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RECREATIONAL FISHERIES



RECREATIONAL FISHERIES

General Overview

The Recreational Fisheries Program is responsible for the management of the recreational components of Western Australia's fisheries and the delivery of program outcomes identified through strategic, business and operational planning.

The program's key strategic objective is to maintain or improve the quality, diversity and value of recreational fishing and ecotourism based on fish and fish habitats in Western Australia through partnerships with the community.

Other major program objectives include:

- the conservation of fish stocks and their habitats of importance to recreational users;
- improved individual responsibility and community support for sustainable recreational fishing; and
- improved quality and diversity of opportunities for recreational fishing and activities associated with fish and the aquatic environment.

Community advice on planning and operational priorities is provided through the Recreational Fishing Advisory Committee and a network of 12 Regional Recreational Fishing Advisory Committees.

Additional advice on specific management issues is provided through community-based working groups and public submissions collated during planning processes.

Recreational fishers in specific fisheries contribute directly to the general cost of managing their fishery through the payment of licence fees for four species-based fisheries and one fishing activity. Licence fees were increased from 1 July 2002 following a review conducted during 2001/02. Revenue raised from licence fees is credited directly to the Recreational Fishing Fund to support recreational fisheries management, research and community education activities.

Anglers in marine finfish fisheries do not contribute to the cost of management, however funds raised through licensed fisheries are used to support compliance and research in the marine finfish fisheries.

The Recreational Fisheries Program was allocated a budget of \$11.2 million including accruals in 2002/03. About \$2.2 million was contributed directly by resource users through recreational fishing and fishing tour licence fees, with the remainder contributed by the State Government via the Consolidated Fund.

In the State's licensed recreational fisheries a total of 63,087 licences were issued in 2002/03. Recreational Fisheries Table 1 gives the breakdown of recreational licences issued over the past four years.

RECREATIONAL FISHERIES TABLE 1

Recreational fishing licences 1999/2000 to 2002/03.

	2002/03	2001/02	2000/01	1999/00
Rock lobster	26,989	23,343	25,566	25,714
Marron	5,101	9,507	11,206	11,966
Abalone	8,700	9,171	7,459	7,097
Netting	5,950	4,792	6,043	4,973
South-west freshwater angling	3,569	3,740	4,541	3,470
All categories (umbrella)	12,778	11,552	11,254	9,793
Total licences	63,087	62,105	66,069	63,013

Note that, because recreational fishing licences are valid for 12 months from the date of issue, totals may fluctuate during the course of a year. Licence numbers quoted in individual fishery status reports are extracted at a time of year relevant to the peak fishing season and may differ from the annual sales data.

Western Australia's Recreational Fisheries

Western Australia's 12,000 km coastline, 200 nautical mile fishing zone and inland regions support nine major recreational fisheries.

These are distributed between the State's four broad marine and two inland biogeographic regions (north, Gascoyne, west and south coasts, northern inland and southern inland).



From a biological perspective the boundaries of these regions are largely consistent with (or represent sub-sections of) the major oceanographic and climatic zones of Western Australia, and consequently the distribution of fish species and stocks.

In addition, these regions also coincide with discrete tourism regions of the State, and visitor fishing activity tends to focus within these areas during identifiable seasons.

The major recreational fisheries comprise four marine and estuarine multi-species finfish fisheries, a temperate and a tropical freshwater finfish fishery, and licensed single-species fisheries for western rock lobster (*Panurilus cygnus*), abalone (*Haliotis* spp.) and marron (*Cherax tenuimanus*).

Recreational fishing activity occurs in four main zones: creeks and estuaries, shore-based fishing, inshore marine fishing in waters generally within the inshore reef system or three nautical miles of the coast, and an offshore fishery which targets demersal fish and pelagics such as billfish and tunas.

Recreational catch and target species in each region vary significantly, as does the fishing pressure.

Threats and Opportunities

Western Australia's recreational fisheries are a major community asset, and contribute in excess of \$570 million a year to the State's economy.

Since 1987 participation in recreational fishing of all kinds has more than doubled from 284,000 people to about 600,000 people a year, or from 27% to 35% of the State's population over 4 years old (Baharthah and Sumner 2003). The National Recreational and Indigenous Fishing Survey estimated that the mean fishing effort by recreational fishers was 7 days per year, with the total recreational fishing effort for the State estimated at 3.4 million fishing days (Henry and Lyle 2003).

Recreational fishing contributes to the quality of life of thousands of Western Australians and provides the basis for an important domestic market for the fishing tackle, bait, boating and vehicle manufacturing industries.

Major threats to the sustainability of Western Australia's recreationally fished stocks come from population growth, coastal development, improved fishing and fish storage technology, a low participation cost, and the opening of access to areas previously protected from significant levels of recreational exploitation by their remoteness. These factors are placing unprecedented pressure on many fish stocks at all

stages in their life cycle, compounded in some instances by the eutrophication of rivers and estuaries.

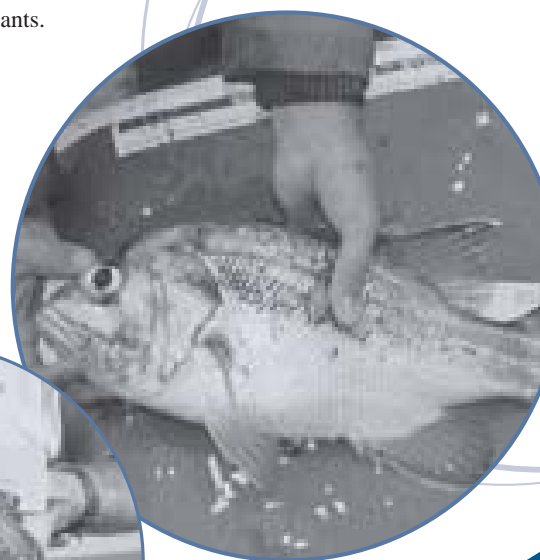
Opportunities for maintaining and developing recreational fishing as an important community activity and regional tourism drawcard occur through growing community support for fishing as a quality experience, rather than focusing on taking large quantities of fish.

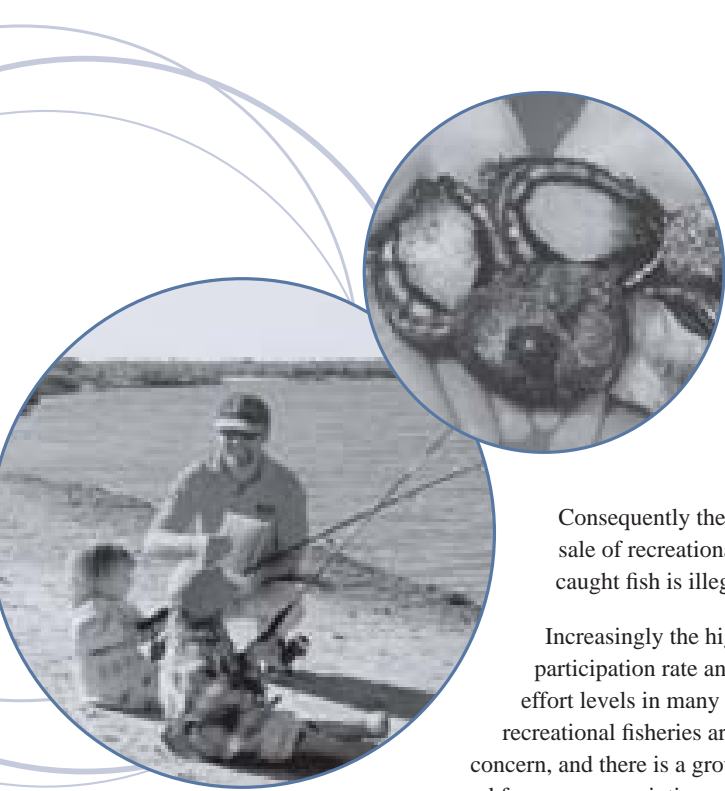
Other opportunities are provided by the multi-species, regional nature of recreational fishing activities, a demand by fishers to be involved in all aspects of resource management, and limited fishery enhancement opportunities provided through the developing aquaculture industry, particularly for freshwater impoundments.

Recreational Fisheries Management

Most of Western Australia's recreational fisheries are managed through a mix of broad input controls (closures and size limits) and output controls (individual and boat catch limits) which provide some protection for juvenile and breeding fish, and help share the available catch between the large number of participants.

A clear separation has been created in law on the basis for management between the recreational and commercial sectors.





Consequently the sale of recreationally caught fish is illegal.

Increasingly the high participation rate and effort levels in many recreational fisheries are of concern, and there is a growing need for more prescriptive regulations which can directly manage the total recreational catch or the recreational share of the total catch, rather than simply relying on socially acceptable bag limits for individual fishers.

