

Natural Character and Visual Impact Assessment of Potential Finfish Farming Development

Prepared by:
Bernard Brown Associates Ltd

For:
Environment Waikato
PO Box 4010
HAMILTON EAST

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Phil Parkes

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Executive Summary

Environment Waikato is considering a plan change to the Regional Coastal Plan that will enable fish farming and other new types of aquaculture in the existing Aquaculture Management Areas (AMA) located offshore from Wilson Bay, and the Coromandel Peninsula.

Bernard Brown Associates has been engaged to undertake a Natural Character and Visual Impact Assessment of the proposed fish farming aquaculture activities. As a baseline assessment, the study is required to compare full development of mussel farming aquaculture in the existing AMAs with potential fish farming activities. The study focuses on the greatest concentration of marine farms on the Peninsula's west coast from Wilson Bay to Amodeo Bay.

Existing mussel farming activities in the Waikawau/Wilson Bay coastal environment are located in Area A of the Wilson Bay Marine Farming Zone sited 1.5 kilometre off shore. The mussel farm activities generate visual effects caused by buoys, barges and navigational lighting. The buoys (the actual farms) are generally innocuous and their presence in the CMA is signified by the barges working the farms.

Existing mussel farm activities in the Coromandel/Motukawao coastal environment are randomly located throughout the CMA often in close proximity to the mainland and islands shoreline. The Coromandel sub unit is in a delicate balance with respect to any additional mussel farming activities being developed in this area.

There are two key variables that affect the ability of the marine environment to visually absorb mussel farming activities. These include:

- a) the scale of the receiving coastal environment and the degree of visual interest in the view.
- b) elevation and distance viewed.

The vast scale of the Waikawau/Wilson Bay coastal environment provides high visual absorption capability, sufficient to accommodate full development of mussel farming expanding into Area B of the Wilson Bay Zone without causing adverse effects on natural character values.

In the Coromandel coastal sub unit additional mussel farms would have a significant visual impact and should not be allowed unless those effects can be remedied or mitigated. A precautionary approach is recommended for this area.

Based on a model fish farm using circular sea cages, fish farming will have increased visual effects compared to mussel farming activities. This is primarily due to their characteristic vertical structural elements. Viewing distance (for example 5km offshore) is considered a key visual mitigation measure. When considering the location of fish farming in the Wilson Bay Zone, Area B is the preferred location for large scale (50 hectares or more) fish farming activities from a visual impact perspective

Fish farming activities would assimilate best when seen in conjunction with existing mussel farming activities. Established mussel farming activities would form the foreground, provide context and mitigate the effect of additional fish farm structures.

To maintain and protect the natural character values of the coastal environment fish farming activities should avoid high visual audience areas where close views are gained.

1 Assessment methodology

The following methodology was employed for this assessment.

- Research on previous reports prepared for Environment Waikato by Bernard Brown Associates entitled “Marine Farming Visual Assessment” (1992).
- Research on the Environment Waikato Regional Coastal Plan Policies included within Section 3.1 - Preservation of Natural Character, Section 5 - Structures and Section 6 - Marine Farming and the Thames-Coromandel District Council District Plan policies relating to Landscape and Natural Character.
- Research on the types of fish farming structures developed for use in New Zealand and overseas.
- Wide traverses of the west coast of the Firth of Thames and the Coromandel/Motukawao coastal environments to update descriptions on landscape context and natural character in the study area.
- Identification of key viewpoints to assist in defining potential view shed areas, including visual absorption capability (VAC) and other factors influencing the degree of visual effects generated by existing marine farming activities.
- Extraction of the key principles identified in the assessment for incorporation in the conclusion section of the report.

This study focused on the west coast of the Coromandel Peninsula as this area contains the main concentration of marine farming in the Region. General principles identified in this study may be applicable to other areas, but a site specific assessment may also be required to properly assess them.

2 Coastal environment context and characteristics in the study area

The scope, objectives and tasks of this Natural Character and Visual Impact Assessment require that two landscape units be described. These are illustrated in the map below and described as Waikawau/Wilson Bay and Coromandel/Motukawao. The latter coastal unit has three defined sub units, and for the purpose of this study, are described as Deadmans Point, Coromandel and Motukawao.



Figure 1: The Waikawau/Wilson Bay and Coromandel/Motukawao Landscape/CMA Units in the Study Area

2.1 Description of the Waikawau/Wilson Bay landscape unit

Previous landscape assessments have delineated the Waikawau/Wilson Bay land and CMA interface as comprising the area located between Te Mata Township extending to Deadmans Point in the north (see Figure 1).

