

# APPROPRIATE COASTAL AQUACULTURE OCCUPATION: USING CONSTRAINTS MAPPING AND CONSULTATION FOR COASTAL MANAGEMENT DECISIONS

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## 1 INTRODUCTION

In response to significant pressure on coastal space for aquaculture at various locations around the country, central government announced its intention to introduce an amendment to the Resource Management Act. The key purpose of the amendment was to ensure aquaculture was managed in an appropriate and effective manner within Aquaculture Management Areas.

## 2 DISCUSSION

### 2.1 BACKGROUND

In the period 2000/2001, the country saw a dramatic increase in resource consent applications for aquaculture activities. In the Auckland Region, much of this interest was centred on the western Firth of Thames area. Over this period, the Council received applications for approximately 6000ha of mussel spat catching activities.

This demand highlighted the limitations of the discretionary activity status rules that applied in many regional coastal plans for the management of high demand activities. In order to control this "gold rush" of applications, the government passed the Resource Management (Aquaculture Moratorium) Amendment Act in 2002 (RMAMAA), while still progressing with the reform of the parent legislation relating to aquaculture.

The purpose of the RMAMAA was, in part, to provide regional councils with time to undertake changes/variations to their regional coastal plans. A principal objective was to move away from the ad-hoc site by site approach under the discretionary activity status, to a more strategic approach by establishing specific zones for aquaculture activities, Aquaculture Management Areas (AMAs).

The moratorium established through the RMAMAA expired on 31 December 2004 and a series of new legislation resulting from the aquaculture reform came into force on 1 January 2005.

### 2.2 GUIDING PRINCIPLES

At the commencement of the variation process, the Auckland Regional Council, (ARC), recognised that aquaculture is an important industry. However, it also noted that the Auckland Region is the most populated region in the country, with many competing uses and values of the coastal marine area, and consequent limitations for aquaculture development. Accordingly, the Council resolved that aquaculture was only appropriate in the right location and at the right scale. In order to give effect to this, a set of guiding principles were established.

- The coastal marine area is public open space and a finite resource
- Provision should be made for aquaculture, but at appropriate locations and scale
- Need to balance competing demands
- Need to safe-guard the life supporting capacity of natural resources
- Need to take a precautionary approach

In order to give effect to these principles, a Constraints Mapping exercise was undertaken.

### **2.3 CONSTRAINTS MAPPING**

The constraints mapping exercise was undertaken to identify the spatial extent of existing uses and values of the coastal marine area in order to identify areas of lower constraints that may be considered for aquaculture development. Accordingly, the constraints mapping was undertaken in two stages.

The purpose of the Stage 1 exercise was to identify possible areas where aquaculture expansion may be considered. The Stage 2 exercise would then focus in detail on these areas.

Stage 1 of the constraints mapping was undertaken at the super-regional level. This included the whole of the Auckland Region and the eastern coast of the Waikato Region to incorporate the whole of the Hauraki Gulf Marine Park, and importantly, the whole of the Firth of Thames. Environment Waikato (EW) manages the eastern side and the southern portion of the Firth with the ARC managing the north-western component. This joint jurisdictional nature of the Hauraki Gulf and the Firth has meant that the ARC has worked very closely with EW over this issue.

The Stage 1 exercise identified two areas for possible expansion for aquaculture; the Kaipara Harbour, and the western Firth of Thames.

The proposed variation (Variation 3) for the Kaipara Harbour area was publicly notified in October 2002. The Council have put the hearings on hold pending the passage of the aquaculture reform legislation.

With regard to the western Firth of Thames, officers have been undertaking on-going investigations to determine suitability of this area for more aquaculture. This is part of the Stage 2 constraints mapping process.

### **2.4 FIRTH OF THAMES STAGE TWO CONSTRAINTS MAPPING PROCESS**

The Firth of Thames is a very important ecological area. The southern shoreline and intertidal areas are internationally recognised as wading bird feeding and roosting areas, and are accorded RAMSAR status. The Firth is an important recreational and commercial fishery. From a geological perspective, the internationally recognised chenier plains and gravel ridges occur on its western shores.

