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MARRON OF WESTERN AUSTRALIA



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MARRON
of
WESTERN AUSTRALIA

(*Cherax tenuimanus*)

This booklet was prepared and published by the Extension and Publicity Service of the Department of Fisheries and Wildlife, in conjunction with Dr. N. Morrissy of the Department's Research Staff.

It is issued as a means of fulfilling the many requests received on marron in Western Australia. While it is accurate in all detail it is intended only as a guide and should not be quoted as a reference.

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MARRON (*Cherax tenuimanus*)

FISHERIES AND
WILDLIFE
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NOTE

Any requests for further information, particularly in relation to commercial marron farming, should be made in writing to:

Director,
Dept. of Fisheries and Wildlife,
108 Adelaide Terrace,
PERTH, W.A. 6000

ALTERATION OF REGULATIONS AND RESTRICTIONS

The regulations and restrictions contained in this publication were current at the time of printing. Any amendments subsequently made will be publicised in the daily press, but reference should be made to the Dept. of Fisheries & Wildlife to determine the regulations and restrictions in force at the time you intend to fish for Marron.

SPECIAL NOTE

The catching of marron, and in fact any fishing, is prohibited by By-laws, in water catchment areas, water reserves and reservoirs under the control of the Metropolitan Water Supply Sewerage and Drainage Board.

1. DISTRIBUTION

Marron are indigenous to Western Australia and their original or native range was in all the streams of the Darling Range extending generally between the Harvey River and Kent River. They have since been established further afield and today are to be found in natural streams as far north as the Chapman River at Geraldton, and south-eastwards as far as the streams of the Albany Region. Further extension of the range has been brought about by the introduction of marron into farm dams between Geraldton and Esperance, extending inland to Kalgoorlie and Lake Grace. Within their natural range marron have also been introduced to farm dams and many of the water supply dams of the Darling scarp.

Marron are recognized as the freshwater crayfish having the best potential for commercial aquaculture in the world because of, for example, the large size they can grow to rapidly, a high tail recovery rate, lack of burrowing habits and lack of a complicated life cycle. At present export of live marron to other States is controlled by agreement between State Departments so that aquaculture on the species may be established first in W.A. Overseas export of live marron is prohibited by a long-term Commonwealth ban to prevent loss of this industry. A recent amendment to the Fisheries Act made a provision for Regulations to establish

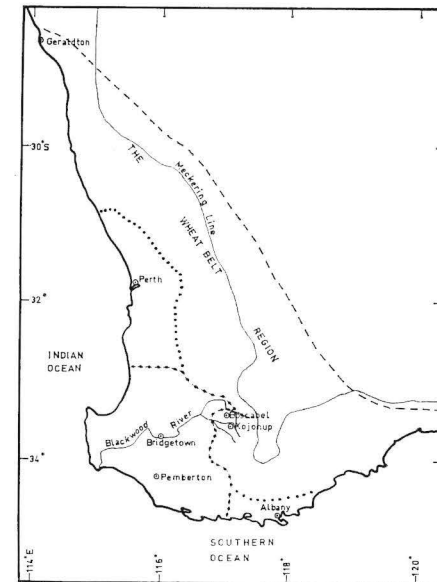


Fig. 1. Locality map and inland boundaries of the distribution of marron. ††† natural distribution in streams and coastal lakes (..... extension by introductions) and introductions to large and small man-made gully dams in the coastal hills. - - - Introductions to small private dams of the excavated type with turbid water.

licensed fish farms in W.A. and for processing, sale, etc. of designated fish, such as marron, otherwise not open to commercial exploitation because of their sporting value.

The demand for this type of crustacea is high in both Europe and the United States and the establishment of several marron farming pilot projects in Western Australia will undoubtedly be of considerable economic value to the State in the future.

2. DESCRIPTION OF SPECIES

Marron is the third largest species of freshwater crayfish in the world; the Tasmanian animal (*Astacopsis franklinii*) is the largest, followed by the Murray River Crayfish (*Euastacus serratus*).