In the context of the greater Coromandel Peninsula west coast the coastal landscape forms a sweeping elongated embayment with numerous smaller bays, rocky headlands and several river mouth spits. Areas north of Te Mata Township extending to Deadmans Point generally remain unsettled with a landscape backdrop characterised by fragmented pastoral farming activities. South of Te Mata Township the coastline has a series of scattered settlements with a continuous vegetation backdrop.

A memorable feature of the Coromandel Peninsula west coast south of Wilson Bay is the location of SH25 on a narrow/constructed bench, featuring a Pohutukawa tree canopy either side of the highway.



Figure 2 :Typical Character of SH25

Numerous low level coastal views open along the seaward side of the highway revealing the open expanse of the CMA (the Firth of Thames) and distant views of the coastline in north and south directions. Due west, the Kaiua coastal landscape frames the Firth of Thames providing a distant visual backdrop with Ponui and Waiheke Islands located further north.



Figure 3: Typical Natural Characteristics and CMA Views from SH25

The TCDC District Plan, (Section 212 - Landscape and Natural Character) describes the district's landscape as "containing substantial areas of significant landscape including a coastal environment which is of national significance and has been determined to be of outstanding value." The key natural elements applicable to the Waikawau/Wilson Bay coastal environment area are:

- a series of small headlands and bays
- localised river mouth spits
- localised scarps and cliffs
- rugged rocky coastline
- stony shorelines with tapering foothills
- the expanse of the CMA (Firth of Thames)

Collectively, the above natural elements in the Waikawau/Wilson Bay coastal environment are considered to rate in the "moderate" natural character range and the landscape/CMA interface is considered to have locally significant importance.

In my opinion, the existing mussel farming aquaculture activities located offshore from Wilson Bay have such distant visual affiliation with the natural elements of the immediate landscape and CMA interface, that overall, the natural character values of the Waikawau/Wilson Bay coastal environment are not presently compromised by these activities.

2.2 Description of the Coromandel/Motukawao landscape unit

This broad coastal environment is physically defined by the land and CMA interface extending between Deadmans Point to the south and Amodeo Bay to the north. The visually enclosing and confined sub units of Deadmans Point and Coromandel have important local landscape characteristics, whilst the Motukawao sub unit has an inherent expansive scale which mostly relates with the CMA.

Overall, this coastal unit has compelling and memorable characteristics which can be viewed from several key elevated viewpoints along SH25 and the local authority road

(Colville Road) between Coromandel and Colville townships. The natural elements of the Coromandel/Motukawao coastal environment are:

- numerous offshore islands and islets
- highly indented rugged shoreline
- prominent headlands and bays
- stony shorelines with tapering hills
- localised scarps and cliffs
- well vegetated coastal backdrop
- generally well integrated settlement



Figure 4: Typical Natural Characteristics of the Coromandel/Motukawao Unit

Collectively, the above natural elements in the Coromandel/Motukawao coastal environment are considered to rate in the "high" natural character range and the composition, as a whole, is considered to provide a landscape/CMA interface of regional importance.

In general terms, from distant viewpoints, the existing mussel farming activities being dispersed and of a small scale throughout the Coromandel/Motukawao coastal environment, do not compromise the natural character values. The land and CMA interface is highly segmented and no single viewpoint captures the entire existing mussel farming activities at any one time.

The existing clustered mussel farm cells located immediately north of Deadmans Point around the mouth of Manaia Harbour are not visible from any key elevated viewpoints along SH2S. The "inland" sections of SH25 comprise a winding tortuous alignment that demand full concentration by the driver.

3 Visual effects of existing aquaculture activities including the expansion of mussel farming into Area B of Wilson Bay

3.1 Existing AMAs and mussel farming locations in the Waikawau/Wilson Bay and Coromandel/Motukawao coastal environments

In 2004 the Government completed the aquaculture reforms by passing the Aquaculture Reform Act. The reforms also amended the Resource Management Act and Fisheries Act. Marine farming can now only occur within zones identified in a Regional Coastal Plan called Aquaculture Management Areas (AMA). All existing marine farms have been deemed to be AMA. Figure 4 below illustrates the existing marine farm AMA in the study area.

Figure 4 shows:

- a) The marine farm zones (coloured green) located 1.5 kilometre offshore from Wilson Bay and labelled Area A and B.
- b) Area A comprises an area of 690 hectares of which 220 hectares represents pre-1999 marine farm licences and permits (coloured red).
- c) Area B comprises an area of 520 hectares with no existing marine farms currently developed.
- d) Scattered existing marine farm licences averaging 5 hectares in area throughout the Coromandel/Motukawao coastal environment.

As a baseline, this study is required to assess the visual effects of both Areas A and B at full development stages comprising a total of 1200 hectares of mussel farming activities. The following discussion considers factors influencing the potential visual effects generated.

