MANAGEMENT DIRECTIONS FOR WESTERN AUSTRALIA'S COASTAL COMMERCIAL FINFISH FISHERIES

Issues and Proposals for Community Discussion

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Management Directions for
Western Australia's
Coastal Commercial Finfish Fisheries

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Contents

Appendices

List of Figures

Glossary of Terms

Demersal

Found on or near the bottom of the sea.

Dinghy

A licensed fishing boat less than 6.5 metres in length, usually connected with a lead or mother boat as a fishing unit.

Fishery

A fishery means -

(a) one or more fish stocks or part of stocks that can be treated as a unit for the purposes of conservation or management; and

(b) a class of fishing activities in respect of those stocks or parts of stocks of fish.

Fishing capacity

Fishing capacity is the combination of inputs that enables the fishing unit to participate in the fishery – boat, gear, and experience of the fishers.

Interim managed fishery

A fishery declared as such by a management plan made under section 56 of the *Fish Resources Management Act 1994*.

Latent effort

Latent effort is that part of the total fishing capacity of the fishery that is not currently being used.

Managed fishery

A fishery declared as such by a management plan made under section 56 of the *Fish Resources Management Act 1994*.

Management plan

A management plan is the rules and regulations governing a managed or interim managed fishery.

National Competition Policy

The regulation and management of fisheries involves legislation, administrative practices and policies, many of which have features restricting competition. The National Competition Policy was established in 1995 to review, and where necessary, reform such laws and practices unless it can be demonstrated that the

benefits of the restriction to the community outweigh the cost; and the objectives of the legislation can only be achieved by restricting competition. More information on this policy can be obtained through Fisheries WA.

Pelagic

Found near the surface or middle depths of the sea.

Recreational fishing

Fishing for pleasure, to catch a feed for oneself or one's family or friends.

Wetfish

Cartilaginous fish (for example, sharks and rays) and scalefish or finfish (for example, dhufish and snapper).

Wetfish fishery

Any fishery or fishing activity which targets cartilaginous fish, scalefish and finfish.

Wetline fishery

Also known as the 'open access' fishery, it involves those fisheries or fishing activities for which there are no specific restrictions on the number of boats with access, or on the use of specific types or quantities of fishing gear on those boats. Hand lining, drop lining, trolling and squid jigging are all methods associated with the 'open access' or 'wetline' fishery.

Executive Summary

Western Australia has some of the best managed commercial fisheries in the world. As well as having fish stocks in good condition, they contribute about $538 million per year to the economy. Managed fisheries account for about 98 per cent of the value of the State's commercial fisheries. The remaining two per cent represents the open access coastal finfish resources.

There is increasing pressure on coastal finfish resources coming from a growing population base and the conflict resulting from a variety of user groups wanting to share the marine resources. Fisheries Western Australia has in place a number of mechanisms to deal with conflict over resources, but within the current management framework these have not been sufficient.

Sharing and protecting the fish resources is a complex balancing act, as is deciding how much government intervention is appropriate. Sustainability has been the primary objective for intervention in the past. Although still of major significance, resource sharing and security must also be key drivers for management decisions.

To achieve this, we need a new management framework. The one proposed in this paper integrates the management of the State's coastal fish stocks within one framework for all resource users. The path to integrated fisheries will not be an easy or short journey and hence the journey has been broken into stages.

This discussion paper presents the framework in the light of commercial fisheries, in particular the open access coastal finfish fishery. It provides the background to commercial fisheries management in Western Australia; describes the current situation; and sets the scene for a new management framework, with some important proposals on specific management issues.

It does not, nor can it, ignore the interaction with recreational fisheries but it does not attempt to discuss the management framework as it pertains to recreational fisheries. This can be found in *Management Directions for WA's Recreational Fisheries* (Fisheries WA, 2000). Having said this, this commercial fisheries paper makes the point that without management of the recreational sector, there is little use in managing the remaining coastal commercial fisheries – sustainability of stocks could not be guaranteed.

I urge you to read this paper and to attend the public meetings which are scheduled to be held along the coast. Fish resources are community resources and if they diminish, then everyone misses out – not just commercial fishermen.

Peter Rogers
Executive Director
Fisheries Western Australia

Summary of Proposals

Proposal 1

That the major commercial fisheries protected with management frameworks and associated consultative processes are recognised as sustainable in the long term; the major concern now being resources sharing and long term resource security.

Resource-sharing issues are discussed in 'Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management' (Fisheries WA, 2000).

Proposal 2

That management of the coastal finfish stocks be founded on the setting of a total catch limit, that is, management of both the commercial and recreational sectors.

Proposal 3

That the State's coastal fish resources should be managed on the basis of four major marine and two inland bio-geographical regions.

These regions are the Kimberley/Pilbara, the Gascoyne, the West Coast between Zuytdorp Cliffs and Augusta, the South Coast, the inland tropical waters of the North West, and the inland temperate waters of the South West.

Proposal 4

That to complement management for recreational and charter fishing, and establish a consistent basis for integrated management and resource allocation, current management boundaries for commercial coastal finfish fishing should be modified as follows:

- *That a Gascoyne commercial finfish fishery be created by extending the existing Shark Bay Snapper Managed Fishery boundaries northwards from 26°30' south to the western boundary of the current Pilbara trap fishery (114°9'36" east), and incorporating all finfish species.*
- *That Black Point (east of Cape Leeuwin, 115°30') be the boundary of the southern bio-geographical region, and that there be separate commercial licences for the West and South Coast regions.*

Proposal 5

That finfish stocks no longer automatically be available for take by all commercial fishing boat licence holders. A dedicated small-scale commercial fishery for finfish should be established, with clear entry criteria, and an appropriate limit on the number of operators in each bio-region.

The basis for managing the finfish fishery should be the allocation of Total Allowable Effort for commercial fishers, complemented by appropriate controls on recreational catches.

Proposal 6

That the following strategies be considered as part of the regional resource-use planning process:

- *Consistent with proposal 5, that the time/gear management approach be extended to encompass the Gascoyne and Pilbara regions' demersal finfish fisheries resources, complementing existing commercial fisheries management arrangements.*
- *Greater exclusion of commercial net and line fishing from marine parks and fish habitat protection areas.*
- *General prohibition on the commercial fishing for shark and finfish by demersal gill net, demersal long line or drop line within three nautical miles of the coastline on the West and South Coasts where it is both practical and appropriate.*
- *Further funding of licence buy-back to reduce the number of commercial fishing boats targeting finfish.*
- *Greater emphasis on aquaculture as a source of fish for human consumption, stock enhancement and private water fishing.*
- *Reduced commercial netting of key recreational species including Australian herring and salmon, tailor, mulloway, barramundi and blue manna crabs.*

Proposal 7

That in order to control the commercial exploitation of Spanish mackerel and other tropical finfish, the mackerel troll line fishery be incorporated into existing line fisheries in the Gascoyne, Pilbara and Kimberley areas.

Proposal 8

That a benchmark date of 3 November 1997 be one of the entry criteria for access to Spanish mackerel and other finfish outside the existing Shark Bay Snapper Managed Fishery area.

Proposal 9

That enhanced management arrangements for the South-West Beach Seine Fishery be introduced, taking into account historical access entitlements.

Proposal 10

That a closed season for all fishing to protect dhufish and baldchin groper breeding stocks be introduced within fishing blocks 97011-15 (waters surrounding the Abrolhos islands) during November, December and January each year.

Proposal 11

That adequate resourcing and effective funding strategies should be an integral part of any package for fundamental changes in the management of the State's coastal fish stocks.

Section 1 Commercial Fisheries Management in Western Australia

The commercial fisheries of Western Australia are recognised as some of the best managed sustainable fisheries in the world. They contribute about $538 million to Western Australia's economy, most of which comes from the largest six fisheries – Western Rock Lobster, Shark Bay Prawns, Shark Bay Scallops, Exmouth Gulf Prawns, Abalone and Pearling. There are a large number of smaller fisheries managed at various levels.

Regardless of the size or value of the fishery, the driving objective of fisheries management in this State has always been sustainability of the fish resources, backed up by the fulfilment of economic and social objectives where possible. The framework developed in this paper continues the pursuit of these objectives.

1.1 The last 16 years

Before September 1983, there was no constraint on the issue of commercial Fishing Boat Licences (FBLs), except for fisheries where legislation prevented new access.

At that time, the largest commercial fisheries were already subject to management arrangements and access to the estuarine fisheries for commercial fishing was constrained by a limited number of owner-operator licences. There was also a rush to implement management arrangements for the State's smaller commercial fisheries, in part driven by the need for sustainability, and in part by the fishing industry itself seeking resource security, with the goodwill values tied to licences generating improved investment capacity.

On 5 September 1983 the then Minister for Fisheries announced an immediate freeze on all new applications to enter the fishing industry via a FBL. Even at that time the Minister indicated that "the Government and industry are increasingly being faced with the consequences of excess fishing capacity in areas such as ... the inshore fisheries on shark, dhufish and other reef fish species ..." (Fisheries and Wildlife 1983).

In 1986, commercial industry leaders and departmental officers met in Mandurah to develop a future management strategy for the commercial fishing fleet. This working group formally sought and gained ministerial approval for an increase in the number of commercial fisheries under management and the introduction of a Government/industry-funded buy-back scheme to reduce the number of commercial FBLs.

Consequently, by the mid-1980s, a significant number of commercial finfish and shellfish stocks had been brought under management plans including Shark Bay snapper, the southern shark stocks, two small rock lobster stocks on the southern coast and the south-west scallop and prawn stocks.

One result of the gradual introduction of management changes was the concentration of the remaining commercial fleet onto stocks in areas where fishing access was still unrestricted. This was exacerbated by the rationalisation of the Western Australian southern bluefin tuna (SBT) fleet (as a result of Commonwealth fisheries changes) in this period which also resulted in a significant number of previous SBT fishing vessels moving into unrestricted State fisheries.