A key outcome of the strategic planning process jointly carried out by the Department's Recreational Fisheries Program and the Recreational Fishing Advisory Committee is the development of four marine regional recreational fisheries management strategies, based on the State's major biogeographic regions (Recreational Fisheries Figure 1).

These five-year strategies aim to ensure that the quality of recreational fishing available in Western Australia is maintained or enhanced in the face of growing population pressures, and will complement management already in place for the licensed recreational fisheries and commercial fisheries.

The regional management framework also provides a relevant spatial and biogeographical basis for recreational fisheries management arrangements that can be readily incorporated into the proposed Integrated Fisheries Management arrangements along with the commercial and fishing tour sectors.

Key elements in each strategy include the clear identification of those fish species, stocks and areas of most importance for recreational fishing, those that are considered most at risk of over-exploitation, and the development of biological and 'fishing quality' outcome indicators against which each plan can be reviewed.

The Gascoyne and west coast regional strategies have been completed and are due to be implemented in 2003/04.

Fishing and Aquatic Tour Management

An important element in managing the recreational sector, and establishing the basis for integrated management and future resource allocation, has been the introduction of management for the previously open-access aquatic tour (charter and fishing tour) industry.

Fishing tour operators are not permitted to sell their catch, and are therefore not considered as commercial fishers. However, the industry provides an important and growing service to the State's recreational fishing and tourism industries.

In the latter half of 2001 legislation was passed enabling the grant of fishing tour operators' licences and aquatic ecotour licences across the State's four marine bioregions. By 2003, a total of 252 tour operators' licences and 32 ecotour licences had been issued. Of these, 46 fishing tour licences operate in two regions or more.

The aquatic tour industry is closely related to the recreational sector in species targeted, gear used and motivation for fishing. As a consequence the industry is managed under the current suite of recreational fishing regulations, although there is discrete legislation which imposes certain responsibilities and conditions on charter licence holders.

One of those conditions requires all operators to submit catch and effort returns for each trip, on a monthly basis. There is now a moratorium on the issue of any further fishing tour licences in fully exploited fisheries until there is sufficient data for an assessment of the sector's relative impact on the State's fish stocks.

It is envisaged that the bioregional management of the industry will provide the spatial framework for integrating the management of fishing tours and ecotourism with recreational fisheries, commercial fisheries and other uses such as conservation.

Recreational Fisheries Research Survey Program

Data for the estimation of recreational catch and effort is collected through a strategic program of surveys.

An annual community phone survey conducted by the Department of Fisheries provides broad information on trends in participation and fishing effort.

This community survey provides an overall estimate of the number of people participating in recreational fishing for the State and each bioregion within the State, as well as the number of days of fishing effort for the past 12 months. The estimate of participation is considered to be reasonably accurate; however, the estimate of fishing effort may suffer from bias due to problems of recall by respondents.

For specifically licensed species fisheries, an annual telephone or mail survey of licence holders is also undertaken to directly estimate catches for management purposes.

In addition to these mainly telephone-based annual surveys, detailed field (or 'creel') surveys are also carried out on each of the State's marine bioregions in turn. These surveys,

involving interviews with anglers at boat ramps and fishing venues, each take place over a 12-month period, with the four marine bioregions being covered in rotation over a planned six-year cycle. During 2002/03 a reduced-scale survey of the south coast estuaries is being undertaken, owing to the high cost of surveys in this extensive region. It is hoped that the results from this survey can be combined in due course with a subset of the data from the previously conducted National Recreational Fishing Survey to provide useful estimates of the south coast catch.

In addition, a series of full creel surveys has been undertaken in the Shark Bay region to meet the more urgent management needs of the inner bay snapper stocks.



RECREATIONAL FISHERIES FIGURE 1

Map showing Western Australia's major biogeographical regions.

WEST COAST BIOREGION

REGIONAL MANAGEMENT OVERVIEW

The west coast, between Kalbarri and Augusta, attracts the highest level of recreational fishing activity in the State, with around 470,000 anglers fishing an estimated 2.4 million fishing days a year. Within this region the metropolitan coastal waters between Yancheep and Mandurah attract about 290,000 fishers, generating an estimated 1.3 million fishing days a year (Baharthah and Sumner 2003). (It should be noted that these estimates of fishing effort are approximate, owing to the limitations in the survey methods discussed previously.) The total effort from Kalbarri to Augusta for the boating sector alone was estimated at 453,000 angler fishing days in 1996/97 (Sumner and Williamson 1999).

Charter activity, although not covered in the 1996/97 survey, is also significant, with 130 fishing tour licences and 16 ecotour licences valid for the west coast bioregion in 2003.

Major species in the shore and inshore boat catch include Australian herring (*Arripis georgianus*), whiting (several species including King George whiting, *Sillaginodes punctata*), skipjack trevally (*Pseudocaranx dentex*), blue swimmer (manna) crabs (*Portunus pelagicus*), tailor (*Pomatomus saltatrix*), garfish (*Hyporhamphus melanochir*) and squid, while dhufish (*Glaucosoma hebraicum*), pink snapper (*Pagrus auratus*) and baldchin groper (*Choerodon rubescens*) dominate boat fishers' target list.

Estuaries including the Swan/Canning, Peel/Harvey, Leschenault and Hardy Inlet are highly popular recreational fishing areas and produce catches of black bream (*Acanthopagrus butcheri*), cobbler (*Cnidoglanis macrocephalus*), tailor, mulloway (*Argyrosomus hololepidotus*), flathead (Platycephalidae), flounder (Bothidae) and a suite of marine species. Western king prawns (*Penaeus latisulcatus*) and river prawns (*Metapenaeus dalli*) also provide a highly seasonal and variable fishery in the Swan/Canning and Peel/Harvey Estuaries.

Blue swimmer crabs are the target of Western Australia's largest recreational fishery, with over 80,000 participants. Major fishing areas include the Peel/Harvey Estuary, Leschenault Inlet, Cockburn Sound, Geographe Bay and Swan River. Catch surveys for these areas indicate that the total recreational catch is likely to be between 400 and 500 t per year (two million crabs), with over half of this coming from the Peel/Harvey Estuary.

Key issues facing Western Australia's west coast recreational fisheries revolve around the growth in recreational fishing pressure (particularly on demersal fish and the inshore reef system), coastal development and environmental degradation in estuaries and near-shore waters, and competition for the available resource with the commercial wetline and

demersal gillnet fleet, commercial crab fleet and commercial estuarine fishery.

A review of recreational fisheries management arrangements for the west coast has been completed and new management arrangements will be implemented in 2003/04.

REGIONAL COMPLIANCE AND COMMUNITY EDUCATION OVERVIEW

Fisheries Officers working out of District Offices located at Geraldton, Dongara, Jurien, Lancelin, Hillarys, Fremantle, Mandurah, Bunbury and Busselton deal with a number of recreational fisheries within the region. These include abalone, rock lobster, marine boat- and shore-based angling, and estuarine netting fisheries. Officers patrol near-shore waters using 8 m patrol vessels together with a number of smaller craft, and a 12 m vessel is used at the Abrolhos Islands. The Department's large patrol vessels PV *McLaughlin* and PV *Hamelin* (delivered March 2002) are also used to a limited extent.

Work in the recreational fisheries principally involves checking that fishers are adhering to size and bag limits. Areas of highest risk of non-compliance with management arrangements are considered to be abalone, rock lobster, crab, marine shell collection, marine finfish and estuarine netting.

Activities during 2001/02

A total of 20,672 hours of activity by Fisheries Officers were applied to coastal boating and land-based fishing and to overseeing netting by recreational fishers (West Coast Recreational Compliance Table 1). Approximately 45% of these hours were applied in the greater metropolitan area between Mandurah and Lancelin. Of the remaining hours, most were delivered in the south-west of the bioregion (Bunbury to Augusta), with approximately 25% of the total hours being applied in the mid-west (Jurien to Kalbarri).

The Fishwatch Service received 568 reports of illegal fishing activity for the 2001/02 year. Of all calls received around the state, over 75% related to incidents occurring in the metropolitan area. The main types of illegal activity reported there related to finfish (28%), abalone (10%), rock lobster (10%), crabs (10%), and marron (8%).

As a result of compliance activities, 388 warnings and 177 infringement notices were issued and 129 prosecutions were initiated in the west coast bioregion. Around 90% of all prosecutions concerned offences in the recreational rock lobster and abalone fisheries, with the majority relating to the take of under-size rock lobster and catches of abalone in excess of bag limits.

Compliance with the six-week closure to fishing for pink snapper in Cockburn Sound was again well supported by the recreational fishing community, with little evidence of fishers targeting snapper during the closed season.