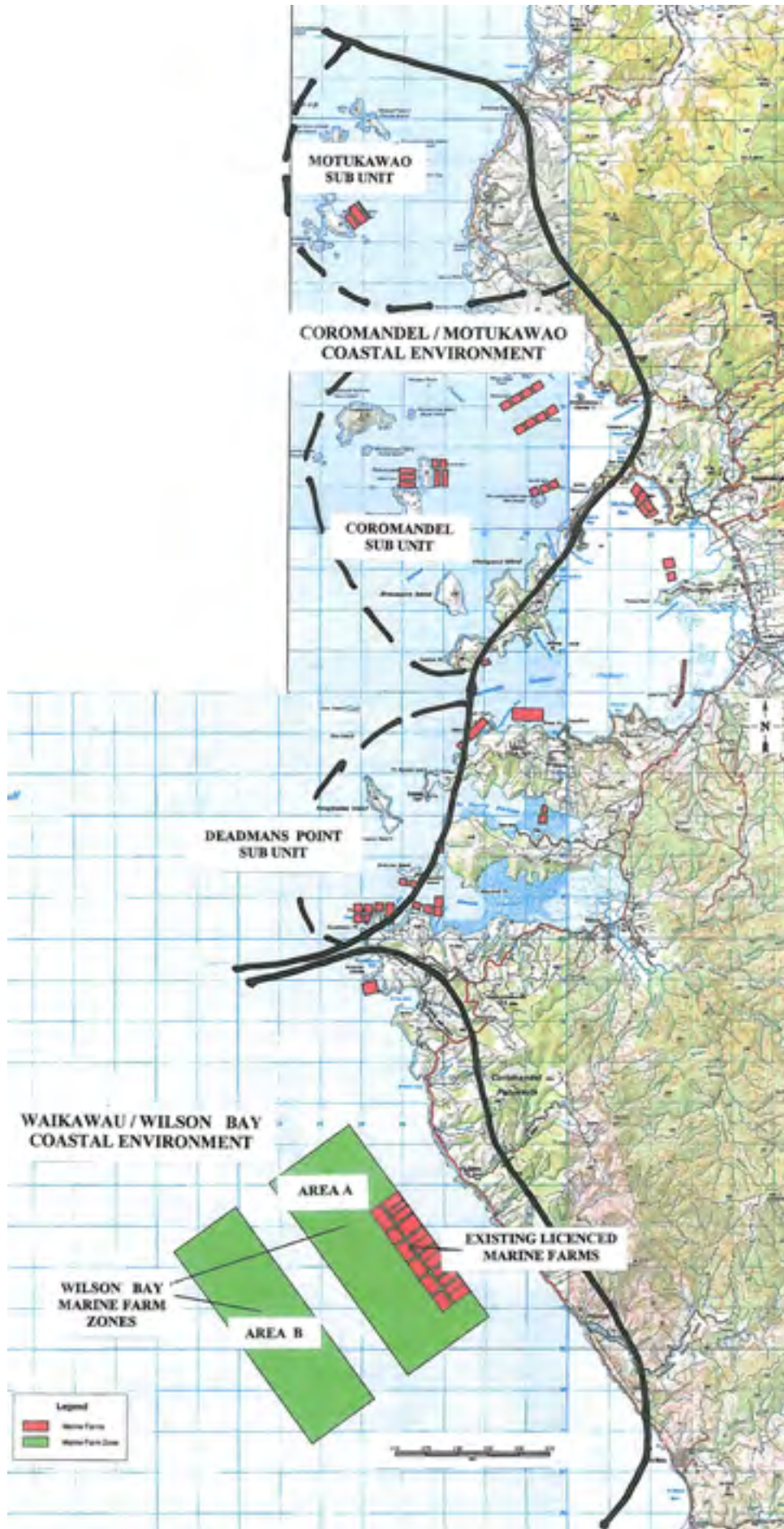


Figure 5 :Existing Marine Farm AMAs in the Study Area

3.2 Factors Influencing the degree of visual effects generated by existing mussel farming activities

NB. All viewpoint photos use a 50 mm fixed lens taken on 21 February 2008.

3.2.1 Primary Visual Effects of Mussel Farms

- a) All existing mussel farms are perceived as horizontal structures on the water plane.
- b) The visual elements of existing marine farms include the following:
 - **the lineal patterns of buoys**
These are perceived as horizontal lines and patterns dependent on distance, and elevation viewed.



Figure 6: Typical mussel farm characteristics

- **the barges working the farms**
Stationary barges are perceived as vertical structures. However they are not permanent fixed objects.



Figure 7: Typical Existing Barge Characteristics

- **navigational lighting marking the farms**
Research has confirmed that navigational lighting is typically visible between 1 kilometre and 3 kilometres at night time. Visual effects are subject to climatic variables, distance of view and elevation viewed.

