
Piked spurdog	0.22 (0.22)	0	0.22 (0.22)	0.33 (0.33)	0.08 (0.08)	0.42 (0.33)	0	0.1 (0.1)	0.1 (0.1)	0.75 (0.45)	0.11 (0.07)	0.85 (0.48)	0.37 (0.17)	0.07 (0.04)	0.44 (0.18)
Pearl perch	0.31 (0.21)	0	0.31 (0.21)	0.69 (0.44)	0.07 (0.05)	0.76 (0.47)	0.39 (0.26)	0.06 (0.06)	0.44 (0.31)	0	0	0	0.34 (0.14)	0.03 (0.02)	0.37 (0.15)
Barracouta	0	0	0	0	0	0	0	0	0	1.18 (0.65)	0	1.18 (0.65)	0.36 (0.21)	0	0.36 (0.21)
Imperador	0.11 (0.11)	0	0.11 (0.11)	0.5 (0.41)	0	0.5 (0.41)	0.51 (0.26)	0	0.51 (0.26)	0.21 (0.16)	0	0.21 (0.16)	0.33 (0.14)	0	0.33 (0.14)
Philippine spurdog	0.21 (0.15)	0	0.21 (0.15)	0.51 (0.51)	0.29 (0.27)	0.81 (0.55)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.21 (0.15)	0.08 (0.08)	0.29 (0.16)
Jackass morwong	0.11 (0.11)	0	0.11 (0.11)	0.25 (0.25)	0	0.25 (0.25)	0.41 (0.24)	0	0.41 (0.24)	0.27 (0.14)	0	0.27 (0.14)	0.25 (0.1)	0	0.25 (0.1)
Bass groper	0.26 (0.17)	0	0.26 (0.17)	0.07 (0.04)	0	0.07 (0.04)	0.08 (0.06)	0	0.08 (0.06)	0.43 (0.16)	0	0.43 (0.16)	0.23 (0.1)	0	0.23 (0.1)
Hapuku	0.31 (0.31)	0	0.31 (0.31)	0.19 (0.11)	0	0.19 (0.11)	0.34 (0.2)	0	0.34 (0.2)	0.11 (0.11)	0	0.11 (0.11)	0.22 (0.13)	0	0.22 (0.13)
Eastern longnose spurdog	0.05 (0.05)	0.05 (0.05)	0.1 (0.07)	0.36 (0.25)	0	0.36 (0.25)	0.36 (0.36)	0	0.36 (0.36)	0	0	0	0.18 (0.14)	0.01 (0.01)	0.19 (0.14)
Harrisson's dogfish	0.21 (0.15)	0	0.21 (0.15)	0.15 (0.1)	0	0.15 (0.1)	0	0	0	0.19 (0.12)	0	0.19 (0.12)	0.15 (0.06)	0	0.15 (0.06)
Sawtail shark	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0	0	0	0.37 (0.27)	0.37 (0.27)	0	0.14 (0.09)	0.14 (0.09)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Dropline – NSW	**(spring/summer)**			**(autumn/winter)**			**(spring/summer)**			**(autumn/winter)**			**(24 months)**		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Dusky shark	0	0	0	0.42 (0.42)	0	0.42 (0.42)	0	0	0	0	0	0	0.12 (0.12)	0	0.12 (0.12)
Ocean blue-eye trevalla	0.21 (0.1)	0	0.21 (0.1)	0.23 (0.15)	0	0.23 (0.15)	0	0	0	0	0	0	0.11 (0.05)	0	0.11 (0.05)
Gummy shark	0	0	0	0.19 (0.17)	0	0.19 (0.17)	0.1 (0.1)	0	0.1 (0.1)	0.1 (0.07)	0	0.1 (0.07)	0.1 (0.07)	0	0.1 (0.07)
King morwong	0.21 (0.13)	0	0.21 (0.13)	0.18 (0.07)	0	0.18 (0.07)	0	0	0	0	0	0	0.1 (0.04)	0	0.1 (0.04)
Ocean jacket	0	0	0	0.11 (0.09)	0	0.11 (0.09)	0.07 (0.07)	0	0.07 (0.07)	0.18 (0.12)	0	0.18 (0.12)	0.1 (0.06)	0	0.1 (0.06)
Sharphead perch	0	0	0	0.34 (0.27)	0	0.34 (0.27)	0	0	0	0	0	0	0.1 (0.1)	0	0.1 (0.1)
Grey morwong	0	0	0	0.12 (0.08)	0	0.12 (0.08)	0.23 (0.13)	0	0.23 (0.13)	0	0	0	0.08 (0.04)	0	0.08 (0.04)
Banded wobbegong	0.21 (0.21)	0	0.21 (0.21)	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0	0	0	0.07 (0.07)	0	0.07 (0.07)
Port Jackson shark	0	0.1 (0.1)	0.1 (0.1)	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0	0	0	0.07 (0.07)	0.07 (0.07)
Skipjack tuna	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.36 (0.33)	0	0.36 (0.33)	0	0	0	0.07 (0.07)	0	0.07 (0.07)
Southern dogfish	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.11 (0.07)	0	0.11 (0.07)	0.06 (0.03)	0	0.06 (0.03)
Saddled swellshark	0.05 (0.05)	0	0.05 (0.05)	0	0.07 (0.05)	0.07 (0.05)	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0.01 (0.01)	0.03 (0.02)	0.05 (0.03)
Teraglin	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.25 (0.25)	0	0.25 (0.25)	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Alfonsino	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.04 (0.04)	0	0.04 (0.04)
Longfin perch	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.07 (0.07)	0	0.07 (0.07)	0.06 (0.06)	0	0.06 (0.06)	0.04 (0.03)	0	0.04 (0.03)
Mandarin shark	0	0	0	0.08 (0.06)	0	0.08 (0.06)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.04 (0.03)	0	0.04 (0.03)
Oilfish	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.04 (0.03)	0	0.04 (0.03)
Snipe eel	0	0	0	0	0	0	0	0.21 (0.12)	0.21 (0.12)	0	0	0	0	0.04 (0.02)	0.04 (0.02)
Spotted wobbegong	0.16 (0.16)	0	0.16 (0.16)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Unid. conger	0	0	0	0	0	0	0.21 (0.12)	0	0.21 (0.12)	0	0	0	0.04 (0.02)	0	0.04 (0.02)
Sergeant Baker	0	0.05 (0.05)	0.05 (0.05)	0	0.05 (0.03)	0.05 (0.03)	0	0	0	0	0	0	0	0.03 (0.02)	0.03 (0.02)
Bigeye thresher	0	0	0	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Blue grenadier	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.02)	0	0.02 (0.02)
Eastern red scorpionfish	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Flame snapper	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.01)	0	0.02 (0.01)
Green moray	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.02)	0	0.02 (0.02)

APPENDIX E-2	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Dropline – NSW	**(spring/summer)**			**(autumn/winter)**			**(spring/summer)**			**(autumn/winter)**			**(24 months)**		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
Longfin gemfish	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.02)	0	0.02 (0.02)
Ribaldo	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.02)	0	0.02 (0.02)
Samson fish	0.1 (0.07)	0	0.1 (0.07)	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Sharpnose sevengill shark	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0	0	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Shortfin mako	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0.02 (0.02)	0.02 (0.02)
Taiwan gulper shark	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.02 (0.02)	0	0.02 (0.02)
Thresher shark	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0.02 (0.02)	0.02 (0.02)
Amberjack	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Balloonfish	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Blackspot goatfish	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Eastern pigfish	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Eastern shovelnose ray	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Largetooth beardie	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Mahi mahi	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Sawtooth moray	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Unid. deepwater perch	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.01 (0.01)	0	0.01 (0.01)
Unid. stingray	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Unid. whaler shark	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)

APPENDIX E-3	**P12: Sep07-Feb08**			**P34: Mar08-Aug08**			**P56: Sep08-Feb09**			**P78: Mar09-Aug09**			**Overall: Sep07-Aug09**		
A) Set/trotline–Nth	**(spring/summer)**			**(autumn/winter)**			**(spring/summer)**			**(autumn/winter)**			**(24 months)**		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All species combined	23.43 (18.77)	6.14 (5.48)	29.57 (24.18)	22.5 (9.56)	14.9 (7.01)	37.4 (16.5)	16.14 (12.64)	3.29 (2.65)	19.43 (15.26)	41.5 (14.42)	7.13 (5.34)	48.63 (18.99)	24.34 (8.05)	8.86 (3.25)	33.2 (11.03)
Snapper	6.86 (6.86)	0.86 (0.86)	7.71 (7.71)	13 (5.99)	3.5 (1.57)	16.5 (7.37)	5.14 (5.14)	0.43 (0.43)	5.57 (5.57)	15.38 (10.07)	1 (1)	16.38 (10.77)	9.85 (3.6)	1.73 (0.65)	11.57 (4.14)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Set/trotline–Nth	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Gummy shark	7.43 (7.43)	0.14 (0.14)	7.57 (7.41)	0	0	0	3.57 (3.57)	0	3.57 (3.57)	3.88 (3.2)	0	3.88 (3.2)	3.77 (2.78)	0.05 (0.05)	3.82 (2.77)
Sandbar shark	2.86 (2.86)	0.14 (0.14)	3 (2.84)	0.4 (0.22)	0	0.4 (0.22)	1.71 (1.71)	0	1.71 (1.71)	8.25 (3.9)	0	8.25 (3.9)	2.53 (1.19)	0.05 (0.05)	2.59 (1.18)
Eastern red scorpionfish	0.57 (0.57)	0	0.57 (0.57)	5.1 (2.6)	0	5.1 (2.6)	2 (2)	0	2 (2)	1.88 (1.74)	0	1.88 (1.74)	2.54 (1.01)	0	2.54 (1.01)
Eastern fiddler ray	0	2.29 (2.29)	2.29 (2.29)	0	1.6 (0.99)	1.6 (0.99)	0	1 (1)	1 (1)	0	1.5 (1.5)	1.5 (1.5)	0	1.74 (0.93)	1.74 (0.93)
Ornate wobbegong	0.14 (0.14)	0	0.14 (0.14)	0	3.2 (1.67)	3.2 (1.67)	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0.05 (0.05)	1.13 (0.58)	1.18 (0.58)
Green moray	0	0.43 (0.43)	0.43 (0.43)	0	1.9 (0.98)	1.9 (0.98)	0	0.29 (0.29)	0.29 (0.29)	0	0.75 (0.75)	0.75 (0.75)	0	0.96 (0.39)	0.96 (0.39)
Sergeant Baker	0	0.57 (0.57)	0.57 (0.57)	0	1.4 (1)	1.4 (1)	0	0	0	0	1.38 (0.91)	1.38 (0.91)	0	0.88 (0.42)	0.88 (0.42)
Grey morwong	1 (1)	0.14 (0.14)	1.14 (1.14)	0.2 (0.2)	0	0.2 (0.2)	0.43 (0.43)	0	0.43 (0.43)	1.63 (1.36)	0	1.63 (1.36)	0.71 (0.42)	0.05 (0.05)	0.77 (0.46)
Blind shark	0	0.14 (0.14)	0.14 (0.14)	0	1.7 (0.87)	1.7 (0.87)	0	0	0	0.13 (0.13)	0.38 (0.38)	0.5 (0.5)	0.02 (0.02)	0.69 (0.31)	0.71 (0.31)
Eastern shovelnose ray	0.14 (0.14)	0	0.14 (0.14)	1.7 (0.8)	0	1.7 (0.8)	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.67 (0.28)	0	0.67 (0.28)
Dusky shark	0.43 (0.3)	0.14 (0.14)	0.57 (0.3)	0.1 (0.1)	0	0.1 (0.1)	0.14 (0.14)	0	0.14 (0.14)	2.63 (1.8)	0	2.63 (1.8)	0.56 (0.26)	0.05 (0.05)	0.61 (0.26)
Venus tuskfish	1.14 (1.14)	0	1.14 (1.14)	0.4 (0.27)	0	0.4 (0.27)	0	0	0	0	0	0	0.55 (0.42)	0	0.55 (0.42)
Yellowtail kingfish	0.14 (0.14)	0.29 (0.29)	0.43 (0.43)	0	0.1 (0.1)	0.1 (0.1)	1 (1)	0	1 (1)	0	0	0	0.21 (0.17)	0.14 (0.11)	0.35 (0.22)
Pearl perch	0.43 (0.43)	0	0.43 (0.43)	0	0.1 (0.1)	0.1 (0.1)	0.29 (0.29)	0	0.29 (0.29)	0.63 (0.63)	0.13 (0.13)	0.75 (0.62)	0.28 (0.18)	0.05 (0.04)	0.33 (0.18)
Spinner shark	0.43 (0.3)	0	0.43 (0.3)	0	0	0	0.57 (0.43)	0	0.57 (0.43)	0.63 (0.32)	0	0.63 (0.32)	0.33 (0.13)	0	0.33 (0.13)
Tiger shark	0.29 (0.29)	0.14 (0.14)	0.43 (0.3)	0	0	0	0.29 (0.29)	0	0.29 (0.29)	0.63 (0.42)	0.13 (0.13)	0.75 (0.41)	0.23 (0.13)	0.07 (0.05)	0.3 (0.13)
Bluespotted flathead	0.43 (0.43)	0	0.43 (0.43)	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.21 (0.16)	0	0.21 (0.16)
Scalloped hammerhead	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	1.13 (0.55)	0	1.13 (0.55)	0.2 (0.09)	0	0.2 (0.09)
Marbled flathead	0.29 (0.29)	0	0.29 (0.29)	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.19 (0.13)	0	0.19 (0.13)
Crimsonband wrasse	0	0	0	0.5 (0.31)	0	0.5 (0.31)	0	0	0	0	0	0	0.17 (0.11)	0	0.17 (0.11)
Port Jackson shark	0	0.43 (0.43)	0.43 (0.43)	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.17 (0.16)	0.17 (0.16)
Eastern pigfish	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.25 (0.25)	0	0.25 (0.25)	0.16 (0.11)	0	0.16 (0.11)
Eastern frogfish	0	0	0	0	0.3 (0.21)	0.3 (0.21)	0	0	0	0	0.38 (0.38)	0.38 (0.38)	0	0.15 (0.09)	0.15 (0.09)
Redfish	0	0	0	0	0	0	0	0	0	1.13 (1.13)	0	1.13 (1.13)	0.15 (0.15)	0	0.15 (0.15)
Silver sweep	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.88 (0.64)	0	0.88 (0.64)	0.15 (0.09)	0	0.15 (0.09)
Shortfin mako	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0.43 (0.3)	0	0.43 (0.3)	0.25 (0.25)	0	0.25 (0.25)	0.14 (0.07)	0	0.14 (0.07)

