

Recreational Fisheries

Southern Inland Bioregion

Regional Management Overview

The major species fished recreationally in southern inland waters are native marron, trout stocked by Fisheries WA into public dams and rivers, and red-fin perch, an introduced, self-perpetuating exotic stock. The native freshwater cobbler is also taken in small numbers, as are black bream artificially stocked into some inland impoundments.

The recreational fishery for Western Australia's native freshwater crayfish, the marron (*Cherax tenuimanus*), operates in freshwater dams and rivers throughout the south of the State. Stocks of marron have been extended well beyond their original range through translocation, and can now be found as far north as Hutt River near Geraldton and as far east as Esperance.

A recreational fishing licence is required to take marron. Other fishing controls include bag and size limits, gear controls and a closed season. The fishing season is in January–February each year.

'Snare-only' waters were first introduced in the 1990 season, and have received widespread support from fishers. A number of areas have now been set aside for snaring only, which has had the beneficial effect of reducing fishing effort and improving the size of the marron caught.

Major concerns with the marron fishery relate to its ability to withstand the existing level of fishing pressure, particularly in low rainfall periods as has occurred during 2001.

Fishing for trout and other freshwater fish species (other than for crustaceans) in waters south of latitude 29° S requires a freshwater angling licence. People under 16 years of age are not required to hold a licence.

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

A trout stocking committee, established in 1994 to maximise angler returns on fish available for stocking into public waterways, continued to operate successfully during 2000/2001. The committee consists of agency officers including the manager of the South West Freshwater Research and Aquaculture Centre (SWFRAC) in Pemberton, and representatives from RFAC, the WA Trout and Freshwater Angling Association and the general freshwater angling public.

Regional Compliance and Community Education Overview

Recreational fishing compliance and education in the southern inland bioregion was carried out by Fisheries Officers stationed in Geraldton, Fremantle, Mandurah,

Bunbury, Busselton and Albany with the assistance of Volunteer Fisheries Liaison Officers based in major coastal centres. The statistics on Fisheries Officers' compliance work and VFLO contacts do not differentiate between coastal and inland activities. Consequently, their activities in the southern inland bioregion will have been incorporated in the statistics for the south and west coast bioregions.

In the marron fishery the highest risks of non-compliance with the management arrangements were illegal fishing before the season opening in January, use of illegal fishing gear, use of nets in recently declared 'snare-only' waters, illegal fishing in closed Water Corporation catchments, and complaints of illegal fishing on private property.

In the trout fishery a number of complaints were received regarding the use of bait in 'artificial lure only' waters, exceeding bag limits, and the take of fish prior to the season opening.

Regional Research Overview

Research for managing and enhancing the State's southern freshwater fisheries for marron and trout has been largely undertaken by Fisheries WA. In addition, collaborative university projects have provided data on red-fin perch and freshwater cobbler and their relationships to the small native freshwater species.

Recreational Marron Fishery

RESEARCH SUMMARY

Detailed research on the marron stocks in south-west rivers and estuaries has been undertaken since the 1970s and 1980s. Current research involves the scientific monitoring of stock levels both before and after the summer fishing season, surveys of catches taken by recreational licence holders and volunteer logbook holders, and joint sampling with individual catchment groups. These data enable trends in stock levels to be monitored and recommendations to be made for adjustments to fishery management when necessary. Data are reported in an annual report on the recreational marron fishery and a supporting fisheries assessment document. The following status report is based on these research findings.

Licensed Recreational Marron Fishery Status Report

Prepared by B. Molony

FISHERY DESCRIPTION

Boundaries and access

The recreational marron fishery extends from the Hutt River north of Geraldton to waters near Esperance. There is a specific annual licence for the open season during January and February. In 2000 the season was open between 9 January and 29 February.

Some waters have been declared 'snare-only' in order to reduce the effect of high levels of effort placed on these water bodies. These waters are: Warren River National Park (since 1990); Shannon River (1990); Margaret River (1993); Harvey Weir (1994); Wellington Dam (1996); and Samson Dam (1996).