Western Australia's management philosophy continued into the 1990s with the introduction of management into the Pilbara and Kimberley demersal finfish stocks, the West Coast shark stocks, the West Coast pilchard stocks, aquarium fish and specimen shell fisheries. At the end of the 1990s, most significant commercially-fished stocks are now protected by specific management plans, leaving a small group of fisheries, mainly based on demersal finfish and mackerel, outside formal management structures.

This process of protecting the State's major fish resources through management plans was also assisted by the introduction of Offshore Constitutional Settlement (OCS) arrangements in 1988 (revised in 1995) which shifted legal responsibilities for the management of most major fish stocks from the Commonwealth to Western Australia and allowed unified management arrangements (Fisheries Department of Western Australia 1995, Commonwealth of Australia 1998).

The combined impact of these management changes over the past 16 years (1983-1999) has been to reduce the significance of the catch by fishing boats that are fishing unmanaged fish stocks. They account for only two per cent of the value of total harvest in 1997/98 (F. Crowe, 1999). As more and more commercial management plans came into place, fewer 'open access' fisheries or fishing opportunities remained for boats with only FBLs.

1.1.1 Current access arrangements

Today, unrestricted access to fish stocks for those who hold only Fishing Boat Licences (FBLs) is principally restricted to the use of hand lines, some types of drop lines, or trolling (for mackerel, principally in northern waters). All other commercially significant fish stocks, although often small, are subject to some licensing constraint or management plan. (See Appendix 1 for a complete list of managed fisheries).

As a consequence of these management changes over the last two decades, many fishers who held FBLs alone have left the commercial fishery, either selling their licence on the open market or to the general licence buy-back scheme. There is, however considerable surplus fishing capacity within the wetline fleet as there are many licensees who could undertake wetline fishing and choose not to at this time.

1.1.2 Recent restructuring of the commercial fishing fleet

Between 1985 and 1998, the following key changes took place within the commercial fishing fleet:

- The number of fishing units in the Western Australian fishing fleet shrank from 1,615 to 1,361.
- The number of managed fisheries increased from 7 to 33 (30 managed and 3 interim-managed).

- A total of 69 FBLs without managed fisheries endorsements were sold to the general buy-back scheme between 1987 and July 1999 and cancelled.
- A total of 133 estuarine and beach fishing units were acquired by the general buy-back scheme supplemented by the recent $8 million Resource Sharing Initiative and cancelled. Between January 1987 and September 1999 the number of estuarine licences dropped from 145 to 58 as a result of a more active Fisheries Adjustment Process (see Appendix 2).
- The number of units in the wetline fishery (without access to a managed fishery) has now dropped to 156, compared with more than 300 units in 1986.
- The number of recreational fishing charter vessels in WA has expanded from 40 in 1990 to over 135. About 50 of these boats also have commercial FBLs.
- The landed value of the catch taken by vessels operating under commercial FBLs without access to managed fish stocks has fallen to $10-12 million per year, and is now only about two per cent of the value of WA's total commercial fisheries production (including pearling) (Appendix 3).

1.1.3 The commercial 'wetline' fleet

The commercial wetline fleet is a subset of the total fishing fleet, and consists of all boats with Fishing Boat Licences which have access to fish stocks that are not subject to specific management. The catch taken by boats outside of managed fisheries is added to by the catches from a mixture of boats from managed and interim-managed fisheries when they are fishing outside of their primary fisheries, that is, when they are targeting wetfish rather than rock lobster or prawns, for example. A major area of recent development has been the growth in Spanish mackerel fishing between the Gascoyne and the Northern Territory border, but particularly in the Kimberley.

Between 1991/92 and 1997/98 about half (720) of the State's total fishing vessels submitted catch returns for wetline fishing. However in any one year, between 370 and 400 of the State's fishing fleet undertake this type of fishing activity (*see Figure 1*).

Within the wetline catch, only three 'line-caught' species had catches exceeding 100 tonnes a year, over the last seven years. For example in 1997/98 these species were: dhufish – 202 tonnes; Spanish mackerel – 536 tonnes; pink snapper – 230 tonnes.

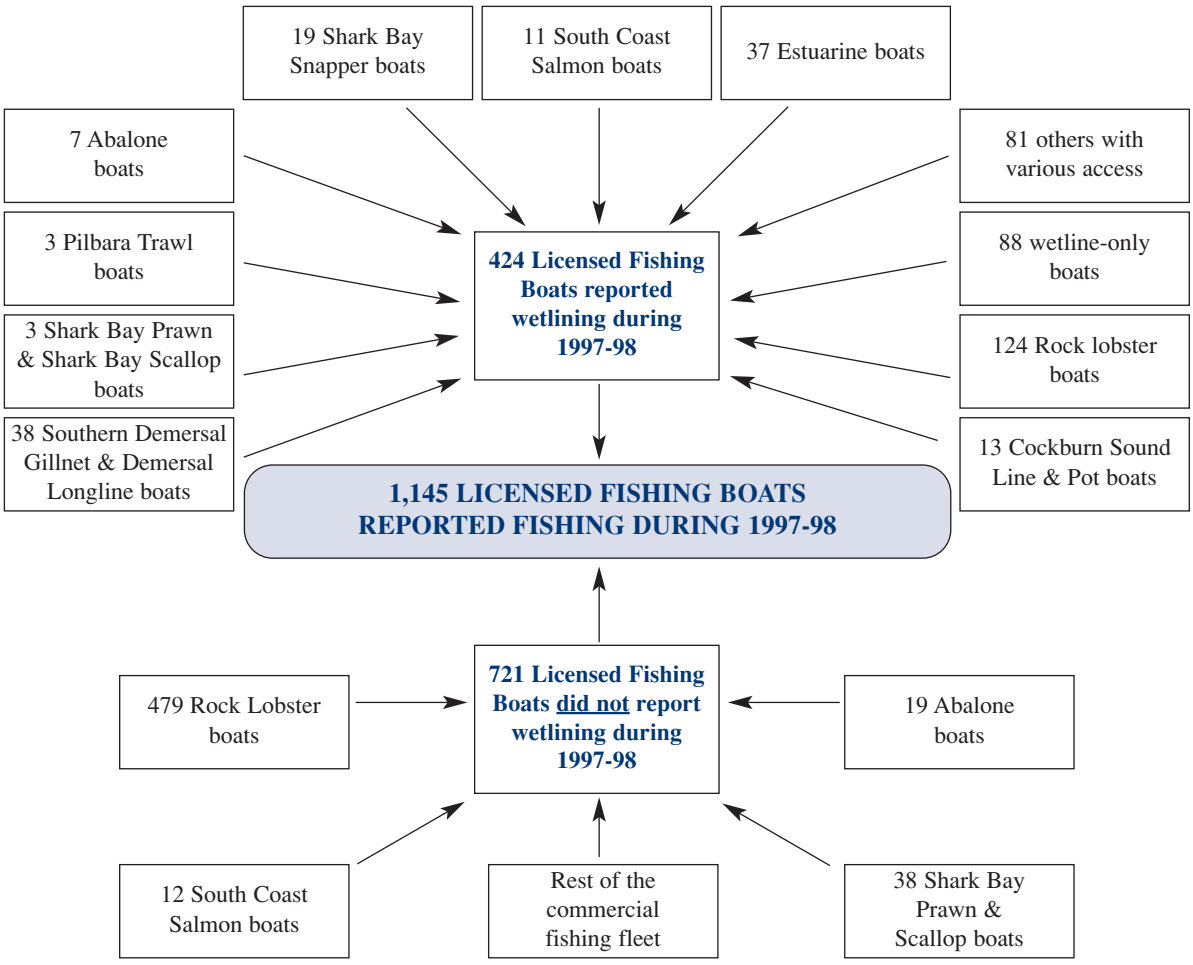
The wetline fleet catch of 'net-caught' species only contained two which generally exceeded 100 tonnes a year over the last seven years. The 1997/98 catches of these species were: whitebait – 48 tonnes (down from 256 in 1996/97); Australian herring – 112 tonnes.

The majority of the wetline-only fleet is highly mobile, although the estuarine licence holders tend to fish close to the estuary to which they have access. Similarly, boats holding managed fishery licences tend to wetline near the geographical areas associated with their major licence, such as the rock lobster vessels which fish predominantly in the lower West Coast region.

The major areas for wetline catches are the Kimberley (where most of the Spanish mackerel are taken); the Abrolhos Islands (over 200 tonnes); the Perth metropolitan area (over 150 tonnes); and the south-west coast (over 200 tonnes).

For a full analysis of the wetline fishery, see *A study into WA's open access and wetline fisheries* (F.Crowe, 1999).

Figure 1: Number of boats wetline fishing during 1997/98



1.2 Community involvement in management

Fisheries management has had invaluable support from an increasing number of Ministerial Advisory Committees (MACs), which represent commercial, recreational, and aquaculture sectors as well as community interests.

These MACs generally have independent chairpersons and stakeholder members and experts to ensure consultation and provide advice on future policy settings for particular fisheries or individual agency programs. The State's major managed commercial fisheries all have formally appointed MACs.

The majority of MACs tend to focus on the operation of the fishery or activity most relevant to them, although some also provide advice on regional recreational fishing and aquaculture development.

On a broader level the Minister, on behalf of the Government, also receives advice and views from peak community and industry-based bodies such as the commercial Western Australian Fishing Industry Council (WAFIC) and the recreational peak body, Recfishwest.

1.3 Fisheries snapshot

Today there are 30 managed and three interim-managed fisheries in Western Australia, representing 98 per cent of the commercial fisheries production (that is, about $527 million in 1997/98). The majority of these comprise 'the big six' – Western Rock Lobster, Shark Bay Prawns and Scallops, Exmouth Gulf Prawns, Abalone and Pearling. The remainder includes the southern and west coast shark fisheries; pilchard purse seine; trawl, trap and line off the north-west coast; and other prawn and scallop trawl fisheries.

These fisheries are, in the main, managed effectively for sustainability in the context of current knowledge of the resources. They are the result of over 30 years of fisheries management in Western Australia – they have management frameworks, are operating under management plans and have consultative processes in place.

