

Best Management Practice guidelines for salmon farms in the Marlborough Sounds: Operations

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Prepared by the farm operations working group:

The New Zealand King Salmon Co. Ltd.



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Introduction:

In November 2013 the Marlborough District Council (MDC) and The New Zealand King Salmon Co. Ltd. (NZKS) committed to a process to ensure Marlborough develops world-leading salmon farming practices which are environmentally and economically sustainable while making an important social and cultural contribution.

This process commenced with a week of intensive meetings and workshops bringing together key figures from the industry, regulatory, science providers and Sounds communities¹ to discuss how stakeholders might improve management and understanding of salmon farming in the Marlborough Sounds.

Assisting with facilitating the process and providing external independent experience and input were aquaculture experts from Scotland (Professor Kenneth Black) and Australia (Dr Catriona Macleod).

The workshops identified that the development of Best Management Practice (BMP) guidelines would provide the basis for more effective and transparent management for both farmers and regulators. The existing salmon farm consents span three decades and as a result of evolving knowledge and technologies, and changes in personnel over that timeframe, have a variety of differing conditions, standards and requirements. It was therefore determined that a standardised regional BMP for NZKS be developed, and that in the future all salmon farm consents should be referenced to these guidelines with a standard condition that relates to compliance with the BMP.

The BMP document will provide guidance to farmers and environmental managers on best practice for operational management issues and will help to frame the future development of salmon farms in the Marlborough Sounds. This review has been developed in an integrated working group environment and incorporates expertise from:

- Regional Council (Marlborough District Council)
- Salmon Farming Industry (NZKS)
- Community stakeholder (Marlborough Sounds Advisory Group)

Note Environmental Quality standards and monitoring protocols are dealt with in a separate document (BMP Part II).

<http://www.marlborough.govt.nz/Environment/Coastal/~media/Files/MDC/Home/Environment/Coastal/BestpracticeguidelinesforsalmonfarmmanagementseabedhealthNov2014Final.pdf>

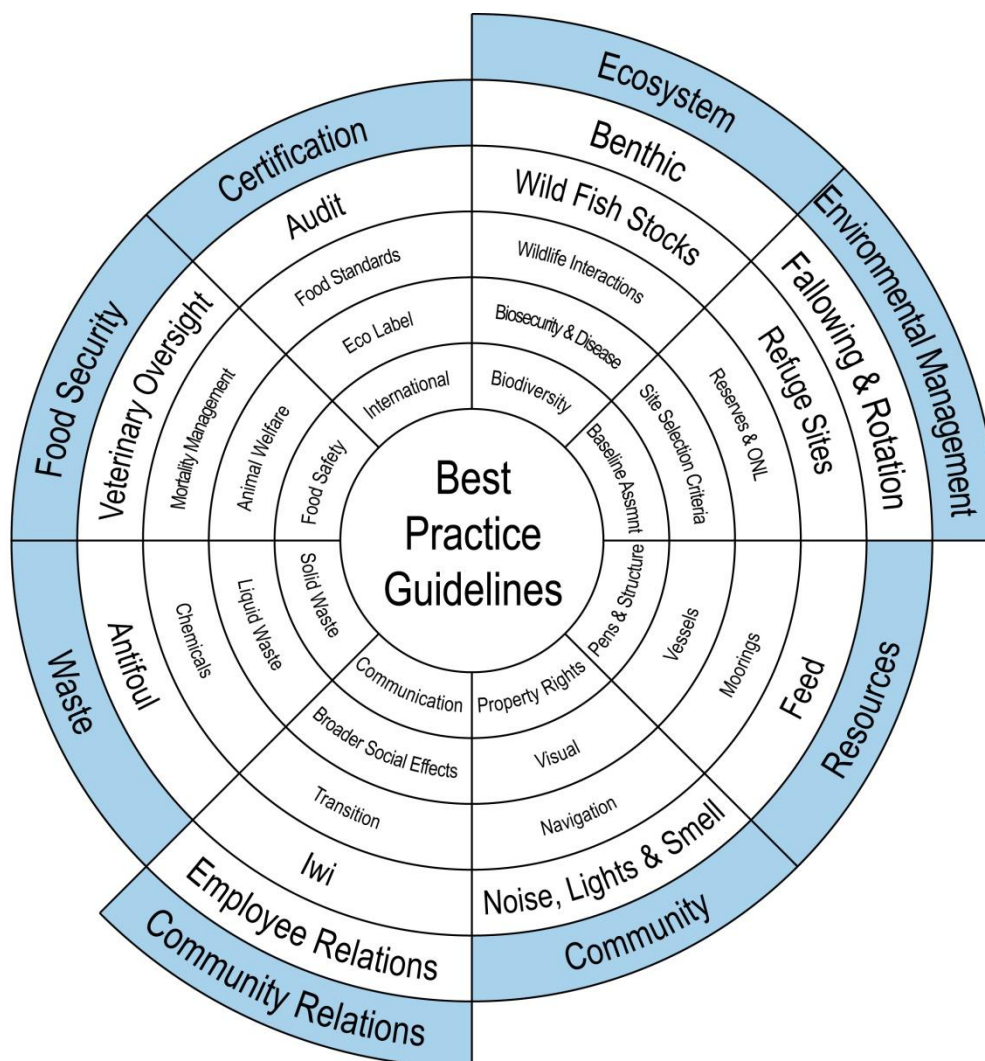
This document frequently refers to other supporting material, and internet links are provided to those more detailed documents where appropriate. e.g. “Best Management Practices for salmon farms in the Marlborough Sounds: Part II) benthic environmental quality standards and monitoring protocol” that specifically deals with managing the benthic environment, and Best Aquaculture Practices (BAP) certification documents that show the international standards which NZKS is currently measured against.

¹ Appendix 3 - List of Participants at 1st workshop

Scope:

These guidelines provide a framework for farm development and operational management, detailed directives for assessment of farm impacts in the wider environment, along with protocols to guide ongoing communications and engagement between stakeholders.

They set performance expectations and engagement protocols for all stakeholders. A pictorial representation of the eight key criteria and how they are comprised is shown in the 'wagon wheel' below. Each of the main criteria are dealt with in individual chapters; it is important to note that the sub-categories (shown in white in the inner wheel) have no specific hierarchical relationships, they simply represent the main elements of each of the key criteria.

