

THE HARDY INLET ESTUARINE FISHERY
MANAGEMENT ISSUES AND OPTIONS

FISHERIES MANAGEMENT PAPER NO. 169

Department of Fisheries
168 St. Georges Terrace
Perth WA 6000

February 2004

ISSN 0819-4327



Department of
Fisheries

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SECTION 1 BACKGROUND

In November 1999, Fisheries Management Paper No. 131: *Management Directions for Western Australia's Estuarine and Marine Embayment Fisheries - A Strategic Approach to Management* was released for public comment. Submissions made to that paper highlighted a number of matters specific to the Hardy Inlet Estuarine Fishery.

To further ascertain the key issues facing the future management of the Hardy Inlet Estuarine Fishery a number of key stakeholder group meetings were held in December 2002. Present at these meetings were members of the South West Recreational Fishing Advisory Committee, the Molloy Island Home Owners' Association, Recfishwest, the Western Australian Fishing Industry Council (WAFIC), the commercial fisherman, fishing tour operators, local fish retailers, Augusta Margaret River Shire Councillors, the Editor of *Fishing Western Australia (WA)*, the Editor of *Western Angler*, a Murdoch University scientist involved in the black bream re-stocking program and Department of Fisheries researchers and compliance officers.

The purpose of the stakeholder meetings was to present the most recent information regarding the fishery, and determine which matters needed to be addressed to facilitate acceptable management arrangements. A summary of the matters raised is provided in Appendix 1.

The two key fisheries matters arising from the meetings that became the focus of this paper are:

- The sustainability of black bream stocks; and
- Sharing the black bream resource between the recreational and commercial sectors, specifically in the Blackwood River.

These discussions have highlighted the relatively recent emergence of black bream as an "icon" recreational species. Two fishing tour operators ("fishing guides") have commenced operations in this area in the past few years; more recently, bream fishing competitions, predominantly catch and release, are attracting a small band of dedicated competitors. Black bream have also been historically targeted by commercial fishermen during the winter months and provide the sole remaining fisherman with his primary source of income in those months.

This paper presents information available on fish resources in the Hardy Inlet/Blackwood River system, and discusses the key management matters and likely impacts of a number of possible management measures.

SECTION 2 MAKING A SUBMISSION

The release of this report provides an opportunity to contribute your ideas and views on how the Hardy Inlet black bream fishery should be managed. Submissions are welcome until 3 May 2004 and should be addressed to:

Hardy Inlet Management Options
Locked Bag 39
Cloisters Square Post Office
PERTH WA 6850

When making a submission, please make reference to the particular option or section of the report you wish to comment on. If you disagree with a position, please provide a clear rationale and suggest alternate ways to resolve or overcome the matter identified in the report. This will enable your views to be properly considered.

Further copies of the report are available from the Department of Fisheries or on its website www.fish.wa.gov.au. If you require any further information please contact the Department of Fisheries on (08) 9482 7333.

SECTION 3 INTRODUCTION AND OBJECTIVES

The Western Australian Government is actively working to ensure the concept of sustainability underpins government policies, activities and decision-making.

This commitment extends to developing a new management approach for fisheries that incorporates economic, social and environmental issues. The Department of Fisheries recently released the Ecologically Sustainable Development (ESD) policy for Western Australian Fisheries. Within this broad context of ESD, the issue of how fish resources can best be shared between competing users requires consideration.

An Integrated Fisheries Management Review Committee was established and has reported on a strategy to integrate the management and sustainable use of fish resources (Fisheries Management Paper No. 165). The Government is currently considering these findings, but it is clear such a framework must be based on:

- The distribution of fish stocks;
- The determination of a sustainable level of fishing; and
- The allocation of explicit catch shares to the various user groups.

Following responses from the key stakeholder meetings held in December 2002, it became apparent the key issues relating to the Hardy Inlet Estuarine Fishery (the fishery) should be considered under the broader concept of Integrated Fisheries Management (IFM), rather than primarily as a commercial fishery management issue.

This paper has three objectives, which are to:

1. Present the information that is currently available on fishing and in particular, black bream fish stocks in the Hardy Inlet Estuarine Fishery (the fishery);
2. Explain the key issues surrounding the fishery; and
3. Present a range of options for future management of the fishery.

3.1 Fish Resources Management Act 1994 - objectives and framework

The principle purpose of the *Fish Resources Management Act 1994* (FRMA) is to “conserve, develop and share the fish resources of the State for the benefit of present and future generations”. The specific objects cited in the Act include:

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

3.2 Specific objectives for the Hardy Inlet

When looking specifically at the Hardy Inlet fishery, it appears useful to develop more specific objectives as a basis for management of the fishery.

Recommendation

The following long-term objectives should form the basis for management of the Hardy Inlet Estuarine Fishery:

- The exploitation of fish stocks is conducted in a manner consistent with the principles of ecologically sustainable development;
- The management framework provides mechanisms that can contain the catch of each sector within a prescribed allocation;
- The management arrangements are as simple as possible to minimise the cost of management, including research and compliance; and
- The socio-economic benefits of the fishery are optimised.

SECTION 4 CURRENT MANAGEMENT FRAMEWORK

The Hardy Inlet and the Blackwood River have been commercially and recreationally fished for at least 100 years. The following information offers a more recent history of commercial and recreational fishing, and provides some context for consideration of the issues.

4.1 Commercial fishing

A general Fisheries Adjustment Scheme (FAS) for commercial fisheries was initiated in 1998, and resulted in a reduction in the number of participants in the commercial fishery from nine to one. Commercial fishing effort in the fishery also fell from 636 gear-fishing days to 242 gear-fishing days in the same period. Since March 2000, there has only been one commercial fisherman in this fishery.

The commercial fishery is administered by licence conditions (endorsements) on both the fisherman's Commercial Fishing Licence (CFL) and Fishing Boat Licence (FBL). These conditions effectively permit only one commercial fisherman to fish in the fishery.

Currently, a commercial fishing "unit" in the fishery consists of up to three dinghies less than 6.5 metres in length. In practical terms, only one boat can be used at any one time, as management policy in the fishery requires that only the holder of the licence operates the licence. This allows the fisherman to store different fishing gear in each boat, and use each boat for a particular fishing activity.

The *Hardy Inlet Lawful Nets Order 1996* prescribes the gear that the commercial fisherman can use in the fishery. It states a lawful net is a set net used to take any species of fish (apart from yellow eye mullet and whiting) provided that it:

- Does not exceed 800m in length;
- Has a mesh size of between 63mm and 128mm; and
- Does not exceed 33 meshes in depth.

A combined total of 1,000m of net is currently allowed to be set at any one time, and the same size limits apply as in the recreational fishery.

