MANAGEMENT DIRECTIONS FOR WESTERN AUSTRALIA'S RECREATIONAL FISHERIES

Issues and Proposals for Community Discussion

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Management Directions for
Western Australia's
Recreational Fisheries

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FISHERIES WESTERN AUSTRALIA
3rd floor, SGIO Atrium
168 St George's Tce, Perth WA 6000

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Section 1 Executive Summary

Over the past decade, increasing population, a growing tourism industry, improved facilities at many coastal locations and better access to remote areas have led to a significant growth in recreational fishing in Western Australia.

It is now estimated about 600,000 people go recreational fishing each year, compared to 284,000 people in 1987. Perhaps more significantly, it is estimated that the total recreational effort has increased from three million fishing days to over 10 million fishing days over the same period.

A major challenge for the Western Australian community is to ensure the sustainability of these resources in the face of growing pressure, and to ensure that the industries based on these resources are able to develop in a controlled and sustainable fashion which will optimise long-term benefits to the community.

Several recreational fisheries, including marron and Shark Bay inner gulf snapper, have shown definitive signs of over-exploitation due to recreational fishing, and there is little doubt that this trend will continue in many near-shore fisheries as the human population increases, unless a new and innovative approach to management is adopted and supported by the recreational fishing community.

Such an approach will need to not only identify and manage for the needs of the recreational fishing community, but also take into account total exploitation pressure and demands for use of fish resources and inshore waters by all sectors - recreational, tourism, commercial, conservation and Aboriginal.

The purpose of this paper is to outline the planning and management approach being taken for WA's recreational fishing sector by Fisheries WA, and provide background information on major trends and specific management arrangements in WA's major recreational fisheries. This paper should be read in conjunction with the recreational fisheries management papers listed in the references section.

One of the key initiatives outlined in this paper is the development of an outcome-focused planning approach to recreational fisheries management, which involves recreational fishing community stakeholders at both the strategic and operational levels in all planning processes.

This approach has involved the adoption of a set of key management principles and objectives for the State, with specific management arrangements and operational plans for each region of Western Australia.

These principles recognise that management objectives for recreational fisheries may differ from those of commercial fisheries and are not necessarily based solely around maintaining maximum sustainable yield from a fish stock. In addition to sustainability, which remains a fundamental principle that underpins fisheries management, in recreational fisheries the quality of the fishing, the diversity of opportunities available and the value to the individual and the community are also key goals.

A key element in the management approach for recreational fishing (including fishing charter tours) is an explicit recognition of the natural complexity and diversity of WA's marine environment, and the existence of identifiable biological regions, each with its own climatic, environmental and ecological characteristics.

A second element is a clear recognition that fishing pressure and the abundance and diversity of fish stocks varies significantly from area-to-area and region-to-region.

An important factor has also been the need to establish a framework which will assist in the management of the total catch by all sectors, and provide a basis for the development of resource sharing strategies.

Consequently, Fisheries WA has moved to a more regional approach to recreational fisheries and fishing charter tour management. This approach seeks to better link management to the biology and distribution of both fish stocks and fishing activity.

This process has commenced with the development of draft recreational fishery management strategies for the State's four major marine biogeographic-regions by community-based working groups, commencing with the Gascoyne and West Coast regions.

These regional management strategies aim to identify the key management issues in each region and propose effective solutions. Each strategy is based on a five-year review cycle, and will also identify the resources needed to provide effective fisheries management.

Generic issues considered in each region include the escalation in recreational fishing activity, both current and predicted; recreational catch levels; the adequacy of resources and research; education and compliance strategies; and the need for a more critical evaluation of management strategies for recreational fishing.

When discussing the future of recreational fishing, two major issues come to the fore: the provision of adequate funding for ongoing research, education and management and resource sharing with the commercial fishing sector.

Under current arrangements, recreational fishers contribute about 25 per cent of the total management cost for recreational fishing in WA through five fishery-specific licences. The remaining funding is met from the State Consolidated Revenue Fund.

There is no doubt that additional resources are required if we are to effectively manage the recreational catch and maintain the present high quality of fishing experience we enjoy. The question of securing sufficient funding to meet these demands requires widespread community consideration and debate.

Resource sharing is an issue relevant to all users of the resource, not just recreational fishers. Decisions about how these resources can be best shared between competing users can only be resolved by moving towards a more integrated approach to fisheries management. This issue is discussed in detail in another paper 'Protecting and Sharing Western Australia's Recreational Fisheries' (Fisheries Management Paper No. 135).

There is no doubt that Western Australia has a unique place in the history of world fisheries management, and that the WA community is the steward of one of the few remaining healthy recreational fisheries in the world based on wild fish stocks.

Unless the key issues and challenges facing the management of WA's recreational fisheries are properly met and necessary management supported by the community, there will be no 'fish for the future' and fishing opportunities will diminish to the point where recreational fishing in WA is no longer a quality experience.

Section 2 WA's Recreational Fisheries In Profile

2.1 WA's recreational fisheries

Western Australia's 12,000km coastline, inshore continental shelf and inland regions support nine major recreational fisheries.

Across these fisheries an estimated 600,000 people – or 34 per cent of the total population – target and catch a huge variety and quantity of finfish and shellfish.

While finfish stocks in estuaries and inshore areas are the main recreational attraction, crustaceans such as crabs, prawns, rock lobster and marron also have significant numbers of devotees, and form an important part of recreational fishing in the State.

The State's recreational fisheries are distributed between the four broad marine biogeographic regions of the Kimberley/Pilbara (wet and arid tropics), Gascoyne (tropical/temperate mixing zone), West Coast (warm temperate) and South Coast (cool temperate), and two major inland fishing regions.

The major recreational fisheries in these regions comprise four marine and estuary multi-species finfish fisheries, a temperate and a tropical freshwater finfish fishery, and licensed single species fisheries for western rock lobster, abalone, and marron.

From a biological perspective the boundaries of these bioregions are largely consistent with the major coastal 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.

Recreational fishing activity occurs in four main zones within each region. These are: 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.

The inshore marine fishery operates mainly out of boats smaller than five metres, and is most concentrated near major population centres, marinas and launch facilities and in areas such as Jurien Bay or Shark Bay where the inshore reef system or islands and promontories provide some protection from the oceanic swell and weather.

The offshore boat fishery operates mainly within the 50m depth contour, targeting demersal species such as dhufish, baldchin groper, pink snapper, emperors, cods and sea-perches. In areas such as Perth, Exmouth and Broome seasonal fishing for billfish and tunas is becoming an increasingly important part of the recreational and charter fishery.

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

2.1.1 State trends - recreational fishery performance and impact

2.1.1.1 Participation

Major trends in WA's recreational fisheries are clear from household surveys on participation. Data from a 1987 Australian Bureau of Statistics survey estimated that 284,100 people out of a State population of 1.185 million – or 26.6 per cent of WA's population over age 15 – went fishing at some time. Total recreational fishing days at the time of the survey were estimated to exceed three million.

In 1992 the Australian Bureau of Statistics estimated that 5,193 tonnes of seafood consumed domestically came from the recreational catch.

A survey by Patterson in 1994 (Patterson, K. unpublished, 1994) estimated 520,000 West Australians participated in recreational fishing — about 30 per cent of WA's population. Participation was consistent across age groups and included 46 per cent of the male population and 13 per cent of the female population, with a mean of 9.4 fishing days per fisher per year and an estimated total of almost 5 million fishing days.

Further phone surveys commissioned by Fisheries WA in 1996, 1997 and 1998 (Reark 1996, 1997, Right Marketing, 1998) indicated a growth in overall participation to an estimated 600,000 — an increase from 26 per cent to 34 per cent of the population in 10 years. These surveys also showed an increase in the average number of fishing days per person.

All surveys indicated that the fishing activity was unevenly spread among the fishing population. In 1997 less than 30 per cent of anglers accounted for nearly 70 per cent of the total number of fishing days, a further 35 per cent accounted for 25 per cent of the fishing activity, while the remaining 35 per cent accounted for less than 10 per cent of the total activity.

Fisheries WA catch surveys in Shark Bay (Sumner and Steckis, 1999) on the West Coast (Sumner and Williamson, 1999), the Gascoyne (Sumner and Williamson, in prep.) indicate that the distribution of the recreational catch is also highly skewed, with over 50 per cent of fishers catching no fish on any one day fishing trip, and the highest catches being taken by a minority of the remaining participants.

Different types of fishing also attracted different activity levels, with 31 per cent of fishers participating in several different fishing types. Favoured fishing experiences in 1997 were:

- Freshwater fishing: 13 per cent of fishers, with an average of 11.9 trips per year.
- Rock fishing: 25 per cent of fishers with an average of 6.9 trips per person per year.
- Estuarine fishing: 32 per cent of fishers, with an average of 9.7 trips per person per year.
- Boat fishing: 42 per cent of fishers, with an average 18.9 trips per year.
- Beach or jetty fishing: 61 per cent of fishers with an average of 10.1 trips per person per year.

A 1999 survey by Fisheries WA (Bahartah and Sumner, in prep) showed a participation rate of 34 per cent with a mean of 18 fishing days per fisher per year, and a total effort of 10 million fisher days. This contrasts significantly with the 1987 estimate of three million fishing days.

While data from these surveys are not directly comparable, there is a clear upward trend in both the total rate and frequency of participation in recreational fishing. Recreational fishing effort appears to be growing at a rate faster than the population.

The increasing popularity of fishing as a recreational activity is also evidenced by the number of television shows, magazines and newspaper columns on recreational fishing and the popularity of events such as the annual Perth Boat, Dive and Fishing Show.

Even at current participation rates, recreational fishing effort is expected to increase significantly in the future with population growth.

2.1.1.2 Catch

Current estimates of recreational fish catches and impacts are mostly based on regional or species-specific surveys.

Fisheries WA currently has a program of regional catch surveys which commenced in 1996/97. This program will ultimately provide baseline information for all species across all regions. An additional survey across the entire State in 2000/2001 will also provide an overview of the total recreational catch for all the most frequently caught species.

Log book programs for the charter industry, fishing clubs and volunteer anglers supplement this information.

However for the moment the picture on total recreational fishing impact is incomplete. Total catch and effort can be estimated for the licensed rock lobster, marron and abalone fisheries across a number of years, but fishery performance and impact information for other fisheries is only available for the particular species, fisheries and years in which surveys were conducted. Much of this information is not directly comparable, and can only serve to highlight major trends over long periods of time.

For example, a 1996/97 boat ramp survey of the West Coast region between Augusta and Kalbarri estimated that recreational fishers landed 130 tonnes of prized dhufish - or 29,000 fish, and released a further 60 tonnes. Data for previous years is not available.

The results of recreational catch surveys are held in a recreational fisheries database at the WA Marine Research Laboratories and published in Fisheries WA research reports.

2.1.2 Economic impact

In 1991 Economic Research Associates (Lindner, R. and McLeod, P. 1991) undertook a survey of participation and expenditure patterns of recreational fishers in WA. This survey estimated that recreational fishing activity had a direct expenditure of $205m in 1989/90, and indirect impact of $184m, giving an aggregate impact of $389m and an employment impact of 5,700 full time jobs.

A regional survey of fishers in the Gascoyne Region in 1996 (Sumner and Steckis, 1999) found that 62 per cent of fishers spent more than $751 in the region on their trip, while 25 per cent spent more than $2,000.

The State economic impact was updated by a repeat survey in 1998, based on a State population of 1.755 million and a participation rate of 36 per cent. Direct expenditure associated with recreational fishing was estimated at of $299m in 1995/96, giving an aggregate impact of $569m and an employment impact of 7,000 full time jobs.

2.2 Environmental influences

The productivity of WA's fisheries is affected by two major factors: natural environmental variation and human use through exploitation of fish stocks and impacts of coastal development.

In WA waters the natural productivity of marine ecosystems is largely driven by the availability of nutrients from sea floor macrophyte communities such as macro-algae and sea grasses.

The conditions that provide highly productive marine fisheries through massive nutrient flows into the system from oceanic upwellings, land runoff or major current systems simply don't exist in the WA marine environment.

Instead a steady but comparatively low level flow of nutrients is provided through living seafloor macro-algae and coral communities and the gradual decay of organic matter, supported by periodic zooplankton blooms.

Environmental influences appear to have a significant effect on the seasonal abundance of most fish species, and are a key factor in the survival of fish larvae and juveniles.

Major environmental influences include the warm, low nutrient Leeuwin Current which flows southward from the Indonesian archipelago. It flows most strongly during the autumn and winter months (April to September), influencing water conditions and the reproductive and migratory activity of marine life as far south as the Great Australian Bight. The Leeuwin Current is highly variable from year to year, running as fast as three knots in some years and varying markedly in its proximity to the coastline.

The cooler Capes Current, which flows inshore from Cape Leeuwin northward up the west coast as far as Shark Bay during the summer months, is also thought to influence the survival and distribution of larvae and juveniles from fish species such as tailor which spawn in spring and summer.

Also of importance are the three to five year cyclical variations in coastal climate including rainfall and ocean temperatures driven by the ENSO effect (El Nino and La Nina events), and single climatic events such as cyclones and severe winter storms which stir up sediments, damage seafloor communities and change water conditions.

A notable feature of the WA marine environment is that despite 200 years of industrial and coastal development in WA more than 95 per cent of the marine environment remains in a healthy condition.

2.3 Pilbara/Kimberley

The Pilbara and Kimberley regions have historically experienced the lowest fishing pressure in WA, with boat fishing focused around major population centres such as Karratha/Dampier, Port Hedland and Broome.

In recent years significant growth in recreational fishing activity has become apparent with a booming fishing-based tour and eco-tourism industry based around the region's reputation as remote and pristine.

Creek systems, mangroves and rivers, and ocean beaches provide shore and small boat fishing for a variety of marine and freshwater species including barramundi, tropical emperors, sea-perches such as mangrove jack, trevallies, sooty grunter, threadfin, mud crabs, and cods.

Offshore islands, coral reef systems and continental shelf waters provide species of major recreational interest including many members of the demersal sea perch family (Lutjanidae) such as scarlet sea perch and red emperor, cods, coral and coronation trout, sharks, trevally, tuskfish, tunas, mackerels and billfish.