Australia has an extensive freshwater crayfish fauna. In Western Australia there are four main types of crayfish each being characteristic of a certain type of habitat. However, except for marron, many intergrading forms can be found and the exact number of different species present is a complex taxonomic problem.

(A) MARRON—*Cherax tenuimanus*

Specimens of up to 2.72 kg weight have been recorded but these weights are the exception.

The growth rate of marron is variable, dependent upon the density of marron and the availability of food. A legal size marron has a carapace length of 76 mm and a total weight of 113.4 g.

Marron are identified by the presence of five ridges or keels on the back of the head (See Fig. 2); these include those forming the side of the rostrum, or spike, on the front of the head. In addition there are 2 spines located centrally on the upper surface of the telson or tail end. There is no mat of fine hairs on the upper surface of the hand as is the case with the other three species.

Marron are found only in the larger more permanent rivers of the southwest. Mature marron are black in colour. Juveniles in their first year have dark markings over a general body colour ranging from yellow-greenish to brown, while older juveniles are brownish. Bright blue specimens are frequently reported.

(B) KOONAC—*Cherax preissii*

Koonacs are generally smaller than marron and are identified by four ill-defined keels on the back of the head (See Fig. 2) plus a mat of fine hairs contained on the upper surface of the hand. There are no central spines on the surface of the telson. Koonacs are found in the inland headwaters of rivers and in swamps which habitually dry up. They appear to be capable of surviving for several years under drought conditions by burrowing.

The colour of Koonacs is blue-black and mottled brownish-black, with blue on the claws.

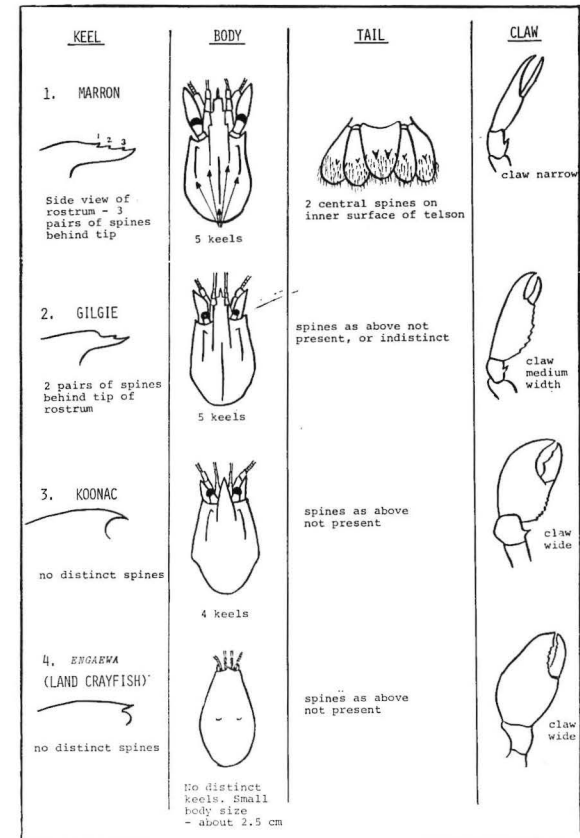


Fig. 2. Main points of identification for Marron, Gilgie, Koonac and Land Crayfish.

(C) GILGIE—*Cherax quinquecarinatus*

Although the Gilgie has five keels on the back of the head (similar to the marron) there are less than three pairs of spines on the rostrum and they are less prominent than for marron (See Fig. 2). The telson or tail end has no central spines.

Gilgies are found in the smaller less permanent streams and also swamps near the coast. They are able to survive in a drought year by retreating to a capped burrow if the water dries up. They are usually coloured brownish black with bluish mottlings or spottings on claws and body.

(D) YABBIE—*Cherax destructor*

These have only four keels on the back of the head plus a mat of fine hairs on the upper surface of the inner portion of the hand.

Yabbies are not indigenous to Western Australia and were introduced from the Eastern States. They are located in isolated and small numbers in farm dams of the northern wheatbelt.

Yabbies are very similar to Koonacs. Both types do well in turbid farm dams where their coloration becomes very pale.

