

Proposals for community discussion

**A QUALITY FUTURE
FOR THE
RECREATIONAL MARRON FISHERY**

**A five-year draft strategy to ensure the long-term sustainability
of the marron fishery**



By the RFAC Recreational Freshwater Fisheries Stakeholder
Sub-Committee

FISHERIES MANAGEMENT PAPER No. 198

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FOREWORD

Fishing for marron has a long history in Western Australia. The large freshwater crayfish has been highly prized for its eating qualities since early European settlement and Indigenous West Australians are likely to have captured marron for thousands of years. In the early 21st century, over 20,000 recreational licenses are issued annually that enable fishers to participate in the marron fishery.

There are now thought to be two separate species of marron - the common or 'smooth' marron and the recently discovered 'hairy' marron. The 'hairy' marron, which only occurs in Margaret River, is now under threat from habitat changes and the more aggressive 'smooth' marron that has been introduced into the Margaret River catchment. While a designated recovery team has been established to help protect 'hairy' marron stocks, there has been widespread concern over the past few decades that 'smooth' marron stocks are also under increasing pressure through environmental changes.

Factors such as declining rainfall, land management practices, predation by exotic and feral fish and fishing pressure have all contributed to declining stocks in many popular 'marroning' locations. In addition, recreational fishers have lost access to many of the State's once popular reservoirs, as they have been progressively brought on-line as drinking water supply dams to satisfy Western Australia's increasing demand for water. The allocation and diversion of water for agricultural and industrial purposes from dams where fishing is still permitted also has the potential to affect the quality of the recreational marron fishery.

While some of the factors threatening the future of the marron fishery can be managed via traditional fisheries controls, many fall outside of the Department of Fisheries' jurisdiction and require a 'whole of Government' approach to management.

To help ensure a quality future for the recreational marron fishery, the Recreational Freshwater Fisheries Stakeholder Sub-committee (RFFSS) has now developed a set of draft management proposals designed to form the basis of a five-year management plan for the fishery. Recreational fishers who have an interest in the marron fishery are encouraged to carefully consider these proposals and provide the RFFSS with their comments and ideas. All submissions will be carefully considered by the RFFSS.

Following community response to this discussion paper, the RFFSS will prepare final recommendations for consideration by the Minister for Fisheries; the Kimberley, Pilbara and Gascoyne – the Hon. Jon Ford, JP MLC. Subject to the Minister's approval, it is anticipated that the new management arrangements will be implemented prior to the 2007 marron season.

We look forward to considering your responses.

Kay Webber
Chair
Recreational Freshwater Fisheries Stakeholder Sub-Committee

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ACRONYMS

CL	-	Carapace Length
CPUE	-	Catch Per Unit Effort
FRDC	-	Fisheries Research and Development Corporation
MOU	-	Memorandum of Understanding
MSY	-	Maximum Sustainable Yield
OCL	-	Orbital Carapace Length
PFRC	-	Pemberton Freshwater Research Centre
RFAC	-	Recreational Fisheries Advisory Committee
RFSS	-	Recreational Freshwater Fisheries Stakeholder Sub-Committee
TAC	-	Total Allowable Catch
VFLO	-	Volunteer Fisheries Liaison Officer
WATFAA	-	WA Trout and Freshwater Angling Association

SUMMARY OF PROPOSALS

Proposal 1 - Priorities for research

To enable the estimation of Maximum Sustainable Yield (MSY) and the setting of an appropriate Total Allowable Catch (TAC) for the fishery each season, the following research is needed:

- The continuation of the logbook and phone survey methods so that quality time-series information is maintained to provide estimates of total catch and effort.
- The development of a more cost-effective fishery-independent method for estimating (relative) abundance of marron in representative water bodies, to provide a tool to evaluate the effects of management changes within the recreational marron fishery.
- Studies on the size at maturity of marron for a range of representative water bodies throughout the recreational marron fishery.
- A monitoring program to measure the annual volume of water available to the marron stocks so that compensating changes to management can occur.

Proposal 2 – Target catch range

Based on the available research data and knowledge of the marron fishery, it is proposed that the fishery be managed to a target catch of between 12 and 17 tonnes. It should be noted that under current management arrangements the estimated recreational catch is around 9 to 12 tonnes. If the catch exceeds 17 tonnes or falls below 12 tonnes, this will be a ‘trigger’ for management action.

Proposal 3 - Season duration

In an effort to increase the overall quality of the marron fishery, while ensuring the sustainable management of the fishery by containing catches to within the proposed target catch range, the Recreational Freshwater Fisheries Stakeholder Sub-committee (RFFSS) is seeking to determine the level of community support for each of the following options:

- a) 16-day season – (current season length) maintaining a low risk precautionary approach to management and allowing some growth in the catch.
- b) 23-day season – a low-to-medium risk strategy to allow for increased fishing opportunities and an increase in the total catch.
- c) 37-day season – a medium-to-high risk strategy to allow for increased fishing opportunities and include two complete dark moon phases to benefit dam fisheries.

Proposal 4 - Season start date

To enhance the overall quality of the recreational marron fishery, the RFFSS is seeking to determine the level of community support for each of the following options:

- a) Commencing the marron season in January following the New Year holiday. This option would take in the summer school holiday period and the dark moon phase where possible; or
- b) Commencing the marron season at Easter. This option would take advantage of the milder climatic conditions and include the Easter holiday period and often include the first term school holiday period.

Proposal 5 - Marron possession limit

To prevent fishers from stockpiling large potentially saleable quantities of marron while still enabling the accumulation of socially acceptable quantities, the RFFSS is seeking the level of community support for the introduction of a possession limit of either:

- a) 20 marron per person, or
- b) 30 marron per person.

Note: The general daily bag limit will remain at 10 marron per person.

Proposal 6 - Minimum legal size limit

The Department of Fisheries is currently evaluating the net benefits of a higher size limit on the marron fishery. Subject to the outcomes of this study, the RFFSS is seeking to determine the level of community support for an increase (or otherwise) in the minimum legal size limit (carapace length) for marron to:

- a) 76 mm – i.e. no change to the existing minimum legal size limit.
- b) 80 mm
- c) 82 mm
- d) 85 mm
- e) Other minimum legal size limit.

Proposal 7 - Hutt River

To provide increased protection for marron breeding stocks, the Hutt River should be managed as a 'Trophy Water', with a bag limit of five marron and a minimum size limit of 90 mm applying.

Proposal 8 - Warren River

To reduce the confusion over the boundaries of the Warren River National Park and enable fishers to use marron drop nets and scoop nets, the 'snare-only' requirement should be removed from the Warren River within the Warren National Park.

Proposal 9 - Donnelly River

To enable marron fishers to access the relatively inaccessible sections of the Donnelly River, fishers should be permitted to carry marron drop nets and scoop nets by boat to the area that they intend to fish (down stream of 'Boat Landing' only). The use of a boat to actively fish for marron with drop nets and scoop nets will remain prohibited.

Proposal 10 - Shannon River

The RFFSS is seeking to determine the level of community support to permanently close the Shannon River, to provide a system that can be utilised to assess the impact of environmental factors on a marron stock in the absence of fishing pressure and predation from introduced fish.

Proposal 11 - Management of dams

To ensure the long-term future of recreational fishing in dams where fishing is currently permitted, a formal Memorandum of Understanding should be developed between the Department of Fisheries and the relevant water management authorities. The Memorandum of Understanding should cover an agreed risk assessment process for the water authorities and the Department of Fisheries, and a strategy towards future water allocation decisions, designed to minimise the impact on the quality of the recreational marron fishery.

Proposal 12 – Restocking marron as a stock enhancement strategy

Restocking of marron via a captive breeding program or via translocation should be considered as a strategy to assist with the recovery of a stock where it can be identified that the stock has been significantly depleted, and its recovery is endangered or will be prolonged.

To minimise any ecological impacts, all stock enhancement projects should be assessed against disease risk, biodiversity and genetic diversity criteria. Any stock enhancement project should use stock from the existing water catchment and also be adequately monitored and evaluated.

Proposal 13 – Artificial habitats

To improve the survival of juvenile marron and increase the overall productivity of marron waters, funding should be sought for the installation, monitoring and evaluation of artificial habitat in dams identified to be lacking in natural habitat. The installation of any artificial habitat should be negotiated with the relevant management authorities and constructed in accordance with water body management plans.

Proposal 14 – State freshwater faunal emblem

In recognition of the unique place of marron in Western Australia's freshwater ecology and the high social value of the fishery as part of the heritage of all Western Australians, marron should be declared as a State freshwater faunal emblem.

Proposal 15 – Community education plan for the recreational marron fishery

A community education plan should be developed for the recreational marron fishery that focuses on the most important issues and areas within the fishery. Such a plan should seek to keep the recreational fishing community informed of management decisions, give a clear lead on the values and attitudes which will assist in sustaining marron stocks, and develop a broad community recognition of the value of the marron fishing. As a minimum, the plan should contain the following elements.

- *Marron fishing guide:* A comprehensive fishing guide should be produced to inform and educate fishers about the management arrangements for the marron fishery, fishing ethics, research, conservation issues and promoting stewardship for marron stocks and the environment.
- *Marron gauges and other educational resource materials:* Adequate quantities of practical educational tools, such as measuring gauges and fishing venue signs, should be produced to support the marron fishing guide.
- *Annual media campaign:* An annual media campaign should be implemented to promote marron fishing and fishing ethics.
- *Volunteer involvement in education:* Volunteer groups should be encouraged to continue their involvement in structured fisheries education activities for the marron fishery.

Proposal 16 – Field management and compliance

To maximise the effectiveness of the five-year management plan for the recreational marron fishery, the Department of Fisheries should aim to deliver at least 2,500 hours towards field compliance and education, both during and outside of the marron season.

SECTION 1 PLANNING FOR THE FUTURE

1.1 Managing for the future – why review the marron fishery?

In 2002, following several consecutive years of declining catches and catch rates (Molony *et al.* 2002), the then Minister for Agriculture, Forestry and Fisheries established an independent community-based working group to review the management arrangements for the recreational marron fishery. At the same time, the Department of Fisheries' Research Division was successful in obtaining a significant Fisheries Research and Development Corporation (FRDC) grant to undertake a comprehensive research project (2003/027) on changes to the marron fishery over time. This project will be reported on in late 2006.

In order to protect vulnerable marron breeding stocks, the working group recommended that the Minister introduce interim management arrangements for the 2003 season to stabilise the total catch at, or below, 2002 levels.

The key outcomes of the 2002 review included a reduction in the fishing season from 55 days to 16 days, the inclusion of all major dams as 'snare only' fishing areas, the establishment of additional 'marron waters' (where fishers may only be permitted to carry legal marron gear), and separate bag, size and possession limits for the Harvey Weir.

These measures were successful in significantly reducing the total fishing effort and therefore total catch during the 2003 and subsequent seasons while increasing individual catch rates, resulting in a higher quality fishing experience. The lack of a compensating increase in fishing due to the shorter season has resulted in a lower-than-expected catch.

The working group also identified habitat loss resulting from factors such as river degradation, salinity and consistent below-average rainfall as long-term threats to the fishery. As these factors fall outside of the primary role and responsibility of the Department of Fisheries, the working group concluded that a major review of the fishery was necessary to address these issues via a 'whole of Government' approach.

Noting this advice, the Minister established a Recreational Freshwater Fisheries Stakeholder Sub-committee (RFFSS) in 2004 to ensure future issues relating to the viability and sustainability of marron, trout and other recreational freshwater species were addressed in an integrated manner. As a priority, the RFFSS was tasked with a major review to ensure a quality future for the recreational marron fishery, in light of the available catch information from recent seasons.

