

## BARRAMUNDI FARMING

### BARRAMUNDI FARMING STATUS REPORT

Prepared by G. Maguire

#### INDUSTRY DESCRIPTION

##### Production areas

Barramundi (*Lates calcarifer*) is produced intensively in cages in Lake Argyle or in recirculating systems in the southern half of the State. Interest in producing barramundi is growing strongly.

##### Production methods

Barramundi can be farmed in cages in Lake Argyle or coastal areas, in inland saline ponds, or in intensive recirculating culture systems using fresh water, inland saline water or sea water.

#### AQUACULTURE PRODUCTION

Production current season (2000/01): 45 tonnes

Number of producers for year 2000/01: 7

Production projection next year (2001/02):  
75–125 tonnes

#### ECOSYSTEM EFFECTS

Barramundi farming is considered to present a medium risk to the environment. Cages within protected coastal areas and lakes can be operated with low environmental impact if appropriately located in deeper water with good current flow and if modern feeding practices and feed design are used which minimise uneaten food and soluble nutrient release.

Native fish around the cages can be expected to consume a significant amount of waste material (uneaten feed and faeces), thus reducing the overall impact on the environment. Land-based farms producing more than 1 tonne of fish are required to minimise their environmental impact and are subject to discharge licensing, which includes monitoring of water quality. The Department of Fisheries recommends use of swirl separators and/or settlement/reed ponds to improve the quality of water discharge from land-based farms prior to release or reuse.

#### SOCIAL EFFECTS

The industry is becoming a small but valuable source of regional employment, and has local tourism potential.

#### ECONOMIC EFFECTS

Estimated annual value (to producers) for year 2000/01:  
\$420,000

#### INDUSTRY GOVERNANCE

To undertake barramundi farming, a Department of Fisheries aquaculture licence is required. A water quality monitoring program that is to the satisfaction of the Department of Environmental Protection must be developed and maintained.

#### EXTERNAL FACTORS

This industry has the potential to grow significantly, particularly in Lake Argyle where a 500 tonne production licence has been issued. Growth in production has been delayed by some farmers moving to production of 3 kg fish for fillets rather than smaller, plate-size fish.

## Southern Inland Bioregion

### REGIONAL MANAGEMENT OVERVIEW

The southern inland bioregion is dominated by production of yabbies (*Cherax albidus*), marron (*Cherax tenuimanus*) and freshwater finfish, while the development of inland saline aquaculture continues to grow. Management and licensing arrangements have not changed significantly over the past year.

Coordination has improved within the aquaculture industry. The two main trout grower groups are working together to deal with issues facing their industry, which produces both rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*).

The Department of Fisheries facilitated a government workshop in February 2002, and organised an industry

workshop in Narrogin during April, in relation to inland saline aquaculture. The government workshop resulted in a commitment by the attendees from various agencies to form a working group to achieve better communication and co-operation and a strategic approach to the development of inland saline aquaculture. Industry participants resolved to develop strategies through the Aquaculture Council of WA.

Trout ova and fry from the South West Freshwater Research and Aquaculture Centre (SWFRAC) at Pemberton were again sold to freshwater trout farmers, and yearlings were sold to growers using inland saline waters.

The Silver Perch Growers' Association are working on developing a code of practice and marketing strategies for exporting their product (*Bidyanus bidyanus*).

The production of freshwater and marine ornamental fish species is a small but rapidly growing sector of the aquaculture industry in Western Australia.

## REGIONAL DEVELOPMENT AND COMPLIANCE OVERVIEW

Aquaculture Development Officers stationed at Albany and Narrogin provide an extension service to farmers as well as providing displays and information at country shows and workshops. For 2001/02 there was a particular focus on the production of trout, marron and yabbies, including the Yabby Roadshow, the SWFRAC open day and a series of workshops on inland saline aquaculture, with extensive resources being directed to providing development and extension assistance to farmers.