(E) LAND CRAYFISH—**Engaewa** spp. (two).

These are very small crayfish which live permanently in extensive burrow systems in permanently wet swamp ground in the Cape Leeuwin-Cape Naturaliste part of the extreme southwest. They are rarely seen because of their nocturnal feeding habits, but are sometimes uncovered when habitat is being destroyed by land clearing.

3. RESEARCH

Three avenues of research have been undertaken on marron by a research officer of the Department:

- (a) Examination of the exploitation in the amateur fishery in the rivers and large storage dams located in the Darling Range, e.g. Warren River and Wellington Dam, to determine the influence of fishing on stocks of marron and to ascertain what action is necessary to control the amount of fishing so that adequate numbers of good-sized marron can be caught by all.
- (b) To determine how successful marron culture has been in rural farm dams outside the natural range of marron. This has been considered an important phase in view of the extreme distances of many farms from the source of supply of other fresh fish.
- (c) The study of the animal under artificial conditions to determine the prospects of future commercial farming.

The results of (b) above showed that the propagation of marron in most of the dams was generally not successful. Some dams however were very successful and the conditions which existed in these dams are outlined in a later section of this publication. Similar conditions are to be found in many other dams not yet stocked with marron.

4. FISHING REGULATIONS

The regulations covering marron and cherabin are a conservation measure necessary to conserve and manage the "wild" stocks as sports fisheries for amateur fishermen, the holiday maker and tourist. Without adequate protection the young, undersized animals would be fished out before reaching the age at which

spawning takes place and so bring to an end the perpetuation of the species.

In addition to conserving the species it is also a means of assuring that the animals reach a size worthwhile as a table delicacy. Marron can grow to king size so why not let them do so before capture.

In relation to marron and cherabin the regulations and other restrictions in force on September 1, 1977, may be summarised as follows:

INLAND FISHERMAN'S LICENSE: A person who catches or attempts to catch marron or cherabin by any means of capture shall hold an inland fisherman's license, the fee for which shall be two dollars.

METHOD OF CAPTURE: The only means by which marron or cherabin may be taken are by drop net, pole snare or hand scoop net. The use of traps, nets (other than drop nets and hand scoop nets), spearguns, harpoons, hawaiian slings and all other pointed instruments is illegal. Boats or similar craft shall not be used in the taking of marron nor shall any artificial aid, apparatus, or equipment be used which permits the user to move or remain under water.

PERMITTED GEAR: Not more than six drop nets, or one pole snare or one hand scoop net shall be used for taking marron or cherabin.

BAG LIMIT: Not more than thirty marron shall be taken in any one day.

SALE: Marron or cherabin shall not be sold, consigned or offered for sale.

CLOSED SEASON: By Ministerial notice the marron fishing season is closed from May 1 to December 15 inclusive each year. Any variation of this period is publicised in advance in the daily press. The closure period is based on biological grounds

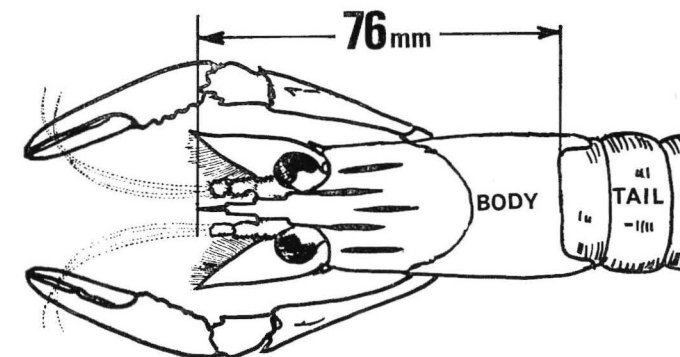


Fig. 3. The length is measured from the tip of the rostrum (spike) to the rear of the carapace (body). 76 mm is the minimum legal length.

in that it protects the female during the spawning period and at the same time acts as a means of reducing the number of marron caught. By May the larger, legal-sized marron have been well fished and it affords a respite during which the immature marron may develop to legal size for the following season.