1.2 The Recreational Freshwater Fisheries Stakeholder Sub-Committee

1.2.1 Membership

The RFFSS is comprised of members representing a range of stakeholder groups including conservation, Indigenous, recreational fishing (including marron fishers and freshwater anglers) and Government agencies.

Composition of the RFFSS;

Chairperson

Ms Kay Webber RFAC

Sub-committee members

Mr Nathan Harrison	Department of Fisheries
Mr Frank Prokop	Recfishwest
Mr Harry Vosper	WA Trout and Freshwater Anglers Association (WATFAA)
Mr James Duggie	Conservation interests
Mr Glen Kelly	Indigenous interests
Mr John Evans	Marron licence holder
Mr David Morgan	Marron licence holder
Mr Peter Ryall	Freshwater angling licence holder
Mr John McConigley	Freshwater angling licence holder

Sub-committee observers

Mr Rod Brooks	Water Corporation
Mr Tom Rose	Department of Environment

Executive support

Mr Clinton Syers	Department of Fisheries
Mrs Eileen Ferguson	RFAC Executive Officer

Research advisors

Dr Brett Molony	Department of Fisheries – Research Division ¹
Dr Martin de Graaf	Department of Fisheries – Research Division

1.2.2 Terms of reference

The terms of references of the RFFSS are:

- To identify key short, medium and long term issues facing recreational freshwater fisheries in Western Australia, in particular the trout and marron fisheries.
- To develop a five-year strategy for the management of recreational freshwater fisheries in Western Australia.
- Consult with key stakeholder groups on management options for recreational freshwater fisheries in Western Australia.
- Make recommendations via the RFAC to the Minister for Fisheries, on the future management arrangements for recreational freshwater fisheries in Western Australia.

¹ Dr Molony was Research Scientist in charge of freshwater fisheries up to 2004. Dr de Graaf took over in 2005.

1.2.3 Vision statement for the recreational marron fishery

The RFFSS has developed the following vision statement for the future management of the recreational marron fishery:

“To have a recreational marron fishery based on sustainably managed aquatic ecosystems and marron stocks that provide a variety of high quality and valued social experiences.”

1.2.4 Objectives for the management of the marron fishery

The RFFSS has identified the following objectives for the future management of the recreational marron fishery:

- Ensure the long-term sustainability of the marron resource.
- Maximise the catch of marron within sustainability limits.
- Minimise the illegal activity in the fishery.
- Increase the individual responsibility and community support for sustainable fishing.
- Provide equitable recreational access to marron stocks.
- Increase the quality and diversity of opportunities for recreational marron fishing in the future.
- Support research projects aiming to improve the management of the recreational marron fishery.

1.3 Opportunity for public comment

The release of this discussion paper (Fisheries Management Paper No. 198) for public comment provides an opportunity for further information to be available for you to express your opinion on how the recreational marron fishery should be managed. Whether you agree or disagree with the various proposals, it is equally important to respond and, where relevant, offer an alternate option for management, as the RFFSS will review each of these proposals in light of the comments received.

1.3.1 Points to consider for submissions

To ensure your comments are as effective as possible, please:

- Clearly and briefly describe each separate subject you wish to address.
- Refer to the different section numbers/proposals/page numbers in the paper.
- Tell us whether you agree/disagree with any or all of the proposals or issues identified in each section.
- Suggest alternative ways to resolve any of the issues you have raised.

1.3.2 How to make a submission

Written

- Clearly and briefly describe each separate subject you wish to address.
- Please refer to the different section number/proposals/page numbers in the paper.

Questionnaire

- Responses can also be made by completing the questionnaire contained at the back of this discussion paper.

For further information, contact the Executive Officer of the Recreational Marron Fishery Review at the Department of Fisheries in the following manner:

Telephone: 9482 7371

e-mail: csyers@fish.wa.gov.au

1.3.3 Where and when to send your submission

The closing date for submissions is **16 December 2005**. Please send your submission along with your full name, address and association details (if applicable) to:

Executive Officer

Recreational Marron Fishery Review

c/- Recreational Fisheries Program

Department of Fisheries

Locked Bag 39

Cloisters Square Post Office

PERTH WA 6850

Fax: 9482 7218

e-mail: csyers@fish.wa.gov.au

1.3.4 What happens to your submission

All submissions are confidential and will only be reviewed by the RFFSS. After consideration of submissions, final recommendations will be forwarded to the Minister via RFAC.

The recommendations approved by the Minister for Fisheries will form the basis of a new five-year management strategy for the recreational marron fishery to be implemented in 2007.

SECTION 2 AN OVERVIEW OF THE RECREATIONAL MARRON FISHERY

2.1 Biology and ecology

Marron are the largest naturally-occurring crustacean in freshwaters of south-west Western Australia. Like other freshwater crayfish, marron populations in rivers and dams can reach high numbers. Marron primarily feed on decaying vegetation and associated fauna but will also scavenge for other foods (e.g. dead fish or terrestrial animals). This opportunistic feeding style is most likely because the productivity of Western Australian rivers in the southwest is low, compared to the eastern states or internationally.

Marron prefer areas with structures (e.g. submerged fallen timber and rocks) to clear areas, although they will build burrows. Juvenile marron require shelter in the form of leaf litter, fallen logs and branches.

Marron start to reproduce at between two and three years of age, and this is typically below the legal minimum size. Unlike marine crustaceans such as lobsters, female marron carry their young under their tails until the juveniles are up to 20 mm long. This allows protection for the young, but means that the number of young a female marron can bear is relatively low, being between 200 and 500 young.

Juvenile marron do not disperse much at all. In fact, most young marron only move a few hundred metres after being released from their mother. This means that if the number of breeding marron is severely reduced in a dam or section of river, it can take a long time for the population to recover.

2.2 Historical management of the recreational marron fishery

Marron are endemic to the southwest of Western Australia, although the translocation of marron following early European settlement has resulted in their distribution to many waters between Hutt River and Esperance (Morrissy 1978a) (Figure 1).

The recreational marron fishery is unusual as regulations and management have been evolving since the early 1950s, an indication of the vulnerability and popularity of the species. Prior to this time there was no Government intervention around the fishery and measuring catches by the bag-full, rather than numbers of individuals, was common practice.

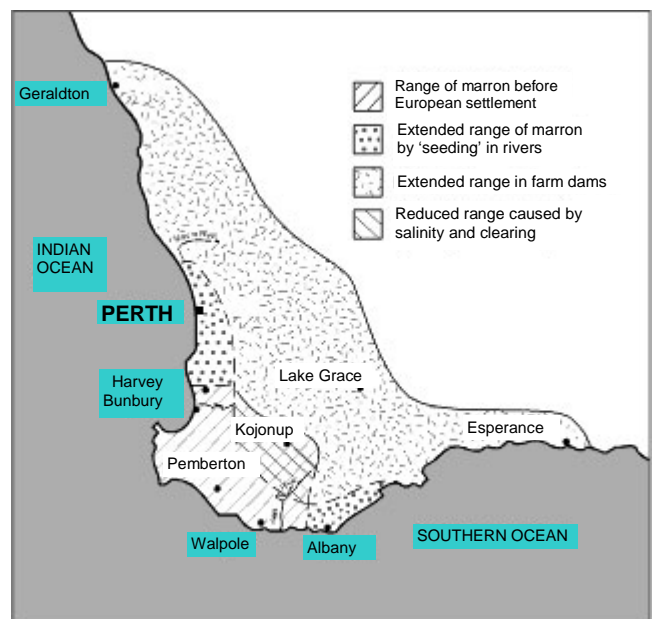


Figure 1 - Distribution of Marron

A minimum size limit and closed season was first introduced in 1952 in an attempt to contain fishing effort and protect breeding stocks during the spawning season. This was promptly followed by an extension to the closed season in 1953. To prevent the take of marron for commercial purposes and create a truly recreational-only fishery, it became illegal to sell wild captured marron in 1955.

The marron fishery was first licensed in 1963 under the Amateur Fisherman's Licence and later by the Inland Fisherman's Licence (1970). Finally the Recreational Fishing Licence endorsed for marron was introduced in 1986 and is still being utilised today (Morrissy 1978b, Department of Fisheries 1988, Morrissy *et al.* 1990).

To further constrain total catches, preliminary fishing gear controls and a daily bag limit of 30 marron per person was first introduced in 1969.

A voluntary marron fisher logbook program was established by the then Department of Fisheries and Wildlife to collect information on the recreational marron fishery in 1971. The logbook program enabled research scientists to develop an estimate of total catch and catch rates for stock assessment purposes, so as to assist in the future management of the fishery.

In 1974 the use of drop nets, scoops and snares became the only legal means to take marron, with diving, snorkeling or using a boat to fish for marron no longer being permitted. To provide additional protection to breeding females, it became illegal to take 'berried' marron, with either eggs or with young attached, in 1975.

An assessment of the logbook data in 1980 revealed a consistent trend of declining catches and catch rates (Figure 2 and Figure 3). In an attempt to reverse this trend, the daily bag limit was reduced to 20, however by this stage the logbook data indicated an average catch rate of just 9 per trip. Despite the reduction in the bag limit, the marron fishery continued to decline due to increasing fishing effort and consecutive years of low rainfall.

In 1988 the marron fishery was closed for two seasons to allow stocks to rebuild. For several years leading up to the closure the season was held over two periods - the summer school holidays and the Easter holiday period. When the fishery re-opened in 1990, the Easter component of the fishery was dropped and there was an initial 'gold rush' effect after which the declining catch rates resumed.

In order to reduce the effects of high levels of effort, certain water bodies were progressively declared as 'snare-only' during the 1990s and into the early 2000s. These waters included the Shannon River and Warren River National Park (1990), Margaret River (1993), Harvey Weir (1994), Wellington and Samson Dam (1996), Logue Brook Dam (2001), Waroona Dam (2002) and Big Brook Dam, Drakes Brook Dam and Glen Mervyn Dam (2003).

In 1990 the Department of Fisheries commenced a random telephone survey of marron licence holders to supplement the information obtained through the marron fishers logbook program. Both the phone survey and the logbook program revealed that the disturbing trends of declining catch and catch rates continued throughout the early 1990s. Compounding this decline was the progressive closures to fishing of major dams by the Water Corporation, as these dams were brought on-line for drinking water supply.

In 1995 the bag limit for marron was once again reduced to 10. However this had little effect on reducing the total catch, as average catches had dropped to just five marron per trip by this stage.

By the 2002 season the average catch rate for marron was just 4.2 marron per fisher (per day) taken over an estimated total of 32,000 days and the recreational catch had plummeted to approximately 17 tonnes or 136,000 marron. This represented a significant decline from the estimated peak of 100 tonnes or 850,000 marron per annum taken during 1970s.

2.3 Outcomes of the 2002 Recreational Marron Fishery Review

An independent community-based working group was formed in 2002 to identify factors responsible for the decline in marron stocks and to develop a strategy to prevent any further decline of the fishery.

The working group concluded that a number of factors were responsible for the decline in marron stocks, including:

- Environmental factors including land-use practices (e.g. water diversion and damming, salinisation, clearing and habitat loss);
- Low rainfall and reduced run-off during the late 1990s and early 2000s; and
- Pressure from a high level of legal and an unknown level of illegal fishing activity.