The south-west freshwater aquaculture industries are monitored by Fisheries Officers based in Esperance, Albany, Bunbury, Mandurah and Fremantle to ensure continuation of a high level of awareness of, and compliance with, management rules.

The theft of marron from farm dams is of major concern, with an increase in incidents of theft reported by licensed aquaculturists. Department of Fisheries staff are working with the police and the Marron Growers' Association to address this issue.

## REGIONAL RESEARCH OVERVIEW

Research activities have focused on work to assist marron, yabby and rainbow trout farming industries and to produce yearling trout at the SWFRAC for inland saline farming trials throughout the region. Research staff based at Perth and Pemberton provided advice to many farmers, particularly through workshops and a major field day at SWFRAC.

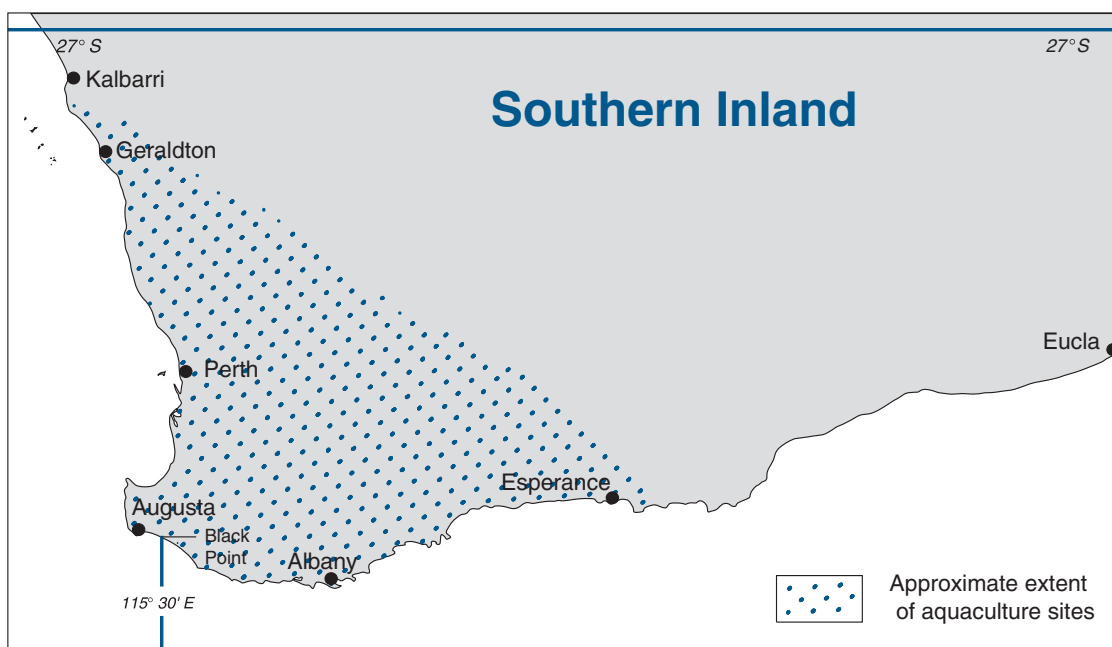
Research facilities have been greatly expanded to help improve the profitability of marron farming through genetic and pond management and by treating discharge water for

reuse, particularly in summer. Model ponds and aquaria have been established at a joint facility with the University of WA at Shenton Park (with additional funding from ADF, FRDC and industry), while a pond complex has been commissioned at the SWFRAC (with additional funding from the Commonwealth Regional Assistance Program, South West Development Commission, the Department of Training and the Water Corporation of WA). This has enabled the SWFRAC to expand its role as a demonstration facility.

Research trials involving four commercial farms and the research facilities at Shenton Park and Pemberton have shown great potential for improving the quality of commercial marron farming lines. Useful results have also been generated by University of WA research students in other marron projects at Shenton Park.