The Voluntary Fisheries Liaison Officer (VFLO) program supplements fisher education activities conducted by Fisheries Officers. VFLOs are fishing enthusiasts who donate their time to educate other recreational fishers about fishing regulations, fish handling, catch care and conservation. The VFLO program involved 70 volunteers in the Perth area, 37 in Mandurah, 27 in Geraldton and the mid-west and 29 in Bunbury and Busselton. VFLOs reported a total of 13,351 recreational fisher contacts during 2001/02.

VFLOs throughout the bioregion attended various agricultural shows and community festivals, gave presentations to school and community groups and conducted fishing clinics for children, adults and seniors. Beachfront patrols and education programs continued to focus on correct fishing techniques, ethics and bag and size limits.

Metropolitan VFLOs also participated in 'Clean Up Australia Day' in March 2002 at Fremantle's North Mole. VFLOs looked at the impacts of recreational fishing on our marine environment, and encouraged community involvement at the site.

The successful 'Fishers with Disabilities' program run over the last couple of years by the metropolitan VFLO program and coordinated by Neville Thomas was a finalist in the 7th Annual Community Service Industry Awards 2001 in the category of Industry Support and Development. Due to the program's popularity, it toured the south-west of Western Australia, conducting fishing workshops for people with disabilities in Bunbury, Busselton, Augusta and Albany.

Mandurah VFLOs Pat McAuliffe, Andy Spurr, Alf Jones and Carol Lutey were awarded the Premier's Australia Day Active Citizenship Award for their 'Learning Circles for Fishers' program covering fishing knots, crabbing, fishing regulations, fishing tools and catch care. The Mandurah team has delivered the program to schools in the south-west and metropolitan areas up to three times a month in peak periods, with eight VFLOs and two Fisheries Officers involved in each presentation, and also took it to Newdegate, Corrigin, Wickipin and Yealering as part of the 'Year of the Outback'. Busselton VFLOs were also successful in securing sponsorship from the Rotary Club of Geographe Bay and the South West Regional Recreational Fishing Advisory Committee to establish 'Learning Circles for Fishers' in their area.

The Department's metropolitan Community Education Officer developed a new class presentation called 'Aquatic Invaders' which was offered to all metropolitan schools. This presentation explores the impacts of pollution, habitat destruction and introduced species on our aquatic ecosystems.

WEST COAST RECREATIONAL COMPLIANCE TABLE 1

Summary of compliance and educative contacts and infringement types in recreational fisheries within the west coast bioregion during the 2001/02 financial year.

CONTACT WITH THE RECREATIONAL FISHING COMMUNITY	NUMBER
Hours delivered in bioregion	20,672
Fisher field contacts by Fisheries Officer	40,190
District Office contacts by Fisheries Officers	21,347
Fisher field contacts by VFLOs	13,351
Fishwatch reports *	568
OFFENCES DETECTED	
Infringement warnings	388
Infringement notices	177
Prosecutions	129

* This represents the total number of Fishwatch reports, both commercial and recreational, since the service provider reporting mechanism cannot currently differentiate between sectors.

Initiatives for 2002/03

Education of recreational fishers in respect to the fishing rules and the 'Fish for the Future' initiative remains a priority. However, the Department's move into the delivery of marine safety services within the community will broaden the role of both Fisheries Officers and VFLOs in this area. With this in mind, during 2002/03 the Regional Services Branch extended its use of risk assessment processes to determine priority areas of concern in both recreational fishing and marine safety.

The completion of the West Coast Recreational Fishing Review remains a future point of interest for recreational fishers within the bioregion. The implementation of the review has been moved back to 1 October 2003, enabling the Department to enact the complex legislative changes before the southern summer recreational fishing season starts.

The increase in recreational fishing licence fees from July 2002 will be used to support additional Fisheries Officers. Two mobile patrol units dedicated to education and compliance in recreational fisheries will patrol seasonally within the west coast bioregion, moving with the peak recreational fishing activity. The Department recognised the need for these units to increase compliance in the recreational sector and create an effective deterrent against illegal fishing.

REGIONAL RESEARCH OVERVIEW

Scientific information to underpin recreational fisheries management in this bioregion is provided by dedicated research projects on specifically licensed high-value species (rock lobster and abalone), and research based on commercial fisheries in the finfish sector.

In addition, the estuarine and beach species have been the focus of a number of extensive studies, some undertaken by Department of Fisheries researchers and others in collaboration

with postgraduate students, mainly of Murdoch University. These studies have provided biological data on herring, whiting (including King George whiting), blue swimmer crabs, prawns, tailor, cobbler, black bream and other minor species. For west coast offshore boat angling species – whiting (other than King George whiting), wrasse and groper (various species), Western Australian dhufish and snapper – some biological data is also available from previous Department of Fisheries studies based on the commercial fisheries, and from collaborative postgraduate research projects.

Estimates of abundance for most of these recreational species are also provided by statistical information from commercial fishing recorded in the long-run CAES database. To estimate total recreational catch and recreational/commercial catch shares in order to assess the overall status of these stocks, recreational creel survey data is required. Historically, there have been two surveys, one targeting herring in the 1970s (Lenanton and Hall 1976) and another which assessed beach angling for the lower west coast (Perth to Cape Leeuwin) (Ayvazian et al. 1997).

The most recent survey of recreational boat-based fishing from Augusta to Kalbarri was completed in 1997 (Sumner and Williamson 1999). The main marine species caught by boat-based fishers were (in order of number caught) whiting species (Sillaginidae) other than King George whiting 564,000, Australian herring (*Arripis georgianus*) 425,000, blue swimmer crabs (*Portunus pelagicus*) 255,000, skipjack trevally (*Pseudocaranx dentex*) 123,000, King George whiting (*Sillaginodes punctata*) 94,000, squid 88,000, southern sea garfish (*Hyporhamphus melanochir*) 79,000, various species of wrasse and groper 66,000, and Western Australian dhufish (*Glaucosoma hebraicum*) 29,000. The size of the recreational catch for many of these species was of a similar magnitude to the commercial catch. These findings highlighted the importance of proper management for recreational fisheries.

Surveys have been completed of recreational fishing in the Leschenault Estuary (Malseed et al. 2000), and in the Swan/Canning and Peel/Harvey Estuaries where the main focus was on the recreational catch of blue swimmer crabs (Sumner et al. 2000). Annual surveys of recreational rock lobster fishers are also undertaken, as reported by Melville-Smith and Anderton (2000). These combined surveys indicate that blue swimmer crabs and rock lobsters are the most commonly taken recreational species in this bioregion, followed by the finfish species reported by Sumner and Williamson (1999). These survey-based data, integrated with the long-run data sets from the commercial CAES database, provide the core information necessary for management of the most important recreational fish stocks in future.

An FRDC-funded survey to examine changing recreational shares of crab catches in Cockburn Sound and Geographe Bay following management changes is currently in progress.

Recreational Rock Lobster Fishery

Management summary

The recreational component of the western rock lobster (*Panulirus cygnus*) fishery is managed under a mix of fisheries regulations including a specific recreational licence. The licence arrangements are designed to complement the management plan for the commercial fishery and constrain to some extent the proportional impact of the recreational fishery.

Recreational management controls are not absolute, and allow variations in the total recreational catch against the total available catch to ensure the quality of the fishing experience is maintained, and the fishery continues to provide an appropriate proportion of social benefits through recreational fishing.

Current controls effectively limit fishing efficiency in the recreational sector, protect juvenile and breeding lobsters, and constrain the temporal spread of fishing effort.

These controls include an open season from 15 November to 30 June each year; a shorter season from 15 March to 30 June applies at the Abrolhos Islands. Night-time fishing for lobster by either diving or potting is prohibited.

Fishers are restricted to two pots per licence holder. The pots must meet specific size requirements and must have gaps to allow under-size rock lobsters to escape. Divers are also restricted to catching by hand, snare or blunt crook in order that the lobsters are not damaged. Fishing for rock lobsters at the Abrolhos Islands is restricted to potting.

A minimum size limit of 77 mm carapace length applies from 15 November to 31 January and 76 mm from 1 February to 30 June, while the take of female lobsters carrying eggs is prohibited at all times. A maximum size limit for female lobsters was re-imposed in 2002/03 that prohibits the take of female lobsters larger than 105 mm from waters between 21°44' and 30° S and those larger than 115 mm between 30° and 34°24' S, excluding waters east of 115° 08'.

A daily bag limit of 8 lobsters per fisher per day controls individual catches, and limits the ability of recreational fishers to accumulate quasi-commercial quantities of lobster. A daily boat limit of 16 provides further control on high individual catches where there are two or more people fishing from the same boat. In Ningaloo Marine Park the daily bag limit is 4 and the boat limit 8 lobsters.