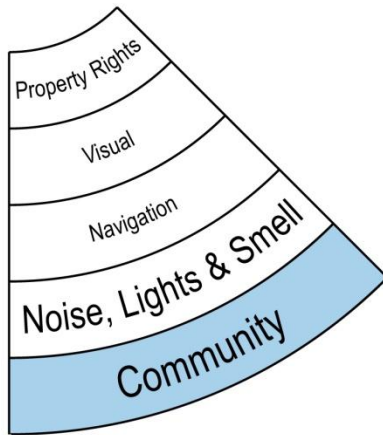


Keeping the guidelines current and relevant:

The guidelines as presented in this document have been developed by all participating parties as best management practice given our current knowledge and understanding. The guidelines will be fully reviewed every five years by NZKS in cooperation with MDC (i.e. next review in 2020), but can be updated and changed should any substantially new information become available. Referenced documents will be updated as necessary. That said, changes to the BMP guidelines may occur with the agreement of both MDC and NZKS. Any issues beyond the expertise and experience of MDC and NZKS may be referred to an agreed Peer Review Panel or similar external expert consultation body for consideration and recommendation back to MDC and NZKS.

Best Management Practice guidelines

1. Community



It is acknowledged that salmon farming will; have some effects beyond the farm boundaries, but that these will be within levels considered acceptable under current (and future) regulatory conditions. A summary of the relevant legislation relating to marine farms is available as Appendix 1 – Regulatory.

It is the responsibility of the salmon farm to operate within relevant consent conditions and ensure that community amenity values² are not significantly compromised. When planning for future salmon farms sites, sites that are likely to impact on the amenity of existing residences will not be preferred; unless suitable alternative sites are not available. Operational specifications for key amenity values are outlined below.

1.1. Property Rights

A coastal permit is required to occupy coastal space for a marine farm and to discharge any substance to the coastal marine area. Activity and disturbance consents are also required. Each coastal permit will have a term and a set of specific compliance conditions.

- a) All salmon farming operations must act in accordance, and be compliant with all of the conditions of their coastal permits.
- b) Where relevant, codes of practices including the BMP guidelines, A+ and other policies are to be complied with.
- c) All salmon farming operations should be designed and operated to minimise negative impacts to the local community and other maritime users.

1.1.1. Fishing

Fisheries legislation does not allow the establishment of a marine farm if a determination has been made by MPI (under its delegated authority) that there is likely to be an “Undue Adverse Effect” (UAE) on recreational or customary fishing, the farm cannot proceed. If a commercial UAE is determined a reservation is placed on the consent and compensation must be paid.

- a) UAE determination must be part of the legislated application process.
- b) Further information regarding the UAE is found here:
<http://www.fish.govt.nz/en-nz/Commercial/Aquaculture/Marine-based+Aquaculture/Undue+Adverse+Effects+test/default.htm>

² Amenity Values – natural or physical qualities or characteristics of an area that contribute to peoples appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes;

1.1.2. Site Decommission

The company will remove all infrastructure if the site is permanently vacated. Scientific evidence demonstrates benthic recovery will occur naturally once farming activities cease, and therefore continued site monitoring is unnecessary. This is addressed in the BMP Benthic II, 3.1.2 Monitoring required during fallowing.

1.2. Visual

Visual impacts of any development should be minimised; salmon farms should be sympathetic to the surrounding natural landscapes and residences, wherever possible.

- a) Recessive colours should be used if not specified in the resource consent, except for where signage and navigation markers are required to be clearly visible for safety purposes.
- b) The “Residential Amenity Management Plan” for the sites granted by the Board of Inquiry is available here:

<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2014/02/Residential-Amenity-Management-Plan.pdf>

1.3. Navigation

The Marlborough Sounds is used by a variety of vessels, consequently salmon farms need to be adequately identified (with lighting and other navigational aids) to ensure collision risks are minimised where reasonably possible. Navigational lighting and markers on a salmon farm may be beneficial to other users as navigational aids.

1.3.1. Navigation Routes

Salmon farms within a main navigation route can appear to be a risk to vessels therefore;

- a) Salmon farm surface structures should be located at an agreed safe distance away from the nearest ferry track within Tory Channel.
- b) Farms adjacent to a main shipping channel should be securely moored using a design by a suitably qualified and experienced Chartered Professional Engineer and regular maintenance and monitoring carried out.

1.3.2. Navigation Risk Management

A “Navigation Risk Management Plan” should be developed in cooperation with the Harbourmaster and ferry operators. These plans include specific provisions for potential hazards to navigation at each particular site but would all include the following requirements:

- a) Loose ropes or unmarked floats are not permitted.
- b) Lights and light reflectors, and if necessary radar reflectors, should be installed according to a Lighting Plan agreed with the Harbourmaster.
- c) Land Information New Zealand (LINZ), the Harbourmaster and MDC are to be informed and additionally local broadcasts on Maritime Radio should be made when the farm is in place.
- d) There is a requirement for the operation of navigational lights and reflectors to be routinely audited to ensure that they are located and operating correctly.
- e) The Navigation Risk Reduction and Management Plan in relation to the sites granted by the Board of Inquiry is available here (Navigation Risk Reduction Management Plan, 2014)

1.4. Noise, Lights and Smell

The Marlborough Sounds Resource Management Plan (MSRMP) has Policies and Rules which ensure that noise, light and smell are maintained within accepted levels. These state that:

- a) A salmon farm must comply with the relevant conditions contained in the coastal permit (if applicable);
- b) A salmon farm must comply with the relevant controls contained in the MSRMP.
- c) A salmon farm must have operational procedures in place to ensure any nuisance from smell, light and noise is kept to an acceptable level.
- d) Operational procedures in respect of noise, light and smell should include an auditing and reporting process.
- e) The Residential Amenity Management Plan for the sites granted by the Board of Inquiry is available here:
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2014/02/Residential-Amenity-Management-Plan.pdf>

Where the guidelines require a report or plan to be prepared, a single report can apply to multiple farms.

1.4.1. Noise

Noise in the coastal area is governed by Noise Bylaws or Noise Emission Standards in Coastal Plans. All marine farming shall be conducted so as to ensure that noise arising from such activities does not exceed the following noise limits when measured no closer than:

250m from any marine farm surface structure:

- | | |
|--|--|
| a) 0700hrs – 2200hrs Mon – Fri | 55dBA L ₁₀ ³ |
| b) 0700hrs – 1200hrs Saturday | 55dBA L ₁₀ |
| c) On any day between 0700hrs and 2200hrs | No L _{max} Limit ⁴ |
| d) At all other times including any Public Holiday | 45dBA L ₁₀ and 75 dBA L _{max} ⁵ |

Notional boundary of dwellings (20m) near to the salmon farm:

- | | |
|--|--|
| e) 0700hrs – 2200hrs Mon – Fri | 50dBA L ₁₀ |
| f) 0700hrs – 1200hrs Saturday | 50dBA L ₁₀ |
| g) On any day between 0700hrs and 2200hrs | No L _{max} Limit |
| h) At all other times including any Public Holiday | 40dBA L ₁₀ and 75dBA L _{max} |

1.4.2. Lights

1.4.2.1. Underwater Lighting

Underwater lighting is used to control maturation in salmon.