Main fishing method

One scoop net (preferred for dams), or six drop nets (rivers), or one bushman's pole snare (snaring only applies to some waters). Anglers can only use one gear type at a time. Dimensions and mesh sizes of the scoop and drop nets are specified in an information brochure sent annually to licence holders. All methods involve bait, which is typically chicken layer pellets.

RETAINED SPECIES

Recreational catch (season 2000): **25 tonnes**

An estimated total of 200,000 legal-sized marron (minimum of 25 tonnes) were taken in the 2000 season (1999: 158,000 marron, 19.7 tonnes; 1998: 206,000 marron, 25 tonnes) (Recreational Marron Figure 1).

Fishing effort

The number of licences issued for the 2000 season was 21,894, with an estimated 11,493 of these (unusually low at 53%) used to make one or more trips, at an estimated average of 3.6 trips/licence holder. (1999: 21,330 licences, with 13,899 (65%) used to make one or more trips.) A total of approximately 40,835 trips were made, comprising an estimated 12,027 trips to dams and 28,808 trips to rivers. (1999: 40,910 total trips, with 12,675 trips to dams and 26,662 trips to rivers.)

Catch rate

The average catch rate in 2000 was estimated at 4.89 legal-sized marron per licence holder per night (1999: 3.84). The increase in the catch rate over that recorded for the 1999 season may be due to the lower overall participation rate, with more marron available for fewer fishers. However, information for the 2000 season was generated using a slightly different telephone survey technique which may have caused a minor bias in estimated catch rates. Catch per unit effort data continues to show a long-term decline that appears unlikely to recover to historic levels (Recreational Marron Figure 2).

Commercial share: **Nil**

There is no commercial fishery for marron.

Stock assessment completed: **Yes**

As the marron fishery operates on a series of discrete river and dam stocks where growth and productivity differ, the stock assessment process treats the river and dam sectors separately. Further, stock levels are affected by rainfall patterns, with higher winter rainfall resulting in larger catches in subsequent marron seasons. Marron catch and effort data are collected and assessed from logbook records from recreational fishers, an end-of-season telephone survey of licence holders, and pre- and post-season research sampling.

Total numbers of landed marron are calculated by using the mean number caught per trip from the logbook and

phone survey data. This number is then multiplied by the number of active licence holders.

A minimum total weight of landed marron is calculated using the average weight of a legal-sized marron (76 mm carapace length – 125 g) to convert the estimated catch in numbers to biomass. As a result, the total catch in weight may be an under-estimate as larger, and therefore heavier, marron are captured during the season. A second estimate of total catch is generated using the size and weight distributions of marron recorded by logbook holders.

The estimated number of trips (effort) to dams and rivers is calculated in a similar manner.

The status of the stock is currently assessed by examination of the relationship between catch (numbers) and fishing effort for dams and rivers separately. This analysis indicates that although the catches and catch rates were higher at similar levels of effort in earlier decades, the stock has been relatively stable during the 1990s.

A good correlation exists between catches (numbers) and rainfall during the previous winter relative to the long-term rainfall of the south-west ($r = 0.63$). This preliminary model is used to predict the future season's total catch.

Exploitation status: **Fully exploited**

As catch rates and total catch have declined compared to historical levels, it is likely that most of the marron stocks are fully exploited.

Breeding stock levels: **Adequate**

Breeding stocks are protected from recruitment over-fishing by the minimum legal size limit, gear escape meshes and the tendency for snare-fishers to target larger marron. Most females in dams are capable of breeding at least once prior to attaining legal size, while those in rivers are capable of breeding at least twice. Small animals and females carrying eggs and young are fully protected. However, some individual stocks (e.g. Harvey Weir stock) do not appear to reproduce below the legal size and thus may not be protected by the size limits. Some breeding stocks are also protected in water supply dams not subject to fishing.