APPENDIX E-3 A) Set/trotline–Nth	P12: Sep07-Feb08 (spring/summer)			P34: Mar08-Aug08 (autumn/winter)			P56: Sep08-Feb09 (spring/summer)			P78: Mar09-Aug09 (autumn/winter)			Overall: Sep07-Aug09 (24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Unid. moray	0	0.29 (0.29)	0.29 (0.29)	0	0	0	0	0	0	0	0.25 (0.16)	0.25 (0.16)	0	0.14 (0.11)	0.14 (0.11)
Black-banded seaperch	0	0	0	0	0.3 (0.3)	0.3 (0.3)	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.12 (0.11)	0.12 (0.11)
Spotted wobbegong	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0.25 (0.25)	0.38 (0.26)	0.63 (0.5)	0.03 (0.03)	0.08 (0.05)	0.12 (0.07)
Foxfish	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.29 (0.29)	0	0.29 (0.29)	0.13 (0.13)	0	0.13 (0.13)	0.11 (0.07)	0	0.11 (0.07)
Eastern blue groper	0	0	0	0	0.3 (0.21)	0.3 (0.21)	0	0	0	0	0	0	0	0.1 (0.07)	0.1 (0.07)
Smooth hammerhead	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0.38 (0.26)	0	0.38 (0.26)	0.1 (0.06)	0	0.1 (0.06)
Black stingray	0	0	0	0	0	0	0	0.43 (0.3)	0.43 (0.3)	0	0	0	0	0.07 (0.05)	0.07 (0.05)
Blacktip shark complex	0	0	0	0	0	0	0	0	0	0.5 (0.19)	0	0.5 (0.19)	0.07 (0.02)	0	0.07 (0.02)
Eastern conger	0	0	0	0	0.2 (0.13)	0.2 (0.13)	0	0	0	0	0	0	0	0.07 (0.05)	0.07 (0.05)
Goldspotted sweetlips	0	0	0	0.2 (0.2)	0	0.2 (0.2)	0	0	0	0	0	0	0.07 (0.07)	0	0.07 (0.07)
Mosaic moray	0	0	0	0	0	0	0	0.43 (0.43)	0.43 (0.43)	0	0	0	0	0.07 (0.07)	0.07 (0.07)
Banded wobbegong	0	0	0	0	0	0	0	0.29 (0.29)	0.29 (0.29)	0	0	0	0	0.05 (0.05)	0.05 (0.05)
Collar carpetshark	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0.05 (0.05)
Eastern wirrah	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.05 (0.04)	0	0.05 (0.04)
Unid. shovelnose ray	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Bull shark	0	0	0	0	0	0	0	0	0	0.25 (0.16)	0	0.25 (0.16)	0.03 (0.02)	0	0.03 (0.02)
Eastern blue devil	0	0	0	0	0	0	0	0	0	0	0.25 (0.25)	0.25 (0.25)	0	0.03 (0.03)	0.03 (0.03)
Estuary cobbler	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Sixspine leatherjacket	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Southern Maori-wrasse	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Tarwhine	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Yellow-finned leatherjacket	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Bronze whaler	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.02 (0.02)	0	0.02 (0.02)
Coffin ray	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Crested hornshark	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Great white shark	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.02 (0.02)	0.02 (0.02)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
A) Set/trotline–Nth	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Remora	0	0	0	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Samson fish	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.02 (0.02)	0	0.02 (0.02)
Silky shark	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.02 (0.02)	0	0.02 (0.02)
Smooth stingray	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.02 (0.02)	0.02 (0.02)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
B) Set/trotline–Cent	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	10.57 (3.68)	4.57 (1.84)	15.14 (4.01)	6 (1.02)	4.29 (3.64)	10.29 (3.56)	6 (1.07)	3.88 (3.17)	9.88 (3.95)	3 (0.71)	0.8 (0.49)	3.8 (0.97)	6.84 (1.15)	3.68 (1.42)	10.52 (1.91)
Smooth stingray	0	2.71 (1.51)	2.71 (1.51)	0	2.29 (2.12)	2.29 (2.12)	0	3.25 (2.97)	3.25 (2.97)	0.4 (0.24)	0	0.4 (0.24)	0.06 (0.04)	2.35 (1.15)	2.42 (1.15)
Spotted wobbegong	3.43 (1.63)	0.14 (0.14)	3.57 (1.59)	0.43 (0.3)	0	0.43 (0.3)	0.5 (0.38)	0.13 (0.13)	0.63 (0.5)	0.4 (0.4)	0.4 (0.4)	0.8 (0.8)	1.32 (0.5)	0.15 (0.09)	1.46 (0.51)
Dusky shark	1.14 (0.86)	0	1.14 (0.86)	2.71 (0.81)	0	2.71 (0.81)	1.13 (0.52)	0	1.13 (0.52)	0.8 (0.58)	0	0.8 (0.58)	1.45 (0.36)	0	1.45 (0.36)
Banded wobbegong	4.29 (3.33)	0	4.29 (3.33)	0	0	0	0	0	0	0	0	0	1.24 (0.96)	0	1.24 (0.96)
Port Jackson shark	0.14 (0.14)	0.86 (0.55)	1 (0.58)	0	1.43 (1.43)	1.43 (1.43)	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0.04 (0.04)	0.62 (0.37)	0.66 (0.37)
Bronze whaler	0	0	0	0.43 (0.3)	0	0.43 (0.3)	1.25 (0.59)	0	1.25 (0.59)	0	0	0	0.5 (0.2)	0	0.5 (0.2)
Spinner shark	0.57 (0.37)	0	0.57 (0.37)	0.29 (0.18)	0	0.29 (0.18)	0.5 (0.38)	0	0.5 (0.38)	0.6 (0.4)	0	0.6 (0.4)	0.49 (0.18)	0	0.49 (0.18)
Smooth hammerhead	0	0	0	0.71 (0.36)	0.14 (0.14)	0.86 (0.46)	0.38 (0.26)	0	0.38 (0.26)	0	0	0	0.29 (0.12)	0.03 (0.03)	0.32 (0.14)
Tiger shark	0.14 (0.14)	0	0.14 (0.14)	0.29 (0.29)	0.29 (0.29)	0.57 (0.37)	0.25 (0.16)	0	0.25 (0.16)	0	0.4 (0.4)	0.4 (0.4)	0.19 (0.09)	0.13 (0.09)	0.32 (0.13)
Black stingray	0	0.71 (0.57)	0.71 (0.57)	0	0	0	0	0	0	0	0	0	0	0.21 (0.16)	0.21 (0.16)
Blacktip shark complex	0	0	0	0.43 (0.2)	0	0.43 (0.2)	0.25 (0.25)	0	0.25 (0.25)	0.2 (0.2)	0	0.2 (0.2)	0.21 (0.1)	0	0.21 (0.1)
Bluespotted flathead	0	0	0	0	0	0	0.63 (0.32)	0	0.63 (0.32)	0	0	0	0.2 (0.1)	0	0.2 (0.1)
Shortfin mako	0	0	0	0.29 (0.18)	0	0.29 (0.18)	0.25 (0.16)	0	0.25 (0.16)	0	0	0	0.15 (0.07)	0	0.15 (0.07)
Gummy shark	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.25 (0.25)	0	0.25 (0.25)	0	0	0	0.12 (0.09)	0	0.12 (0.09)
Thresher shark	0	0	0	0	0	0	0.38 (0.38)	0	0.38 (0.38)	0	0	0	0.12 (0.12)	0	0.12 (0.12)