In order to protect the vulnerable marron breeding populations, the working group recommended a number of management changes aimed at stabilising the total catch at, or below, the previous season's catch estimate of 136,000 marron, equivalent to 17 tonnes at minimum legal size.

The key management changes introduced for the 2003 season were as follows:

- Reduction in season length from 55 days to 16 days (designed to reduce fishing effort).
- All Water Corporation dams open to recreational fishing became 'snare only' (designed to reduce fishing efficiency).
- All major waters within the marron fishery became 'Marron Waters' where fishers could only be in possession of legal marron fishing gear (designed to reduce illegal fishing practices).
- Margaret River was closed to recreational marron fishing upstream of 10-Mile Brook (to protect the threatened Margaret River 'hairy' marron).
- Harvey Weir became a 'Trophy Water', with a minimum size limit of 90 mm and an individual bag limit of five marron per person (to protect breeding animals).

2.4 Status of the marron fishery

Current assessment data is derived from scientific monitoring of stock levels both before and after the summer fishing season, telephone surveys of recreational licence holders, log books completed voluntarily by some recreational fishers, and joint sampling with individual catchment groups.

The total catch for the 2004 season was estimated at approximately $64,264 \pm 13,198$ marron, which equates to about 8.03 tonnes. This is a significant increase compared to the previous season (2003: $46,400 \pm 6,000$ marron or about 5.8 tonnes).

The increase in catch is most likely due to a proportionate increase in fishing effort as season length and 'catch per unit effort' (CPUE) did not differ in 2004 and 2003. Note that these tonnages are underestimates of legal catch as it is assumed that the average catch size equals the minimum legal size.

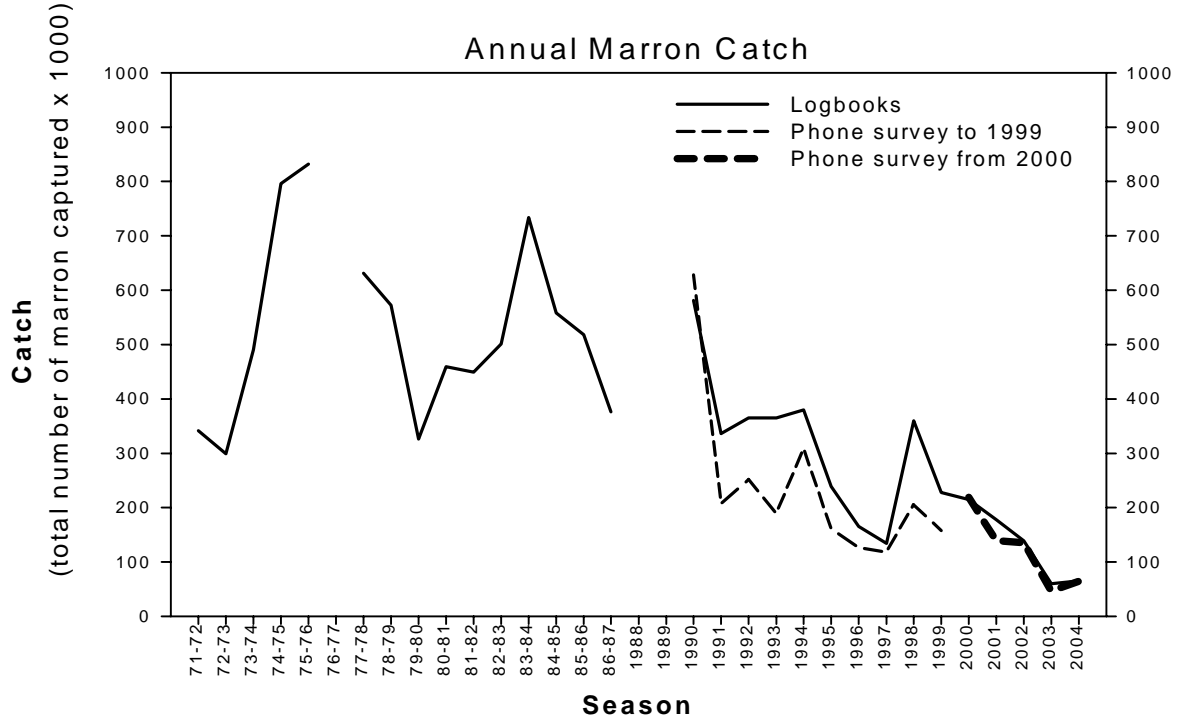


Figure 2 - Estimated total numbers of marron landed in the recreational marron fishery

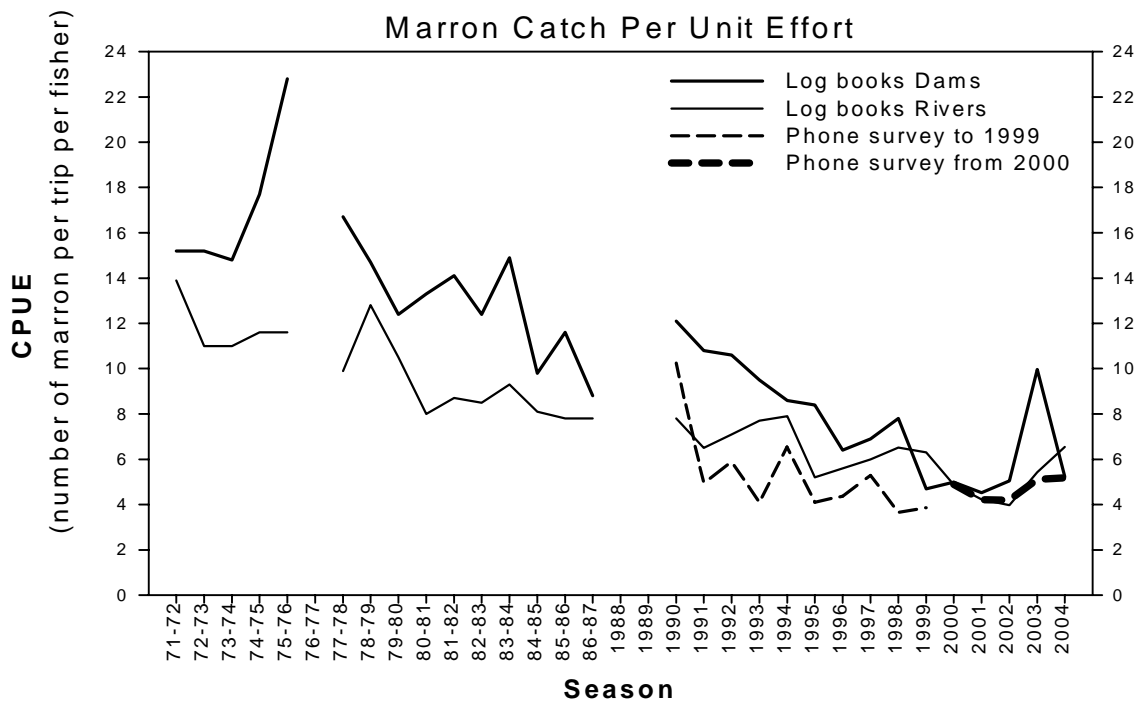


Figure 3 - CPUE in the recreational marron fishery

Total effort for the 2004 season was estimated at around 12,400 days. Fishing effort significantly increased compared to the previous season (e.g. 2003: 9,100 days). This increase is due to both an increase in the number of licensed fishers and an increase in the number of fishing days per fisher during the 2004 season. The season length for both the 2003 and 2004 season was just 16 days.

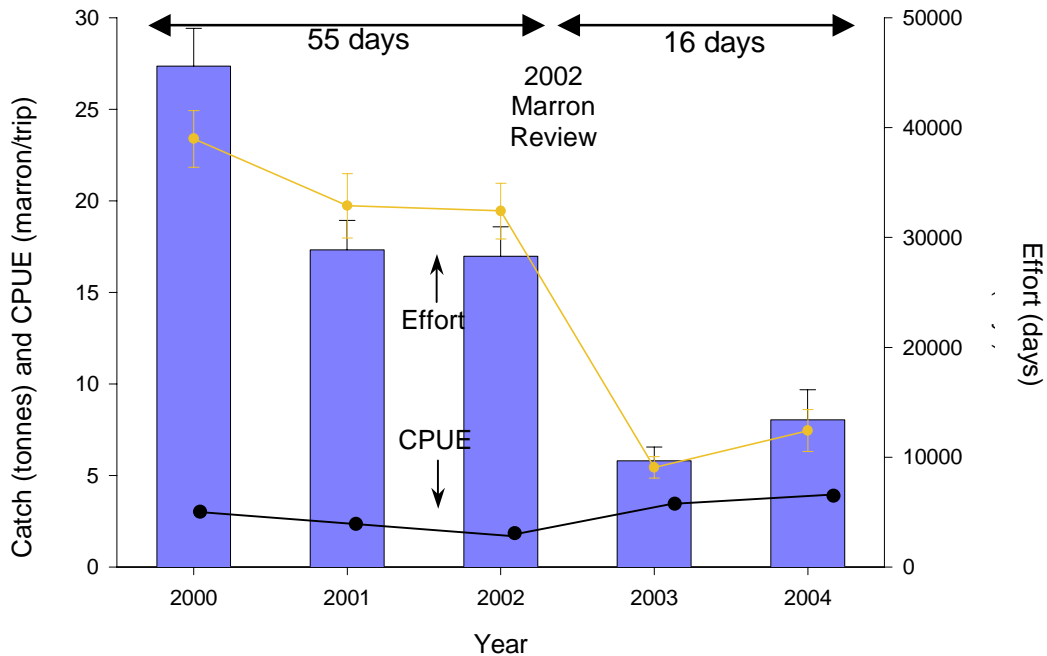


Figure 4 - Estimated catch and effort 2000 to 2004

The shorter marron season since 2003 also had a significant effect on the number of licences issued. While the number of umbrella licences (a combined licence which enables fishers to participate in all five licensed recreational fisheries) has steadily increased since 2000, the number of designated marron licences nearly halved in 2003 as a response to the 16-day season. However since 2003 there has been a consistent increase in licences issued as fishers returned to the marron fishery (Figure 5), possibly in response to improved catch rates.

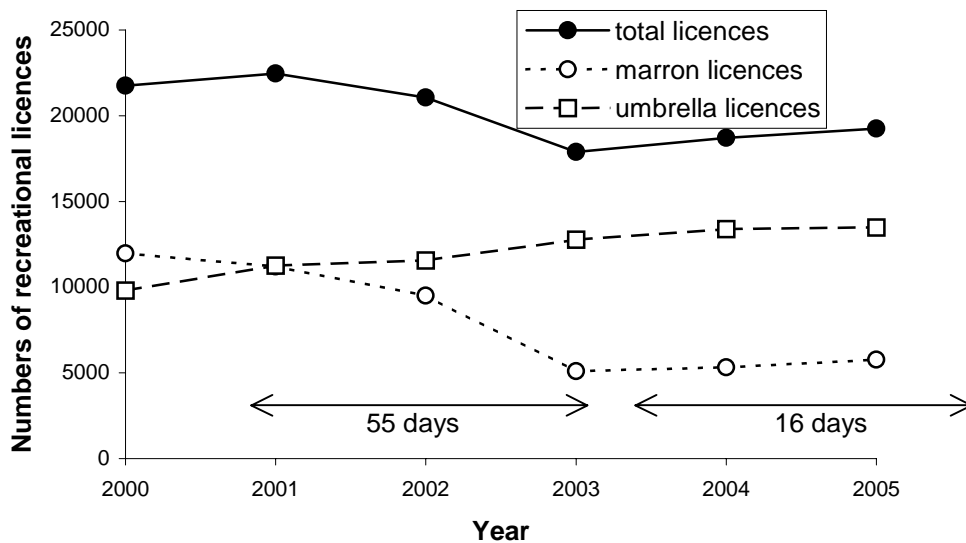


Figure 5 – Number of recreational marron licences issues since 2000

Catches are predicted based on a relationship between rainfall and subsequent catches, with rainfall data supplied by the Bureau of Meteorology. Briefly, higher rainfall increases the volume of rivers and dams, allowing marron to spread out, reducing competition for food and allowing more energy to be allocated to growth and reproduction. Further, higher rainfall washes more leaf litter and nutrients into waters, increasing the productivity and thus growth and reproductive rates.