Recreational fishing activity shows distinct seasonal peaks, with the highest number of visitors during the winter months. An estimated 6.5 per cent of the State's recreational fishers fished marine waters in the Pilbara/Kimberley during 1998/99, while a further 1.6 per cent fished freshwater in the region.

A survey commissioned by the East Kimberley Recreational Fishing Advisory Committee and the Kimberley Development Commission in 1995/96 showed the importance of recreational fishing in the Kununurra area (Kewagama Research, 1996).

The 12 month survey indicated that 50 per cent of respondents participated in recreational fishing, reporting an average of 19.6 days per angler fishing in the past 12 months, with a mean annual expenditure of $821 per angler. A total effort of 34,500 fishing days was estimated for the east Kimberley Region, with a total expenditure of $1.1m.

Fishing charters and fishing tournaments are also an area of growth in the region, and have seen surges in popularity over the past five years or so. The Dampier Classic and Broome sailfish tournaments are both State and National attractions, and WA is gaining an international reputation for the quality of its offshore pelagic sport and game fishing.

Major issues include the maintenance of water quality and levels in the lower Ord River, control of illegal fishing in remote areas, growth in fishing charter tours, particularly in the Broome area, and competition with the commercial sector.

A significant opportunity exists for the creation or enhancement of barramundi stocks in the Kununurra area as a drawcard for sportfishing tourism.

Specific management arrangements in place for the Kimberley/Pilbara in addition to "Statewide" bag and size limits include:

- A ban on the use of recreational set nets throughout the Kimberley/Pilbara, and ban on all netting in inland waters.

- Separate possession and size limits for barramundi in the lower Ord River to protect the high quality recreational fishing and aquatic ecotourism currently found there from excessive fishing pressure.
- A recreational fishing priority area consisting of a commercial fishing closure and separate bag limits for tropical rock lobster in the Dampier Archipelago.
- A recreational fishing and eco-tourism priority area at Rowley Shoals which includes a ban on the take of key reef species and a prohibition on commercial fishing in the vicinity of the Shoals.
- "Recreational only" mud crabbing areas consisting of commercial mud crabbing closures near Derby, Broome, Port Hedland, Karratha and the whole coast south of Onslow.
- A recreational fishing priority area consisting of a commercial fishing closure in the Lower Ord River upstream of the old quarantine zone boundary.
- A recreational fishing priority area consisting of an inshore closure to commercial trap and line fishing (northern demersal scalefish fishery) between Point Coulomb and Cape Bossut out to 12 nautical miles (nm).
- Limited commercial fishing within 12 nm of the coast throughout the Kimberley and a total ban on the use of fish traps.

There is also likely to be considerable pressure in the future to apply specific management controls in areas declared as marine reserves, and differential controls on charter fishing boats.

2.4 The Gascoyne

Recreational fishing activity in the Gascoyne has increased significantly since the early 1980s. Estimates of recreational fishing participation in the region in recent years range between 6.5 and 11 per cent of the State's fishers or 40,000 - 60,000 fishers a year (Fisheries WA, 1999).

Fishing activity tends to peak between April and August each year. Most fishers stay an average of less than two weeks and intend to fish every day (Fisheries WA, 1996). Assuming an average of 10 days fished, this would equate to some 350,000 - 600,000 fisher days each year. The majority of fishers come from Perth (60 per cent) or rural WA (35 per cent), with three per cent being based locally and the remainder from the Eastern States.

Direct expenditure by recreational fishers in the region is significant, and is estimated in the order of $50m a year, making recreational fishing-based tourism the region's second most valuable industry after commercial fishing.

A 12 month creel survey conducted by Fisheries WA in the Gascoyne region in 1998/99 indicated that the recreational catch of all species is significant (Sumner and Williamson, in prep).

The dominant species taken by recreational fishers and preliminary estimates of total catch from the 1998/99 creel survey include pink snapper (60 tonnes), spangled emperor (30 tonnes), blue-lined emperor (black snapper - 21 tonnes), and narrow-barred Spanish mackerel (21 tonnes). Other important species in

the recreational catch include rock lobster, golden trevally, red emperor, yellow-tailed emperor, cod, cobia, mulloway, tailor, baldchin groper, coral trout and tuskfish.

The Gascoyne has also experienced a significant escalation in recreational fishing activity since the early 1980s. A 1983 survey indicated the total recreational pink snapper catch for whole Shark Bay region was 45 tonnes, with a estimated catch from Monkey Mia of five tonnes.

Increases in the number of visiting recreational fishers from 1993/94 and the location of a major spawning ground for pink snapper off Monkey Mia in the eastern inner gulf led to significant numbers of spawning pink snapper being taken by recreational fishers. This was highlighted in a 1995 catch survey which indicated that over 100 tonnes of snapper were taken by recreational fishers from the Monkey Mia area alone over a three month period. The commercial catch in this area at the time was less than three tonnes.

This catch was taken by an average of 14 boats with two to three people aboard fishing each day during the three month aggregation period.

Revised management arrangements for Shark Bay's eastern and western inner gulfs were introduced in 1997, following scientific advice that identified a major risk to the sustainability of pink snapper stocks in these areas.

Management arrangements included revised bag limits for all species in order to contain the potential transfer of fishing pressure from snapper.

Additional arrangements for eastern inner gulf snapper fishery were implemented in 1998 following further scientific evidence that stocks in the eastern gulf remained at a high risk of collapse.

Research estimates indicated there may be as little as five tonnes of mature spawning snapper remaining in the eastern gulf (a notional biomass estimate of a "virgin" stock would be in the order of 300 tonnes). The package included a ban on the take of pink snapper in the eastern gulf until research monitoring shows the spawning stock has recovered to a target level of 100 tonnes.

Ongoing biomass surveys indicate that the western gulf stock has also been depleted to a level well below the original biomass with a best estimate of 100 tonnes of spawning fish. A recreational catch survey in 1998 estimated that the recreational catch of pink snapper in the western gulf was 38 tonnes, 12 tonnes of which was caught in Denham Sound and 26 tonnes in Freycinet Estuary. This level of catch is considered to be excessive given the 100 tonne estimate of spawning biomass, and not sustainable at current breeding stock levels (it is generally accepted by scientists that taking fish up to a level of 25% of the spawning biomass is within sustainable limits).

Conservation values are also important in the region with two major Marine Parks in the region, Ningaloo and Shark Bay. The uniqueness of Shark Bay has been recognised through its declaration as a World Heritage Area.

In 1992 specific management controls were introduced for Ningaloo Marine Park, including a total mixed bag of seven fish per day and a possession limit of 17 kilos of fish per fisher. These were introduced to

help sustain the diversity of marine life and preserve the quality of recreational fishing in face of increasing numbers of visiting recreational fishers.

Recreational fisheries management arrangements for the Gascoyne are currently under review.

Generally speaking, commercial fishing between Tantabiddi and Point Maud is prohibited by a licence condition.

2.5 The West Coast

The West Coast, between Kalbarri and Augusta, attracts the highest level of recreational fishing activity in the State, with around 380,000 anglers fishing an estimated four million fishing days a year. The total effort in this area for the boating sector was estimated at 453,000 angler fishing days in 1996/97 (Sumner and Williamson, 1999).

Within this region the Metropolitan coastal waters between Yanchep and Mandurah attract about 227,000 fishers, generating an estimated 2.4 million fishing days a year.

Major species in the shore and inshore boat catch include Australian herring, whiting, skipjack trevally, blue swimmer (manna) crabs, King George whiting, tailor, garfish and squid.

An Australian Bureau of Statistics survey (ABS, 1987) indicted that the key target species in the west coast region in 1987 were Australian herring, whiting, blue swimmer crabs, snapper, dhufish, Australian salmon and marron.

By contrast, data from a marine boat catch survey conducted by Fisheries WA in 1996/97 indicates that the main species targeted were, in order, dhufish (17%), rock lobsters (14%), herring (11%), King George whiting (8%), other whiting (9%), pink snapper (6%), blue swimmer crabs (6%), skipjack trevally (5%), squid (4%) and tailor (3%).

However, the most numerous species in the recreational boat catch are, in order: whiting, Australian herring, skipjack trevally, King George whiting, squid, garfish, wrasse, dhufish, snook, tailor, blue mackerel, and pink snapper. (Sumner and Williamson, 1999).

Estuaries including the Swan-Canning, Peel-Harvey, Leschenault and Hardy Inlet are highly popular recreational fishing areas and produce catches of black bream, cobbler, tailor, mulloway, flathead, flounder and a suite of marine species.

King and river prawns also provide a highly seasonal and variable fishery in the Swan-Canning and Peel-Harvey estuaries.

Blue swimmer crabs are the target of WA's largest recreational fishery, with over 80,000 participants. Major fishing areas include the Swan River, Cockburn Sound, Peel-Harvey Inlet, Leschenault Inlet and Geographe Bay. Catch surveys for these areas indicate that the total recreational catch is likely to be between 400 and 500 tonnes per year (two million crabs), with over half of this coming from the Peel-Harvey estuary.

Average catch rates range from six crabs per boat per trip in the Swan River to 20 crabs per boat per trip in the Peel Harvey Estuary (Malseed and Calligaro, in press). A significant proportion of crabs caught are released, generally because they are under size. The Leschenault Survey indicated that for every crab fishers kept, another three to four were released.

Key issues facing WA'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 nearshore waters and competition for the available resource with the commercial wetline and demersal gillnet fleet, commercial crab fleet and commercial estuarine fishery.

Recreational management arrangements specific to the west coast include:

- A reduced bag limit for black bream in the Swan-Canning introduced in 1999.
- A closure to bream fishing in Lake Clifton.
- A raft of localised netting controls including a prohibition on recreational netting in the Swan River introduced in 1988, unattended netting one night a week in the Peel-Harvey estuary and a seasonal closure to recreational netting in the Peel-Harvey and Leschenault Inlets to protect breeding cobbler.
- A recreational fishing (angling) priority area consisting of a prohibition on commercial fishing, netting and spearfishing in the waters of Rottnest Island.
- Recreational fishing priority areas in the Swan and Canning Rivers consisting of commercial fishing closures upstream of the Causeway (Plain Street) and Second Avenue in Rossmoyne and downstream of a line between Point Walter and Point Resolution.
- A reduced bag limit on large snapper in Cockburn Sound.
- A ban on commercial fishing for snapper in Cockburn Sound on weekends between September and December.
- Specific abalone seasonal controls in the Perth metropolitan area.
- Recreational abalone fishing priority areas and resource sharing through a ban on commercial fishing on reef platforms and between North Mole and Trigg Island, and a higher minimum legal size (70mm) for commercial fishing licence holders.
- A lower minimum legal size for King George whiting than the south coast (25cm) - this limit is applicable to both commercial and recreational catches.

Additional requests have also been made in recent times for specific management controls for the proposed Jurien Bay Marine Park, Abrolhos Islands Fish Habitat Protection Area, prawn drag netting in Peel-Harvey and Leschenault Inlets, and crabs in Cockburn Sound and Geographe Bay.

2.6 The South Coast

Recreational fishing participation for the south coast of WA, between Augusta and the WA/SA border is estimated at 180,000 anglers per year generating 1.8 million fishing days (Sumner et al, 1999).

Key recreational fishing areas include the major estuaries of Walpole-Nornalup, Wilson Inlet, the Albany Harbours, Bremer Bay, Hopetoun, and Stokes Inlet.

Major target species in estuaries include black bream, King George whiting and silver trevally, while shore fishing focuses on Australian salmon, herring, whiting and silver trevally. Boat fishing is concentrated near major population centres with the major target species being pink snapper, queen snapper, blue groper, shark and red snapper.

A shore based survey of recreational catches on the south coast conducted in 1993/94 estimated that the total recreational catch of herring was 147 tonnes in that year (with a further 100 tonnes taken on the west coast). No other data is available on the recreational fishery on the south coast.

Management issues include resource sharing conflicts between the recreational line fishery and the commercial estuarine fishery, particularly in Wilson and Stokes inlets, and concerns over the impact of commercial fishing on food chain species such as pilchards. Illegal "shamateur" fishing for high-value green and brownlip abalone and rock lobster is also a periodic issue.

Since 1996 a number of commercial fishing licences have been bought out in fisheries important to the recreational sector including six herring trap net licences, two salmon netting licences and eight estuarine fishing licences.

Management arrangements in place specific to the south coast include:

- Separate minium legal size for King George whiting (28cm on south coast);
- A recreational fishing priority area in Walpole-Nornalup Inlet which consists of a prohibition on all commercial fishing; and
- Separate minimum legal size for pink snapper in Wilson Inlet (28cm).

2.7 Aquatic tour (charter) industry

In 1998 the Minister for Fisheries announced a management program for the fishing and aquatic eco-tour industry in response to a major review by an industry/community working group.

The Tour Operators Fishing Working Group (TOWFG) identified a rapid growth in the charter fishing fleet - from just 40 boats in 1990 to 135 in 1997 - and major concerns expressed by industry participants and recreational fishers about the sustainability of fish resources in the face of this escalation in fishing activity.

A call for expressions of interest in fishing tour licences by Fisheries WA in 1998 has resulted in over 500 registrations being received.

It is expected management arrangements for fishing tour and aquatic ecotour operators will be introduced in early 2000.

Key recommendations approved by the Minister for Fisheries for management of the fishing tour industry were:

- All fishing tour and aquatic eco-tourism operators to be licensed under the *Fish Resources Management Act*, 1994 (FRMA).
- Management to be based on four main fishing regions.
- A benchmark date of September 1997 to apply as part of the entry criteria.
- A log book system to record catch and effort be established.
- A moratorium be placed on increased fishing effort in the industry once the initial round of licences are issued, until sufficient data from the logbook system identifies the relative impact of charter operations on key fish stocks.

2.8 Licensed fisheries

The licensed fisheries for rock lobster, marron, abalone, south west freshwater finfish and netting attract significant numbers of people, and form an important part of the State's west coast recreational fisheries.

The management principle of licensing "high value" and vulnerable species or stand alone fishing methods which are difficult to police without a user registration system was established in 1990 in the first review of recreational fisheries management.