Daytime netting restrictions are in place for the commercial fishery that restrict fishing activity to nets being set no earlier than 1.5 hours before sunset, and retrieved no later than 1.5 hours after sunrise.

4.2 Recreational fishing

The recreational fishery in Hardy Inlet and the Blackwood River is currently managed using daily bag limits, minimum sizes (for certain species of fish) and recreational netting rules.

The recreational bag limit for black bream was previously 20 fish per day, but was reduced to four fish per day from 1 October 2003. The reduction in bag limit (recommended through the West Coast Recreational Fishing Review process) is based on the species being of moderate abundance, highly accessible, as it utilises inshore and estuarine habitats extensively, and targeted by increasing numbers of recreational fishers. The black bream stock in the Hardy Inlet and Blackwood River is also considered to be isolated stock, which supports the need for a higher level of protection. A minimum size limit of 250mm applies.

Recreational net fishing is also permitted in waters of the fishery downstream of the Fisher Road boat ramp, and north of a line drawn between Point Irwin and the Irwin Street Boat ramp (see map at Appendix 5). In these areas, netting is permitted from 1 September to 31 May. Nets must be attended and an hourly 'check and clean' carried out.

When a set net is to be used in inland waters, its mesh size must not measure less than 63mm or more than 87mm. The length of recreational set nets must not exceed 60m in length, while the depth, or 'drop', of the nets must not exceed 25 meshes.

SECTION 5 STATUS OF THE FISHERY

5.1 Catch information

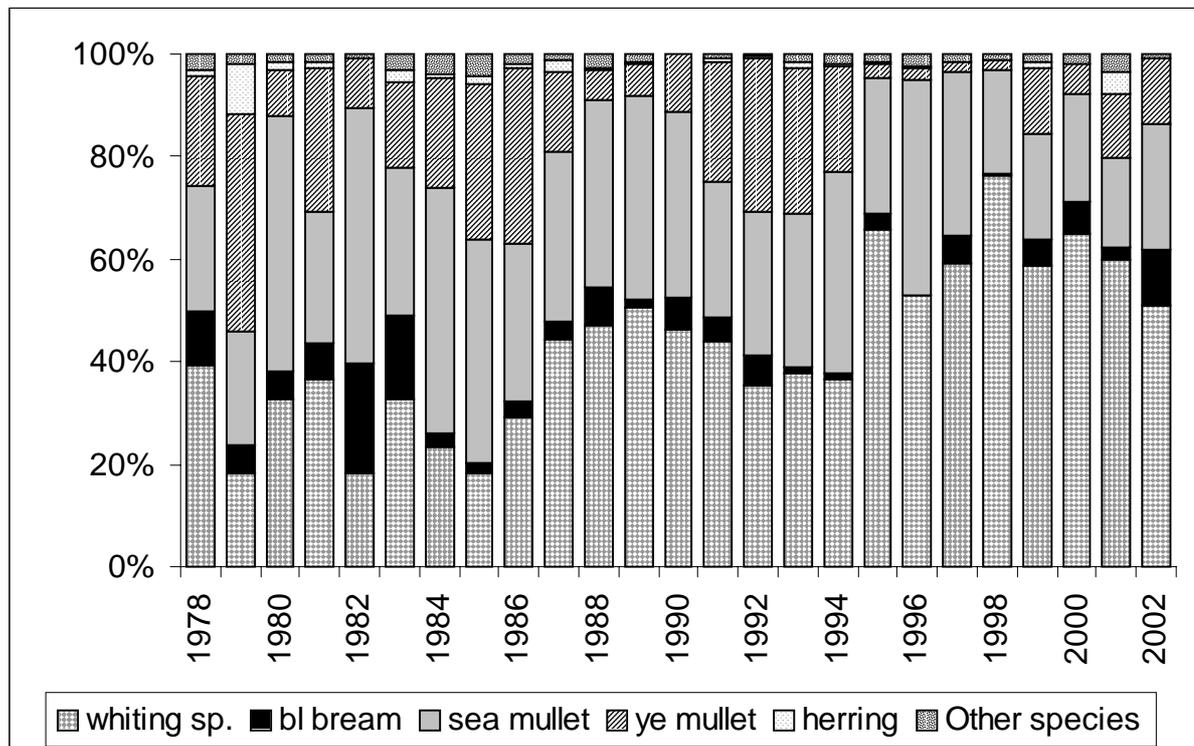
A summary of available information on catches by various user groups is provided below. It should be noted at the outset, however, that a comprehensive time series set of data that encompasses all user groups for the Hardy Inlet/Blackwood River is not available. An outline of information currently held and what has not been collected is provided in Appendix 2.

5.1.1 Commercial catch

The Department of Fisheries has more than 25 years of data collected from the commercial fishery in the Hardy Inlet. Over this 25-year period, the annual commercial catch of all species has varied between 10 tonnes and 34 tonnes.

A review of the species composition of the commercial catch of the fishery, conducted between 1978 and 2002, reveals, increasingly, the catch (by weight) is dominated by whiting (mostly yellowfin whiting), and that in years of low whiting catch, there are higher catches of yellow eye mullet (Figure 1).

Figure 1 Commercial catch composition from the Hardy Inlet Estuarine Fishery from 1978-2002. Source: Catch and Effort Statistics, Department of Fisheries.



The take of black bream has been variable and a relatively small component of the commercial catch. Over the five years from 1998 to 2002 the commercial catch of black bream totalled 4,374kg, or an average of less than one tonne per year (Appendix 4).

The biggest catch year for black bream since 1978 was in 1983, when 3.6 tonnes of black bream were taken in the commercial fishery. Since March 2000, there has only been one fisherman in the fishery.

Most black bream taken in the commercial fishery are caught in winter (Appendix 4). During the rest of the year, other species such as whiting, mullet and herring are the primary targets. A graphical representation of the 1978-2002 data and the data table is provided at Appendix 4.

5.1.2 Recreational catch

The Hardy Inlet/Blackwood River has a long history of use by recreational fishers. The only survey of recreational fishing in the Hardy Inlet/Blackwood River was conducted in 1974-5 (Caputi, 1976). The results of this survey showed that even in 1974 the Hardy Inlet and Blackwood River was popular with recreational fishers who contributed an estimated 16,500 days of fishing effort during that year.

The most common species kept by recreational fishers were, in order of estimated total weight: black bream (20.0 tonnes), yellowfin whiting (12.8 tonnes), Australian herring (9.2 tonnes), King George whiting (2.5 tonnes), silver bream (2.3 tonnes), tailor (2.2 tonnes) and skipjack trevally (2.2 tonnes). Catch rates were also high, at around 3.8 fish per angler per hour.

