

PEARLING AND AQUACULTURE

General Overview

The Pearling and Aquaculture Program is responsible for the management of the pearling and aquaculture sectors throughout Western Australia.

The production of South Seas pearls dominates the State's commercial aquaculture industry.

In 2002 the Minister for Fisheries announced the commencement of a review of the aquaculture industry in Western Australia. The review has two components: a legislative review, and the development of a five-year strategic aquaculture plan. In this reporting period the Minister has issued two reports: *Draft Report on the Review of Legislative Arrangements in the Aquaculture Industry in Western Australia* and *A Draft Strategy for Development of the Western Australian Aquaculture Industry*. It is anticipated that the review and Government response to the review will be settled in 2003/04.

Pearling Activities

The Pearling Sub-Program is responsible for the development, implementation and review of management of the *Pinctada maxima* pearling industry. Its projects relate to the management of the wild-capture pearl oyster fishery and the hatchery sector; research and monitoring of the wild pearl oyster stocks; disease management; compliance and education; and lease and licence assessment and administration.

The Sub-Program provides executive support to the Pearling Industry Advisory Committee, a statutory management advisory committee established under the *Pearling Act 1990*, and its sub-committees. Strong linkages are also maintained with the peak industry representative body, the Pearl Producers Association.

The management of pearling is discussed in detail under the north coast bioregion (pp. 188–189).

Aquaculture Activities

The Aquaculture Sub-Program is responsible for implementation of the Government's aquaculture development initiative. It provides support to the Aquaculture Development Council, a statutory management advisory committee established under the *Fish Resources Management Act 1994*, and its associated sub-committees.

Excluding *Pinctada maxima* and marine algae, the total increases in value and tonnage of aquaculture product for 2001/02 were 2.5% and 3.3% respectively, compared to 2000/01. Commercial enterprises in Western Australia include production of mussels, edible oysters, marron, yabbies, trout, algae (for beta carotene), barramundi, abalone, ornamental fish and non-*maxima* pearl oysters.

The continuing commercial harvest of black pearls from Shark Bay and the Abrolhos Islands is important in the development of this new industry for Western Australia. The quality of the pearls has been encouraging.

The first commercial sale of abalone produced in Western Australian farms is a milestone along the road to seeing this industry sector become a significant producer of quality abalone.

The continued development of the abalone grow-out farm at Bremer Bay, combined with excellent progress made at the established hatchery at the Albany Aquaculture Park, will provide a basis for the establishment of a major industry in years to come. It is anticipated that in the next few years, another three or four ventures will begin development. There is potential for the abalone aquaculture sector to have a higher value of production than the wild-caught sector in the future.

The commercial hatchery production of scallop spat and the 'seeding' of an aquaculture site off Geraldton in the Mid West Region is an exciting component in the process of developing a new industry. It is expected that the success of this pioneering activity will be known in 2003/04.

Barramundi is the fastest growing aquaculture industry in Western Australia, with production increasing strongly in this



financial year. Major supplies came from the farm at Lake Argyle and from smaller recirculation systems, which are located throughout the State. Interest from other proponents indicates that this sector will expand rapidly in the coming years.

The continued establishment of 'new' mussel farms on the Southern Flats site in Cockburn Sound is important for the growth of what is becoming an important industry.

The funding approval from the Kimberley Sustainable Regions Program (KSRP) for a prawn aquaculture project in the Kimberley is seen as a major positive. This project, with the continued capture of *Penaeus monodon* prawn broodstock and the production of post-larvae in Broome, is an important milestone, underpinning the development of the prawn aquaculture industry in Western Australia.

This industry is likely to see the first pilot production of prawns in 2003/04. A pilot development has occurred at Derby, and additional ponds are being developed as part of the KSRP project. Prawn farming is therefore positioned to be a major contributor to regional economic development and employment in the next few years.

Licensing

The growth in the number of aquaculture licences granted is encouraging. As of 30 June 2003, the Department of Fisheries had issued 470 aquaculture licences – an increase of approximately 2% on the previous year (462).

