Fishing Industry Research Trust Account

Report

by

Director, Department of Fisheries and Wildlife

Western Australia

for

Financial Assistance for further development of Aquaculture of Marron, *Cherax tenuimanus* (Smith) by testing a specially designed pond sited in the most climatically favourable locality in Western Australia.

December, 1976

As a result of extensive research at the Pemberton Fish Hatchery and at Kojonup (the recently completed FIRTA farm dam project, 1973-76) on the annual growth cycle of marron, in particular in relation to winter water temperatures, it was deduced that the most favourable area for marron is near Cape Leeuwin (Augusta) (Morrissy, N.M. 1976a Aquaculture of Marron, *Cherax tenuimanus* (Smith) Part 1. Site Selection and the Potential of Marron for Aquaculture. *Fish. Res. Bull. West. Aust. 17*, Pt. 1, 1-27). Persons wishing to set up an aquaculture facility for marron are being advised to seek a site for ponds in this area.

Thus, the current FIRTA project is a logical extension of the research work being carried out to develop commercial aquaculture of marron. In addition to research aims, this project is more heavily involved than former projects in the practical difficulties of technical development and community interest and co-operation.

The Western Australian State Government provided small limited funds (up to $4,000) for building a pond facility near Augusta in early 1976 and the Commonwealth FIRTA has provided a grant for the employment of a Technical Officer, his travelling expenses, a vehicle, and maintenance of equipment to enable monthly field trips to be carried out between Perth and the ponds at Augusta.

After closely examining various localities near Augusta for suitable pond sites (suitable clay and water supply), including some rather isolated uncleared Crown Land, an agreement was reached with a local farmer to build ponds on his property.

This choice has turned out to be highly successful; the farmer was most co-operative in helping to locate and build the ponds, providing on-the-spot needed supervision of the bulldozer driver, and he has continued to maintain water levels and upgrade the pond area in many ways, without interfering with the research work. The choice of site has drawn out a considerable local interest to the extent of further help with additions and the ponds are easily viewed from a public road close-by. Two shallow (maximum depth 1m) drainable ponds, area 0.1 hectare (25 x 40 m), were built in January-February 1976. A small petrol pump is used to fill the ponds and maintain the water levels, during the dry season, from a large deep gully dam very close at hand. During the wet season, water is siphoned from a small spring fed excavation from which white clay was obtained to line the banks of the marron ponds.

A steel tower was erected at the centre of one pond and, on it, a Grant miniature temperature recorder was installed in April 1976 to record, at half-hourly intervals, air temperatures and bottom and surface water temperatures. During July (1976), the coldest month of the year, the mean monthly minimum water temperature was 13.4°C (mean monthly maximum, 14.6°C) and the lowest daily minimum was 11.5°C. Average daily and monthly water temperatures, therefore, usually well exceeded the winter growth threshold of 12 - 13°C for marron (Morrissy 1976a) contrasting with Kojonup, Pemberton and other inland localities where temperatures fall below this level for up to four months.

In one of the two drainable ponds a brood stock of several hundred mature marron was established during April 1976 to provide young-of-the-year early in the next summer. This pond was drained in mid-November 1976 and thirty females carrying hatched young were placed in small wire cages in the pond. By early December the young were successfully released, had spread out over the growing pond, taking refuge in synthetic weed bunches provided, and the caged females were removed (- techniques developed from long term breeding trials at the Pemberton Fish Hatchery; Morrissy, N.M. 1976b. Aquaculture of Marron, *Cherax tenuimanus* (Smith). Part 2, Breeding and early rearing. *Fish. Res. Bull. West. Aust. 17*, Pt. 2, 1-32).

The other pond was stocked with 1 000 young-of-the year marron, bred at Pemberton, during April 1976. Their growth was followed by monthly sampling using bunches of synthetic weed. The effect of the higher winter water temperatures near Augusta was that good growth occurred during winter in contrast to, for example, negligible winter growth in a stock of 1 000 marron established in a similar pond, in April 1976, far inland north of Kojonup.

A number of factors have detracted from the research work and emphasize the additional problems of technical development in this project.

Bird predation was severe and covering of the ponds with fish netting is in progress, greatly aided practically by the volunteer labour of interested local people, notably the owner of the property.

Bird predation occurred because the desired high turbidity of the pond water did not eventuate during mid 1976. Testing of the main water supply dam during the normal rainfall winter of 1975 had shown a favourable (low) level of salinity (established from the Kojonup FIRTA project) allowing suspension of clay particles. Unfortunately 1976 has been a year of below average rainfall with no early winter rains to dilute the salinity of the supply dam after summer evaporation. Also a saline side spring was uncovered by the excavation forming the small dam used as a siphonable supply. The former problem would not occur in a year of normal rainfall and the latter problem can be remedied.

Establishing a detrital food supply in the six new ponds at the same time as stocking with marron also presented a problem because the lack of water did not allow an adequate flushing rate of the ponds when the plant base (poultry pellets) was added. The latter was added to the ponds in the same quantities as has repeatedly given high survivals and excellent production rates in trials at the Pemberton Fish Hatchery. However, the reduced initial ability to flush the Augusta ponds, compared with a large on-tap supply at Pemberton, allowed strong ephemeral algal blooms to develop from the nutrients released from the plant base added; the algal blooms cause oxygen deficiencies to develop overnight resulting in mortality of marron.