The Firth is already subject to aquaculture activity. Within the Auckland region there is already 45 ha of marine farming at Waimaungu Point, and within the Waitako region, there is the Wilson's Bay Aquaculture Management Area which allows for 1000 ha to be farmed, plus numerous existing mussel and oyster farms around Coromandel, Te Kouma and Manaia Harbours.

Given the above, the ARC has taken a precautionary approach and has initiated investigations to determine appropriate sustainability levels for further mussel farming in the western Firth of Thames. Stage 2 of the constraints mapping exercise has incorporated research undertaken by NIWA on ecological sustainability, plus a detailed information gathering process that focuses on concerns raised by the community.

### **2.5 RESEARCH**

The research and investigations have concentrated primarily on ecological, social and cultural sustainability issues.

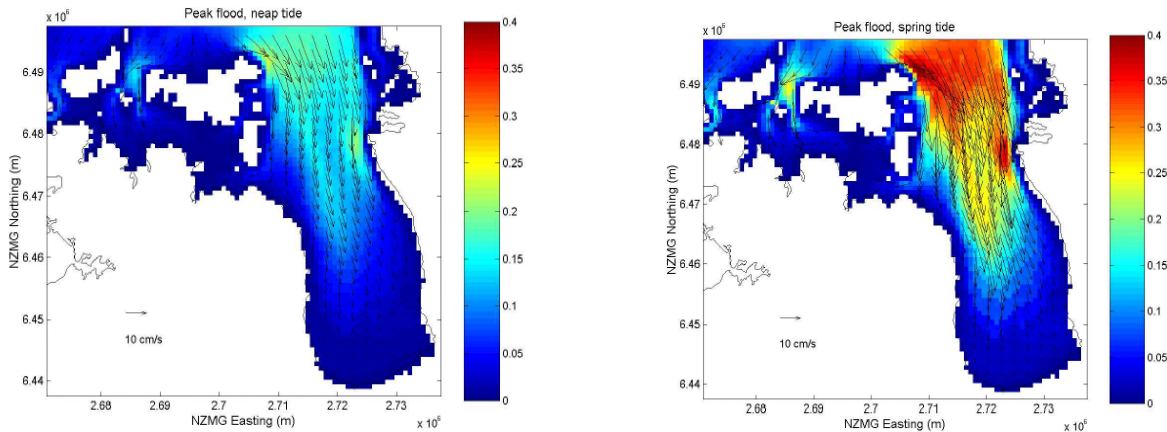
### **2.6 ECOLOGICAL SUSTAINABILITY**

Mussels are filter feeders. They filter phytoplankton and zooplankton from the water column. It is well recognised that concentrations of mussels can cause plankton depletion. As these same plankton form the base of the food chain for the Firth of Thames, it is possible that increased mussel farming could have a deleterious effect on the ecology of the area.

The ARC and EW jointly commissioned NIWA to undertake a scoping report which compiled existing information and recommended a series of further investigations. As there is a lack of hard data to estimate likely effects, especially for large areas of mussel farming, the scoping report recommended using computer models to predict likely effects.

In a joint project with EW and the consortium of mussel spat catching applicants, the ARC contracted NIWA to develop numeric models of the Firth of Thames. The base model is a hydrodynamic model that simulates the water and current flows within the Firth. This model simulates water movements across seasons and events, such as La Nina and El Nino, which have significant effects on the hydrodynamics of the area. Importantly this model allows for three dimensional analysis of the water column.

**Figure 1:**



In order to predict ecological effects, NIWA has developed three biological models. These simulate the effects of mussel feeding on phytoplankton, zooplankton and snapper eggs. One of these models also predicts more complex interactions such as changes in phytoplankton and zooplankton species composition as a result of feeding activities.

In terms of snapper eggs, it was considered likely that mussel feeding would remove fish eggs from the plankton. As snapper is an important fishery within the Firth, a model was developed to simulate likely effects of mussel feeding on this part of the ecology.