- a) Underwater lighting should be installed as so to avoid creating an unacceptable navigation risk or light pollution.
- b) The potential affect on wild fish is addressed in 3.4 Wild Fish Stocks

³ 55dBA L₁₀

⁴ No L_{max} Limit

⁵ 75dBA L_{max}

55dBA can only be exceeded for 10% of the time interval stated.

no maximum dBA limit to which 55dBA can be exceeded as long as it is for not more than 10% of the time.

places a maximum limit of 75dBA within the time stated.

1.4.2.2. Navigation Lights

Navigation lights are a legal safety obligation.

- a) Lighting plans shall be agreed with the MDC / Harbourmaster prior to establishing the farm.

1.4.2.3. Other Lighting

Floodlights may be used to facilitate safe working conditions on the farm.

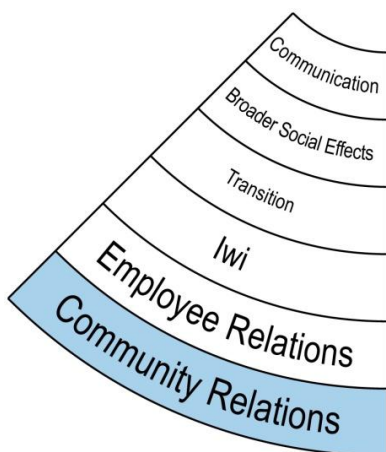
- a) These lights should only be used when necessary for specific operations (e.g. smolt deliveries) or when required for health and safety reasons.

1.4.3. Smell

A salmon farm must have operational procedures in place to ensure any nuisance from smell is kept to an acceptable level. For example:

- a) Care should be taken when opening storage containers so as to avoid creating an odour nuisance.
- b) Salmon nets should be cleaned regularly, or as frequently as practically possible, to minimise the potential odour from decaying fouling organisms.

2. Community Relations



The salmon industry shares the marine environment with the community at large, and has a particular connection with several other marine resource users, including iwi, the boating community and recreational fishers. Open communication with these key stakeholders can foster a culture of trust through frank and open discussion and mutual understanding. The industry should seek to engender this environment through targeted opportunities for community engagement and participation, a complaints procedure and multiple communication lines.

2.1. Communication

Open communication and reporting will give the community confidence that salmon farms are being monitored and managed appropriately, in accordance with consent conditions.

- a) Relevant information, such as environmental and compliance reports, should be available on the company website www.kingsalmon.co.nz.
- b) Complaints or concerns can be lodged by phone: 035485714 or email: contact@kingsalmon.co.nz.
All complaints received by NZKS will be recorded and investigated.
- c) Where any complaints cannot be resolved by NZKS directly or where the concern relates to the Resource Management Act (RMA), the issue will be referred to MDC for arbitration.
- d) Media releases in respect of RMA matters should consider the effect on all relevant parties.

2.2. Broader Social Effects

The Marlborough Sounds is a multi-use environment, therefore when considering a new farm location, it is not only the specific operational requirements (i.e. physical and environmental conditions) that need to be considered, the broader social interactions of salmon farming also need to be taken into account, such as:

- a) The benefits of locating a salmon farm where significant production can occur;
 - The potential to enhance/develop local tourism (i.e. opportunities for site visits).
 - Potential for positive industry/community engagement (i.e. sponsorship of social and environmental projects).

<http://www.kingsalmon.co.nz/our-community/> to community page on website.
- b) To what extent existing/other users might be displaced, and the ready availability and capacity for those users to easily utilise alternate sites.
- c) Alternative farming locations.

2.3. Transition

Currently there are a range of consent conditions for sites being operated in the Marlborough Sounds. This document represents a significant step towards making these consistent. However, the current operational and legislative environments do not yet allow for a “one size fits all” approach to farm management and it is important that the older sites and sites in transition remain viable in the meantime.

It is acknowledged that some of the existing farms have legacy issues, in that they are not an ideal size or in optimal locations for best practice under current and improved farming practices. The sites granted by the Board of Inquiry will help to resolve this issue, and NZKS will need some time and consideration whilst they align existing and new farms to the BMP guidelines. Consequently, a staged implementation time line for adoption of these BMP guidelines is proposed such that all farms would be compliant by 2024.

It is not only farming practices that have developed over time, the needs and expectations of the broader community have also changed. For instance council and the community have expressed a wish to set aside the inner Queen Charlotte Sound for recreational activity only. Under this scenario the existing farm at Ruakaka Bay would need to be relocated. NZKS recognises that needs can change, and in the context of multiple –use management NZKS would be prepared to consider an alternative location for this farm (and potentially other farms too, if necessary).

Achieving the best outcome for the community as a whole, requires co-operation, respect and understanding, recognising that there will be a transition period for some sites, but that the intent is to give effect to the guidelines.

2.4. Iwi

There are eight iwi groups who have statutory recognition as having cultural, spiritual, historical and traditional association with the Marlborough Sounds and the wider Marlborough Region. Iwi have *mana whenua* and *mana moana* and demonstrate *kaitiakitanga* within the Marlborough Sounds, and some iwi actively participate in marine farming, including salmon farming.

Where a proposed activity is to be established within a location that is encompassed by or an activity is to have an effect on a matter within an iwi’s stated Statutory Acknowledgement Document, they are to be considered as an affected party and must be consulted.

An iwi's Statutory Acknowledgement Document identifies the specific iwi's area of interest, relationship with the resources and concerns over development. Some iwi have developed an Iwi Environmental Management Plan. This generally sets out how iwi are to be consulted, with whom and the issues and values iwi are concerned about. Both documents must be considered when developing a proposal and consulting with the relevant iwi and more than one "Iwi Environmental Management Plan" may need to be included. A Cultural Impact Assessment (CIA), which may or may not be part of an Iwi Environmental Management Plan, may assist in defining site specific concerns and issues that may need to be addressed as part of the proposal.

