Attachment 1 - Implementing a recreational fishing log book program to enable long-term monitoring of fishery resources on Rottnest Island

Final Report to the Swan Catchment Council

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Department of Fisheries

swan catchment council

ROTTNEST ISLAND

RESEARCH ANGLER PROGRAM

Australian Government

RECFISHWEST

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INTRODUCTION

Fish stocks and their habitats are significant natural assets around Rottnest Island with high social and economic values derived from a diversity of uses, including recreation, conservation and tourism. Sustainable management of these assets requires the ongoing collection of large quantities of monitoring data.

Catch and effort data collected by recreational fishers in daily log books can provide valuable information about local fish stocks. The numbers and lengths of important recreational target species recorded in log books, and the fishing effort can be used to monitor their relative abundance and population structure, which can form the basis of fishery stock assessments and the formulation of management advice. In addition, the total composition of the catch and observations about fish health can provide measures of local biodiversity and ecosystem health.

In April 2007, the Swan Catchment Council (SCC) funded a 15-month project to significantly expand the existing Department of Fisheries (DoF) recreational fishing log book program on Rottnest Island. The project was a partnership between the SCC, the DoF, the Rottnest Island Authority (RIA) and Recfishwest.

Information collected through the program will assist RIA and DoF to develop a more informed approach to marine resource management within the Rottnest Island Marine Reserve, including a better understanding of trends in recreational fishery catch and effort and of the effectiveness of sanctuary zones.

The Rottnest Island Marine Management Strategy (MMS) was implemented on 1 July 2007. The MMS included a new zoning plan, which extended the Parker Point and Kingston Reef sanctuary zones (established in 1988) and created new sanctuary zones at Green Island, Armstrong Bay and West End. The West End was designated a demersal sanctuary zone to protect demersal fish species such as Western Australian dhufish (*Glaucosoma hebraicum*), pink snapper, (*Pagrus auratus*), breaksea cod (*Epinephelides armatus*), queen snapper (*Nemadactylus valenciennesi*) and red snapper (*Centroberyx gerrardi*).

The new and extended sanctuary zones came into effect on 1 July 2007. Sanctuary zones now cover 663 hectares or approximately 17% of the Rottnest Island Marine Reserve waters. However, 83% of the Island's shoreline still remains accessible for fishing. Given that over 500,000 people visit Rottnest Island each year, it is important that the impacts of recreational fishing continue to be carefully monitored. It is also important that the impacts of new sanctuary zones on recreational fishing are investigated over time in to determine potential advantages such as 'spill over' of fish from sanctuaries into areas open to fishing (leading to improved fishing in these areas), or potential disadvantages such as the concentration of fishing effort in other areas.

This document provides a report to the SCC on the implementation of the recreational fishing log book on Rottnest Island.

This report summarises data collected by log book fishers from the waters surrounding Rottnest Island from August 2005 to April 2008. This period includes the 20 months of data collected before the commencement of the SCC-funded project and the 13 months of data collected subsequently.

Project Objectives

The progress of this SCC-funded project can be assessed against the project objectives and intended project outcomes, as listed below.

Develop and implement a recreational fishing log book program to provide cost-effective, ongoing monitoring of recreational fishery catch rates and catch composition at Rottnest Island.

1. Directly target recreational fishers of Rottnest Island and encourage them to participate in ongoing monitoring of local fisheries resources.

2. Implement the Research Angler Program (RAP) log book on Rottnest Island and establish a basis for ongoing volunteer-based monitoring of fish resources.

3. Provide additional and ongoing spatial information on the abundance of fish/invertebrates and the level of fishing effort in the waters surrounding Rottnest Island.

4. a) Provide a cost-effective means to monitor long-term trends in the distribution and abundance of many fish resources around Rottnest Island.

   b) Provide annual indices of relative abundance for fish and invertebrate species.

5. a) Provide catch/effort data that is directly comparable and/or complementary to that currently being collected by DoF in creel surveys.

   b) Add value to the creel survey investment by i) providing independent validation of creel data and ii) extending the use of creel data by increasing the quantity of recent data available from Rottnest Island, thus increasing the confidence of recreational catch/effort estimates.

Intended Project Outcomes

1. A community-based monitoring approach that engages key stakeholders in the management of marine resources around Rottnest Island.

2. Ongoing information about spatial and temporal trends in the distribution, abundance and size structure of key recreational fishing target species around Rottnest Island.

3. Information about the spatial and temporal distribution of various types (boat/shore, invertebrate/finfish, etc.) of recreational fishing effort around Rottnest Island.

4. Information about changes in the recreational fishery catch that may occur following the implementation of new Sanctuary Zones at Rottnest Island.

METHODS

The log book program implemented on Rottnest Island is an extension of the recreational fishing log book program operated by the DoF since 2004. Log books are one of several volunteer-based research projects run within the DoF RAP.

The DoF log book is available in 2 formats – "Ocean Edition" and "Estuary Edition". The Ocean Edition is designed for all types of ocean beach and offshore fishing, while the Estuary Edition is designed for all types of estuary and freshwater fishing.

A revised version of the Ocean Edition log book was printed for the Rottnest implementation, with the logos of the RIA, Recfishwest and the SCC added to the cover and with minor changes made to better accommodate data on rock lobster, a key species on Rottnest. 500 revised log books were printed. The revised log book format is illustrated in Appendix 1.

To specifically recruit boat-based fishers, all people listed in the Rottnest Island Moorings Database were contacted by mail, given a brief outline of the project and invited to register for the log book program. Approximately 3,275 boat users who visit the Island at various times throughout the year are listed in the database and it was anticipated that 10-20% might register for a log book.

Notices were displayed at key locations (eg. boat ramps, jetties) and also posted on the DoF website to promote the project and invite fishers to participate. The project was also promoted through media releases, magazine and newspaper advertising, pamphlets, posters, static displays at boat shows and fishing clinics. Volunteer fishers were issued with a log book immediately upon registration.

All Rottnest fishers that registered with the program were sent a copy of the revised log book. The log book accommodates finfish and invertebrate catch and effort data and can also be used when fishing at ocean locations other than Rottnest.

The log books, which consist of carbon-copy pages to enable fishers to keep a copy of the records submitted, were sent in a registration pack which included detailed instructions, a DoF West Coast Recreational Fishing Guide, a DoF West Coast Species Identification Guide, a DoF Size Limit Guide sticker, a DoF Catch Care Guide, a RIA Experience Rottnest Island Fishing Guide, block location maps and a year's supply of reply-paid envelopes. Fishers were encouraged to contact the RAP coordinator by phone or email at any time if they had queries.

Two block location maps were developed using DoF GIS facilities throughout the course of the implementation. The new maps were designed to allow finer spatial scale data to be collected than the existing DoF block maps, that divide the waters of Western Australia into 5 x 5 Nautical Mile blocks. In both of the new maps each the 5 x 5 Nautical Mile blocks that cover the waters surrounding Rottnest Island (Blocks BN60, BN61, BO60 and BO61) are divided into 9 smaller sub-blocks (each block is approximately 1 x 1 NM). The first map developed was included in registration packs sent up to 1 July 2007, when the new and extended sanctuary zones came into effect. The map showed the boundaries of the then current and proposed sanctuary zones as well as the boundary of the Marine Reserve. A second map was developed for the new and extended sanctuary zones, gazetted on 1 July 2007 (Appendix 2). The map was sent to all existing Rottnest log book fishers to replace the old map and to any Rottnest fishers that registered with the program after 1 July.

Registrations (hard copy and electronic) from fishers were sent to the DoF, who issued the log books and instructions to fishers. Personal details and catch information were entered into the existing DoF log book database.

Data was error-checked by DoF staff prior to entry into the log book database. Any error/inconsistencies were immediately resolved by contacting the fisher by phone or email.

All log book fishers were sent regular feedback and encouragement via quarterly RAP newsletters and prizes.

Timeline of project activities

March 2007	A joint Expression of Interest letter from the DoF and the RIA sent to 3,275 authorised Rottnest Island mooring users and annual admission holders. The letter gave a brief outline of the project and invited the mooring users to register for the log book program.
March 2007	The format of the existing Ocean Edition DoF recreational fishing log book was modified with a Rottnest Island focus and the logos of the RIA, Recfishwest and the SCC were added to the cover. 500 modified log books were printed.
April 2007	5000 log book registration flyers (with a Rottnest Island focus), designed by the DoF with input from the RIA, were printed and distributed on Rottnest Island at locations including the Visitors Centre. The registration flyers were also distributed to DoF offices and various other locations within the Perth Metropolitan area (Appendix 3).
April 2007	RAP newsletter no. 8 distributed to >600 RAP log book fishers featuring the article "Calling all Rottnest Island fishers!".
May 2007	An article, promoting the use of log books when fishing in the waters surrounding Rottnest Island, was published under Jako's Fishing Tips in the Western Australian newspaper.
May 2007	An article, promoting the use of log books when fishing in the waters surrounding Rottnest Island, was published in the Autumn edition of the Boating WA magazine.
Sep 2007	RAP newsletter no. 9 distributed to >600 RAP log book fishers featuring the article "New Sanctuary Zones at Rottnest Island".
Dec 2007	RAP newsletter no. 10 distributed to >650 RAP log book fishers.
Dec 2007	RAP fishing statistics reports summarising data collected in 2005 and 2006 distributed to >650 log book fishers.
Feb 2008	RAP promotional material (including stubby holders, key rings and pencils) developed and introduced as prizes for the "fisher of the month" competition, completion of entire log books and as general incentives for fishers.
Apr 2008	RAP newsletter no. 11 distributed to >700 RAP log book fishers.
Jun 2008	RAP newsletter no. 12 distributed to >700 RAP log book fishers.