No recent data has been collected on the recreational catch and effort in the Hardy Inlet and Blackwood River.

It is likely recreational fishing effort in the Hardy Inlet/Blackwood River has increased, given the increase in Statewide recreational fishing participation rates over the past 15 years and the State's population growth. However, it is difficult to predict the impact of these changes on the recreational catch, which is related to the abundance of fish, fishing effort, fishing regulations and changes in fishing values, with practices such as 'catch-and-release'.

5.1.3 Tour operator catch

In recent years, two fishing tour operators have worked in the Hardy Inlet/Blackwood River, and have conducted mainly catch-and-release fishing trips. Catch data from both operators recorded clients as having caught 229 fish during 183 angler days between December 2001 and November 2002. The majority of fish were released, with a reported 19 fish (eight per cent) being kept. Of the fish kept, the length ranged from 300mm to 435mm with an average length of 378mm. This is well above the minimum size of 250mm for black bream.

5.1.4 Aboriginal fishing

The Department does not have any information on the levels of Aboriginal customary catch from the Hardy Inlet/Blackwood River. Due to the lack of information, Indigenous fishing activities are not discussed in this paper.

Customary fishing requirements were examined in a recent draft 'Aboriginal Fishing Strategy' paper, prepared by Hon E M Franklyn QC, (Fisheries Management Paper No. 168). Public consultation on this report closed on 22 November 2003. Following Government consideration of the findings, customary fishing issues are likely to be addressed in a manner consistent with the IFM (or allocation) process as identified in Fisheries Management Paper No. 165.

5.2 Status of black bream stocks

Preliminary research from the Murdoch FRDC-funded re-stocking project suggests that black bream can become sexually mature as early as the end of their second year of life (or about 190mm in length) in the Blackwood River (Professor Ian Potter, pers. comm.).

Recent research by Murdoch University suggests the spawning period in the Hardy/Blackwood is around October to December, with spawning thought to predominantly occur in the region from about 4 km above Twinem's Bend to just upstream of Alexandra Bridge (see Map at Appendix 5). However, black bream is an incredibly adaptable species and can spawn in a wide range of salinities so the exact location of spawning may vary between years.

Currently, the available information on the status of black bream stocks within this system consists of:

- A time series of monthly catches and effort reported by each commercial fisher since the late 1970s (CAES 2003);
- A creel survey of the recreational catch for 1974-5 (Caputi 1976); and
- Biological data on the age compositions (for some years), growth and reproduction of black bream within the Blackwood Estuary.

However, this existing information is inadequate for the development of a formal quantitative assessment of the current status of the black bream stock in this system. Additional data encompassing all user groups is required to quantify the status of the stock, particularly since it appears the recreational sector may be taking a significant proportion of the overall catch.

Nevertheless, the available data can be used to provide a qualitative judgement of the stock's status. In the absence of data on the catch composition for the recreational and Indigenous sectors, commercial catch and effort data were examined to identify trends in abundance.

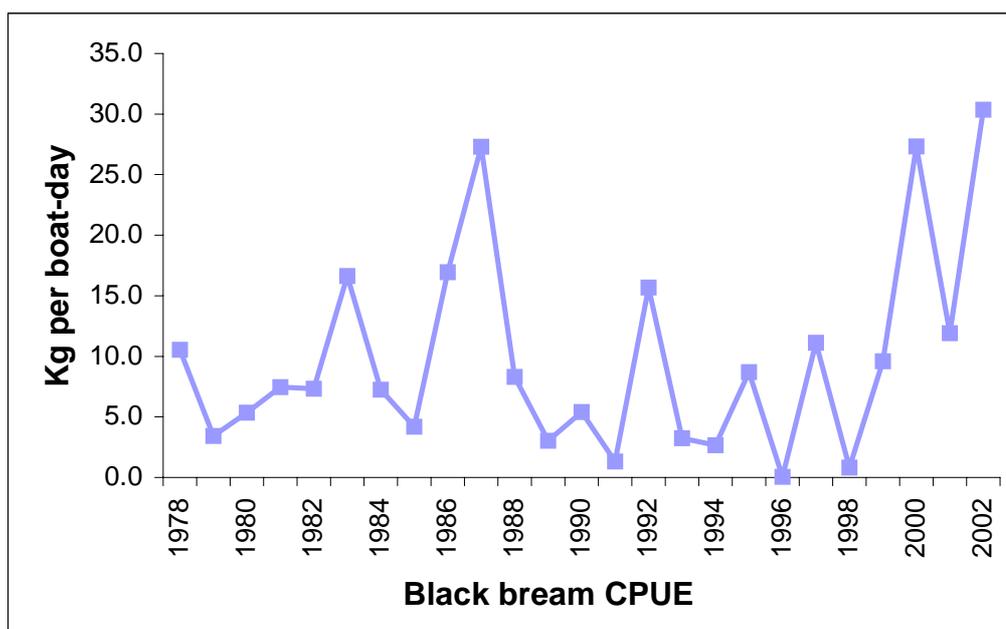
To provide the best possible estimate of targeted bream effort, and ultimately an index of relative abundance, only the boat days associated with the gill netting during the winter months were used, because this is when the majority of black bream were taken. Although likely to provide a better estimate of targeted effort than using the whole year's data, it is clear from examination of the catch data from these months that black bream has never dominated monthly commercial catches. In recent years, more detailed data has shown that it is likely that black bream were only targeted for about 27 per cent of the boat days during the winter months.

If it is assumed the nature of commercial fishing operations has not changed markedly over the years, then the catch per unit effort (CPUE) values indicate periods of relatively high abundance during the mid to late 1980s, and again since 2000 (Figure 2).

This pattern of relative abundance is characteristic of the bream family (*Sparidae*), where peaks in abundance have been shown to be the result of sporadic strong recruitment events. For example, commercial fishers have recently indicated there appear to be large numbers of juvenile bream (0^+ age group) across the south coast estuaries, including the Hardy/Blackwood. This indicates there was a good natural recruitment last year (of young fish into the stock).

The abundance, and therefore the catch, of black bream populations is expected to vary widely as a result of this variable recruitment. In this context, recruitment variability is most likely to be primarily related to environmental influences instead of fishing. However, in years of low recruitment, fishing effort may be an issue.

Figure 2 Commercial catch per unit effort during winter months for black bream from the Hardy Inlet from 1978-2002. Effort is calculated from the gill net boat days during the winter months (CAES 2003).



SECTION 6 KEY MANAGEMENT ISSUES

Two major areas of concern were identified through the stakeholder meetings:

1. Greater assurance around the sustainability of the black bream fishery; and
2. The appropriate level of access to the fishery by competing user groups (resource sharing issues).