3.2.2 Variables affecting the ability of the marine environment to visually absorb mussel farming activities

Regardless of climate variables such as surface cloud patterns, glare, mist and roughened surface conditions, the viewing perspectives within the study area also

present a number of variables that will influence any judgement on the potential visual effects of mussel farms when the Wilson Bay AMA are fully developed. These are outlined below:

a) The nature and frequency of the visual audience - transient or static

On-land surveys have identified the typical key viewpoints available from the land in the study area (refer attached Appendix 1 - Viewpoint Location Plan).

State Highway 25 provides the dominant transient viewing platform in the Waikawau/Wilson Bay landscape unit. The average daily vehicle count (2006) for this section of SH25 is 1860. Two typical viewpoints across the CMA toward the licensed mussel farms at Wilson Bay are illustrated below. The static viewing audience within the study area, includes a total of 153 properties with a potential visual audience of 382 persons when fully developed.

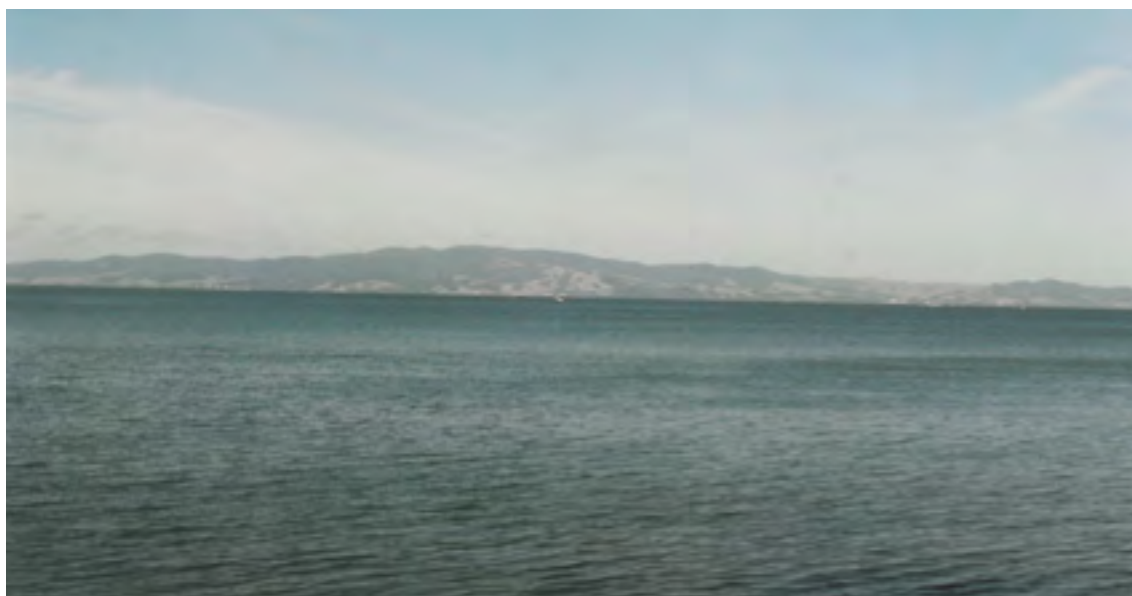


Figure 8: Viewpoint 1 – typical view from the SH25 Kereta shoreline

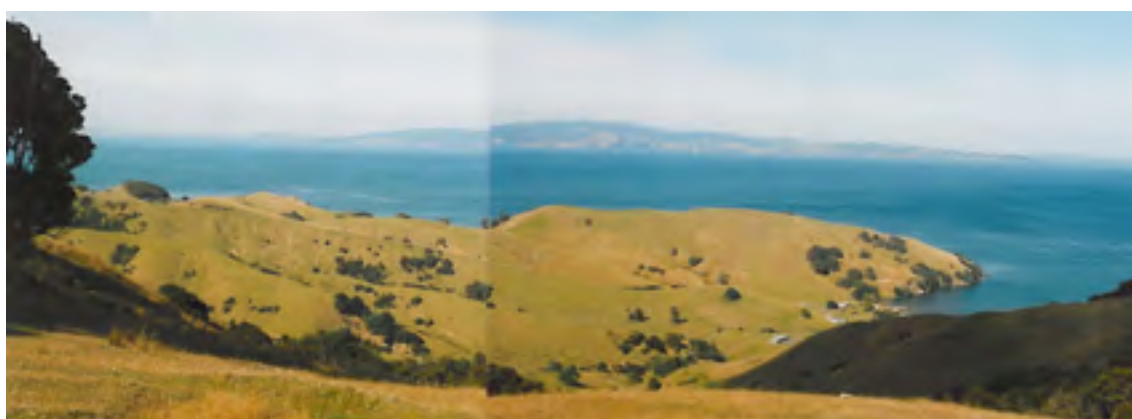


Figure 9: Viewpoint 2 – typical views from SH25 at 100m elevation across the Firth of Thames (See attached Appendix 1 for Viewpoint Locations)

In the Coromandel/Motukawao landscape unit the transient viewing platform comprises Colville Road. No vehicle count information is available for this section of road. The current static viewing audience includes 229 properties with an estimated population of 572 persons when fully developed.