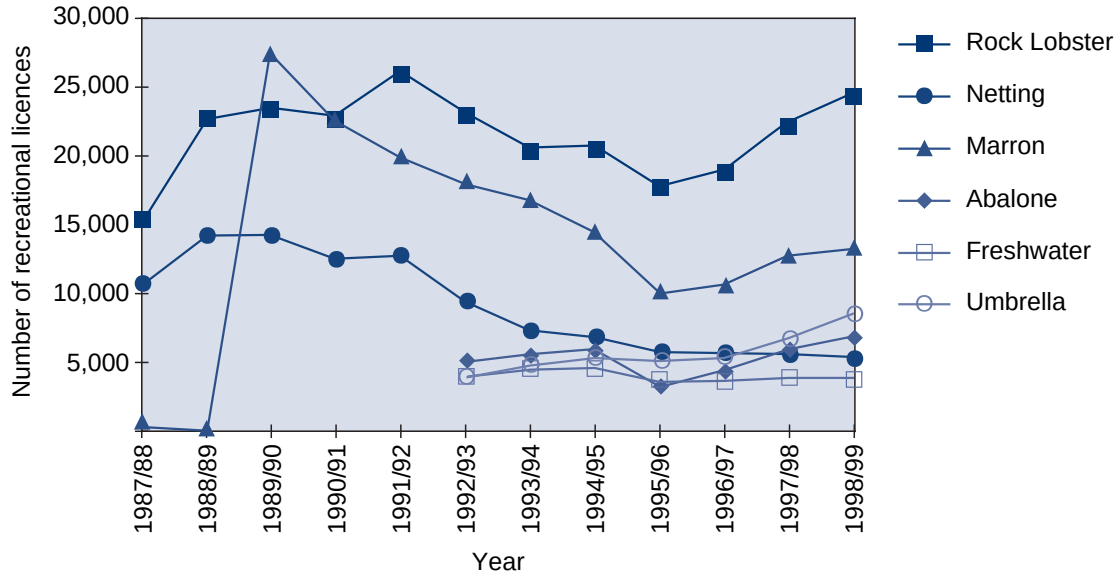
Specific licences for recreational fishing activities have mainly been used to improve compliance with rules for high value species, but have also increased community awareness of fishing rules and resource conservation, and assisted with collection of research information.

Licences also provide some revenue towards management costs for the recreational sector and in 1998/99 raised some $1.5 million in revenue for the Recreational Fishing Trust Account. Funding is dedicated to recreational fisheries management under the FRMA.

In 1998/99 Fisheries WA issued licences to 56,899 people. These consisted of 24,344 rock lobster licences, 13,114 marron licences, 6,790 abalone licences 5,331 netting licences, and 3,707 freshwater angling licences. An additional 8,388 "umbrella" licences, which encompass all categories of licence available, were also issued.

Key elements driving participation appear to be community perceptions about the quality of fishing available, changes in licence fees, and the level of pre-season promotion in any given year for a particular fishery.

Figure 1: Recreational licences issued since 1987/88. Figures for each fishery exclude the total number of "umbrella" licences, which are shown separately.



2.8.1 Rock lobster

Western rock lobster *(Panulirus cygnus)* is distributed from Augusta on the south coast as far north as the Muirion Islands in the Gascoyne Region.

The rock lobster fishery is one of the more successfully managed and valuable single species fisheries in the world.

The recreational rock lobster fishery is concentrated between Kalbarri and Augusta and operates within 1-2 km of the shoreline in depths of less than 20m, which are also the nursery grounds for rock lobster with many undersize lobster present.

Most fishing occurs around the Perth metropolitan area and Geraldton, but increasingly Jurien Bay and the reef areas in Shark Bay and North of Carnarvon are becoming focal points for seasonal fishing activity.

Historically, management of the fishery has focussed on the commercial sector, with changes to management controls such as size limits, protection of females in breeding condition and seasonal closures also automatically applying to recreational fishers. In the past it is estimated that recreational fishers have taken about 500 tonnes (less than 5 per cent) of the total catch, however a survey estimates this rose to approximately 7 per cent in 1997/98.

A total of 32,732 licences (including 8,388 "umbrella" licences) were issued in 1998/99, up 15 per cent on 97/98 levels. With even better catches predicted for 99/2000 it is likely licences may rise further, as licence sales appear to track catch predictions.

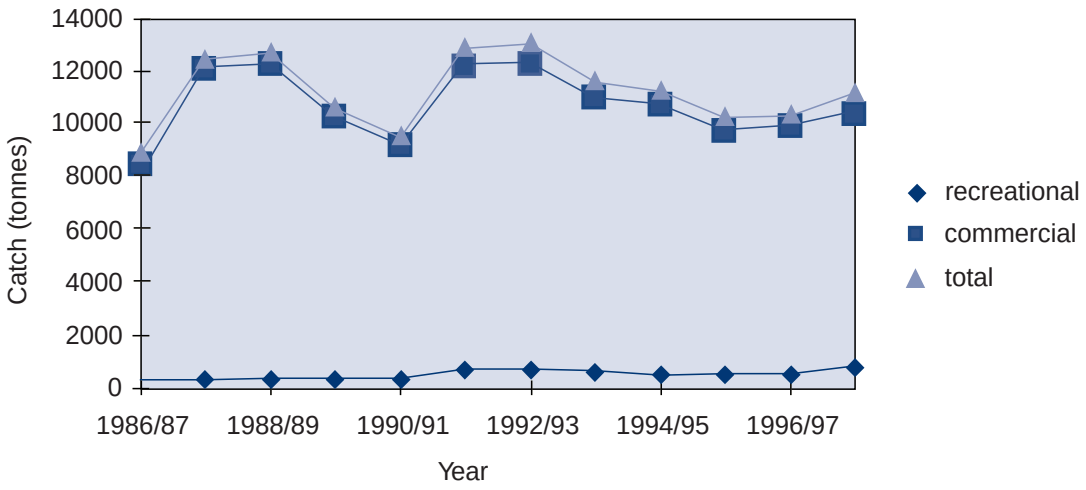
Recreational fishing controls include licensing, gear restrictions, bag and size limits and protection of breeding females. In addition, a restricted fishing season operates between November 15 to June 30 .

With the fishery proven to be sustainable under current management arrangements, the objective of management of the recreational sector is to maintain or improve the quality of fishing for rock lobster. The major issue of concern is competition with the commercial sector, particularly around key population and tourist areas. The major conflict between the two sectors occur during the "whites" when both users are targetting inshore reef systems.

The equitable distribution of catch among recreational fishers is also a growing issue, with a small number of fishers reportedly taking large numbers of lobster each year (anecdotal evidence suggests in the vicinity of 300). This is particularly relevant in recreational fishing priority areas such as Rottnest where recreational users are solely competing for the resource.

Key management issues which will need to be addressed in the next five to 10 years include pressure from the commercial sector to reduce recreational bag limits and total catch, illegal sale of rock lobster by recreational fishers, and sharing the catch better within the recreational sector.

Figure 2: Western rock lobster catches by sector.



2.8.2 Marron

Marron *(Cherax tenuimanus)* are a freshwater crayfish unique to Western Australia, and are distributed in a series of discrete populations in dams and river systems throughout the south-west of the State.

Stocks of marron have been extended well beyond their original range through translocation, and can now be found as far north as Hutt River near Geraldton and as far east as Esperance. No commercial fishing of wild marron stocks is permitted.

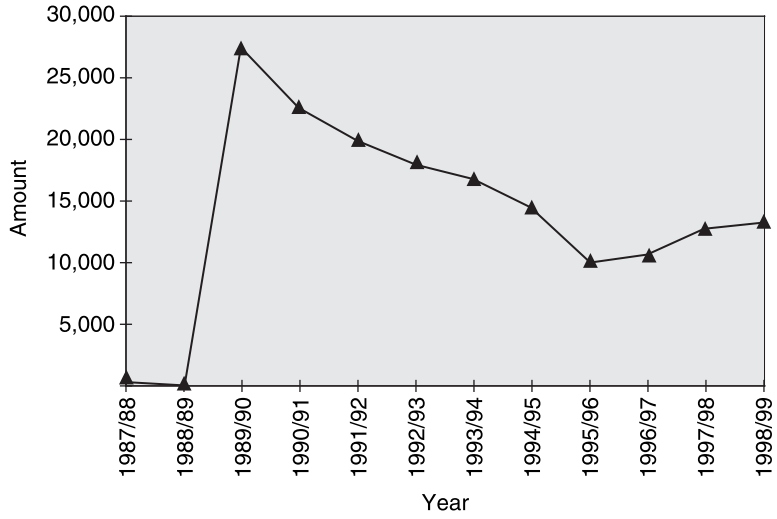
The marron fishery is exclusively recreational and is concentrated in the major irrigation dams between Perth and Bunbury, however significant levels of fishing also occur in all major river systems. In recent years the warmer freshwater in the Geraldton area has also become an important element of this fishery.

A recreational fishing licence is required to take marron and 21,502 licences were issued in 1998/99, (including 8,388 "umbrella" licences). Although the number of marron fishing licences issued for the 1999 season increased from 19,192 in 1997/98, 1,828 of these were an increase in the number of "umbrella" licences.

Phone surveys indicate that the participation rate has declined to 65.2 per cent of licence holders from 84.4 per cent in 1998. The average number of trips made per active licence also declined in 1998/99 to 2.9 trips per fisher from 3.7 trips in the 1997/98 season.

The popularity of snaring as the sole method of capture increased in 1999 and now accounts for 29.7 per cent (25.1 per cent in 1998) of all marroning trips.

Figure 3: Issued marron licences (excluding "umbrella" licences).



In recent years, management changes have included a bag limit reduction from 20 to 10 marron per day. Management also continues to emphasis snaring as the preferred method of capture in specific waterways.

"Snare only" waters were first introduced in the 1990 season, and have received widespread support from the community. Seven specific areas have now been set aside for snaring only.

Major concerns with the marron fishery relate to its ability to withstand the existing levels of fishing pressure, particularly in low rainfall years which are linked with poor recruitment.

Post-season reviews are conducted regularly and can result in changes to management. In 1988 - 1990 the marron fishery was closed due to over fishing. The total annual catch for the marron fishery in 1998/99 was estimated at 20 tonnes, which has declined from an estimated 50 tonnes in 1990.

The marron fishery is a major focus for fisheries compliance activities, with research indicating out of season fishing activity prior to the opening of the fishery on some water bodies.

The future management of the marron fishery will need to focus on improving compliance with the fishing season, increasing the use of snares rather than scoop and drop nets, and better identifying fishing pressure and the stock condition in specific waters.

Environmental and water quality degradation is also a major issue, as is the loss of traditional recreational fishing waters due to an expanding drinking water supply scheme.

2.8.3 Abalone

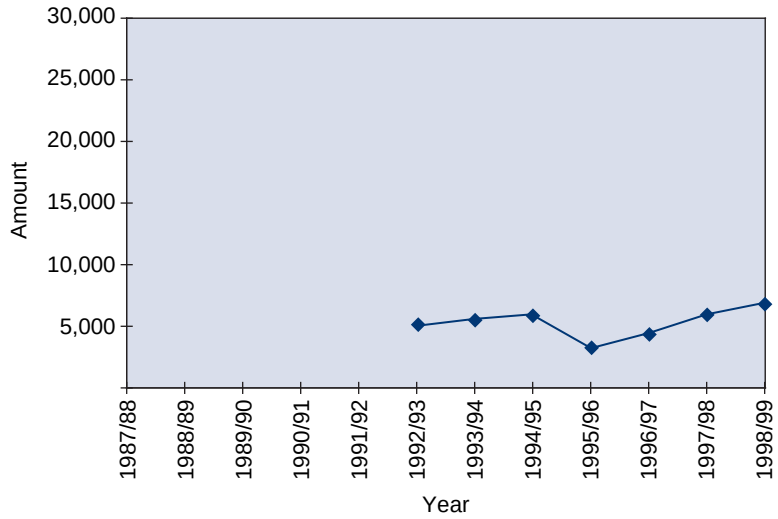
Recreational fishing for Roe's abalone *(Haliotis roei)* takes place mainly on the inshore reef platforms between Geraldton and Augusta during the early spring and summer months when tide and weather conditions allow easy access to the reefs.

Reeftops are generally regarded as nursery areas for abalone, which tend to migrate over the reef edge into deeper gutters as they mature. Consequently, there are always large numbers of under-size abalone present among the legal-size animals in the main areas where recreational fishing occurs.

South of Cape Naturaliste the larger species of greenlip and brownlip abalone are also taken in deeper water, with most activity occurring from Hamelin Bay round to the south coast. From Geographe Bay south the recreational abalone fishery for all species is almost exclusively a dive fishery.

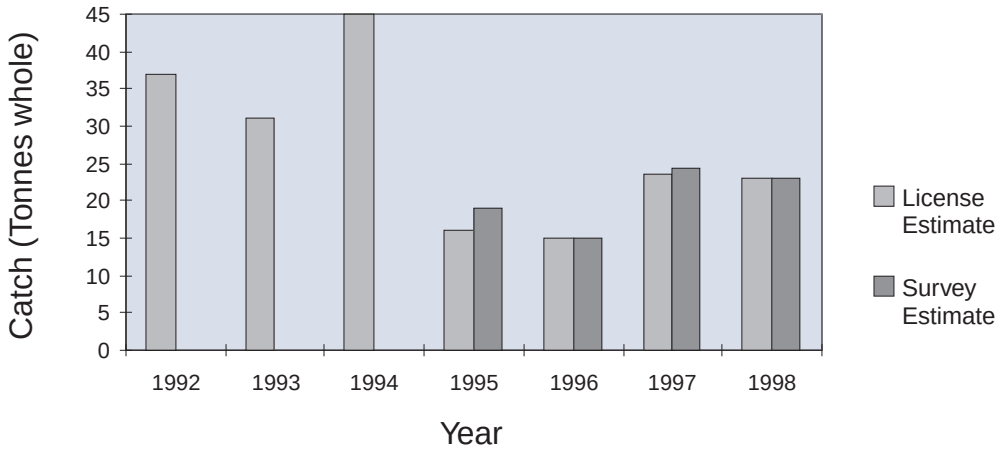
A total of 6,789 licences were issued in 1998/99, excluding umbrella licences which totalled 8,386. Participation in the abalone fishery has been increasing over the last four years.

Figure 4: Issued abalone licences (excluding "umbrella" licences).