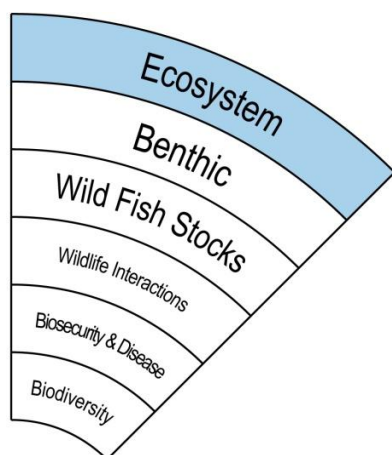
- a) Iwi must be consulted regarding a proposed salmon farm.
- b) The relevant Iwi Environmental Management Plans should be considered when consulting with Iwi.
 - i) Te Atiawa (to be provided at a later date)
 - ii) Ngati Koata Management Plan can be found here:
<http://www.koata.iwi.nz/assets/PDF-files/Ngati-Koata-Trust-IMP-24-May-02.pdf>
 - iii) Other iwi Environmental Management Plans will be listed as they become available
- c) Iwi may ask that a site specific CIA be prepared.

2.5. Employee Relations

Committed staff are essential to the successful operation of the salmon farm, therefore maintaining a high standard of workplace satisfaction and health and safety standards is critical.

- a) As a minimum farms must at all times be compliant with relevant H&S legislation (and associated Codes of Practice) and any other laws or policy requirements in relation to employment, including;
 - i) Adequate training, information and supervision.
 - ii) An Emergency Response Plan link to website.
 - iii) Availability of suitable personal protective equipment.
 - iv) Provision of accommodation to an agreed standard.
 - v) The existence of a policy to deal with contractors and sub contractors while on site.
- b) Management will adhere to the "Staff Recruitment and Training Plan"
<http://www.marlborough.govt.nz/Services/Property-File-Search.aspx>
- c) Diving in and around the salmon farm must only be carried out according to either the Aquaculture Code of Practice or AS/WZS2299.1 (depending on task), and in compliance with Health and Safety in Employment legislation.

3. Ecosystem



Salmon farms operate within the wider Marlborough Sounds environment, and it is important that the farms are managed to ensure long term sustainability of both the environment and the business.

3.1. Biodiversity

3.1.1. Ecologically Significant Marine Sites

Salmon farms must be situated where they do not have a measurable adverse effect on ecologically significant marine sites. Parts of the Marlborough Sounds have already been mapped for ecologically significant marine sites, and this should be taken into account when identifying areas for farming.

(Davidson, et al., 2011)

- a) Baseline survey will be updated to recognise most recent knowledge.
- b) Prior to application sites will have a Baseline Survey conducted identifying any ecologically significant sites that may be impacted.
- c) All new sites will require a Baseline Plan. Baseline Plans for sites granted by the Board of Inquiry's (BOI⁶) are available on the MDC website.

3.2. Biosecurity & Disease

For all sites a "Biosecurity Management Plan" must be prepared with advice from a registered vet, to address the following areas:

- a) Finfish disease prevention, transmission and control
- b) Control steps to prevent spread of unwanted organisms
- c) Communications protocols to advise all relevant parties should a biosecurity issue arise.

The NZKS "Biosecurity Management Plan" is available here:

<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2015/11/Biosecurity-Management-Plan-30-October-2015.pdf>

3.2.1. Harmful Algae

Certain types of microalgae can be harmful to salmon; as a consequence salmon farms will have an algae monitoring plan encompassing:

- a) Daily phytoplankton monitoring (when relevant).
- b) Daily dissolved oxygen recordings.
- c) A mitigation response plan (should adverse conditions be identified).

⁶ The Board of Inquiry was appointed by the Environment Protection Authority to hear The New Zealand King Salmon Co Ltd application for nine new salmon farms.

3.2.2. Water Column

Nutrient discharges from salmon farms can have an effect on the water column and the organisms growing in it. At present there is no clear understanding of the relationship between farm loads and any adverse effects on water quality. Research is in train to monitor and model farm discharges with a view to identifying water quality standards, and once complete this information will be incorporated into Best Practice guidelines.

3.3. Wildlife Interactions

Salmon farms should seek to minimise, as much as practicable, any interactions with naturally occurring wildlife populations. Salmon farms should have Management Plans for marine mammals, the New Zealand King Shag and other significant species identified by the Department of Conservation.

<http://www.doc.govt.nz/publications/conservation/nz-threat-classification-system/>

These plans must identify:

- a) Ways to minimise disturbance to the species.
- b) Training in the identification and handling of the species.

There are currently 3 specific Management Plans which are relevant in this area:

- i) Marine Mammal and Protected Shark
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2014/02/Marine-Mammal-and-Shark-Management-Plan-15-October-2014-Final-1.pdf>
- ii) Wildlife Interactions
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2014/02/Wildlife-Nuisance-Management-Plan-Final.pdf>
- iii) The New Zealand King Shag relevant to the Pelorus Sound will be available here.
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2015/06/King-Shag-Mangement-Plan.pdf><http://www.kingsalmon.co.nz/our-environment/best-management-practices/>

3.4. Wild Fish Stocks

The potential for adverse interactions between salmon farms and wild fish stocks should be addressed when determining the suitability of a location.

- a) Salmon farm applications are required to include an assessment of environmental effects which will include assessment of any relevant fisheries ecology.
- b) An example of the effects of feeding on wild fish are addressed by (Dempster, 2012):
<http://www.epa.govt.nz/Publications/20%20Timothy%20David%20Dempster%20-%20Effects%20on%20Pelagic%20Fish%20-%20v1.pdf>
- c) Underwater lighting is reviewed in (Cornelisen, 2011):
<http://www.epa.govt.nz/Publications/Appendix%202012%20Artificial%20Lighting%20Report.pdf>
- d) An assessment of a salmon farm effects on fish fauna in the Marlborough Sounds (Taylor, 2012): <http://www.epa.govt.nz/Publications/19%20Paul%20Robert%20Taylor%20-%20The%20Pelagic%20Habitat,%20Pelagic%20Finfish%20and%20Sharks%20-%20v1.pdf>

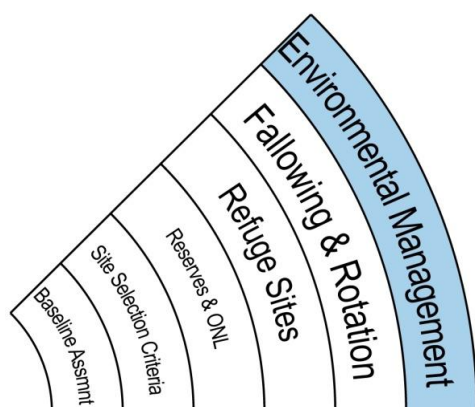
3.5. Benthic

Benthic monitoring and reporting is carried out according to “Best Management Practice guidelines for salmon farms in the Marlborough Sounds Part II-benthic environmental quality standards and monitoring protocol”.