Figure 10: Viewpoint 3 – typical views from Colville Road, Oamaru Bay



Figure 11: Viewpoint 4 – typical views from the Ruffins Peninsula residential area



Figure 12: Viewpoint 5 – views toward the Motukawao Island Group from the Amodeo Bay Boat Ramp

b) The scale of the coastal environment and degree of interest in the view influencing visual absorption capability

This is a qualitative assessment of the perceived spaciousness of the CMA and land interface.

The Waikawau/Wilson Bay landscape unit has a vast scale formed by the average 18 kilometres width of the Firth of Thames. A planned 1.5 kilometre "open space" buffer exists between the existing licensed mussel farms located in the Wilson Bay Zone and the mainland shoreline. This inshore buffer zone assists in retaining an important open space element sufficient to minimise the visual effects of the buoys. The key visual effects are generated by the barges working the mussel farms. In this context, the full development of Area B in mussel farming activities (seen at 5 kilometres from the shoreline) will not be formed from the patterns of buoys themselves (which remain innocuous), but rather the cumulative number of barges working the farms.



Figure 13: Existing mussel farm barges moored in Coromandel Harbour seen at approximately 200m viewing range

By contrast the Coromandel/Motukawao coastal unit has an intimate scale with a high degree of visual interest provided by an indented shoreline and numerous offshore islands. Generally, the existing licensed Mussel farms are located between 600 metres and 2.5 kilometres offshore from the mainland and Colville Road viewpoints.

Despite this ample buffer distance some existing mussel farm cells were noted as highly "legible" and seen from Viewpoint 5 - Oamaru Bay and Viewpoint 6 - Ruffins Peninsula. Both of these viewpoints have a moderately high visual audience and capture the mussel farm cells from a variety of perspectives. The subject farms include:

Cell 1 – Li343, Li296, Li383

Cell 2 – Li347, Li336, Li345, Li327

Cell 3 – Li346, Li310, Li326

Overall, the complex coastal setting creates a fair degree of visual absorption. However when present, the barges form the key visual elements in the view.

In my opinion, the scale of the Coromandel coastal segment when assessed against the scale of the existing licensed mussel farms, is in a delicate state of balance. In respect of the Coromandel coastal segment, no further marine farms should be allowed without substantial mitigation measures if the natural character values of this area are to be maintained and protected. There would appear greater scope for additional mussel farming in the distance offshore islands of the Motukawao Group.

c) Elevation and distance viewed

These are important variables that also affect the visual absorption capability of surface mussel farms. In calm open sea conditions at 1.5m elevation above sea level the horizon exists at an approximate distance of 4.5km. At a 10m elevation above sea level the horizon would be approximately 30km distance.

Elevation and distance viewed affects the perceived visual expressions of surface mussel farms. In general terms, a line expression is perceived when viewing mussel farms at elevations less than 10m or when distance viewed provides an expansive seascape foreground. A pattern expression is perceived when viewing mussel farms at high elevations, particularly at close viewing range.

In the case of the existing mussel farms located 1.5km offshore at Waikawau/Wilson Bay and using a mean elevation of SH25 and associated rest areas at 5m elevation (Viewpoint 1), the dominant line expression of the buoys is punctuated by barges working the farms. The existing licensed mussel farms in Area A of the Wilson Bay Zone will always present the foreground to any future development in Area B. Therefore, the line expression will potentially remain the same and the presence of additional barges will present the only cumulative visual effects in the CMA.

In the case of elevated viewpoints from SH 25 (Viewpoint 2) the existing mussel farms in Area A of the Wilson Bay Zone are perceived as faint pattern expressions. The full development of mussel farms in Area B will have the visual effect of extending the existing patterns seen. Owing to increased viewing distance, the visual contrast of the buoys will be reduced and be highly subjected to climatic variables. As is the case above, the key visual effects of full development in Area B of the Zone will result from the cumulative increase in the number of barges working the mussel farms rather than the buoys/farms themselves.

3.3 Summary of the visual effects of mussel farming in the study area

3.3.1 General

The primary visual effects of mussel farms are generated by the lineal patterns of buoys, barges working the farms and navigational lighting marking the farms.