In 1994 available fishing time in the Perth Metropolitan recreational fishery was reduced by 50 per cent, with a corresponding drop in catch from 45 tonnes in 1994 to 15 tonnes in 1996.

Figure 5: Recreational Roe's abalone catch for Perth metropolitan area, estimated from the number of licences issued and from survey data.



The estimated annual recreational catch of greenlip abalone between Augusta and Cowaramup was 6,700 animals in 1996/97, with over 90 per cent of the catch in the survey area taken during spring and summer. During the survey fishers who were recorded as having caught greenlip had an average of 2.6 people in each boat, with an average catch of 12.14 greenlip abalone per boat. On the basis of these statistics the average greenlip abalone catch was 4.7 abalone per fisher.

Last year Garden Island was included under the metropolitan management arrangements due to community concern over its accessibility and increasing fishing pressure on abalone stocks around the Island. Penguin Island remained closed to abalone fishing to allow stocks to recover. Penguin Island was first closed to fishing following research surveys in 1996, which indicated that the stocks around the island were depleted to very low levels.

While abalone stocks are highly valued, they are also fragile and easily over fished. Fisheries compliance activities have shown a minority of fishers carry out illegal fishing activities for commercial gain.

To help ensure the future sustainability of the State's abalone resources and protect the future quality of the recreational fishery, the Recreational Fishing Advisory Committee (RFAC) is currently developing a discussion paper to assist with reviewing the recreational management arrangements currently in place for the abalone fishery.

2.8.4 Southern freshwater angling

Brown trout *(Salmo trutta)* and rainbow trout *(Oncorhynchus mykiss)* have been stocked into irrigation dams and streams in WA's south-west since the establishment of the Pemberton Trout Hatchery in the early 1930s, although the first attempts to introduce trout date back to the 1890s.

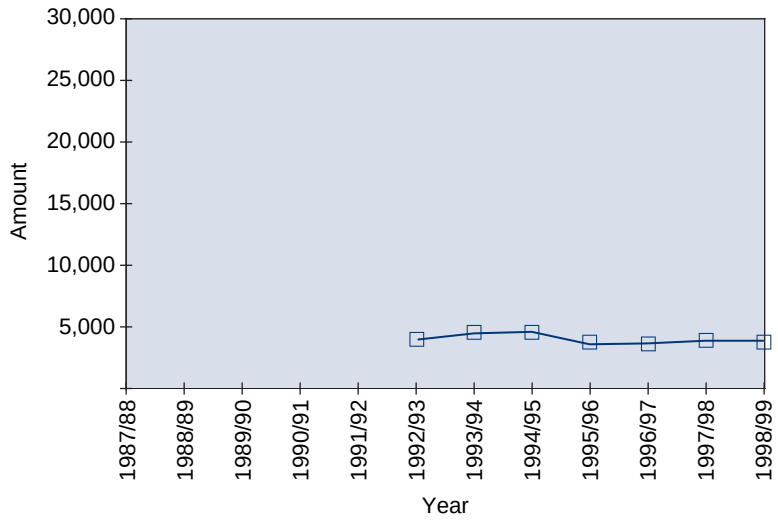
A licence is required for freshwater fishing in waters south of 29° south latitude. Species targeted include rainbow and brown trout, redfin perch and freshwater cobbler.

The distribution of trout and their ability to breed is limited by water and temperature conditions and they are stocked annually into rivers and dams in the south-west of the State. Redfin perch which were introduced in the 1890s are more adapted to WA's hot summer conditions and breed freely in the wild.

A trout stocking committee was established in 1994, to maximise angler returns on fish available for stocking and to allow community involvement in the management of the trout fishery. The committee consists of agency officers including the Pemberton hatchery manager, and representatives from RFAC, the Trout and Freshwater Angling Association and general freshwater angling public.

A total of 3,707 fresh water fishing licences were issued in 1998/99 (excluding 8,388 "umbrella" licences).

Figure 6: Issued SW licences (excluding "umbrella" licences).



No specific catch figures are available for the trout fishery, however in 1999 Fisheries WA stocked a total of 535,000 rainbow fry, 20,000 rainbow yearlings and 2,500 hatchery brood stock into south west streams and irrigation dams.

Management controls include a closed season and closed waters, bag and size limits and gear controls.

These controls aim to protect juvenile fish and ensure the available catch is shared among anglers. The bag limit for trout is four, which is consistent with the community view of trout as a prized fish species, and also helps to distribute the stocked public resource to maximise community benefits.

Challenges to managing the trout fishery include the limited number of waters suitable for trout, predation by redfin perch, environmental changes and reduced streamflow wrought by catchment land use such as dam construction.

These issues have resulted in a need to evaluate different stocking strategies to improve the quality of the trout fishery. Currently Fisheries WA, with the assistance of community groups, is studying the viability of stocking yearling trout as opposed to fry, which has been the main stocking strategy in past years.

Key issues for the future management of the trout fishery will include the development of specific management arrangements for individual water bodies and facilitating increased community ownership of the trout fishery.

The requirement to meet translocation risk assessment criteria and properly identify the interactions between trout and native species, and the continued supply of stock suitable for stocking in Western Australian conditions also pose challenges.

2.8.5 Netting

Netting has been practised since the early days of European settlement where it was used to capture fish for sale and to supplement the diet of early settlers, primarily from estuarine and nearshore marine waters near major population centres.

While a separate licence is issued for netting due to the nature of the gear and its potential efficiency the net fishery is effectively managed as part of the recreational finfish fishery, with highly regionalised arrangements to suit local conditions.

In 1970/71 there were 8,195 licence holders who owned 2,382 nets. By 1976/77, 22,400 licences were issued and the number of nets was estimated at 11,379. In 1986/87 14,476 nets were licenced and this remained fairly constant through to present when 13,710 licences were issued (although the number of 'umbrella' licences increased to 8,386 during this time - the number of actual net licences being used may therefore have decreased significantly).

Netting is predominantly undertaken in the south of the State, primarily targeting sea mullet and yellow eye mullet, however other species such as herring, tailor, whiting, crabs, skipjack, bream and cobbler are also taken in nets as bycatch or as targeted species. In the north of the State target species include mullet, whiting and threadfin salmon.

Throughout the history of net fishing in WA there has always been conflict between commercial fishers, recreational netters and recreational line fishers with respect to catch share, catches in excess of domestic requirements, capture of non-targeted species and undersize individuals, and the sale of fish surplus to domestic requirements (Lenanton, 1974, 1978).

In 1975 fishing regulations were amended to restrict each fisher to the use of one net at a time and also defined net specifications.

A two year review of recreational haul and gill netting was undertaken in 1990 and major recommendations included:

- Recreational net fishing be phased out gradually throughout Western Australia except where it can be demonstrated that the target species can not be caught by rod or line.
- Set gill netting north of Beadon Creek be prohibited from 1 January, 1995.
- Gill netting in ocean waters be phased out from 1 July, 1995 outside of 800 metres offshore and ultimately only in specific areas where only appropriate target species occur.

- Estuaries and beach areas which are dominated by prime angling species should be given priority in the phase-out process.
- Commercial net fishing in estuaries should be more intensively managed to provide a better balance between the recreational fishing community's need and the ability of estuarine resources to sustain pressure by all users.

The review also recommended that a study of the impacts of attended and non-attended netting occur in estuaries where netting was allowed to continue. This survey (Fisheries Research Report No. 104, 1996) which was conducted in Wilson Inlet and Peel Harvey estuary, found that unattended recreational netting has greater impact in terms of greater bycatch, with significantly greater catches of species such as tailor and cobbler, and greater or similar catches of other non-target species, damage to catch and higher occurrence of unintended breaches of bag and size limits [eg catch of 150 tailor, and in fact the most dominant species caught by nets were crabs, the majority of which were undersize (it is illegal to take crabs by net)].

Consequently unattended set netting was banned in Peel Harvey with the exception of Wednesday nights, which remain open for unattended netting.

Future management issues include continued conflict with other recreational users and appropriateness of netting as a recreational fishing method for finfish, particularly in high use areas, removal of netting from known nursery areas, areas where restocking trials are being conducted and other areas where target species are not common.

Section 3 Planning For The Future

3.1 Early days 1950 – 1988

The *Fisheries Act 1899* specified that fishers catching fish for sale using a seine net must be licensed.

This Act was amended in 1940 to require any person fishing with a net to be licensed, with no distinction made between commercial and recreational fishers. The first distinction between commercial and amateur fishers was made in 1949.

Prior to the 1970s, fisheries management in WA was very much focused around industry development, rather than the management of fishing effort and catch.

In the 1970s, following the introduction of systematic scientifically-based stock assessment for the rock lobster fishery, a range of licensed recreational fisheries were also created. These included:

- prawning;
- rock lobster;
- netting; and
- inland fisherman's licence (trout, barramundi, cherabin, redfin perch).

In 1988 a review of research on catches from the licensed marron fishery indicated severely depleted stocks in many major fishing areas, and a high level of non-compliance with existing regulations such as bag and size limits.

The marron fishery effectively became the first example in Western Australia where it could be clearly demonstrated that recreational fishing pressure alone was capable of severely depleting fish populations to the point of both growth and recruitment overfishing.

As a result the fishery was closed for two years, and reopened with a reduced season, lower bag limits, new gear controls and a major community education program to improve community support for management.

A management review of the abalone fishery followed, in response to major public concern over the large numbers of fishers and widespread non-compliance on the onshore reef platforms near Perth and Geraldton. Strict controls on recreational catch and effort were introduced in 1988, and further reviewed over the next four years.

3.2 Statewide review and management 1989-1995

During the 1980s the State experienced a significant growth in recreational fishing activity, increasing pressure to declare marine parks, and demands for areas to be set aside for pearl culture and aquaculture.

As a consequence in the early 1990s, a major review was undertaken on behalf of Government to set the future direction for recreational fishing. This review resulted in the introduction of landmark policies which led the way in recreational fishing management in Australia.

The review took a Statewide approach as the first step in bringing the complete recreational fishery under a management and regulatory framework and establishing community consensus on both the need for management of recreational fishing and the major strategies that should be adopted.

The review also clearly signalled that competition between the recreational and commercial sectors and resource sharing was a major and growing issue. RFAC identified 24 key recreational fishing areas of the coast in which recreational fishing was a significant and growing use and in which an escalation in conflict was likely to be an issue. These included Dampier Archipelago, Shark Bay, Jurien Bay, Perth metropolitan waters from Two Rocks to Rockingham, including the Swan River and Cockburn Sound, Peel-and Leschenault Inlets, Geographe Bay, and Walpole–Nornalup, Bremer and Stokes Inlets (RFAC, 1991).

Key changes in management direction implemented as a result of this review included:

- Establishment of a State Recreational Fishing Advisory Committee (RFAC), supported by a network of regional recreational fishing advisory committees across the State, with a key role in providing advice on the use of the average $1.2m per year raised through recreational licence fees, and any proposed alterations to recreational fisheries management.
- Introduction of a new licence for abalone fishing, and the sequestering of all recreational licence revenue into a dedicated Recreational Fishing Trust Account created to ensure that funds were used solely for recreational fishing purposes.
- A comprehensive review of bag and size limits and their extension to virtually all species caught recreationally, including many which previously were not subject to any limits.
- Creation of dedicated resources within Fisheries WA covering recreational fisheries research, management and community education.
- Establishment of a Volunteer Fisheries Liaison Officer (VFLO) Program with a strong emphasis on educating the public and encouraging voluntary compliance with fishing rules.
- Bolstering research into key recreational fishing species such as tailor in order to monitor fish movement, breeding habits and levels of exploitation.
- New projects to enhance recreational fishing with the emphasis on community involvement.

The RFAC review clearly recognised that there was a lack of scientific data on the impact of recreational fishing on key fish stocks – particularly finfish – and that the primary management needs at the time were to lead a change in community attitudes to support conservation and management.

Consequently the bag limits and other fishing controls implemented as a result of the review were aimed at setting clear social standards for recreational fishing, based on the community's view of what was

considered a fair and reasonable individual daily catch. In the main the bag limits implemented at the time were not intended to restrain in any significant way the total recreational catch.

Between 1991 and 1995, recreational fishery management strategies were further refined through community consultation on specific issues, regular advice through regional recreational fishing advisory committees and specific reviews of either individual fisheries or fishing practices such as netting.

The first area-specific recreational fisheries management package was developed for the Ningaloo Marine Park in 1992. The management package was aimed at maintaining fish populations in the area of the park, and in particular reducing the ability for anglers to store and transport large semi-commercial quantities of fish.

Management controls for the marine park included a possession limit by weight of fish and fillets, as well as a mixed daily bag limit. Surveys following the introduction of the management package indicate strong public support for improved management.

However, the development of such an area specific management package also resulted in a movement of some anglers to areas outside the marine park, and the transport of considerable quantities of recreationally-caught fish on commercial trucking companies to fisher's residences in the south of the State.

A major overhaul of the recreational sector of the abalone fishery following the introduction of a licence in 1992 resulted in a highly restricted fishing season on the Perth and Geraldton inshore reef platforms and a reduction in the recreational catch in these areas. Further restrictions on the abalone fishing season in 1994 reduced the recreational catch from a peak of 45 tonnes to between 15 and 20 tonnes a year.

Management regulations and education programs were also further developed for the rock lobster, net, and tailor fisheries, while a review of Statewide bag and size limits in 1993 resulted in minor adjustments to the existing schedule in 1995.

3.3 Recreational Fisheries Program 1996 - 1999

A major public review of the operations of the Fisheries Department commissioned in 1995 by the Minister for Primary Industry; Fisheries, Monty House MLA, emphasised the importance of recreational fishing to Western Australia through the creation of a dedicated recreational fisheries program within the Fisheries Department.

In addition, the *Fish Resources Management Act* passed by Parliament in 1994, established a new legislative mandate for the Fisheries Department and provided the basis for improved management of fish resources and their habitats.

The Act states:

> *The principal object is to conserve, develop and share the fish resources of the State for the benefit of present and future generations.*

In particular, the Act has the following objectives:

- To conserve fish and to protect their environment.
- To ensure that the exploitation of fish resources is carried out in a sustainable manner.
- To enable the management of fishing, aquaculture and associated industries and aquatic eco-tourism.
- To foster the development of commercial and recreational fishing and aquaculture.
- To achieve the optimum economic, social and other benefits from the use of fish resources.
- To enable the allocation of fish resources between users of those resources.