A number of issues must be considered when addressing these two areas:

- Information for management;
- The impact of commercial fishing on the sustainability of black bream stocks;
- The impact of commercial fishing on the quality of recreational fishing;
- Compatibility of 'take' fisheries (both commercial and recreational) with 'catch and release' fisheries targeting 'trophy' fish;
- Environmental issues;
- Principles for resource sharing; and
- Resourcing requirements (funding for research etc).

6.1 Information for management

6.1.1 Biological and stock assessment information

To establish an effective management system, it is essential to have a proper scientific understanding of the dynamic nature of fish stocks and how they respond to changes in exploitation. It is also important to have a research program that can evaluate the effectiveness of management changes. Traditionally in estuarine fisheries the only source of information is fishery dependent data collected through catch returns provided by commercial fishermen.

As is the case with most WA estuaries, there is little information on recreational catches in the Hardy/Blackwood.

The relationship between effort and catch is important, particularly in the rapidly expanding recreational sector, to determine whether increases in effort result in a commensurate increase in catch. An estimate of the present level of recreational catch and fishing effort is required to help resolve resource allocation issues between the commercial fisherman and recreational anglers, netters, clients of fishing tour operators and fishing tournament competitors. This information can only be effectively provided by a recreational catch survey.

As noted previously, the Department of Fisheries has no information on Indigenous fishing activity, and this was identified as a key issue in the recently released Aboriginal Fishing Strategy (Fisheries Management Paper No. 168). It is likely any customary fishing activity in this area would only account for a minimal proportion of overall catch.

This lack of information on catches across all user groups, particularly where the recreational catch is likely to be a significant proportion of the overall catch, precludes a quantitative stock assessment from being undertaken. This lack of information is also a major impediment to having informed discussions on resource sharing issues. This issue was identified by the Integrated Fisheries Management Review Committee (see Fisheries Management Paper No. 165) as fundamental to progressing resource sharing debates, and a key recommendation was that additional resources were required for research and monitoring purposes.

Additional research is required to provide this information. In particular, information on the recreational catch, as well as length/frequency information on commercial, recreational, fishing tour and fishing competition catches must be included.

If commercial fishing was to cease in this system, the task of assessing the stock status could become increasingly difficult, unless the time series of commercial CPUE is replaced with an alternative, overlapping time series of abundance data. The closure of the Leschenault Estuary to commercial fishing highlights this issue, as there is currently no data on fishing activity to provide an indication of the status of fish stocks. In addition, it is not possible to assess whether any tangible benefits have accrued to the recreational sector following the commercial fishing closure.

6.1.2 *Re-stocking project*

Murdoch University is undertaking a stock enhancement trial with black bream in the Blackwood River, which is being funded by the Fisheries Research and Development Corporation (FRDC). It is important to note this project is not being carried out because of sustainability concerns, or because the stocks need replenishment due to a fishery-induced decline in abundance. Rather, this project is being undertaken to critically evaluate the feasibility of estuarine stocking programs, and assess the likely impacts of such programs.

The project has shown the stocked juvenile fish are surviving well. Recaptures indicate stocked fish comprise the dominant proportion of the year classes that were introduced. This may infer that the re-stocking coincided with naturally low recruitment years for wildstock.

The key management question is whether these stocked fish will continue to survive and join the breeding stock, and if so, what impact will these additional fish have in terms of contributing to future overall recruitment to the fishery. Thus, it is essential to determine whether re-stocking simply enhances the size of each of the stocked year classes that comprise the fishable stock, or whether additionally, the increase in the size of the fishable stock increases the subsequent level of juvenile recruitment to that stock.

In other words, is recruitment primarily related to the breeding success of the stock (which is largely influenced by environmental factors), or is it related to the size of the breeding stock?

Failure to continue to monitor the impact of the stocked fish in this way would mean the full potential of the research undertaken to date would not be realized. Therefore, neither would the opportunity for the most meaningful results on all of the potential impacts of re-stocking.

The most challenging aspect of this research would be to discriminate between environmental factors, and a larger breeding stock as the primary reason for any observed increase in recruitment.

Proposal

Additional funding be sought to continue research on the restocking project, specifically to ascertain whether restocked fish contribute to the magnitude of subsequent recruitment of black bream and continue to impact on the abundance of the fishable stock of black bream.

6.1.3 Socio-economic considerations

Recent arguments from recreational fishers include claims that they spend more money on fishing trips to the Hardy Inlet/Blackwood River than the amount of revenue generated by the commercial fisherman. These claims are often put forward as justification for shifting resource 'shares' between sectors.

It is important to consider a wide range of relative impacts of any potential shift in allocation among sectors in a fishery. For example, recreational participation and effort is increasing, and a resource shift could potentially affect recreational fishing quality, changes in visitation patterns and impacts on local economies.

Possible impacts of a resource shift must also be examined for the commercial sector. The Hardy Inlet commercial fisherman's catch is virtually all sold locally in the South West. Outlets include restaurants in Augusta and Busselton, fish and chip shops and retail outlets in Margaret River, Dunsborough and Bunbury. An increasing component of the catch (more than half) is sold direct by the fisherman to Augusta residents, tourists and visitors from inland towns, such as Manjimup and Pemberton. Local suppliers have indicated demand for local fresh fish in the South West is increasing and, with the closure of the Leschenault Estuary to commercial fishing, added weight is given to the importance of the Hardy Inlet commercial fishery in satisfying this demand.

Increasingly, communities are demanding the impacts of fishery management policies on social structures and economies of towns be considered, and that these matters are important in the sustainable management of fisheries. If one of the aims of management is to maximise community benefits from the use of fish stocks, it is important to be able to identify and measure a more complete range of relevant economic, social and environmental factors. This information is important in addressing perceptions and making objective decisions.

As yet, there is no general agreement on the best way to analyse and compare this range of factors. Methods incorporating 'net economic benefit analysis' are being developed and it is likely they will be important tools in making comparisons between sectors. This was highlighted in Fisheries Management Paper No. 165. Such analysis may be costly and it will be hard to justify such costs for small fisheries such as the Hardy/Blackwood. However, the

availability and consideration of available information will still assist in more informed and balanced decisions.

6.2 Impact of commercial fishing on the sustainability of black bream stocks

As discussed in Section 5.2, the available information provides no indication that black bream breeding stock has fallen to the point where it is reducing subsequent recruitment to the fishery.

The commercial catch of black bream is quite low. Over the past five years, the average catch has been just under one tonne per year, and it is probable the recreational catch represents a much more significant proportion of the total catch.