3.3.2 The Waikawau/Wilson Bay coastal environment

This area has a vast scale and high visual absorption capability.

- a) An existing 1.5km inshore buffer zone minimises the visual effects of the buoys which are barely perceived as structures at this viewing range. Barges working the farms present the key visual effects.
- b) From the low elevation SH25 Viewpoint 1, the mussel farm buoys are perceived as line expressions. Full development of mussel farms into Area B will not necessarily exaggerate this line expression and only the additional barges working the farms will cause a cumulative visual effect.
- c) From the high elevation SH25 Viewpoint 2, the existing mussel farms are perceived as faint pattern expressions. Full development of the mussel farms into Area B will extend this pattern effect with some loss of contrast due to increased viewing distance (5km from shore). Additional barges working the farms will cause a cumulative visual effect.

3.3.3 The Coromandel/Motukawao coastal environment

The Coromandel/Motukawao coastal environment has an intimate scale. Existing mussel farms rely on a dispersed layout amongst a highly indented shoreline with numerous offshore islands for visual absorption.

- a) The Coromandel sub unit of this coastal environment is in a fine state of balance. The scale of existing mussel farms relates with the scale of the CMA and associated offshore islands. However, there is a sense of "full capacity" if the mussel farms are not to dominate natural character values.
- b) A precautionary approach is recommended in respect of permitting additional mussel farming in the Coromandel coastal sub unit. No further expansion should be allowed. This area has a moderate visual audience gaining close quarter views

from a variety of perspectives and the coastal environment is considered to have natural character values of regional importance.

- c) There is potential for additional mussel farming around the Motukawao Island Group providing substantial buffer distances are maintained from the mainland shoreline and the islands.

4 Potential landscape and visual effects of proposed fish farming aquaculture activities in the existing AMAs

4.1 Possible fish farming aquaculture structures

A variety of fish farm structures have been investigated for application in the existing AMAs (Aquaculture Management Areas) in the study area. Current salmon farms in New Zealand use a box cage structure as illustrated below (figure 14) but it is likely that proposals for new fish farms will use a circular sea cage layout similar to the South Australian kingfish cage shown in figure 15.

For the purpose of this study a model farm unit is used. This is assumed to consist of 18 circular sea cages of 20 metre diameter spread over a 5 hectare site creating an effective enclosed footprint of 0.5 hectare. Initial development of fish farming is expected to consist of several of these 5 hectare units with potential expansion up to full operation at whatever carrying capacity is set by the Regional Coastal Plan. Two scenarios of full development are considered by this study: 50 hectares (10 model farm units) and 150 (30 model farm units).



Figure 14: Marlborough Sounds salmon farm



Figure 15: Kingfish farm in Port Lincoln, South Australia

4.2 Comparison of the visual effects of fish farm activities with existing mussel farm activities in the study area

Using the model fish farm and scenarios described above, the following discussion compares these possible fish farming activities with the baseline criteria for full expansion of mussel farming in the Wilson Bay Zone (Areas A and B) as summarised in Section 3.3 of this assessment.

The full expansion of mussel farms in the Wilson Bay AMAs will generate a series of horizontal lines created by the buoys on the water plane. Elevation and distance viewed influences the degree of line and pattern effects generated.

By comparison, fish farming activities will be perceived as a collection of small vertical structures on the water plane. Elevation and distance viewed will also influence the degree of line and pattern effects generated. The potential visual effects of fish farms are considered to register as more significant than mussel farms.

Mussel farming activities in Area B of the Wilson Bay Zone have the potential to be not visible when viewed from low elevation viewpoints along SH25 (e.g. Viewpoint 1) as they will be absorbed by the existing mussel farming activities in Area A (the foreground).

Potentially the same screening effect could apply to fish farming activities located in Area B. However a highly legible pattern effect would remain visible from the elevated SH 25 viewpoints. Area B is located 5 km from the mainland shoreline and this viewing distance is considered a key mitigation measure regardless of climatic variables in the CMA.

Barges working the mussel farms create the most significant visual effects at daytime and navigational lighting causes similar visual effects over night time periods. It is envisaged that craft servicing the fish farms and navigational lighting will potentially have similar visual effects.

The presence of permanently moored craft or service structures in association with any fish farms, similar to the Marlborough Sounds farm shown in figure 14, would require separate consideration.

The highly regulated layout of existing mussel farms in the Wilson Bay Zone tends to concentrate the visual effects, albeit in an inoffensive manner. Similar concentration of any fish farming activities in Area A is considered to potentially be highly legible with the vertical structural elements of fish farms seen at a minimum 1.5 km viewing distance from the mainland shoreline (Viewpoint 1).