A direct consequence of the new *FRMA 1994* was the establishment of the Recreational Fishing Advisory Committee (RFAC) as a statutory advisory body to the Minister for Fisheries under the Act, and the formal constitution of the Regional RFAC committees with legal status.

A major issue for the new RFAC and the Recreational Fisheries Program was to clearly identify the issues, challenges and priorities facing recreational fishing in WA over the next five to 10 years, and put in place the funding and projects to meet these challenges.

Consequently, a two-day community planning seminar for recreational fishing in Western Australia was held in February 1996 as the first step in identifying the management needs and priorities for the future direction of recreational fishing management.

The 40 workshop participants represented a wide range of community groups with a stake in the management of recreational fisheries and strongly endorsed the theme of *Fish for the Future* as the most important key concept for the management of recreational fisheries. The workshop also emphasised the value of recreational fishing as a community activity, the need to maintain and enhance the quality of the recreational fishing experience, and community stewardship of the fishery.

These outcomes have been developed in a series of strategic planning and review workshops with State and Regional Recreational Fishing Advisory Committees, Fisheries WA staff, Volunteer Fisheries Liaison Officers (VFLO) and more recently Recfishwest members.

Also closely considered in the strategic planning process were the five key goals and 16 principles for the management of recreational fishing which form the basis for the National Policy for Recreational Fishing in Australia. This policy was endorsed by all Australian States and Territories and the National Ministerial Council on Forestry, Fisheries and Aquaculture in December 1994.

As a result, a five-year business plan for the Recreational Fisheries Program was published in 1997, setting key objectives for the management of recreational fisheries to 2002 (Fisheries WA, 1997). The plan guides priorities for annual operational and budget planning for the Recreational Fishing Advisory Committee and Fisheries WA's Recreational Fisheries Program.

Major achievements in developing a dedicated recreational fisheries program for Western Australia since 1996 include:

- A clear business planning focus and greater transparency and accountability in the use of all funds for the management of recreational fisheries.
- Clearer identification of the costs involved in the management of recreational fisheries – including the component not funded through licence fees.
- The securing of all recreational licence and consolidated fund revenue for recreational fishing into a fund established under the *FRMA 1994*, which may only be used for purposes related to the management of recreational fishing.
- Greater community involvement and influence through RFAC and RRFACs in planning for the recreational fisheries program and setting funding priorities for all recreational fisheries program activities across the entire program budget of $5.6m per year (excluding agency overheads).
- A more strategic focus for RFAC based around clear identification of the issues and threats facing recreational fishing and the development of a series of policy positions in consultation with Regional RFACs.
- A greater role for RFAC in providing advice to Fisheries WA and the Minister on proposed management for other sectors which are likely to affect the recreational fishing community.
- The establishment and part-funding of an independent body (Recfishwest) to represent the interests of the recreational fishing community at a State and National level.
- An annual contribution from recreational fishing licence revenue of $100,000 to the Fisheries Research and Development Corporation, which returns on average between $300,000 - $500,000 per year in funds for recreational fisheries research.
- An annual operational plan for all Fisheries WA activities in recreational fisheries management which integrates the research, management, compliance and community education requirements in a single planning and priority setting framework.
- A series of enhancements to the recreational licensing system, including new software which will allow internet and phone applications and the introduction of waterproof licences.
- A new management framework for the aquatic tour and charter industry integrated with regional recreational fisheries management strategies.
- Major extensions to the Volunteer Fisheries Liaison Officer (VFLO) program across the State with an enhanced role in school and community educational activities. (winner of the *Premier's Award for Excellence in Public Sector Management, 1998*).
- The implementation of resource sharing and commercial fishing buyout initiatives aimed at reducing conflict in key recreational fishing areas and readjusting catch shares between the commercial and recreational sectors.
- Provision of funding for a series of community-based projects developed by Regional Recreational Fishing Advisory Committees to improve education and enhance the quality of the fishing experience.

The development of specific recreational fisheries management packages for:

- Pink snapper in Cockburn Sound – to protect large mature fish when aggregating and reduce conflict between the commercial and recreational sector.
- Pink snapper in the eastern inner gulf of Shark Bay – following research confirmation of a severely depleted breeding stock.
- Barramundi fishing in the Lower Ord River – to prevent a major escalation in catch and protect the unique wilderness fishing values of the area.
- Shark Bay – to complement management arrangements for pink snapper and compensate for a transfer of effort to other species.
- Tropical rock lobster in the Dampier archipelago – to share the catch among recreational fishers following the buyout of commercial fishing in the area.
- The Gascoyne and West Coast regions of the State – draft management strategies to identify and resolve key issues facing recreational fisheries including management and resource sharing.
- Trout – a revised stocking program with a focus on re-establishing higher quality fishing experiences, and evaluating the best and most cost effective stocking strategies.
- Billfish and tuna – successful negotiations with the Commonwealth for a handover of powers to the State for the management of the recreational and charter elements of the billfish and tuna fisheries and the exclusion of foreign longlining from key recreational fishing areas around Rottnest, Exmouth and Broome.

3.4 Funding and projects 1999/2000

In 1999/2000 the Recreational Fisheries Program funded 24 major projects in fishery management and community consultation, research, compliance and community education at an estimated cost of $5.7 million, excluding Fisheries Agency overheads.

Revenue sources for the program included a $3.5 million contribution from the Government Consolidated Fund, $1.6 million from recreational fishing and fishing tour operators licences and $650,000 in research grants from the Commonwealth Government.

Expenditure was split between management and community consultation - three projects at $1m, Research - 15 projects at $1.8m, Compliance and community education - six projects at $2.9m.

A complete list of Recreational Fishing Program projects is contained in Appendix 1.

Section 4 Management Framework

4.1 Statewide strategic plan

The business plan for the Recreational Fisheries Program and RFAC in 1997 identified a series of key issues facing recreational fishing (FWA, 1997) and set the State objectives and key strategies for the Recreational Fisheries Program against a series of performance milestones, and a series of projects and budget figures.

The plan represents a major development in recreational fisheries management in WA, and builds on the experience of the original RFAC review in 1991.

An important consideration is that the plan formally recognises that the recreational fishing community, and the industries that it helps support, have a legitimate and growing place in the total fishery management picture, and that specific resources within Fisheries WA must be assigned to managing recreational fisheries.

The strategic 'vision' for the recreational fisheries program is:

> *"To have a Western Australian recreational fishery based on a sustainable aquatic ecosystem and fish stocks which provides a diverse range of high quality and valued experiences."*

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.
- Improved quality and diversity of opportunities for recreational fishing and activities associated with fish and the aquatic environment.

Key issues identified under the outcome areas identified in the plan included:

4.1.1 Conservation and sustainability

- Increasing fishing pressure, localised depletion of fish stocks and disappearance of fish refuges through population growth and coastal development.
- Pollution and destruction of key fish habitats.
- Limited information on catches, fishing effort, biology and stock productivity for key recreational fisheries.
- Inadequate or inappropriate fishing controls to address regional and local issues.
- Regional multi-species nature of recreational fisheries.
- The opening of access to areas previously protected from significant levels of exploitation by their remoteness.

4.1.2 Community stewardship

- Change in community attitudes to recreational fishing to support maintenance of fishing quality and conservation needs - strong community conservation ethic.
- Community involvement in departmental activities - partnerships with community and industry.

4.1.3 Equity, quality and diversity

- Unmanaged shift in resource share of key fisheries to commercial sector through developmental fisheries, market variations and expansion in effort.
- Competition for available catch from commercial fishing activities in high use recreational areas and associated conflict.
- Competition and conflict with other community uses such as no-take areas for eco-tourism or conservation purposes and leases for aquaculture.
- Fishery enhancement and increased opportunities through aquaculture and the obstacles posed by environmental concerns and translocation restrictions.
- Limited funding available for expanding management needs.

4.1.4 Statewide issues and management principles

Among the key issues identified by RFAC as driving recreational fisheries management were the localised depletion of fish stocks in high use areas, and the potential to impact on sustainability of stocks on a wider regional scale.

In addition the complexity of managing a multi-species, multi-area fishery cannot be overstated. The period between 1992 and 1996 had also seen a raft of fragmented and often inconsistent management proposals put forward as solutions for specific issues, and a growing demand for more specific management for recreational fishing activity in marine parks.

RFAC and Fisheries WA also identified a lack of flexibility in trying to maintain a rigid Statewide set of fishing regulations on a five-year review cycle.

Other gaps identified in the 1991 management framework included:

- A need to have management objectives specific to recreational fisheries which recognised the needs and desires of the recreational fishing community.
- A need for rigorous time-series data on recreational catch and effort in unlicensed fisheries, and lack of other fishery specific data on which to base stock assessment and fishery performance models.
- A need to establish performance indicators against which the health, productivity and community value associated with recreational fisheries could be evaluated.
- A need to evaluate the effectiveness of management strategies set in place between 1991 and 1995.

- A lack of recognition in commercial fisheries management process of the impact of allowing increases in commercial activity or catch on the recreational sector and vice versa.
- A lack of definition around the total cost of recreational fisheries management and a community expectation that government would fund all contingencies not met by existing licence revenue.

In addition a reliance on Statewide regulations also tended to assume that the abundance of fish stocks and trends in fishing activity were consistent across the state.

However, a perceived strength in having a set of Statewide regulations was the success of community education and a fishing community perception that fishing regulations were somehow easier to understand or communicate if they were the same everywhere.

To support a more outcome-focused approach to fisheries management, and allow for greater flexibility in applying effective management solutions, RFAC endorsed a review of the framework within which finfish fisheries in particular were managed.

The review supported a regionalised approach to recreational fisheries management planning which included a more detailed management planning process to examine and encompass the range of recreational fishing issues specific to each area, and deal with them as a group, in the complete context of that region at one time, rather than in a fragmented fashion.

Consequently the Minister for Fisheries approved proposals put forward by RFAC in 1997, for a major review of recreational fisheries management, and the development of regional management plans for recreational fisheries based on the State's major bio-regions.

The regional plans were to be developed by community-based working groups appointed by the Minister, and involve extensive community consultation.

This approach complemented proposals from the Tour Operators Working Group for the management of the aquatic tour and fishing charter industry, and also better fitted with the growing development of regionalised commercial fisheries for finfish.

However, it was clearly recognised that, irrespective of whether separate regulations were needed in each area of the State, a consistent set of Statewide principles should underpin recreational fisheries management, there should be a consistent approach to the use of various management tools, and a focus on the evaluation of both fishery performance and the effectiveness of management.

These principles needed to recognise that the management objectives for recreational fisheries are likely to be different to the objectives for commercial fisheries, and not necessarily based solely around maintaining maximum sustainable yield from a fish stock, but also incorporate the need to maintain the community and amenity values based around the fishing experience.

In addition to sustainability, which remains a fundamental principle that underpins all fishery management, in recreational fisheries the quality of the fishing experience, the diversity of opportunities available and the value to the individual fisher, and the community of the type of recreational fishing experience are also key goals.

Consequently each working group was also requested to consider the national principles for the management of recreational fisheries agreed to by all States in 1994, and apply these in the local context.

The following key principles for recreational fisheries management are based on proposals by the Gascoyne Recreational Fisheries Working Group which have been strongly endorsed by over 90 per cent of submissions to the draft management strategy for the Gascoyne Region:

- A key aim should be to ensure that the biodiversity of fish communities and sustainability of fish stocks are preserved.
- Fisheries management should be proactive and recognise projected increases in fishing pressure.
- Management should be based on the best available information, but where necessary incorporate the precautionary principle and seek to minimise risk to fish stocks.
- Fishing rules should acknowledge that equitable access to fishing opportunities across recreational user groups is important.
- The value of recreational fishing should be clearly recognised and given proper weight in all planning processes.
- Fishing rules be kept simple and where possible and practical, made uniform across each region.
- Recreational fishing rules should be designed to limit the total recreational catch, as well as protect fish at vulnerable stages in their life.
- The benefits from controls on the total recreational catch should flow back to the recreational sector and be reflected in improved fishing quality and sustainability.

4.1.5 Basis for bioregional management

The basis for a more regional approach to recreational fisheries management was an acknowledgment of the natural complexity and diversity of WA's marine life and environments, and a clear need to better link management to the biology and distribution of both fish stocks and fishing activity. In other words building effective management from the biological characteristics of resource upwards, rather than simply imposing human social values on fish.

The same assumptions also underlie commercial fisheries management, which uses a "fishery by fishery" framework. In the case of finfish most commercial fishery boundaries are already effectively regionalised.

A key element in the regional planning approach was the preliminary findings of a national scientific working group (Interim Marine and Coastal Regionalisation of Australia, 1998 [IMCRA]), which had started to classify the marine environment by identifying the distribution of major elements in the ecology of various areas - including habitat types and the distribution of fish species and populations.

A second key element is an increasing body of biological information which indicates that most, if not all, fish populations in WA appear to be constrained by environmental boundaries, rather than subject to mass long distant migrations.

Even species such as Australian herring and Spanish mackerel, which in the past have been viewed as highly migratory, increasingly appear to consist of a series of separate adult populations, which take up residence within defined regions or even smaller areas once they mature.

These populations may be topped up by periodic migration, or the drift of eggs, larvae or juveniles from other areas, but there is no guarantee that this is consistent from season to season or year to year.

In effect each of these smaller populations may be highly susceptible to local depletion, and if fishing pressure is spread across a sufficient number of these populations, the risk of stock collapse becomes very real.

Fish such as pink snapper in the Shark Bay inner gulfs, which occur in small, but clearly defined, genetic stocks are particularly vulnerable to local depletion driving stock collapse.

In the case of demersal species such as dhufish and baldchin groper and members of the sea-bream family such as such as pink snapper and black bream, which aggregate to spawn, the problem of depletion leading to recruitment overfishing can be masked by a high fishing success on the spawning aggregations – followed rapidly by serious depletion of the breeding stock.

In a multi-species fishery – such as the recreational fishery – fishers then move on to targeting the next most abundant species and so on, eventually depleting a range of target species across an entire food chain.