The modelling work considered three scenarios:

- No marine farms,
- Existing situation - all existing approved marine farms. It also assumed that the partially farmed Wilson's Bay AMA was fully established, and
- Existing situation plus a 4,300 ha AMA located in the area of the existing mussel spat catching applications.

This 4,300 ha area was chosen as it was considered to be an extreme AMA, and it was the area covered by the majority of the mussel spat catching applications.

The conclusions from the modelling are as follows:

- The larger the AMA, the larger the effect.
- Phytoplankton depletion occurs within the AMA, where it extends outside the farm it is generally localised and is of low ecological significance.
- During periods of low nutrient availability, the mussel farm would act as a nutrient source and stimulate the growth of small fast growing phytoplankton.

Snapper egg depletion occurs, however this is likely to be of low ecological significance.

From this, it is concluded that even with a large AMA, the ecological sustainability effects are manageable and are therefore likely to be secondary to social and cultural issues in determining the location and size of mussel farming AMAs in the western Firth of Thames.

As these models are predictive, it is important to have confidence in their output. In order to achieve this, the ARC in association with EW asked NIWA to validate the model using monitoring information from Wilson's Bay. The model was run using hydrodynamic data from a selected time period and compared to actual monitoring results from Wilson's Bay over this same period. Although the final

report has not yet been released, the results indicate that the model demonstrates a good level of prediction.

## **2.7 SOCIAL AND CULTURAL INVESTIGATIONS**

The social and cultural investigations undertaken sought to draw a picture of peoples' use of the area and of the aspects they value. As with other information, this is being collected in a spatial format for inclusion on the constraints maps.

Council staff have pulled together a wide range of information including, Growth Forum information and information from Statistics New Zealand to assist in addressing community concerns. The ARC has also been granted access to information from a Ministry of Fisheries survey on recreational fishing in the area. This information is in its final stages of analysis.

A consultation programme is currently underway to assist with determining the level of aquaculture that could be provided for in the Firth. The ARC recognises that the communities around the Firth are well versed in aquaculture and what is required for their provision. The third stage of consultation involved public meetings in late April/ May 2004. A presentation in November utilised this community information and took the study area (the Firth), through a series of mapping exercises which addressed their concerns by cutting sections off the study area, ultimately resulting in a reduced area of interest.

Much of the information gathered has been driven by the concerns raised by the community at the various public consultation meetings held in April/May 2004 and in November 2004.

Key issues that were discussed at the workshops in relation to marine farming in the western Firth and Kawakawa Bay were:

- Visual amenity, landscape and natural character effects by locating away from land.
- Navigation effects by clear navigation paths and lighting.
- Future issues by size, location and planning.
- Environmental and pollution affects by size, separation and good management practices.
- Marine farming providing for the social and economic wellbeing of people and communities.

Additional concerns were the effects of aquaculture on the marine and bird species that use the areas, fishing and usage by future generations should they proceed.

The ARC has contracted Boffa Miskell Ltd to undertake a natural character assessment for the AMA variation process. Two assessments have been undertaken which cover this area – “Natural Character Assessment - Firth of Thames and Kaipara Harbour, November 2002”, and “Natural Character Assessment - Eastern Tamaki Strait/ Waiheke Channel, October 2004”. These reports identify areas of high natural character. It should be noted that neither report considers the ecological aspects of natural character.

The mapping exercise in November was useful for interpreting previous community concerns and proposing mitigation measures for those concerns. Further community consultation is being programmed for early 2005. It is planned to present possible AMA's to the community at this time. The ARC is aware it needs to find a balance in providing appropriate aquaculture as set down by government legislation versus against the environmental impacts it can have on the environment. The community is a key player in finding this balance and a useful way to show them information is in a visible format.

## **2.8 WHERE TO FROM HERE**

Following the feedback at upcoming community meetings, the ARC will make decisions on aspects of the AMA process in the Firth of Thames (FOT). If the ARC propose an AMA in the FOT, they will be required to seek an Undue Adverse Effects test from the Ministry of Fisheries. This is a statutory requirement under the new aquaculture legislation. It requires the Minister of Fisheries to consider the effects of any AMA on recreational, traditional and commercial fishing. The Ministry has six months to undertake the test.