Yabby research supported by the FRDC and the ADF has shown that hybrid Australian yabbies grew twice as fast as existing commercial yabbies under pond conditions. Ongoing efforts are being made with commercialising this technology, with stocks of parental strains being developed at a separate facility at Shenton Park and in the pond complex operated by the Department of Fisheries within the Department of Agriculture's Avondale Research Centre at Beverley.

Upgrading of production facilities at the SWFRAC allowed increased production of yearling rainbow trout for farmer assessment of production in saline ponds or dams. However, the late start to winter and associated dry conditions have depressed demand in 2001. Production trials for inland saline trout, including marketing initiatives, continued with assistance from the Development and Better Interest Fund. Additional trials with snapper grown in inland saline bore water have been initiated by the WA Maritime Training Centre.



**SOUTHERN INLAND AQUACULTURE FIGURE 1**

Map showing the major licensed aquaculture sites of the southern inland bioregion.

## MARRON FARMING

### MARRON FARMING STATUS REPORT

Prepared by G. Maguire

#### INDUSTRY DESCRIPTION

##### Production areas

Licensed purpose-built farms for marron (*Cherax tenuimanus*) extend from Esperance to Hutt River north of Geraldton, though the bulk of farms are concentrated in the higher-rainfall south-west coastal areas.

Two types of marron licence are available:

1. An Aquaculture Licence (Marron) allows the holder to sell marron of any size to any person. Applicants must demonstrate that they own or occupy private property with a minimum of 2,500 m<sup>2</sup> of impounded water available for marron aquaculture purposes.
2. An Aquaculture Licence (Marron Limited) allows the licence holder to sell marron of 76 mm or greater to the holder of a Fish Processor's Licence or an Aquaculture Licence (Marron).

##### Production methods

Semi-intensive farming in purpose-built earthen ponds; extensive farming in gully dams.

#### AQUACULTURE PRODUCTION

**Production current season (2000/01): 52 tonnes**

**Number of producers for year 2000/01: 172**

**Production projection next year (2001/02): 50–60 tonnes**

Production in the 2000/01 and 2001/02 years is being impacted by the drought conditions experienced in the growing areas. Production capacity is increasing, and this is expected to sustain existing total production despite the low water supply.

#### ECOSYSTEM EFFECTS

Marron farms present a low risk to the environment because there is relatively little water discharged from marron farms. The Department of Fisheries recommends use of settlement

and reed ponds to improve the quality of this discharge for reuse on the farm. A demonstration facility including settlement and reed ponds has been constructed at the SWFRAC. Escape of farmed stock into natural waterways is of concern, particularly if genetically selected stocks are used. The demonstration facility includes designs for electric fences which are eco-efficiency tools, that is, they prevent such escapes while improving profitability through deterring predators such as water rats.

#### SOCIAL EFFECTS

Marron farming is being utilised as a means of diversification of farm income. The industry involves a large number of family-based farms, and has the potential to provide additional regional employment as production increases.

#### ECONOMIC EFFECTS

**Estimated annual value (to producers) for year 2000/01:  
\$1.2 million**

#### INDUSTRY GOVERNANCE

Licence approvals are required.

#### EXTERNAL FACTORS

A significant number of new purpose-built marron farms have been developed during 2001/02, and other existing farms have constructed more ponds. This should progressively contribute to expansion in State production, as will ongoing improvements in husbandry. Development of a new farm to full production usually requires around three years and, for most farms, production is influenced by rainfall.

The recent drought has attracted considerable interest in the water reuse systems at SWFRAC as these have the potential to help drought-affected marron farms, although farmers cannot sustain an excessive number of ponds for the available water supply. As production expands, the industry will need to efficiently harvest more ponds in drier, warmer months, by draining the ponds, to allow continuity of supply of marron. This will increase the need for efficient water reuse systems.