Research from Murdoch University has shown the mesh sizes of nets used by the commercial fisher to target black bream do not retain fish below the size of maturity, and retain few fish below the legal minimum length. Maturity for black bream occurs at around two years of age (about 190mm in length in the Blackwood River). The fish captured in commercial gear range in age from 4 - 10 years. The maximum age of black bream recorded from the estuary is around 30 years.

However, research by Murdoch University finfish scientists indicate that the mesh sizes used by the commercial fisherman to catch whiting have the capacity to take juvenile bream. The vast majority of the juvenile bream (one year and older) occur in the riverine section of the Blackwood above Molloy Island. Therefore, gill netting for whiting in this region of the system could generate a by-catch of juvenile black bream. The fisherman has indicated that in his experience there is little by-catch of small bream, and any undersize fish are returned to the water because they cannot be legally retained.

6.3 Impact of commercial fishing upon the quality of recreational fishing

The commercial catch of black bream is predominately taken during the winter months. It has been suggested the majority of recreational fishing is undertaken outside this time, particularly for fishers who prefer to target bream using lures, as water clarity is better from spring to autumn. If this is the case, there may be some natural temporal separation of fishing activity between these groups.

The average annual commercial catch over the past five years is 875kg of black bream per year. This equates to an estimated 1,789 fish taken by the commercial fisherman each year (based on an average weight of 0.489g - see Appendix 3). When this resource sharing issue first arose, the average annual commercial take equated to about 90 recreational bag limits (of 20 black bream/day). However, from 1 October 2003 a new bag limit of four black bream came into effect, and the average commercial take now equates to about 450 recreational bag limits.

Based on the 1974 survey, which estimated 16,500 recreational fisher days for the Hardy Inlet (one fisher day represents one fishing trip), if the average commercial catch was to be reallocated to the recreational sector, this translates to an average of 0.1 additional black bream per recreational fishing trip. If recreational effort in the Hardy Inlet/Blackwood River has increased since this time, in line with Statewide trends, it is likely that figure would be considerably smaller again.

Given the commercial catch of black bream has remained fairly steady over the past 20 years, it appears more likely any perceived declines in the quality of recreational fishing could be attributed to growth in recreational activity and competition for fish within this sector. This may be compounded by changes in productivity of the system caused by environmental changes (see Section 6.5) or, more likely, reflect the sporadic nature of bream recruitment (see Section 5.2).

6.4 Compatibility of ‘take’ fisheries (both commercial and recreational) with ‘catch and release’ fisheries targeting ‘trophy’ fish

The commercial fishing operation targets large adult bream, a fish also keenly sought by recreational fishers, and in particular, by fishing tour and fishing competition participants. While this has not been articulated by protagonists in the resource sharing debate, this is more likely to be the ‘real’ conflict that needs to be addressed.

If it was in the best interests of the community to manage the Blackwood River to provide a high quality recreational fishery, promoting the catch and release of large black bream, and the cessation of some or all commercial fishing may offer some benefit. Such benefits could not be realised, however, if the existing recreational take was permitted to continue under current management arrangements.

The likely high level of recreational effort (refer Section 5.1.2) means the introduction of tight recreational controls to restrict the overall catch would also be required, such as catch and release only, or introducing very low possession limits for this system. The management controls in the Ord River barramundi fishery (which includes minimum and maximum size limits and a possession limit of one fish) is a relevant example. This concept may appeal to fishing tour operators and fishing tournament competitors, but would also require assessment against the needs/values of recreational fishers and the wider regional community.

6.5 Environmental issues

Environmental factors play a major role in the health of estuarine systems.

It is important to note that estuaries are not static systems, they change over time. The difficulty is isolating change induced by human activities within a catchment from natural environmental patterns –(both of which may impact on fish stocks).

For example, rainfall patterns may influence factors such as salinity, which in turn may impact on species composition and abundance of fish species between years. Thus, extended periods of low abundance of a species may result in a magnification of the relative impacts of a given level fishing pressure, which may not have otherwise been a cause for concern.

These relationships are not well understood, and there is currently little information available for the Hardy Inlet/Blackwood River system that would enable such relationships to be explored. A research project to explore these relationships has been estimated to cost around \$90,000.

Proposal

A funding application be submitted for a research project to look at environmental and water quality indicators in the Blackwood/Hardy system, and explore interrelationships with fish abundance and species composition.

6.6 Principles for resource sharing

As mentioned previously, details of the guiding principles for allocation and an outline of the management structure and processes proposed are contained in Fisheries Management Paper No. 165. It proposes a set of guiding principles as a basis for fisheries allocation decisions that include:

“Allocation decisions should aim to achieve the optimal benefit to the Western Australian community from the use of fish stocks and take account of economic, social, cultural and environmental factors”.

The State Government is currently considering its response to this review and an IFM framework is expected to be introduced in the near future.

SECTION 7 POSSIBLE MANAGEMENT OPTIONS

As discussed in the previous section, the key management issue appears to be focused upon resource sharing concerns over black bream in the Blackwood River. As a basis for community discussion, this section outlines three options to address these concerns and their possible implications.

7.1 Status quo

Under this option, the current management arrangements would remain. This option is proposed on the basis that the commercial black bream 'take' is at a relatively low level and a prohibition on commercial fishing would do little to improve recreational fishing. The average commercial catch of black bream of less than one tonne, if redistributed across the recreational fishery, is not likely to provide any discernable change to the individual recreational fisher (refer Section 6.3).

This option would not necessarily overcome the perception issues created from recreational fishers observing the commercial fisherman's nets in the river, nor the direct competition for large bream between sectors (recreational 'catch and release', recreational 'keep' fishers, and the commercial fisherman), in certain parts of the river - particularly any 'high use' zones.

7.2 Place a ceiling on the commercial bream catch

A second option could be to fix the commercial catch of black bream at a specified level. This could be done by introducing any of a range of further controls, which would effectively cap the commercial catch. This could be done by:

- Introducing a catch quota on black bream for the commercial fisherman; or
- Reducing commercial effort via further input controls, that is:
 - reducing the length of net that can be set in the river,
 - restricting netting to certain parts of the inlet only,
 - specifying times when commercial netting can be undertaken.

For example, the commercial bream catch could be capped at the one tonne average (either by quota or additional input controls). In reality, the commercial catch fluctuates between years (Appendix 4), probably in line with the abundance of bream in the Blackwood River.

Capping the commercial catch at an 'average' catch level through a quota would, in effect, only provide a resource re-allocation to the recreational sector in 'good' years when the fisherman would normally have caught a greater quantity of black bream. The recreational sector would also be likely to have improved catches in these years.