Regulatory tools used in the management of these fisheries include limits on gear, total number of boats and the amount of time fishers can operate, coupled with a reduction in overall fleet size through a number of adjustment mechanisms, such as licence buy-back.

Consequently, sustainability is no longer the major current concern for the vast majority of these fisheries as they are protected under the management regimes in place. The major long-term issue for some of these fisheries is now resource security – the implications of coastal development, and setting yield limits for the purpose of resource sharing, among other things. This broader issue is covered more fully in *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management* (Fisheries WA, 2000).

Outside this framework of key stocks and areas are a group of fisheries which are essentially open access and are primarily based on the wetfish resources. The remaining 'unmanaged' fisheries largely involve demersal finfish on the west coast, mackerel, whitebait and the unmanaged herring stocks. These fisheries

involve up to 370 - 400 participants each year and represent about two per cent of the value of WA's total commercial fisheries production, worth $10 - 12 million per year.

The question in these 'unmanaged' fisheries is still one of sustainability and this is intricately linked with resource sharing. Both these issues have to be addressed because unless resource shares are resolved, there can be no guarantee of sustainability. This may, or may not, require the introduction of structured management for these fisheries. If it does, how do we manage these fisheries? The remainder of this paper addresses this question.

Proposal 1

That the major commercial fisheries protected with management frameworks and associated consultative processes are recognised as sustainable in the long term; the major concern now being resource sharing and long-term resource security.

Resource-sharing issues are discussed in 'Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management, (Fisheries WA, 2000).

Section 2 Stakeholders in the Marine Finfish Resources

For a full discussion of the issues pertaining to stakeholders in the State's fish resources, see *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management* (Fisheries WA, 2000).

2.1 Commercial fishing

The principal use of commercially caught finfish in Western Australia is domestic consumption. A significant number of the public buy fish regularly, many preferring to buy locally caught rather than imported fish. The commercial fishing industry also contributes export earnings and, in addition to domestic consumption, provides a source of fish to WA's consumers for the retail and hospitality industries, fishing bait, and recreational angling.

The industry's future expectations focus on sustainable catch levels, greater security of access to fish resources, better use of the available catch, and improvement in economic returns. This economic improvement should come from maintaining better product quality, improvements in value-adding, market diversification, greater catching efficiency and associated industry restructuring. Lifestyle interests are increasingly being put to one side as the major commercial fisheries shift to a more business oriented approach. However, lifestyle continues to remain a key factor in the State's inshore/estuarine net fisheries.

2.2 Recreational fishing

Recreational users belong mainly to two groups: those who simply wish to catch fish, and those who seek to enjoy both the experience and the environment and may catch fish as well. There is an estimated 600,000 people in WA who fish for a huge variety of fish, mainly in inshore and estuarine waters.

2.3 Aboriginal communities

Some Aboriginal communities in the Pilbara and Kimberley, in particular, fish to meet traditional needs of their communities. In addition, commercial fishing and aquaculture are seen as important opportunities for economic and social development among Kimberley Aboriginal communities, as is Aboriginal-based eco-tourism.

2.4 Aquaculture and pearling

A key requirement of aquaculture and pearl farming is access to quality protected waters. Competition for space in the face of other needs of the community will impose additional costs and limitations on new industry development and, for the time being, requires Government intervention and a more planned approach to development.

2.5 Conservation

Biological diversity and habitat protection are key national and international conservation requirements. These imperatives, along with government's desire to establish marine management areas and a representative marine reserve system along the WA coastline, will undoubtedly cause greater political pressure for spatial separation of resource users.

The community, as passive users of the marine resources, also has a desire for the conservation of fish resources. Included are the passive users of the marine resources, such as divers and those boating to enjoy the marine environment rather than fishing. These passive users also include those who may never visit the coastline, yet gain some satisfaction from knowing the diversity of fish species is being maintained and the utilisation of fish resources is sustainable.

2.6 Aquatic charter and fishing tours

Aquatic charter operators provide a service to fee-paying customers to take them fishing or sightseeing. They can be either marine-based or land-based 'adventure' tour operations focusing on a fishing/camping experience.

Charter operators aim to provide a quality experience for customers, which revolves around high catches of quality fish and access to special marine and terrestrial areas or highly valued accessible fishing grounds.

2.7 Tourism and social benefits

The tourism industry obtains secondary benefits from a well-managed relatively pristine aquatic environment and generally healthy fish stocks.

Quality fishing is a regional tourism drawcard which increases both visitor numbers and the length of stay. These, in turn, support retail/service industry businesses catering for the families and non-fishing companions of keen fishers.

In a recent study (David Hides Consulting Group P/L, 1998), 93 per cent of respondents advised that they ate seafood and about 60 per cent said that eating locally caught seafood was an important part of tourism.

2.8 Other stakeholder interests

There is a range of service industries covering bait supplies, tackle shops, banking, boat builders, gear manufacturers, hoteliers, restaurants and retail fish shops that depend on the welfare of WA's fish stocks. These interests will continue to influence policy through local government and various business and lobby groups.

To these must be added the interest of the community who do not fish actively but gain satisfaction from the knowledge that they can buy fish and that the State's fisheries are well managed and resources are sustainable for the future.

There is also an increasing market for wild-caught fish that remain 'uncontaminated', which is how the Australian marine environment generally is viewed.

Section 3 Key Issues Facing the Commercial Wetfish Fishery

Although the managed fisheries face similar issues to the wetfish fishery, these are dealt with through existing management frameworks and consultative mechanisms. The remainder of this paper concerns the open access and minor commercial fisheries that rely on the wetfish, or coastal finfish, resources.

3.1 Fish stocks at risk

When looking across the broad range and diversity of finfish stocks, most WA fish resources at this time are both sustainable and in reasonable health by national and international standards. Despite this, local depletion is already an issue for some exploited finfish stocks and as fishing pressure continues to expand, this will become an increasing feature of coastal fisheries. These expected trends will be reflected by changes in catch composition of fish size and age, reductions in catch rates (abundance) and greater variations in abundance from season to season or year to year.

The 1997/98 *State of the Fisheries Report* has identified a number of finfish stocks which are fully exploited and may be at risk. They include red emperor and Rankin cod in the Pilbara Trawl Fishery; pilchards at Albany; whiskery shark off the lower west and south coasts; and some cobbler and black bream stocks in our temperate estuaries.

In addition, the 1999 wetline study (F. Crowe, 1999), has also pointed to five stocks of critical significance to the present wetline sector; pink snapper, dhufish, Spanish mackerel, whitebait and Australian herring.

Assessments of the status of some of these stocks are at Appendix 4.

3.2 Surplus fishing capacity

Despite existing management plans and licensing arrangements there continues to be significant surplus capacity, or latent effort, in the wetline fleet with minimal opportunity for diversification into new fisheries.

Management arrangements, particularly for coastal finfish and the smaller commercial fisheries, are in some cases complex and as more management plans have come into effect, further commercial fishing effort has moved onto the uncontrolled stocks.

3.3 Impact of improved fishing technology

The average commercial wetfish boat 30 years ago was a displacement hull boat, built of wood, with a top speed of about 10 knots.

There have been considerable advances since then.

- The average wetline boat, although still relatively old (10 – 15 years) by standards in other WA commercial fishing fleets, is usually an aluminium or fibreglass planing hull capable of up to 20 knots, with onboard refrigerated seawater tanks or freezers.
- These boats are increasingly capable of moving rapidly between fishing grounds and spending more days fishing.
- Improved weather forecasting has given fishers better information to help maximise their fishing activities.
- Electronic equipment is also much cheaper and more sophisticated.
- Fishers also have more efficient catching gear, including power reels and mechanised drop lines, and better refrigeration technology.

A range of controls on commercial fishing, gear and time have been introduced to compensate for these trends, however this has also led to questions as to the cost-effectiveness of these controls.

3.4 Oceans Policy

In late 1998 the Commonwealth launched *Australia's Oceans Policy*. The *Oceans Policy* sets in place a framework for integrated and ecosystem-based planning and management for all of Australia's marine jurisdiction.

It proposes to build upon existing effective sectoral and jurisdictional mechanisms, including Western Australia's very effective fisheries management regime. Under Offshore Constitutional Settlement arrangements, WA manages most fish stocks out to the 200 nautical mile Exclusive Economic Zone.

The core of the *Oceans Policy* is the development of Regional Marine Plans based on large marine ecosystems. The *Oceans Policy* also proposes management of uncertainties in resource access, use and allocation processes, for example, by creating tradeable rights and/or other market mechanisms where they are able to adequately address the full range of economic, environmental and community values.

The State Government has not agreed to the introduction of the *Oceans Policy* adjacent to WA or agreed to participate in its planning processes. However, WA's own integrated marine planning process for waters and resources under its jurisdiction must be developed taking the *Oceans Policy* into account.

3.5 Economic and social considerations

The expansion and development of commercial fishing can be in conflict with that of recreational fishing or aquaculture. Economic and social objectives and their primacy in fisheries management are difficult to achieve, let alone measure or reach easy community agreement. Maximising economic wealth in a fishery and the concentration of wealth as opposed to a social objective for regional development and employment, do not easily sit side by side.

For most managed commercial fisheries where access entitlements are transferable, the key focus has been resource sustainability. Economic and social considerations have only sought to influence management direction where there is wide industry support or some political imperative at the time.

Furthermore, as governments cope with the consequences of the National Competition Policy and the fishing industry seeks more certainty for resource security, a need for clarification of management objectives and a focus on the directions of management is becoming more apparent.

3.6 Cost of management of finfish resources

While fish stock management has been highly successful in sustaining the major commercial fisheries, the process is becoming increasingly complex, expensive and demanding. Since 1995, the Government has been recovering an increasing proportion of management costs of the State's six largest commercial fishing sectors – Western Rock Lobster, Shark Bay Prawns and Scallops, Exmouth Prawns, Pearling and Abalone – with other fisheries contributing to a lesser extent. This has provided reasonable funding certainty to sustain these valuable fisheries. As a matter of Government policy, an increasing number of commercial fisheries could be moving to full cost-recovery over time.