This provides detailed guidelines for benthic assessment and compliance standards:

<http://www.marlborough.govt.nz/Environment/Coastal/~media/Files/MDC/Home/Environment/Coastal/BestpracticeguidelinesforsalmonfarmmanagementseabedhealthNov2014Final.pdf>

4. Environmental Management



Environmental Management Practices will be undertaken in accordance with, but not limited to, the:

- a) Resource Management Act 1991 (RMA)
<http://www.legislation.govt.nz/act/public/2013/0063/latest/DLM4921611.html>
- b) Marine Environmental Management and Adaptive Management Plan (MEM-AMP)
- c) Best Management Practice guidelines for salmon farms in the Marlborough Sounds: Part II) benthic environmental quality standards and monitoring protocol, 2014 is available from the link in **3.5 Benthic**.

Whilst it is not essential to specify in detail every activity or discharge covered by the consent, coastal permits should cover in principle all operations with environmental management implications associated with the salmon farm site.

4.1. Baseline Assessment

In order to determine if changes associated with the development of the farm are within agreed and acceptable limits a good understanding of the environmental conditions on the proposed salmon farm site and wider environment must be obtained prior to farming. This requires the following information/ protocols to be implemented:

- a) A Baseline Plan⁷ and Baseline Report⁸ must be prepared by an independent science provider prior to establishment of the salmon farm.
- b) The Baseline Management Plan and Baseline Report must be approved by MDC or delegated to an agreed Scientific/Peer Review Panel for sign-off.
- c) Once ratified, the Baseline Plan and Baseline Report are to be made publicly available through the company website.
- d) An example of a Baseline Plan is available via the Marlborough District Council website: <http://www.marlborough.govt.nz/Services/Property-File-Search.aspx> this was prepared for the Board of Inquiry.

⁷ Baseline Plan – sets out requirements for assessment

⁸ Baseline Report – reports on those requirements once work has been completed

4.2. Site Selection Criteria

Choosing the right site for salmon farming underpins the viability of future farming operations. Selecting sites with optimal farming conditions will reduce the potential for negative environmental interactions.

There is a wide range of considerations to be taken into account when considering suitability of a marine site. An example of these can be found in the evidence presented by Mark John Gillard in the Board of Inquiry (Gillard, 2012).

Map overlays of the Marlborough Sounds showing some of the criteria associated with identifying suitable areas for salmon farming is included in that document, found here: <http://www.epa.govt.nz/Publications/Pre-Site%20Selection%20maps.pdf>

Key considerations include:

4.2.1. Spatial Extent Depositional Footprint

Approved salmon farms have a designated area within which they are allowed to operate and have an effect (a footprint). The depositional footprint is determined prior to installation of the farm by modelling, using a recognised and verified depositional model such as “DEPOMOD”.

- a) Prior to applying for a new marine salmon farm, modelling must be carried out to determine the extent and intensity of the farming footprint based on the proposed feed discharge level(s). The farming application is then made for the proposed discharge level and modelled level of effects.

4.2.2. Depth

Depth should be sufficient to allow adequate space between the bottom of the net pens and the seabed for dispersion and assimilation of metabolic waste.

4.2.3. Current

Water flow (current), brings oxygen to the fish and removes metabolic wastes (e.g. nitrogen) allowing the waste material to be assimilated back into the environment. Production and management regimes should be adapted to augment these processes and take into account differing flow regimes. Prudent locations of pens within the site boundaries will enable current flows to be maximised within individual pens.

4.2.4. Temperature Profile

To optimise a salmon farm’s performance including fish health and growth, sites should be preferably located where the temperature range is 12-17°C (Gillard, 2012).

4.3. Reserves and Areas of Outstanding Natural Landscape

4.3.1. Marine Reserves

The primary function of Marine Reserves is to protect the marine ecosystem within a specified area from fishing and other potentially damaging activities.

- a) It is inappropriate to establish a salmon farm anywhere it will (as predicted by modelling or other expert evidence) negatively affect a marine reserve (this does not include recreational fishing reserve).

4.3.2. Outstanding Natural Features & Landscape

Recent RMA case law has determined outstanding natural landscape is very important. These areas should be carefully considered when assessing locations for salmon farm operations.

4.3.3. Department of Conservation (DoC) Reserves

Proximity to land or waters held or managed under the Conservation Act 1987 or any Act listed in the 1st schedule to that Act or an other Act used for conservation or protection purposes does not necessarily preclude a suitability assessment of a site for salmon farming.

4.4. Refuge Sites

Emergency situations, such as in the event of a toxic algal bloom or similar threat, or where there has been an accidental breakaway, there may be a requirement to move the farm urgently in order to protect the fish on site. Under such conditions refuge locations may be accessed. These sites will be identified in consultation with the Marlborough District Council on a case by case basis. However, the following criteria would apply in any selection process (listed in order of preference):

- a) A currently consented site not in operational use
- b) A currently consented site in operational use with spare capacity
- c) A non-consented location for temporary emergency use

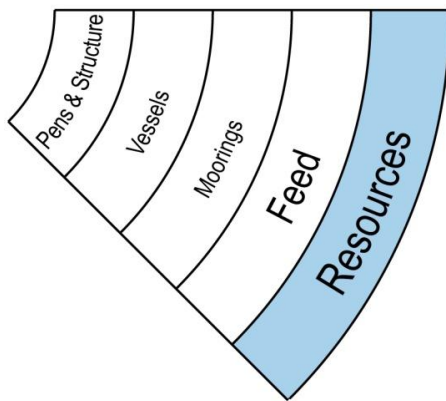
Refuge sites will be allocated under the following provisos:

- the site should be vacated as soon as reasonably possible.
- the company will ensure that all infrastructure associated with farming operations is removed (e.g. moorings, pens etc).
- any specific management or monitoring requirements as outlined in the temporary site consent conditions are adhered to.

4.5. Fallowing and Rotation

Fallowing and pen rotation are recognised tools that may be used to assist in seabed recovery, help break disease cycles (should there be any), also minimising benthic effects by providing appropriate time for recovery and thereby ensuring the most efficient utilisation of consented water space.

5. Operational Resources



In order for salmon farming to operate efficiently, a range of resources are required. These include but are not limited to permanent and semi-permanent structures such as pens, moorings, nets, barges and vessels. Feed is also a significant requirement. These resources should be managed to minimise any environmental or social impact.