Given the sporadic nature of bream recruitment, it is likely this would only occur about every five years under this option (depending upon the level at which the commercial catch was set).

Input controls would not be as effective because catch would fluctuate in line with abundance, simply at a lower level due to the more restrictive controls.

A reduction of the commercial fisherman's catch may also give rise to compensation considerations.

Any shift in catch to the recreational sector under this option is likely to be in the nature of hundreds of kilograms, and it is therefore unlikely that the majority of individual recreational fishers would perceive any difference in fishing quality.

7.3 Manage the Blackwood as a recreational 'trophy' bream fishery

Many of the concerns raised by tour operators and participants in fishing competitions relate to fishing quality and their desire to target large (or 'trophy') fish.

If the objective for managing the fishery was to establish a high quality recreational bream fishery or 'trophy' fishery, appropriate controls would need to be introduced to significantly restrict the overall take of black bream to move the population into the older/larger size categories. Given the commercial fisherman's fishing method targets large adult fish, this would require a prohibition on commercial fishing in the Blackwood River portion of the fishery.

However, for such an initiative to be successful, it would require further controls to contain the recreational catch. This could include the introduction of revised size limits, and possibly a maximum size limit, and either a 'catch and release' requirement, or a very low possession limit on black bream.

The management arrangements in place for the Ord River Barramundi Fishery provide an example of how this could be done. These include:

- A minimum size limit;
- A maximum size limit;
- Gar restrictions of one line per angler; and
- A possession limit of one fish per angler (that is, rather than a bag limit of one fish/day that allows a person to accumulate fish, a possession limit restricts the person to one fish at any time).

This option could be introduced for either:

- a) *The entire of length of the Blackwood River; or*
- b) *A particular section of the Blackwood River.*

7.3.1 The entire of length of the Blackwood River

Under this scenario, commercial fishing would be prohibited and special recreational controls introduced for all waters and tributaries of the Blackwood River.

The issue of prohibiting commercial fishing in the Blackwood River was raised in the recent Review of Recreational Fishing on the West Coast (Fisheries Management Paper No. 153). Recommendation 21(e) of the West Coast noted:

“The ban on recreational net fishing upstream of Fisher Road on the Blackwood River, near Augusta, should apply to commercial netting to protect black bream stocks.”

Over 1,200 public submissions were made on this recommendation. Less than one per cent of those submissions disagreed or strongly disagreed with the recommendation. It should be noted, however, that the working group appointed to carry out this review acknowledged the development of the West Coast Recreational Fishing Strategy did not involve widespread consultation with the commercial fishing industry or local community. It also recognised recommendations that have an impact on resource sharing should be progressed through a proper resource sharing process with the commercial fishing sector.

At the time, the relatively low level of commercial catch was not known to the working group, and the need for complementary management controls to contain the recreational catch to achieve any tangible benefits for recreational fishing was not discussed.

Clearly, an option along these lines would be favoured by fishing tour operators and fishing competition participants. Yet it is not known at this stage whether the wider recreational fishing sector would support the introduction of the required tighter controls (such as ‘catch and release’ only or limited possession limits for black bream) to achieve the intended ‘trophy’ fishery under this option. The level of support for such an option is likely to be clarified through this consultation process.

7.3.2 Particular section of the Blackwood River

Under this scenario, commercial fishing and general recreational fishing would be permitted downstream of a specified point on the river, while the areas upstream of this point could be managed as a ‘trophy’ fishery restricted to recreational fishing under special rules.

For example, a point such as Twinem’s Bend or Alexandra Bridge (see map at Appendix 5) could be chosen, although any readily distinguishable point along the Blackwood River could be chosen under this option). Commercial and general recreational fishing would still be permitted downstream of this point, but only recreational fishing under ‘special’ rules would be permitted in areas upstream.

The removal of commercial fishing from part, or all, of the river will impact on the commercial fisher’s operation (as would any reduction in catch considered under option 7.2) and give rise to compensation considerations. This could be addressed through using funds to ‘buy back’ this entitlement.

Alternatively, other compensatory measures may be possible, such as investigating whether the fisherman would be interested in replacing his commercial licence with a tour operator licence in the river. This option would enable him to utilise his local knowledge of the river and provide a service as a fishing guide to recreational fishers.

Any associated impacts from the removal of commercial fishing, such as local availability of fish for purchase, would also need to be considered in making this decision.

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APPENDIX 1 MATTERS ARISING FROM STAKEHOLDER MEETINGS DECEMBER 5-9, 2002

ENVIRONMENTAL

- A major concern of participants in this process was the health of the Blackwood River.
- The increasing demand on the river system from all sectors, including farming, mining, recreational fishing and commercial fishing was identified as an issue.
- Lack of rainfall and resultant flushing problems are perceived as major concerns and are possibly affecting fish stocks.
- The effects of farming and mining in the catchment area are considered major contributors to the river's health problems.
- Flow-on effects from the ill-health of the Scott River system on the Blackwood River is perceived as serious.

CONCERN FOR FISH RESOURCES

- Perception that black bream stocks are not being fished sustainably.
- Resource sharing issue between recreational fishers and the remaining commercial fisherman in the area. The main species in dispute is black bream, a highly valued recreational species in the area.

COMMERCIAL

- Perception that the commercial fisher's netting activities are compromising the sustainability of black bream stocks in the area.
- Participants were concerned about the 'herring-bone' pattern of set netting by the commercial fisherman.
- Participants felt the commercial operation is too visible. Clients of fishing tour operators do not want to see set nets.
- Most participants believe the commercial fisherman provides a valuable community service in the provision of fresh whiting to the South West community and tourists through retail and wholesale outlets. However, the value of the commercial fisherman's black bream catch was questioned.

RECREATIONAL

- There is widespread concern for the lack of recreational data for the region.
- There was a request to decrease bag limits (bag limits have since decreased from 20 to four).
- Recreational netting was considered an issue.
- Some participants suggested a slot (size) limit for black bream.
- It was suggested recreational fishers would be keen to provide logbook returns.

COMPLIANCE

- The Molloy Island community would like to have a Volunteer Fisheries Liaison Officer program (this has since been followed up by the Department's liaison officer).

- There is a general perception that compliance in the area is inadequate.

FUNDING

- There has been no funding for a survey of recreational fishing in the Inlet/River since 1974/75.