Growth of about 392% in the number of licences issued since 1994 gives a clear indication of the level of interest and activity in the aquaculture sector in Western Australia. This figure actually understates the real level of involvement in aquaculture, given that yabby farmers generally do not require an aquaculture licence and anecdotal evidence suggests that the interest and activity in this area have increased substantially.

The breakdown of licences in 2002/03 was as follows:

- 288 marron licences;
- 111 mariculture or non-freehold land licences (including mussels, abalone, non-*maxima* pearls); and
- 71 others (including yabby, silver perch, trout, ornamental fish).

Two new larger-scale land-based aquaculture licences were issued, one for the first commercial finfish farm in the State, located at Exmouth, and the other for a prawn hatchery at the Broome Tropical Aquaculture Park. One new marine-based aquaculture licence was issued.

The Department assessed 40 new applications, 10 variations and seven transfers for licences on freehold land during the year. Public consultation and assessment of coastal water applications under Ministerial Policy Guideline no. 8 also continued.

Value of Production

The value of aquaculture in Western Australia is growing strongly, having increased by 23% from 1998/99 to 2001/02. Some indications suggest that yabby and marron farming were affected by drought conditions.

It is predicted that significant growth will occur in the next decade as licences granted in the late 1990s result in the construction of facilities, and as projects move from pilot status to commercial maturity. Whilst no estimate of capital expenditure on aquaculture facilities is available, it is significant and will increase substantially in coming years.



WEST COAST BIOREGION

REGIONAL AQUACULTURE DEVELOPMENT OVERVIEW

The principal aquaculture activities in the west coast bioregion are the production of blue mussels (*Mytilus edulis*) and marine algae (*Dunaliella salina*) for beta carotene production, and the emerging black pearl industry based on the production of *Pinctada margaritifera* at the Abrolhos Islands and Shark Bay.

The Department of Fisheries manages mussel farming in Cockburn Sound in liaison with the Fremantle Port Authority and has recently commenced a process of reallocation of farm sites, with further reallocations planned for 2003/04. The tenure for farmers operating at the Kwinana Grain Terminal has been uncertain for some time. Consequently the Department of Fisheries secured an alternative farming site at Southern Flats within Cockburn Sound several years ago. Discussions are continuing around an additional 12 ha of water at this site, following the loss of a farm site within the waters controlled by the Royal Australian Navy.

The WA Shellfish Quality Assurance Program (WASQAP) monitors and regulates the quality of shellfish harvested in Western Australia for domestic and export markets. The WASQAP is conducted jointly with industry and the WA Department of Health. The program involves regular sampling of bivalve shellfish-growing areas for toxic algae and contaminating bacteria in order to monitor shellfish quality and permit the classification of shellfish growing areas. The two principal areas used for the production of shellfish in Western Australia, Cockburn Sound and Oyster Harbour near Albany, have been classified in accordance with the procedures outlined in the WASQAP and are approved for export status by the Australian Quarantine and Inspection Service (AQIS).

Activities during 2002/03 included the completion and submission to AQIS of update reports on the farm sites at the Kwinana Grain Terminal, Southern Flats and Oyster Harbour. AQIS conducted its annual audit of the WASQAP in March 2003, according to 100% accreditation.

The emerging aquaculture sector at the Abrolhos Islands continues to be carefully managed to ensure its sustainable development. In the past 12 months, the seven licensees engaged in the culture of black pearls have increased the utilisation of their sites, with growth of approximately 58% in the numbers of adult pearl oysters held. Although the number of pearls produced at the Abrolhos is still small by comparison with the established pearl industries, the prospects for increased production are encouraging.

During the past year a trial of tuna yellowfin tuna farming near the Abrolhos Islands has been proposed. The applicants are currently involved in consultation with community groups and Government departments to identify issues that need to be addressed and approvals required. The pilot trials being

proposed are planned to determine operational feasibilities and to identify further environmental issues requiring management.

The principals involved with the saucer scallop seeding project near Geraldton have, with funding from the FRDC, developed techniques to seed hatchery-produced spat on the seabed. Over the past year the production capacity of the hatchery has been increased, with the operators now able to produce spat reliably, which in turn has led to a significant increase in spat successfully seeded in the Geelvink Channel.