Projected catch next season (2001): **Approx. 194,000 marron (24 tonnes)**

Based on rainfall records during the year 2000, the catch for the 2001 season is likely to be similar to or slightly lower than the catch in 2000. Bureau of Meteorology data indicate that the rainfall during 2000 was approximately 95.18% of the long-term average. Based on this figure, the expected catch of marron is predicted to be approximately 194,000 animals. However, the relationship between rainfall and marron catches needs further analysis. Further, modifications to several major dams in the Harvey River catchment have resulted in limited access to certain marron stocks (e.g. Stirling Dam, Harvey Weir). Thus slightly lower catches are expected during the 2001 marron season, from the fishery overall.

NON-RETAINED SPECIES

Bycatch species impact: **Negligible**



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The marron fishery does capture small quantities of non-target species, principally gilgies (*Cherax quinquecarinatus* and *C. crassimanus*) and koonacs (*C. plejebus* and *C. glaber*). Although little is known about their biology, the impact of the marron fishery on these species is thought to be low, as gilgies and koonacs are smaller than marron and many smaller animals are released.

Protected species interaction: **Negligible**

This fishery does not interact with protected species.

ECOSYSTEM EFFECTS

Food chain effects: **Low**

The removal of legal-sized marron from freshwater rivers is unlikely to have a significant effect, noting that the bulk of the marron biomass is below legal size. Similarly, marron biomass taken from man-made dams does not significantly impact on the natural freshwater ecosystems.

Habitat effects: **Negligible**

The impact of this fishery on the aquatic habitat is negligible.

SOCIAL EFFECTS

The marron fishery in the 2000 season involved approximately 11,500 licence holders and their families undertaking about 40,000 fishing trips, and provided a major recreational activity in regional areas of the south-west of the State.

ECONOMIC EFFECTS

The 'commercial' value of the 2000 season recreational marron catch was about \$0.5 million (based on a price of \$20/kg). In addition, the estimated 40,000 trips to regional locations provided a significant boost to regional towns in the south-west.

FISHERY GOVERNANCE

Contemporary catches of marron are much lower than those of the 1970s and 1980s (Recreational Marron Figure 1). However, since the 1991 season the total marron catch has fluctuated at a relatively low level despite large fluctuations in effort (total number of trips). The reasons for the lower catches after 1990 include changes in land practices (including clearing and water diversion), a reduction of access to large dams, salinisation of the upper reaches of many rivers, the spread of the competitive yabby and the impact of introduced predatory fishes (including red-fin and trout) – all issues outside the control of the Fisheries legislation. Illegal fishing, including fishing out of season, retention of under-size marron and retention of more marron than permitted by the daily bag limit, may also be having a significant impact. At this stage, the ranking of these fishery-related impacts on the marron stocks is not possible and is likely to vary among different water bodies and catchments.

EXTERNAL FACTORS

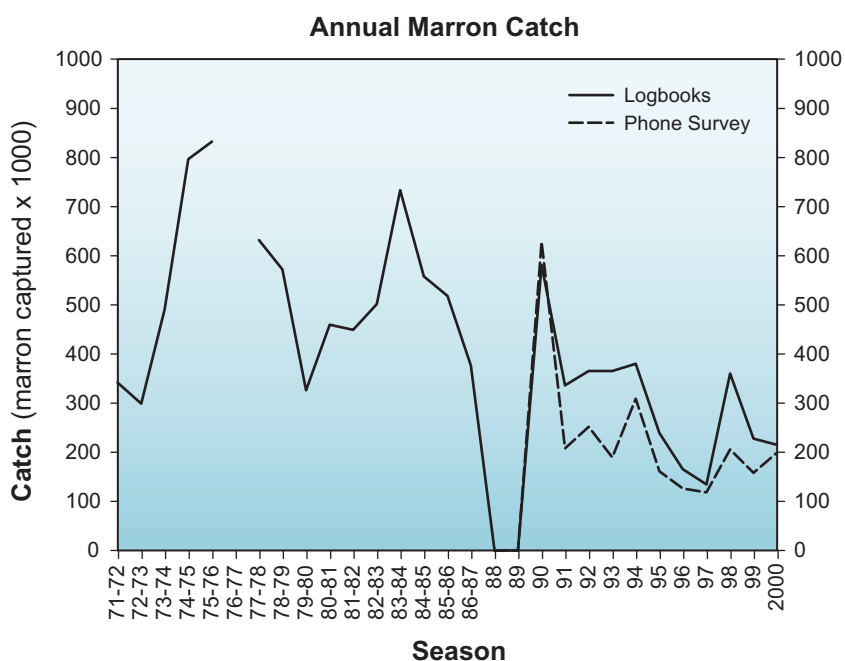
The fishery currently appears to be capable of producing between 118,000 and 309,000 marron per season. However, winter rainfall plays a major role in marron