RESULTS

SCC-funded recruitment of log book fishers commenced in March 2007. In the following sections, RAP log book data collected to March 2007 (20 months of data) is compared to log book data collected from April 2007 to April 2008 (13 months of data).

Log book fisher participation rates

A number of methods were employed to promote the use of recreational fishing log books at Rottnest Island throughout the course of the implementation (see above - Timeline of project activities).

Since the commencement of the project, 142 Ocean Edition log books have been issued to fishers registered as residents of the West Coast region, increasing the number of log books issued to West Coast residents from 301 to 443, an increase of 32%. In the same period, the total number of log books issued by DoF state-wide increased from 651 to 924 (42%) (Figure 1).

Almost half of the Ocean Edition log books distributed to fishers that were resident in the West Coast region (between Black Point, east of Augusta and the Zuytdopt Cliffs, north of Kalbarri) since the launch of the project have been sent to fishers that specified they fish in the waters surrounding Rottnest Island.

Fishing effort

From August 2005 to March 2007, the total number of fishing days reported by log book fishers at Rottnest Island (blocks BN60, BN61, BO60 and BO61) was 35 days (126.22 hours), with an average of 1.75 fishing days per month (6.31 hours). From April 2007 to April 2008, the total number of fishing days reported by log book fishers at Rottnest Island was 156 days (331.28 hours), with an average of 12 fishing days per month (25.48 hours) (Figure 2).

Boat/Shore

Of the 457.5 fishing hours reported by log book fishers at Rottnest Island from August 2005 to April 2008, 226.15 hours were reported by boat fishers and 212.6 hours were reported by shore fishers (an additional 18.75 hours were reported by fishers that did not specify whether they were fishing from a boat or from the shore) (Figure 2).

Spatial distribution of effort

Since August 2005, log book fishers have reported 200.37 hours of fishing in block BO60 (44% of the total effort), 130.40 hours in block BN60 (28%), 101.07 hours in BO61 (22%) and 25.67 hours in block BN61 (6%). Seventy percent of the total log book effort reported in these blocks since 2005 was specified by fishers as being either within or outside the Marine Reserve (Figure 3). The majority (91%) of this location-specific fishing effort occurred within the Marine Reserve, with only 9% of effort reported occurring outside the Marine Reserve. The remaining 30% of the total log book effort reported in these blocks since 2005 did not specify whether it was within or outside the Marine Reserve (Figure 3).

The most popular fishing sub-blocks reported by log book fishers around Rottnest Island were BO60-1 (Salmon Bay area) with 118.58 hours, BO61-7 (Parakeet and Geordie Bay area) with 41.33 hours, BN60-3 (Strickland Bay area) with 38 hours and BO60-3 (Bickley Bay area) with 26.12 hours.

From April 2007 (when sub-blocks were introduced) to 1 July 2007 (when current sanctuary zones were gazetted), only 11.58 hours of effort were reported from within the then-proposed zones. This effort represented 19% of the total effort collected by log book fishers at Rottnest Island in those months.

Fishing Duration

The average number of hours fished per day reported by boat-based fishers around Rottnest Island (2.09 hours, SE 0.18 hours) was less than the average for all West Coast boat-based fishers (3.92 hours, SE 0.07). The average number of hours fished per day reported by shore-based fishers on Rottnest Island (2.9 hours, SE 0.15) was slightly greater than the average for all West Coast shore-based fishers (2.3 hours, SE 0.04).

Catch composition

Species listed in this report are as identified by log book fishers. Obvious errors, such as species that do not occur in this region, were corrected before being entered into the log book database but, otherwise, no attempt has been made by the authors to verify these identifications.

Prior to April 2007, a total of 28 finfish, 2 elasmobranch and 1 invertebrate taxa were reported in the waters surrounding Rottnest Island at an average of 1.55 taxa per month. The total catch contained 571 individual finfish, including Australian herring (*Arripis georgianus*) (24% of total catch), southern school whiting (*Sillago bassensis*) (18%), silver trevally (*Pseudocaranx georgianus*) (15%) and yellow-finned whiting (*Sillago schomburgkii*) (10%). Prior to April 2007, no western rock lobsters (*Panulirus cygnus*) were reported (Table 1).

From April 2007 to April 2008, a total of 52 finfish, 2 elasmobranch and 5 invertebrate taxa were reported in the waters surrounding Rottnest Island at an average of 4.54 taxa per month. The total catch contained 1783 individual finfish, including southern school whiting (*Sillago bassensis*) (24%), Australian herring (*Arripis georgianus*) (21%) and silver trevally (*Pseudocaranx georgianus*) (10%). In that period, a total of 240 western rock lobsters (*Panulirus cygnus*) were reported (Table 1).

Overall, a total of 62 finfish, 3 elasmobranch and 5 invertebrate taxa have now been reported from the waters surrounding Rottnest Island. The total catch contains 2354 individual finfish, 291 individual invertebrates and 7 individual elasmobranches (Table 1).

Prior to April 2007 the reported log book catch from the waters surrounding Rottnest Island represented approximately 12% of the total West Coast catch from ocean waters. This increased to approximately 17% in the period from April 2007 to April 2008 after the Rottnest Island log book implementation commenced.

Boat/Shore

Despite similar levels of effort reported by each group, a higher percentage of the total catch in the waters surrounding Rottnest Island was reported by shore-based fishers (57%). Boat based fishers reported 37% of the total catch (6% unknown).

Shore-based fishers reported a total of 28 finfish and 2 invertebrate taxa. The total shore based catch contained 1516 individual finfish, including southern school whiting (*Sillago bassensis*) (31%), Australian herring (*Arripis georgianus*) (25%) and silver trevally (*Pseudocaranx georgianus*) (14%) (Table 2).

Boat-based fishers reported a total of 51 finfish, 3 elasmobranch and 5 invertebrate taxa. The total boat based catch contained 699 individual finfish, including general/sand whiting (Sillaginidae) (14%), Australian herring (*Arripis georgianus*) (12%) and southern school whiting (*Sillago bassensis*) (11%) (Table 2).

The key demersal species of Western Australian dhufish (*Glaucosoma hebraicum*), pink snapper, (*Pagrus auratus*), breaksea cod (*Epinephelides armatus*), queen snapper (*Nemadactylus valenciennesi*) and red snapper (*Centroberyx gerrardi*), accounted for only 6% of the boat based catch reported.

Boat-based fishers reported 95% of the western rock lobster catch.

Overall, boat-based fishers around Rottnest Island tended to have a lower catch rate, but a more diverse catch composition, compared to shore-based fishers.

Spatial distribution of catch

The majority of the catch was reported in block BO60 (62% of the total catch), followed by blocks BO61 (18%), BN60 (17%) and BN61 (3%). The vast majority (73%) of the reported catch was from within the Marine Reserve, with only 11% of catch from outside the Marine Reserve (16% unknown) (Figure 4).

The sub-blocks from which the highest catch was reported by log book fishers around Rottnest Island were BO60-1 (Salmon Bay area) (37% of the total catch), BN60-3 (Strickland Bay area) (9%) and BO60-2 (Porpoise Bay area) (7%).

Proportion of retained and released by species

Log book fishers are asked to record whether they retained or released each individual fish caught and asked also to select a reason for release from the following options: under the legal size limit, bag limit already reached, prefer to release or poor eating.

Southern school whiting (*Sillago bassensis*)

The majority (64%) of southern school whiting reported by Rottnest log book fishers were retained. Only 25% of reported fish were released (11% unknown). The reasons for the release for this species included prefer to release (68% of fish were released for this reason) and bag limit (14%).

Australian herring (*Arripis georgianus*)

The majority (77%) of Australian herring reported by Rottnest log book fishers were retained. Only 11% of reported fish were released (12% unknown). The main reason for the release for this species was prefer to release (69% of fish were released for this reason).

Silver trevally (skippy) (*Pseudocaranx georgianus*)

Approximately half (52%) of the silver trevally reported by log book fishers were retained (48% were released). The reasons for the release of this species included under the legal size limit (91% of fish were released for this reason) and prefer to release (9%).

Western rock lobsters (*Panulirus cygnus*)

Almost half (47%) of western rock lobsters reported by log book fishers were retained (43% released and 10% unknown). The reasons for release for this species included size limit (39%) and prefer to release (9%). A number of other release reasons were reported by fishers that caught western rock lobster including releases due to the breeding condition of female lobsters (setose, tar spot or in berry).

Lengths of key species

Lengths described in this section are those of all fish reported by log book fishers, including retained and released fish.

Southern school whiting (*Sillago bassensis*)

The majority of southern school whiting caught by log book fishers around Rottnest Island were between 150 and 300 mm total length (TL) (Figure 5). Most (72%) of these fish were above the length at maturity (~200 mm) (Hyndes and Potter 1996) and all were well below the maximum size recorded for this species (~360 mm) (Kailola et al. 1993). There is currently no legal minimum length for this species.