LEGAL SIZE: The minimum legal size marron measure 76 mm from the tip of the rostrum or spike to the rear of the body (Fig. 3).

PENALTIES: The penalty upon conviction of an offence under these regulations is a maximum of \$500.



5. SPORT FISHING

1. **LOCATION:** As mentioned in the section "Distribution", marron are widely distributed but the best fishing is obtained from those more inaccessible and remote places not often frequented by "marroners".

The Warren, Murray and Blackwood are popular marron streams while the smaller Gardner River is well known for its generally larger marron. However, intensification of fishing in any area containing the large marron, will inevitably result in a diminution of the larger animals. So if you find yourself a particularly good fishing spot it might perhaps pay to keep it to yourself!

The least fished streams are in the dense forest areas of the south coast and they will naturally offer the best fishing for big marron. On the other hand the more popular areas such as irrigation dams contain many small animals but only about

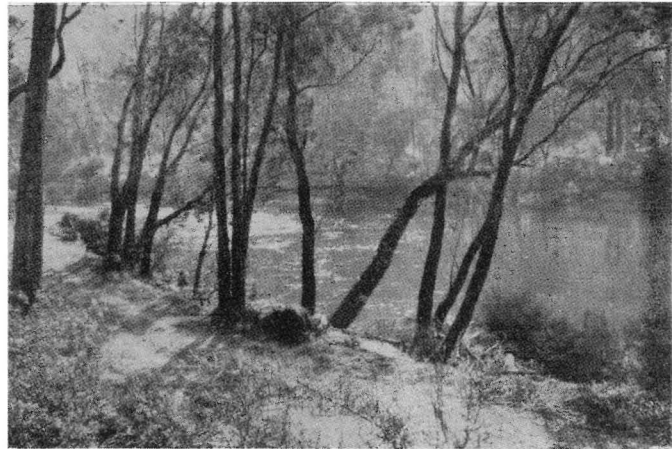


Fig. 4. Part of the Murray River showing a popular marroning section.

50 of every 100 caught will be a legal minimum length (76 mm carapace) early in the open season. In the Warren River during the same period only about four or five in every hundred will be of legal length.

2. CATCHING:

(a) **IN RIVERS:** Generally these have steep banks and fishing is done in the deeper pools (Fig. 4), which necessitates the use of "drop nets" (a limit of 6). These nets are similar to the conventional crab drop nets and may be baited with either some form of fresh meat or chicken pellets. The latter, tied up in a piece of cheese cloth or silk stocking, makes an ideal bait—particularly for the holiday maker or traveller who can keep a stock on hand for all occasions. Pellets eliminate messy meat problems—and pollution problems too!

(b) **IN IRRIGATION DAMS** (Not Domestic Water Supplies): These dams (Fig. 5) usually have large areas of shallow water around gently sloping banks. The fishing method adopted here is to put down baits of chicken pellets (or meat) in the shallow water area along the bank just before sundown. With the approach of darkness the marron move into the shallow areas where they are attracted by the baits. Using a longhandled scoop net and a light (preferably the head-type used by miners) the marron are scooped up from the bait. Drop nets are inefficient in these shallow waters—the sidelong pull to the shore inevitably lets the marron escape.

The best time to catch marron in clear water is just after sunset for a period of 3-4 hours. During the day the marron hide under logs and other debris in the deep water but with the coming of darkness they move out to the more open areas to feed. In some areas where the water is muddy or turbid (such as some farm

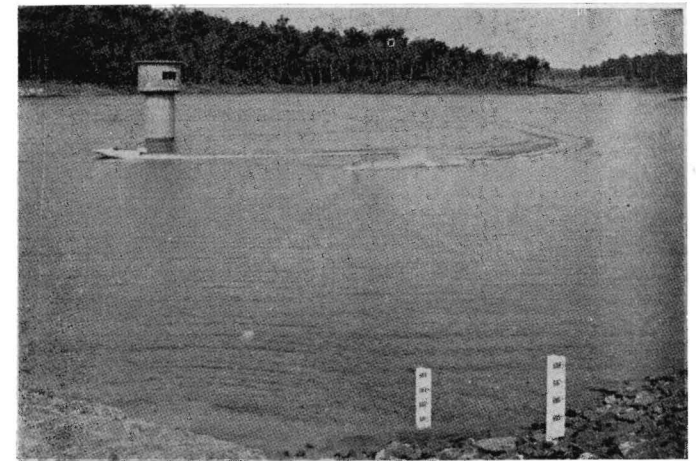


Fig. 5. Waroona Dam, a typical irrigation dam.