reproduction and growth. Rainfall increases the quality of areas for marron by transporting leaf-litter into streams and by maintaining water volume and quality. It may also affect the ease with which fishers can access the water bodies.

A second major issue in this fishery is access to irrigation dams. The Water Corporation has recently closed access to Stirling Dam (Harvey River catchment) owing to the diversion of this water to the metropolitan water supply, and has limited the access to Harvey Weir. Thus, a redistribution of fishing effort is likely to occur and extra effort is likely to be applied to other water bodies, especially Logue Brook Dam and Waroona Dam. However, the Water Corporation is likely to refurbish Waroona Dam in the near future, which would include the complete draining of the dam for at least 18 months. Fisheries WA is working closely to ensure the refurbished dam provides a high-quality marron fishery once the dam is refilled.

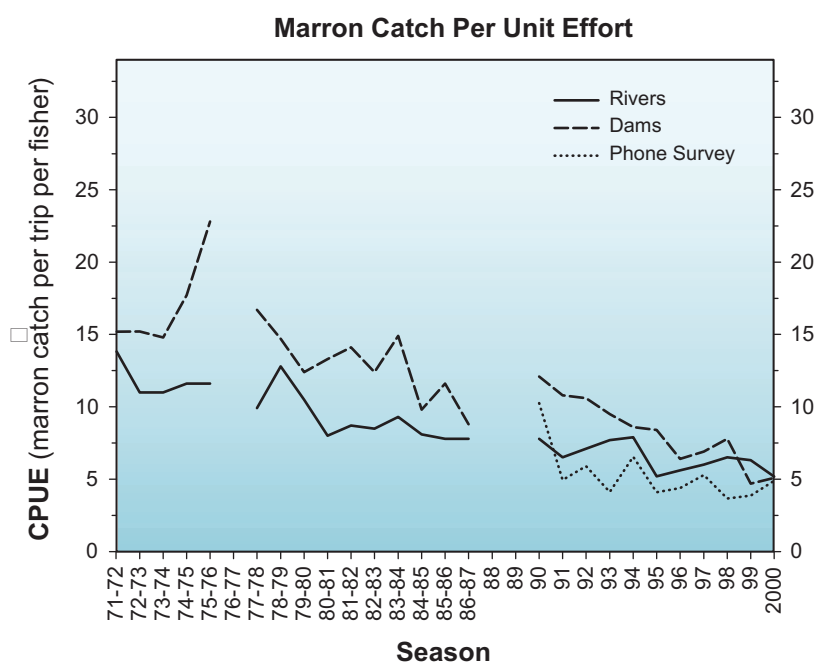
Introduced species also impact on the quality of marron fishing. The two major introduced species that impact on the marron fishery are yabbies and red-fin perch. Yabbies, a direct competitor and potentially serious threat to marron, have been recorded from a number of areas within the marron recreational fishery. Yabbies were introduced from the Eastern States and have escaped from farm dams or have been deliberately released into rivers and irrigation dams. Yabbies can also carry diseases such as *Thelohania* which may be passed on to other freshwater crayfish, including marron. Murdoch University is currently examining the marron stocks co-existing with yabbies in Hutt River (Geraldton) and will provide information to the Research Division of Fisheries WA.