APPENDIX 2 SUMMARY OF INFORMATION AVAILABLE AND REQUIRED ON BLACK BREAM CATCH BY DIFFERENT SECTORS OPERATING IN THE HARDY INLET AND BLACKWOOD RIVER

SECTOR	TYPE OF INFORMATION	IS THE INFORMATION AVAILABLE?
Commercial	Monthly catch reports	Yes, since 1978. Earlier data is available, but not separated from oceanic catches.
Recreational (anglers)	Monthly catch report	No
	Creel survey	No, only data from one survey in 1974.
Recreational (netters)	Monthly catch reports	No
	Comprehensive creel survey	No
Recreational (catch and release)	Monthly catch reports	No
	Fishing competition reports	No
Tour operators (catch and release)	Monthly catch reports	Yes, since Sept. 2001.
Tour operators (fish caught)	Monthly catch reports	Yes, since Sept. 2001.
Indigenous use of fish resource	Survey of user group	No

APPENDIX 3 CALCULATION OF NUMBER OF RECREATIONAL BAG LIMITS CAUGHT BY THE COMMERCIAL FISHERMAN

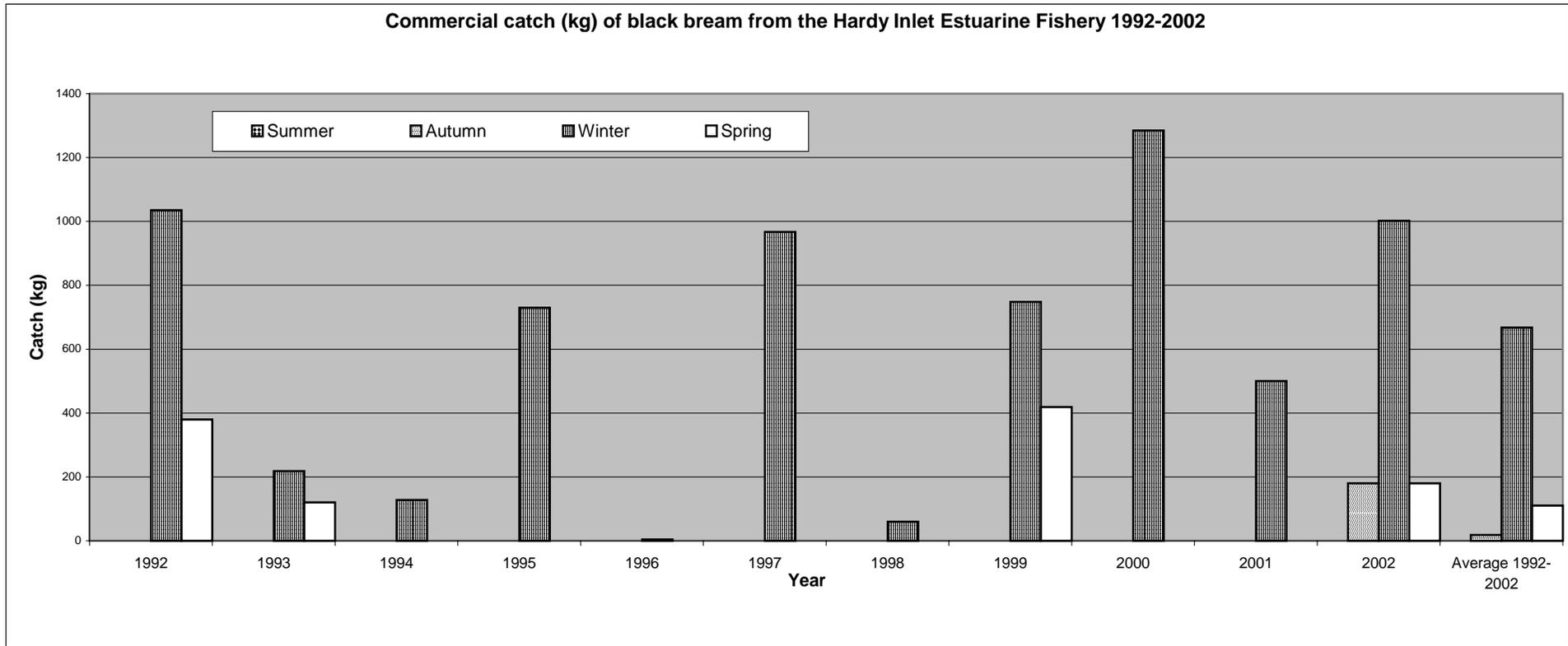
Gavin Sarre (pers. comm.) provided information on the total length and wet weight of black bream caught with four-inch mesh in a number of estuarine systems along the lower West and South Coast. The four-inch mesh is the smallest of several mesh sizes used by the commercial fisher in the Hardy Inlet Estuarine Fishery to catch black bream.

For an appropriate comparison between the Hardy Inlet and those estuaries examined in Gavin Sarre's research, only the Swan-Canning and Walpole-Nornalup estuaries were chosen. The minimum and maximum lengths of black bream from these two estuarine systems are within the range of lengths for black bream caught during the Murdoch University net selectivity study using 3.5 and 4.5 inch mesh, in the Hardy Inlet.