Development activities included handling public enquiries and providing technical support, particularly for black pearl farmers at the Abrolhos Islands. Results of small-scale 'on-farm' experiments, comparing a range of husbandry techniques used by the growers in the region, were presented to growers at their annual general meeting.

During 2002/03, compliance activities within the Cockburn Sound mussel industry focused on ensuring mussel farmers comply with the navigational lights and boundary marking requirements and that all mussel farming equipment remained within the boundaries of farm sites. This was achieved through regular water- and land-based inspections of mussel farm sites. Compliance with these requirements was generally good, with the exception of the Garden Island mussel farm sites where there is a continued need to notify mussel farmers to maintain the required navigation lights and boundary markers.

Fisheries Officers also supervised the collection of samples under the WASQAP. When the presence of contaminants exceeds levels specified under WASQAP, formal notification to cease mussel collection is given to mussel farmers and Fisheries Officers enforce the closure through monitoring until further testing indicates that mussel harvesting can commence again. There were four formal mussel harvesting closures in 2002/03.

Black pearl compliance activities involved informal inspections of navigational marking requirements and boundary leases. A number of licensees were formally notified regarding inadequate marking of lease sites. Formal operations involving audits of licensee operations will be carried out during 2003.

REGIONAL RESEARCH OVERVIEW

The research undertaken within the Perth region included joint activities with the WA Maritime Training Centre (Challenger TAFE) on marine finfish. This has produced encouraging results in larval and nursery trials as well as a grow-out trial using an intensive system for yellowtail kingfish (*Seriola lalandi*) culture as part of an Aquaculture Development Fund project. Broodstock collection, and conditioning of these fish at Challenger TAFE, has continued. Other related activities included farming trials with this species in rock

lobster holding systems in Geraldton and in a seawater supply channel for a marine algae (beta carotene) farm at Port Gregory. Growth rates, product quality and trial marketing results have been very encouraging. Efforts have continued to collect more yellowtail kingfish broodstock locally to allow commercialisation of this initiative.

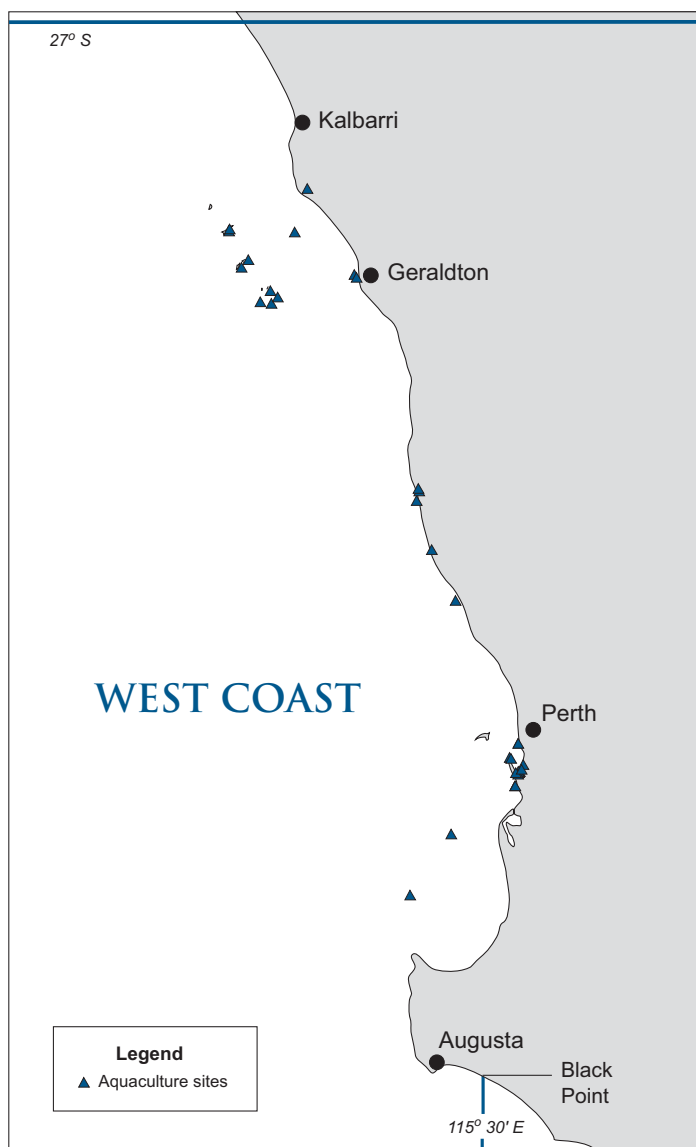
Barramundi larvae have been reared in an automated larval rearing system designed by research staff, with funding support from FRDC. This project, assisted by Department of Agriculture staff, has evaluated different experimental and commercial products claiming to improve the nutritional content of brine shrimp larvae while minimising transfer of bacterial load to finfish larval tanks when brine shrimp are used as a feed. An automated system has been developed for enriching brine shrimp larvae and a finfish system adapted for growing brine shrimp adults from cysts.