Bull shark	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.4 (0.4)	0	0.4 (0.4)	0.1 (0.07)	0	0.1 (0.07)
Eastern fiddler ray	0	0	0	0	0	0	0.25 (0.16)	0	0.25 (0.16)	0	0	0	0.08 (0.05)	0	0.08 (0.05)
Eastern wirrah	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0	0.08 (0.08)
Grey nurse shark	0	0	0	0	0	0	0	0.25 (0.16)	0.25 (0.16)	0	0	0	0	0.08 (0.05)	0.08 (0.05)
Luderick	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0	0.08 (0.08)
Great hammerhead	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0.2 (0.2)	0	0.2 (0.2)	0.07 (0.05)	0	0.07 (0.05)
Great white shark	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0	0.07 (0.05)	0.07 (0.05)
Eastern highfin spurdog	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)
Red morwong	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0	0	0	0.04 (0.04)	0	0.04 (0.04)
Cobia	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Set/trotline–Sth	**(spring/summer)**			**(autumn/winter)**			**(spring/summer)**			**(autumn/winter)**			**(24 months)**		
Common name	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**	**Retained**	**Discarded**	**Total**
All species combined	87 (20.64)	20.13 (8.36)	107.13 (20.98)	157.86 (36.42)	13.29 (3.43)	171.14 (35.18)	220.33 (79.76)	14.67 (6.06)	235 (78.83)	65.63 (10.3)	31.75 (10.61)	97.38 (12.31)	135.89 (25.32)	20.26 (3.94)	156.15 (25.07)
Bigeye ocean perch	25.25 (11.16)	1.13 (0.74)	26.38 (11.24)	30.29 (12.14)	0.71 (0.71)	31 (12.26)	71.5 (44.74)	0	71.5 (44.74)	2.5 (2.5)	0	2.5 (2.5)	33.6 (13.64)	0.39 (0.22)	33.99 (13.65)
Pink ling	8.63 (4.27)	0	8.63 (4.27)	51 (25.2)	0	51 (25.2)	39.67 (28.65)	0	39.67 (28.65)	0.88 (0.74)	0	0.88 (0.74)	24.95 (10.14)	0	24.95 (10.14)
Gummy shark	15.88 (15.45)	0	15.88 (15.45)	4.86 (3.82)	0.29 (0.29)	5.14 (4.1)	36.5 (33.19)	0	36.5 (33.19)	9.38 (4.4)	0.13 (0.13)	9.5 (4.37)	17.69 (10.37)	0.1 (0.07)	17.79 (10.37)
Whitefin swellshark	5.25 (3.24)	0	5.25 (3.24)	16.29 (7.09)	0	16.29 (7.09)	30.17 (14.97)	0	30.17 (14.97)	0	0.25 (0.25)	0.25 (0.25)	13.55 (4.72)	0.07 (0.07)	13.62 (4.72)
Ribaldo	0.13 (0.13)	0.13 (0.13)	0.25 (0.16)	9.29 (4.37)	0.86 (0.7)	10.14 (4.9)	16.17 (13.39)	0	16.17 (13.39)	0	0	0	6.83 (4.06)	0.22 (0.16)	7.05 (4.09)
Snapper	1.5 (1.5)	0	1.5 (1.5)	6.86 (4.84)	1 (0.85)	7.86 (5.66)	7.33 (4.65)	0.33 (0.33)	7.67 (4.88)	9.25 (4.58)	0.13 (0.13)	9.38 (4.55)	6.57 (2.18)	0.35 (0.21)	6.92 (2.31)
Draughtboard shark	14.75 (14.05)	0.5 (0.5)	15.25 (14.55)	12.43 (12.43)	0.29 (0.29)	12.71 (12.71)	1.83 (1.83)	0	1.83 (1.83)	0.38 (0.38)	0.88 (0.64)	1.25 (0.82)	6.42 (4.02)	0.41 (0.22)	6.83 (4.14)
Port Jackson shark	0.25 (0.25)	6.13 (3.56)	6.38 (3.7)	0	2.14 (2.14)	2.14 (2.14)	0	1.83 (1.64)	1.83 (1.64)	3 (2.1)	12.75 (9.94)	15.75 (9.63)	0.89 (0.59)	5.84 (2.95)	6.73 (2.88)
Eastern fiddler ray	3.88 (2.62)	0.13 (0.13)	4 (2.73)	10.71 (10.71)	1.43 (1.02)	12.14 (11.02)	0.17 (0.17)	0.17 (0.17)	0.33 (0.21)	7 (6.06)	3 (1.91)	10 (5.89)	5.17 (2.96)	1.23 (0.58)	6.4 (2.99)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Set/trotline–Sth	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Blue mackerel	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	10.38 (6.94)	1.63 (1.07)	12 (8)	2.93 (1.94)	0.45 (0.3)	3.39 (2.24)
Grey morwong	1.38 (1.38)	0	1.38 (1.38)	2.29 (1.71)	0	2.29 (1.71)	2.83 (2.01)	0	2.83 (2.01)	3.13 (1.72)	0	3.13 (1.72)	2.49 (0.9)	0	2.49 (0.9)
Piked spurdog	0	8.13 (7.98)	8.13 (7.98)	2 (1.53)	0	2 (1.53)	0.33 (0.21)	0	0.33 (0.21)	0	0.5 (0.5)	0.5 (0.5)	0.54 (0.34)	1.81 (1.64)	2.35 (1.68)
Red gurnard	1.13 (0.67)	0	1.13 (0.67)	0.86 (0.86)	0	0.86 (0.86)	2.17 (2.17)	0	2.17 (2.17)	3.38 (1.81)	0.13 (0.13)	3.5 (1.82)	2 (0.85)	0.03 (0.03)	2.04 (0.85)
Reef ocean perch	0.38 (0.38)	0.13 (0.13)	0.5 (0.5)	1.57 (1.27)	0.14 (0.14)	1.71 (1.41)	0.17 (0.17)	0.17 (0.17)	0.33 (0.21)	3.13 (2.29)	2 (1.86)	5.13 (4.1)	1.35 (0.71)	0.67 (0.52)	2.01 (1.2)
Redfish	0.25 (0.25)	1.13 (1.13)	1.38 (1.38)	1.71 (1.25)	0	1.71 (1.25)	0	0.33 (0.33)	0.33 (0.33)	3.25 (1.81)	0.38 (0.18)	3.63 (1.97)	1.34 (0.58)	0.43 (0.26)	1.77 (0.69)
Grey spotted catshark	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	4.17 (2.88)	4.17 (2.88)	0	1.5 (1)	1.5 (1)	0	1.68 (0.89)	1.68 (0.89)
Tiger flathead	1.25 (1)	0.25 (0.25)	1.5 (1.24)	0	0	0	1.5 (1.5)	0.17 (0.17)	1.67 (1.67)	2.38 (1.49)	0	2.38 (1.49)	1.36 (0.64)	0.1 (0.07)	1.46 (0.69)
Bluespotted flathead	1.88 (1.26)	0.13 (0.13)	2 (1.3)	0.29 (0.18)	0.43 (0.43)	0.71 (0.57)	1 (1)	0	1 (1)	1.25 (0.9)	0	1.25 (0.9)	1.09 (0.47)	0.12 (0.1)	1.21 (0.49)
Bight skate	0	0.13 (0.13)	0.13 (0.13)	0.86 (0.59)	1.14 (0.99)	2 (1.29)	1.83 (1.45)	0	1.83 (1.45)	0	0	0	0.73 (0.45)	0.28 (0.22)	1.01 (0.51)
Eastern red scorpionfish	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0.17 (0.17)	0	0.17 (0.17)	2.63 (1.63)	0	2.63 (1.63)	0.78 (0.46)	0.03 (0.03)	0.81 (0.46)
Sawtail shark	0	0.25 (0.16)	0.25 (0.16)	0	1.57 (1.57)	1.57 (1.57)	0	0	0	0	1.25 (1.25)	1.25 (1.25)	0	0.75 (0.49)	0.75 (0.49)
Largetooth beardie	0	0	0	0	0.29 (0.29)	0.29 (0.29)	0.83 (0.83)	0.33 (0.33)	1.17 (1.17)	0.13 (0.13)	0.88 (0.88)	1 (0.87)	0.28 (0.25)	0.41 (0.27)	0.69 (0.42)
Unid. carpetshark	0	0	0	0	0	0	0	2.33 (2.33)	2.33 (2.33)	0	0	0	0	0.69 (0.69)	0.69 (0.69)
Blue-eye trevalla	0.13 (0.13)	0	0.13 (0.13)	0.86 (0.7)	0	0.86 (0.7)	1.33 (0.84)	0	1.33 (0.84)	0.13 (0.13)	0	0.13 (0.13)	0.64 (0.3)	0	0.64 (0.3)
Southern whiptail	0.13 (0.13)	0.13 (0.13)	0.25 (0.16)	0	0.43 (0.2)	0.43 (0.2)	0	1.67 (1.67)	1.67 (1.67)	0	0	0	0.03 (0.03)	0.61 (0.49)	0.64 (0.49)
Sergeant Baker	0	0	0	0.86 (0.7)	0	0.86 (0.7)	1.17 (1.17)	0.17 (0.17)	1.33 (1.15)	0	0.13 (0.13)	0.13 (0.13)	0.53 (0.38)	0.08 (0.06)	0.62 (0.37)
Southern dogfish	0	0	0	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0	1.88 (1.88)	1.88 (1.88)	0.06 (0.06)	0.52 (0.52)	0.59 (0.53)
Black stingray	0	0.25 (0.16)	0.25 (0.16)	0	0	0	0	0	0	0	1.38 (1.12)	1.38 (1.12)	0	0.44 (0.31)	0.44 (0.31)
Endeavour dogfish	0.88 (0.48)	0	0.88 (0.48)	0.29 (0.29)	0	0.29 (0.29)	0.67 (0.67)	0	0.67 (0.67)	0	0	0	0.44 (0.23)	0	0.44 (0.23)
Green moray	0.13 (0.13)	0	0.13 (0.13)	0.14 (0.14)	0.43 (0.3)	0.57 (0.3)	0	0.17 (0.17)	0.17 (0.17)	0	0.75 (0.41)	0.75 (0.41)	0.06 (0.04)	0.35 (0.14)	0.41 (0.14)
Jackass morwong	0.75 (0.53)	0	0.75 (0.53)	0.57 (0.57)	0	0.57 (0.57)	0.17 (0.17)	0	0.17 (0.17)	0.25 (0.16)	0	0.25 (0.16)	0.4 (0.18)	0	0.4 (0.18)
Snipe eel	0	0	0	0	0.43 (0.3)	0.43 (0.3)	0.33 (0.33)	0.33 (0.33)	0.67 (0.42)	0	0.25 (0.25)	0.25 (0.25)	0.1 (0.1)	0.26 (0.14)	0.36 (0.16)
Eastern shovelnose ray	0.13 (0.13)	0	0.13 (0.13)	0.57 (0.57)	0.29 (0.29)	0.86 (0.59)	0	0.33 (0.33)	0.33 (0.33)	0	0.13 (0.13)	0.13 (0.13)	0.15 (0.13)	0.2 (0.12)	0.35 (0.17)
Collar carpetshark	0	0.38 (0.26)	0.38 (0.26)	0	0	0	0	0.33 (0.33)	0.33 (0.33)	0	0.5 (0.5)	0.5 (0.5)	0	0.31 (0.18)	0.31 (0.18)
Common gurnard perch	0.5 (0.5)	0	0.5 (0.5)	0	0	0	0.5 (0.5)	0	0.5 (0.5)	0	0	0	0.25 (0.18)	0	0.25 (0.18)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Set/trotline–Sth	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Southern eagle ray	0.5 (0.33)	0	0.5 (0.33)	0.29 (0.29)	0.14 (0.14)	0.43 (0.3)	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0.17 (0.09)	0.08 (0.06)	0.25 (0.11)
Bronze whaler	0	0	0	0	0	0	0	0	0	0.88 (0.88)	0	0.88 (0.88)	0.24 (0.24)	0	0.24 (0.24)
Sharpnose sevengill shark	0.63 (0.63)	0	0.63 (0.63)	0.14 (0.14)	0.14 (0.14)	0.29 (0.29)	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.21 (0.14)	0.03 (0.03)	0.24 (0.15)
Eastern wirrah	0	0	0	0	0	0	0	0	0	0.75 (0.62)	0	0.75 (0.62)	0.21 (0.17)	0	0.21 (0.17)
Serpent eel	0	0.38 (0.38)	0.38 (0.38)	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0.38 (0.18)	0.38 (0.18)	0	0.21 (0.1)	0.21 (0.1)
Gemfish	0.25 (0.25)	0	0.25 (0.25)	0.14 (0.14)	0	0.14 (0.14)	0.17 (0.17)	0	0.17 (0.17)	0.25 (0.25)	0	0.25 (0.25)	0.2 (0.1)	0	0.2 (0.1)
Melbourne skate	0	0.38 (0.38)	0.38 (0.38)	0.57 (0.57)	0	0.57 (0.57)	0	0	0	0	0	0	0.13 (0.13)	0.08 (0.08)	0.2 (0.15)
Toothed whiptail	0	0	0	0	0.43 (0.43)	0.43 (0.43)	0	0.33 (0.33)	0.33 (0.33)	0	0	0	0	0.19 (0.14)	0.19 (0.14)
Ocean jacket	0.13 (0.13)	0	0.13 (0.13)	0.43 (0.43)	0	0.43 (0.43)	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.16 (0.1)	0	0.16 (0.1)
Common sawshark	0.75 (0.62)	0	0.75 (0.62)	0	0	0	0	0	0	0	0	0	0.15 (0.13)	0	0.15 (0.13)
Latchet	0.13 (0.13)	0	0.13 (0.13)	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0.25 (0.25)	0	0.25 (0.25)	0.14 (0.09)	0	0.14 (0.09)
Banded wobbegong	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0.17 (0.17)	0.17 (0.17)	0	0.13 (0.13)	0.13 (0.13)	0.03 (0.03)	0.08 (0.06)	0.12 (0.07)
Hapuku	0	0	0	0.29 (0.29)	0	0.29 (0.29)	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.11 (0.08)	0	0.11 (0.08)
Barracouta	0	0	0	0	0	0	0	0	0	0.38 (0.18)	0	0.38 (0.18)	0.1 (0.05)	0	0.1 (0.05)
Bass groper	0	0	0	0	0	0	0.33 (0.33)	0	0.33 (0.33)	0	0	0	0.1 (0.1)	0	0.1 (0.1)
Longspine flathead	0	0	0	0	0	0	0	0.33 (0.33)	0.33 (0.33)	0	0	0	0	0.1 (0.1)	0.1 (0.1)
School shark	0	0	0	0	0	0	0.33 (0.21)	0	0.33 (0.21)	0	0	0	0.1 (0.06)	0	0.1 (0.06)
Smooth stingray	0	0	0	0	0	0	0	0	0	0	0.38 (0.38)	0.38 (0.38)	0	0.1 (0.1)	0.1 (0.1)
Unid. skate	0	0	0	0	0	0	0.33 (0.33)	0	0.33 (0.33)	0	0	0	0.1 (0.1)	0	0.1 (0.1)
Zebra shark	0	0	0	0	0	0	0	0.33 (0.33)	0.33 (0.33)	0	0	0	0	0.1 (0.1)	0.1 (0.1)
Orange spotted catshark	0	0.13 (0.13)	0.13 (0.13)	0	0.29 (0.29)	0.29 (0.29)	0	0	0	0	0	0	0	0.09 (0.07)	0.09 (0.07)
Broadnose shark	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.08 (0.06)	0	0.08 (0.06)
Bearded rock cod	0	0	0	0.29 (0.29)	0	0.29 (0.29)	0	0	0	0	0	0	0.06 (0.06)	0	0.06 (0.06)
Broadgilled hagfish	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.06 (0.04)	0.06 (0.04)
Ogilby's ghostshark	0.13 (0.13)	0	0.13 (0.13)	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0.06 (0.04)	0	0.06 (0.04)
Great white shark	0	0	0	0	0	0	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0.05 (0.05)	0.05 (0.05)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
C) Set/trotline–Sth	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Moller's lanternshark	0	0	0	0	0	0	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0.05 (0.05)	0.05 (0.05)
Rock ling	0	0	0	0	0	0	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Unid. porcupinefish	0	0	0	0	0	0	0	0.17 (0.17)	0.17 (0.17)	0	0	0	0	0.05 (0.05)	0.05 (0.05)
Black shark	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Bluntnose sixgill shark	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.03 (0.03)	0	0.03 (0.03)
Common pike eel	0.13 (0.13)	0	0.13 (0.13)	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Eastern pigfish	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.03 (0.03)	0	0.03 (0.03)
Longfin pike	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.03 (0.03)	0	0.03 (0.03)
Mado	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.03 (0.03)	0.03 (0.03)
Owston's dogfish	0	0	0	0.14 (0.14)	0	0.14 (0.14)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Sand flathead	0	0.13 (0.13)	0.13 (0.13)	0	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Shortfin mako	0	0	0	0	0.14 (0.14)	0.14 (0.14)	0	0	0	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Silver sweep	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.03 (0.03)	0	0.03 (0.03)
Smooth hammerhead	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0	0.13 (0.13)	0.03 (0.03)	0	0.03 (0.03)
Sydney skate	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.03 (0.03)	0.03 (0.03)
Unid. eagle ray	0	0	0	0	0	0	0	0	0	0	0.13 (0.13)	0.13 (0.13)	0	0.03 (0.03)	0.03 (0.03)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Set/trotline–NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
All species combined	43.6 (12.19)	10.74 (4.08)	54.35 (14.67)	71.89 (14.62)	13.17 (3.87)	85.07 (15.8)	130.71 (45.53)	9.86 (3.56)	140.57 (45.06)	53.21 (7.61)	22.27 (6.94)	75.48 (9.33)	74.39 (15.28)	13.55 (3.34)	87.94 (16.47)
Bigeye ocean perch	8.67 (3.83)	0.39 (0.25)	9.06 (3.86)	11.44 (4.59)	0.27 (0.27)	11.71 (4.63)	40.7 (25.47)	0	40.7 (25.47)	1.6 (1.6)	0	1.6 (1.6)	15.73 (6.39)	0.18 (0.1)	15.91 (6.39)
Pink ling	2.96 (1.47)	0	2.96 (1.47)	19.26 (9.52)	0	19.26 (9.52)	22.58 (16.31)	0	22.58 (16.31)	0.56 (0.48)	0	0.56 (0.48)	11.68 (4.75)	0	11.68 (4.75)
Gummy shark	9.39 (6.6)	0.08 (0.08)	9.47 (6.59)	1.83 (1.44)	0.11 (0.11)	1.94 (1.55)	21.77 (18.91)	0	21.77 (18.91)	7.02 (2.94)	0.08 (0.08)	7.1 (2.92)	9.83 (6)	0.07 (0.05)	9.9 (6)
Snapper	4.14 (3.66)	0.45 (0.45)	4.59 (4.11)	9.31 (3.6)	2.19 (0.87)	11.5 (4.37)	5.55 (2.98)	0.3 (0.22)	5.85 (3.15)	9.96 (3.95)	0.34 (0.27)	10.31 (4.06)	7.09 (2.49)	0.87 (0.36)	7.96 (2.77)
Whitefin swellshark	1.8 (1.11)	0	1.8 (1.11)	6.15 (2.68)	0	6.15 (2.68)	17.17 (8.52)	0	17.17 (8.52)	0	0.16 (0.16)	0.16 (0.16)	6.34 (2.21)	0.03 (0.03)	6.37 (2.21)
Eastern fiddler ray	1.33 (0.9)	1.25 (1.21)	2.58 (1.53)	4.05 (4.05)	1.37 (0.64)	5.41 (4.19)	0.14 (0.1)	0.36 (0.28)	0.5 (0.29)	4.48 (3.88)	2.31 (1.28)	6.79 (3.79)	2.43 (1.39)	1.28 (0.65)	3.72 (1.79)