5.1. Pens & Structures

The type of pen used will be dependent upon the physical characteristics of the site (wave energy, currents etc), consent conditions, integration with existing infrastructure and resource availability.

5.1.1. Additional Structures

Additional structures may be located at a salmon farm, for example, feed and accommodation barges. Where barges are present the following criteria should be considered:

- a) The barge superstructure should be a dark recessive colour to blend in with the background environment.
- b) The overall height of a barge should not exceed 7.5m above the waterline.

Temporary barges are permitted on site for specific operations e.g. harvest barges, but their presence should be restricted to the duration of those operations.

5.2. Vessels

Salmon farms require a range of support vessels. These vessels may include commuter boats for moving staff and visitors, as well as large transport craft to carry feed, harvested fish, live fish transport units and general freight.

- a) All vessels, skippers and crew must be fit for purpose and suitably certified/qualified to comply with relevant maritime legislation.

<http://www.maritimenz.govt.nz/Commercial/Safety-management-systems/>

5.3. Moorings

A network of moorings is required to secure the salmon farm infrastructure. These moorings extend from the structures to the seabed and can exceed 100m. A mooring design and maintenance plan relevant to the specific infrastructure at each site must be prepared and signed off by a suitably qualified and experienced Chartered Professional Engineer and should be submitted to MDC.

The mooring plan should ensure the following:

- a) All moorings must be located within the consented area.
- b) The moorings shall be monitored and maintained in accordance with the “Marine Farm Mooring, Monitoring and Maintenance Schedule”

<http://www.marlborough.govt.nz/Services/Property-File-Search.aspx>

5.4. Feed

Salmon require a balanced nutritious diet on which to grow and remain healthy.

5.4.1. Fishmeal and Fish Oil Conservation

Salmon diets still have to rely on wild sourced whole fish fishmeal and oil as part of the diet. This resource is utilised in a wide range of industries including pig, poultry and pharmaceutical sectors. However, commercially produced pelletised diets for salmon are increasingly being formulated to use smaller amounts of wild sourced fish meal; added fish meal being derived from sustainably harvested wild fish, from better utilisation of fish meal factory trimmings and by using fish meal replacements from land animal and vegetable proteins and oils, along with necessary minerals and vitamins.

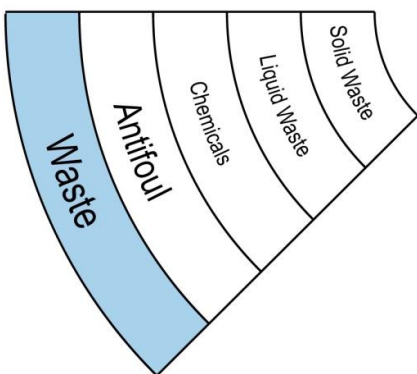
In order to ensure best practice for our industry in New Zealand, farmers need to ensure that:

- a) The feed used must be specifically formulated for salmon.
- b) All raw ingredients must be sustainably sourced and traceable. Manufacturers should be able to provide the information to ascertain this – For example see details provided on manufacturer’s websites below.
- c) Salmon farmers must monitor feeding to minimise feed wastage.
- d) Daily feed discharge should be recorded on farm, with the monthly and annual total discharge reported to MDC.

Further details regarding feed can be found on the following manufacturers’ websites.

- Skretting Australia <http://www.skretting.com.au/>
- Ridley Aquafeeds <http://www.agriproducts.com.au/Products/AquaFeed.aspx>
- Biomar <http://www.biomar.com/en/Corporate/>

6. Waste



Salmon farming like any other form of farming or industry will produce a certain amount of waste materials. The key waste management issues are associated with solid and liquid waste, and the potential for chemical and oil spills.

6.1. Solid Waste

Solid waste can include such items as; feed bags, rope, plastic, containers etc.

To minimise the risk of accumulation of farm waste on the foreshore and seabed a “Solid Waste Management Plan” should be developed, including a plan to reduce, re-use and re-cycle materials wherever possible.

- a) All solid waste from the salmon farm must be disposed of onshore, in an appropriate manner.
- b) All farms must comply with the NZKS “Solid Waste Management Plan”.
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2014/02/Solid-Waste-management-Plan-Final-1.pdf>

6.2. Liquid Waste

Liquid waste can include greywater and blackwater.

6.2.1. Greywater

Greywater (including liquid waste from showers, wash basin, kitchen and laundry facilities) may be discharged from staff facilities on a marine farm and will be part of the resource consent for the salmon farm. Any chemicals in the greywater discharge, including detergents, should be “eco friendly” and the best reasonable biodegradable option.

6.2.2. Blackwater

Sewage must be retained and disposed of via an approved treatment facility.

6.3. Chemicals

Certain chemicals are used on site as part of day to day operations (e.g. harvest and grading), these include chemicals for general cleaning, disinfection and fuels.

- a) Chemical use and storage on site should be minimised.
- b) All chemicals on site must be listed (i.e. chemical register must be kept, indicating amounts stored and usage). Chemicals should be used according to recommended practice and a relevant Material Safety Data Sheet (MSDS) should be kept in an accessible location.

6.3.1. Oil Spill Plan

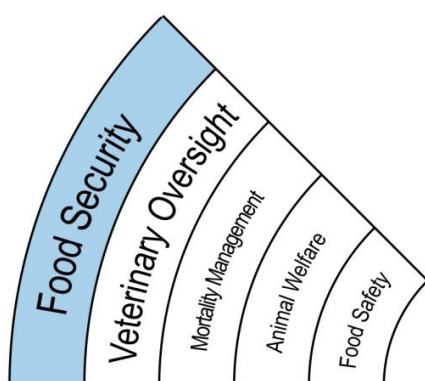
Oil and other hydrocarbon spills represent a potential risk to both personnel and the environment.

- a) All spills must be reported, as per the site marine oil spill contingency plan.
- b) If fuel/oils are stored on site then the site is subject to the Maritime Transport Act 1994 and Marine Protection Rule 130B.
<http://www.maritimenz.govt.nz/Rules/List-of-all-rules/Part130B-marine-protection-rule.asp>
- c) A site marine oil spill contingency plan must be in place and submitted to the MDC.
- d) NZKS has a specific ‘Oil Spill Management Plan’ - available here.
<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2015/11/SEAPEN-MANUAL-4-Oil-Spill-Plan-V2-Final.pdf>

6.4. Antifoulants

Antifoulants are used to reduce bio-fouling on marine farming nets and structures. There are various commercial antifoulant products available, including copper based paints, recent research has suggested the potential for sediment accumulation of copper with these products and as such current best practice should seek to minimise the use of copper based antifouling paint.