In the last decade, as well as the seasonal 77 mm minimum size limit and the ban on taking female lobsters in breeding condition, a requirement has been introduced that lobsters be tail-clipped in order to stop recreationally caught animals from being sold illegally as part of 'shamateur' activity. More recently, as a result of international concern over 'mad cow disease' and the sensitivity of the export lobster market, it was decided to prohibit the use of any bovine matter or any animal skin or hide as lobster bait for both commercial and recreational lobster fishers.

It is not anticipated that there will be any change to the recreational rock lobster season opening in November 2003.

Research Summary

General research for managing the rock lobster stock is undertaken through the Commercial Fisheries Program and is reported under that section.

For the recreational component of this fishery, an annual survey of participants is used to estimate the recreational catch and to produce the following status report.

Licensed Recreational Rock Lobster Fishery Status Report

Prepared by R. Melville-Smith and A. Thomson

FISHERY DESCRIPTION

Boundaries and access

The recreational rock lobster fishery operates on a statewide basis and encompasses the take of all rock lobster species; however, fishing is concentrated on western rock lobsters in inshore regions in depths of less than 20 m between North West Cape and Augusta. The Perth metropolitan region and Geraldton experience the greatest fishing activity. A recreational rock lobster licence is required to take any lobster, and for the 2001/02 season 39,623 licences were sold. The 2001/02 season operated between 15 November and 30 June inclusive, except at the Abrolhos Islands where the waters were closed to diving for rock lobsters, but open for potting, between 15 March and 30 June.

Main fishing method

Pots and diving.

RETAINED SPECIES

Recreational catch (season 2001/02):
545 tonnes (estimate)

The recreational catch of western rock lobster for 2001/02 was estimated at 545 t, with 383 t by potting and 162 t by diving. Comparative catch estimates for 2000/01 were 421 t by potting and 143 t by diving. The catch achieved was within the range of 450–550 t predicted in the *State of the Fisheries Report 2001/2002*.

Fishing effort

A total of 39,623 licences that permitted fishing for lobsters in the course of the season (rock lobster licences plus umbrella licences) were purchased, but only an estimated 27,300 (69%) were utilised for lobster fishing. This is a similar figure for licence usage to the 28,453 recorded in 2000/01, but in that season there was a higher proportion of users (76%). The average rates of usage by pot and diving fishers (excluding all those who held a licence but failed to use it) were 33 and 10 days respectively during the 2001/02 fishing season. These rates are similar to those found for the 2000/01 fishing season.

Catch rate

The average pot and diving catches were 1.3 and 2.7 lobsters per person per fishing day in the 2001/02 fishing season. These compare closely to the 2000/01 fishing season where potters and divers caught 1.3 and 2.5 lobsters per person per fishing day respectively.

Commercial share: **94% (approx.)**

The commercial fishery accounted for around 94% of the overall catch of western rock lobster over the past season.

Stock assessment completed: **Yes**

Stock assessments are an important focus of western rock lobster research, but because of the relatively small contribution to the overall catch made by the recreational fishery (around 6%), the full assessment information is provided in the commercial fishery status report (pp. 9–15).

Exploitation status: **Fully exploited**

See the commercial fishery status report.

Breeding stock levels: **Adequate**

See the commercial fishery status report.

Projected catch next season (season 2002/03):
700–800 tonnes

The recreational rock lobster catch has been estimated by an annual mail survey since the 1986/87 season. Regional estimates suggest that licence usage has remained relatively constant in Zone B (that part of the western rock lobster grounds north of 30° S) and that the resulting catch has hovered at around 100 t per year. By contrast, licence usage has more than doubled in Zone C (south of 30° S) over the period surveyed and this has had a highly significant impact on catch over time. The average annual rate of increase has been estimated to be 6%.

In addition to licence usage, the recreational catch in Zone C has also been shown to be correlated with puerulus settlement indices recorded on the Alkimos collectors three to four years earlier. (Recruitment of lobsters to the fishery is dependent on puerulus settlement with a three- to four-year time lag.) As might be expected, sales of licences and associated usage figures are substantially higher in years of good recruitment into the fishery, which in turn results in those years producing a higher overall recreational rock lobster catch due to a combination of increased lobster abundance and higher fishing effort.

Puerulus settlement indices at Alkimos, which have been shown to be a reliable predictor of future recruitment in the southern region of the commercial fishery, have been used to predict the recreational rock lobster catch. Based on the strong settlement in the 1999/2000 season, along with the predicted increase in licence usage, it is forecast that the recreational rock lobster catch will increase to around 750 t in 2002/03 (Recreational Rock Lobster Figure 1) which would be a record recreational catch. Even higher catches are expected in 2003/04 and 2004/05.

WEST COAST BIOREGION

Licence sales and usage are also expected to increase over the next few years; the prediction is that sales will increase to approximately 40,000 and usage to 31,000 in 2002/03. However, the costs of buying a lobster licence increased in 2002 from \$25 to \$30 per year and it is not known what effect this might have on licence sales or usage patterns.

NON-RETAINED SPECIES

See commercial fishery status report.

ECOSYSTEM EFFECTS

See commercial fishery status report.

SOCIAL EFFECTS

With approximately 30,000 people taking approximately a million individual lobsters annually, this fishery represents a major recreational activity and provides a significant social benefit to the Western Australian community.

ECONOMIC EFFECTS

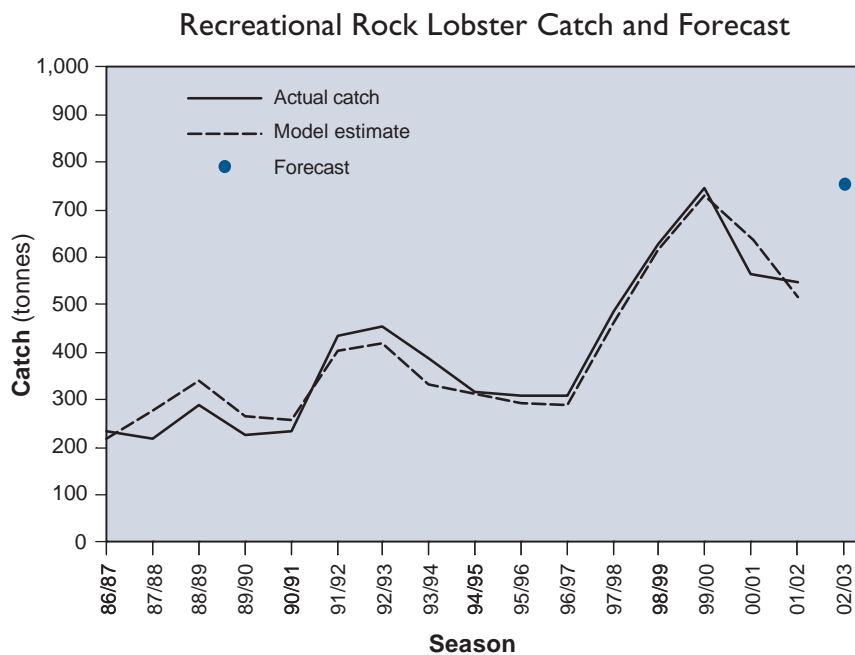
The direct value of the recreational catch in the 2001/02 season was about \$18 million, however this represents only a minor proportion of the economic activity generated by this sector through the use of boats, fishing gear etc.

FISHERY GOVERNANCE

While the annual take by the recreational sector in this fishery is subject to size, bag and pot usage limits and seasonal constraints, there is no direct control on the number of recreational licences issued.

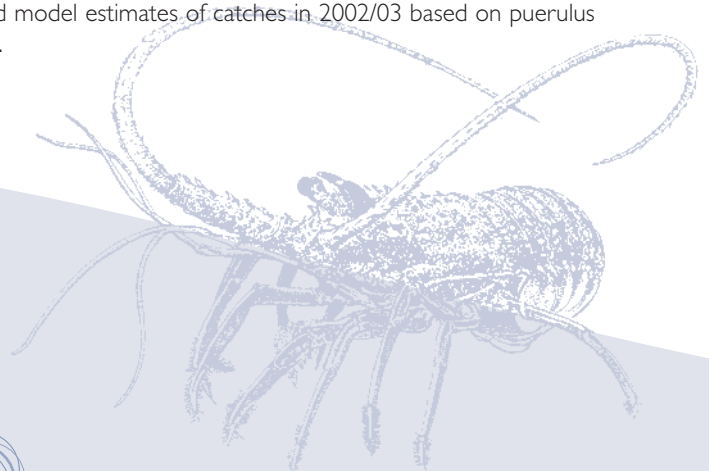
EXTERNAL FACTORS

The recreational catch is strongly influenced by the puerulus settlement in the metropolitan area, which in turn is responding to variations in the Leeuwin Current and related oceanographic factors.