Australian herring (*Arripis georgianus*)

The majority of Australian herring were between 180 and 290 mm TL (Figure 5). The vast majority of these fish were above the length-at-maturity (~197 mm for females, ~179 mm for males) (Fairclough et al. 2000). The maximum length reported by log book fishers was well below the maximum size (~410 mm) recorded for this species (Hutchins and Swainston 1986). There is currently no legal minimum length for this species.

Silver trevally (skippy) (*Pseudocaranx georgianus*)

The lengths of silver trevally hooked by log book fishers ranged from 100 to 490 mm (Figure 5). Over half of these fish were below the legal minimum length for silver trevally (250 mm) and length-at-maturity (~310 mm for females, ~279 mm for males) (Farmer et al. 2005). All fish were well below the maximum reported size (~885 mm) for this species (Farmer et al. 2005).

Some sand trevally (*Pseudocaranx wrightii*) may have been misidentified and reported as silver trevally by fishers. These two species are very similar in appearance and it would be difficult to verify the individual catches of these species. However, it is likely that the majority of fish were silver trevally. The maximum size of sand trevally is only ~220 mm (Farmer et al. 2005), suggesting that the larger fish were indeed silver trevally. Also, other evidence (anecdotal reports and fishery-independent surveys) has found silver trevally to be the more common species in coastal waters in recent years.

Silver bream/tarwhine (*Rhabdosargus sarba*)

The size of fish caught by log book fishers ranged between 160 and 380 mm (Figure 5). The majority (80%) of these fish were below the length-at-maturity (~260 mm) (Lau and Li 2000) and 71% of fish were below the legal minimum length. The maximum lengths reported by log book fishers were well below the maximum size (~800 mm) recorded for this species (Lau and Li 2000).

Yellowfin whiting (*Sillago schomburgkii*)

The lengths of yellowfin whiting caught by log book fishers ranged between 150 and 260 mm TL (Figure 6). Half of these fish were below the length-at-maturity (~200 mm) (Hyndes and Potter 1997). The maximum lengths reported by log book fishers were well below the maximum size (~420 mm) recorded for this species (Kailola et al. 1993). There is currently no legal minimum length for this species.

Tailor (*Pomatomus saltatrix*)

The size of tailor caught by log book ranged between 290 and 450 mm TL (Figure 6). Only one fish was below the legal minimum size of 300 mm. Approximately 15% of fish were below the length-at-maturity (~340 mm) (Bade 1977). The maximum lengths reported by log book fishers were well below the maximum size (~1100 mm) recorded for this species (Backus 1962).

Western rock lobster (*Panulirus cygnus*)

The carapace length (CL) of western rock lobsters caught by log book fishers ranged from 62 to 115 mm (Figure 7). The legal minimum sizes for western rock lobsters are 77 mm from 15 November – 31 January and 76 mm from 1 February – 30 June. More than half (65%) of the lobsters caught by log book fishers were 78 mm CL or larger and the majority were below the length at maturity ~87.5 mm CL (Melville-Smith and de Lestang 2006).

Catch rates of selected species

Catch rates from log books can provide an index of fish abundance. In future, log book data will be useful in monitoring seasonal and annual fluctuations in the abundance of key species caught by recreational fishers at Rottnest Island, and also spatial differences in catch rates around the island.

At present, the limited quantity of log book data from Rottnest Island precludes the calculation of meaningful catch rates based on this data alone. For example, the average monthly catch rates of popular species such as Australian herring, whiting (including southern school, western school, yellowfin and general whiting, but not including King George whiting) and trevallies (including silver trevally and general trevallies) at Rottnest Island reveal few trends at this stage (Figure 8).

However, Rottnest Island data already has considerable value as part of a regional data set. Most of the species caught around Rottnest Island are migratory and have a distribution that is not restricted to the Island. Regional catch rates are likely to be the most appropriate measure of abundance at Rottnest for popular species such as Australian herring, whiting and trevally. For example, the average West Coast regional catch rate for Australian herring (including data from Rottnest) clearly shows seasonal and annual trends in the abundance of this stock (Figure 9).

SUMMARY

The communication strategy used by the DoF, the RIA and Recfishwest in this SCC-funded project was very effective in boosting the number of registered log book fishers that fish in the waters surrounding Rottnest Island.

This project has established a basis for ongoing collaboration between DoF, RIA and Recfishwest (the project partners).

The recruitment of additional log book fishers during this project has led to a substantial increase in the amount of ongoing recreational fishing data available for Rottnest Island and the metropolitan region.

Since the commencement of this project in April 2007:

- the number of Ocean Edition log books issued to fishers resident in the West Coast region has increased by 32%.
- the average monthly effort reported by log book fishers in the waters surrounding Rottnest Island has increased from 6.31 hours per month to 25.48 hours per month.
- the average number of taxa reported by log book fishers has increased from 1.55 to 4.54 taxa per month.
- the quantity of information relating to western rock lobsters around Rottnest Island has increased substantially (240 western rock lobsters were reported by log book fishers during this project, no rock lobsters were recorded before the start of the project).

Since August 2005, approximately 90% of total fishing effort expended by log book fishers in the waters surrounding Rottnest Island (specifically blocks BN60, BN61, BO60 and BO61) occurred inside the Marine Reserve. This suggests that boat-based recreational fishing effort is intensely concentrated in the waters immediately adjacent to the Island.

This project commenced in April 2007, allowing only a 3 month period in which to collect log book data prior to the introduction of sanctuary zones on 1 July 2007. In this 3-month period, 19% of the total effort reported by log book fishers at Rottnest Island was within the then proposed sanctuary zones. This very limited data suggests that approximately 19% of total fishing effort at Rottnest Island may have been displaced as a result of sanctuary zone implementation.

The total catch rate (total number of fish per hour, irrespective of species) of shore-based log book fishers was considerably higher than boat-based log book fishers. However, the shore-based catch was less diverse (i.e. contained fewer species) than the boat-based catch. Similar levels of total effort were reported by shore-based and boat-based log book fishers in the waters surrounding Rottnest Island.

More than 75% (by number) of the fish caught by log book fishers during 2007/08 were migratory species with distributions that extend well beyond the boundaries of the Rottnest Island Marine Reserve. Sanctuary zones within the reserve are unlikely to afford significant protection to these species.

The most reported species by log book fishers from the waters surrounding Rottnest Island were southern school whiting (*Sillago bassensis*), Australian herring (*Arripis georgianus*), silver trevally (*Pseudocaranx georgianus*) and western rock lobster (*Panulirus cygnus*). Herring, whiting and trevally dominated the finfish component of both shore and boat-based catches around the island. Rock lobsters were mainly taken by boat-based fishers.

The key demersal species of Western Australian dhufish (*Glaucosoma hebraicum*), pink snapper, (*Pagrus auratus*), breaksea cod (*Epinephelides armatus*), queen snapper

(*Nemadactylus valenciennesi*) and red snapper (*Centroberyx gerrardi*) accounted for only 6% of the boat-based catch reported by log book fishers from the waters surrounding Rottnest Island. These species will come under new management arrangements from 15 October 2008 due to concerns about sustainability. Given that these species comprise a very low proportion of the current boat-based catch, the new management arrangements are not expected to substantially reduce the quantity of fish caught recreationally around the island.

Sedentary species (e.g. dhufish) within the Rottnest Island Marine Reserve may benefit from the introduction of new management arrangements for demersal species and from the implementation of sanctuary zones. Log book catch rates will be useful in assessing changes in distribution and abundance of such species in future years.

Log book data indicates that a significant proportion of fish caught recreationally within the Rottnest Island Marine Reserve are released (>30% of total catch) for a variety of reasons, including bag/size legal limits and fisher preferences. This suggests that education campaigns to promote appropriate fish handling and release techniques on the Island are worthwhile.

The ongoing data that is expected to flow from recreational log books should enable cost-effective, long-term monitoring of the abundance, distribution and size structure of numerous fish species around Rottnest Island. Given that the vast majority of species in the recreational catch at Rottnest Island are migratory, log book data from the Island also will contribute to the sustainable management of fish resources in the metropolitan region and west coast bioregion.

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TABLES AND FIGURES

Table 1. Compositions of total catch reported (including retained and released fish) by log book a fishers at Rottnest Island before and after the start of the project.