However, this approach is not viable for the State's remaining economically less valuable small scale commercial fisheries. These often small regional fisheries mainly exploit finfish and shark, but also include prawns, scallops, crabs, beche-de-mer, aquarium fish and specimen shells. Most of these fisheries operate in coastal marine embayments and near shore waters, although some extend farther offshore. Many also face increasing competition from recreational fishing, changes to fish populations due to local environmental change, and conflicting demands from other users of coastal waters (such as aquaculture), and passive users (marine parks).

Despite being small fisheries of relatively low value, the cost of managing these fisheries is high. There are a number of reasons for this high cost.

- Both the distribution, and attributes of the 'minor commercial' finfish resource is characterised by the following factors:
  - very high species diversity, with individual species needing specific assessment and management attention;
  - relatively low abundance of individual species, which means relatively low catches, and most often low value of catches; and
  - complex life histories, often involving both estuarine and coastal habitats, with the overall catch being shared between a number of fisheries and stakeholders, greatly complicating the determination of the status of stocks.
- The move to regional management of the majority of these fisheries has meant that attempts are made to resolve far more issues than in past years, and the rate at which resolutions are sought has increased.

- There are a great variety of stakeholders in WA's coastal/estuarine finfish resource, and even more stakeholders in the wider coastal environment. While minor commercial fisheries continue to exist in these coastal regions, there will be perceptions around their 'presence' (irrespective of their size) which will result in 'use-conflict', with an attendant high cost that bears little relation to the real cost of actually managing the commercial component of the overall catch.

Of these stakeholders, the wetline/other commercial and recreational/charter sectors are targeting the same finfish resource. Who should pay for the management of this multi-species, multi-user fishery, especially as the need for dedicated full-scale management arises?

Recovery of total management cost (stock monitoring research, compliance, etc.) from the small scale commercial fisheries is unlikely to be viable due to their lower revenue levels and profit margins compared with the larger, more productive commercial fisheries. The risk of fish stock or fishing collapse is also likely to be greater, due to a lack of substantial long-term supporting research, data analysis and stock assessment, and the consequent uncertainty associated with management advice. At present these costs are met by Government.

As the need for cost recovery increases, cost-effective management in these smaller commercial fisheries will become an increasing imperative for the commercial client group. While the cost of managing single species and predominantly commercial fisheries such as rock lobster, prawns, scallops and pearling is relatively inexpensive through economies of scale, management of coastal fish resources which are generally multi-species/multi-gear/multi-sector is particularly costly – especially given WA's 12,000 km coastline.

A new approach to fisheries management – integration of all user groups and their eventual consolidation into a single management plan – may be warranted.

3.7 Other influences

3.7.1 Impact of population growth

WA is one of Australia's fastest-growing states. Population growth is likely to expand from its 1995 figure of 1,755,011 to more than 2.7 million people by 2029 (State Planning Commission 1996).

Population structure and its distribution can be expected to change considerably.

- Greater recreational fishing pressure can be expected, along with more mobility of fishers, through increased coastal development, more marinas, better road access and improved boating mobility.
- Average seafood consumption is also expected to grow with Australia's ageing society and changing ethnic composition.
- There will be small shifts in fish consumption due to growing health and dietary awareness.

Future increases in demand for domestic consumption are only likely to be met through greater use of presently under-utilised species, aquaculture, or greater imports. Present recreational 'bread and butter'

species such as herring and whiting could well be targeted for new markets. Demands on local fish stocks for bait and aquaculture feeds are also likely to increase.

The value of recreational fishing along the highly populated West Coast is arguably more important to the community than commercial fishing for finfish. This is particularly true for nearshore areas, marine embayments and estuaries where the majority of recreational activity is focussed. A phone survey commissioned by Fisheries WA in 1997 indicated that recreational fishing effort was growing faster than the population and in 1998 was estimated at 10 million fishing days per year (Fisheries WA, 2000).

Recreational fishing pressure has the capacity to have a substantial impact on coastal stocks. While commercial fishing is often constrained by operating costs relative to catch rates, recreational fishing is seemingly undiminished by economic constraints. Recreational fishers continue to fish provided there is a possibility of something to catch, and in the process are severely depleting some stocks.

This reality cannot be ignored in any discussion of managing these small commercial fisheries. If the recreational fishery cannot be managed, there is no point managing these small commercial fisheries as they are such a small part of the equation and, further, there is no guarantee of sustainability of the stocks.

In a 1998 survey (David Hides Consulting Group P/L, 1998), 79 per cent of respondents agreed "the government should manage recreational fishing activities to ensure the future of the WA commercial fishing industry". This statement was supported equally by recreational fishers and non-fishers alike. Although only a snapshot of Western Australia's population, this survey indicates there is community recognition that recreational fishing cannot proceed unmanaged if the fish stocks are to be maintained.

Proposal 2

That management of the coastal finfish stocks be founded on the setting of a total catch limit, that is, management of both the commercial and recreational sectors.

3.7.2 Impact of marine planning and the expansion of marine conservation reserves

Although the process of reserve establishment will take some time, the cumulative longer-term impact on commercial line fishing in marine reserves must be carefully considered. The establishment of 'no take' or sanctuary areas, together with pressure from the recreational and aquaculture sectors to secure areas primarily for their use, could significantly reduce areas accessible to coastal commercial line fishing.

Existing authorisations for commercial fishing, aquaculture and pearling will continue to be valid if the area to which they apply falls within a marine reserve. If an area historically fished becomes, for example, a marine nature reserve, or a sanctuary zone in a marine park, commercial authorisation will continue until its expiry date. Authorisations may be renewed if the activity is in a zone (i.e. general purpose zone) where the activity is permitted.

If the commercial value of an authorisation is considered to be diminished by the establishment of a marine conservation reserve, the holder of any fishing authorisation will be eligible to apply for compensation under the *Fishing and Related Industries Compensation (Marine Reserves) Act 1997*.

Section 4 A New Framework for Management of the Finfish Fishery

There are a number of problems with retaining open access in the coastal finfish fishery and existing situations in the minor commercial finfish fisheries, most of which revolve around the management issues previously discussed:

- the impact of recreational fishing and how to contain it;
- the interaction between commercial fishing fleets, for example the rock lobster fleets operating in the wetline fishery;
- the impracticality of quotas in a multi-species, multi-gear fishery (inadequate research and compliance);
- the impact of surplus fishing capacity and how to remove it; and
- the implications of the marine planning process.

The only way forward is to make a decision whether or not to manage these fisheries. If not, then there is a danger that the finfish resources may cease to be sustainable. There is also a danger that the commercial fleet could become marginalised and that the small commercial fisheries could come under political focus as the pressure from recreational fishers mounts. These outcomes are not likely to be acceptable – the community demands sustainable fish resources, a fresh fish supply and proactive, cost-effective management.

There appears little option but to decide for management and to consider the options. The following discussion will describe the current management framework, which has proved inadequate for these multi-gear, multi-species fisheries, and proposes a new total management framework, building on the established fisheries management arrangements.

4.1 Current management framework

The current management framework is fishery-specific and sector-specific, using a range of regulatory tools. These include closures, gear restrictions, boat number limits, quotas, effort units, bag limits and size limits. These tools are established through management plans or section 43 Orders under the *Fish Resources Management Act 1994*, or through the *Fish Resources Management Regulations 1995*.

The inability of regulatory mechanisms to adequately reduce participation in the minor commercial fisheries and in the open access finfish fishery led to the development of the *Fisheries Adjustment Scheme Act 1987*. Through industry and government contributions, a fund was established so that fishers could apply to surrender their licences within the framework of an agreed price buy-out. By 1998, 69 licences had been bought out through this process.

In 1997, the Government injected $8 million over four years for fisheries adjustment where the basis for adjustment was resource sharing.

Although the larger commercial fisheries in Western Australia are fully managed, to date, the Government has not sought to manage the small commercial fisheries that are grouped as 'wetline'. The objective has still been sustainability of resources, but this was addressed through decreasing the number of participants. This may no longer be adequate.

If management is to be introduced, what are the options? Input controls (such as area or time closures, gear restrictions, limited entry) in themselves could not provide enough protection for this complex finfish fishery. Quotas are also impractical as there is insufficient information on the resources and they would be unenforceable.

Individual Transferable Effort units (ITEs) have been used successfully in the demersal finfish fisheries of the Kimberley and Pilbara. In the Northern Demersal Scalefish Fishery and the Pilbara Trawl Fishery, participants have been allocated tradeable access units of time. These units are linked to a gear type based on research as to the capacity of a fisher to fish using that gear type in one fishing day or fishing trip. The resulting measures are continually reviewed to account for changes in technology and efficiency.

ITEs provide flexibility for both participants and managers. They have the benefits of quotas in terms of economic efficiency and the facilitation of adjustment in the fishery, yet are enforceable with the assistance of modern enforcement technology, such as the satellite-based Vessel Monitoring System (VMS). See Appendix 5 for a description of this management tool as it applies to these two northern finfish fisheries.

The ITE management tool could be applied to finfish resources not currently under management arrangements across all regions. A list of all commercial fisheries by region is at Appendix 6.

Again, such a management framework will not maintain sustainability unless similar constraints are placed on the recreational sector. Although the framework for managing recreational fisheries is discussed in another paper (*Management Directions for WA's Recreational Fisheries, Fisheries WA, 2000*), such management must lead towards a ceiling being placed on the total recreational take. One option to achieve this would be to adopt a system similar to the commercial ITEs – limiting the total number of angler days and sharing them equitably between and within user groups.

4.2 Proposed management framework

The rationale for a new framework revolves around a vision for integrated coastal finfish management, with explicit shares of the fishery designated to various user groups. Within this total package, there is a need to address the commercial take of finfish and to resolve resource sharing conflicts. Although this paper has as its emphasis the management of the commercial take of finfish, this in itself cannot guarantee sustainability of the resources because there will be a continual increase in recreational fishing pressure. Management needs to take into account the total take of finfish.

The framework for management of recreational fishing can be found in *Management Directions for WA's Recreational Fisheries* (Fisheries WA, 2000) and for resource sharing in *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management* (Fisheries WA, 2000).