The most effective management solutions to these issues require comprehensive fishery performance monitoring, the development of methods of catch prediction for key species, and the application of fishing controls which are relevant to the place where fishing occurs.

The marine biogeographic regions described by IMCRA were regarded by Fisheries WA and RFAC as the best available basis for reviewing the spatial scale required for future recreational fisheries management. Ultimately the fisheries bioregions described also required some minor adjustments to boundaries to reflect patterns of human use, and the practicalities of on-the-ground management.

The broad bio-regional approach picks up the distribution of the majority of most fish populations, though perhaps not the extremes of their range, and allows for the uneven distribution and growth of fishing pressure.

It also avoids the risks and complexities inherent in fisheries management at the scale of individual marine reserves or sanctuary areas, which may not be able to protect a sufficient proportion of the breeding stock of any given species to ensure sustainability.

On a practical level a bioregional management approach will enable fishing controls to be better matched to the biology and abundance of the fish stocks and the fishing pressures that are present in each region, and as importantly, focus evaluation on those species which are most important to the recreational fishery in each area.

This approach has also recently been adopted on a national level by the Commonwealth agency Environment Australia, and is a key element in the both Commonwealth's Oceans Policy, and in the National Representative System of Marine Protected Areas (REF).

The regional approach for recreational fisheries also matches management arrangements proposed for aquatic tour and charter fishing and provides a spatial framework for integrating the management of recreational and charter fishing with commercial fishing and other uses such as conservation and eco-tourism.

The four recreational fishing bioregions proposed by RFAC (Figure 7) are:

Pilbara/Kimberley Region

Waters east and north of the point where 114°50'E intersects the North West coast of Western Australian (approximately 4nm south of the mouth of the Ashburton river) to the NT/WA border.

Gascoyne Region

Waters west of the point where Longitude 114°50'E intersects the North West coast of Western Australian (approximately 4nm south of the mouth of the Ashburton River) South to 27°00'S (Zuytdorp Cliffs - between Kalbarri and Steep Point).

West Coast Region

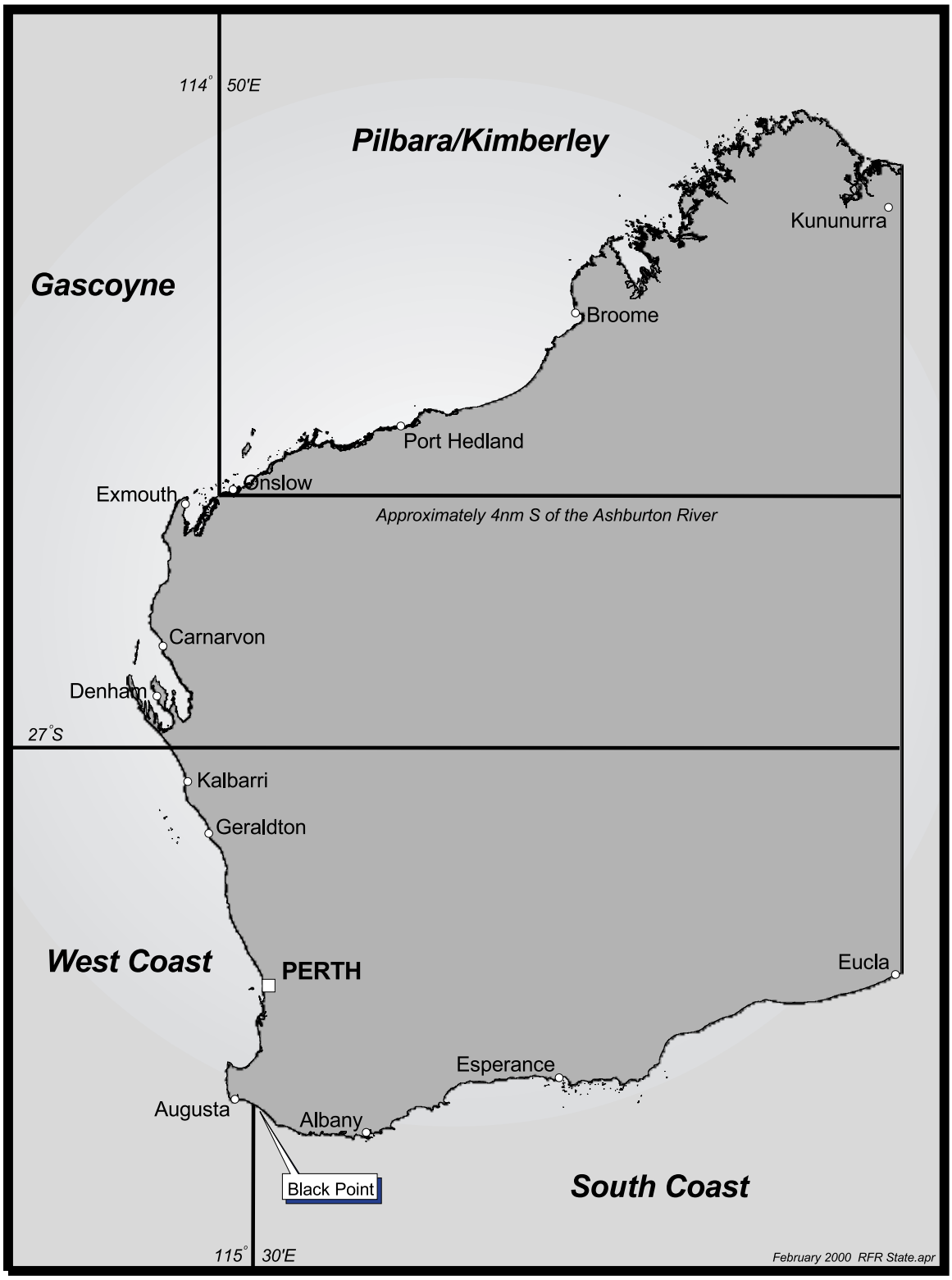
Waters south of 27°00'S (Zuytdorp Cliffs) to west of the point where 115°30'E intersects the Southern Western Australian coastline (Black Point).

South Coast Region

Waters east of the point where 115°30'E intersects the southern Western Australian coastline (Black Point) east to the WA/SA border.

The precise location of final boundaries for the bioregions will need to be considered in light of management planning for commercial fisheries.

Figure 7: *Recreational fishing regions as proposed by RFAC.*



The review process has commenced with the Gascoyne Region because of the complexity of existing management arrangements in that region. It is also timely, given management issues that have arisen over the decline in Shark Bay inner gulf pink snapper stocks and the transfer of fishing pressure to other species. A community based working group released a discussion paper for public comment for three months in May 1999. Following the group's review of public submissions they will prepare a final report for the consideration of the Minister for Fisheries.

The Minister has also appointed a working group to begin the review of the West Coast region and it is expected a discussion paper will be released in early 2000. The review of the Pilbara/Kimberley region will commence in early 2000 and the South Coast in late 2000.

4.2 Fishery management strategies

There are a limited number of management strategies that can be applied to recreational fisheries. Ultimately these strategies have one fundamental goal – to ensure WA continues to offer a quality recreational fishing experience by managing the recreational fishing community's share of the total catch within the limits a fish stock can sustain.

This section provides a brief outline of the major recreational fishery management strategies used in WA, their strengths and their limitations. It is important to note that these tools are used in combination, and that often there is no single effective solution to any one issue.

Clearly these strategies also need to be part of an integrated management framework which manages the impact of all users – commercial, recreational, charter, and conservation – on the fish resources and their habitats.

4.2.1 Daily bag limits

Bag limits currently set a social standard for a "fair day's catch" for an individual angler. They also may reduce the rate at which an aggregation of fish or an area is depleted by fishing, and ensure that a larger number of fish are available in the water for a longer period of time.

Bag limits also help to share the available catch among the thousands of anglers who wish to catch a fish.

However, to be effective, bag limits need to be set at a level which is readily attainable for an angler of reasonable skill and knowledge.

Under current WA fishing regulations bag limits can be accumulated over an unlimited number of days, and consequently do not in general constrain the total recreational catch.

Their limitations include the unknown mortality factors involved in catch and release fishing – especially for fish caught in deep water or played for long periods of time on light line. They also tend to be seen as unfair by anglers aiming to maximise their catch because they reduce the total quantity they can land on any one occasion.

The greater the number of people fishing, or the number of days spent fishing, the less effective bag limits are in managing either individual or total catches. In this context they serve mainly to set a social standard and highlight the need for conservation.

An additional weakness is the concern that, if used in isolation, they may simply make more fish available to the commercial sector by reducing the total recreational catch.

4.2.2 Possession and trip limits

Possession and trip limits are a strategy to manage the total take of an individual angler on any one fishing trip. They effectively represent an individual "quota" and put a ceiling on the total amount of fish an angler can have in possession at any one time in a defined area – either in total weight or in numbers of fish, or a combination of both.

Places of permanent residence and commercial premises may be excluded from possession limits.

Possession limits were originally introduced to reduce the ability of anglers to accumulate commercial quantities of fish. Their major application was to eliminate "shamateur" quasi-commercial fishing and the storing and freezing of large quantities of fish in remote locations.

However they have also been used in limited single-species fisheries elsewhere in the world to in effectively establish a total recreational "quota", usually in combination with a limit on the total number of participants.

Their weaknesses include the ability of anglers to transport fish unaccompanied without any effective constraint, and the evidentiary and legal issues inherent in proving possession.

Like bag limits they set a firm social standard for a recreational catch, but become less effective in managing the total catch as numbers of fishers or angler/fishing days increases.

4.2.3 Legal sizes – minimum and slot limits

Minimum size limits are usually based on the breeding biology of a species, and are set to protect fish until they reach maturity and have been able to spawn at least once. They can also be set to help enhance recreational fishing quality by increasing the average size of fish available.

Size limits generally apply equally to both the recreational and commercial sectors, however their effectiveness depends on voluntary compliance – particularly where filleting is allowed at sea and compliance checks are not possible.

However some existing size limits reflect the size at which some species are available for capture during a stage in their life cycle. This is particularly true in WA for species such as King George whiting and tailor, which tend to use estuaries and nearshore areas as nurseries, and migrate further offshore as they mature.

In many cases current legal sizes also reflect the desirable market size of fish by the commercial sector, and were set early this century, with no biological basis.

The ability to determine appropriate size limits, and hence their applicability as a management tool, is limited by the level of biological information available for many species. There is also increasing concern over the mortality of fish, particularly demersal species, taken from deep water and the appropriateness of size limits as a management tool for these species is being questioned.

Maximum size or slot limits are theoretically useful for protecting large breeding fish, or reducing the take of highly prized, and often rare, large specimens.

In a purely recreational fishery they have considerable merit, however in a mixed commercial/recreational fishing area or fishery they are unlikely to achieve the desired effect unless applied to both sectors.

As with minimum sizes and bag limits, the issue of mortality of fish returned to the water is of great importance.

4.2.4 Closed seasons and closed areas

Closed seasons have been widely used in licensed recreational fisheries and commercial fisheries as a means of containing total effort outside the peak fishing season, or to protect fish at crucial stages in their life cycle.

Their advantages are that they affect all fishers equally, effectively limit the opportunity to fish to a given number of days, and have been widely accepted in marron, rock lobster, trout and prawn fisheries.

However it may be difficult to gain acceptance for the use of closures in multi-species fisheries and they may be ineffective if peak fishing seasons and spawning times are not clearly defined or consistent from year to year.

Closed areas may also be used to protect fish at crucial stages in their life history such as during spawning, protect populations of sedentary species, or protect important fish habitats from the impact of human use. They have also been proposed as an alternative means of rebuilding depleted fish stocks.

The success of closed areas however, depends on either widespread community support or effective compliance.

Both closed areas and closed seasons may limit all fishing, or only limit some types of fishing. Consequently they can also be used as a means of resource sharing and reducing community conflict.

4.2.5 Gear and method restrictions

Gear restrictions may limit the type of fishing gear that can be used, or limit the area and time in which defined types of gear may be used.

In recreational fisheries gear restrictions aim to prevent the use of highly destructive fishing methods such as poisoning reefs and explosives, the use of highly efficient commercial-type fishing gear, and reduce conflict in some areas between incompatible fishing activities such as set netting and angling.

Fishing gear may also be designed to assist in the release of undersize fish and reduce the likelihood of injury to the fish involved. Examples include drop net bases for marron and defined wire scoops for crabs and marron.

Gear restrictions in line fisheries are harder to regulate, however angler education in catch and release methods, including substituting plain limericks for jag or treble hooks, and flattening barbs, all help to improve the survival rate of released fish.

Limitations on the quantity of gear an individual fisher can use are also a means of resource sharing and spreading the opportunity to catch with other participants in the fishery.

Spatial closures to limit or prohibit the use of commercial fishing methods in important recreational fishing areas are also a means of managing social conflict and resource sharing.

4.2.6 Licensing

Licensing individual fishers is used world-wide as a key strategy in the management of many recreational fisheries including five in WA.

Licences provide a ready made and accurate database which can be used for research and education. They also ensure that the level of funds for the management of recreational fisheries tracks the growth in recreational fishing, and consequently management demands in developing fisheries.

An additional use is the application of licence cancellations and suspensions as a penalty for serious fisheries misdemeanours, and as a relevant means of reinforcing the need for ethical fishing behaviour.

Licences track participation rates accurately, and provide a basis for estimates of fishing effort, individual and average fishing success and total catches from a given fishery. In the absence of a licensing system, randomised boat ramp and beach front catch surveys and phone surveys are used to provide this data.

Section 5 Key Issues Facing Recreational Fishing

5.1 Population growth and development

Western Australia is Australia's fastest growing State. Since 1987 WA's population has grown by over 37 per cent – from 1.1 million to over 1.75 million. By the year 2010 the State's population will reach over two million people. This trend is predicted to continue at 1.5 per cent a year until at least 2030.

WA's natural environmental and climatic attributes also lend themselves to a high participation in outdoor recreation of all forms, and increasingly are becoming the basis for significant growth in domestic, interstate and international tourism.