Fig. 6. A gully-type dam of clear water located in the Darling Range. These dams are usually erected across a watercourse to hold back the flow of water. They are only common in the wetter, cooler region of the central ranges in the South-West. Generally they are within the limits of the natural distribution of marron and provide good conditions for breeding.

dams) it is possible to fish during the daylight hours. Drop nets, although not successful in the shallows, are most suitable if used in deeper waters.

(c) **IN FARM DAMS:** Baited drop nets are the most efficient method of capture in these dams. Quite often good hauls may be made during daylight hours if the dam is turbid. Normally marron feed only at night but with cloudy water conditions they will move out from their hiding places to forage for food during the day.

(d) **SNARES:** Snares have long been considered the most sporting way to catch marron and were once quite popular. A running loop of flexible wire (usually the gilt picture-frame type) is attached to the end of a long pole. With the aid of a light the loop is lowered over the tail of a marron located feeding near the banks of a stream. Once over the tail it is manoeuvred up towards the carapace or body and the free end of the wire quickly tautened to close the loop. The marron is then hauled to the surface. The addition of baits to the streams helps to lure the marron to a suitable spot for catching.

6. STOCKING OF FARM DAMS

Investigations have shown that approximately 80 per cent. of the farm dams previously stocked with marron are unsuitable for propagation.

The following conditions are considered necessary for success: Deep, clear-water dams of the gully type (in the well-watered cooler Darling Range) are well suited for marron, but the excavated stock-tank type of dam in a wheat growing and sheep grazing area such as the Great Southern region, should have the following characteristics:

- (a) The size should be not less than 1 530 cubic metres or 0.1 hectares in area. The best dams in this area are those excavated on higher ground into white pipe clay so that the dam water is milky in appearance and the dam is not influenced by salt conditions common in gully flats (Fig. 7). Clear water leads to excessive water temperatures for marron on the bottom of the dam and bird predation. The low summer depth should not be less than 1.5 m in drier years. In most cases dams which become very shallow also become **extremely** turbid and the marron will then crawl out and die.

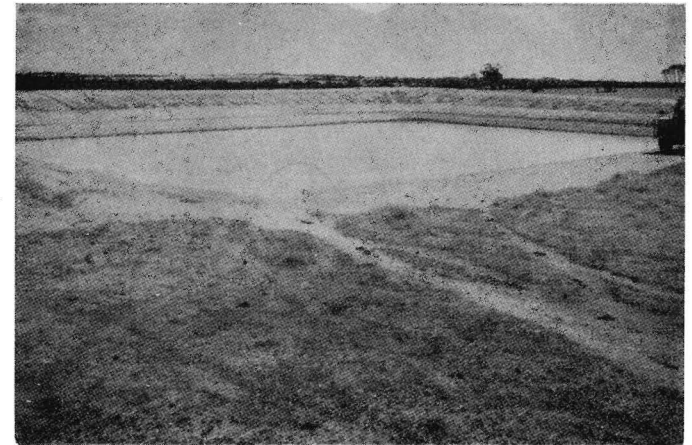


Fig. 7. An excavated white-clay farm dam in the wheat belt area. Research to date indicates that the white-clay dams are the most successful in the rearing of marron.

- (b) Absence of koonacs and fish, particularly Redfin perch. If these are already established in dams in large numbers they appear to cause breeding failure and poor growth of marron.
- (c) Dams with little or no cover for marron to shelter under (particularly if the water is clear) are open to predation by cormorants in areas close to the river systems (e.g. Kojonup

area). Place shelters in the water, such as pipes or logs in the deeper water for large marron, and old bags in shallow water near the banks for the small marron. This will increase the holding capacity of the dam for marron and stop predation by birds.