7. Food Security



All operations should be carried out to ensure that all health requirements are met.

7.1. Food Safety

Food safety is important throughout the supply chain, from raw materials to final product, to ensure the safety of the product and eliminate any potential to cause illness and/or death.

7.1.1. Residues

It is important to be aware of any residues potentially in the environment, and at risk of being introduced that could create human health issues. These residues, if present, need to meet Maximum Residue Limits (MRL's) set out for New Zealand www.foodsafety.govt.nz/elibrary/industry/register-list-mrl-agricultural-compounds and for the country being exported to.

- a) Furthermore MPI run a National Chemical Residue Programme that enables the Government to confirm residue limits are not exceeded and the fish is safe to eat. <http://foodsafety.govt.nz/policy-law/food-monitoring-programmes/apa-1999/ncrp/>

7.1.2. Heavy Metals

New Zealand salmon is low in heavy metals, however to confirm this and to give confidence to consumers, flesh monitoring of key elements such as Mercury, Zinc and Copper is undertaken to ensure food safety and market access. MPI sampling programme for heavy metals is outlined in the following document: <http://www.fish.govt.nz/en-nz/Research+Services/Research+Database+Documentation/hmetal/Sampling.htm>.

7.1.3. Parasites

Fish for market must be free of parasites known to be transmitted to humans, as this can cause human health issues, and may affect market access. Historical evidence confirms this is not an issue in New Zealand farmed salmon, however ongoing assessments continue.

7.1.4. Supplier Guarantees

Feed and chemical suppliers are required to provide guarantees and/or certificates of analysis (COA's) to provide assurance that their products are compliant with MRL's and can be considered safe for use in relation to any of the other issues outlined above.

7.1.5. Harvest Supplier Statement

The seafood code of practice, requires a supplier statement for fish harvested for human consumption identifying that any medications used in the production process do not present a risk to human health, and that post-harvest chilling or freezing practices are appropriate <http://www.foodsafety.govt.nz/elibrary/industry/supply-of-farmed-fish/supplier-statement-supply-of-farmed-fish-for-human-consumption-by-1-03-2014.pdf>.

7.1.6. Traceability

In the event of an issue or recall it is important to be able to trace product back to farm and pen and even identify the supply line for raw materials fed to the fish. Consequently, traceability procedures have been defined as per the NZ Food Safety Guidelines. <http://www.foodsafety.govt.nz/elibrary/industry/code-practice-seafood/part-2-sections31->

[39.pdf](#)

This allows for quick response and may help to avoid a broader recall of fish/ product.

7.2. Animal Welfare

Fish husbandry requires the containment, handling and feeding of fish. Under the Animal Welfare Act, 1999, fish are defined as animals accordingly; the following “five freedoms” must be adhered to for all animals on the salmon farm:

1. Provision of sufficient food and water.
2. Provision of adequate shelter.
3. The opportunity to display normal patterns of behaviour.
4. The physical handling of fish is undertaken to minimise the likelihood of unreasonable or unnecessary pain or distress.
5. Protection from, and rapid diagnosis of, any significant injury or disease.

MPI has a wealth of information available regarding animal welfare, which can be found here.

<http://www.mpi.govt.nz/biosecurity-animal-welfare/animal-welfare.aspx>

7.2.1. Fish Escapes

Stock escapes must be minimised, and in order to do this the following is required.

- a) A management plan to maintain the structures, approved by a suitably qualified person.
- b) A net replacement management plan which ensures safe containment.

7.2.2. Fish Handling

Occasionally through the grow-out cycle it may be a requirement to handle the fish. This may be for assessment of fish health, size, or to undertake a grading activity or harvest.

- a) All handling activities should be carried out by a suitably qualified person and as a minimum comply with the Animal Welfare Act, 1999.

7.3. Mortality Management

A mortality management plan must be in place which includes:

- a) A response to elevated mortalities.
- b) Bio-security considerations.
- c) Disease notification to MPI.
- d) Any dead salmon should be removed from the net pens regularly.
- e) Mortalities should be classified as to the potential cause of death, and mitigating measures taken according to the mortality management plan.
- f) There are a number of notifiable organisms
http://www.legislation.govt.nz/regulation/public/2010/0265/latest/whole.html?search=ts_r egulation_biosecurity_resel&p=1#d1m3170938 and these are listed along with the actions

to be taken in the NZKS Biosecurity Management plan.

<http://www.kingsalmon.co.nz/kingsalmon/wp-content/uploads/2015/11/Biosecurity-Management-Plan-30-October-2015.pdf>

7.3.1. Mortality Disposal

Mortalities should be recovered regularly.

- a) Dead salmon must be placed in a sealed container for transfer and disposal.
- b) Salmon should be rendered, converted to silage or disposed in landfill.

7.4. Veterinary Oversight

All farmed animals may require veterinary intervention at some time in order for them to remain healthy and grow well.

- a) Salmon farms should have staff competent in identifying symptoms of adverse fish health, and clear procedures in the event that a health issue is identified.
- b) A registered fish veterinarian should be available at all times.
- c) Fish health should be assessed regularly by the veterinarian and the results reported to the company.
- d) Resource consent is required to use medicated feed.
- e) Medicated feeds must be fed under veterinary management and control.

8. Certification



Best Management Practices can be ratified with independent certification. There are a number of different programmes with relevance to salmon farming, but they are all valuable as they give resource managers (MDC) and the general public additional confidence that practices are sustainable and audited. They are also increasingly being required by customers and markets as proof of practice.

8.1. International

At the salmon farmers discretion, farms can be independently audited against an internationally recognised certification programmes, such as:

- a) BAP (Best Aquaculture Practices) <http://gaalliance.org/bap/standards.php>
- b) ASC (Aquaculture Stewardship Council) <http://www.asc-aqua.org/>
- c) Monterey Bay Aquarium <http://www.montereybayaquarium.org/conservation/research/seafood-watch>

8.2. Eco Label

Adoption of an indigenous Eco Label may be obtained. This will reflect customary values and give confidence that the farming operations are managed accordingly to ensure those values are respected.

8.3. Food Standards

There are numerous other respected food standards which can indicate particular aspects of production such as the level of sustainability, organic status or nutritional / dietary context, for example:

- a) MPI (Export)
- b) Woolworths Quality Assurance
- c) Kosher Kiwi
- d) Halal
- e) RMP (HACCP) – Notice of Registration

Compliance with these standards ensures market access

8.4. Audit

The BMP guidelines have been developed to provide guidelines for salmon farm development and farming in the Marlborough Sounds; as a result they need to comply with the salmon industry A+ Certification.