At this stage, the forecast is based on a simple correlation, but will be improved at the conclusion of the current study.

2.5 Summary of current management arrangements (2005 season)

The following is a summary of the management arrangements that applied during the 2005 recreational marron season.

2.5.1 Daily bag, size and possession limits

Daily bag limit.....10 marron (midnight to midnight)
Minimum size limit.....76 mm carapace length

Harvey Weir – ‘Trophy Water’

Daily bag and possession limit.....5 marron (applies within 500 metres of Harvey Weir)
Minimum size limit.....90 mm carapace length

Daily bag limits apply over a period of midday to midday the next day.

All females with eggs (berried) or live young attached beneath its body and undersize marron must be returned to the water immediately.

2.5.2 Licensing, seasons and closed areas

A recreational fishing licence is required to fish for marron - \$21[^] (2005)

Open season 2005 (16 days) – Midday, Friday 7 January to midday, Sunday 23 January.

All drinking water dams are closed to recreational fishing at all times by the Water Corporation.

Margaret River is closed to marron fishing within 50 metres of the Bussell Highway traffic bridge and all waters upstream of the 10-Mile Brook Junction at all times.

Waroona Dam is temporarily closed to marron fishing to enable stocks to rebuild.

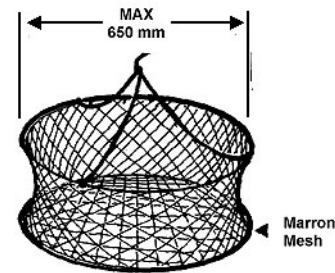
[^] Note: All recreational fishing licences are Consumer Price Indexed and future fee increases fall outside of the terms and references of this review.

Transporting marron outside of the closed season is prohibited. A person must not remove marron, or permit any marron to be removed from private property during the closed marron season.

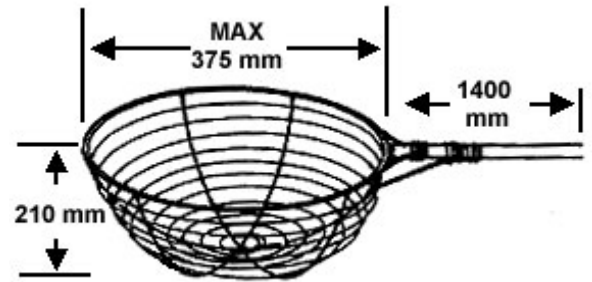
2.5.3 Gear and method restrictions

Legal fishing gear

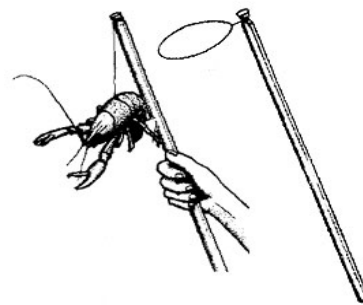
Marron drop nets: Maximum of six per person. Upper hoop maximum diameter 650 mm, minimum 400 mm. The base of the net must be made out of 'marron mesh'. Marron mesh is rectangular, rigid wire or plastic mesh. Each individual mesh rectangle must be a minimum of 80 mm x 32 mm. The wire or plastic may be no more than 5 mm thick.



Scoop nets: Maximum of one per person. Marron scoop nets are wire crabbing-style scoops with a maximum diameter of 375 mm across the top hoop, and a maximum depth of 210 mm. Fine-mesh dab nets are not legal gear for catching marron. There must be no more than six vertical support wires and a maximum of 75 individual mesh rectangles. Maximum handle length is 1400 mm.



Pole snare: Maximum of one per person. Pole snares are usually a broomstick, or fishing rod with a noose made out of fine telephone wire tied around one end.



It is illegal to transport marron scoop nets or drop nets by boat or use a boat or diving gear to take marron.

Marron waters

A person must not be in possession of anything capable of taking fish other than legal marron fishing gear (as described above), or a single rod, reel and line or single hand-held line, or a landing net with a handle not more than 500 mm in length in, on or within 50 metres of the following waters and their tributaries:

- Blackwood River (upstream of the Alexandra Bridge)
- Donnelly River
- Warren River
- Hutt River
- Moore River
- Murray River (upstream of Pinjarra Dam)
- Deep River (upstream of the Deep River Bridge)

- Gardner River

Marron waters – ‘snare only’

A person must not be in possession of anything capable of taking fish other than a marron pole snare, or a single rod, reel and line or single hand-held line, or a landing net with a handle not more than 500 mm in length in, on or within 50 metres of the following waters:

- Harvey Weir
- Waroona Dam
- Drakes Brook Dam
- Logue Brook Dam
- Glen Mervyn Dam
- Big Brook Dam
- Wellington Dam
- Harvey River (upstream of the Harvey Falls)
- Margaret River
- Shannon River (downstream of the Shannon River Dam)
- Warren River (within the Warren National Park)

2.6 What’s new for the 2006 season?

2.6.1 Waroona Dam

In 2002 the Water Corporation drained Waroona Dam, approximately 30km to the north of Harvey Weir, to allow the dam’s wall to be refurbished (Molony *et al.* 2005). To ensure that the dam would once again be a productive component of the recreational marron fishery, the Water Corporation commissioned the Department of Fisheries and Murdoch University to conduct an extensive de-stocking and re-stocking program.

Prior to the refurbishment of the dam, marron were translocated to purpose-built ponds located at the Pemberton Freshwater Research Centre and Alcoa’s Willowdale marron farm where a breeding program was undertaken. As the dam was refilled, the marron were progressively restocked. However, to enable marron stocks to rebuild, it was decided that the fishery should be closed for at least three years – that is, until the re-stocked cohort of juveniles reach legal size.

Recent surveys indicate that the stock structure of marron in Waroona Dam is now similar to that recorded prior to 2002. To provide increased protection for marron breeding stocks, the Minister for Fisheries has approved that Waroona Dam will be reopened in 2006 as a ‘Trophy Water’ with a minimum size limit of 90 mm and a bag and possession limit of five marron within 500 metres of the waters edge.

The concept of managing areas of the marron fishery as ‘Trophy Waters’ was developed during the 2002 review and adopted for Harvey Weir. ‘Trophy Waters’ have separate bag limit and size limit to the remainder of the fishery and provide fishers with the opportunity to target large trophy-sized marron.

SECTION 3 THE PROPOSED STRATEGY FOR THE MARRON FISHERY

3.1 Information for Management

3.1.1 Research information

There has been a long-running small research monitoring project on the marron fishery, which continues to provide basic management information (Morrissy 1978b). In addition, the Department of Fisheries currently has a significant Fisheries Research and Development Corporation grant to refine knowledge of the marron fishery and set up new monitoring programs suitable for the future needs of management. This project is currently managed by Dr Martin de Graaf and will report in 2006.

It is critical that good time-series data on fishing activity, catches, population structures and the effects of environmental change is available for fisheries management to formulate a Maximum Sustainable Yield (MSY) for the marron fishery, which can be converted into a Total Allowable Catch (TAC). Put simply, a TAC equates to the total amount of marron (by weight or total number) that can be safely removed from the fishery each year without causing the population to decline over time.

While over 30 years of time-series catch and effort data is available for the recreational marron fishery via logbook and phone surveys, the necessary information to develop an estimate of (relative) population densities, size-at-maturity and total fecundity (egg/juvenile production) across the fishery is limited using these methods.

Currently, standardised pre and post-season fishing surveys using marron drop nets and scoop nets are conducted on selected water bodies to monitor changes in population structures over a fishing season. However these indicator surveys do not provide a particularly accurate estimation of the total biomass across the entire range of the fishery. New survey methods using traps are being developed to allow the survey of a greater range of waters in a cost-effective manner.

In addition, while biological information on size at maturity is known for several water bodies such as Harvey Weir, Waroona Dam and the Hutt River (Beatty *et al.* 2003, Beatty *et al.* 2004), this information still remains limited for the majority of the fishery. Size at maturity can vary significantly between marron populations, due to factors such as water temperature, salinity and productivity of a water body. Size at maturity may also vary within a given water body over time.

This information is crucial to set effective minimum legal sizes for the recreational marron fishery in its various components. Minimum legal size restrictions should aim to protect the active reproductive part of the population by ensuring that in any given water body individuals are able to spawn at least once before being recruited into the recreational marron fishery.

Furthermore the effects of environmental factors such as variations in rainfall are also thought to significantly influence marron populations on a seasonal basis.

The outcome of higher-than-average rainfall is two-fold. Firstly, good rains are likely to increase the growth rates of large marron, resulting in more marron above legal size for the following season. Secondly, due to increased survival of juveniles, increased rain is likely to result in higher numbers of marron reaching fishery-size within two to five years, depending on the productivity of the system and the growth rate of marron within different areas.

Conversely, low rainfall has the opposite (negative) effects on marron populations. Further, in periods of low rainfall, extra water extraction occurs to fill private dams for stock and crops.

It should also be noted that unseasonal summer rain can reduce water quality by the short-term addition of fertilisers and manures from farm run-off without the follow-through flooding which occurs in winter. This summer nutrient 'input' often reduces dissolved oxygen levels to critical levels (i.e. eutrophication) and can cause walk-outs of marron from water bodies and deaths of marron.

If fisheries scientists are to provide reliable Maximum Sustainable Yields (Total Allowable Catches) for the marron fishery, additional research is required to improve the current estimation of the total biomass, size-at-maturity and fecundity, as well as an assessment of the effect of environmental factors.

Proposal 1 - Priorities for research

To enable the estimation of Maximum Sustainable Yield (MSY) and the setting of an appropriate Total Allowable Catch (TAC) for the fishery each season, the following research is needed:

- The continuation of the logbook and phone survey methods so that quality time-series information is maintained to provide estimates of total catch and effort.
- The development of a more cost-effective fishery-independent method for estimating (relative) abundance of marron in representative water bodies, to provide a tool to evaluate the effects of management changes within the recreational marron fishery.
- Studies on the size at maturity of marron for a range of representative water bodies throughout the recreational marron fishery.
- A monitoring program to measure the annual volume of water available to the marron stocks so that compensating changes to management can occur.

3.2 Managing the catch and breeding stock protection

During the 2002 review, a working group developed a management strategy to enable marron stocks to recover by containing the total catch to within the estimated 17 tonnes taken in the 2001 and 2002 seasons. The working group took a precautionary approach in making this decision in the absence of the necessary information required to develop an annual Total Allowable Catch (TAC) for the recreational marron fishery.

In order to contain catches to within 17 tonnes for the 2003 and subsequent seasons, the working group recommended to the Minister for Fisheries that the recreational marron season be reduced from 55 days to 16 days.