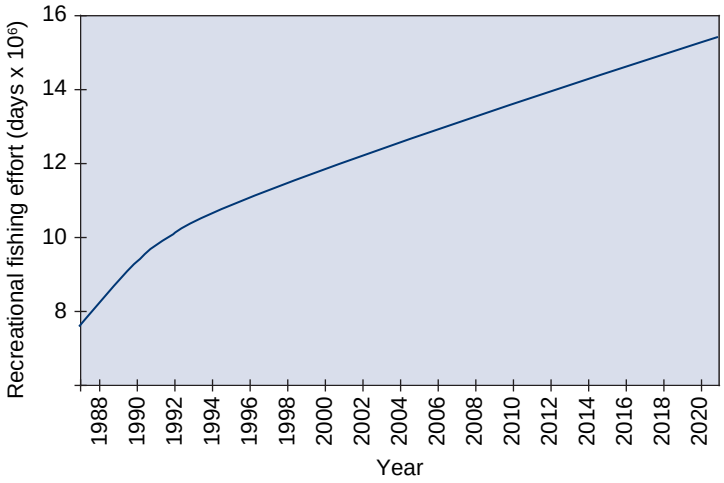
Population growth poses two major challenges for fisheries management – one is to manage the impact of increasing levels of fishing activity, and the other is to limit the threats to fish habitats posed by the development of infrastructure to support this growth.

Participation in recreational fishing and the number of angler fishing days have exceeded the rate of population growth in the last decade – from 27 per cent of the population and three million angler days to 34 per cent of the population and 10 million angler days. Recreational boat registrations with the Department of Transport also reflect these trends, with a 33 per cent increase over past 10 years.

New roads, marinas, industry, and domestic water supply sources, although all desirable as improvements to community services, also represent a threat to fish habitats and fish stocks.

Consequently population growth is the primary driver for most of the other issues that threaten not just recreational fishing quality, but also the sustainability of wild fish populations.

Figure 8: Projection of recreational fishing effort.



Assumptions

1. The mean number of days fished per recreational fisher is 18 per year (Baharthah and Sumner, 1999).
2. For years 1987 to 1999 the participation rate was estimated by fitting a curve to the participation rates for 1987, 1994, 1997 and 1999. After 1999 the participation rate was assumed to be constant and was set to the rate of 0.34 estimated by Baharthah and Sumner, 1999.
3. The population projections were based on Australian Bureau of Statistics (1998b).

5.2 Disappearance of fish refuges

Recreational fishing in WA tends to focus around coastal towns and marinas, with very high levels of fishing in the vicinity of boat ramps and near areas which provide accommodation facilities.

In the past, the small population, distance between many coastal communities, poor or no access roads and lack of launching facilities have effectively protected many areas of coastal water and inshore reef from high levels of fishing activity.

Offshore aggregation areas for demersal fish have also had some measure of protection from fishing due to the difficulty in locating or returning to them without sophisticated navigation equipment, and their distance from boat ramps.

As new coastal roads and marinas are developed, opening up wider access to waters previously protected by their isolation, species which use these areas as a key part of their life history become increasingly at risk of over-exploitation.

The impact of improved access on fish stocks, particularly demersal finfish such as dhufish, and species such as tailor which take up residence on nearshore reef systems, or aggregate to spawn in these areas, will be a key consideration in the regional management planning process.

5.3 Improved fishing technology

In the past 10 years or less, dramatic improvements in fishing technology have had a significant impact on the way people fish - particularly from boats.

Prior to the mid-1980s few anglers used echo sounders or other high-tech fish finding equipment. Bulky, expensive paper tape echo sounder systems or water temperature readers tended to occur only on a few of the larger boats.

Consequently the more sophisticated recreational anglers who targeted offshore bottom fish used compass bearings and drift markers to set drift lines. However the majority used visible features such as islands, reef breaks, FADs or navigation markers to orientate largely “hit and miss” drift fishing.

The digital technology explosion of the late 1980s and 1990s has meant that small, inexpensive high-quality fish finding and navigation equipment is now readily available and widely used.

The 1996 West Coast Boat Survey (Sumner, 1999) indicted that 36 per cent of all recreational fishing boats have echo sounders on board, while 12 per cent also carried satellite navigation Global Positioning Systems (GPS).

It is important to recognise that digital age fish finding equipment is also considerably more sophisticated than the paper-tape solid state gear of the 1980s.

Modern echo sounders can accurately scan sea floor features at a far greater speed than previously possible, while improved transducers and high resolution LCD displays give greater accuracy for

pinpointing reefs, drop-offs, or schools of fish. Interference from hull turbulence and waves has also been considerably reduced, while GPS position finders provide accurate locations on what was previously a trackless ocean.

Used in combination GPS and modern echo sounders considerably reduce the time taken to reach a given location, and more importantly the speed at which an area can be searched for either features or schools of fish.

Digital locations stored on GPS can then be used to return to the same area, or given to other anglers for their use. In effect anglers equipped with high-tech gear and position information to locate key fishing areas no longer require the extensive fishing experience or as high a level of navigational and fishing skills as was once the case.

This has resulted in a significant change in fishing practices, where instead of more random drifts, boat anglers actively search for and target reef habitats and aggregating fish.

In effect technology is helping more recreational fishers to catch more fish, more often - even those that previously had a low level of success due to their inexperience.

While this trend is good for anglers and their catch rates in the short-term, the increased exploitation rate may not be sustainable in the long term.

There is little argument that fishing success in nearshore waters - particularly for demersal species such as dhufish, pink snapper and baldchin groper - has declined in the past 20 years.

There is also no question that boat anglers are travelling further and further from major population centres such as Perth in order to reach productive fishing grounds - either out into deeper water or along the coast to less fished areas.

Anecdotal information also indicates that recreational catches of dhufish have been exceptionally good in the past few years. The key question that must be asked is what does this indicate? A good couple of seasons for dhuies, or a significant improvement in fishing success and increased exploitation on the available stock due to better technology?

Advances in technology have not been limited to fish finding equipment. The development of low-stretch gel spun and braided lines, chemically sharpened hooks and sensitive carbon composite rods, all improve the sensitivity of fishing gear and consequently hook-up rates - particularly in waters deeper than 50m which were infrequently fished by recreational fishers before the 1980s.

Fishing technology in the future is likely to improve the accuracy with which anglers can target fish even more. Fibre optics, better digital imaging equipment, and other advances will greatly increase the transparency of the ocean, and make the finding of fish increasingly a matter of science and applied technology rather than experience and skill.

5.4 Community stewardship - attitudes and values

The degree of community stewardship – or community support – for the sustainability of fish resources is a crucial factor in successful recreational fisheries management. Community education is the key process for the development of effective community stewardship.

Community stewardship can be evaluated against four criteria:

- The level of individual knowledge of what is required to ensure healthy fisheries.
- The attitudes and values which individuals hold in relation to fishing.
- The behaviour that people adopt when fishing.
- The level of community support for necessary changes to management.

Both Fisheries WA and the Recreational Fishing Advisory Committee (RFAC) have taken a strong position that prosecution and court action should be a last resort to ensure compliance with necessary management, rather than a primary response.

The 1991 RFAC final report stated:

> *"The committee considers that management of our recreational fish resources is largely dependent on the majority of the public abiding by fishing rules voluntarily."*
>
> *"The fishing community needs to be properly informed of management decisions, and given a clear lead on the values and attitudes which will assist in sustaining fish stocks."*

The recreational fishing ethic also developed by RFAC in 1991, has been widely accepted in WA, and was the first statement that the capture of large quantities of fish was not an acceptable recreational fishing practice.

"To aim to catch a feed for oneself and one's family, and for a variety of personal reasons to enjoy the experience along the way" is still strongly supported by most WA recreational fishers.

This ethic has since been further developed at a national level by the development and publication of a code of recreational fishing practice through Recfish Australia (Recfish Australia, 1996).

Since the 1980s there has been a significant change in community attitudes to recreational fishing in WA. The promotion of catch and release fishing, a growing community awareness of the need for conservation, and peer education pressure has seen fewer and fewer anglers aiming to maximise their legal catch, or, in some cases, use fish as a means of barter or income generation.

Boat ramp and beach interviews during catch surveys with anglers indicate a very high level of awareness - better than 80 per cent - of fishing rules for the finfish species being targeted, and a high voluntary level of compliance with fishing regulations with only 2.5 per cent of anglers keeping undersize fish, and even less exceeding bag limits.

Nonetheless, voluntary compliance varies considerably from fishery to fishery and region to region, and in many cases is linked to the attitudes of individual anglers, the desirability or "value" of the fish targeted, and often the frequency with which fishers participate in a fishery.

There also appears to be significant differences in attitude between individuals in different demographic and social groups, with two distinct set of values prevailing. One group comprising of about 50% of the recreational fishing population seek to maximise their catch, whilst the remaining group demonstrate a more conservative approach to catch sufficient for their immediate consumption.

Other key influences on fishing behaviour include community perceptions about the level of supervision and therefore the importance of the rules in place, the cultural "norm" for behaviour in the fishery, and the degree of reinforcement that anglers get from other anglers or from Fisheries Officers or volunteers who supervise the fishery.

Individuals inevitably assess the risks against the personal benefits involved in adopting a particular behaviour.

Consequently community education programs for recreational fisheries need to recognise the crucial role that peer education plays in setting the social standards for fishing behaviour, and the need to target adults, not just children, with clearly identified key strategies and messages designed to be relevant and accessible to each target group.

Some of the best and most effective community education programs were pioneered in the field of health education, and have since been adapted to recreational fisheries management in WA.

A key element of these programs is that they are designed to deliver messages or reminders to recreational fishers at the time and the place where these messages have the most relevance.

A prime example of this process at work has been the success of the Volunteer Fisheries Liaison Officer (VFLO) program, which was the established by Fisheries WA in 1992.

The VFLO program is a structured process of peer education and a key long-term management strategy for recreational fisheries.

Working beyond the conventional law enforcement and compliance model, the volunteer program involved recreational fishers themselves encouraging a change in the knowledge, values and attitudes of individuals, that in combination influence fishing behaviour.

A crucial element in the VFLO program has been the use of beach and boat ramp contacts with anglers as a primary strategy – with volunteers handing literature and talking anglers through not just the fishing rules, but the reasons behind them.

A strong education process is also evident within the recreational fishing community outside the management of Fisheries WA. Local fishing magazines such as *Western Angler*, fishing clinics conducted by clubs or other groups, and boat and fishing show promotions all provide more consistent conservation oriented messages than was the case in the 1980s.

However, as we move into the next century, there will need to be strong community acceptance that fishing practices such as excessive take and use of indiscriminate fishing methods, are no longer acceptable in light of increasing pressure on our fish resources.

Community education is a process that needs further extension and support, and increasingly, will need to adopt a strategy of constantly reinforcing the key message of 'fish for the future'.

However, it is crucial that this message is seen to be reinforced and supported by Fisheries WA and Government when decisions in relation to fishery management and resource sharing are being made – and that there is a clear flow of benefits to the recreational fishing community from fisheries management.

5.5 Information for management – catch and fishery performance

Recreational fisheries management is a relatively new role for government, and many of the strategies that will achieve success are still being developed.

However an increasingly crucial element is the availability of good quality time-series data on fishing activity, catches, and fish population (catch) structure for all recreational fisheries.

This needs to be supported by effective fishery modelling, and where possible, the development of predictive sampling programs which can serve as indicators of the future abundance of fish populations and hence catches.

In effect these two research strategies in combination can provide data on fishery performance which allows changes in fish abundance and fishing pressure to be tracked from year to year, and an analysis of the health and sustainability of the fish population to be made.

Just as importantly catch surveys also provide a means of comparing recreational catches with the catch recorded in commercial fisheries, and are essential if resource sharing conflicts are to be resolved.

Licensed recreational fisheries including abalone, marron and rock lobster have annual monitoring programs which provide a picture of catch and effort trends and the condition of the stock around which management changes can be based.

The data for unlicensed fisheries is far less comprehensive. In the past four years creel surveys have recorded recreational catch and fishing effort for all species in three regional areas of the State. These surveys have covered shore-based catches on the South Coast between Esperance and the Perth metropolitan area, trailer-boat catches between Augusta and Kalbarri, shore and boat catches for the Gascoyne Region from Shark Bay to Exmouth, and crab catches in the Swan River, Peel-Harvey Estuary, and Leschenault Inlet.

These surveys are part of a five-year program to establish a baseline dataset of total recreational catch and effort for each biogeographic region of the State at a resolution of five nautical miles.

However the data on recreational fishing impacts is far from complete. The development and funding of a comprehensive research and monitoring program for all the State's recreational fisheries is a matter of high priority, and will become increasingly critical in the next 10 years.

5.6 Resource sharing and integrated management

The key role of fisheries management is to ensure the sustainability of fish stocks, however management priorities have been historically driven by the risk of over-exploitation.

Management arrangements were first developed for the commercial sector, with considerable emphasis being placed on containing the exploitation rate of the rock lobster fishery in the late 1960s and early 1970s. In 1983, a freeze was placed on the issue of any further fishing boat licences and major advances in management occurred over the next five years with the declaration of over 45 limited entry and restricted entry fisheries.

Recreational fisheries management followed in the late 1980s and early 1990s, with the development of broad social standards for fishing such as bag and size limits.

Resource sharing is a critical part of the social dimension of fisheries management, and many fishing regulations to separate user groups, and reduce conflict, date back to the early 20th century with closures to methods such as netting (Lenanton, 1984).

However while the *Fish Resources Management Act (1994)* recognises resource sharing is an essential part of fishery management no specific powers have been enacted to describe the nature of a "resource share", and there is no single or integrated process by which resource shares are assigned to various user groups – either in Western Australia or anywhere else in Australia.

In the past resource sharing has been achieved through administrative arrangements such as closures to netting, some areas closed to commercial fishing, the setting of differential size limits, and limiting the number of commercial fishermen in some areas to ensure the commercial catch remains below maximum sustainable yield.

Examples of implicit "resource sharing" by administrative arrangement include fishery management plans, regulations and orders which limit certain sorts of fishing activity, gear types or the times various sectors can operate in specific waters, leases or closures for either aquaculture or non-extractive uses such as eco-tourism, and marine protected areas planning and marine park zonings.

While these processes and regulations imply the allocation of access between sectors, they are not usually explicit about the nature of this access, and what it may mean as a "resource share".