- (d) The greatest danger to marron in farm dams is the overloading of the dam with pasture or crop, debris, and stock wastes—particularly due to heavy cyclonic summer rains. A bank across the front of the dam with a gate opened for the normal winter rains and closed during summer to divert heavy run-off has been found to be successful in keeping dams clean.
- (e) If very numerous, small, buff-coloured insect eggs are found on marron during the late summer months, it is a symptom of dam "going bad" where oxygen conditions for marron are becoming poor and the dam should be cleared of bottom "muck" and restocked. The adult aquatic insect which lays the eggs is about 6.25 mm in length, white underneath, with grey-brown wings and a pair of oar-shaped legs.
- (f) If marron are brought from the Pemberton Hatchery in oxygenated water contained in sealed plastic bags, the **unopened** bag should be placed in the dam water for 20 minutes. This will permit the temperature of the water in the bag to gradually equal that of the dam after which the marron may be released.

Marron brought to the dam after a trip of several hours in a damp bag should be released on the banks of the dam near the water and allowed to walk a short stage into the dam water.

7. MANAGEMENT OF MARRON STOCKS IN DAMS

During the late summer of each year following the introduction of marron an inspection should be made of the underneath of the bags placed in shallow water (especially near the banks at the back corners of the dam) for small marron 19-25 mm in overall length. (Fig. 8).

When the marron have been found to have spawned twice, there are thus three groups; very small ones (as under the bags), ones of intermediate size from the previous year's spawning and the large original marron. The large original marron can then be removed because the ones of intermediate size will breed the following year.

Always ensure in future years that marron of intermediate size (less than 76 mm carapace length or 152 mm overall) are present in good numbers and are returned to the water, but remove all larger marron each year.

The best method for catching marron in farm dams is by the use of baited drop nets with a mesh of about 25 mm. Experiments have shown that to be adequately stocked, a normal farm dam

requires a total of 500-2 500 young marron, released from parent females in December; faster growth rate is obtained with lower numbers. Only one or two large females are necessary to provide this number of young.

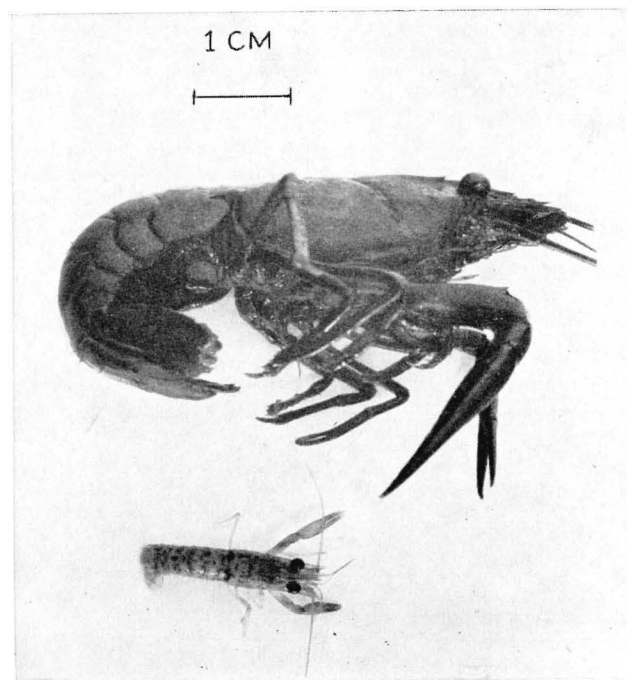


Fig. 8. Small marron (bottom) about 19-25 mm are located in the late summer of each year following the introduction of marron into dams—usually under bags put into the dam for protection of the young. Top photo is of a marron one year older than the lower one.

8. "MARRONING"

For some the prime enjoyment of "marroning" is the eating of its succulent flesh but, to most, it is the whole evening of preparation, catching, cooking and pleasant company, culminating in a gourmet feast of unequalled delicacy.