The reduction in season length caused a drop in the number of fishers participating in the fishery, either because they believed a 16-day season was not worth the cost of a licence or they interpreted the new management arrangements as a sign that the fishery was in decline (Figure 4 – Estimated catch and effort 2000 to 2004).

The reduction in participation saw the total effort decline from 32,000 fishing days in 2002 to just 9,100 fishing days in 2003. This led to a significant decline in the total catch from an estimated 16.8 tonnes in 2002 to 5.8 tonnes for the 2003 season. However the average catch rate (CPUE), which can be viewed as a measure of fishing quality, increased from 4.2 to 5.1 marron per trip in the 2003 season and there is an indication that larger sizes of marron were caught.

Recent logbook and phone surveys now indicated that both catch and effort have slowly increased over the 2004 and 2005 seasons, as fishers returned to the fishery. In 2004, effort increased to 12,400 days and total catch increased to 8 tonnes. While a comprehensive assessment of the 2005 season has yet to be completed, preliminary analysis suggest that the total catch was between 9 and 12 tonnes.

The number of designated recreational marron licences issued has also show a steady increase since 2003.

3.2.1 Sustainable target catch for the marron fishery

In considering the future management of the recreational marron fishery, the RFFSS is again faced with the challenge of determining an appropriate target catch as a basis for management decisions in the absence of the necessary fishery-based information required to predict the sustainable harvest level (Total Allowable Catch) for the fishery.

Since the 2002 season, below average rainfall has placed further pressure on the marron fishery. In 2005 a number of rivers ceased flowing completely for the first time in living memory, as a consequence of low rainfall and land management practices. These short-term fluctuations in rainfall require a continuing adjustment to the target TAC each year.

The RFFSS is therefore of the view that since stock levels will fluctuate from season-to-season due to factors such as rainfall and fisher participation, the fishery should be managed to within an acceptable catch range rather than to a specific target catch.

Having considered the trends in catch and effort since the 2003 season, the RFFSS believes that a precautionary management approach should be maintained for the life of this management plan to enable stocks to continue to rebuild. The RFFSS believes that a catch range of between 12 and 17 tonnes would provide sufficient protection at this time and provide a quality fishing experience by maintaining average catch rates above five marron per person per trip.

It should be noted that if the long-term rainfall shift causing the gradual drying of the southwest corner of Western Australia continues, the productivity of the marron stock could decline further and require active monitoring.

The RFFSS is confident that if the research priorities identified in Section 3.1 are undertaken, then a variable TAC based on an assessment of the total available biomass each year rather than on recent catch trends could be developed and implemented within the life of this plan.

Proposal 2 – Target catch range

Based on the available research data and the knowledge of the marron fishery, it is proposed that the fishery be managed to a target catch of between 12 and 17 tonnes. It should be noted that under current management arrangements the estimated recreational catch is around 9 to 12 tonnes. If the catch exceeds 17 tonnes or falls below 12 tonnes, this will be a ‘trigger’ for management action.

3.2.2 Length of the marron season

The duration of the recreational marron season has an obvious influence on the total catch. A longer season provides greater opportunities to fish for marron that results in higher catches being taken during the season.

As previously stated, a major outcome of the 2002 marron review was a reduction in the season length from 55 days to 16 days. Due to the state of the fishery, the working group believed that this reduction was necessary to contain the catch at 2002 levels or even reduce the total catch.

While the shorter season had the desired effect of containing the catch below 17 tonnes for the past three years, it has also led to fishing effort being concentrated within the 16-day period. Reports of fishers vying for space along the banks of popular rivers and dams have detracted from the quality of the fishing experience for some fishers.

While the management arrangements for the past three seasons were based around a target of 17 tonnes, actual catches were well below this level. Given this, there is justification for increasing the current season length from 16 days, even with a revised catch range of between 12 and 17 tonnes.

However, the RFFSS is wary of any significant increases in season length, as fishers might view this as a response to a recovered fishery, triggering a mini ‘gold rush’ effect similar to that recorded when the fishery was reopened in 1990.

In an effort to maximise the quality of the fishery by maintaining or even increasing average catch rates while containing catches to within 12 to 17 tonnes, the RFFSS is considering increasing the season length. An analysis of the marron logbook and phone survey data indicates that the majority of available legal-size marron are caught during the opening two weeks of the season, therefore it is not expected that an increase in the season length would result in the total catch increasing by the same proportion.

Additional factors such as holiday periods, water levels and lunar phases also affect catches and catch rates.

The RFFSS is now seeking the level of community support for three options:

- Maintaining the current 16-day season (approximately two weeks commencing on a Friday and ending on a Sunday);
- Increasing the season to 23 days (approximately three weeks); or
- Increasing the season to 37 days (approximately 5 weeks).

Maintaining the 16-day season would continue a precautionary, low risk approach to management and aid in the evaluation of the fisheries' recovery by providing a consistent effort constraint since 2003. In addition, given the steady increase in participation since the 2003 season, it is likely that the lower end of the 12 to 17 tonnes target catch would be achieved with a 16-day season.

However, a 16-day season would not alleviate any of the crowding and fisher conflict issues that have been reported to detract from the fishing experience, particularly around dams.

A 23-day season would result in the fishery being opened for an extra week and is thought to be a low-to-medium risk management option. A 23 day season is likely to result in the target catch range being achieved and may help to alleviate some of the crowding and fisher conflict issues that have been reported over the past few seasons.

However, if effort continues to grow over future seasons, a 23-day season may eventually result in catches exceeding the upper catch range of 17 tonnes. In addition, due to the influence of moon phases on marron catches, a 23-day season may not result in any material benefit to dam fisheries.

Anecdotal evidence suggests that during the full moon phase, marron in dams become less active and more easily 'spooked', which leads to a decline in catch rates. A complete lunar cycle takes approximately 28 days, of which 14 days is in full moon phase and 14 days in the new or 'dark' moon phase.

It has been suggested that snare fishers would only benefit by an increase in the season length if it were to encompass two complete new or 'dark' moon phases. For this to be accomplished, the season would need to be increased to a minimum of five weeks.

Increasing the season to 37 days (approximately five weeks) would spread effort over a greater timeframe and therefore alleviate overcrowding and fisher conflict that have occurred along the banks of popular locations. However as dams only constitute 20 to 30 per cent of the fishery and the remainder of the fishery is relatively unaffected by moon phases, there is a medium-to-high risk of catches exceeding the upper catch range of 17 tonnes.

If strong community support leads to an increase in the length of the marron season, the total catch from the fishery will need to be monitored closely. If catches exceed 17 tonnes and average catch rates decline once again, the RFFSS may be forced to close the fishery until the necessary research information becomes available to calculate annual harvest levels on which to base future management arrangements.

Proposal 3 - Season duration

In an effort to increase the overall quality of the marron fishery, while ensuring the sustainable management of the fishery by containing catches to within the proposed target catch range, the RFFSS is seeking to determine the level of community support for each of the following options:

- a) 16-day season – (current season length) maintaining a low risk precautionary approach to management and allowing some growth in the catch.
- b) 23-day season – a low-to-medium risk strategy to allow for increased fishing opportunities and an increase in the total catch.
- c) 37-day season – a medium-to-high risk strategy to allow for increased fishing opportunities and include two complete dark moon phases to benefit dam fisheries.

3.2.3 Season start date

The recreational marron season has traditionally commenced in January to coincide with the end of the species' reproductive season and the summer school holiday period. During the 2002 review, the working group considered a proposal to delay the start of the season until after the summer period on the basis that the most rapid growth phase for marron was over the summer months.

Although this proposal received a moderate level of support in submissions to the working group's discussion paper, the working group decided to defer any recommendations so the merits of a later season could be further evaluated. In revisiting this proposal, the RFFSS is strongly of the view that the marron season should be primarily focused around a holiday period to promote the fishery as a family-based activity and, where possible, be held over the dark phase of the moon.

Prior to the closure of the marron fishery in the late 1980s, the season was held over two periods - the summer school holidays and Easter. The RFFSS is now considering a proposal to return the fishery to an Easter-based season, which would also include an entire dark phase of the moon and often include the first term school holidays, depending on the season length.

The following table indicates the extent to which holiday periods and the dark moon phase would be included in a 23-day marron season commencing on Good Friday.

	Good Friday	Friday	Friday	Sunday
2007 Marron Season	06-Apr	13-Apr	20-Apr	29-Apr
Easter/School Hols				
Dark Moon Phase				
2008 Marron Season	21-Mar	28-Mar	04-Apr	13-Apr
Easter/School Hols				
Dark Moon Phase				
2009 Marron Season	10-Apr	17-Apr	24-Apr	03-May
Easter/School Hols				
Dark Moon Phase				
2010 Marron Season	02-Apr	09-Apr	16-Apr	25-Apr
Easter/School Hols				
Dark Moon Phase				

An Easter-based season would take advantage of the cooler, calmer climatic conditions often experienced during that time of the year. Milder temperatures and lighter winds would reduce the chance of bushfires igniting from campsites. The lighter wind conditions are also more conducive to snare fishing, as it is difficult to snare marron through a wind-affected water surface.

In addition, it has been suggested that a later season may benefit the fishery by providing additional food via marron baits to undersize marron not retained in the lead-up to the breeding season, thus enhancing the reproductive potential of marron.

However, there are also possible downfalls in having a later season. As autumn marks the end of the ‘dry’ summer period, water levels are often at their lowest. This can be exacerbated in dams and reservoirs as water is siphoned off for irrigation purposes over the summer months.

While less water may ‘concentrate’ marron, making them easier to catch, in certain areas of the fishery low water levels may also leave muddy banks exposed, making it difficult to access the water’s edge and concentrating fishers on reduced bank space. In addition, an increased likelihood of rain prior or during the season may result in run-off, causing the water to become turbid and reducing the ability to snare marron.

The following table gives an indication of how the marron season would relate to the summer school holiday period and the dark moon phase if it were to continue to commence in January for a 23-day period. Holding the marron season over the Christmas and New Year holiday period is not a valid option, due the increased likelihood of unsocial behaviour occurring over the festive period and the added difficulty in securing sufficient compliance resources.

	Friday	Friday	Friday	Sunday
2007 Marron Season	12-Jan	19-Jan	26-Jan	04-Feb
School Holidays				
Dark Moon Phase				
2008 Marron Season	04-Jan	11-Jan	18-Jan	27-Jan
School Holidays				
Dark Moon Phase				
2009 Marron Season	16-Jan	23-Jan	30-Jan	08-Feb
School Holidays				
Dark Moon Phase				
2010 Marron Season	08-Jan	15-Jan	22-Jan	31-Jan
School Holidays				
Dark Moon Phase				

The RFFSS is now seeking to determine the level community support to commence the season at Easter as opposed to the traditional January season. If there is sufficient community support, the RFFSS believes that an Easter-based season should be adopted for a two-year trial period, after which licence holder support should be re-evaluated.

Proposal 4 - Season start date

To enhance the overall quality of the recreational marron fishery the RFFSS is seeking to determine the level of community support for each of the following options;

- a) Commencing the marron season in January following the New Year holiday. This option would take in the summer school holiday period and the dark moon phase where possible, or
- b) Commencing the marron season at Easter. This option would take advantage of the milder climatic conditions and include the Easter holiday period and often include the first term school holiday period.

3.2.4 Possession limits

A possession limit is a key conservation measure that prevents the accumulation of excessive quantities of fish by individuals on a fishing trip, and sets a clear ceiling for socially acceptable catch levels. In recent years, a separate possession limit for finfish and abalone has been introduced as a fisheries management tool in WA.