RECREATIONAL ROCK LOBSTER FIGURE I

Estimates of the recreational rock lobster catch since 1986/87 and model estimates of catches in 2002/03 based on puerulus settlement three to four years earlier and expected licence usage.



Recreational Abalone Fishery

Management Summary

The recreational abalone fishery exploits three species (greenlip abalone, *Haliotis laevis*; brownlip abalone, *Haliotis conicopora*; and Roe's abalone, *Haliotis roei*).

Recreational fishing for Roe's abalone takes place mainly on the inshore reef platforms between Geraldton and Augusta, with a concentration of fishing activity around the Perth metropolitan area and Geraldton. South of Cape Naturaliste the larger greenlip and brownlip abalone are also taken in deeper water.

Recreational fishers are required to take out either a dedicated abalone recreational fishing licence, or an umbrella licence (which covers all licensed recreational fisheries). These licences are not restricted in number.

The minimum legal size for Roe's abalone is 60 mm with a daily bag limit of 20 per fisher. The minimum legal size for greenlip/brownlip abalone is 140 mm with a combined daily bag limit of 10.

A closed season applies to the Perth metropolitan area (Cape Bouvard to Wedge Island) and the Greenough area (Greenough River to Flat Rocks car park). Fishing is permitted in these areas for a total of nine hours over six consecutive Sundays, commencing on the first Sunday in November between the hours of 7.00 a.m. and 8.30 a.m. only. Elsewhere in the State abalone can be taken at any time of the year.

Following a review of the fishery a number of management arrangements will be introduced prior to November 2003. These changes include:

- The fishery will be divided into three zones: the Northern Zone (from Greenough River Mouth to the Northern Territory border), the West Coast Zone (from Busselton Jetty to Greenough River Mouth) and the Southern Zone (from Busselton Jetty to the South Australian border).
- Separate seasonal fishing times will apply to the West Coast Zone and the combined Northern and Southern Zones. The open season for the West Coast Zone will continue to operate for a total of nine hours over six consecutive Sundays, commencing on the first Sunday in November between the hours of 7.00 a.m. and 8.30 a.m. only.
- Abalone fishing will be permitted in the Northern and Southern Zones all day and the season will remain open until 15 May 2004. In future years the fishing season in these zones will only be permitted between 1 October and 15 May.
- The daily bag/possession limit for Roe's abalone species will remain at 20 per fisher while the maximum number of this species that may be stored at a person's permanent place of residence will be 80.
- The daily bag limit for greenlip and brownlip abalone combined will be amended to 5 per fisher. The possession

limit for this species will remain at 10 while the maximum number of this species that may be stored at a person's permanent place of residence will be 20.

The management controls for the recreational abalone fishery constitute the most restrictive input management regime for a recreational fishery in Australia. Arrangements are designed to complement the management plan for the commercial fishery by constraining and cost-effectively managing the proportional impact of the recreational fishery on abalone, and also protecting other molluscs and reef species such as echinoderms.

Research Summary

For research purposes, the recreational fishery for abalone has recently been reported in three main sectors: the Perth fishery (corresponding to the greatest concentration of fishing activity), and the west (excluding Perth) and south coast fisheries (corresponding to bioregional boundaries).

Catch and effort figures presented in this report are derived from two independent surveys: telephone surveys covering all of the State, and field surveys for the Perth fishery only. The telephone survey estimates the catch of all three species based on interviews stratified by licence type (abalone or umbrella) and respondent location (country or Perth metropolitan area) from the licensing database. The field survey estimates the catch and effort from each distinct Roe's abalone stock within the Perth fishery. Field survey results are based on effort estimates from head counts conducted from land and from aerial surveys. Catch rates and catch weight measures are obtained from interviews of recreational abalone fishers.

In addition to measuring the recreational catch, the Department's Mollusc Research section conducts a fishery-independent assessment of stocks in the Perth fishery. This is done by measuring size and density of abalone across the near-shore habitat at six indicator sites between Burns Beach and Penguin Island, the area which provides the majority of the recreational catch.

Licensed Recreational Abalone Fishery Status Report

Prepared by B. Hancock, T. Baharthah and N. Sumner

FISHERY DESCRIPTION

Boundaries and access

The Perth fishery extends from Cape Bouvard to Wedge Island. Access by recreational fishers to the Perth fishery is controlled by allowable fishing times (7.00 a.m. to 8.30 a.m.) and a limited season (six Sundays). There is also a small section of reef in the Greenough area of the west coast fishery (between the Flat Rocks car park and the mouth of the Greenough River) which operates under the same season and time restrictions as the Perth fishery. The Perth and Greenough season ran for six consecutive Sunday mornings from 3 November to 8 December during 2002.

The west coast recreational fishery sector includes all

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other areas of the west coast down to and including Black Point (close to Cape Beaufort). This delineation reflects the bioregion boundaries of the west coast. The south coast recreational fishery sector extends east from Black Point to the South Australian border. Both the west and south coast sectors are currently open for recreational fishing throughout the year.

For all three fishery sectors a daily bag limit of 20 Roe's abalone and a combined limit of 10 greenlip and brownlip abalone is enforced throughout the State. There is a daily boat limit of twice the legal bag limit if more than one licence holder is fishing. The minimum legal size for recreational fishing of Roe's abalone is 60 mm, and for greenlip and brownlip abalone 140 mm.

Main fishing method

Roe's abalone can be collected while wading or free diving, whereas greenlip and brownlip abalone are usually taken while free diving or diving on compressed air.

RETAINED SPECIES

Recreational catch (2002): Roe's Perth fishery 38 tonnes
Roe's rest of State 27 tonnes
Greenlip 30 tonnes
Brownlip 9 tonnes

All catches are shown in whole weight.

Calculating the recreational catch in tonnes requires estimates of the total numbers of each species of abalone caught and an estimate of the mean weight for each species in each recreational catch region (see Recreational Abalone Tables 1 and 2 and Figure 1). Direct estimates of the mean weight for recreationally caught abalone are available only for the Perth Roe's abalone recreational fishery, and then only for the 1999–2002 seasons. The weights used within the other regions and for the other species are based on the commercial catch weights and recreational minimum legal sizes (Recreational Abalone Tables 1 and 2).

As in previous years, the majority of Roe's abalone were taken in the Perth fishery. Catch estimates for the Perth fishery during 2002, derived from telephone and field surveys, were 39.3 t and 36.0 t respectively. Based on these estimates, the catch for the Perth fishery has decreased by about 18% from 2001. This was driven by a decrease in effort and catch rate, as the mean weight of abalone was similar in 2001 and 2002 (91.7 g and 89.7 g respectively).

The catch of Roe's abalone in the other areas of the fishery was estimated using telephone surveys stratified by recreational abalone and umbrella licence holders and residential location (Recreational Abalone Table 2). The estimated catch from the west coast has remained fairly steady (22.5 t, an increase of 4%) while the catch from the south coast (4.9 t) declined by 20%, driven by a decrease in effort.

The estimated recreational catch of greenlip abalone on the west coast (18.4 t) decreased by 22% over the 2001 levels, which is the first decrease since estimates commenced in 1999. The west coast brownlip catch estimate (4.6 t) decreased by

58% to the same level as 2000. The catch of greenlip abalone from the south coast decreased by 50% from 2001 to 11.4 t. This is the lowest catch recorded from this area (Recreational Abalone Table 2), with a 30% decrease in both catch rate and effort. The catch estimate for brownlip abalone from the south coast also decreased by 29% to 4.7 t, with a similar decrease in effort.

These catch estimates for the west coast and south coast are less precise than that for the Perth abalone fishery and have wide confidence limits. This is due to the smaller sample size and the reduced ability of fishers to recall past fishing trips over a period of 12 months, rather than six weeks in the case of the Perth abalone fishery. There may also be some incorrect identification amongst the three species. For these reasons, these estimates should only be regarded as preliminary indications of recreational fishing impact.

Fishing effort

The total recreational fishing effort during the 2002 Perth fishery was estimated at 26,300 fisher days from the telephone survey and 22,500 fisher days from the field survey. These figures represent decreases of 11% and 12% respectively over the 2001 estimates from the corresponding survey technique, but are still higher than effort in the years prior to 2001. These increases are consistent with the increase in the number of licences purchased to participate in the recreational abalone fishery, which rose to over 21,000 during the 2002 Perth season (including umbrella licences covering all licensed recreational fisheries), with 8,680 specific abalone licences (Recreational Abalone Figure 2). The telephone survey estimated that 6,900 of these licence holders participated in the Perth fishery, a slight decrease (6%) from 2001. Participation in 2002 was 33% of the total number of all valid licences (abalone and umbrella).