In the convivial atmosphere of a glowing camp fire, the warm marron, enhanced by fresh bread and butter and hot coffee (or your favourite drink) are delectable and the whole evening's activities become a ritual followed by many Western Australians entertaining overseas or interstate visitors.



9. PURCHASE OF MARRON STOCKS

For the stocking of private dams or backyard pools marron are available from the Pemberton Fish Hatchery during the months January to April. The stocks are supplied in lots of 50 at a cost of \$15 per lot, plus \$2 for freight. The marron are sent in oxygenated water contained in sealed plastic bags protected by a carton.

Generally marron of sizes 2.5 cm to 4 cm (orbit) carapace length are used. In their natural habitat 50 per cent. of 2+ female marron over 3 cm in length breed each year. Development of the eggs starts one year before spawning (October). Because marron are sent by rail, places distant are given the smaller marron so that they may have more chance of surviving the trip of at least one day in the container. The marron should be released in the manner described in Section 6.

The large numbers of marron required for commercial marron farming are not available from the Pemberton Fish Hatchery but can be obtained from established licensed commercial farmers. Details may be obtained from the Hatchery or by writing to the Director of Fisheries and Wildlife, 108 Adelaide Terrace, Perth 6000.



10. COOKING

A large pot and a few pounds of salt are the first essentials. Having caught your marron (kept alive in a wet bag) get the water boiling over a good fire—then add the salt and the **live** marron. Bring the water to the boil again and allow the marron to cook for 5-10 minutes for just legal size and a little longer for larger size. After cooking, remove the marron from the water and allow to cool. We've heard that beer added to the water gives a delicious flavour to the marron flesh but can't personally vouch for it!

If it is intended to take the marron home for cooking—**they must be alive**. This is done by keeping them cool and in a damp bag where they should last overnight until the next day. Once dead, marron deteriorate very quickly and become highly odourous and it is therefore essential to cook them only if alive.

After cooking, the flesh may be removed and frozen for later use but the eating quality will not be as good as in the freshly cooked condition.

MARRON FARMING IN WESTERN AUSTRALIA

In February 1975 the Western Australian Fisheries Act was amended to provide for the establishment of private fish farms, subject to the preparation of Regulations for their control (gazetted December 24, 1976 scheduling Marron as a "farm fish").

The Regulations cover the processing and sale of certain scheduled species but, in the first instance, will apply specifically to the indigenous freshwater crayfish called marron, ***Cherax tenuimanus*** (Smith).

Dr N. M. Morrissy, a Senior Research Officer from the Western Australian Marine Research Laboratories has been researching marron since 1969. The latest Fisheries Research Bulletin (No. 17 Parts 1 and 2) may be considered the culmination of nine years research work which has resulted in the way now being open to the breeding of marron on a commercial scale. The issue of these Bulletins is restricted to those specifically undertaking commercial marron farming.

Many southwest farmers and others interested in establishing commercial marron farms have long awaited these research bulletins and most certainly the procedures and techniques outlined will become the guidelines for future development.

During the research programme pond breeding and early rearing of high densities of juvenile marron was undertaken at the Pemberton Fish Hatchery.

Marron were produced at the hatchery for pond and laboratory experiments and for the large-scale farm dam experiments near the southwest town of Kojonup.

It is upon this work that the practicality of large-scale marron farming has been based.

Maintenance of a rapid growth schedule both over winter and summer, and an assurance of a low probability of sudden mass mortality (due to adverse summer weather) are the two important criteria for optimal site selection.

The area offering the most suitable conditions and generally conforming to the above criteria was found to be the extreme southwest of the State near Cape Leeuwin. Here the oceanic influence over weather promotes the highest winter temperatures and the lowest daily and yearly temperature variations: it is also the centre of the natural distribution of marron.

A keen interest has been shown by many prospective marron farmers and there will no doubt be many problems and even failures before marron farming becomes a viable and economic proposition. Failures can of course create marketing and supply problems and for this reason endeavours must be made to ensure that only those operators with a reasonable chance of success will be granted licenses during the initial and formative years of the industry.