Port Jackson shark	0.1 (0.09)	2.44 (1.25)	2.54 (1.29)	0	0.96 (0.82)	0.96 (0.82)	0	1.06 (0.93)	1.06 (0.93)	1.92 (1.35)	8.19 (6.36)	10.11 (6.16)	0.42 (0.28)	2.88 (1.49)	3.3 (1.46)
Ribaldo	0.04 (0.04)	0.04 (0.04)	0.09 (0.06)	3.51 (1.65)	0.32 (0.27)	3.83 (1.85)	9.2 (7.62)	0	9.2 (7.62)	0	0	0	3.2 (1.9)	0.1 (0.07)	3.3 (1.91)
Draughtboard shark	5.06 (4.82)	0.17 (0.17)	5.24 (5)	4.69 (4.69)	0.11 (0.11)	4.8 (4.8)	1.04 (1.04)	0	1.04 (1.04)	0.24 (0.24)	0.56 (0.41)	0.8 (0.52)	3 (1.88)	0.19 (0.1)	3.2 (1.94)
Blue mackerel	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	6.64 (4.44)	1.04 (0.68)	7.68 (5.12)	1.37 (0.91)	0.21 (0.14)	1.59 (1.05)
Grey morwong	1 (0.71)	0.08 (0.08)	1.08 (0.77)	0.97 (0.66)	0	0.97 (0.66)	1.73 (1.15)	0	1.73 (1.15)	2.43 (1.16)	0	2.43 (1.16)	1.46 (0.59)	0.02 (0.02)	1.48 (0.61)
Eastern red scorpionfish	0.3 (0.3)	0.04 (0.04)	0.34 (0.3)	2.64 (1.35)	0	2.64 (1.35)	0.63 (0.54)	0	0.63 (0.54)	2.17 (1.14)	0	2.17 (1.14)	1.4 (0.62)	0.01 (0.01)	1.42 (0.62)
Piked spurdog	0	2.79 (2.74)	2.79 (2.74)	0.76 (0.58)	0	0.76 (0.58)	0.19 (0.12)	0	0.19 (0.12)	0	0.32 (0.32)	0.32 (0.32)	0.25 (0.16)	0.85 (0.77)	1.1 (0.79)
Sandbar shark	1.51 (1.51)	0.08 (0.08)	1.58 (1.5)	0.21 (0.11)	0	0.21 (0.11)	0.46 (0.46)	0	0.46 (0.46)	2.17 (1.03)	0	2.17 (1.03)	1.03 (0.48)	0.02 (0.02)	1.05 (0.48)
Red gurnard	0.39 (0.23)	0	0.39 (0.23)	0.32 (0.32)	0	0.32 (0.32)	1.23 (1.23)	0	1.23 (1.23)	2.16 (1.16)	0.08 (0.08)	2.24 (1.17)	0.94 (0.4)	0.02 (0.02)	0.95 (0.4)
Reef ocean perch	0.13 (0.13)	0.04 (0.04)	0.17 (0.17)	0.59 (0.48)	0.05 (0.05)	0.65 (0.53)	0.09 (0.09)	0.09 (0.09)	0.19 (0.12)	2 (1.47)	1.28 (1.19)	3.28 (2.63)	0.63 (0.33)	0.31 (0.25)	0.94 (0.56)
Redfish	0.09 (0.09)	0.39 (0.39)	0.47 (0.47)	0.65 (0.47)	0	0.65 (0.47)	0	0.19 (0.19)	0.19 (0.19)	2.38 (1.2)	0.24 (0.12)	2.62 (1.3)	0.69 (0.33)	0.2 (0.12)	0.89 (0.38)
Grey spotted catshark	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	2.37 (1.64)	2.37 (1.64)	0	0.96 (0.64)	0.96 (0.64)	0	0.78 (0.42)	0.78 (0.42)
Bluespotted flathead	0.87 (0.49)	0.04 (0.04)	0.91 (0.5)	0.16 (0.09)	0.16 (0.16)	0.32 (0.22)	0.67 (0.57)	0	0.67 (0.57)	0.83 (0.58)	0	0.83 (0.58)	0.62 (0.3)	0.06 (0.05)	0.68 (0.31)
Tiger flathead	0.43 (0.34)	0.09 (0.09)	0.52 (0.43)	0	0	0	0.85 (0.85)	0.09 (0.09)	0.95 (0.95)	1.52 (0.95)	0	1.52 (0.95)	0.64 (0.3)	0.05 (0.03)	0.68 (0.32)
Sergeant Baker	0	0.3 (0.3)	0.3 (0.3)	0.32 (0.27)	0.72 (0.52)	1.05 (0.58)	0.66 (0.66)	0.09 (0.09)	0.76 (0.65)	0	0.44 (0.25)	0.44 (0.25)	0.25 (0.18)	0.4 (0.2)	0.65 (0.35)
Green moray	0.04 (0.04)	0.23 (0.23)	0.27 (0.23)	0.05 (0.05)	1.14 (0.52)	1.2 (0.52)	0	0.17 (0.12)	0.17 (0.12)	0	0.68 (0.33)	0.68 (0.33)	0.03 (0.02)	0.56 (0.23)	0.58 (0.23)
Ornate wobbegong	0.08 (0.08)	0	0.08 (0.08)	0	1.66 (0.86)	1.66 (0.86)	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0.02 (0.02)	0.46 (0.24)	0.48 (0.24)
Bight skate	0	0.04 (0.04)	0.04 (0.04)	0.32 (0.22)	0.43 (0.37)	0.76 (0.49)	1.04 (0.82)	0	1.04 (0.82)	0	0	0	0.34 (0.21)	0.13 (0.1)	0.47 (0.24)
Dusky shark	0.37 (0.19)	0.08 (0.08)	0.45 (0.19)	0.34 (0.1)	0	0.34 (0.1)	0.22 (0.09)	0	0.22 (0.09)	0.77 (0.48)	0	0.77 (0.48)	0.41 (0.15)	0.02 (0.02)	0.43 (0.15)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Set/trotline–NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Eastern shovelnose ray	0.12 (0.09)	0	0.12 (0.09)	1.1 (0.47)	0.11 (0.11)	1.2 (0.47)	0.04 (0.04)	0.19 (0.19)	0.23 (0.19)	0	0.08 (0.08)	0.08 (0.08)	0.34 (0.18)	0.09 (0.06)	0.43 (0.2)
Smooth stingray	0	0.35 (0.19)	0.35 (0.19)	0	0.24 (0.22)	0.24 (0.22)	0	0.53 (0.49)	0.53 (0.49)	0.04 (0.02)	0.27 (0.24)	0.31 (0.24)	0.01 (0)	0.35 (0.2)	0.36 (0.2)
Sawtail shark	0	0.09 (0.06)	0.09 (0.06)	0	0.59 (0.59)	0.59 (0.59)	0	0	0	0	0.8 (0.8)	0.8 (0.8)	0	0.35 (0.23)	0.35 (0.23)
Largetooth beardie	0	0	0	0	0.11 (0.11)	0.11 (0.11)	0.47 (0.47)	0.19 (0.19)	0.66 (0.66)	0.08 (0.08)	0.56 (0.56)	0.64 (0.55)	0.13 (0.12)	0.19 (0.13)	0.32 (0.2)
Unid. carpetshark	0	0	0	0	0	0	0	1.33 (1.33)	1.33 (1.33)	0	0	0	0	0.32 (0.32)	0.32 (0.32)
Blue-eye trevalla	0.04 (0.04)	0	0.04 (0.04)	0.32 (0.27)	0	0.32 (0.27)	0.76 (0.48)	0	0.76 (0.48)	0.08 (0.08)	0	0.08 (0.08)	0.3 (0.14)	0	0.3 (0.14)
Southern whiptail	0.04 (0.04)	0.04 (0.04)	0.09 (0.06)	0	0.16 (0.08)	0.16 (0.08)	0	0.95 (0.95)	0.95 (0.95)	0	0	0	0.01 (0.01)	0.29 (0.23)	0.3 (0.23)
Blind shark	0	0.08 (0.08)	0.08 (0.08)	0	0.88 (0.45)	0.88 (0.45)	0	0	0	0.03 (0.03)	0.1 (0.1)	0.13 (0.13)	0.01 (0.01)	0.28 (0.13)	0.29 (0.13)
Southern dogfish	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	1.2 (1.2)	1.2 (1.2)	0.03 (0.03)	0.25 (0.25)	0.28 (0.25)
Black stingray	0	0.18 (0.09)	0.18 (0.09)	0	0	0	0	0.11 (0.08)	0.11 (0.08)	0	0.88 (0.71)	0.88 (0.71)	0	0.26 (0.19)	0.26 (0.19)
Banded wobbegong	0.55 (0.43)	0	0.55 (0.43)	0.05 (0.05)	0	0.05 (0.05)	0	0.17 (0.12)	0.17 (0.12)	0	0.08 (0.08)	0.08 (0.08)	0.17 (0.13)	0.06 (0.05)	0.23 (0.17)
Spotted wobbegong	0.44 (0.21)	0.02 (0.02)	0.46 (0.2)	0.05 (0.03)	0.05 (0.05)	0.1 (0.06)	0.08 (0.06)	0.02 (0.02)	0.1 (0.08)	0.1 (0.08)	0.14 (0.08)	0.24 (0.15)	0.18 (0.08)	0.05 (0.03)	0.23 (0.09)
Venus tuskfish	0.6 (0.6)	0	0.6 (0.6)	0.21 (0.14)	0	0.21 (0.14)	0	0	0	0	0	0	0.23 (0.17)	0	0.23 (0.17)
Endeavour dogfish	0.3 (0.16)	0	0.3 (0.16)	0.11 (0.11)	0	0.11 (0.11)	0.38 (0.38)	0	0.38 (0.38)	0	0	0	0.21 (0.11)	0	0.21 (0.11)
Jackass morwong	0.26 (0.18)	0	0.26 (0.18)	0.22 (0.22)	0	0.22 (0.22)	0.09 (0.09)	0	0.09 (0.09)	0.16 (0.1)	0	0.16 (0.1)	0.19 (0.08)	0	0.19 (0.08)
Spinner shark	0.3 (0.16)	0	0.3 (0.16)	0.03 (0.02)	0	0.03 (0.02)	0.23 (0.13)	0	0.23 (0.13)	0.22 (0.09)	0	0.22 (0.09)	0.19 (0.08)	0	0.19 (0.08)
Bronze whaler	0	0	0	0.05 (0.03)	0	0.05 (0.03)	0.21 (0.1)	0	0.21 (0.1)	0.59 (0.56)	0	0.59 (0.56)	0.18 (0.15)	0	0.18 (0.15)
Collar carpetshark	0	0.2 (0.12)	0.2 (0.12)	0	0	0	0	0.19 (0.19)	0.19 (0.19)	0	0.32 (0.32)	0.32 (0.32)	0	0.17 (0.1)	0.17 (0.1)
Snipe eel	0	0	0	0	0.16 (0.11)	0.16 (0.11)	0.19 (0.19)	0.19 (0.19)	0.38 (0.24)	0	0.16 (0.16)	0.16 (0.16)	0.05 (0.05)	0.12 (0.06)	0.17 (0.07)
Tiger shark	0.17 (0.15)	0.08 (0.08)	0.24 (0.16)	0.03 (0.03)	0.03 (0.03)	0.06 (0.04)	0.12 (0.08)	0	0.12 (0.08)	0.16 (0.11)	0.07 (0.05)	0.24 (0.12)	0.12 (0.06)	0.04 (0.03)	0.16 (0.07)
Pearl perch	0.23 (0.23)	0	0.23 (0.23)	0	0.05 (0.05)	0.05 (0.05)	0.08 (0.08)	0	0.08 (0.08)	0.16 (0.16)	0.03 (0.03)	0.2 (0.16)	0.12 (0.07)	0.02 (0.02)	0.14 (0.08)
Yellowtail kingfish	0.08 (0.08)	0.15 (0.15)	0.23 (0.23)	0	0.05 (0.05)	0.05 (0.05)	0.27 (0.27)	0	0.27 (0.27)	0	0	0	0.09 (0.07)	0.06 (0.04)	0.14 (0.09)
Eastern wirrah	0.04 (0.04)	0	0.04 (0.04)	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.51 (0.4)	0	0.51 (0.4)	0.13 (0.11)	0	0.13 (0.11)
Common gurnard perch	0.17 (0.17)	0	0.17 (0.17)	0	0	0	0.28 (0.28)	0	0.28 (0.28)	0	0	0	0.12 (0.08)	0	0.12 (0.08)
Southern eagle ray	0.17 (0.11)	0	0.17 (0.11)	0.11 (0.11)	0.05 (0.05)	0.16 (0.11)	0	0.09 (0.09)	0.09 (0.09)	0	0	0	0.08 (0.04)	0.04 (0.03)	0.12 (0.05)
Sharpnose sevengill shark	0.21 (0.21)	0	0.21 (0.21)	0.05 (0.05)	0.05 (0.05)	0.11 (0.11)	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.1 (0.07)	0.01 (0.01)	0.11 (0.07)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Set/trotline–NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Melbourne skate	0	0.13 (0.13)	0.13 (0.13)	0.22 (0.22)	0	0.22 (0.22)	0	0	0	0	0	0	0.06 (0.06)	0.04 (0.04)	0.1 (0.07)
Serpent eel	0	0.13 (0.13)	0.13 (0.13)	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0.24 (0.12)	0.24 (0.12)	0	0.1 (0.05)	0.1 (0.05)
Smooth hammerhead	0.08 (0.08)	0	0.08 (0.08)	0.08 (0.04)	0.02 (0.02)	0.09 (0.05)	0.06 (0.04)	0	0.06 (0.04)	0.18 (0.11)	0	0.18 (0.11)	0.09 (0.06)	0 (0)	0.1 (0.06)
Gemfish	0.09 (0.09)	0	0.09 (0.09)	0.05 (0.05)	0	0.05 (0.05)	0.09 (0.09)	0	0.09 (0.09)	0.16 (0.16)	0	0.16 (0.16)	0.09 (0.05)	0	0.09 (0.05)
Shortfin mako	0	0	0	0.08 (0.06)	0.05 (0.05)	0.14 (0.08)	0.16 (0.08)	0	0.16 (0.08)	0.07 (0.07)	0	0.07 (0.07)	0.07 (0.04)	0.01 (0.01)	0.09 (0.05)
Toothed whiptail	0	0	0	0	0.16 (0.16)	0.16 (0.16)	0	0.19 (0.19)	0.19 (0.19)	0	0	0	0	0.09 (0.06)	0.09 (0.06)
Eastern pigfish	0.15 (0.15)	0	0.15 (0.15)	0	0	0	0.04 (0.04)	0	0.04 (0.04)	0.15 (0.1)	0	0.15 (0.1)	0.08 (0.06)	0	0.08 (0.06)
Marbled flathead	0.15 (0.15)	0	0.15 (0.15)	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.08 (0.05)	0	0.08 (0.05)
Scalloped hammerhead	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0	0	0	0.3 (0.14)	0	0.3 (0.14)	0.08 (0.04)	0	0.08 (0.04)
Silver sweep	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0.31 (0.19)	0	0.31 (0.19)	0.08 (0.05)	0	0.08 (0.05)
Common sawshark	0.26 (0.21)	0	0.26 (0.21)	0	0	0	0	0	0	0	0	0	0.07 (0.06)	0	0.07 (0.06)
Crimsonband wrasse	0	0	0	0.26 (0.16)	0	0.26 (0.16)	0	0	0	0	0	0	0.07 (0.04)	0	0.07 (0.04)
Latchet	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0.16 (0.16)	0	0.16 (0.16)	0.07 (0.04)	0	0.07 (0.04)
Ocean jacket	0.04 (0.04)	0	0.04 (0.04)	0.16 (0.16)	0	0.16 (0.16)	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0.07 (0.05)	0	0.07 (0.05)
Eastern frogfish	0	0	0	0	0.16 (0.11)	0.16 (0.11)	0	0	0	0	0.1 (0.1)	0.1 (0.1)	0	0.06 (0.04)	0.06 (0.04)
Unid. moray	0	0.15 (0.15)	0.15 (0.15)	0	0	0	0	0	0	0	0.07 (0.04)	0.07 (0.04)	0	0.06 (0.04)	0.06 (0.04)
Barracouta	0	0	0	0	0	0	0	0	0	0.24 (0.12)	0	0.24 (0.12)	0.05 (0.02)	0	0.05 (0.02)
Bass groper	0	0	0	0	0	0	0.19 (0.19)	0	0.19 (0.19)	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Black-banded seaperch	0	0	0	0	0.16 (0.16)	0.16 (0.16)	0	0	0	0	0.03 (0.03)	0.03 (0.03)	0	0.05 (0.04)	0.05 (0.04)
Blacktip shark complex	0	0	0	0.05 (0.02)	0	0.05 (0.02)	0.04 (0.04)	0	0.04 (0.04)	0.15 (0.05)	0	0.15 (0.05)	0.05 (0.02)	0	0.05 (0.02)
Foxfish	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0.03 (0.03)	0	0.03 (0.03)	0.05 (0.03)	0	0.05 (0.03)
Hapuku	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.05 (0.04)	0	0.05 (0.04)
Longspine flathead	0	0	0	0	0	0	0	0.19 (0.19)	0.19 (0.19)	0	0	0	0	0.05 (0.05)	0.05 (0.05)
School shark	0	0	0	0	0	0	0.19 (0.12)	0	0.19 (0.12)	0	0	0	0.05 (0.03)	0	0.05 (0.03)
Unid. skate	0	0	0	0	0	0	0.19 (0.19)	0	0.19 (0.19)	0	0	0	0.05 (0.05)	0	0.05 (0.05)
Zebra shark	0	0	0	0	0	0	0	0.19 (0.19)	0.19 (0.19)	0	0	0	0	0.05 (0.05)	0.05 (0.05)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Set/trotline–NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Broadnose shark	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.04 (0.03)	0	0.04 (0.03)
Eastern blue groper	0	0	0	0	0.16 (0.11)	0.16 (0.11)	0	0	0	0	0	0	0	0.04 (0.03)	0.04 (0.03)
Great white shark	0	0	0	0	0.02 (0.02)	0.02 (0.02)	0	0.12 (0.1)	0.12 (0.1)	0	0.03 (0.03)	0.03 (0.03)	0	0.04 (0.04)	0.04 (0.04)
Orange spotted catshark	0	0.04 (0.04)	0.04 (0.04)	0	0.11 (0.11)	0.11 (0.11)	0	0	0	0	0	0	0	0.04 (0.03)	0.04 (0.03)
Bearded rock cod	0	0	0	0.11 (0.11)	0	0.11 (0.11)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Broadgilled hagfish	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0.03 (0.02)	0.03 (0.02)
Bull shark	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.1 (0.06)	0	0.1 (0.06)	0.03 (0.02)	0	0.03 (0.02)
Eastern conger	0	0	0	0	0.1 (0.07)	0.1 (0.07)	0	0	0	0	0	0	0	0.03 (0.02)	0.03 (0.02)
Goldspotted sweetlips	0	0	0	0.1 (0.1)	0	0.1 (0.1)	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)
Mosaic moray	0	0	0	0	0	0	0	0.11 (0.11)	0.11 (0.11)	0	0	0	0	0.03 (0.03)	0.03 (0.03)
Ogilby's ghostshark	0.04 (0.04)	0	0.04 (0.04)	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.03 (0.02)	0	0.03 (0.02)
Bluntnose sixgill shark	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0.02 (0.02)	0	0.02 (0.02)
Longfin pike	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0	0.08 (0.08)	0.02 (0.02)	0	0.02 (0.02)
Mado	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0.02 (0.02)	0.02 (0.02)
Moller's lanternshark	0	0	0	0	0	0	0	0.09 (0.09)	0.09 (0.09)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Rock ling	0	0	0	0	0	0	0.09 (0.09)	0	0.09 (0.09)	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Sydney skate	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0.02 (0.02)	0.02 (0.02)
Unid. eagle ray	0	0	0	0	0	0	0	0	0	0	0.08 (0.08)	0.08 (0.08)	0	0.02 (0.02)	0.02 (0.02)
Unid. porcupinefish	0	0	0	0	0	0	0	0.09 (0.09)	0.09 (0.09)	0	0	0	0	0.02 (0.02)	0.02 (0.02)
Unid. shovelnose ray	0.08 (0.08)	0	0.08 (0.08)	0	0	0	0	0	0	0	0	0	0.02 (0.02)	0	0.02 (0.02)
Black shark	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Coffin ray	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Common pike eel	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Crested hornshark	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Eastern blue devil	0	0	0	0	0	0	0	0	0	0	0.07 (0.07)	0.07 (0.07)	0	0.01 (0.01)	0.01 (0.01)
Eastern highfin spurdog	0	0.02 (0.02)	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)