		Aug 05 - Mar 07		Apr 07 - Apr 08	
Common Name	**Species Name**	**Number**	**% of catch**	**Number**	**% of catch**
Whiting, School Southern / Silver	*Sillago bassensis*	105	18	502	24
Herring, Australian	*Arripis georgianus*	138	24	439	21
Trevally, Skipjack/Silver	*Pseudocaranx georgianus*	88	15	200	10
Whiting, General/Sand				147	7
Bream, Silver (Tarwhine)	*Rhabdosargus sarba*	41	7	95	5
Whiting, Yellow-Finned (Western Sand)	*Sillago schomburgkii*	60	10		
Trevallies, general				60	3
Flatheads, general	Platycephalidae	3	1	52	3
Tailor	*Pomatomus saltatrix*	15	3	37	2
Wrasse/Gropers, general		12	2	28	1
Blowfish, Common	*Torquigener pleurogramma*	26	5	10	<1
Wrasse, Brown-Spotted	*Pseudolabrus parilus*			34	2
Wrasse, Western King	*Coris auricularis*	4	1	23	1
Whiting, Western School	*Sillago vittata*	26	5		
Cod, Breaksea (Black-arse Cod)	*Epinephelides armatus*	5	1	15	1
Salmon, Australian	*Arripis truttaceus*	4	1	11	1
Sweep, Footballer	*Neatypus obliquus*			13	1
Groper, Baldchin	*Choerodon rubescens*	3	1	9	<1
Garfishes	*Hemiramphidae*			10	<1
Dhufish, Western Australian	*Glaucosoma hebraicum*	6	1	4	<1
Trumpeters/Grunters, General	Teraponidae			9	<1
Snapper, Pink	*Pagrus auratus*	2	<1	7	<1
Whiting, King George	*Sillaginodes punctata*	3	1	5	<1
Samson Fish/Sea Kingfish	*Seriola hippos*			8	<1
Kingfish, Yellowtail	*Seriola lalandi*	8	1		
Snook	*Sphyraena novaehollandiae*	3	1	3	<1
Sergeant Baker	*Aulopus purpurissatus*	6	1		
Foxfish, Western	*Bodianus frenchii*			6	<1
Emperor, Sweetlip (Red Throat)	*Lethrinus miniatus*			6	<1
Tuna, Southern Bluefin	*Thunnus maccoyii*	5	1		
Snapper, Red (Nannygai)	*Centroberyx gerrardi*			5	<1
Snapper, Queen (Blue Morwong)	*Nemadactylus valenciennesi*			5	<1
Wirrah, Western	*Acanthistius serratus*			4	<1
General Fish				4	<1
Blowfish, Northwest (Silver Toadfish)	*Lagocephalus sceleratus*			4	<1
Scad, Yellowtail	*Trachurus novaezelandiae*			3	<1
Cods - General				3	<1
Trumpeter, Sea (Stormy Perch)	*Pelsartia humeralis*			2	<1
Gobbleguts	*Apogon rueppellii*			2	<1
Footballer/Stripey	*Microcanthus strigatus*	2	<1		
Eels, General	Gymnothorax spp.	1	<1	1	<1
Other finfish		6	1	18	1
		(6 taxa)		(18 taxa)	
Shark, Port Jackson	*Heterodontus portusjacksoni*	2	<1	2	<1
Wobbegongs/Catsharks, general	Orectolobus sp.			2	<1
Ray, Eagle	*Myliobatis australis*	1	<1		
Rock Lobster, Western	*Panulirus cygnus*			240	12
Abalone, Roe's - General	*Haliotis roei*			40	2
Octopus, general				6	<1
Cuttlefish				3	<1
Squids, general		1	<1	1	<1

Table 2. Boat and shore compositions of total catch reported (including retained and released fish) by log book a fishers at Rottnest Island since August 2005.

		Boat		Shore		Unknown
Common Name	**Species Name**	**Number**	**%**	**Number**	**%**	**Number**
Whiting, School Southern / Silver	*Sillago bassensis*	110	11	469	31	28
Herring, Australian	*Arripis georgianus*	123	12	378	25	76
Trevally, Skipjack/Silver	*Pseudocaranx dentex*	61	6	220	14	7
Whiting, General/Sand		133	14	14	1	
Bream, Silver (Tarwhine)	*Rhabdosargus sarba*	7	1	120	8	9
Whiting, Yellow-Finned (Western Sand)	*Sillago schomburgkii*			60	4	
Trevallies, general				60	4	
Flatheads, general	*Platycephalidae*	47	5	8	1	
Tailor	*Pomatomus saltatrix*	5	1	47	3	
Wrasse/Gropers, general		13	1	27	2	
Wrasse, Brown-Spotted	*Pseudolabrus parilus*	8	1	21	1	6
Blowfish, Common	*Torquigener pleurogramma*	5	1	23	2	8
Wrasse, Western King	*Coris auricularis*	14	1	13	1	
Whiting, Western School	*Sillago vittata*			26	2	
Cod, Breaksea (Black-arse Cod)	*Epinephelides armatus*	17	2	3	<1	
Salmon, Australian	*Arripis truttaceus*	15	2			
Sweep, Footballer	*Neatypus obliquus*	13	1			
Groper, Baldchin	*Choerodon rubescens*	11	1	1	<1	
Garfishes	Hemiramphidae	10	1			
Dhufish, Western Australian	*Glaucosoma hebraicum*	10	1			
Snapper, Pink	*Pagrus auratus*	9	1			
Whiting, King George	*Sillaginodes punctata*	4	<1	4	<1	
Samson Fish/Sea Kingfish	*Seriola hippos*	7	1	1	<1	
Kingfish, Yellowtail	*Seriola lalandi*	8	1			
Snook	*Sphyraena novaehollandiae*	6	1			
Sergeant Baker	*Aulopus purpurissatus*	6	1			
Foxfish, Western	*Bodianus frenchii*	6	1			
Emperor, Sweetlip (Red Throat)	*Lethrinus miniatus*	6	1			
Tuna, Southern Bluefin	*Thunnus maccoyii*	5	1			
Trumpeters/Grunters, General	Teraponidae			5	<1	4
Snapper, Red (Nannygai)	*Centroberyx gerrardi*	4	<1	1	<1	
Snapper, Queen (Blue Morwong)	*Nemadactylus valenciennesi*	5	1			
Wirrah, Western	*Acanthistius serratus*	2	<1	2	<1	
General Fish		1	<1	3	<1	
Blowfish, Northwest (Silver Toadfish)	*Lagocephalus sceleratus*	4	<1			
Scad, Yellowtail	*Trachurus novaezelandiae*			3	<1	
Cods - General		3	<1			
Trumpeter, Sea (Stormy Perch)	*Pelsartia humeralis*	2	<1			
Gobbleguts	*Apogon rueppellii*			2	<1	
Footballer/Stripey	*Microcanthus strigatus*			2	<1	
Eels, General	Gymnothorax spp.	2	<1			
Other finfish (21 taxa)		17	2	3	<1	
Shark, Port Jackson	*Heterodontus portusjacksoni*	4	<1			
Wobbegongs/Catsharks, general	Orectolobus sp.	2	<1			
Ray, Eagle	*Myliobatis australis*	1	<1			
Abalone, Roe's - General	*Haliotis roei*	40	4			
Rock Lobster, Western	*Panulirus cygnus*	229	23	10	1	1
Octopus, general		5	1	1	<1	
Squids, general		2	<1			
Cuttlefish		3	<1			

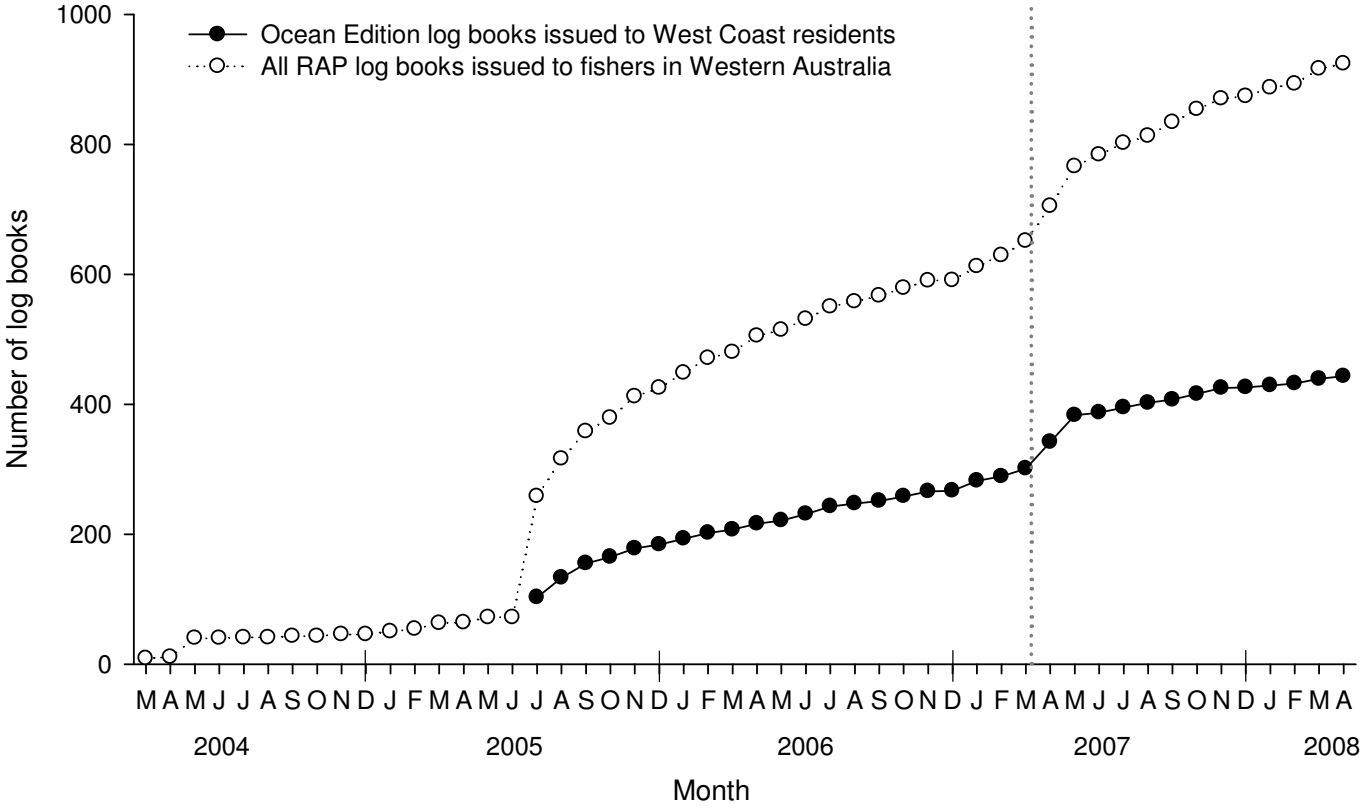


Figure 1. Number (cumulative total) of RAP log books issued to Western Australian fishers over the life of the program. The dotted line represents the start of the project.