Red-fin perch, which appear to predate heavily on small marron, have been illegally stocked into most rivers and irrigation dams in the south-west. Red-fin may be of greatest concern in irrigation dams, which generally have all structure (e.g. tree stumps) removed prior to filling and provide little shelter or protection for marron. The potential for increasing the marron survivorship rates and carrying capacity of water bodies by installing artificial structures is currently being investigated by Fisheries WA and should be considered, especially in the context of irrigation dams.



RECREATIONAL MARRON FIGURE 1

Total annual recreational marron catch, 1971 to 2000.



RECREATIONAL MARRON FIGURE 2

Catch per unit effort in the recreational marron fishery as recorded from logbook holders and from the telephone survey.



Recreational Fisheries

Recreational Freshwater Angling

RESEARCH SUMMARY

Fisheries WA Research Division projects on trout involve the production and distribution of trout fry, yearlings and excess broodstock to public waters. In addition, a number of research projects are currently being undertaken at the South West Freshwater Research and Aquaculture Centre, Pemberton (formerly known as the Pemberton hatchery). A limited survey of licence holders was performed for the 1998/99 season and results provided information on catch and effort within the fishery, as well as other data. Research is being undertaken to produce sterile trout with enhanced growth to provide superior angling fish. Further, comparison of the success of stocking fry versus stocking yearlings is being evaluated in several water bodies to reduce the predation rate of stocked fish, thus providing more angling opportunities. Genetic research into enhancing the quality of trout, particularly heat tolerance, from the agency's hatchery facility is also under way, comparing the tolerances of the SWFRAC strain, a natural strain and hybrids of rainbow trout. Finally, rainbow trout yearlings have been produced for use in inland saline waters. Research information from these projects and the annual report from the manager of the SWFRAC have been used to compile the following status report.

Recreational Freshwater Angling Status Report

Prepared by B. Molony

FISHERY DESCRIPTION

Boundaries and access

The south-west inland fishing licence includes trout, red-fin perch and freshwater cobbler (but not marron). Waters with public access are limited to the major rivers and Government irrigation water supply dams. The only public rivers and dams that are stocked are those with a long history of trout stocking. Private waters, mainly large gully farm dams and waterlogged and salt-affected south coast areas, are also regularly stocked by private owners as part of put-and-take trout fisheries. Rainbow trout yearlings are being trialled for their aquaculture potential in inland saline waters but also provide some recreational fishing opportunities.

Main fishing method

Angling with rod and line.

RETAINED SPECIES

Recreational catch (season 2000): Not assessed

No catch or effort data were recorded for the fishery in the 1999/2000 season while improved survey methods were being designed and implemented. In the future, annual data will be collected via a new telephone survey.

The most recent survey data, for the 1998/99 season, gave an estimated catch of 34.1 tonnes (110,100 fish), comprising rainbow trout 6.8 tonnes (22,400 fish), brown

trout 0.4 tonnes (1,300 fish), red-fin perch 26.0 tonnes (83,800 fish) and native catfish 0.8 tonnes (2,600 fish).

Fishing effort

Not assessed.

Catch rate

Not assessed.

Commercial share:

Nil

There is no commercial fishery for these species.

Stock assessment completed:

No

Enhanced rainbow and brown trout are produced at the SWFRAC and stocked into public waters as breeding by trout in south-west dams and rivers is negligible. A total of 550,000 rainbow trout fry and 25,000 brown trout fry from the SWFRAC were stocked into public waters during 1999. In addition, approximately 230,000 rainbow trout fry were sold to private dam owners for tourist fishing and private club fishing and 175,000 rainbow trout fry were sold to commercial producers. Older fish were also produced and sold from the SWFRAC during the year. Approximately 24,800 rainbow trout yearlings were produced and stocked into the public fishery, while 2,700 ex-broodstock rainbow trout entering their second and third years of life were also stocked into the recreational fishery for the 1999/2000 season.