APPENDIX E-3	P12: Sep07-Feb08			P34: Mar08-Aug08			P56: Sep08-Feb09			P78: Mar09-Aug09			Overall: Sep07-Aug09		
D) Set/trotline–NSW	(spring/summer)			(autumn/winter)			(spring/summer)			(autumn/winter)			(24 months)		
Common name	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total	Retained	Discarded	Total
Estuary cobbler	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Great hammerhead	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0.01 (0.01)	0	0.01 (0.01)
Grey nurse shark	0	0	0	0	0	0	0	0.04 (0.03)	0.04 (0.03)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Luderick	0.04 (0.04)	0	0.04 (0.04)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Owston's dogfish	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Red morwong	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Remora	0	0	0	0	0	0	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Samson fish	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.01 (0.01)	0	0.01 (0.01)
Sand flathead	0	0.04 (0.04)	0.04 (0.04)	0	0	0	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Silky shark	0	0	0	0	0	0	0	0	0	0.03 (0.03)	0	0.03 (0.03)	0.01 (0.01)	0	0.01 (0.01)
Sixspine leatherjacket	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Southern Maori-wrasse	0	0	0	0	0.05 (0.05)	0.05 (0.05)	0	0	0	0	0	0	0	0.01 (0.01)	0.01 (0.01)
Tarwhine	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Thresher shark	0	0	0	0	0	0	0.06 (0.06)	0	0.06 (0.06)	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Yellow-finned leatherjacket	0	0	0	0.05 (0.05)	0	0.05 (0.05)	0	0	0	0	0	0	0.01 (0.01)	0	0.01 (0.01)
Cobia	0	0	0	0.02 (0.02)	0	0.02 (0.02)	0	0	0	0	0	0	<0.01 (<0.01)	0	<0.01 (<0.01)