Fishing effort for the south coast and west coast fisheries has not been separated by species since it is possible to fish all species on the same day. Estimated effort in 2002 was 6,900 fisher days on the south coast and 17,500 fisher days on the west coast. This represents a decrease in effort for the south coast of 28% from the effort estimated for 2001, and a decrease of 5% for the west coast. Effort estimates for the south coast continue to decline, while the effort for the west coast is still substantially higher than in 1999 or 2000 (Recreational Abalone Table 2). The telephone survey estimated that 3,600 licence holders fished the west coast and 1,400 fished the south coast during 2002.

Catch rate

The catch rate during the 2002 Perth season was estimated at 16.7 and 17.9 abalone per fisher day by the telephone and field surveys respectively, a decrease of 5% over the 2001 figures for both techniques. The Roe's abalone catch rates on the south and west coasts were estimated at 7.9 and 14.3 abalone/day respectively, which were increases of 11% and 9% over 2001. The catch rates for greenlip were 3.5 and 1.6 abalone/day on the south and west coasts respectively, decreases of 31% and 18%. Brownlip catch rates were 1.1 abalone/day on the south

coast, which was similar to those for 2001, and 0.4 abalone/day on the west coast, which was lower than the 2001 rate of 0.9.

Commercial share: **Roe's 55–60% approx.**
Greenlip/brownlip 80% approx. (under review)

The commercial fishers in the Perth Roe's abalone fishery have caught their quota of 36 t in recent years. This was about 49% of the combined recreational and commercial catch in 2002, similar to the four-year average of 48% (1999–2002). For the State as a whole, the commercial Roe's abalone catch share was estimated at 55–60%.

For greenlip and brownlip abalone the commercial catches were 166.7 t and 27.5 t respectively. These catches represent about 85% and 75% of the estimated total take of these two species statewide.

Stock assessment completed: **Yes**

For the Perth fishery, size distributions and densities were measured from six indicator reefs, Burns Beach, Beaumaris, Waterman's Reserve, Mettams Pool, Bailey Street and Penguin Island. Surveys were conducted using quadrats placed at repeated positions along fixed transects oriented perpendicular to the shore, across the reef platform and sub-tidal areas of abalone habitat. All abalone within a quadrat were counted and measured. These surveys were conducted in January and February each year from 1996 to 2003 (post-season) to assess the effects of fishing and to get an indication of the stock levels available for subsequent seasons (Recreational Abalone Table 3). The abundance measures from January and February reflect the abalone stocks following the recreational fishery in November and December of the previous year.

Mean densities after the recreational season have remained fairly stable since 1996. There have been slight decreases in total abundance on the Bailey Street and Mettams Pool platforms that are mainly due to declines in the density of sub-legal-sized abalone. There has been no appreciable increase in the sub-tidal stocks at Bailey Street or at Mettams Pool, which has had a low abundance since 1997. Platform abundances at Penguin Island in 2003 were lower than previously recorded, possibly a response to the re-opening of Penguin Island to fishing in 2000 (reflected in the abundance measures since 2001). Abundances at the Burns Beach sample site have increased over the eight years of sampling. Beaumaris densities are showing signs of recovery in the sub-tidal portion of the stock. The Waterman's Reserve, which is closed to fishing, shows stable abalone densities over the period. All reef platforms sampled show a decline in density of sub-legal abalone in 2003.

Incidental mortality describes the number of animals that are killed as a result of recreational fishing but are not retained, and remain dead or moribund on the reef. Incidental mortality in the Perth recreational fishery was estimated from two sites in 1997 to be at least 5–20% of the retained catch. The study was repeated at a third site in 2001 and gave a minimum estimate of incidental mortality of 21% of the retained catch, which indicates significant wastage by the fishery. Incidental

mortality estimates are not available from the west and south coast regions, but are assumed to be lower for greenlip and brownlip abalone fishing, as these species are not taken from within the surf zone while fishing the reef platform. Estimates of the incidental mortality were not undertaken during the 2002 season.

The field surveys provide catch and effort data on a fine spatial scale that allows trends to be examined for each reef system. This provides a subsidiary means of stock assessment in areas which may have factors affecting abalone abundance that are independent of the overall view provided by the distribution of 'indicator' monitoring sites. Recreational abalone fishing at Cottesloe is one such instance. Since construction of the Cottesloe surf reef the pattern of sand deposition in the near-shore zone has altered, causing the abalone habitat at Cables Station to be covered in sand. This has removed at least one-third of the abalone population from the Cottesloe area. Effort and catch rates have declined in the remaining portion of the Cottesloe fishery resulting in catches falling to very low levels (Recreational Abalone Figure 3). Analysis of the recreational fishery data, results from occasional abundance surveys, and the genetic isolation of the area have led to the recommendation from Fisheries Research that the area be closed to abalone fishing for the foreseeable future.

West and south coast stock assessments are based on catch and effort data from the commercial fishery (see commercial fishery status report, pp. 113–118).

Exploitation status: **Fully exploited**

Breeding stock levels: **Adequate**

Research has shown that abalone size at sexual maturity (50% of animals mature) is below the State minimum legal size for all species. This is considered to provide adequate protection for the breeding stock. Roe's abalone stocks are further protected by the fact that commercial fishers in the Perth region and the eastern part of the south coast fishery fish to minimum legal size limits of 70 mm and 75 mm respectively, higher than the normal legal minimum size for Roe's abalone of 60 mm.

The densities measured at all of the stock assessment sites surveyed in the Perth fishery were considered to be high enough to allow an adequate flow of abalone to the breeding stock, and the level of recruitment of juveniles to the reef remains strong.

NON-RETAINED SPECIES

Nil. See the commercial fishery status report.

ECOSYSTEM EFFECTS

Habitat effects: **Low**

See the commercial fishery status report.

SOCIAL EFFECTS

Over 21,000 licences were issued that would have allowed fishers to participate in the recreational abalone fishery

WEST COAST BIOREGION

(Recreational Abalone Figure 2). The recreational fishery provides a major social benefit to sectors of the community which appreciate the abalone as a food.

ECONOMIC EFFECTS

Not available.

FISHERY GOVERNANCE

Recreational catch of abalone is controlled through size and bag limits, as well as season and fishing time restrictions. Under present management arrangements the Perth abalone fishery is a nine-hour fishery, operating for 1.5 hours a morning

for six mornings during the season. The number of licences available is not, however, limited and has been steadily increasing since 1995 (Recreational Abalone Figure 2).

There is no biological sustainability issue for the Perth Roe's stocks, given that the legal recreational minimum size (60 mm) is greater than the average minimum spawning size and fishers do not target significant stocks outside the aggregations. However, if preliminary data indicating a fall in average weight of abalone develop into a trend along with increasing participation rate, then changes in the operation of the recreational fishery would be advised to ensure the recreational and commercial fisheries are not negatively impacted.

RECREATIONAL ABALONE TABLE 1

Summary of effort (fisher days), catch rate (abalone per fisher day), catch (number of abalone and tonnes whole weight) and mean whole weight (kg) for the Perth recreational Roe's abalone fishery, from telephone and field surveys.

YEAR	TELEPHONE SURVEY				FIELD SURVEY				MEAN WEIGHT (kg)
	EFFORT (days)	CATCH RATE	CATCH (number)	CATCH (tonnes)	EFFORT (days)	CATCH RATE	CATCH (number)	CATCH (tonnes)	
1997					16,990	18.9	323,200		
1998					20,820	17.5	369,900		
1999	23,300	17.6	410,000	48.8	22,070	17.4	383,600	45.8	0.1195
2000	21,800	17.0	369,000	33.7	19,800	16.7	330,300	30.2	0.0913
2001	29,600	17.6	521,500	47.8	25,590	18.8	481,300	44.1	0.0917
2002	26,300	16.7	438,500	39.3	22,450	17.9	401,500	36.0	0.0897

RECREATIONAL ABALONE TABLE 2

Preliminary summary of effort (fisher days), catch rate (abalone per fisher day) and catch (number of abalone and tonnes whole weight) for the west coast (excluding Perth) and south coast recreational abalone fisheries, from telephone surveys.

Note: Field validation of aspects of these telephone-based surveys has yet to be undertaken, and may alter the individual species catch estimates when completed.