This paper presents a framework for commercial fishing based on the management of commercial fishing by region.

4.3 Management by region

A key step in developing a common basis for a resource-sharing framework across all sectors must be to redefine management boundaries and make them consistent, where possible and useful.

In the case of WA's coastal fish resources, and in particular finfish, understanding human usage patterns and stock and species distribution is the basis of effective fishery management.

Consequently, any planning for future resource use is best placed in the context of acceptable bio-geographical regions.

In the broad sense, for finfish resources, the State can be practically divided into four marine and two inland bio-geographical regions. These are: the South Coast; the West Coast to south of Shark Bay; the Gascoyne region including Exmouth Gulf; the north of the State (Pilbara/Kimberley); and the inland waters of the North West and South West. As there is little commercial fishing activity and minimal conflict between other user groups in these inland regions, the remaining discussion relates to the four marine bio-geographical regions.

These regions have already been defined for recreational finfish and charter activities, and management of access to coastal waters for aquaculture is proceeding along similar lines. By and large, existing commercial fisheries also fit within these regional boundaries. This is not surprising given that a particular coastal bio-geographical region encapsulates areas of similar oceanic conditions and hence similar species groups. This is true of the tropical, sub-tropical, and temperate regions of the northern and western coasts of WA and the waters of the Southern Ocean.

There would be a need for adjustment in some current commercial fisheries boundaries and in some cases to combine groups of commercial finfish fisheries into a single management regime. This would not involve major changes or major disadvantage to commercial fishers. It would, however, establish the basis for comparability and management with the recreational and charter sectors.

These bio-geographical regions serve as the basis for an integrated strategy which would make the logistics of administration and management easier to achieve, and be of direct relevance to the distribution of key fish stocks.

In the longer term, the West Coast region is likely to experience the greater fish resource risks, and ought to be given urgent management priority. Realistically, a new style of management in the Pilbara/Kimberley, Gascoyne, and South Coast regions is likely to be easier to achieve. This is because there has been substantial rationalisation of commercial fishing already and recreational fishing pressure is not as great.

Proposal 3

That the State's coastal fish resources should be managed on the basis of four major marine and two inland bio-geographical regions.

These regions are the Kimberley/Pilbara, the Gascoyne, the West Coast between Zuytdorp Cliffs and Augusta, the South Coast, the inland tropical waters of the North West, and the inland temperate waters of the South West.

Proposal 4

That to complement management for recreational and charter fishing, and establish a consistent basis for integrated management and resource allocation, current management boundaries for commercial coastal finfish fishing should be modified as follows:

- ***That a Gascoyne commercial finfish fishery be created by extending the existing Shark Bay Snapper Managed Fishery boundaries northwards from 26°30' south to the western boundary of the current Pilbara trap fishery (114°9'36" east), and incorporating all finfish species.***
- ***That Black Point (east of Cape Leeuwin, 115°30' be the boundary of the southern bio-geographical region, and that there be separate commercial licences for the West and South Coasts.***

4.4 Management for specific fisheries

A series of adjustments to current management for commercial fisheries are needed in order to establish the basis for assigning longer term resource shares. These adjustments are mainly aimed at reducing significant latent capacity for the take of finfish by commercial fishermen, and establishing a starting point for setting a medium-term direction for the allocation of more specific transferable resource shares in key estuarine and inshore fisheries.

In the short term, controls on effort for commercial fisheries will be complemented by regional recreational fisheries management strategies which spell out limits on individual daily catches, quantities of fish in possession, or constrain access through closed areas or seasons. A discussion of these strategies can be found in *Management Directions for WA's Recreational Fisheries* (Fisheries WA, 2000).

However, in the longer term the setting of notional calculated allowable catches and corresponding allowable effort for each sector will become a crucial element in the assignment and re-allocation of resource shares.

Population trends point to the major area of population growth in WA being in the south-west, centred along the west coast (south of Shark Bay), in metropolitan Perth and its current major regional centres.

To reduce the risks of over-exploitation of coastal marine and estuarine fish stocks through commercial fishing, a number of strategies have already been introduced for the commercial sector using management plans, licensing arrangements and structural adjustment mechanisms.

Similarly, recreational fishers recognise and accept a raft of rules which constrain individual catches on each trip or fishing day. These include daily bag limits, overall possession limits, minimum legal sizes, some seasonal closures, some limited area closures, and constraints on the use of high-take fishing gear. These are being further refined through regional planning to adapt recreational fishery management to more specific circumstances.

4.5 Coastal finfish fisheries

4.5.1 West Coast

A key management issue in the West Coast region is the extent of latent fishing capacity tied up in the rock lobster fishing fleet (see Crowe, 1999). This needs to be managed in conjunction with growth in recreational fishing pressure and the resultant impact on both rock lobster and fish stocks.

To properly manage temperate demersal finfish stocks into the future, catch limits should be set for both the commercial and recreational fishing sectors. Any attempt to ban or reduce wetlining by fishers in the rock lobster sector would be difficult unless there are management controls on other commercial and recreational fishers who take rock lobster and finfish; that is, unless there is a total catch management strategy.

In the longer term, no action should be taken which would ultimately lead to gradual depletion of stocks, overfishing and lower sustainable yields, as well as increasing conflict between users.

One policy choice could be to deal with known latent capacity and to reduce commercial fishing access for wetline species by creating allowable access units, comprising gear and access time, which could be traded between fishers, or even between sectors. Such an approach would need to exclude latent fishing capacity tied up in managed fisheries and remove access from the fishing industry for the inactive boats.

To be of benefit for the longer term, wider consideration would need to be given to limiting total recreational take, especially for prized species such as pink snapper and dhufish. This would require a fundamental shift in the approach to managing recreational fisheries, and may involve a mixture of fishing and access controls.

The following is a range of possible management options.

- Greater exclusion of commercial line and net fishing from appropriate zones in marine parks and Fish Habitat Protection Areas.
- General prohibition on commercial fishing for shark and finfish by demersal gill net, demersal long line or drop line fishing within three nautical miles of the mainland coastline between Shark Bay and

Esperance. In addition to being raised in this paper, this proposal is being pursued through the Western Australian Demersal Gillnet and Demersal Longline Management Advisory Committee.

- Further funding and reduction by buy-back of commercial Fishing Boat Licences in the wetline sector.
- Establishing resource-sharing frameworks based on accepted notional or target catch levels for commercial and recreational fishing.
- Within resource-sharing frameworks, changing management for commercial fisheries, such as the Cockburn Sound beach and bait fisheries, to encourage a reduction in the number of commercial operators and unused fishing capacity.
- Within resource-sharing frameworks, reducing commercial netting of key recreational species such as Australian herring, salmon, tailor, mulloway and blue manna crabs to improve recreational opportunities.
- Greater emphasis on aquaculture as a source of market supply of key species, stock enhancement and private water fishing.
- Stricter recreational bag and size limits and protection of key nursery areas and adult habitats to better contain the total recreational take.
- Introducing closed zones or seasons to limit fishing for particular species across all sectors.
- Requiring that all licensed fishing boats operated in conjunction with a dinghy/dinghies fish as a single fishing unit unless otherwise specified in a management plan.

On the question of wetline access by the West Coast rock lobster fleet there are several broad choices:

- A general prohibition on taking finfish by West Coast rock lobster boat licence holders, or those operating vessels licensed for this fishery, during the lobster season or off season.
- Tradeable access rights to finfish stocks for the entire commercial fishing fleet, in effect creating a managed multi-species finfish fishery in each region of the State. This would mean deciding a target catch within a management framework for each region and allocating units of access which fishers can either use or trade.
- No change to current management arrangements, that is, demersal scalefish off the west coast are left unmanaged.

Whichever of these approaches are adopted, they warrant community discussion. Again, it needs to be emphasised that the choice made about rock lobster is only a small part of the total picture. The real issue is population distribution, with its latent effort and the management of the recreational catch. If total catch management controls are not introduced, there can be no guarantee of long-term sustainability for the fish stocks.

Proposal 5

That finfish stocks no longer automatically be available for take by all commercial Fishing Boat Licence holders. A dedicated small scale commercial fishery for finfish should be established, with clear entry criteria, and an appropriate limit on the number of operators in each bio region.

The basis for managing the finfish fishery should be the allocation of Total Allowable Effort for commercial fishers, complemented by appropriate controls on recreational catches.

Proposal 6

That the following strategies be considered as part of the regional resource-use planning process:

- ***Consistent with proposal 5, that the time/gear management approach be extended to encompass the Gascoyne and Pilbara regions' demersal finfish fisheries resources, complementing existing commercial fisheries management arrangements.***
- ***Greater exclusion of commercial net and line fishing from marine parks and fish habitat protection areas.***
- ***General prohibition on the commercial fishing for shark and finfish by demersal gill net, demersal long line or drop line within three nautical miles of the coastline on the west and south coasts where it is both practical and appropriate.***
- ***Further funding of licence buy-backs to reduce the number of commercial fishing boats targeting finfish.***
- ***Greater emphasis on aquaculture as a source of fish for human consumption, stock enhancement and private water fishing.***
- ***Reduced commercial netting of key recreational species including Australian herring and salmon, tailor, mulloway, barramundi and blue manna crabs.***

4.5.2 Gascoyne, Pilbara and Kimberley regions

During 1998, Fisheries WA introduced a new approach to management of northern demersal trap and line fishing. For the first time, different commercial fishing fleets using trap and line technology were integrated into a single fishery with tradeable access rights. Efficiency calculations, applied to a notional Total Allowable Catch, enabled access units to be determined.

Theoretically this approach could be extended to apply to the total scalefish and certain pelagic (stock) fisheries within a regional context. This approach is particularly relevant to management of commercial finfish in the Gascoyne, Pilbara and the Kimberley.

Potentially this would require the determination of access for Spanish mackerel, setting of a notional commercial catch level and the integration of existing management arrangements for the trap, line and trawl operations on demersal fish and mackerels. The method of doing this would have to be discussed with relevant industry groups and MACs.