APPENDIX F - Summaries of size statistics (mean size ± SE, size range and water depth range) for each species observed (methods, regions and periods combined)

		Summary size and depth data (regions and periods combined)		
Common Name	***n***	**Mean size ± SE (cm FL*)**	**Size range (cm FL*)**	**Depth range (m)**
Alfonsino	2	33.5 ± 8.5	25–42	329–439
Amberjack	6	60.7 ± 4.1	41–68	22–86
Australian bonito	851	37.4 ± 0.2	26–68	1–100
Australian sawtail *	1	35	35	13
Balloonfish	1	35	35	170
Banded rockcod *	129	70.9 ± 1	41–100	103–278
Banded seaperch *	1	26	26	29
Banded wobbegong *	43	154.9 ± 4.8	65–213	5–80
Barracouta	26	87.1 ± 3.3	47–107	19–399
Bass groper *	22	80.9 ± 4.3	57–133	240–460
Bearded rock cod *	2	36 ± 1	35–37	84–84
Bigeye ocean perch *	1107	35.6 ± 0.1	19–44	180–572
Bigeye thresher	1	-	-	323
Bight skate *	14	91.4 ± 8	50–145	382–513
Black rabbitfish	1	31	31	12
Black rockcod *	1	62	62	91
Black shark *	1	103	103	438
Black stingray #	3	160 ± 10	150–180	27–100
Black-banded seaperch *	7	19.3 ± 0.5	18–21	26–40
Blackspot goatfish	4	24.8 ± 2.7	19–31	22–92
Blacktip bullseye *	2	10 ± 0	10–10	3–15
Blacktip rockcod *	1	23	23	15
Blacktip shark complex *	19	147.6 ± 16.7	73–256	7–110
Blind shark *	27	59.9 ± 1.3	47–76	8–53
Blue grenadier *	1	98	98	388
Blue mackerel	320	25.7 ± 0.3	14–37	4–80
Blue sprat *	3	5.7 ± 0.3	5–6	15–15
Blue-eye trevalla	556	64.7 ± 0.6	47–107	240–592
Bluespotted flathead *	54	41.8 ± 1	26–61	6–120
Bluethroat wrasse *	14	38.9 ± 1.5	27–48	5–26
Bluntnose sixgill shark *	1	65	65	90
Broadgilled hagfish *	2	54 ± 0	54–54	263–324
Broadnose shark *	2	182.5 ± 2.5	180–185	35–47
Bronze whaler *	21	212 ± 17.8	84–305	30–88

		Summary size and depth data (regions and periods combined)		
Common Name	***n***	**Mean size ± SE (cm FL*)**	**Size range (cm FL*)**	**Depth range (m)**
Bull shark *	5	230.2 ± 24.3	145–293	33–60
Cobia	1	113	113	42
Coffin ray *	2	49 ± 8	41–57	35–66
Collar carpetshark *	10	73.3 ± 3.6	52–84	47–80
Common gurnard perch *	7	36.9 ± 0.6	34–39	27–48
Common jack mackerel	1	23	23	15
Common pike eel *	1	82	82	506
Common sawshark *	6	83.2 ± 4.4	66–96	27–27
Crested hornshark *	1	61	61	51
Crimsonband wrasse *	29	27.4 ± 0.2	25–29	12–37
Diamondfish	1	20	20	10
Draughtboard shark *	231	75.3 ± 0.5	45–94	27–90
Dusky shark *	77	240.1 ± 10.5	92–357	5–110
Eastern Australian salmon	4	56.8 ± 1.8	53–61	4–22
Eastern blue devil *	2	25 ± 0	25–25	37–40
Eastern blue groper *	3	52 ± 2.6	47–56	22–33
Eastern conger *	2	71.5 ± 3.5	68–75	31–33
Eastern fiddler ray *	253	81.6 ± 0.8	8–110	15–100
Eastern frogfish *	6	19.7 ± 0.9	16–22	33–38
Eastern highfin spurdog *	95	74.2 ± 0.7	58–90	57–494
Eastern kelpfish *	4	20.3 ± 0.9	18–22	15–21
Eastern longnose spurdog *	29	69.9 ± 1.7	53–106	180–452
Eastern Moses snapper	3	33 ± 2.3	29–37	26–40
Eastern orange perch	3	17 ± 0.6	16–18	100–100
Eastern pigfish	10	32.8 ± 0.9	26–36	37–188
Eastern pomfred	3	18 ± 1.2	16–20	0–0
Eastern red scorpionfish *	441	23.4 ± 0.2	9–38	8–102
Eastern shovelnose ray *	31	80.7 ± 1.7	55–99	22–101
Eastern wirrah *	63	29.2 ± 0.7	19–49	10–78
Endeavour dogfish *	47	86.8 ± 1	67–97	263–513
Estuary cobbler *	1	40	40	22
False fusilier	1	33	33	15
Flame snapper	2	59 ± 11	48–70	206–240
Foxfish	3	35.3 ± 0.7	34–36	42–78
Frigate mackerel	2	37 ± 5	32–42	6–25
Frostfish	19	134.6 ± 2.8	105–150	357–451
Gemfish	557	63.6 ± 0.4	42–98	229–572