KEEPING MARRON IN BACKYARD POOLS

Marron, and other Western Australian freshwater crayfish may be successfully kept in small backyard pools, ranging in size from as small as 1½ m in dia. (plastic wading pools) to larger ponds of the concrete fish pond type. Water depth need not be in excess of 15 cm. New concrete pools should be well-cured with lime before use and the bottom should be covered with coarse sand. If a normal tap supply is used, the water should be allowed to dechlorinate for a week or so, with aeration upon first filling of a pool. If bore water is used and contains iron in solution, the iron must be allowed to oxidize and precipitate out of solution before the water is added to the pool. Complete changes of pond water are not required, unless the marron are frequently overfed.

The pool should be completely shaded from direct sunlight during the summer to prevent water temperatures exceeding 25°C or so. Aeration of small pools may be provided by several air stones running off a small aquarium type compressor. Aeration may only be necessary when water temperatures are high (usually late afternoon) or in the early morning if algae is present.

Algae may be in the form of long green strands or minute green cells giving the water a green soupy appearance. An algal "bloom" will result in an oxygen deficiency developing overnight.

The larger crayfish should be provided with individual shelters; short lengths of P.V.C. piping are suitable. If mating and spawning occurs in the early spring the young marron, resembling their parents, will be released from the swimmerets under the tail of the female in November in the Perth area. Bunches of rope fibre should be placed in the pond in anticipation of the release of young. When release occurs the young will seek out this shelter and remain in or close to it during early life. Rather than disturb the female to see how spawning is progressing, examination of the weed in December will tell whether spawning has finished or not, for the young marron, if present, cling to the fibre bunches when it is pulled out of the water. For the very best results large adult non-spawning crayfish should be kept in a separate pond from the small young. It is possible to maintain a number of small ponds on schedule of growing, cropping and restocking. Females can breed at two years of age, but usually breed for the first time at three years of age.

The worst practice in marron raising is any zealous tendency to overfeed. Excessive feeding will pollute the water, cause deoxygenation, and deaths. Lumps of meat are particularly bad in this respect.

Poultry pellets can be fed but require some weeks to break down to a rich bottom layer of detritus. Red worms found in compost or manure heaps are better for a small pond and just a few marron since it can be eaten immediately and does not pollute the water. These worms can be cultured the year round in a wooden box, kept in a cool place, initially filled with a mixture

of pre-soaked cow manure and garden peat moss (1:1). Soaked poultry pellets or kitchen vegetable scraps (non-acid) can be placed on the surface of the mixture occasionally to feed the worms. Larger worms with a "collar" are breeders.

In stocking the pond, male marron are distinguished by having two bluish penes at the base of the most posterior pair of the five pairs of legs. Females have an opening at the base of each of the middle pair of legs.

In the smallest size pool suggested at the beginning probably no more than half a dozen legal sized marron can be stocked. Even then some initial fighting may result in deaths particularly if no shelters are provided.

At times each marron will become inactive and tend to remain in its shelter or when moving about appear very sluggish and perhaps are covered in a furry coat of algae. This behaviour is normal and the marron should not be interfered with as it is preparing to cast off its shell, called ecdysis, the growth process in crayfish. The empty shell will be seen some time later while the marron will be, after a short period of "hardening" (when again it should not be handled) most active in its shiny new shell and eat more food per day than at any other time.

CHERABIN (*Macrobrachium* sp.)

Under the provisions of the Fisheries Act Regulations an inland fisherman's license is required for the taking of Cherabin.

Cherabin are an edible freshwater crustacea (see illustration below) located in the rivers and streams of the north of Australia. Some specimens measure up to 20 cm overall length.

Barrages and dams on some of the northern rivers constitute an obstruction to these animals which apparently spawn in the estuaries and migrate upstream in the young stages. Towards evening, and at night, cherabin may be seen on the barrage aprons attempting to climb up over the barrage.

Although it is possible to catch cherabin from the apron the practice is dangerous and not permitted; the use of drop nets is safer and more sure.