Possession limits generally apply throughout WA and may also include a person's permanent place of residence. Any fish that a Fisheries and Marine Safety Officer considers to be in a person's ownership or control is taken to be in their 'possession'.

While there is no proposal to change the current daily bag limit of 10 marron per licensed fisher, the RFFSS is of the view that the introduction of an individual possession limit would deter unscrupulous fishers from taking and stockpiling large potentially saleable quantities of marron.

The RFFSS believes that an individual possession limit of between 20 and 30 marron should apply to a person outside of their permanent place of residence to enable fishers to accumulate a socially acceptable quantity of marron during a fishing trip.

Proposal 5 - Marron possession limit

To prevent fishers from stockpiling potentially saleable quantities of marron while still enabling the accumulation of socially acceptable quantities, the RFFSS is seeking to determine the level of community support for the introduction of a possession limit of either:

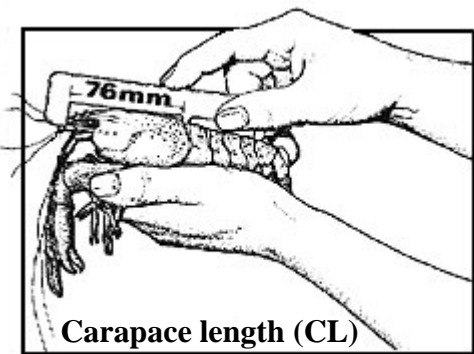
- a) 20 marron per person, or
- b) 30 marron per person.

Note: The general daily bag limit will remain at 10 marron per person.

3.2.5 Minimum legal size limits

Minimum size limits are usually based on the breeding biology of a species, and are set to protect fish, in this case marron until they reach maturity and have been able to spawn at least once. They can also be set to help enhance recreational fishing quality by increasing the average size of the fish available. Maximum size or slot limits are also useful for protecting large breeding fish, or reducing the ‘take’ of highly prized, and often rare, large specimens.

In the case of recreational marron fishery, size limits are measured from the tip of the rostrum to the back of the carapace. This measurement is often referred to as the ‘carapace length’, but scientists studying freshwater crustaceans often utilise another measurement known as the ‘orbital carapace length’ as the rostral horn can occasionally break.



A proposal to increase the minimum size limit (carapace length) for marron from 76 mm to between 80 mm and 90 mm was considered during the 2002 recreational marron review. This proposal received a high level of support in public submissions to the discussion paper. However, at the time the working group believed that the relative benefit of setting a higher minimum size limit needed further consideration.

While studies have show that the current minimum size limit of 76 mm (carapace length) offers adequate protection for breeding stock in most marron populations (Moloney *et al.* 2003), it has been suggested that a larger minimum size may increase the productivity and improve the overall quality of the fishery in a number of ways.

Firstly, most marron populations mature at a size that is well below 76 mm, thus enabling females to reproduce before being legally taken. However, the actual number of eggs produced by each female (known as the fecundity) increases with the size of the female.

An increase in the minimum size limit for marron could result in an increase in the overall egg production, which in turn might lead to an increase in abundance of marron in parts of the fishery that could support a larger population. However, these increases in fecundity of individual females will be offset by natural mortality occurring during the extended period in the fishery.

Increasing the minimum size limit would also have the added benefit of significantly increasing the whole weight of an individual daily bag limit. For example a bag limit of 10 just legal-size marron (76 mm) weighs approximately 1.150 kg. If the size limit were increased to 82 mm, a bag limit of 10 marron would weigh approximately 1.460 kg, which would equate to about 27 per cent more marron by weight.

Carapace length (mm)	Estimated weight 10 marron (kg)
76	1.150
80	1.350
82	1.460
85	1.635
90	1.960

Although an increase in the minimum size limit could improve production from the marron fishery, it is unlikely that any significant improvements will be seen in the first few years. In fact, the relative abundance of legal size marron would decrease in the first year, as it may take over a year for some 76 mm marron to grow through to a new size limit of (for example) over 80 mm.

After considering the merits of changing the minimum legal size limit, the RFFSS is of the view that in the long term a larger minimum size limit would increase the number of young produced per female, but may not necessarily increase recruitment to the fishery owing to natural mortality losses of broodstock.

The RFFSS is also aware that the current FRDC-funded research project is designed to answer this question of the net benefits of a higher size limit and proposes to wait for the outcomes of this work before (potentially) recommending any changes.

In the interim, the RFFSS is seeking to determine the level of community support for a higher minimum size limit for marron if the current FRDC-funded research project indicates the fishery will be benefited by an increase in the size limit.

Proposal 6 - Minimum legal size limit

The Department of Fisheries is currently evaluating the net benefits of a higher size limit on the marron fishery. Subject to the outcomes of this study the RFFSS is seeking to determine the level of community support for an increase (or otherwise) in the minimum legal size limit (carapace length) for marron to:

- a) 76 mm – i.e. no change to the existing minimum legal size limit.
- b) 80 mm
- c) 82 mm
- d) 85 mm
- e) Other minimum legal size limit.

3.3 Management of specific water bodies

3.3.1 Hutt River

A study into the biology of a translocated population of marron in the Hutt River was recently undertaken by Murdoch University (Beatty *et al.* 2004). The Hutt River is located north of Geraldton and hosts WA's northernmost marron population. Due to the Mediterranean climate of the region, the water temperature is substantially warmer than that found within the marron's natural range.

The study revealed that the warmer waters of Hutt River caused marron to grow faster and mature at a larger size than their southern counterparts. More importantly, female marron were found to mature (L_{50}) at about 97.9 mm (carapace length) which is well above the current minimum size limit of 76 mm (carapace length).

The study suggested that while the relatively small Hutt River fishery supported an estimated 400 fishers, the fishing pressure was concentrated due to limited distribution of marron within the system. As fishing pressure is likely to increase in the future, the study concluded that the minimum legal size limit should be increased to ensure the sustainability of this translocated population.

While the study indicated a relative abundance of over 90 mm-long marron in the Hutt River system, there were few marron over 100 mm in length present. Rather than recommending an increased size limit of approximately 98 mm to fully protect female breeding stocks but essentially close the fishery, the RFFSS is of the view that Hutt River should also be managed as a 'Trophy Water', with a size limit of 90 mm and a bag limit of five.

A size limit of 90 mm and a bag limit of five marron would offer increased protection, while enabling fishers continued access to marron stocks during the season. Having the same management arrangements for all 'Trophy Waters' would also aid in ease of fisher education about marron rules.

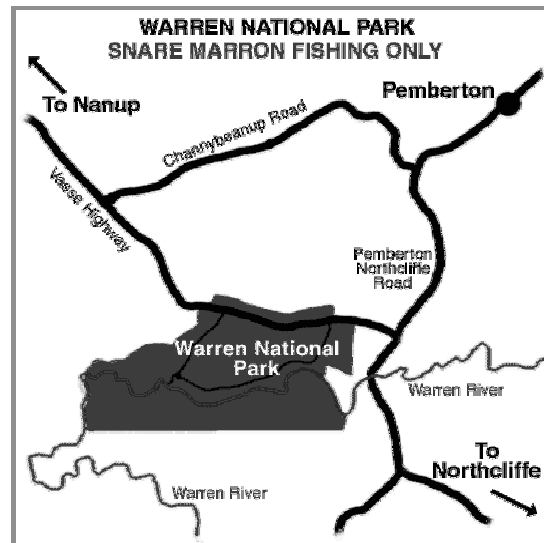
Proposal 7 - Hutt River

To provide increased protection for marron breeding stocks the Hutt River should be managed as a 'Trophy Water', with a bag limit of five marron and a minimum size limit of 90 mm applying.

3.3.2 Warren River

In 1990 the section of the Warren River within the Warren National Park was declared a 'snare-only' fishery to reduce the effects of high levels of effort and to promote snare fishing as a family-orientated activity.

The Warren River is typical of many of the State's southwest rivers with steep banks, deep pools and dark tannin-stained waters, all combining to make the river uncondusive to snare fishing. As a result the snare-only requirement has inadvertently closed this section of the river to the recreational marron fishery.



In addition, where sections of the river form the National Park's boundary, the snare-only requirement only applies to one side of the river. This has lead to confusion among some marron fishers as to where the snare-only section of the river commences.

After reviewing the snare-only requirement for the Warren River, the RFFSS is of the view that this section of the river should be 'reopened' to the marron fishery once again by permitting the use of marron drop nets and scoop nets within the Warren National Park.

Proposal 8 - Warren River

To reduce the confusion over the boundaries of the Warren River National Park and enable fishers to use marron drop nets and scoop nets, the 'snare-only' requirement should be removed from the Warren River within the Warren National Park.

3.3.3 Donnelly River

The lower reaches of the Donnelly River is relatively inaccessible by land, as this part of the river runs through dense vegetation within the D'Entrecasteaux National Park. While marron fishers can access this section of the river by boat from 'Boat Landing', the current regulations prohibit marron drop and scoop nets being carried in a boat, making fishing this once popular section of the river extremely difficult.

Fishers can legally transport marron snares by boat to their chosen location, but the steep banks and dark tannin-stained waters make the river unsuitable for snaring.

The RFFSS is now considering a proposal to allow marron drop nets and scoops to be transported by boat in the area of the Donnelly River downstream of Boat Landing. The use of a boat to actively fish for marron will still remain prohibited. Whilst there still remains limited opportunities to access the shore without a boat, the RFFSS is cautious that relaxing

the rules for this section of the river may provide fishers with an incentive to fish from a boat.

In the past, Fisheries and Marine Safety Officers have reported a number of incidences where fishers have been apprehended using their boat to actively fish for marron with drop nets or scoop nets in this section of the Donnelly River. The RFFSS is now seeking to determine the level of public support for this proposal before giving it further consideration.

If this proposal is supported and Fisheries and Marine Safety Officers continue to observe non-compliant fishing activities in the future, the RFFSS will recommend that this allowance be immediately revoked.

Proposal 9 - Donnelly River

To enable marron fishers to access the relatively inaccessible sections of the Donnelly River, fishers should be permitted to carry marron drop nets and scoop nets by boat to the area that they intend to fish (down stream of 'Boat Landing' only). The use of a boat to actively fish for marron with drop nets and scoop nets will remain prohibited.

3.3.4 Shannon River

The Shannon River is considered to be one of the few remaining pristine riverine systems in the State's southwest corner. The river is situated entirely within the Shannon National Park and flows into the Broke Inlet on the south coast. Unlike most other river catchments in the southwest, the National Park provides a buffer zone which shields the river from agricultural and rural practices that may impact on water quality.

In 1990 the Shannon River was declared a 'snare-only' fishery to reduce the effects of high levels of fishing pressure. Due to its isolation and inaccessibility, and the fact that the Shannon River has proved unsuitable for snare fishing, the take of marron from the river is now thought to be insignificant.

The RFFSS is of the view that the Shannon River and its tributaries could be permanently closed to marron fishing and managed as a representative un-fished fishery. Closing the entire river system would provide an area for research where the impact of environmental factors, such as climatic changes and variations in rainfall, could be studied in the absence of fishing pressure. However, this proposal would provide a small reduction in the current overall marron catch.

If the proposal to permanently close this area to marron fishing is supported, extra resources will need to be allocated for compliance and the establishment of a long-term research monitoring program to evaluate the effectiveness of the closure and the impact of environmental factors on the marron stock.

Proposal 10 - Shannon River

The RFFSS is seeking to determine the level of community support to permanently close the Shannon River to provide a system that can be utilised to assess the impact of environmental factors on a marron stock in the absence of fishing pressure and predation from introduced fish.