		Summary size and depth data (regions and periods combined)		
Common Name	***n***	**Mean size ± SE (cm FL*)**	**Size range (cm FL*)**	**Depth range (m)**
Goldspotted sweetlips	3	41 ± 2.5	36–44	17–22
Great hammerhead *	2	337 ± 11	326–348	45–45
Great white shark *	4	201.3 ± 9.2	180–225	33–48
Green moray *	67	64.6 ± 1.8	40–117	12–512
Grey morwong	138	33.8 ± 0.4	17–53	5–107
Grey nurse shark *	2	215 ± 35	180–250	30–32
Grey spotted catshark *	40	55.6 ± 1.7	47–116	21–80
Gummy shark *	575	90.4 ± 0.6	52–165	14–444
Halfbanded seaperch *	13	15 ± 1.4	10–28	14–36
Hapuku *	19	84.1 ± 1.8	72–100	240–444
Harrisson's dogfish *	14	95.6 ± 1.6	83–106	433–481
Highfin amberjack	4	24.8 ± 1.8	20–29	10–15
Imperador	16	38.1 ± 1.2	27–46	329–490
Jackass morwong	25	37.4 ± 0.6	33–44	80–407
King morwong	10	47.6 ± 1.7	40–58	166–385
Largetooth beardie *	19	32.7 ± 0.9	23–40	15–495
Latchet *	4	38 ± 2.5	34–45	62–80
Leaping bonito	12	37.3 ± 0.7	32–40	5–22
Longfin gemfish	1	49	49	380
Longfin perch	6	32.5 ± 2.8	24–40	95–170
Longfin pike	30	33.9 ± 1.2	23–48	8–95
Longspine flathead *	5	28 ± 5.3	21–49	35–48
Luderick *	2	30 ± 2	28–32	0–0
Mackerel tuna	32	60.8 ± 2.9	28–80	5–34
Mado	27	14.5 ± 0.5	8–19	7–85
Mahi mahi	4	61.5 ± 21	35–124	95–113
Mandarin shark *	4	95.8 ± 3.4	87–101	358–487
Maori rockcod *	11	45 ± 1.7	38–60	32–34
Maray *	1	18	18	15
Marbled flathead *	6	46.3 ± 3.3	40–62	29–51
Melbourne skate *	6	89.2 ± 12.9	55–130	27–42
Moller's lanternshark *	1	37	37	473
Mosaic moray *	3	65.7 ± 5.9	54–73	51–53
Mulloway *	30	92.3 ± 2.4	80–132	25–42
Ocean blue-eye trevalla	13	73.8 ± 1.8	59–82	177–357
Ocean jacket *	112	45.8 ± 0.7	25–60	30–366
Ogilby's ghostshark *	2	70 ± 6	64–76	475–479

		Summary size and depth data (regions and periods combined)		
Common Name	***n***	**Mean size ± SE (cm FL*)**	**Size range (cm FL*)**	**Depth range (m)**
Oilfish	2	148.5 ± 13.5	135–162	296–399
Onespot puller	7	17.3 ± 0.3	16–18	20–24
Orange spotted catshark *	3	58 ± 1.5	55–60	33–80
Ornate wobbegong *	34	83.1 ± 2.2	47–93	22–49
Owston's dogfish *	1	105	105	466
Pearl perch	240	35.7 ± 0.4	21–58	15–112
Philippine spurdog *	38	69.5 ± 1	55–86	260–485
Piked spurdog *	109	53.9 ± 1	41–90	256–475
Pink ling *	695	82.5 ± 0.4	49–130	40–572
Port Jackson shark *	227	80.5 ± 1.5	47–122	10–100
Purple rockcod *	1	60	60	6
Rainbow runner	1	34.5	34.5	13
Red gurnard *	55	40.7 ± 0.8	30–51	27–100
Red morwong *	1	35	35	0
Redfish	218	23.3 ± 0.4	14–43	12–375
Redthroat emperor	1	29	29	17
Reef ocean perch *	61	20.4 ± 0.5	12–33	17–256
Remora	1	59	59	53
Ribaldo *	170	49.4 ± 0.5	36–69	438–572
Rock ling *	1	28	28	48
Rosy snapper	2	30 ± 2	28–32	27–85
Saddled swellshark *	5	70.4 ± 1.1	67–73	366–485
Samson fish	10	53.3 ± 7	30–99	14–97
Sand flathead *	3	20.7 ± 2.6	16–25	12–46
Sandbar shark *	103	185.2 ± 2.4	76–220	10–110
Sawtail shark *	31	52.3 ± 0.4	48–57	263–506
Sawtooth moray *	1	80	80	50
Scalloped hammerhead *	10	184.5 ± 16.5	133–298	10–80
School shark *	3	89.7 ± 4.5	81–96	15–455
Senator wrasse *	1	21	21	5
Sergeant Baker	90	35.8 ± 0.9	13–52	10–119
Serpent eel *	4	165 ± 35	60–200	40–439
Sharphead perch *	11	37 ± 0.9	29–41	240–320
Sharpnose sevengill shark *	9	80.3 ± 1.1	77–85	305–572
Shortfin mako *	12	129.3 ± 9	86–185	48–354
Silky shark *	1	128	128	82
Silver sweep	1025	25.3 ± 0.1	9–31	7–78

		Summary size and depth data (regions and periods combined)		
Common Name	*n*	Mean size ± SE (cm FL*)	Size range (cm FL*)	Depth range (m)
Silver trevally	632	39.3 ± 0.3	17–53	5–50
Sixspine leatherjacket *	26	33.9 ± 0.9	27–42	12–33
Skipjack tuna	22	48.8 ± 1.7	33–58	13–100
Smallscale bullseye *	13	10.8 ± 0.4	8–13	15–15
Smooth hammerhead *	13	164.7 ± 10.7	70–235	10–88
Smooth stingray #	47	141.4 ± 5.4	100–264	20–82
Snapper	1411	34.5 ± 0.3	18–79	5–269
Snipe eel *	9	95 ± 10.7	70–160	62–495
Southern calamari squid ^	6	24.8 ± 1.4	21–31	5–20
Southern dogfish *	20	56.6 ± 4.5	40–105	324–512
Southern eagle ray #	5	63.8 ± 4.7	54–76	27–69
Southern Maori-wrasse *	275	30.5 ± 0.2	19–37	5–35
Southern whiptail #	14	40.3 ± 0.6	36–44	472–513
Spanish mackerel	4	85 ± 3.7	77–95	16–17
Spinner shark *	37	198.1 ± 11.5	79–300	7–75
Spotted mackerel	20	81.5 ± 1.2	71–92	17–25
Spotted wobbegong *	54	127.9 ± 2	76–152	5–82
Stout whiting	2	18.5 ± 0.5	18–19	6–15
Striped marlin	1	170	170	120
Striped seapike	6	25.5 ± 3.7	21–44	3–33
Swallowtail dart	2	35.5 ± 1.5	34–37	5–15
Sydney skate *	1	-	-	80
Tailor	528	31.9 ± 0.2	21–56	3–43
Taiwan gulper shark *	2	154.5 ± 3.5	151–158	450–480
Tarwhine	12	19.8 ± 0.9	14–23	29–40
Teraglin *	331	48.8 ± 0.4	25–79	10–102
Thresher shark *	3	342.3 ± 39.9	300–422	51–366
Tiger flathead *	41	38.4 ± 0.9	28–51	27–90
Tiger shark *	19	170.3 ± 16.3	82–380	25–82
Toothed whiptail #	4	45.8 ± 1.7	41–48	466–513
Unid. carpetshark *	14	56.8 ± 0.9	52–62	55–62
Unid. conger *	2	100 ± 5	95–105	303–369
Unid. cucumberfish	1	37	37	430
Unid. deepwater perch *	1	39	39	229
Unid. eagle ray #	1	-	-	40
Unid. moray *	4	66 ± 6.5	49–80	40–75
Unid. perch	1	22	22	26

		Summary size and depth data (regions and periods combined)		
Common Name	***n***	**Mean size ± SE (cm FL*)**	**Size range (cm FL*)**	**Depth range (m)**
Unid. porcupinefish *	1	27	27	48
Unid. shovelnose ray *	1	85	85	53
Unid. skate *	2	125 ± 5	120–130	47–47
Unid. stingray #	1	-	-	198
Unid. whaler shark *	1	150	150	0
Unid. wrasse *	1	29	29	28
Velvet leatherjacket *	2	18 ± 1	17–19	12–52
Venus tuskfish	15	42.3 ± 2	28–51	15–49
Whitefin swellshark *	366	79.6 ± 0.6	56–105	256–572
White-spotted guitarfish *	1	132	132	22
Yellowfin bream	23	26.1 ± 1	17–35	6–35
Yellowfin tuna	4	63.6 ± 0.7	62–66	17–27
Yellow-finned leatherjacket *	1	29	29	33
Yellowtail kingfish	976	59.4 ± 0.4	27–110	4–258
Yellowtail scad	831	19.6 ± 0.2	10–31	3–56
Zebra shark *	2	-	-	48

* – Total length (TL) instead of fork length (FL) (note: TL = FL for non-fork-tailed teleosts)

– Disc width instead of FL

^ – Mantle sheath length instead of FL

n – Number of individuals contributing to summary data

- – Data not recorded

Depth range refers to total depth of water column at capture location

APPENDIX G - Estimated total retained and discarded catches (± SE) for the top ten most-frequently-caught handline, dropline and set/trotline species in the north, central and south regions (and all regions combined) for each year of the 24-month study.

Estimated total retained and discarded catches (± SE) for the top ten most-frequently-caught handline, dropline and set/trotline species in the north, central and south regions (and all regions combined) for each year of the 24-month study. Data were up-scaled from G-1) handline, G-2) dropline and G-3) set/trotline catch rates for observed fisher days and total reported fisher effort (in fisher days) to estimates of cumulative total catch for the first and second year of the 24-month study.

APPENDIX G-1:Estimated total retained and discarded catches (± SE) for the top ten most-frequently-caught handline species in the north, central and south regions (and all regions combined – All NSW) during the first and second years of the 24-month study.