The preferred location of any fish farming activities in the Wilson Bay Area A, is the western segment situated at least 3km from the mainland shoreline. Existing mussel farm activities in Area A will "mask" the foreground and provide a degree of visual absorption to fish farms in the background, as seen from the mainland low elevation shoreline and SH 25 (e.g. Viewpoint 1).

In the Coromandel/Motukawao coastal environment the most visually sensitive area for existing mussel farming activities has been identified as the Coromandel sub unit. Any replacement of existing mussel farming activities with fish farming in this sub unit would increase the visual effects seen by a moderate visual audience in a high natural character coastal environment.

The Deadmans Point sub unit has a concentrated cell of existing mussel farms which are only seen in a local context. Any fish farming activities located in this sub unit

AMAs would also generate moderate local visual effects providing the size is limited to 5ha maximum. Larger fish farms would have a significant effect and should not be allowed in this sub unit.

In the Motukawao sub unit the viewing distance from the mainland is considered a key visual mitigation measure for the replacement of any existing mussel farms by fish farming activities. One mussel farm cell is located close to Moturua (Rabbit Island). When viewing from the Amodeo Bay shoreline the island provides visual backdrop at 2.5km distance. Replacement of the existing mussel farm cell by fish farming activities at maximum 5ha area is not considered to compromise natural character values as seen by a low visual audience.

Fish farming activities would assimilate best when seen in conjunction with existing mussel farming activities in each respective AMA of the study area. The reason for this relates to context and associated mitigation derived from established mussel farming activities forming the foreground from any viewpoint.

Existing mussel farm activities are perceived as innocuous and relatively inoffensive. Fish farming activities have potential to generate greater visual effects when seen in isolation particularly in high visual audience areas and at close viewing distance.

4.3 Summary of 5ha, 50ha and 150ha fish farming scenarios in the study area

Based on the preceding outline in 5.1 and 5.2 above, the following table (figure 16) summarises the scenarios in each of the coastal environments and sub units assessed in the study area and identifies where the fish farming development would be appropriate or not appropriate from a visual impacts perspective.

Landscape unit	Sub unit/AMA	Fish farming scenario		
		5 hectares	50 hectares	150 hectares
Waikawau/ Wilson Bay	Area A	✓	✓	✗
	Area B	✓	✓	✓
Coromandel/ Motukawao	Deadmans Point	✓	✗	✗
	Coromandel	✗	✗	✗
	Motukawao	✓	✗	✗

Figure 16: Summary of fish farming scenarios by coast landscape unit

5 Conclusions and key principles

The Waikawau/Wilson Bay coastal environment has a transient visual audience featuring SH25 located in close proximity to the west coast shoreline. Natural character values rate in the moderate range. Low elevation and high elevation viewpoints project due west across the CMA.

The Coromandel/Motukawao coastal environment has three sub units with varying degrees of natural character. The highest visual audience is located in the Coromandel sub unit where high natural character values exist. This sub unit has diverse viewing perspectives across the CMA.

Existing mussel farming activities in the Waikawau/Wilson Bay coastal environment have been located in a planned 1.5 km offshore zone, the Wilson Bay Marine Farming Zone. The mussel farm activities generate visual effects caused by buoys, barges and navigational lighting. The buoys are generally innocuous and their presence is signified mainly by barges working the farms.

Existing mussel farming activities in the Coromandel/Motukawao coastal environment are randomly located through the CMA often in close proximity to the mainland shoreline. The Coromandel sub unit is considered to be in a delicate balance with respect to any additional mussel farming activities being developed in this area,

Two key variables affect the ability of the marine environment to visually absorb mussel farming activities. These include:

- the scale of the coastal environment and degree of visual interest in the view
- elevation and distance viewed

The vast scale of the Waikawau/Wilson Bay coastal environment provides high visual absorption capability sufficient to accommodate full development of mussel farms in the Wilson Bay Zone, without causing adverse effects on natural character values. Low elevation viewpoints from SH25 will perceive the existing foreground mussel farms as line expressions, whilst high elevation viewpoints from SH25 will register the mussel farms as faint patterns on the water plane.

Recommendation 1: No further expansion of mussel farming activities in the Coromandel sub unit should be allowed. Some potential for additional small scale mussel farming exists in the outer Motukawao Island Group providing substantial buffers are maintained from the mainland and islands.

Fish farming activities will have greater visual effects when compared with mussel farming activities. This is primarily due to their characteristic vertical structural elements. Viewing distance (e.g. 5 km offshore) is considered a key visual instigation measure when considering the location of fish farming aquaculture in the Wilson Bay Zone. The preferred locations for potential fish farms are in Area A (western portions only with size limitation) and Area B (full development to 150 ha is possible).