In determining access, consideration should be given to two relevant announcements. A benchmark date warning all licensees (fishers) to be cautious about investing in northern fisheries was published in the January 1996 issue of Fisheries WA's *Western Fisheries* magazine. On 3 November 1997, Fisheries WA announced a study would be undertaken into the activities associated with the unrestricted WA Fishing Boat Licence and established that date as being the benchmark date should management of this 'open access' or 'wetline' fishery eventuate.

Following the success in existing northern finfish fisheries, it is proposed that a time/gear regional management strategy be undertaken to:

- pursue the objective of a diversified fishing fleet off the Gascoyne, Pilbara and North-West coasts within a consistent commercial fisheries management framework for the finfish stocks;
- prevent any additional pressure on Spanish mackerel stocks;
- be consistent with management plans already in place for the Gascoyne, Pilbara and North-West coasts; and
- seek to minimise long-term management costs for these small commercial fisheries.

In addition, there is a need to actually propose an integrated finfish fishery in the Gascoyne because it is presently a species-based snapper fishery. This is covered in Proposal 4.

Proposal 7

That in order to control the commercial exploitation of Spanish mackerel and other tropical finfish, the mackerel troll line fishery be incorporated into existing line fisheries in the Gascoyne, Pilbara and Kimberley areas.

Proposal 8

That a benchmark date of 3 November 1997 be one of the entry criteria for access to Spanish mackerel and other finfish outside the existing Shark Bay Snapper Managed Fishery area.

4.5.3 South Coast

The wetline study has shown that there is relatively little commercial fishing for finfish in the South Coast region outside existing managed fisheries, with the exception of some beach seining for Australian herring.

The key objective for management (noting other State fisheries priorities and demands) would be to quarantine the fishing fleet. A line at Cape Leeuwin to prevent movement, and resultant extra fishing effort, between the South Coast and the West Coast regions is considered desirable. This would become particularly relevant if decisions are taken to manage the West Coast fish stocks in an integrated way.

4.5.4 Beach fisheries on the South West coast

For a number of years, beach fisheries along the South West coast have operated as an open access fishery with controls on beach access by shire councils. The wetline study has indicated this major part-time fishing focus has been on whitebait, bluebait and Australian herring.

While stocks do not appear to be at significant risk, local commercial fishermen have sought to be brought into a managed fishery framework. Some further negotiation would then be necessary with shire councils for defined longer term beach access entitlements or alternative fishing methods introduced.

As the area will be subject to continuing coastal development, resource security remains a key issue. Without some form of managed fishery, any attempt to retire or remove surplus fishing capacity will be difficult to achieve. Future measures should take account of historical catch levels (over the last ten years) rather than attempting to reallocate catch shares between sectors.

Proposal 9

That enhanced management arrangements for the South West beach seine fishery be introduced, taking into account historical access entitlements.

4.5.5 Spawning protection for dhufish and groper at the Abrolhos Islands

The management plan for the Abrolhos Islands has proposed closure of the shallows as a reasonable option for the partial protection of fish stocks, especially coral trout and baldchin groper.

However, seasonal closure within three nautical miles of the Abrolhos Islands to all types of commercial fishing during November, December and January may provide a further low risk option towards maintaining breeding stocks of key fish species. It is understood the level of fishing at this time is low and that both dhufish and baldchin groper spawn during these months.

Proposal 10

That a closed season for all fishing to protect dhufish and baldchin groper breeding stocks be introduced within fishing blocks 97011-15 (waters surrounding the Abrolhos islands) during November, December and January each year.

Section 5 Funding for the New Framework

Implementing major management plans for six fisheries regions throughout the State (four marine and two inland) will give rise to an array of significant costs involving administration, staffing, research, education and compliance.

Current funds are totally committed under existing government priorities. Although some components of this framework will sit with or replace current projects, most of it amounts to new business for the agency and hence will require funding.

A full discussion of the agency budget and funding sources can be found in *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management,* Fisheries Management Paper No. 135 (Fisheries WA, 2000).

5.1 So where will the money come from?

There is no doubt that new funding sources will have to be identified and pursued.

Realistically, licence revenue is the only guaranteed large-scale funding source outside Consolidated Revenue. The commercial sector contributes about $12 million in licence and access fees. However, much of the costs of commercial fisheries management are being borne by the larger commercial fisheries subject to cost recovery. Minor fisheries such as the finfish fisheries contribute only a small percentage of the total cost of management for these fisheries.

Expanded cost recovery from having commercial fisheries is one obvious means by which State government can source further revenue to balance extra management costs. However, in a practical sense, given the lower commercial values of many of the State's finfish fisheries, there is a limit to which cost recovery can apply.

The recreational sector, which is also a major user group for these fisheries, contributes $1.5 million through licence fees.

In some situations it is also doubtful whether one ought to prevail with further commercial finfish management unless an integrated management approach to managing both the recreational and commercial take is adopted. The issues around resource allocation and integrated management are more fully canvassed in *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management,* Fisheries Management Paper No. 135 (Fisheries WA, 2000). The issue of securing additional funding for the management of recreational fisheries and the State's smaller commercial fisheries must be resolved in order for long-term resource sustainability to be maintained.

5.2 A gloomy future?

What will happen to our fish stocks, and fishing in general, without proper financial support?

If left unmanaged, world-wide experience shows that competition and conflict between user groups for access to fish is likely to reach such a crescendo that effective management will be paralysed. In such circumstances there will surely be increasing dissatisfaction among user groups, with greater risks of political intervention and litigation. Much of this is bound to focus on decisions about resource shares and access.

Ad hoc decision-making outside an agreed framework may lead to the undermining of resource and licence security for commercial fishers, and a push for substantial areas to be excluded from commercial and/or recreational fishing and perhaps aquaculture development.

In the end, WA's fish stocks will diminish and the fishing community – both commercial and recreational – will be the big losers.

Proposal 11

That adequate resourcing and effective funding strategies should be an integral part of any package for fundamental changes in the management of the State's coastal fish stocks.

Section 6 Bibliography and Further Reading

Abrolhos Islands Management Advisory Committee in conjunction with Fisheries WA, *Management of the Houtman Abrolhos System*, Fisheries Management Paper No. 117, December 1998, Fisheries WA.

Brayford, H. and Lyon, G.E. (Compilers) *Offshore Constitutional Settlemen*t, Fisheries Management Paper 77, May 1995, Fisheries Department of Western Australia

Campbell, C. *Issues affecting Western Australia's inshore crab fishery – Blue swimmer crab (Portunus pelagicus)*, Fisheries Management Paper No. 108, September 1997, Fisheries WA.

Commonwealth of Australia (1998) Australia's Ocean's Policy

Crowe, F. M. (1999) – *A study into WA's open access and wetline fisheries*, Fisheries Technical Report No 118, Fisheries WA, Perth WA

David Hides Consulting Group Pty Ltd (1998) *A Report into Community Perceptions of Fish Resource Allocation*. Prepared on behalf of the Western Australian Fishing Industry Council (Inc), Perth WA.

Department of Fisheries and Wildlife (1983) *Discussion Paper – Future Management of Western Australian Developed and Under-exploited Fisheries*, Perth, WA

Fisheries Department of Western Australia (1985) *Discussion Paper – Arrangements for Entry to all Fisheries off and along the Western Australian Coast*, Perth, WA

Fisheries Department of Western Australia (1989) – *Commercial Fishing Licensing in Western Australia*, Fisheries Management Paper 21, Perth WA

Fisheries WA (1997) *Strategic Plan 1997-2002*, Perth WA

Fisheries WA (1997) *Programs Business Plan 1997-2002*, Perth WA

Fisheries WA (1998) 1997/98 *State of the Fisheries Report*, Perth WA

Fisheries WA (2000) *Management Directions for WA's Recreational Fisheries*, Fisheries Management Paper No 136, Perth WA

Fisheries WA (2000) *Protecting and Sharing WA's Coastal Finfish Resources – the Path to Integrated Management*, Fisheries Management Paper No 135, Perth WA

Grazby, M. (1996) *Improving the Western Australian Wetfish Market*, Fisheries WA, Perth, published electronically

McLeod, P. & McGinley, C.(1994) *Economic Impact Study. Commercial Fishing in Western Australia*, Fisheries WA, Perth, WA

Reark Research (1996) *Final Report Community Attitudes Survey*, prepared for Fisheries WA, Perth, WA

Summerfield, P. (1995) – *Implications of Native Title Legislation for Fisheries Management and the Fishing Industry in Western Australia*, Fisheries Management Paper No. 75, Perth WA

Appendix 1 Managed Fisheries in WA

Managed Fishery Management Plan	Interim Managed Fishery Management Plan
Western Rock Lobster	West Coast Demersal Gillnet and Demersal Longline Fishery
Shark Bay Prawn	
Shark Bay Scallops	Pilbara Fish Trawl
Exmouth Gulf Prawn	Northern Demersal Scalefish
Abalone	
Esperance Rock Lobster	
Onslow Prawn	
Nickol Bay Prawn	**Managed under different arrangements**
Broome Prawn	Inshore Crab
Kimberley Prawn	Trochus
Pilbara Trap	Beche-de-mer
Kimberley Gillnet and Barramundi	Estuarine fisheries
Shark Bay Snapper	Northern Shark
South Coast Salmon	Northern Joint Authority Shark
South West Salmon	South Coast Inshore Trawl
Joint Authority Demersal Gillnet and Demeral Longline	
Cockburn Sound Crab	
Cockburn Sound Mussel	**Managed by the Commonwealth**
Cockburn Sound Fish Net	Deep Water Trawl
Cockburn Sound Line and Pot	Tuna
West Coast Beach Bait	
Shark Bay Beach Seine and Mesh Net	
South Coast Purse Seine	
West Coast Purse Seine	
Specimen Shell	
Marine Aquarium Fish	
Abrolhos Islands and Mid West Trawl	
South West Trawl	
Warnbro Sound Crab	
Windy Harbour Rock lobster	