## YABBY FARMING

### YABBY FARMING STATUS REPORT

Prepared by G. Maguire

#### INDUSTRY DESCRIPTION

##### Production areas

Yabbies (*Cherax albidus*) are an introduced species and so for translocation reasons, the licensed commercial yabby farming industry is restricted to the drier inland developed agricultural area of the south-west, to the north of Perth and to the east of Albany. Agricultural farms may sell yabbies without a licence to licensed farmers/processors.

##### Production method

Harvesting of farm dams by baited traps.

#### AQUACULTURE PRODUCTION

**Production current season (2000/01): 201 tonnes**

**Number of producers for year 2000/01: 23**

(This number refers to licensed farmers or processors. Note most farmers do not require licences.)

**Production projection next year (2001/02):**

**180–220 tonnes**

Production is limited by water levels in farm dams which have been restricted by low rainfall in 2000/01 and 2001/02.

## ECOSYSTEM EFFECTS

Yabby farming presents a low risk to the environment because negligible amounts of water are discharged from farm dams, whose primary purpose is the provision of water for stock. As the yabby farming industry is located away from the marron zone, it poses little threat to marron fisheries, which are more at risk from landholders within the marron zone stocking yabbies in dams on a non-commercial basis. If all-male hybrid yabbies, which are currently under development, can be used commercially, these should further reduce environmental risks as they do not breed with the parental strains. The current commercial yabby stocks have been shown not to be destructive burrowers, but rather build shallow burrows (research part-funded by the ADF).

## SOCIAL EFFECTS

On-farm management of yabby stocks is generally undertaken by women, who through yabby harvesting generate a small but valuable income for a large number of agricultural households. Yabby processors also provide useful regional employment.

## ECONOMIC EFFECTS

**Estimated annual value (to producers) for year 2000/01:  
\$2.51 million**

Wholesale value is reported rather than farm gate value. Emphasis is being placed on more winter harvesting and on producing larger, more valuable yabbies.

## INDUSTRY GOVERNANCE

Licence approvals are required for yabby processors and commercial harvesters. Commercial yabby farming is only permitted to the north and east of the 'yabby boundary' which approximately follows the direct line from Perth to Albany.

## EXTERNAL FACTORS

The discovery of the parasite *Thelohania* in a variety of farms was a major setback in 1998/99 although it posed no threat to consumers. Researchers have developed a non-sacrificial test for identifying *Thelohania*-free broodstock. Prospects for the industry are very good as FRDC research results (e.g. monosex growout, improved feeding regimes and regular, more effective trapping) are adopted by industry, although production depends greatly on rainfall.

Drought is a key issue as most farmers rely on surface runoff to fill stock watering dams. Few purpose-built yabby ponds are used. Yabbies probably use the dam wall slopes, particularly in deeper dams where bottom waters contain little oxygen. As dam volumes decline, more intensive management can sustain yields, but eventually the yabbies are forced to use the dam floor in shallow water where organic matter accumulates and creates an unfavourable environment, particularly on warm days.

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## TROUT FARMING

### TROUT FARMING STATUS REPORT

Prepared by G. Maguire

#### INDUSTRY DESCRIPTION

##### Production areas

Intensive culture of trout (both rainbow trout, *Oncorhynchus mykiss* and brown trout, *Salmo trutta*) is confined to the lower south-west by summer water temperatures and limited by the need for a large through-put volume of water. Potential exists to expand production by the utilisation of irrigation dam water in transit to agricultural farms on the south-west coastal plain. In addition, farmers with saline underground water are evaluating the performance of rainbow trout, stocked as yearlings and grown out in dams during cooler months. On an experimental basis, sea cage trials have been undertaken at Fremantle in more protected inshore waters.

##### Production methods

Highly intensive pond culture for food and extensive farming in large gully dams stocked for pay fishing. Low-intensity purpose-built ponds are being constructed by inland saline farmers.

#### AQUACULTURE PRODUCTION

**Production current season (2000/01): 18 tonnes**

**Number of producers for year 2000/01: 6**

**Production projection next year (2001/02): 20–25 tonnes**

The drought conditions during 2001 restricted the number of inland farmers able to purchase yearlings and thus curtailed inland saline farming trials during winter/spring of 2001.