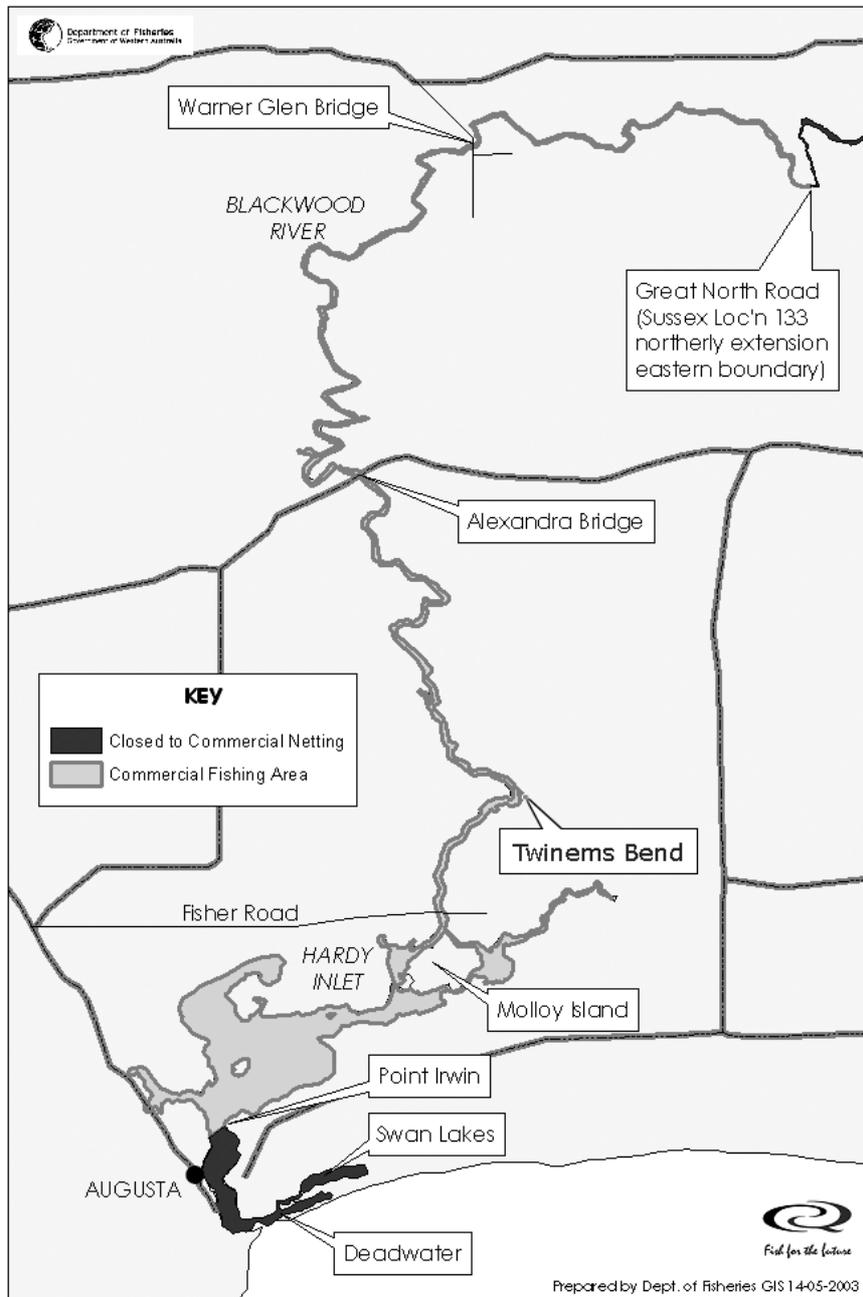
In an effort to compare the commercial and recreational harvest of black bream in the Blackwood estuary system, the five-year average commercial catch of black bream has been converted into a number of bag limits for the recreational sector. The average weight of a black bream from the Swan-Canning and Walpole-Nornalup is 0.489kg and this value was used to convert the weight of black bream caught into an estimate of the number of actual fish caught.

APPENDIX 4 CATCH (KG) OF BLACK BREAM FROM THE HARDY INLET COMMERCIAL FISHERY 1978 2002 (TABLE AND GRAPH)

	Summer	Autumn	Winter	Spring	All
Year					
1978	39	563	1,064	183	1,849
1979	170	465	181	1	817
1980	49	307	508	18	882
1981	84	34	1,537	80	1,735
1982	1,702	396	762	0	2,860
1983	0	0	2,145	1,500	3,645
1984	0	259	478	0	737
1985	0	294	255	36	585
1986	0	92	559	0	651
1987	6	99	655	43	803
1988	2	5	1,222	570	1,799
1989	70	5	345	0	420
1990	0	0	480	1,685	2,165
1991	0	0	125	1,230	1,355
1992	0	0	1,035	380	1,415
1993	0	0	218	120	338
1994	0	0	128	0	128
1995	0	0	730	0	730
1996	0	0	4	0	4
1997	0	0	967	0	967
1998	0	0	60	0	60
1999	0	0	748	419	1,167
2000	0	0	1,285	0	1,285
2001	0	0	500	0	500
2002	0	180	1,002	180	1,362
Average	85	108	680	258	1,130



APPENDIX 5 MAP OF HARDY INLET AND BLACKWOOD RIVER



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- No. 145** The Aquaculture of non-endemic species in Western Australia - Silver Perch (*Bidyanus bidyanus*). As amended October 2000. Tina Thorne. This replaces Fisheries Management Paper No. 107.
- No. 146** Sustainable Tourism Plan for the Houtman Abrolhos Islands (February 2001)
- No. 147** Draft Bycatch Action Plan for the Shark Bay Prawn Managed Fishery (Full Report) (April 2002)
- No. 148** Draft Bycatch Action Plan for the Shark Bay Prawn Managed Fishery (Summary Report) (April 2002)
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- No. 151** Inventory of the Land Conservation Values of the Houtman Abrolhos Islands (July 2003)
- No. 152** Guidelines for the Establishment of Fish Habitat Protection Areas (June 2001)
- No. 153** A Five-Year Management Strategy for Recreational Fishing on the West Coast of Western Australia. Final Report of the West Coast Recreational Fishing Working Group (August 2001).
- No. 154** A Five-Year Management Strategy for Recreational Fishing in the Gascoyne. Final Report of the Gascoyne Recreational Fishing Working Group (September 2001)
- No. 155** Plan of Management for the Cottesloe Reef Fish Habitat Protection Area (September 2001)
- No. 156** The Translocation of Brown Trout (*Salmo Trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) into and within Western Australia (June 2002)
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- No. 158** Draft Plan of Management for the Miaboolya Beach Fish Habitat Protection Area (March 2002)
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- No. 165** Report to the Minister for Agriculture, Forestry and Fisheries by the Integrated Fisheries Management Review Committee (November 2002)
- No. 166** Fisheries Statutory Management Authority Inquiry. A background paper (February 2003)
- No. 167** Draft Fisheries Environmental Management Plan for the Northern Region (*in press*)
- No. 168** Aboriginal Fishing Strategy: Report to the Minister for Agriculture, Forestry and Fisheries by the Hon E. M. Franklyn QC, Chairman of the Aboriginal Fishing Strategy Working Group
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- No. 171** Draft Aquaculture Plan for Shark Bay (*in press*)
- No. 172** Draft Aquaculture Plan for Exmouth Gulf (*in press*)
- No. 173** Draft Plan of Management for the proposed Point Quobba Fish Habitat Protection Area (August 2003)
- No. 174** Translocation of Golden Perch, Murray Cod and Australian Bass into and within Western Australia for the Purposes of Recreational Stocking, Domestic Stocking and Commercial and Non-commercial Aquaculture (December 2003)
- No. 175** Fish Stock and Fishery Enhancement in Western Australia - a discussion paper. By Jane Borg (*in press*)
- No. 176** Fish Stock and Fishery Enhancement in Western Australia - a summary report. By Jane Borg (*in press*)
- No. 177** Fisheries Environmental Management Plan for the Gascoyne Region (*in press*)
- No. 178** Draft Plan of Management for the Kalbarri Blue Holes Fish Habitat Protection Area (*in press*)
- No. 179** A Draft Policy for the Translocation of Brown Trout (*Salmo trutta*) and Rainbow Trout (*Oncorhynchus mykiss*) into and within Western Australia for the Purposes of

Recreational Stocking, Domestic Stocking and Commercial and Non-Commercial
Aquaculture (*in press*)