Research has also commenced at the Port Gregory marine algae farm to determine how to grow brine shrimp for cyst and

adult biomass production. Reliance on unpredictable supplies of imported cysts poses a major risk for marine finfish and prawn farming initiatives.

The algal facility at Challenger TAFE has been used by abalone researchers to quantify the grazing rates on attached diatoms (a type of algae) by juvenile abalone. Use of low light levels was found to improve the growth rates of abalone when fed some species but not others, probably because low light can inhibit the growth of some diatoms.

Collaboration with various universities has continued, with research students providing valuable results on food intake by juvenile abalone, physical characteristics of formulated microdiets for finfish larvae, rock lobster larval rearing, feed ingredient evaluation with juvenile snapper, yabby aquaculture, and capacity for natural marine habitats to utilise waste outputs from finfish sea cages.



WEST COAST AQUACULTURE FIGURE 1

Map showing the major licensed aquaculture sites of the west coast bioregion.

WEST COAST BIOREGION

Mussel Farming

Mussel Farming Status Report

Prepared by G. Maguire

INDUSTRY DESCRIPTION

Production areas

Mussel (*Mytilus edulis*) farms are found in Cockburn Sound and Warnbro Sound (as well as in the Albany harbours and King George Sound in the south coast bioregion). Resource-sharing issues are a major constraint to securing additional sites in protected and productive areas. Production has commenced in the Southern Flats area of Cockburn Sound where mussel farmers now have more secure access to productive growing areas.

Production method

Vertical rope and bag culture on longlines.

AQUACULTURE PRODUCTION

Production current season (2001/02): 989 tonnes

Number of producers for year 2001/02: 14

Production projection next year (2002/03):
900–1,100 tonnes

ECOSYSTEM EFFECTS

Mussel farms present a low risk to the environment because there is no addition of feeds. In general, mussel farms can be considered as significant removers of excess nutrient inputs into waterways from domestic and industrial sources, as algae that take up these nutrients are consumed by mussels and are then removed as harvested mussel biomass. Secondly, faecal wastes from the farms are far less likely to cause high organic

loadings on the sea bed in Western Australia than in mussel industries elsewhere in the world, because the local mussel lines are more widely separated in response to low food (plankton) levels. Monitoring of potential impact on seagrass beds below mussel lines at Albany indicated negligible impact. In Cockburn Sound, large pink snapper which aggregate in the area to spawn are attracted to the mussel farms in some years and are thought to consume significant amounts of mussels.

SOCIAL EFFECTS

The industry provides direct employment to 40–50 personnel and adds valuable diversity to the Western Australian seafood industry.

ECONOMIC EFFECTS

Estimated annual value (to producers) for year 2001/02:
\$2.82 million

INDUSTRY GOVERNANCE

Licence approvals are required and regular site inspections are carried out to ensure farmers are operating within their site coordinates and their sites are clearly marked for marine safety compliance.

The mussel industry must also meet the requirements of the WA Shellfish Quality Assurance Program. This program contributes significantly to the overall monitoring of the water quality of waterways such as Cockburn Sound.

EXTERNAL FACTORS

Productive areas are generally in protected waters where nutrients from terrestrial sources raise the food levels above those in coastal waters dominated by the low-nutrient, tropical Leeuwin Current.