YEAR	EFFORT ¹ (days)	ROE'S ABALONE			GREENLIP ABALONE			BROWNLIP ABALONE		
		CATCH RATE	CATCH (number)	CATCH ² (tonnes)	CATCH RATE	CATCH (number)	CATCH ³ (tonnes)	CATCH RATE	CATCH (number)	CATCH ⁴ (tonnes)
WEST COAST										
1999	10,300	12.4	128,700	11.8	1.9	20,400	13.5	1.2	11,900	8.1
2000	9,800	12.7	123,500	11.2	2.3	23,400	15.5	0.6	6,900	4.6
2001	18,400	13.1	240,700	21.6	1.9	35,600	23.6	0.9	16,200	11.0
2002	17,500	14.3	250,300	22.5	1.6	27,900	18.4	0.4	6,900	4.6
SOUTH COAST										
1999	16,300	11.0	186,800	17.0	3.0	48,400	22.6	0.7	10,900	7.1
2000	13,000	7.3	90,900	8.3	5.0	67,500	31.5	0.8	11,400	7.4
2001	9,600	7.1	68,100	6.1	5.1	48,700	22.7	1.1	10,200	6.6
2002	6,900	7.9	54,600	4.9	3.5	24,400	11.4	1.1	7,300	4.7

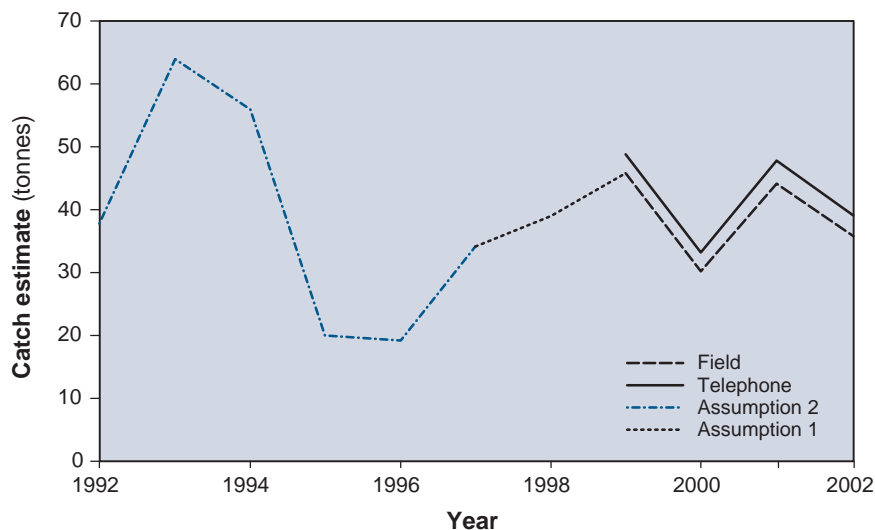
1. Effort is estimated for all species combined.
2. Mean whole weight for Roe's abalone is assumed to be 0.09 kg (mean weight measured from the Perth fishery for 2000).
3. Mean whole weight for greenlip is assumed to be 0.661 kg for the west coast and 0.467 kg for the south coast.
4. Mean whole weight for brownlip is assumed to be 0.675 kg for the west coast and 0.650 kg for the south coast.

RECREATIONAL ABALONE TABLE 3

Preliminary mean densities of sub-legal abalone (5 mm to 59 mm) and mean densities of legal-sized abalone (60 mm and over) from the six reef platform monitoring sites in the Perth fishery, measured as abalone/m². Densities are from quadrats placed at repeated positions along fixed transects oriented perpendicular to the shore across the reef.

YEAR	BURNS BEACH		BEAUMARIS		WATERMAN'S RESERVE		METTAMS POOL		BAILEY STREET		PENGUIN ISLAND	
	<60	60+	<60	60+	<60	60+	<60	60+	<60	60+	<60	60+
REEF PLATFORM												
1996	90	34	44	46			61	23	73	37		
1997	58	43	57	62	59	31	41	39	56	51	42	34
1998	77	42	57	65	63	46	50	31	71	38	54	50
1999	82	45	47	45	70	36	55	35	63	25	96	53
2000	91	46	39	47	39	45	61	27	65	21	76	55
2001	99	56	38	50	50	45	49	25	61	26	84	54
2002	107	61	24	45	54	49	30	26	52	33	77	53
2003	89	59	22	48	45	51	20	29	42	34	69	39
SUB-TIDAL REEF												
1997	3	14	4	12	12	24	15	17	4	33	21	30
1998	3	16	6	14	19	38	1	8	8	25	22	30
1999	5	14	10	12	18	35	0	0	4	16	10	21
2000	6	22	1	11	14	39	0	1	3	9	6	40
2001	6	19	3	14	13	35	0	1	4	10	11	36
2002	6	29	5	15	12	40	0	1	4	12	7	28
2003	6	27	2	17	8	32	0	1	10	14	23	35

Perth Recreational Abalone Catch Estimates



RECREATIONAL ABALONE FIGURE 1

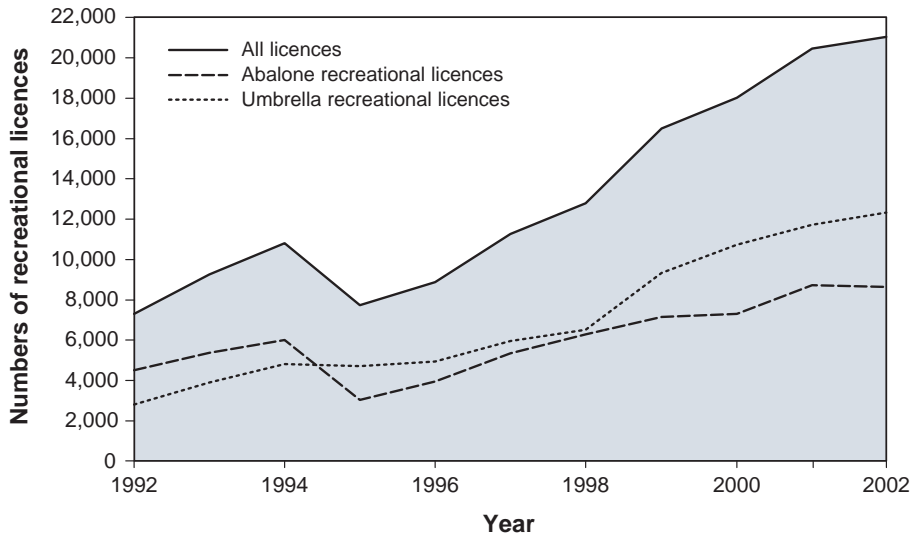
Catch estimates for the Perth recreational abalone fishery for the period 1992 to 2001, including backwards projections through time based on two assumptions.

Assumption 1: assumes that the mean weight of abalone taken during 1997 and 1998 is equal to the average of the two mean weight values measured for 1999 and 2000 (i.e. 105.4 g, averaged from 119.5 g in 1999 and 91.3 g in 2000). Numbers caught are estimated using the field survey technique (Recreational Abalone Table 1).

Assumption 2: assumes that effort from 1992 to 1996 is the average percentage of the potential effort utilised for the years 1997 to 2000; that the catch rate for the years 1992 to 1996 is the average of the annual catch rates for the years 1997 to 2000; and that the mean weight of abalone taken from 1992 to 1996 is the same as applied to 1997 and 1998 in Assumption 1.

WEST COAST BIOREGION

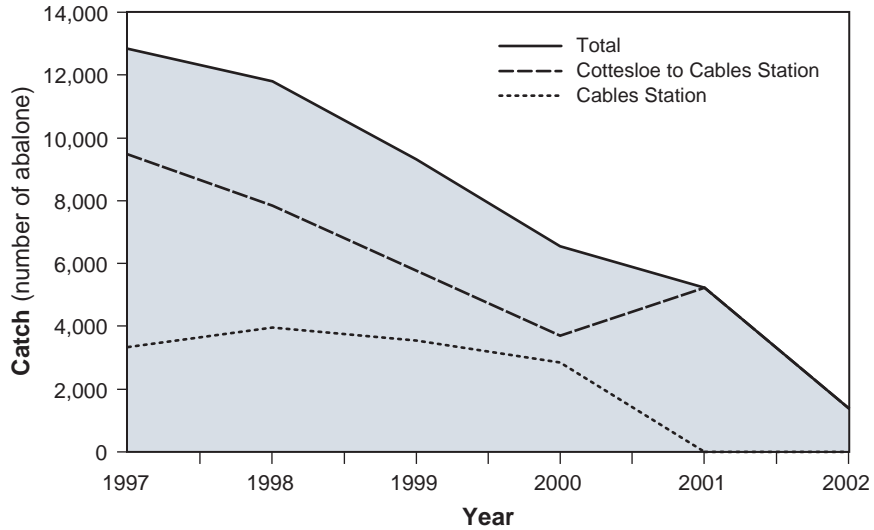
Recreational Abalone Licences



RECREATIONAL ABALONE FIGURE 2

The number of licences issued in the recreational abalone fishery, by licence type, for the period 1992 to 2002.