HANDLINE		**Estimated total catch ± SE**	
		Year 1 (P12 + P34)	**Year 2 (P56 + P78)**
All individuals (species combined)			
Retained catch	North	91280 ± 12230	86200 ± 18000
	Central	231550 ± 26860	173640 ± 30740
	South	63170 ± 18030	14720 ± 7480
	All NSW	**386000 ± 34590**	**274570 ± 36400**
Discarded catch	North	15980 ± 3320	21000 ± 6900
	Central	41550 ± 8730	15450 ± 4410
	South	16460 ± 7650	2760 ± 990
	All NSW	**74000 ± 12070**	**39200 ± 8250**
Yellowtail scad			
Retained catch	North	17440 ± 7660	18660 ± 7540
	Central	40460 ± 15200	25980 ± 6750
	South	0 ± 0	0 ± 0
	All NSW	**57900 ± 17030**	**44640 ± 10120**
Discarded catch	North	2520 ± 2520	8070 ± 6600
	Central	2390 ± 1760	110 ± 110
	South	0 ± 0	0 ± 0
	All NSW	**4910 ± 3070**	**8180 ± 6600**
Silver sweep			
Retained catch	North	150 ± 100	130 ± 130
	Central	25170 ± 10670	78420 ± 21030
	South	180 ± 130	800 ± 800
	All NSW	**25500 ± 10670**	**79360 ± 21050**
Discarded catch	North	580 ± 310	70 ± 70
	Central	3150 ± 1400	2380 ± 1100
	South	430 ± 360	0 ± 0
	All NSW	**4150 ± 1480**	**2450 ± 1100**

Australian bonito			
Retained catch	North	4890 ± 2430	2410 ± 2200
	Central	46570 ± 13720	39980 ± 26800
	South	0 ± 0	0 ± 0
	All NSW	**51450 ± 13930**	**42390 ± 26890**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**0 ± 0**	**0 ± 0**
Snapper			
Retained catch	North	20960 ± 6000	18600 ± 4480
	Central	4060 ± 2050	2860 ± 1990
	South	1930 ± 1400	690 ± 690
	All NSW	**26950 ± 6490**	**22150 ± 4950**
Discarded catch	North	2590 ± 920	3770 ± 1040
	Central	5030 ± 2270	440 ± 440
	South	120 ± 120	230 ± 230
	All NSW	**7740 ± 2450**	**4440 ± 1150**
Yellowtail kingfish			
Retained catch	North	3750 ± 2470	9060 ± 7540
	Central	6090 ± 2360	4590 ± 2250
	South	2640 ± 1610	1350 ± 970
	All NSW	**12480 ± 3770**	**15000 ± 7930**
Discarded catch	North	3470 ± 1520	3070 ± 1360
	Central	18280 ± 6550	9210 ± 3800
	South	4050 ± 3580	780 ± 780
	All NSW	**25810 ± 7620**	**13060 ± 4110**
Silver trevally			
Retained catch	North	220 ± 160	800 ± 440
	Central	14140 ± 9550	210 ± 150
	South	29470 ± 20030	0 ± 0
	All NSW	**43840 ± 22190**	**1010 ± 470**
Discarded catch	North	0 ± 0	800 ± 500
	Central	2180 ± 1930	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**2180 ± 1930**	**800 ± 500**
Tailor			
Retained catch	North	1490 ± 1410	820 ± 690
	Central	43760 ± 16200	9780 ± 6390
	South	0 ± 0	0 ± 0
	All NSW	**45240 ± 16260**	**10600 ± 6430**
Discarded catch	North	0 ± 0	130 ± 90
	Central	6290 ± 5100	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**6290 ± 5100**	**130 ± 90**

Blue mackerel			
Retained catch	North	15810 ± 6830	15670 ± 11340
	Central	3290 ± 1750	1030 ± 630
	South	860 ± 860	0 ± 0
	All NSW	**19960 ± 7100**	**16690 ± 11350**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	100 ± 100
	South	0 ± 0	0 ± 0
	All NSW	**0 ± 0**	**100 ± 100**
Eastern red scorpionfish			
Retained catch	North	2900 ± 810	3230 ± 980
	Central	2150 ± 1340	110 ± 110
	South	6440 ± 2870	110 ± 110
	All NSW	**11490 ± 3270**	**3450 ± 990**
Discarded catch	North	550 ± 290	810 ± 340
	Central	0 ± 0	0 ± 0
	South	6360 ± 3500	0 ± 0
	All NSW	**6910 ± 3510**	**810 ± 340**
Teraglin			
Retained catch	North	5070 ± 3190	4850 ± 1580
	Central	18390 ± 12960	2320 ± 2090
	South	0 ± 0	0 ± 0
	All NSW	**23450 ± 13340**	**7170 ± 2610**
Discarded catch	North	100 ± 100	1030 ± 660
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**100 ± 100**	**1030 ± 660**

APPENDIX G-2: Estimated total retained and discarded catches (± SE) for the top ten most-frequently-caught dropline species in the north, central and south regions (and all regions combined – All NSW) during the first and second years of the 24-month study.

DROPLINE		**Estimated total catch ± SE**	
		Year 1 (P12 + P34)	**Year 2 (P56 + P78)**
All individuals (species combined)			
Retained catch	North	6390 ± 1370	10230 ± 2290
	Central	7650 ± 1630	6280 ± 1380
	South	28250 ± 6590	30010 ± 5580
	All NSW	**42290 ± 6930**	**46520 ± 6190**
Discarded catch	North	680 ± 270	140 ± 60
	Central	1750 ± 1690	1220 ± 680
	South	1080 ± 450	1060 ± 310
	All NSW	**3510 ± 1770**	**2420 ± 750**

Blue-eye trevalla			
Retained catch	North	1280 ± 550	2120 ± 760
	Central	660 ± 620	0 ± 0
	South	7910 ± 2840	10540 ± 3020
	All NSW	**9840 ± 2950**	**12660 ± 3120**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	60 ± 60	0 ± 0
	All NSW	**60 ± 60**	**0 ± 0**
Gemfish			
Retained catch	North	390 ± 230	3170 ± 2080
	Central	90 ± 40	0 ± 0
	South	9350 ± 3350	9940 ± 2550
	All NSW	**9830 ± 3350**	**13110 ± 3290**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	120 ± 120	80 ± 50
	All NSW	**120 ± 120**	**80 ± 50**
Yellowtail kingfish			
Retained catch	North	90 ± 50	60 ± 40
	Central	2080 ± 1250	4020 ± 1370
	South	0 ± 0	0 ± 0
	All NSW	**2160 ± 1250**	**4080 ± 1380**
Discarded catch	North	160 ± 160	10 ± 10
	Central	1640 ± 1640	1190 ± 690
	South	0 ± 0	0 ± 0
	All NSW	**1800 ± 1650**	**1210 ± 690**
Bigeye ocean perch			
Retained catch	North	120 ± 70	230 ± 90
	Central	0 ± 0	0 ± 0
	South	6500 ± 3850	4800 ± 1340
	All NSW	**6620 ± 3850**	**5020 ± 1340**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	180 ± 100	0 ± 0
	All NSW	**180 ± 100**	**0 ± 0**
Snapper			
Retained catch	North	1750 ± 1170	470 ± 250
	Central	20 ± 20	60 ± 60
	South	0 ± 0	0 ± 0
	All NSW	**1770 ± 1170**	**530 ± 260**
Discarded catch	North	50 ± 30	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**50 ± 30**	**0 ± 0**

Banded rockcod			
Retained catch	North	130 ± 110	1300 ± 770
	Central	750 ± 390	1110 ± 590
	South	0 ± 0	0 ± 0
	All NSW	**890 ± 410**	**2410 ± 970**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**0 ± 0**	**0 ± 0**
Redfish			
Retained catch	North	540 ± 540	450 ± 190
	Central	720 ± 330	500 ± 80
	South	360 ± 360	250 ± 170
	All NSW	**1620 ± 730**	**1190 ± 270**
Discarded catch	North	50 ± 30	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**50 ± 30**	**0 ± 0**
Eastern highfin spurdog			
Retained catch	North	50 ± 30	710 ± 670
	Central	1720 ± 1010	120 ± 120
	South	0 ± 0	0 ± 0
	All NSW	**1770 ± 1010**	**830 ± 680**
Discarded catch	North	0 ± 0	40 ± 40
	Central	0 ± 0	30 ± 30
	South	0 ± 0	0 ± 0
	All NSW	**0 ± 0**	**70 ± 50**
Pearl perch			
Retained catch	North	670 ± 340	180 ± 120
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**670 ± 340**	**180 ± 120**
Discarded catch	North	50 ± 40	30 ± 30
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**50 ± 40**	**30 ± 30**
Philippine spurdog			
Retained catch	North	490 ± 380	40 ± 40
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**490 ± 380**	**40 ± 40**
Discarded catch	North	210 ± 190	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**210 ± 190**	**0 ± 0**

APPENDIX G-3: Estimated total retained and discarded catches (± SE) for the top ten most-frequently-caught set/trotline species in the north, central and south regions (and all regions combined – All NSW) during the first and second years of the 24-month study.

SET/TROTLINE		Estimated total catch ± SE	
		Year 1 (P12 + P34)	Year 2 (P56 + P78)
All individuals (species combined)			
Retained catch	North	26790 ± 12430	13200 ± 4540
	Central	2230 ± 550	1200 ± 180
	South	99500 ± 17160	156940 ± 44600
	All NSW	**128510 ± 21200**	**171340 ± 44830**
Discarded catch	North	12160 ± 5160	2400 ± 1350
	Central	1160 ± 500	680 ± 510
	South	13330 ± 3540	24900 ± 6540
	All NSW	**26650 ± 6280**	**27990 ± 6690**
Bigeye ocean perch			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	22400 ± 6650	41000 ± 24870
	All NSW	**22400 ± 6650**	**41000 ± 24870**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	730 ± 410	0 ± 0
	All NSW	**730 ± 410**	**0 ± 0**
Pink ling			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	24600 ± 10640	22480 ± 15900
	All NSW	**24600 ± 10640**	**22480 ± 15900**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	0 ± 0
	All NSW	**0 ± 0**	**0 ± 0**
Snapper			
Retained catch	North	11500 ± 5320	4670 ± 2560
	Central	0 ± 0	0 ± 0
	South	3440 ± 2100	8950 ± 3530
	All NSW	**14940 ± 5720**	**13630 ± 4360**
Discarded catch	North	2510 ± 1030	330 ± 240
	Central	0 ± 0	0 ± 0
	South	420 ± 350	250 ± 200
	All NSW	**2930 ± 1090**	**580 ± 310**

Gummy shark			
Retained catch	North	4420 ± 4420	1770 ± 1160
	Central	20 ± 20	40 ± 40
	South	8170 ± 6190	25210 ± 18560
	All NSW	**12610 ± 7600**	**27020 ± 18600**
Discarded catch	North	90 ± 90	0 ± 0
	Central	0 ± 0	0 ± 0
	South	120 ± 120	70 ± 70
	All NSW	**200 ± 150**	**70 ± 70**
Whitefin swellshark			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	8820 ± 3210	16740 ± 8310
	All NSW	**8820 ± 3210**	**16740 ± 8310**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	0 ± 0	130 ± 130
	All NSW	**0 ± 0**	**130 ± 130**
Eastern fiddler ray			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	40 ± 30
	South	5970 ± 4580	3790 ± 3200
	All NSW	**5970 ± 4580**	**3830 ± 3200**
Discarded catch	North	2270 ± 1470	590 ± 420
	Central	0 ± 0	0 ± 0
	South	640 ± 430	1680 ± 1010
	All NSW	**2920 ± 1530**	**2260 ± 1090**
Draughtboard shark			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	10890 ± 7510	1220 ± 1040
	All NSW	**10890 ± 7510**	**1220 ± 1040**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	310 ± 230	460 ± 340
	All NSW	**310 ± 230**	**460 ± 340**
Port Jackson shark			
Retained catch	North	0 ± 0	0 ± 0
	Central	20 ± 20	0 ± 0
	South	100 ± 100	1580 ± 1110
	All NSW	**120 ± 100**	**1580 ± 1110**
Discarded catch	North	260 ± 260	30 ± 30
	Central	290 ± 180	20 ± 20
	South	3260 ± 1640	7750 ± 5320
	All NSW	**3810 ± 1670**	**7800 ± 5320**

Ribaldo			
Retained catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	3920 ± 1820	8970 ± 7430
	All NSW	**3920 ± 1820**	**8970 ± 7430**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	410 ± 300	0 ± 0
	All NSW	**410 ± 300**	**0 ± 0**
Eastern red scorpionfish			
Retained catch	North	3250 ± 1520	930 ± 640
	Central	0 ± 0	0 ± 0
	South	0 ± 0	1480 ± 860
	All NSW	**3250 ± 1520**	**2410 ± 1080**
Discarded catch	North	0 ± 0	0 ± 0
	Central	0 ± 0	0 ± 0
	South	50 ± 50	0 ± 0
	All NSW	**50 ± 50**	**0 ± 0**

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