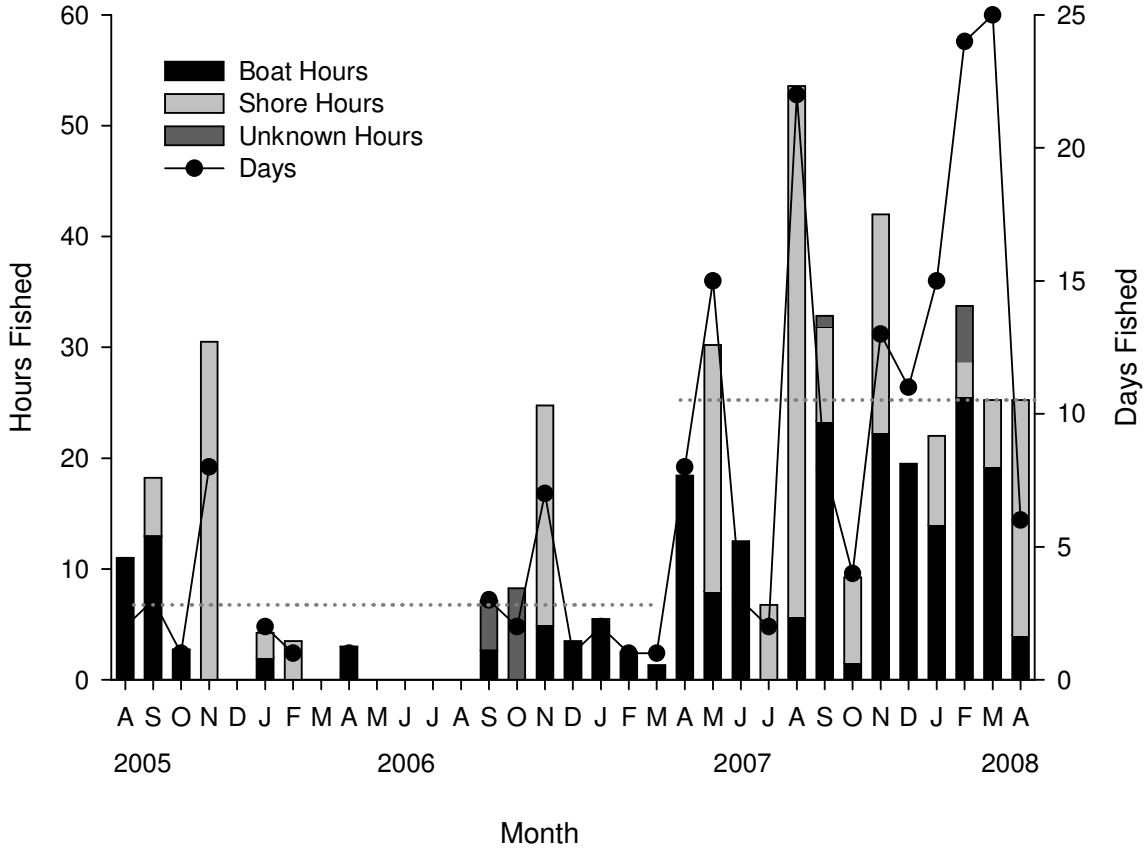


Figure 2. Total monthly fishing effort reported at Rottnest Island by RAP log book fishers. The dotted lines represent average hours reported before and after the start of the project.

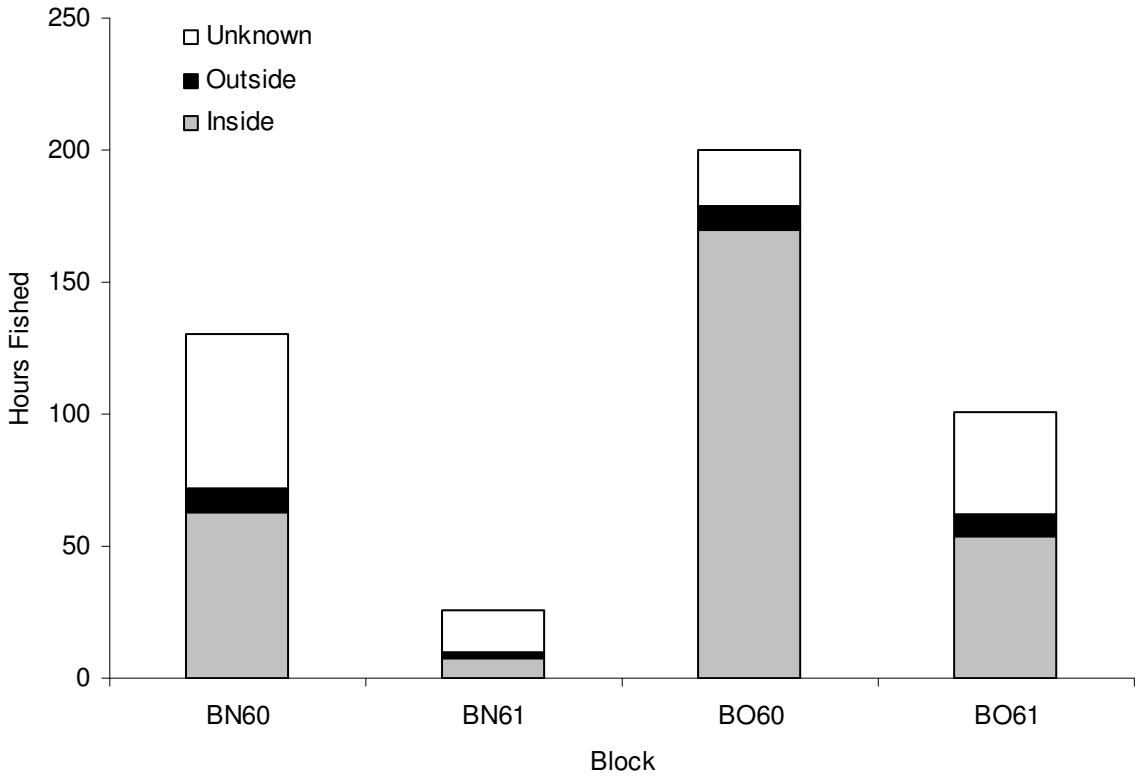


Figure 3. Fishing hours reported by log book fishers in the Rottnest Island blocks since August 2005. Hours are divided into hours fished inside and outside the Marine Reserve.

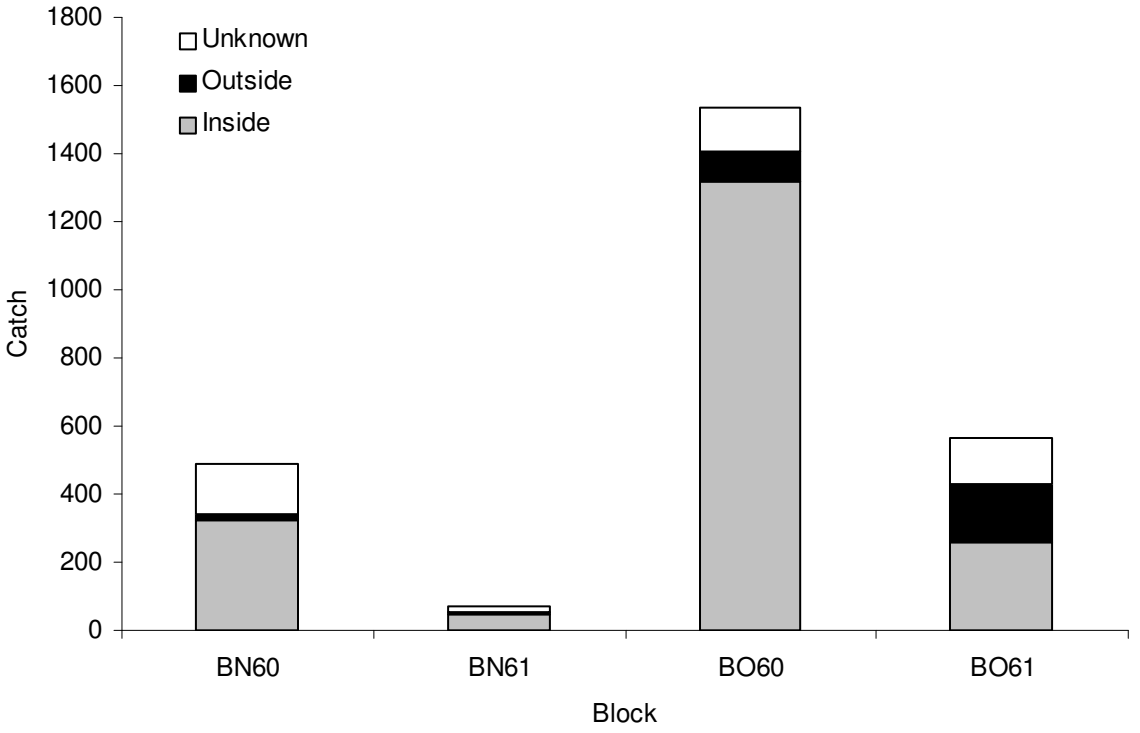


Figure 4. Catch reported by log book fishers in the Rottnest Island blocks since August 2005. Catch is divided into catch inside and outside the Marine Reserve.