Appendix 2 Fisheries Adjustment in WA

	No. of fishing units January 1987	No. of fishing units January 1998	No. of fishing units October 1998	No. of fishing units September 99
South Coast Estuarine	66	40	33	31
Peel-Harvey Inlet	41	24	14	14
Leschenault Inlet	14	7	6	6
Hardy Inlet	7	4	2	2
Swan-Canning	17	8	6	5
Total number of units	**145**	**85**	**61**	**58**

Appendix 3 Value of WA's Commercial Fisheries Production

SPECIES	Catch (Tonnes)		Estimated Value ($'000)	
	1996-97	1997-98	1996-97	1997-98
Western Rock Lobster	9,896	10,400	252,361	208,000
Southern Rock Lobster	83	85	2,253	2,211
Abalone	323	326	10,606	10,703
Pearl Oyster Shells	-	-	12,540	12,540
Scallop	2,027	1,457	14,148	6,119
Banana Prawn	709	515	7 092	5,403
Brown Tiger Prawn	899	875	14,375	16,212
Western King Prawn	1,874	2,029	26,235	29,424
Prawn, other	544	653	3,032	3,778
Cobbler	217	223	509	539
Pilchards	11,945	6,974	6,570	3,781
Salmon, Australian	2,597	2,569	1,428	1,413
Shark, bronze whaler	453	368	2,493	2,023
Shark, gummy	308	305	1,545	1,532
Shark, whiskery	205	203	903	891
Shark, other	667	882	2,182	2,866
Snapper, pink	902	742	3,807	2,989
*Wetline catch	1,970	2,300	9,204	11,244
Aquaculture	563	770	174,799	193,132
Others	9,100	7,911	24,773	23,580
TOTAL	45,279	38,817	$570,855	$538,380

**Note : The wetline catch includes some pink snapper, shark and cobbler. It represents the estimated finfish catch taken by commercial fishermen outside the framework of existing management plans and arrangements.*

Appendix 4 Stock Assessments of Major Species at Risk

Red Emperor and Rankin cod

Red emperor and Rankin cod are long-lived tropical finfish, and are key target species of the commercial and recreational fisheries off the Pilbara and Kimberley coasts. A major research project to determine the status of the stock(s) of red emperor off the Kimberley is still in progress. Thus, although the Kimberley stock of this species is likely to be fully exploited, the precise status of this stock will not be known until the research is completed in the latter half of the year 2000. Further south off the Pilbara coast, research over the last six years has revealed that both red emperor and Rankin cod were over-exploited prior to the implementation of the management plan in 1998. Age-structured modelling has revealed that the spawning biomass of red emperor has fallen below the reference target point in the western Area 1 of Zone 2 of the trawl fishery. Despite recent declines in both catches and catch rates of these species, further effort reductions being implemented in 1999 are likely to allow stocks of these long-lived species to recover.

Pilchards

Pilchards are principally distributed off the lower west and south coasts of the State, where they are exploited by a number of small inshore purse-seine fisheries. The west and south coast populations are considered to consist of separate breeding stocks. Within the south coast breeding stock there are distinct adult fishable assemblages (groups) off Albany, Bremer Bay and Esperance. With the exception of the years of the early 1990s, recruitment to this south coast population has been relatively low. Current stock assessments indicate that the biomass off Albany has been declining since 1994, and is now at its lowest recorded level, with the fishery in this region having become more reliant on fewer older individuals as a result of the continued poor recruitment. Evidence suggests a similar situation is developing off Bremer Bay. Individual Albany quota holders have found it increasingly difficult to reduce their catches to meet sustainability objectives while still maintaining their economic viability. This situation was confounded by a significant mortality event in 1995, and a second more severe event in 1999, during which a large proportion of the breeding stock was killed. As a result, there is a very high probability that the biomass levels in all three south coast zones are now extremely low. Thus there appears little likelihood of a significant improvement in stock levels and hence the fishery in the next few years.

Whiskery shark

Whiskery shark is a demersal triakid shark endemic to continental shelf waters off southern Australia between North West Cape and eastern Victoria. A demersal gill net and long line fleet that operates in managed fisheries off both the mid-west coast, and the lower west and south coasts of WA currently target this species along with several other shark species and a number of demersal scale fish species. Although previously caught in commercial quantities from waters off SA, population numbers in this region are now

believed to be extremely low. In Western Australia, catch rates for this species declined markedly during the late 1970s and early 1980s. Estimates of the level of biomass relative to the virgin level were below the target level of 40 per cent during much of the 1990s. However, the most recent assessment of the status of the stock has the best estimate at about 38 per cent relative to the virgin level. Current management measures, together with those planned for introduction over the next few years, should ensure that breeding stock levels recover to acceptable levels.

West Australian Dhufish

At this stage, a biological assessment undertaken on dhufish has provided a number of key observations:

- The present legal minimum size for dhufish is well above the size of first breeding maturity, but as a management tool the minimum size is less effective due to high mortality associated with air bladder distension and decompression during capture, even if the undersize fish are released.
- Despite high fishing pressure, the dhufish stock appears to be being maintained, although overall catches are increasing, particularly since 1997, and some areas are showing local depletion.

Although there has yet to be a serious assessment of the status of dhufish stock(s), on the basis of available evidence there appear to be no immediate concerns for the overall status of this fishery, although growth overfishing (capture at a smaller size than optimal) is likely to become more evident, as will localised depletion around population centres.

Apart from size and bag limits on the recreational catch of dhufish, there are no specific management arrangements in place for this fishery. Commercial take is via the demersal gill net and line fisheries which contain no specific reference to dhufish.

Spanish mackerel

Biological information on the WA stock is limited and work on stock movements and structure has only recently begun. However, an examination of the Spanish mackerel catch data points to significantly increasing exploitation of this species.

For the immediate future a number of issues need consideration:

- The need to increase in the legal minimum length for Spanish mackerel so that it clearly matches the estimated size at maturity – about 90cm.
- Address the latent commercial fishing capacity in the tropics which could be refocussed on the mackerel stock, either through integration of the commercial troll line fisheries in the North and West Kimberley and perhaps the Pilbara with the demersal fisheries; or the establishment of a commercial mackerel (troll) fishery.

Pink snapper

While the oceanic pink snapper stocks offshore from Shark Bay are generally being harvested at sustainable levels, a specific plan and management program has had to be put in place to deal with the depletion, through recreational fishing, of the unique genetic stocks within the eastern and western gulf stocks of inner Shark Bay.

While current management arrangements will allow the eastern gulf stock to recover, new management approaches will need to be developed to maintain these fragile inner Shark Bay stocks in the longer term.

In contrast to the inshore stocks, the offshore oceanic pink snapper stocks appear healthy with little case for change in management. However, research sampling for snapper eggs associated with some spawning aggregations in Denham Sound are also showing signs of significant local depletion.

Growth in commercial and recreational snapper catches in waters from Kalbarri south also requires further stock assessment to be undertaken, as we have no information of the status of any of the oceanic snapper stocks off the lower west and south coasts of the State.

Herring

The commercial Australian herring catch from the southern coast declined markedly during the first half of the 1990s, as did catches reported by anglers. A major research project is attempting to identify reasons for the decline and determine the status of the stock. However, until this information is available, a precautionary approach to management is recommended, given that Australian herring has been identified as the most important recreational species.

Whitebait

Similarly, whitebait stocks are considered fully exploited and annual catches are likely to continue to show large fluctuations under the influence of environmental factors. While not a recreational angling species, the acknowledged importance of these whitebait stocks as an major food source for predators such as larger fish and penguins means that extra care needs to be taken when formulating management policy for commercial bait and food fisheries targeting this species.

Other finfish species

Other finfish species under increasing pressure along the West Coast include tailor, baldchin groper, breaksea cod and coral trout (in the Abrolhos Islands area). While specific management measures are in process for some of these species, others are still vulnerable to localised depletion if not over-exploitation in the longer term.

Appendix 5 Methodology of Individual Transferable Effort Units

An Individual Transferable Effort (ITE), or time gear unit, system requires the setting of a total fishing time (number of fishing days or hours) to be undertaken in the fishery each year and allocation of these time units equally between all permit holders/licensees.

How these units are calculated and adjusted is set out in the relevant fishery management plan.

Two fisheries where this management system has been successful are the Northern Demersal Scalefish Interim Managed Fishery and the Pilbara Fish Trawl Interim Managed Fishery. A brief description of the gear unit system as it applies to each of these fisheries follows. For full details refer to the relevant management plan.

In both these fisheries, the sustainable catch or target catch, used in the calculations is provided by the Director of Research, Fisheries WA, and is based on relevant research and the most recent stock assessment data from the fishery.

Northern Demersal Scalefish Interim Managed Fishery (NDSIMF)

The NDSIMF is a multi-gear, single zone fishery. The extent to which the permit holders/licensees may fish their allocated days access depends on the quantity of gear they use on a particular day- either trap units or line units.

This time gear unit system operates in the offshore zone of the fishery. Permit holders may hold trap and/or line units, but, if they hold both, may not use the different methods on one trip.

One trap/day = one trap that may be used for one day

One line/day = one hand line or drop line that may be used for one day

The units were calculated using an estimate of the sustainable yield of the fishery and the fishing capacity of the fleet.

The estimated Total Allowable Catch (TAC) is currently directly correlated to the estimated Total Sustainable Catch (TSC) for the offshore zone of the fishery, which is estimated from available stock assessment data on the fishery. The catch rate of trap and line vessels (kg/boat/day) is determined by the Fisheries WA Research Division annually from the catch and effort statistics that the permit holders are statutorily required to be submit on a monthly basis. This is further refined to the catch rate for a trap or a line for the purposes of the calculation.

Effectively, the capacity of the fishery varies annually according to the quantity of effort exerted by the offshore zone fishermen during previous years. The TAC may also vary on an annual basis.

The following is a summary of the method for determining the capacity of the fishery and allocating units for trap fishing. The complete formula is set out in the NDSIMF Management Plan. The method used is the same for trap or line.

