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Geography 211

Aquaculture

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Index

Introduction	p 2
Water Sources	p 3
Water Quality	p 3
Temperature	p 3
Dissolved Oxygen	p 3
Aquaculture WA	p 4
Mussels	p 4
Marron	p 4
Yabbies	p 5
Trout	p 5
End Notes	p 5
Bibliography	p 6

Introduction

Aquaculture is a form of agriculture that involves the propagation, cultivation and marketing of aquatic organisms in an controlled environment. The history of aquaculture first begun in ancient China some 4000 years ago with ornamental carp ponds to today's \$264 million commercial production of catfish in the southern states of America. **1**

The following essay will be a broad examination of the conditions and requirements of aquaculture and a closer study of the industry in Western Australia. It should be noted that the industry is only at a fledgling stage with a handful of organisms in commercial production. However, there is one segment that is a major success with \$153 million worth of merchandise a year. **2** This of course is the Pearling Industry in the northern part of the state.

The scope of this essay is to study those other sections of the industry within the state that displays some potential to be commercially viable in the mid to long term.

Water Sources

Water supply is the most important factor in selecting the location for an aquaculture facility. Aquatic organisms depend upon water for all their needs. Large quantities of water must be available year round.

Water sources can be classified into several categories some of which are wells, springs, groundwater, streams, rivers and lakes. Wells and springs being the best sources because of the high water quality and uncontaminated condition. [3](#)

Water Quality

As mentioned above, water quality determines the success or failure of an aquaculture operation. Therefore it is imperative that when in a commercial enterprise, the key factor - such as water quality - be given the highest priority to ensure quality control measures are embedded within the production system. [4](#)

Temperature

The importance of temperature within an aquatic environment is another key factor in a commercial enterprise. Certain organisms require particular temperate zones for optimum development. Many biological activities such as spawning and egg hatching are geared towards annual temperature changes in the natural environment.

Therefore one of the criteria in the selection of an appropriate organism in which to cultivate should be based on the temperature requirements because heating or cooling the water environment is an added cost that may prove uneconomic. [5](#)

Dissolved Oxygen

Like humans, aquatic organisms require oxygen for respiration. Dissolved oxygen concentrations are expressed in milligrams per litre (mg/l). Not enough oxygen in the water and the organism dies.

Therefore as with water quality and temperature, oxygen becomes another critical factor in the commercial production of aquatic organisms. [6](#)

Aquaculture WA

In Western Australia, the aquaculture industry is managed by Fisheries Western Australia under the control of the Minister of Primary Industries. There are 4 species under commercial production within the state -

- 1) Mussels
- 2) Marron
- 3) Yabbies
- 4) Trout

Mussels

In Western Australia, the species under commercial production is the Blue Mussel (*Mytilus Edulis*). It should be noted that this is an introduced species and not indigenous to West Australian waters. It has been surmised that this species first came to Western Australia as unwanted cargo attached to the hulls of commercial freighters.

The clean tropical waters of the south west coast provides an opportunity for a viable commercial industry in mussel farming around areas like Cockburn Sound and Princes Royal Harbour. As mussel cultivation is likely to be restricted to protected areas near the mouths of rivers, access to such areas are both carefully regulated and monitored.

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Marron

Marron (*Cherax tenuimanus*) are a large crayfish found in fresh water environments such as rivers, creeks and streams located in the high rainfall areas of the south west of the state.

Within the state, varying systems of cultivation have been used such as farm dams, ponds and tanks. Of these, the purpose built ponds produce the best results of between 1000 to 4000 kg / ha / yr.

The future of commercial Marron farming lays within further research and development. More consistent production methods, size regulation and quality control are what both the market and producers are looking for. Similar to the crayfish industry, Marron farming depends on meeting the expectations of the consumer and this is what determines whether a variable operation will continue and expand or cease to exist. 8

Yabbies

Another fresh water crayfish, similar to the Marrons, Yabby cultivation in the state began in the 1930's when a farmer imported a dozen yabbies from Victoria. Yabby farming in the wheat belt is very successful producing between 100 to 300 tonnes a year.

One of the main advantages of yabby production is the time factor between yabbies in the dam to diner's plate anywhere in the world. Yabbies can be exported alive and arrive in prime condition at high value markets in Asia and Europe. [9](#)

Trout

Both the Brown and Rainbow trout have been in Western Australia since the 1930's, a hatchery for trout was open in Pemberton and operated by Fisheries Western Australia, known as the South West Freshwater Research and Aquaculture Center. This facility provides fish stock to commercial operators in the state.

There is a small trout industry in WA, currently there are three trout farms that produce 40 tonnes a year. These farms operate within a protected environment free from disease. The commercial potential of trout farming is enormous given the appropriate conditions. Trout production world wide is valued at \$1.3 billion a year, therefore with careful management and more development, trout cultivation in the mid to long term may prove to be lucrative industry for the state. [10](#)

End Notes

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