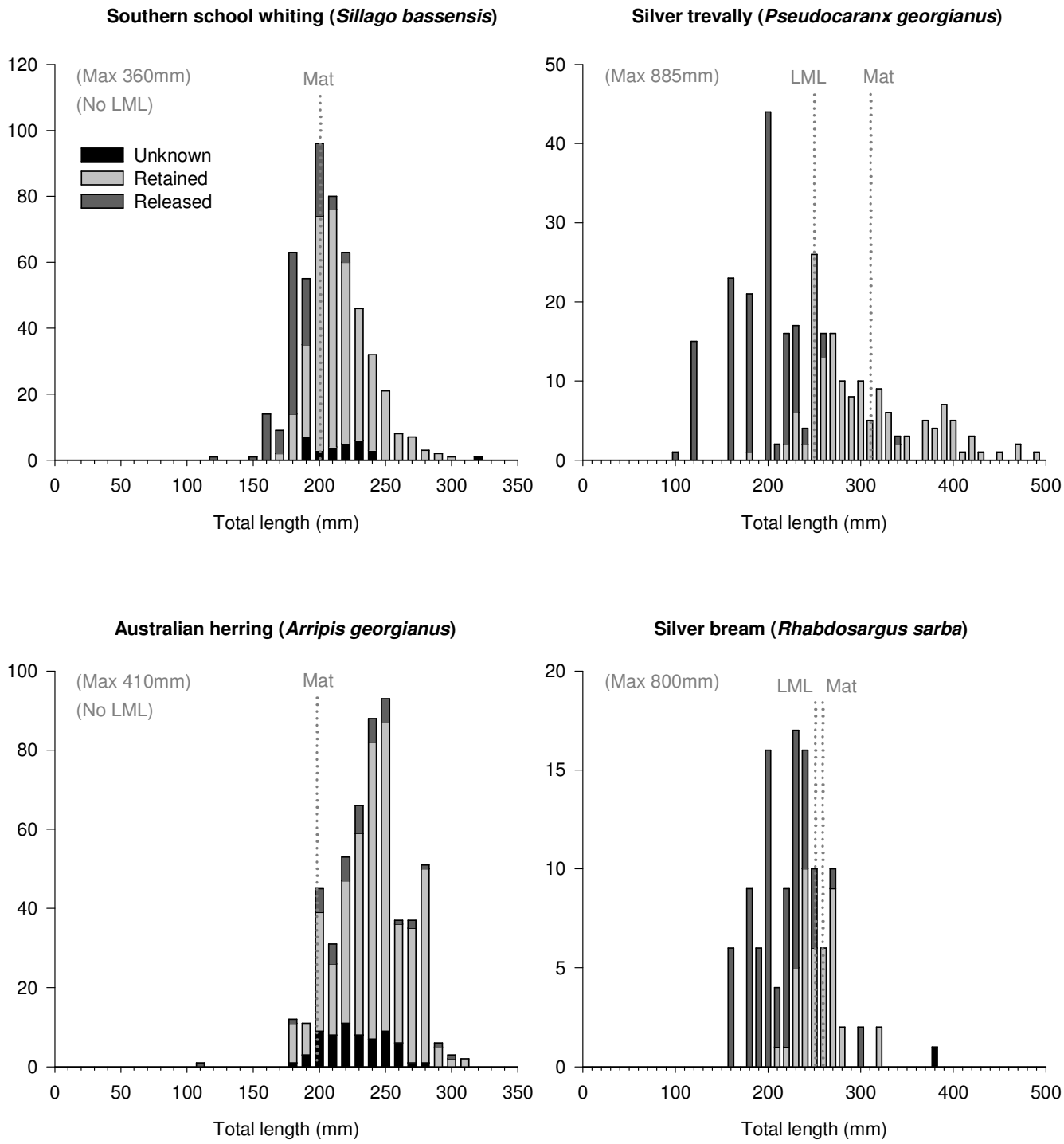


Figure 5. Total lengths of southern school whiting (*Sillago bassensis*), Australian herring (*Arripis georgianus*), silver trevally (*Pseudocaranx georgianus*) and silver bream/tarwhine (*Rhabdosargus sarba*) recorded around Rottnest Island by log book fishers since August 2005 (Max – maximum recorded length for this species; Mat – approximate length at maturity; LML – legal minimum length).

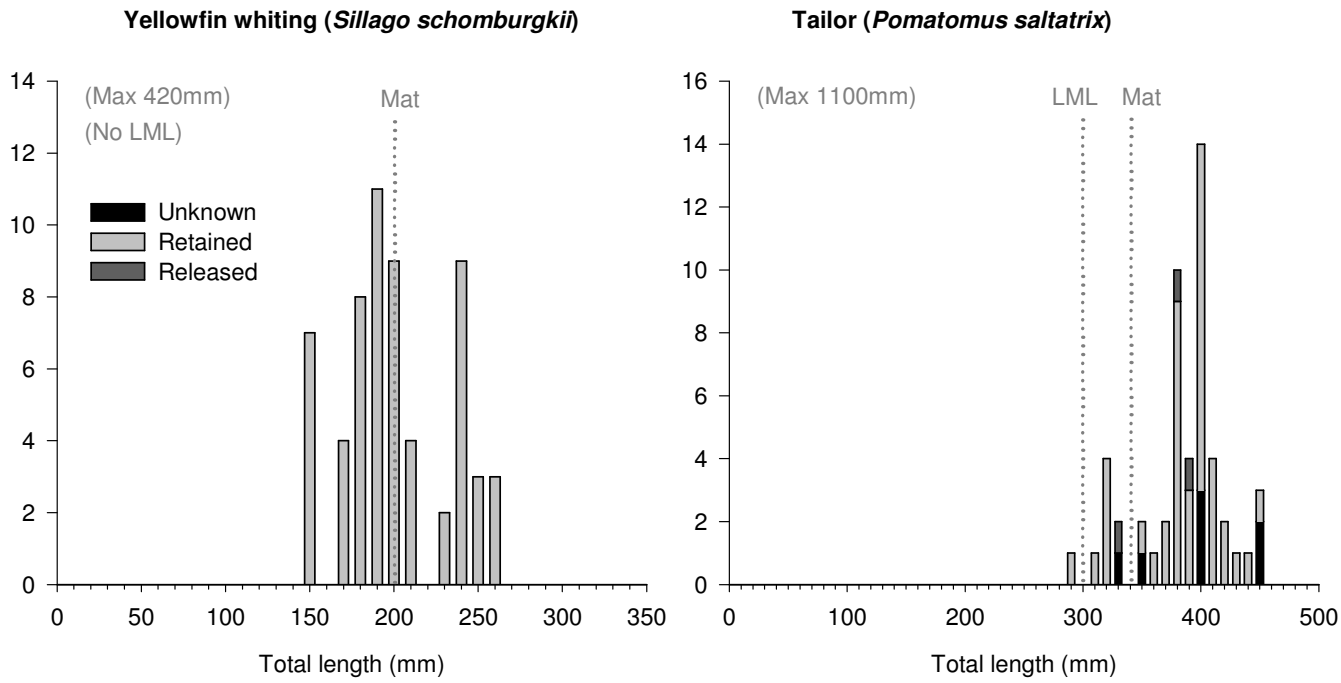


Figure 6. Total lengths of yellowfin whiting (*Sillago schomburgkii*) and tailor (*Pomatomus saltatrix*) recorded by log book fishers around Rottnest Island since August 2005 (Max – maximum recorded length for this species; Mat – approximate length at maturity; LML – legal minimum length).