3.4 Protecting and enhancing the quality of the marron fishery

3.4.1 Management of dams

While factors such as increased fishing pressure, reduced rainfall, habitat loss, exotic and feral fish and reduced water quality from agricultural and land management practices have contributed to the decline in marron stocks over the past few decades, the loss of access to dams has also has a significant impact on the total available catch.

In recent years, reservoirs such as Harris, Stirling and Samson have progressively been closed to recreational fishing, as they have been brought on-line as drinking water supply dams. With Government facing the challenge of satisfying Western Australia's increasing demand for water, it is likely that additional closures or increased diversion of water away from the remaining dams where fishing is still permitted may be considered in the future.

The impact of marron fishing within drinking water supply dams is a low-risk issue which should be fully assessed before any dam is closed to fishing. It should be noted that in many parts of Australia and overseas, responsible recreational fishing is permitted in domestic water supply dams.

While water allocation for domestic and irrigation purposes is a priority, where possible the timing and rate of water diversion from these dams should be managed and a risk assessment undertaken to accommodate the recreational marron fishery where it has a minimal impact on water quality.

To ensure the long-term future of recreational fishing at popular locations such as the Waroona Dam and Harvey Weir, the RFFSS believes that a formal Memorandum of Understanding should be developed between the Department of Fisheries and the relevant water authorities. The Memorandum of Understanding should cover an agreed strategy towards future water allocation decisions and risk assessment procedures, and be designed to minimise the impact on the quality of the recreational marron fishery.

Proposal 11 - Management of dams

To ensure the long-term future of recreational fishing in dams where fishing is currently permitted, a formal Memorandum of Understanding should be developed between the Department of Fisheries and the relevant water authorities. The Memorandum of Understanding should cover an agreed risk assessment process for the water authorities and the Department of Fisheries, and a strategy towards future water allocation decisions, designed to minimise the impact on the quality of the recreational marron fishery.

3.4.2 Restocking as a stock enhancement strategy

While the management of wild marron stocks should be the primary focus for recreational fisheries management, restocking could be considered as a stock enhancement strategy in the future, if external factors such as rainfall and land management practices continue to impact on the fishery.

In recent years, some people have put forward the view that 'restocking' of marron fisheries using hatchery-reared juveniles should be used to boost stocks or to fast-track the recovery of stocks following a particular event such as the draining of a water body. While restocking has the potential to increase stocks within the carrying capacity of water bodies, experiences in the USA and Canada have shown that large-scale restocking can cause the collapse of some wild stocks.

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

Some of the issues that need to be considered before restocking is selected as a means of enhancing fisheries include:

- Knowledge of the status of the wild stock;
- Survival rates of hatchery juveniles;
- Interaction between hatchery-reared marron and wild populations; and
- Risks posed by diseases sometimes generated in hatchery systems.

The viability of restocking as a stock enhancement strategy was recently assessed when Waroona Dam was drained for refurbishment in 2002 (Molony *et al.* 2005). The Water Corporation funded a major destocking and restocking exercise that was conducted as a joint project between Murdoch University and the Department of Fisheries with support from Alcoa.

Immediately prior to the draining of the dam, marron were destocked and moved to purpose-built ponds at the Pemberton Freshwater Research Centre and Alcoa's Willowdale marron farm, where a captive breeding program was initiated.

Once the refurbishment was completed and the dam allowed the refill, several year-classes of captive-bred marron, along with the original brood stock, were incrementally reintroduced into the reservoir. Recent surveys of Waroona Dam suggest that the marron population has now re-established itself.

While the Waroona Dam project is a good example of how restocking can be used to rebuild a fishery through a captive breeding program, the significant cost and the risk to the genetic integrity of the 100 or so individual marron stocks throughout the State may prevent more widespread application of this strategy.

The translocation of marron from healthy populations to depleted areas within the same catchment could be another option for stock enhancement in the future. If this option were to be considered, a structured and supervised destocking program would need to be developed.

Provided that marron were sourced from within catchment areas, translocation could provide a cost-effective alternative to captive breeding, while minimising genetic risks to wild stocks.

To ensure the ongoing survival of each of the major sub-stocks or species of marron, the Department of Fisheries is now maintaining small captive populations at the Pemberton Freshwater Research Centre, including one of the Margaret River ‘hairy’ marron. This program will produce small numbers of marron juveniles annually, which can be used for small-scale enhancement in future years.

Proposal 12 – Restocking marron as a stock enhancement strategy

Restocking of marron via a captive breeding program or via translocation should be considered as a strategy to assist with the recovery of a stock where it can be identified that the stock has been significantly depleted, and its recovery is endangered or will be prolonged.

To minimise any ecological impacts, all stock enhancement projects should be assessed against disease risk, biodiversity and genetic diversity criteria. Any stock enhancement project should use stock from the existing water catchment and also be adequately monitored and evaluated.

3.4.3 Artificial habitat

The level of suitable marron habitat found in rivers and dams will significantly influence the survival of juvenile marron and, overall, the carrying capacity (of marron) of a water body. It is common practice for all potential marron habitat, such as tree stumps and other debris, to be removed from a drainage basin during the construction phase of most dams to prevent the possibility of future outlet blockages.

These habitat-denuded environments offer little protection for juvenile marron from predators such as redfin perch and to a lesser extent trout (Molony *et al.* in press). In an effort to improve the survival of juvenile marron, several artificial habitat experiments have been conducted in waters including Harvey Weir and Waroona Dam (Molony *et al.* 2005).

The study showed that marron rapidly populated artificial habitats (‘concentration effect’) and that small newly-recruited marron also utilised the pipe and tile habitat (‘productivity effects’). The study concluded that artificial habitats increased the suitability of reservoirs for marron and are likely to lead to increased marron productivity as a consequence of reduced natural or predation mortality.

Given the positive outcomes of the study, the RFFSS is of the view that funding should be sought for the installation, monitoring and evaluation of artificial habitat in other suitable dams within the marron fishery. The installation of any artificial habitat should be negotiated with the relevant authorities and constructed in accordance with water body management plans.

Proposal 13 – Artificial habitats

To improve the survival of juvenile marron and increase the overall productivity of marron waters, funding should be sought for the installation, monitoring and evaluation of artificial habitat in dams identified to be lacking in natural habitat. The installation of any artificial habitat should be negotiated with the relevant management authorities and constructed in accordance with water body management plans.

3.5 Improving community stewardship – education and compliance

3.5.1 Marron as a freshwater faunal emblem

In recognition of the unique place of marron in Western Australia's freshwater ecology and the high social value of the fishery as part of the heritage of all Western Australians, the RFFSS believes that marron should be declared as a State emblem. There are currently four State emblems in Western Australia; the kangaroo paw (floral emblem), the numbat and black swan (faunal emblems) and the Gogo fish (fossil emblem).

Declaring marron as the State's freshwater faunal emblem would both enhance the species profile and raise public awareness about its plight in the face of a changing ecosystem. This initiative will need to be progressed through the Department of Culture and the Arts prior to marron being recommended to Cabinet for proclamation as the Western Australian State freshwater faunal emblem.

Proposal 14 – State freshwater faunal emblem

In recognition of the unique place of marron in Western Australia's freshwater ecology and the high social value of the fishery as part of the heritage of all Western Australians, marron should be declared as a State freshwater faunal emblem.

3.5.2 Community education strategy

Education strategies currently in place for the recreational marron fishery include the distribution of advisory material to all licence holders, targeted pre-season media releases, roadside information displays by Fisheries and Marine Safety Officers and Volunteer Fisheries Liaison Officers, and marron fishing workshops at popular fishing locations during the season.

These strategies are supported by focused compliance investigations into specific incident reports, and high penalties under the *Fish Resource Management Act 1994* and *Fish Resource Management Regulations 1995* for many offences. Fisheries and Marine Safety Officers are empowered to issue warnings, infringement notices or to take prosecution action as compliance responses to detected breaches of fisheries legislation.

With the future quality of the recreational marron fishery largely dependent on the majority of the public voluntarily abiding by fishing rules, a structured communications and

community education plan is needed that focuses on the issues pertinent to the recreational marron fishery.

Such a plan should seek to ensure the recreational fishing community is properly informed of management decisions, and is given a clear lead on the values and attitudes that will assist in sustaining marron stocks.

The plan should also seek to help develop broad community recognition of the value of the recreational marron fishery, as well as promote community support for responsible fishing behaviour and key management initiatives.

The plan should clearly identify key target groups, the strategies by which these will be kept informed, and performance indicators by which the effectiveness of the plan can be assessed.

The plan must be able to deliver educational messages to marron fishers when they are fishing. This is the time fishers are most receptive to receiving conservation messages on fishing. There are also significant educational benefits in maximising the direct involvement of community groups and recreational fishers in planning and implementing structured education programs.

A key element in the communications plan for the recreational marron fishery should include the development of a comprehensive and widely-available marron fishing guide to replace the brochure currently produced by the Department of Fisheries.

The revised marron fishing guide would need to be supported by a comprehensive Internet website, effective advertising and media communication strategies that target regional media, and an annual media campaign.

The production of practical educational tools in adequate quantities, including measuring gauges and fishing venue signs, is also essential to getting the message across to marron fishers where and when it is most relevant.

Proposal 15 – Community education plan for the recreational marron fishery

A community education plan should be developed for the recreational marron fishery that focuses on the most important issues and areas within the fishery. Such a plan should seek to keep the recreational fishing community informed of management decisions, give a clear lead on the values and attitudes which will assist in sustaining marron stocks, and develop a broad community recognition of the value of the marron fishing. As a minimum, the plan should contain the following elements.

- *Marron fishing guide:* A comprehensive fishing guide should be produced to inform and educate fishers about the management arrangements for the marron fishery, fishing ethics, research, conservation issues and promoting stewardship for marron stocks and the environment.
- *Marron gauges and other educational resource materials:* Adequate quantities of practical educational tools, such as measuring gauges and fishing venue signs, should be produced to support the marron fishing guide.
- *Annual media campaign:* An annual media campaign should be implemented to promote marron fishing and fishing ethics.

- *Volunteer involvement in education:* Volunteer groups should be encouraged to continued their involvement in structured fisheries education activities for the marron fishery.

3.5.3 Field management and compliance

A number of surveys have indicated that there has been a significant positive change in community attitudes and behaviours towards recreational fishing in recent years (Baharthah 2004). The vast majority of the recreational fishing community are abiding by fish conservation controls most of the time.

However, compliance officers still report that there are small numbers of fishers who continue to fish irresponsibly and take excessive quantities of marron. Fisheries compliance officers have also stated that deliberate and repeated non-compliance by its nature was difficult to observe without detailed surveillance and investigation programs.

Community feedback indicates that the level and strength of community support for fish stock conservation is linked to the frequency of a visible fisheries management presence, as well as an effective education program, supported by freely available and clearly constructed educational resource material, such as brochures.

Community feedback also indicates that there is widespread support for an enhanced presence of Fisheries and Marine Safety Officers to provide a more effective deterrent to illegal and irresponsible fishing behaviours, and to strongly reinforce the positive community attitudes and behaviours needed to ensure fish for the future.

In recent years, Fisheries and Marine Safety Officers based in Geraldton, Dongara, Jurien, Lancelin, Fremantle, Mandurah, Bunbury, Busselton, Albany and Esperance have conducted fisheries compliance and education activities in the southern inland bioregion. Volunteer Fisheries Liaison Officers (VFLOs) located in major coastal centres also assist these officers with educational and research activities, but VFLOs are generally not permitted to accompany compliance officers on fishing patrols, due to the high-risk nature of night-time operations in isolated areas.