Recommendation 2: A precautionary approach is recommended should fish farming activities be considered to replace existing mussel farming activities in the Coromandel/Motukawao coastal environment. Fish farming activities should avoid the Coromandel sub unit area. There is potential for small scale fish farming activities (5 ha maximum) in the Deadmans Point and Motukawao sub units.

Fish farming activities require "context" to assist visual absorption capability in the CMA and would best be assimilated with existing mussel farming activities, especially when these activities provide the foreground from any viewpoint on land.

Recommendation 3: Fish farming activities should avoid high visual audience areas where close views are gained if natural character values are to be maintained in the study area.

The visual impact of permanently moored vessels or service structures seen in association with some fish farms has not been considered in this study and would require separate assessment if they were proposed.

Appendix 1 Viewpoint locations

VIEWPOINT KEY

VIEWPOINT 1 –
TOWARD EXISTING
MUSSEL FARMS AT WILSON BAY FROM
THE SH25 KERETA SHORELINE

VIEWPOINT 2 –
TOWARD EXISTING
MUSSEL FARMS AT WILSON BAY
FROM INLAND ELEVATED
VIEWS SH 25 – 100m ABSL

VIEWPOINT 3 –
ACROSS THE CMA FROM
THE OAMARU BAY SHORELINE

VIEWPOINT 4 –
ACROSS THE CMA
FROM RUFFINS PENINSULA
RESIDENTIAL AREA

VIEWPOINT 5 –
TOWARD THE
MOTUKAWAO ISLAND GROUP
FROM THE AMODEO BAY BOAT RAMP



Appendix 2 Definition of terms used

AMA – are Aquaculture Management Areas where marine farming such as mussel farming and oyster farming can occur.

CMA – means the Coastal. Marine Area.

Climatic variables – are caused by atmospheric conditions affecting the perceived surface conditions of the CMA. Variables such as surface cloud patterns, glare, mist and roughened surface conditions frequently change the visual absorption capability of the CMA.

Natural Character – has three interrelating primary components that, in combination produce "natural" character of varying degrees. These components are as follows:

- natural processes
The ecological processes that underlie the visual expression of an environment – such as water, nutrient cycles and energy cycles that occur within the landscape and CMA
- natural elements
The product of ecological processes. These include the vegetation patterns, underlying geology and topography, islands, water courses, wetlands etc.
- natural patterns
The natural expression or distribution of the elements in an environment.

TCDC – Thames-Coromandel District Council

Visual Absorption Capability (VAC) – is the ability of a landscape or seascape (CMA) to visually accommodate an introduced element without dominating the view and causing a focal effect.

Visual audience – are persons viewing the subject area or object/objects in the view.

Visual Effects – are the effects created by existing or potentially introducing new elements into the landscape or seascape (CMA).

Appendix 3 Terms of Reference

Environment Waikato have engaged Bernard Brown Associates Ltd to undertake a Natural Character and Visual Impact Assessment of diversified aquaculture activities incorporating fish farming, located in the existing AMAs (Aquaculture Management Areas) in the Coromandel Peninsula west coast.

The terms of reference for this assessment were discussed at a meeting on 8 February 2008 with Environment Waikato staff. A work brief with specific tasks was subsequently developed and approved on 15 February 2008.

The scope, objectives and tasks of the Natural Character and Visual Impact Assessment are listed as follows –

The primary objective of this study is to:

Evaluate the impact of new types of aquaculture, such as kingfish farming, on natural character and visual landscape values.

The scope of this assessment is limited to the existing marine farm areas (the deemed AMAs and interim AMAS located in the Waikawau/Wilson Bay and Coromandel/Motukawao landscape/ CMA units). The assessment will be limited to the impacts of changing from the currently authorised activities of mussel or oyster farming to new types of aquaculture, in particular fish farming.

Tasks Required

Task 1

Assess the existing coastal environment context and characteristics of the Waikawau/Wilson Bay and Coromandel/Motukawao landscape/CMA units.

Task 2

Describe the visual effects generated by the existing aquaculture activities in the above areas, including the expansion of mussel farming into Area B. This will form the baseline for the following assessment.

Task 3

Assess the potential visual effects of the proposed fish farming aquaculture activities within the respective AMAs using the following scenarios:

- a 5ha sea space allocation comprising up to 18 sea pens of 20 metre diameter
- a 50ha sea space allocation comprising up to 180 sea pens of 20 metre diameter
- a 150ha sea space allocation comprising up to 540 sea pens of 20 metre diameter

Task 4

From the above assessment outcomes extract the key principles that identify the potential landscape and visual effects generated by fish farming activities on the natural landscape/ CMA characteristics and address any visual mitigation measures available to avoid or remedy any adverse effects generated.