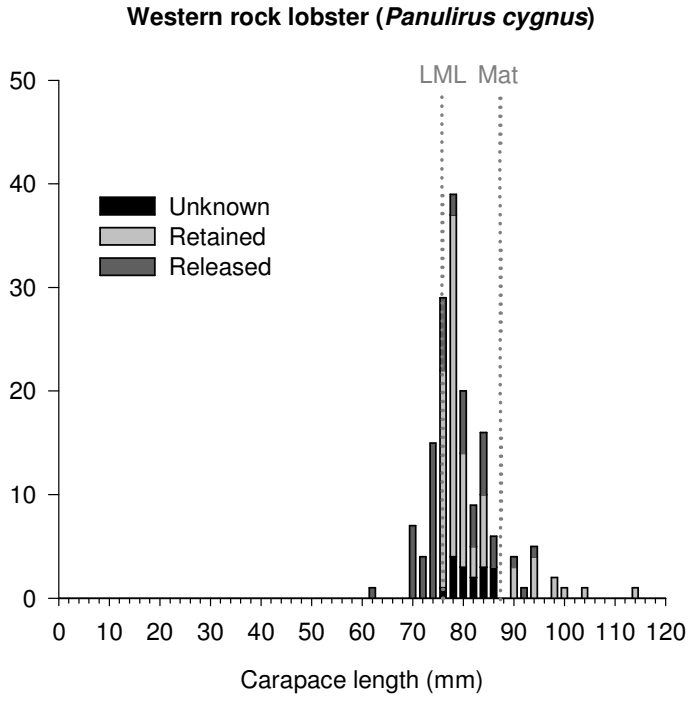


Figure 7. Carapace lengths of western rock lobsters (*Panulirus cygnus*) recorded by log book fishers around Rottnest Island since August 2005 (Mat – approximate length at maturity; LML – legal minimum length).

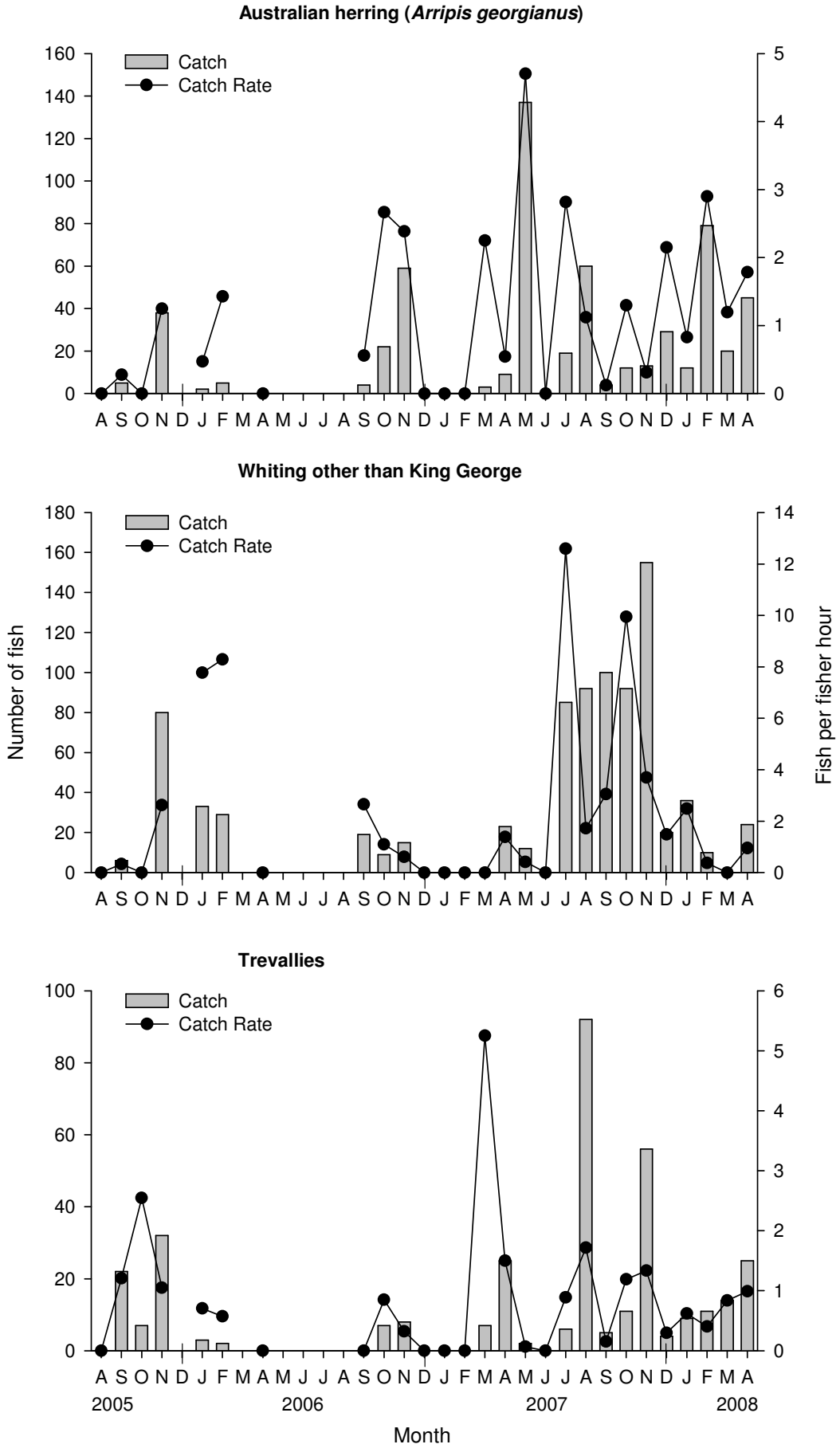


Figure 8. Catch and catch rates (number of fish per fisher hour) of selected species reported by log book fishers around Rottnest Island (missing data indicate no recorded fishing effort in month).

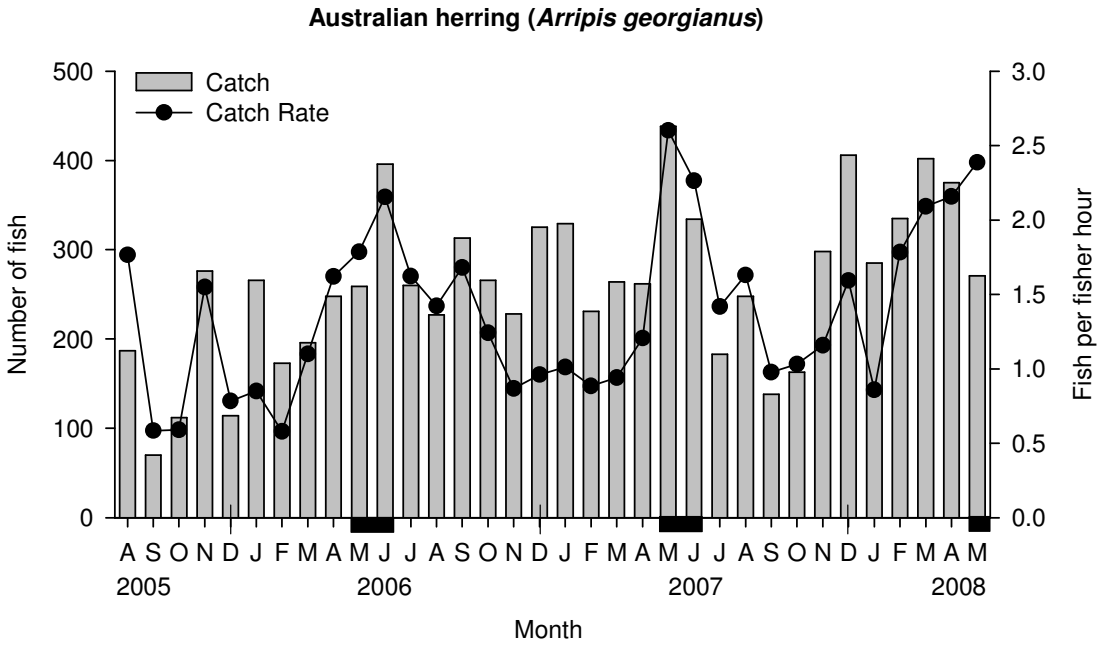


Figure 9. Catch and catch rates (number of fish per fisher hour) of Australian herring (*Arripis georgianus*) reported by log book fishers in ocean waters of the West Coast. The black marks at the bottom of the figure mark the main spawning seasons.

This figure shows a seasonal trend in the log book catch rate of Australian herring associated with the spawning behaviour of the species. Australian herring spawn from late May to early June (Fairclough et al. 2000). During the spawning season, Australian herring aggregate in coastal waters, which increases their catchability, resulting in the higher catch rates during these months.

APPENDICIES

Appendix 1. Format of the revised Ocean Edition log book used in the Rottnest Island implementation.

Angler's Log Book

OCEAN EDITION

Department of Fisheries
Government of Western Australia

RESEARCH ANGLER PROGRAM

Fish for the future

CODES

GEAR

R = rod
H = handline
N = set, haul or throw net
D = drop net
S = scoop net
J = jig
PN = prawn net
P = rock lobster pot
L = rock lobster loop
HC = collected by hand
O = other

TACKLE

BS = bait on single hook
BG = bait on gang of hooks
L = lure
LB = lure plus barbless hook
F = fly

BAIT

PR = prawn
PI = pippy
W = worms
M = maggots
F = small fish
C = crab
S = squid
ML = mulie
OC = octopus
LB = live bait
SB = strip bait
MU = multiple
O = other

REASON FOR RELEASE

S = size limit
B = bag limit
R = prefer to release
P = poor eating

By completing this log book, you are providing essential biological information that will be used by fisheries researchers to manage the fish resources of Western Australia in a sustainable manner.