#### ECOSYSTEM EFFECTS

Trout farming is considered to present a low to medium risk to the environment. Farms producing more than one tonne require discharge licensing including monitoring of water quality. The Department of Fisheries recommends use of swirl separators to improve the quality of this discharge prior to release or reuse. A demonstration facility, including a swirl separator, settlement pond and reed pond for stripping nutrients, has been constructed at the SWFRAC. Inland saline trials usually involve little discharge. However, farms developed in the future to utilise high flow rates of pumped underground saline water can use swirl separators to improve water quality prior to reuse or discharge.

Trout farms pose a low risk to public waterways as inadvertent release from land-based farms is low and there are few localities in Western Australia where escapees could reproduce.

## SOCIAL EFFECTS

Recreational trout fishing is a significant contributor to the tourism industry in the south-west region. Inland saline trout production may have potential for improving returns from salt-affected land, but production is still highly dependent on rainfall.

## ECONOMIC EFFECTS

**Estimated annual value (to producers) for year 2000/01:  
\$170,000**

This estimate includes the value of yearlings provided to inland saline farmers but not production by these farmers, as they are not licensed and hence do not provide aquaculture returns.

## INDUSTRY GOVERNANCE

A licence must be issued. Translocation approval can also be a requirement.

## EXTERNAL FACTORS

The SWFRAC trout hatchery provides support for the commercial trout farming industry as a by-product of

producing trout fry for recreational stocking programs. Fry are also supplied to private buyers who stock private dams within tourist complexes. Trout sold via tourist fishing ventures do not appear within the commercial production records, although they add significant commercial benefits to that sector and the regional economy. There is a trend for major trout producers to move towards tourist fishing ventures, effectively 'adding value' to the trout grown in these systems. While there is no reliable method of estimating the value of this sector, its tourism value within the south-west may be similar to that of the trout grown for the general fish market trade. Inland saline farming trials based on growing yearling rainbow trout to table size have been promising and may help the industry recover to earlier production peaks (more than 40 tonnes per year), but production still is rainfall-dependent and profitability not established.

Except for niche marketing, trout prices are restricted by competition from large-scale producers, particularly those in Victoria. Internationally, prices for farmed trout and salmon (salmonids) are being depressed by massive increases in production, particularly in Norway and Chile.

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## ORNAMENTAL FISH FARMING

### ORNAMENTAL FISH FARMING STATUS REPORT

*Prepared by G. Maguire*

#### INDUSTRY DESCRIPTION

##### Production areas

Production occurs throughout the State, but is mainly focused in metropolitan areas adjacent to the main markets. Both native and non-native species are produced.

##### Production methods

Dedicated small ponds and aquaria; breeding and rearing of juveniles for live sales.

#### AQUACULTURE PRODUCTION

**Production current season (2000/01): 288,000 fish**

**Number of producers for year 2000/01: 22**

**Production projection next year (2001/02):  
250,000–350,000 fish**

#### ECOSYSTEM EFFECTS

Ornamental fish farming is considered to present a low risk to the environment because there is relatively little water discharged from ornamental fish farms. Operators are required to ensure that stock does not escape into natural waterways.

## SOCIAL EFFECTS

This industry provides part-time employment for numerous small-scale producers and has potential as a form of farm diversification for future entrants to the industry.

## ECONOMIC EFFECTS

**Estimated annual value (to producers) for year 2000/01:  
\$250,000**

## INDUSTRY GOVERNANCE

Specific licence approvals are needed for commercial production.

## EXTERNAL FACTORS

Annual commercial production recorded for this sector indicates considerable volatility in production for major aquarium fish groups. This can be affected by marketing strategies of individual farms. Larger farms interstate may compete intensively with local producers, or if interstate production is depressed for key species, create an interstate marketing opportunity for local producers.