

Aquaculture Research Aligned to Salt Interception Schemes in the Riverland

Introduction

Salt interception schemes (SIS's) provide an engineering approach to divert saline groundwater that would otherwise enter the River Murray. The Woolpunda, Waikerie and Qualco SIS's in the Waikerie region of the Riverland comprise 93 bores that intercept approximately 30 million litres of saline groundwater per day and pump this to the Stockyard Plain Disposal Basin (SPDB) 12 kilometres south-west of Waikerie.

The temperature of the saline groundwater is between 20 and 22 °C with a salinity of 18-19 g/L, approximately 50% of oceanic seawater (35 g/L). Developing viable and sustainable aquaculture systems aligned to SIS's to exploit this under utilised resource could provide considerable economic benefit to the region.

The Project

The National Action Plan for Salinity and Water Quality (NAP) has provided three years funding through the Centre for Natural Resource Management (CNRM) to develop an R&D and pilot commercial scale, demonstration aquaculture facility near Waikerie. This facility named the Waikerie Inland Saline Aquaculture Centre (WISAC) is located in close proximity to the Woolpunda section of the SIS pipeline.

The 'Vision' for this project is to generate interest and information to foster commercial investment in an inland saline aquaculture industry aligned to SIS's in the Riverland worth \$20 million by 2013. The development of an aquaculture industry in the Riverland will provide a new primary production industry to complement traditional horticulture/dryland farming and supporting services industries.

It is proposed that this would best be achieved by promoting the 'Aquaculture Park' concept to maximise potential benefits from this resource. Such parks could be planned and serviced to allow commercial developments to use and dispose of SIS water in managed aquaculture systems located within a designated area. Following this managed approach it is expected that future SIS's would consider incorporating an Aquaculture Park to utilise discharged groundwater to provide regional economic benefit.

Site development works were completed at the Waikerie Inland Saline Aquaculture Centre (WISAC) in early 2006. SARDI is now undertaking pilot commercial scale production trials using mullet grown in systems of similar size and operation to those that would be used by commercial growers. These activities are designed to demonstrate and further develop types of managed aquaculture systems that are suitable to utilise the saline groundwater resource for commercial production. These systems will take advantage of the volume of water available and particularly the elevated temperature of this saline groundwater that will allow better growth of fish than would be possible in the sea.



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Research Findings

Early trials conducted at the South Australian Aquatic Sciences Centre at West Beach in 2005/2006 confirmed that water from the Stockyard Plain Disposal Basin was suitable for the production of mulloway.

The first stock of mulloway, delivered to WISAC in May 2006, have increased their body weight by 50% within four months. This indicates that the mulloway will achieve their projected growth rates to reach a marketable size of 600 to 700 grams within 12 months. This compares to two years in the wild.

The food conversion ratio recorded during this time is highly efficient pointing to a low cost of production with feed delivery and feed management easily controlled in 70,000 litre tanks. The ability of the production system achieving target densities at market size is also promising.

Advantages of inland saline aquaculture include:

- Use of high volume unexploited saline groundwater that is presently considered a waste stream
- Potential for commercial production of a highly marketable product
- Faster fish growth due to constant elevated water temperatures
- Improved feed management and food conversion efficiencies
- Biosecure water supply and ability to manage environmental impacts (such as water and nutrients)



Ongoing research is being conducted to determine the suitability of snapper (*Pagrus auratus*) for culture in this saline groundwater. Early findings of this research suggest that this species is less suitable for culture in this saline groundwater due to a lesser tolerance to low levels of potassium in this water than would be found in saline water with composition of oceanic water. Methods are being assessed to rectify this deficiency.

The Waikerie Inland Saline Aquaculture Centre provides future potential to research other high value or novel species and uses such as other edible crustacean, mollusc and finfish species; microalgae for pharmaceuticals and biofuel and halophytes for food, oils and fibre.

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