Exploitation status:

Not assessed

Breeding stock levels:

Not assessed

Trout need stock enhancement by hatchery releases in most waters, as there is very little natural breeding due to high summer temperatures and limited nesting areas. Native cobbler are self-sustaining. Introduced red-fin perch breed naturally in south-west waters.

NON-RETAINED SPECIES

Bycatch species impact:

Negligible

Protected species interaction:

Low

Currently, no species of south-west native fish are protected, although two species are listed as 'restricted' and one species listed as 'vulnerable' by the Australian Society for Fish Biology. The likely effects of trout and red-fin perch on the endemic fishes of the south-west are discussed under 'Food chain effects' below.

ECOSYSTEM EFFECTS

Food chain effects:

Medium

The major environmental risk in this fishery relates to the spread of the introduced red-fin perch. Red-fin consume trout, native fishes and crayfishes (including marron). Further, red-fin breed throughout the fishery and are the most dominant fish in this region, leading to stunted fish with little or no angling value. The release of small red-fin by members of the public, although not recommended, occurs at high levels and may result in a decline of fishing quality. Fisheries WA encourages anglers to retain any red-fin caught, regardless of size.

Rainbow and brown trout are also introduced species but have a much broader diet than red-fin. For example, rainbow trout consume many species of aquatic insects. Further, the reproduction of trout in the wild in Western Australia is minimal due to lack of suitable spawning sites. Thus, the numbers of trout can be controlled by regulating the quantities of hatchery-produced fish stocked. Currently, trout are stocked in only 27 discrete locations and not throughout the range of fresh waters in the south-west. Thus, although trout are also predatory fishes, the lack of natural reproduction means they are more controllable than red-fin and are more acceptable as a recreational species.

Stocking in future will be influenced by a translocation evaluation of the environmental impact of trout stocking now being finalised.

Habitat effects: **Negligible**

SOCIAL EFFECTS

A large number of freshwater angling licences are sold annually. For the 1999/2000 season, a total of 14,209 licences were sold, including umbrella licences. This represents an increase of 20% in the number of valid licences when compared to the 1998/99 season (11,906).

ECONOMIC EFFECTS

The fishery operates in the south-west and is reputedly a major tourist attraction for the region, generating valuable income for regional centres. There are also a number of pay-for-fishing operators who target the tourist market. A major angling event is planned for the 2000/2001 season which will give a better indication of the economic effects of this fishery.

FISHERY GOVERNANCE

Management of the fishery involves regular stocking of trout, and catches are controlled by bag and size limits and closed seasons.

EXTERNAL FACTORS

The extent and success of the freshwater angling fishery in the south-west is dependent mainly upon availability of high-quality fresh waters for stocking. The availability of water is dependent on rainfall and access to irrigation dams.

A major issue in this fishery is access to irrigation dams. The Water Corporation has now closed access to Stirling Dam owing to the diversion of this water to the metropolitan water supply. Further, construction of the new Harvey Weir has resulted in limited access to this water by recreational anglers. Thus, a redistribution of fishing effort is likely to occur and extra effort is likely to be applied to other water bodies. Waroona Dam is also scheduled for reconstruction and draining during the 2001/02 season, which may reduce future catches during the refurbishment process. Fisheries WA is working closely with the Water Corporation to reduce the impacts to recreational fishing by enhancing stocks in refurbished dams.

The general condition of most rivers makes many areas unsuitable for trout. Stock access, cleared banks and

de-snagging of streams all reduce the quality of the stream for trout and other aquatic species. Rehabilitation projects in the USA have produced better stream quality and better angling and similar initiatives may be considered in Western Australia, particularly in irrigation dams.