Step 1 – determine capacity , C, of the fishery for trap/days (that is, the total number of traps that can be used in the fishery)

$$C = \frac{\text{estimated total sustainable catch for trap}}{\text{estimated catching efficiency for trap}}$$

Step 2 – determine the number of units, E, to be allocated to each permit holder

$$E = \frac{\text{C (no. of fish trap/days)}}{\text{no. of permits granted for fish trap in the fishery}}$$

At the commencement of the plan, a unit was one trap/day or one line/day, however these values can be adjusted from year to year (clause 24 of the management plan). Units are docked and only tradeable as whole units.

Pilbara Fish Trawl Interim Managed Fishery (PFT)

The PFT is a single gear, multi-zone fishery in which fish trawl units are expressed as trawl time units. The absolute value of a fish trawl unit can be altered from time to time, which then gives rise to the extent of the entitlement being expressed as fish trawl hours. When fishing, the entitlement is exercised in whole fish trawl units (being the time recorded in any particular area through the satellite Vessel Monitoring System).

The unit system in this fishery is less complex than in a multi-gear fishery. Units are calculated in the following manner. (Again, see the Pilbara Fish Trawl Fishery Interim Managed Fishery Management Plan for complete details).

There are six zones in the fishery, each of which is allocated a total number of trawl units that can be fished in the year. These units are fixed in the management plan. A fish trawl unit is a portion of a fish trawl hour (one trawl net being used for one hour or part of an hour).

There are two types of permit – one that confers a right to fish in the fishery for five months, the other for 10 months. The units allocated to each 10 month permit holder is twice that allocated to five month permit holders. For example, the units allocated to a 10 month permit holder are -

Area 1 – 2448	Area 4 – 480
Area 2 – 480	Area 5 – 816
Area 3 – nil	Area 6 – nil

Area 6 is a research area and access is allocated according to provisions set within the plan after application to the Executive Director of Fisheries WA.

The management plan also sets the value of a unit in terms of trawl hours. For Areas 2 and 6, this value is 1, that is one trawl unit is one trawl hour. However, for other areas the unit is less than one trawl hour -

Area 1 – 0.67 fish trawl hours: one trawl unit entitles the holder to use a fish trawl net for 0.67 hours; similarly

Areas 4 and 5 – 0.91 fish trawl hours.

Permit holders may trade in units on a permanent or temporary basis within each licensing period. How the units are traded is not important if there is an understanding of how much fishing effort a fish stock can handle. It is always assumed that the whole amount of effort will be used each licensing period.

There are not the problems of high grading and black marketing that are associated with output controls and the concept of time usage ensures that the best use of catch is made by each permit holder – time becomes the valuable commodity in an ITE fishery.

Appendix 6 List of all Commercial Fisheries by Region

Fishery	Region				
	Kimb/Pilb	Gascoyne	West	South	Inland NW
Kimberley Prawn	x				
Kimberley Gillnet & Barramundi	x				
Northern Demersal Scalefish	x				
Broome Prawn	x				
Mud Crabs	x				
Specimen Shells	x	x		x	
Net and Line	x	x	x	x	
Aquarium Fish	x	x			
Northern and Joint Authority Shark	x				
Lake Argyle Catfish					x
Trochus	x				
Inshore Crab	x	x	x	x	
Nickol Bay Prawn	x				
Onslow Prawn	x	x			
Pilbara Trap	x				
Pilbara Trawl	x				
Beche-de-mer	x				
Shark Bay Prawn		x			
Shark Bay Scallop		x			
Western Rock Lobster		x	x		
Exmouth Prawn		x			
Exmouth Beach Seine		x			
Shark Bay Snapper		x			
Shark Bay Beach Seine		x			
Abrolhos Island Scallop			x		
South West Trawl			x		
West Coast Purse Seine			x		
South Coast Purse Seine				x	
Estuarine fisheries			x	x	
Demersal Gillnet & Demersal Longline			x	x	
Cockburn Sound fisheries			x		
Abalone			x	x	
Rock Lobster	x		x	x	
Salmon and Herring			x	x	
South Coast Trawl				x	
Deep Sea Crab			x	x	

Fisheries Management Papers

No. 1 The Report of the Southern Western Australian Shark Working Group. Chairman P. Millington (1986).

No. 2 The report of the Fish Farming Legislative Review Committee. Chairman P.Rogers (1986).

No. 3 Management Measures for the Shark Bay Snapper 1987 Season. P. Millington (1986)

No. 4 The Esperance Rock Lobster Working Group. Chairman A. Pallot (1986).

No. 5 The Windy Harbour - Augusta Rock Lobster Working Group. Interim Report by the Chairman A. Pallot (1986).

No. 6 The King George Sound Purse Seine Fishery Working Group. Chairman R. Brown (1986).

No. 7 Management Measures for the Cockburn Sound Mussel Fishery. H. Brayford (1986).

No. 8 Report of the Rock Lobster Industry Advisory meeting of 27 January 1987 . Chairman B. Bowen (1987).

No. 9 Western Rock Lobster Industry Compensation Study. Arthur Young Services (1987).

No. 10 Further Options for Management of the Shark Bay Snapper Fishery. P. Millington (1987).

No. 11 The Shark Bay Scallop Fishery. L. Joll (1987).

No. 12 Report of the Rock Lobster Industry Advisory Committee to the Hon Minister for Fisheries 24 September 1987. (1987)

No. 13 A Development Plan for the South Coast Inshore Trawl Fishery. (1987)

No. 14 Draft Management Plan for the Perth Metropolitan Purse Seine Fishery. P. Millington (1987).

No. 15 Draft management plan, Control of barramundi gillnet fishing in the Kimberley. R. S. Brown (1988).

No. 16 The South West Trawl Fishery Draft Management Plan. P. Millington (1988).

No. 17 The final report of the pearling industry review committee . F.J. Malone, D.A. Hancock, B. Jeffriess (1988).

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No. 20 The Offshore Constitutional Settlement, Western Australia 1988.

No. 21 Commercial fishing licensing in Western Australia. (1989)

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No. 23 Management of the south-west inshore trawl fishery. N. Moore (1989)

No. 24 Management of the Perth metropolitan purse-seine fishery. N. Moore (1989).

No. 25 Rock Lobster Industry Advisory Committee report to the Minister for Fisheries November 1988. (1989)

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No. 38 The economic impact of recreational fishing in Western Australia. R.K. Lindner, P.B. McLeod (1991).

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No. 40 The future for Recreational Fishing - Forum Proceedings. Recreational Fishing Advisory Committee (1991)

No. 41 The future for Recreational Fishing - The Final Report of the Recreational Fishing Advisory Committee. Recreational Fishing Advisory Committee (1991).

No. 42 Appendix to the final report of the Recreational Fishing Advisory Committee. (1991)

No. 43 A discussion of options for effort reduction. Southern Gillnet and Demersal Longline Fishery Management Advisory Committee (1991).

No. 44 A study into the feasability of establishing a system for the buy-back of salmon fishing authorisations and related endorsements. (1991)

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No. 47 Long term management measures for the Cockburn Sound restricted entry fishery. Summary of submissions and final recommendations for management. P. Millington (1992).

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No. 49 Management plan, Kimberley prawn fishery. (1992)

No. 50 Draft management plan, South West beach seine fishery. D.A. Hall (1993).

No. 51 The west coast shark fishery, draft management plan. D.A. Hall (1993).

No. 52 Review of bag and size limit proposals for Western Australian recreational fishers. F.B. Prokop (May 1993).

No. 53 Rock Lobster Industry Advisory Committee, Chairman's report to the Minister for Fisheries. (May 1993)

No. 54 Rock Lobster Industry Advisory Committee, Management proposals for 1993/94 and 1994/95 western rock lobster season (July 1993).

No. 55 Rock Lobster Industry Advisory Committee, Chairman's report to the Minister for Fisheries on management proposals for 1993/94 and 1994/95 western rock lobster seasons (September 1993).

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No. 59 Proceedings of the charter boat management workshop (held as part of the 1st National Fisheries Manager Conference). A. E. Magee & F. B. Prokop (November 1993).

No. 60 Bag and size limit information from around Australia (Regulations as at September 1993) F. B. Prokop (January 1993).

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No. 64 The Warnbro Sound crab fishery draft management plan. F. Crowe (June 1994)

No. 65 Not issued

No. 66 Future management of recreational gill, haul and cast netting in Western Australia and summary of submissions to the netting review. F.B. Prokop, L.M. Adams (September 1994)

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No. 70 Long term management strategies for the Western Rock Lobster Fishery. (4 volumes) Law enforcement considerations, Volume 4. N. McLaughlan (September 1994)

No. 71 The Rock Lobster Industry Advisory Committee Chairman's Report, October 1994, The Western Rock Lobster Fishery - Management proposals for the 1994/95 and 1995/96 seasons (November 1994)

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No. 84 Bag and Size Limit Regulations From Around Australia. Current Information as at 1 July 1995. Third Australasian Fisheries Managers Conference, Rottnest Island. F. Prokop (July 1995)

No. 85 West Coast Rock Lobster Fishery Management Plan 1995 - Draft for Public Comment. Edited by M. Moran (August 1995)

No. 86 A Review of Ministerial Policy Guidelines for Rock Lobster Processing in Western Australia from the Working Group appointed by the Minister for Fisheries and chaired by Peter Rich (December 1995)

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No. 88 Balancing the Scales - Access and Equity in Fisheries Management - Proceedings of the Third Australasian Fisheries Managers Conference, Rottnest Island, Western Australia 2 - 4 August 1995. Edited by P. Summerfield (February 1996)

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No. 119 Access to Wildstock for Aquaculture Purposes (not published)

No. 120 Draft Management Plan for Sustainable Tourism at the Houtman Abrolhos Islands. Prepared by LeProvost, Dames and Moore for the Abrolhos Islands Managment Advisory Committee in conjunction with Fisheries WA. (December 1998)

No. 121 Future Directions for Tourism at the Houtman Abrolhos Islands - Draft for Public Comment. Prepared by LeProvost, Dames and Moore for the Abrolhos Islands Management Advisory Committee in conjunction with Fisheries WA. (December 1998)

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