Cottesloe Recreational Abalone Catches



RECREATIONAL ABALONE FIGURE 3

Catch history for the Cottesloe area, separated into Cables Station and other areas of the Cottesloe fishery, mainly the Muderup Rocks area south of the Cottesloe groyne.

Recreational Tailor Fishery

Management Summary

The recreational component of the fishery for tailor (*Pomatomus saltatrix*) is currently managed under a suite of broad input and output controls for inshore species common to the west coast. The recreational proportion of the total tailor catch on the west coast is likely to be greater than 80%.

Tailor are a key target species for recreational anglers in the lower west coast estuaries, along the beaches and around coastal reef systems. This accessible distribution coupled with strong schooling behaviour makes the stock relatively vulnerable to growth over-fishing and potentially also to recruitment over-fishing. These risk factors, together with naturally variable recruitment and growing inshore fishing pressure, were first recognised in the early 1990s. Since that time, daily bag limits have been reduced from unlimited to 20, then to 8 per person. However the legal minimum size of 250 mm total length, which is well below the size at maturity, has not been adjusted.

The west coast regional review examined issues associated with ensuring the sustainability of tailor stocks, following which a reduced bag limit of 2 on tailor over 600 mm has been approved by the Minister for Fisheries for implementation on 1 October 2003. An increase in the minimum legal size to 300 mm is under consideration.

Research Summary

Research to support the management of tailor stocks was undertaken during the early 1990s. This research identified genetically homogeneous populations along the west coast of Western Australia, between Shark Bay and Cape Naturaliste. However otolith carbonate analysis suggests that the inner Shark Bay populations may remain separate after recruitment from populations outside and south of Shark Bay. Thus from a management perspective tailor located south of Shark Bay and within Shark Bay should be managed as separate stocks.

Concerns about increasing recreational fishing pressure on tailor in the greater Perth metropolitan area in the early 1990s initiated the change in the daily bag limit from 20 to 8 fish per angler, and prompted two research studies, a tagging and a short-term hooking mortality study. Further research has recently been completed which investigated the basic biology of tailor to provide information on the age structure, growth and reproduction of this important recreational species. These data will be included in future modelling of the dynamics of tailor populations to support management needs.

The scientific information from these research projects has been used to compile this status report.

Tailor Stocks Status Report

Prepared by S. Ayyazian and R. Steckis

FISHERY DESCRIPTION

Boundaries and access

Tailor inhabit coastal and offshore waters between Shark Bay and the lower west coast, with most of the fishing occurring in the west coast bioregion. This report presents available data from the west coast and Gascoyne bioregions.

The recreational catch limits for this species include a legal minimum length of 250 mm and a daily bag limit which during the season being reported was defined under the 'key angling and sport fish' category as a mixed bag of 8.

Main fishing method

Recreational: Rod and line.
Commercial: Haul net and gillnet.

RETAINED SPECIES

Recreational catch (season 2002): **Not assessed**

Recreational tailor catch estimates are not available for the current year (2002). The most complete estimates (all areas, all methods) are available from the National Recreational Fishing Survey funded by the FRDC. This survey was completed between May 2000 and April 2001 and estimated that a total of 587,041 tailor were caught in Western Australia during this period. The average weight per tailor was 0.391 kg. Therefore, the recreational catch for the State was estimated at 229.5 t (Henry and Lyle 2003).

Previously completed surveys have been limited in either the areas sampled or the methods covered. A boat-based angler survey was conducted between Kalbarri and Augusta during 1996/97. This estimated the tailor harvest at 26,627 fish (10 t), with the majority of the catch landed from the southern Perth region (Sumner and Williamson 1999). However, there have been no comparable surveys of shore-based catches from this region. Thus, given the total recreational catch reported during the national survey, the shore-based component is almost certain to comprise the majority of the catch.

Recreational catch information from a boat- and shore-based angler survey in the Gascoyne region (Steep Point to Exmouth Gulf) between 1 April 1998 and 30 March 1999 produced a total recreational catch of 6,631 tailor kept (4.95 t) (\pm 1,276 fish) with 1,567 tailor released. The greatest proportion of the Gascoyne tailor catch (87%) was taken from the Shark Bay Marine Park (Sumner et al. 2002). More recent 12-month boat-based-only creel surveys from Nanga, Denham and Monkey Mia, within Shark Bay Marine Park, reported a boat-based tailor catch of 1,774 fish (1.1 t) with 128 released during the 2001 survey, compared with 1,128 fish (0.8 t) and 72 released during the 2000 survey, and 1,294 fish during 1998/99 (Sumner and Malseed 2002).

WEST COAST BIOREGION

Fishing effort

The participation level for the tailor fishery in the west coast bioregion is unknown for 2002. Further analyses of the national survey will be used to provide effort levels for all methods and regions for the 2000/01 period.

The boat-based survey conducted between Kalbarri and Augusta during 1996/97 found totals of 453,000 fisher days (722,000 boat hours or 1,730,000 angler hours based on a mean of 2.4 persons fishing per boat) but most of these fishers would not have been targeting tailor (Sumner and Williamson 1999).

Similarly, the boat- and shore-based angler survey in the Gascoyne region in 1998/99 estimated a total of 243,000 fisher days (Sumner et al. 2002). Boat-based-only creel surveys in Shark Bay (ramps at Nanga, Denham and Monkey Mia) have produced estimates of 34,000 fisher days in the 2001 season and 35,000 in the 2000 season (Sumner and Malseed 2002), compared to 49,000 from the 1998/99 survey. Again, little of this effort is directed at tailor.

Catch rate

The mean catch rate for boat-based anglers from the southern Perth district targeting tailor in 1996/97 was 1.73 fish per angler day (Sumner and Williamson 1999).

**Commercial share: West Coast/Gascoyne 5.7 tonnes
Shark Bay 28.5 tonnes**

Commercial catches of tailor are recorded in CAES returns from the coastal fishing blocks and three major estuaries along the lower west coast (Swan/Canning, Peel/Harvey and Hardy Inlet). Wetline fishers in the coastal fishing blocks between Kalbarri and Cape Naturaliste reported a catch of 0.7 t, representing approximately 2% of the total 2002 annual commercial catch. The three estuaries reported a combined catch of 3.6 t, which is approximately 10% of the total 2002 annual commercial catch.

Approximately 83% (28.5 t) of the 2002 total State commercial catch was recorded from the Shark Bay Beach Seine and Mesh Net Managed Fishery. A further 3.9% (1.4 t) was recorded from wetline fishers in the Gascoyne region.

Stock assessment completed: Yes

A full assessment of the status of the stock is not yet available, although previous tagging studies have provided a basis for preliminary assessments. These studies (Young et al. 1999) provided data on growth and migration, and indicated that the stock experiences a mortality rate of approximately 10% on release of sub-legal-size fish. They also showed that about 21% of the total stock in the metropolitan region is located offshore.

Utilising these data, together with an age at first capture (based on survey data) of one year and preliminary estimates of fishing mortality rates undertaken in 1996, assessment modelling indicates a level of egg production at that time of around 36% of the unexploited stock's egg production.

Exploitation status: Not assessed

Breeding stock levels: Not assessed

Adult tailor contributing to the breeding stock are distributed from Shark Bay to the lower west coast where they are caught predominantly on offshore reefs. For this relatively heavily fished sector of the stock, the above assessment indicates that the breeding stock in 1996 was above the 30% minimum level generally accepted for this type of fish. Further information is however required on the more northerly (Gascoyne) components of the stock, to determine the overall breeding stock status.

As anecdotal evidence also suggests that the large breeding individuals along the west coast are increasingly being targeted by recreational fishers, there is also a need for specific data from this sector.

SOCIAL EFFECTS

The annual summer–autumn appearance of tailor along metropolitan Perth beaches is targeted by thousands of shoreline anglers each year.

ECONOMIC EFFECTS

Not available.

FISHERY GOVERNANCE

At this time, control of the exploitation rate is managed through a daily bag limit and a legal minimum size limit, however there is no limit on the overall catch taken by the recreational sector. Commercial catch is limited to south-west estuaries and Shark Bay where strict licence and gear limits apply.

EXTERNAL FACTORS

The offshore distribution of the spawning stock in the Gascoyne region suggests that the Leeuwin Current that flows through this area may be a significant factor influencing the larval distribution south into the west coast bioregion. Further work to assess the significance of this environmental influence on the fishery will be undertaken when sufficient years of recruitment data from the west coast estuaries become available.