Log book data will be used to monitor changes in the size, structure and distribution of fish and invertebrate populations along ocean beaches and in offshore waters. Data from this log book will be combined with other types of environmental data (e.g. water quality) to better understand the factors that affect the health of fish populations. Fish are near the top of the food web and their health is a useful indicator of the overall condition of the ecosystem that supports them.

Personal details that you provide will remain confidential.

Please return the white pages (originals) at the end of each month to the:

'Research Angler Program'

in the supplied envelopes or post to the following address:

Research Angler Program
Department of Fisheries
PO Box 20,
North Beach, 6920

Keep the yellow pages for your own records.

Instructions

THIS LOG BOOK IS FOR OCEAN BEACH AND OFFSHORE FISHING ONLY. ONLY RECORD YOUR OWN PERSONAL FISHING INFORMATION. DO NOT RECORD CATCHES OF OTHER ANGLERS IN THIS LOG BOOK.

Start a new page for each day of fishing. You can use more than 1 page per day. If you use several pages in one day, make sure you write the date on all pages.

If you went fishing and caught zero fish, record this by ticking the box at top of page. Then record location, depth, start/finish times, gear, tackle and bait used.

Complete a separate line for each fish caught. Record details of all fish and invertebrates caught (including crabs, rock lobster and abalone), whether retained or released, including details of 'trash' fish such as blowfish. Include as many details as possible about each fish.

- **Location** can be recorded as a block number, as a latitude/longitude coordinate or as a well-recognised, precise name (e.g. Halls Head, Mandurah). When fishing at Rottnest Island, or in the surrounding waters, use the block locations map of Rottnest Island.
- Record the **Depth** of where you are fishing in metres.
- **Start time** is when you actually started fishing, i.e. put your gear in the water. When you are setting gear such as crab drop nets or rock lobster pots record the time the gear is set as the start time and the time the gear is pulled as the finish time. Use 24 hour time, e.g. 3 am = 0300, 6:45 pm = 1845, etc.
- Record the code (see inside front cover) for the **Gear** used to catch each individual and the **number** of this gear being used at the time, e.g. if you were using 2 handlines, then write "H 2".
- Record the code for the type of **Tackle** used to catch each individual and the **number** of sets of tackle used on the line, e.g. if you have two sets of ganged baited hooks, then write "BG 2".
- Record the code for the type of **Bait** used to catch each individual.
- Record the **Species** of each fish caught, e.g. "dhufish", "Australian herring", "western rock lobster" etc.
- Record the total **Length** of each individual caught. For finfish, measure from snout tip to tail tip. For crabs, record carapace width. For rock lobster lobsters measure the carapace width from over the ridge between the two spikes at the front of the rock lobster's head to the back of the carapace. For abalone measure across the widest part of the shell. Use millimetres.
- Record whether each individual was **Released** by writing "yes" if released, and "no" if retained.
- If you released the individual, then record the code for the **Reason for release**.

See Inside front cover for codes.

Angler's Daily Log Sheet – Ocean Edition

DATE: 5/Oct/2003 (use 24 hour time)

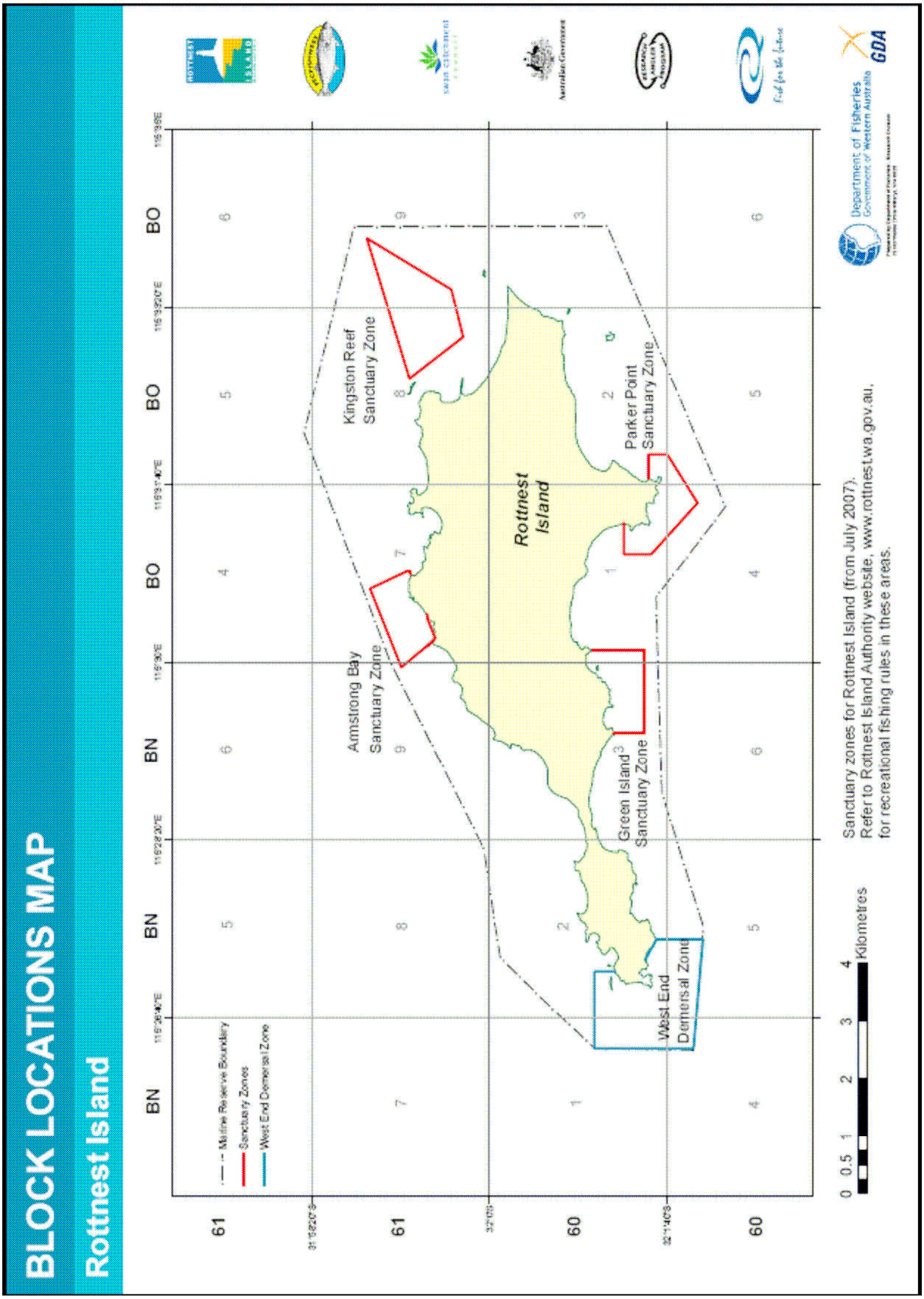
BOAT or SHORE (circle)

Zero fish caught today (tick) ☐

Location (lat / long)	Depth (in m)	Start time	Finish time	Gear & No. used	Tackle & No. used	Bait	Species	Length (in mm)	Released (Y/N)	Reason for release
West End Rottnest Island (WAOI 0013)	10m	1500	1630	N 1	BS 1	SB	pink snapper	550	Y	K
				" "	" "	" "	pink snapper	470	N	
				" "	LB 1	" "	janjon fish	470	Y	K
				" "	BS 1	OC	dhufish	400	Y	S
North of Parker Point Sanctuary Zone Rottnest Island (32 05' 30)	5m	1700	1800	L 1			western rock lobster	89	N	-
							western rock lobster	74	Y	S
							western rock lobster	81	N	
Little Island (WA963)	10m	1530	1700	N 2	BS 1	PR	Australian herring	285	N	
				" "	" "	" "	Australian herring	278	N	-
				" "	" "	" "	toadfish	180	Y	P
				" "	" "	" "	toadfish	170	Y	P

Comments: The janjon fish recorded had a fisheries tag – number 0023 – and has been reported.

Appendix 2. Block locations map of Rottnest Island used by log book anglers, displaying the new and extended sanctuary zones gazetted on 1 July 2007.



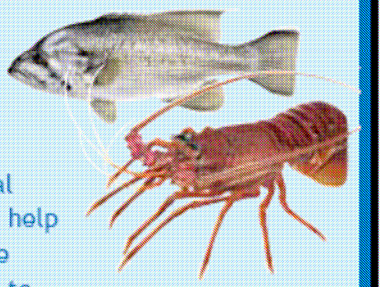
Appendix 3. Design of Rottnest Island log book registration flyer.

Department of Fisheries
Government of Western Australia

Fish for the future

Recreational Fisher Log Book Program

RESEARCH ANGLER PROGRAM



Do you fish regularly at Rottnest Island?

Want to be involved in Fisheries Research?

By keeping a Recreational Fisher Log Book, you can help monitor the health of the environment and help us to keep our fisheries healthy and productive. Please fill out the details below, send it to us and a log book will be mailed to you.

Please send me the Recreational Fisher Log Book.

Name

Address

Phone

Email

Do you belong to an angling club?

Mail to:
Recreational Fisher Log Book Program
PO Box 20, North Beach 6920, WA

Personal details that you provide will remain confidential.
Thankyou for your support. Happy Fishing!

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ROTTNEST ISLAND

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Australian Government