The major non-compliance risks for the recreational marron fishery include illegal fishing during the closed season, the use of illegal fishing gear, use of scoop nets and drop nets in 'snare only' waters, illegal fishing in closed Water Corporation catchment dams, and the theft of marron from dams on private property and licensed aquaculture sites.

The introduction of a recreational fisheries mobile patrol in the southern region has greatly assisted with compliance service delivery and the implementation of the new fishing rules that resulted from the 2002 review of the marron fishery.

Compliance patrols were focused around Wellington, Logue Brook, Drakes Brook, Big Brook, Harvey, Stirling, Canning, Wungong, Glen Mervyn and Waroona Dams and the Blackwood, Collie, Warren, Murray, Margaret, Preston, Donnelly, Hutt, Brunswick and Shannon Rivers.

During 2003/04, Fisheries and Marine Safety Officers delivered 1,997 hours of compliance work directed towards the recreational marron fishery. This resulted in 1,478 contacts with recreational fishers and led to 22 verbal warnings, 13 infringement warnings and seven infringement notices, with a further 12 cases resulting in the prosecution of recreational fishers.

During the opening of the 2005 marron season, Department of Fisheries staff and VFLOs conducted a marron fishing workshop at Harvey Weir that successfully attracted over 50 interested fishers. The workshop explained current fishing rules, demonstrated fishing techniques and promoted the 'fish for the future' message.

With the development of a five-year management strategy for the marron fishery, the RFFSS believes that performance measures for compliance hours directed towards the marron fishery should be developed. The RFFSS believes that due to the vulnerable state of the marron stocks, a compliance target of 2,500 hours should be possible within existing resource allocations.

Proposal 16 – Field management and compliance

To maximise the effectiveness of the five-year management plan for the recreational marron fishery, the Department of Fisheries should aim to deliver at least 2,500 hours towards field compliance and education, both during and outside of the marron season.

QUESTIONNAIRE

A QUALITY FUTURE FOR THE RECREATIONAL MARRON FISHERY

NAME: _____

RESIDENTIAL ADDRESS: _____

_____ POST CODE: _____

Please indicate your response by
marking one box with a tick (✓)

Any additional comments you may care to make
can be made in the space provided.

Please feel free to add additional pages of comments
if insufficient space is available.

HAVE YOUR SAY

This questionnaire provides an opportunity for you to express your opinion on how our recreational marron fishery should be managed. This questionnaire must be read in conjunction with the discussion paper 'A Quality Future for the Recreational Marron Fishery' (Fisheries Management Paper No. 198).

You may use this *proforma* response or complete a written submission when considering the proposals contained in the discussion paper. It is equally important to respond whether you agree or disagree with the various management proposals.

Within the *proforma*, space is provided for written comments on the proposals.

Information for management

Proposal 1 - Priorities for research

To enable the estimation of Maximum Sustainable Yield (MSY) and the setting of an appropriate Total Allowable Catch (TAC) for the marron fishery each season, the following research is needed:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
The continuation of the logbook and phone survey methods so that quality time-series information is maintained to provide estimates of total catch and effort.					
The development of a more cost-effective fishery-independent method for estimating (relative) abundance of marron in representative water bodies and to provide a tool to evaluate the effects of management changes within the recreational marron fishery.					
Studies on the size at maturity for a range of representative water bodies throughout the recreational marron fishery.					
A monitoring program to measure the annual volume of water available to the marron stocks so that compensating changes to management can occur.					

<p><i>Comments:</i></p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>

Managing the catch and breeding stock protection

Proposal 2 – Target catch range

Based on the available research data and the knowledge of the marron fishery, it is proposed that:

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
The marron fishery should be managed to a target catch of between 12 and 17 tonnes. It should be noted that under current management arrangements the estimated recreational catch is around 9 to 12 tonnes. If the catch exceeds 17 tonnes or falls below 12 tonnes, this will be a 'trigger' for management action.					

<i>Comments:</i>

Proposal 3 - Season duration

In an effort to increase the overall quality of the marron fishery, while ensuring the sustainable management of the fishery by containing catches to within the proposed target catch range, the Recreational Freshwater Fisheries Stakeholder Sub-committee (RFFSS) is seeking to determine the level of community support for each of the following options:

	Please tick your preferred option only
<i>16-day season</i> – (current season length) maintaining a low risk precautionary approach to management and allowing some growth in the catch.	
<i>23-day season</i> – a low-to-medium risk strategy to allow for increased fishing opportunities and an increase in the total catch.	
<i>37-day season</i> – a medium-to-high risk strategy to allow for increased fishing opportunities and include two complete dark moon phases to benefit dam fisheries.	
<i>Other</i> – please provide an alternate option.	
<i>Don't know</i> – please tick if you are unsure.	

<i>Comments:</i>

Proposal 4 - Season start date

To enhance the overall quality of the recreational marron fishery, the RFFSS is seeking to determine the level of community support for each of the following options:

	<i>Please tick your preferred option only</i>
<i>Commencing the marron season in January following the New Year holiday. This option would take in the summer school holiday period and the dark moon phase where possible.</i>	<input type="checkbox"/>
<i>Commencing the marron season at Easter. This option would take advantage of the milder climatic conditions and include the Easter holiday period and often include the 1st term school holiday period.</i>	<input type="checkbox"/>
<i>Other – please provide an alternate option.</i>	<input type="checkbox"/>
<i>Don't know – please tick if you are unsure.</i>	<input type="checkbox"/>

<p><i>Comments:</i></p> <hr/> <hr/>

Proposal 5 - Marron possession limit

To prevent fishers from stockpiling large potentially saleable quantities of marron while still enabling the accumulation of socially acceptable quantities, the RFFSS is seeking the level of community support for the introduction of:

	<i>Please tick your preferred option only</i>
A possession limit of 20 marron per person.	<input type="checkbox"/>
A possession limit of 30 marron per person.	<input type="checkbox"/>
Other – please provide an alternate option.	<input type="checkbox"/>
Don't know – please tick if you are unsure.	<input type="checkbox"/>

Note: The general daily bag limit will remain at 10 marron per person.

<p><i>Comments:</i></p> <hr/> <hr/>

Proposal 6 - Minimum legal size limit

The Department of Fisheries is currently evaluating the net benefits of a higher size limit on the marron fishery. Subject to the outcomes of this study, the RFFSS is seeking to determine the level of community support for an increase (or otherwise) in the minimum legal size limit (carapace length) for marron to:

	<i>Please tick your preferred option only</i>
76 mm – no change	
80 mm	
82 mm	
85 mm	
Don't know	
Other – please provide an alternate option.	

<p><i>Comments:</i></p> <hr/> <hr/>

Management of specific water bodies

Proposal 7 - Hutt River

To provide increased protection for marron breeding stocks, the Hutt River should be managed as a 'Trophy Water', with a bag limit of five marron and a minimum size limit of 90 mm applying.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Bag limit of five marron per person					
Minimum size limit of 90 mm					

<p><i>Comments:</i></p> <hr/> <hr/>

Proposal 8 - Warren River

To reduce the confusion over the boundaries of the Warren River National Park and enable fishers to use marron drop nets and scoop nets:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
The 'snare-only' requirement should be removed from the Warren River within the Warren National Park.					

Comments:

Proposal 9 - Donnelly River

To enable marron fishers to access the relatively inaccessible sections of the Donnelly River:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Fishers should be permitted to carry marron drop nets and scoop nets by boat to the area that they intend to fish (down stream of 'Boat Landing' only). The use of a boat to actively fish for marron with drop nets and scoop nets will remain prohibited.					

Comments:

Proposal 10 - Shannon River

The RFFSS is seeking to determine the level of community support to permanently close the Shannon River, to provide a system that can be utilised to assess the impact of environmental factors on marron stocks in the absence of fishing pressure and predation from introduced fish.

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
The Shannon River and its tributaries should be permanently closed to marron fishing.					

Comments:

Protecting and enhancing the quality of the marron fishery

Proposal 11 - Management of dams

To ensure the long-term future of recreational fishing in dams where fishing is currently permitted, a formal Memorandum of Understanding should be developed between the Department of Fisheries and the relevant water management authorities. The Memorandum of Understanding should cover an agreed risk assessment process for the water authorities and the Department of Fisheries, and a strategy towards future water allocation decisions, designed to minimise the impact on the quality of the recreational marron fishery.

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
A formal Memorandum of Understanding should be developed between the Department of Fisheries and the relevant water management authorities. The Memorandum of Understanding should cover an agreed risk assessment process and a strategy towards future water allocation decisions, designed to minimise the impact on the quality of the recreational marron fishery.					

Comments:

Proposal 12 –Restocking marron as a stock enhancement strategy

Restocking of marron via a captive breeding program or via translocation should be considered as a strategy to assist with the recovery of a stock where it can be identified that the stock has been significantly depleted, and its recovery is endangered or will be prolonged.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
To minimise any ecological impacts, all stock enhancement projects should be assessed against disease risk, biodiversity and genetic diversity criteria. Any stock enhancement project should also be adequately monitored and evaluated.					

Comments:

Proposal 13 – Artificial habitats

To improve the survival of juvenile marron and increase the overall productivity of marron waters:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Funding should be sought for the installation, monitoring and evaluation of artificial habitat in dams identified to be lacking in natural habitat. The installation of any artificial habitat should be negotiated with the relevant management authorities and constructed in accordance with water body management plans.					

Comments:

Improving community stewardship – education and compliance

Proposal 14 – State freshwater faunal emblem

In recognition of the unique place of marron in Western Australia’s freshwater ecology and the high social value of the fishery as part of the heritage of all Western Australians:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Marron should be declared as a State freshwater faunal emblem.					

<i>Comments:</i>

Proposal 15 – Community education plan for the recreational marron fishery

A community education plan should be developed for the recreational marron fishery that focuses on the most important issues and areas within the fishery. Such a plan should seek to keep the recreational fishing community informed of management decisions, give a clear lead on the values and attitudes which will assist in sustaining marron stocks, and develop a broad community recognition of the value of the marron fishing.

As a minimum, the plan should contain the following elements:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Don't Know</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
<i>Marron fishing guide:</i> A comprehensive fishing guide should be produced to inform and educate fishers about the management arrangements for the marron fishery, fishing ethics, research, conservation issues and promoting stewardship for marron stocks and the environment.					
<i>Marron gauges and other educational resource materials:</i> Adequate quantities of practical educational tools, such as measuring gauges and fishing venue signs should be produced to support the marron fishing guide.					

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
<i>Annual media campaign:</i> An annual media campaign should be implemented to promote marron fishing and fishing ethics.					
<i>Volunteer involvement in education:</i> Volunteer groups should be encouraged to continue their involvement in structured fisheries education activities for the marron fishery.					

Comments:

Proposal 16 – Field management and compliance

To maximise the effectiveness of the five-year management plan for the recreational marron fishery:

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
The Department of Fisheries should aim to deliver at least 2,500 hours towards field compliance and education, both during and outside of the marron season.					

Comments:

Where and when to send your submission

The closing date for submission is **16 December 2005**. Please detach this questionnaire and send your submission along with your full name, address and association details (if applicable) to:

Executive Officer
 Recreational Marron Fishery Review
 C/- Recreational Fisheries Program
 Department of Fisheries
 Locked Bag 39
 Cloisters Square Post Office
 PERTH WA 6850

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