Department of Primary Industries

primefact

Net Returns of Real-Time Sensors and Salinity-Based Management Plans in NSW Oyster Production

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The adoption of real-time sensors in salinity-based management plans can increase the annual returns to NSW Oyster producers in Pambula Lake and Cromartys Bay (Port Stephens).

An annual net benefit of $95,736 in Pambula Lake and $15,344 in Cromartys Bay is estimated for each harvest area.

This analysis also shows that the cost of sensors for both harvest areas is completely recovered in the first year of operation.

These estimates are considered conservative as the data used for this assessment is from the drought period 2016-17 to 2019-20. During times of increased rainfall there are likely greater benefits from the use of real-time sensors.

The incorporation of environmental and social benefits would also increase the net benefits in this assessment. These include the monitoring of harmful algal blooms and a potential reduction in farmer stress (associated with closure of harvest areas).

Introduction

This Primefact presents the net benefits of real-time sensors and salinity-based management plans in place of current rainfall-based management systems, in two oyster harvest areas in NSW.

Analysis has been conducted for direct harvest in Pambula Lake and Cromartys Bay, and direct harvest and harvest and depuration in Cromartys Bay.

Approach

A Cost Benefit Analysis was undertaken to estimate the net benefits of installing real-time sensors across 20 years. The quantified benefits include:

- additional revenues from using real-time sensors to increase the number of harvest days
- avoided depuration costs associated with the identification of downgrade days that could be direct harvest days

and the additional production costs and costs of installing and maintaining sensors.

A qualitative assessment was conducted for the social and environmental impacts.

Data

Data and assumptions were obtained from the NSW DPI Food Authority and Fisheries.

Results

Table 1 presents the net benefits of replacing rainfall-based management systems with real-time sensors and salinity-based management plans. This table also shows that it takes one year to recuperate the cost of sensors in Pambula Lake and Cromartys Bay.

Table 1. Net benefits in 2020-21 dollars ($/hectare) and recovery of costs

Scenarios	Net benefits across 20 years ($/ha)	Net benefits per annum ($/ha)	Recovery of costs (Year)
A. Direct Harvest			
Pambula Lake	15,039	1,420	1
Cromartys Bay	9,134	862	1
B. Direct Harvest and Harvest and Depuration			
Cromartys Bay	9,131	862	1

Number of additional harvest days from adopting sensors is shown in **Table 2**.

Table 2. Average avoided harvest and downgrade days identified using real-time sensors (DPI Food Authority, 2020)

Additional days	Pambula Lake[1]	Cromartys Bay (with depuration)[2]	Cromartys Bay (without depuration)[2]
Direct Harvest	11	3.33	9
Harvest and Depuration	N/A	5.33	N/A
Avoided downgrade	N/A	5.67	N/A

Note: 1. Average annual data across 2016-17 to 2018-19;
2. Average annual data across 2017-18 to 2019-20.

Data to estimate additional production costs are presented in **Table 3**. The cost of installing and maintaining sensors is $17,000 in year 1 and $6,000 per annum thereafter. These costs are spread across 28 businesses in Pambula Lake, and 7 in Cromartys Bay.

Table 3. Average production cost per dozen oysters (as a percentage of Farm Gate Price) (DPI, pers. comms.,2020)

Item	Costs
FIXED COSTS	
1. Paying annual levy to Government	
a. Fisheries	0.6%
b. NSW Food Authority	
- Pambula Lake:	3.3%
- Cromartys Bay:	6.4%
c. Crown Lands	1.0%
2. Water-based capital replacement	4.2%
3. Land-based and water plant and equipment replacement	3.0%
4. Insurance	0.3%
VARIABLE COSTS	
5. Annual spat purchase or on-farm catching	2.2%
6. Labour	24.6%
7. Maintenance	1.5%
8. Expendables	2.5%

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