In the last 12 years three Fisheries Adjustment Schemes have targeted reductions in the commercial fishing fleet. These are:

- General Fisheries Adjustment Scheme (FAS) - 1987;
- Voluntary Reallocation and Buyout Fisheries Adjustment Process (VBFAP) - 1996; and
- Guidelines for Voluntary Resource Sharing (VRS) - 1997.

The *Fisheries Adjustment Schemes Act* was introduced in 1987 in order to "buy-back" excess commercial fishing effort in estuaries and the "open access" wetline sector. The key purpose of the scheme was industry adjustment within the commercial fishing sector to reduce unused fishing capacity. Funds were provided through a levy on commercial fishing licences and a government contribution.

Between 1987 and July 1999 the General FAS has bought out 187 commercial licences or fishing units, of which 69 were fishing boat licence holders with no other managed fishery access ("wetline" operators). The scheme closed in 1999.

Key outcomes from the buy-back scheme have been a significant reduction in the number of commercial operators in the wetline and estuary fisheries, a redistribution of catch among existing operators, the containment of increased effort inherent in the use of new fishing technology, and some implicit benefits for the recreational sector through having less capacity in the commercial fleet for escalation in effort and catch.

In 1996 the State Government allocated $8 million over four years to a Resource Sharing Initiative. This initiative had two components - *the Voluntary Reallocation and Buyout Scheme and the Guidelines for Voluntary Resource Sharing.*

The *Voluntary Reallocation and Buyout Scheme* aimed to reduce commercial fishing effort where there was a high level of conflict or competition for the available catch - particularly with the recreational sector.

Ten commercial fisheries were given the opportunity to participate in voluntary buyouts. These included the South Coast Herring Trap, South Coast Salmon, Tropical Rock Lobster - (Dampier), Windy Harbour/Augusta Rock Lobster, Kimberley Gillnet and Barramundi, South Coast Estuarine, Hardy Inlet Estuarine, Leschenault Estuarine, Mandurah Estuarine, and Swan River Estuarine.

By August 1999 the scheme had bought out 46 commercial fishing licences in these fisheries at a cost of $3.2m.

In 1997 the *Guidelines for Voluntary Resource Sharing* process was introduced. Rather than focusing on buyout, this process involves mediation which allows resource users to negotiate an adjustment of resource shares between sectors.

The guidelines process relies on user groups nominating where a shift in resource shares is required, and a commitment to a mediation process to arrive at agreed solutions.

These solutions may involve a range of management approaches, including an adjustment of fishing rules for either sector, or a reduction in available effort.

Two fisheries have been accepted under this process so far, although others are under consideration. Those accepted are the West Coast Beach Bait and Fish Net Managed Fishery and the Cockburn Sound Crab Managed Fishery. Both have been nominated by commercial fishermen's associations. An agreement has been reached between parties for the Cockburn Sound Crab Managed Fishery and mediation is currently suspended for the other fishery. Other fisheries are currently being considered for inclusion in this process.

Aquatic resource sharing between non-fishing uses and fishing is more complicated again, and will also increasingly involve Native Title issues and "traditional fishing" as these issues attain more legal definition.

Amendments to the *Conservation and Land Management Act (1984)* allow for the payment of compensation to commercial fishers or the aquaculture industry should they be displaced in the marine reserves planning process, however there is no such provision for recreational fishing.

There is no question that the sharing of WA's aquatic resources will be one of the dominant issues facing recreational and commercial fishers - and the remainder of the community - in the new millennium.

The answers are not simple, and for many fisheries, particularly multi-species finfish fisheries, the outcomes are very hard to define in terms of total or allowable catch.

The reality is that a simple assignment of catch "quotas" to each sector is unlikely to be practical, even when a fishery has a comprehensive monitoring program in place for both sectors, reliable stock assessment, and is managed through a quota system.

There needs to be a recognition that resource sharing includes not just "catch shares" but a powerful social dimension and competition in space and time for access to specific areas, the available catch, and purposes other than fishing such as conservation.

Most commercial finfish fisheries in WA are managed through "input" controls on gear and the number of boats. Recreational fisheries rely on legal sizes, individual bag or possession limits and, in some cases, closed seasons to constrain catches when necessary.

The challenge for the future is to establish a process which can permit the management of the total fish catch by managing the catch of each of the major groups of users.

Such a process will need to be firmly based on the best available information, will need to permit a change in resource shares as community priorities change, must be transparent to all involved, ensure that the basis for any decision making is clear, and the outcomes are capable of evaluation.

In fisheries where the catch is dominated by the recreational sector, or split evenly, the successful resolution of resource sharing issues is increasingly becoming a prerequisite to sustainability - rather than just a means of directing the flow of benefits from a fishery.

5.7 Managing the recreational catch

The current suite of recreational fishing regulations create a social basis for fisheries management, and while they have widespread support in their current form, are unlikely to constrain the recreational catch in the face of population growth and improved access.

It is inevitable that as stock assessments improve fisheries managers will need to seek community support for fishing controls which can contain the total catch on a stock of fish - both recreational and commercial. Within this framework each sector will need to accept its share of constraint.

The benefits from constraint will also need to be clear, and seen to flow-back to the sector or sectors that have accepted limitations.

In recreational fisheries it is also unlikely that bag limits and other individual catch limits, once the number of people participating in the fishery gets beyond a given level, will achieve a real reduction in the total recreational take.

This is already the case in both the marron and abalone fisheries.

Many anglers also consider that once bag limits drop below a certain level much of the fishing quality - which is based around the notion of opportunity - is lost.

Ultimately broad management strategies which can effectively reduce fishing pressure on a stock, or tactical closures which can maximise the potential productivity of a fishery may be the only solutions that can ensure a continuing fishing experience of a reasonable quality.

In effect managing the total effort - and consequently catch - may become the key management tool for recreational fisheries.

Examples of this approach in WA already exist in the Roe's abalone fishery, the marron fishery, the rock lobster fishery and more recently, the Shark Bay eastern inner gulf pink snapper fishery.

In abalone, for example, access to the recreational fishery is limited to nine hours or less per year, licence numbers are relatively static at about 8,000 and a possession limit and legal size constrain individual catches and protect immature stock. Resource sharing is achieved through a minimum legal size which is 10mm lower for recreational fishers, spatial closures to commercial fishing, and a limit on the number of commercial licences, catch quotas and seasons which contain the total commercial catch.

Stock levels for species such as Australian herring, which have defined spawning periods, tailor, which aggregate in estuaries and nearshore areas as juveniles, and pink snapper and dhufish which aggregate to spawn may all benefit by the use of seasonal or spatial closures to fishing.

However in practice, limiting access in the majority of the State's coastal fisheries will be difficult to achieve without strong public support and demonstrable results.

5.8 Translocation and restocking

In recent years a number of proposals have been put forward in WA to "restock" marine fisheries by using hatchery-reared juveniles to boost fish stocks, or create new freshwater fisheries through the import of species native to the Murray-Darling River system.

Many people with significant interests in aquaculture also promote restocking as a means of improving fisheries.

Restocking offers a range of possibilities to assist in the management of fisheries, however experience in the USA and Canada indicates that large scale restocking in marine fisheries should be approached cautiously.

An essential step is to establish properly evaluated trials before a large amount of resources are committed or other forms of management changed.

Key issues relate to the factors that determine the abundance of fish populations in any given year, the survival rate of juveniles, and the genetic risks posed to the survival characteristics of wild populations by selectively bred hatchery stock.

Some of the issues that need to be considered before restocking is selected as a means of enhancing fisheries include knowledge of the status of the wild stock, the survival rates of hatchery juveniles, and the interaction between hatchery-reared fish and wild populations, and the risks posed by hatchery-borne diseases.

An additional consideration is the cost and benefits of using restocking as a management strategy, as opposed to more conventional measures such as fishery or seasonal closures to allow wild populations to improve naturally.

In WA major opportunities identified for the use of stocking strategies include freshwater impoundments and enclosed or semi-enclosed marine systems for species such as black bream which tend not to have an oceanic phase in their life-cycle.

Additional opportunities may exist for translocated Murray-Darling species such as golden perch if any risks posed to native freshwater ecology or rare endemic species are considered acceptable.

5.9 Funding for management and enhancement

The approved Recreational Fisheries Program budget for 1999/2000 management is $7 million, an estimated $1.5 million of which will be contributed by recreational fishers through licence fees.

Licences are presently required for abalone, rock lobster, marron, freshwater angling, and net fishing. All fees from licences are paid into the Recreational Fisheries Fund, established under the *Fish Resources Management Act 1994*, which may only be used for purposes associated with recreational fishing.

This funding covers management, consultation, research, education and compliance activities, however, none of these activities are funded to a level that will meet the increased demands associated with a growing population and a high participation rate.

The adequacy of funding for management will be a critical factor in whether or not WA can meet the challenges in recreational and commercial fisheries in the coming decade.

The question of how adequate funding should be provided is a matter for discussion between Government and the recreational fishing community, but one thing is certain, no additional funding will be forthcoming without strong community support, and a clear set of business rules to ensure funds are dedicated to the management and enhancement of recreational fisheries.

An approach to the Commonwealth Government by WA and other States in 1992 in an attempt to secure a levy through the general sales tax system was rejected by the Commonwealth Government on administrative grounds. State taxation powers do not allow for the introduction of such a levy at State level.

There is no doubt that the need for additional resources for fishery management and demands for action from the community will escalate in inverse proportion to the quality of the fishing experience and the availability of fish.

It is also true that if sufficient resources are not applied early on in the cycle of exploitation, many opportunities which may have been available through the development of fishing-based tourism will be lost.

Once fish stocks are depleted or collapsed there is no alternative but management which aims at stock recovery through the closure of fisheries.

The commercial fishing sector has been under a cost-recovery regime since 1995 and is now paying all management costs in the large commercial fisheries, and a contribution in the smaller and less economically important fisheries which focus on coastal and estuarine finfish.

The area of growth and increasing management demands is no longer the commercial sector - it is the recreational sector, and there is an increasing need for additional resources to be dedicated to managing recreational fisheries. The cost of operating a comprehensive recreational fisheries research and management program across the entire State is currently estimated to be in the order of $10 million a year.

At current funding levels the growth of knowledge and management is likely to be slower than the rate of decline in the fisheries. Without extra funding and without a major crisis which diverts funds, full recreational baseline data will not be collected until 2004, with repeat surveys every seven years.

The implications are that resources will be eaten up in crisis management and not able to be used in strategic projects - further slowing the development of management arrangements for these fisheries and exacerbating sustainability problems.

The question of securing sufficient funding to meet increasing demands for recreational fisheries management requires widespread community consideration and debate. It is clear however, that unless sufficient resources are made available in the face of a growing population and increasing demands on coastal resources the quality of recreational fishing as we know it today can not be maintained.

While the new regional fisheries management approach will address some of the emerging issues, additional funding to meet increasing requirements particularly in the areas of research, compliance and education will become paramount as we advance into the 21st century.

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Appendix 1 Recreational Fisheries Program Projects 1999

Recreational Management

Recreational Fishery Management

Program Planning, Management and Evaluation

Community Consultation and Advice - RFAC etc

Research Services

Western Rock Lobster Recreational Fishery

Recreational Abalone Fishery Survey

Crab Fishery Surveys - Peel, Swan, Leschenault

Recruitment Index - Herring, Salmon, Tailor, Whiting

Black Snapper Biology and Stock Assessment

Recreational Marron Fisheries

Recreational Freshwater Angling Sustainability

National Recreational Fishing Survey

Regional Creel Survey - Pilbara

Community and Licensed Fishery Surveys

Fisheries Officers Database

Shark Bay Inner Gulf Pink Snapper

Black Bream in Inland Waters

Recreational Regional Services

Gascoyne Region - Management, Compliance

Metropolitan - Management, Compliance

Mid-West Region - Management, Compliance

Northern Region - Management, Compliance

Southern Region - Management, Compliance

Community Education/Corporate Services

Community Education Programs

Volunteer Fisheries Liaison Officer (VFLO) Program

Licensed Fisheries Information

Fish for the Future/Marine Angling

Appendix 2 Recreational Licensing Arrangements in Other Australian States

New South Wales re-introduced an inland waters fishing licence in 1998 following demands by the recreational fishing community for improved fishery enhancement and management programs for freshwater.

The NSW Government has commenced a consulation process to determine community views about the possibility of introducing a general recreational fishing licence fee. NSW Fisheries released a discussion paper in January 2000 which outlines a proposed licence model to promote public comment on this issue.

South Australia has specific species licences for rock lobster, abalone and netting. Peak recreational fishing industry bodies have indicated support for a recreational fishing licence, however, it is not being progressed by the Government at this stage.

Tasmania licences specific species and gear including netting, rock lobster pots and scallop dredges, and diving for abalone, rock lobster and scallops. A licence is also required to fish inland waters, with additional fees for more than one rod. Children under 14 are not required to hold a licence.

Victoria introduced a recreational fishing licence for all public waters on 15 July 1999. The decision followed a survey within Victoria that indicated 85 per cent of recreational fishers were in favour of the introduction of a licence for all public waters.

Previously Victoria issued recreational licences for fishing of all types in inland waters, the use of hoop nets for rock lobster and crabs, the use of haul nets to take bait, mullet or prawns, and the take of rock lobster by hand in marine waters.

The general recreational fishing licence is issued for one year ($20), 28 days ($10), or 48 hours ($5). Licences are not required by those under 18, those on a pension or holders of a Victorian Seniors Card. Current estimations are that revenue will be in the order of $4.5 to $7.5 million per year.

Moneys received go into a Recreational Trust Fund which is administered by a committee appointed by the Minister. It has five members drawn from government and the main recreational fishing groups.

It is expected that money will go towards projects such as expanding fish stocking, fisher education, and access area facilities. It will also repay a government loan that was used to buy out commercial fishing from bays and inlets between Port Phillip and Mallacoota. Administration costs will be met from this fund, however, these are only anticipated to be about 8 per cent of the fees collected. Licences are sold through bait and tackle shops and Kmart.

Queensland has announced it will be introducing a fishing permit scheme for 25 stocked impoundments. Funds received from the issue of permits are to be used for fisheries enhancement purposes, principally for the purchase of fingerlings for stocking specific stocked impoundments.

The Northern Territory does not have any licensing arrangements for recreational fisheries.

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