- a) As discussed in 5.3 NZKS aspire to manage each of their operations in accordance with the BMP Guidelines contained in this document.
- b) An audit of the NZKS practices in relation to the BMP guidelines will be carried out at least every three years (potentially more frequently where observed deviation(s) from the guidelines occur).
- c) The cost of the audit is to be agreed between the parties.
- d) Records associated with inventory, biomass and feed usage will be retained for confidential audit if required.
- e) A copy of the New Zealand Salmon Farmers Association (NZSFA) A+ Certification is available from Aquaculture New Zealand here: <http://www.aplusaquaculture.nz/#a-plus-home>

Appendix 1 – Regulatory

This summary has been prepared by the Marlborough District Council. It is intended as a general guide only, rather than a conclusive statement of regulatory considerations.

1. Regulatory Considerations

Aquaculture, like many other primary industries, is heavily reliant on the use and development of natural resources which are generally in the public domain, consequently aquaculture regulation has developed over time to address potential conflicts with the development of these natural resources. Currently aquaculture is impacted by 19 separate pieces of legislation (Agricultural Compounds and Veterinary Medicines Act 1997; Animal Products Act 1999; Animal Welfare Act 1999; Biosecurity Act 1994; Fisheries Act 1996; Hazardous Substances and New Organisms Act 1996; Health and Safety in Employment Act 1992; Local Government Act 2002; Marine Mammals Protection Act 1978; Marine Reserves Act 1971; Maritime Transport Act 1994; The Building Act 2004; Waste Minimisation Act 2008; Wildlife Act 1953; Resource Management Act 1991 (RMA); Fisheries Act 1983; Aquaculture Reform (Repeals and Transitional Provisions) Act 2004). There are a number of specific regulations, rules and guidelines which govern the establishment and operation of marine farming activities in the coastal marine area.

The legislation of most significance to aquaculture in terms of using and developing water space is the RMA (Resource Management Act 1991).

The RMA legislation also sets out responsibilities and processes for all parties that manage, control, use and develop natural and physical resources in the coastal marine area. Hence it is important that all marine farmers are familiar with its responsibilities and requirements.

1.1. Purpose

The purpose of the RMA is to promote the sustainable management of natural and physical resources. In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while:

- a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations;
- b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems;
- c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

In achieving this purpose, councils must have regard to a number of principles set out in Part 2 of the RMA, specifically Sections 6, 7 and 8.

Section 6 requires councils to recognise and provide for matters of national importance. These include matters in relation to:

- d) the natural character of the coastal environment, wetlands, lakes and rivers;
- e) outstanding natural features and landscapes;
- f) areas of significant indigenous vegetation and significant habitats of indigenous fauna;
- g) public access to and along the coastal marine area, rivers and lakes; the relationship of Maori with their ancestral land and sites;

- h) historic heritage; and
- i) protected customary rights.

Section 7 contains matters which councils must have particular regard to. These include amenity values, kaitiakitanga, quality of the environment, efficient use and development of natural and physical resources, intrinsic values of ecosystems and the benefits from the use and development of renewable energy. Section 8 requires the principles of the Treaty of Waitangi to be taken into account.

The RMA establishes a hierarchy of policy instruments, both national and regional that guide Councils, developers, the community and conservationists alike on resource use. Some of the policy documents are mandatory and some are voluntary. The hierarchy of documents are as follows.

- j) New Zealand Coastal Policy Statement (Mandatory), Other National Policy Statements (Optional), National Environmental Standards (Optional)
- k) Regional Policy Statements (Mandatory)
- l) Regional Coastal Plan (Mandatory)
- m) District Plan (Mandatory)
- n) Other Regional Plans (Optional)

1.2. Central Government

There is no specific national policy statement or national environmental standards on finfish farming or other forms of aquaculture (at the time of writing). However, the New Zealand Coastal Policy Statement 2010 (NZCPS) is the only mandatory National Policy Statement required by the Resource Management Act and includes a specific policy on aquaculture. The aquaculture policy (Policy 8) states:

“Recognise the significant existing and potential contribution of aquaculture to the social, economic and cultural well-being of people and communities by:

- a) *including in regional policy statements and regional coastal plans provision for aquaculture activities in appropriate places in the coastal environment, recognising that relevant considerations may include:*
- b) *the need for high water quality for aquaculture activities; and*
- c) *the need for land-based facilities associated with marine farming; taking account of the social and economic benefits of aquaculture, including any available assessments of national and regional economic benefits; and*
- d) *ensuring that development in the coastal environment does not make water quality unfit for aquaculture activities in areas approved for that purpose.”*

The NZCPS contains a wide range of other policies on matters such as landscape, natural character, cultural issues, public access, coastal hazards, discharges, biodiversity, ports, activities in the coastal environment etc. The policies apply to the coastal environment, which includes not only the coastal marine area, but also land. The policies are not set out in the NZCPS in a hierarchical way. The policies get considered in terms of their relevance to a particular proposal i.e. not all policies are relevant in every circumstance.

The Minister of Conservation is responsible for preparing the NZCPS and for monitoring and reviewing its effectiveness. However, the main way in which this policy statement is implemented is through regional policy statements and through the regional, coastal and district plans that are prepared by councils. Many of the NZCPS policies contain specific direction about what is to be included within regional policy statements and plans.

In 2012, central government adopted an Aquaculture Strategy and 5 year action plan to enable the aquaculture sector to grow. Although not part of the statutory considerations, the strategy seeks government led legislative amendments to enable efficient and responsive actions, enable investment, foster innovation and deliver on Treaty of Waitangi obligations with respect to aquaculture.

1.3. Resource Management Act 1991

This RMA provides a quasi-property right to occupy public space and carry out a commercial activity. Finfish farming also has the added requirement of needing to provide artificial feed to its stock. This is an activity that is normally heavily restricted but permission can be sought under the Resource Management Act for a discharge permit.

The Resource Management Act was hailed as a new era in legislation as it was one of the first Acts to be provided an explicit purpose and incorporate the principle of sustainability. It replaced a total of 69 Acts and amended Acts and 19 regulations and orders. The legislators sought to provide one integrated framework for the development and use of natural and physical resources with a set process to resolve competing interest in the development and use of those resources.

1.4. The Marlborough Planning Framework

The current planning framework for the Marlborough Sounds can be found in the Marlborough Regional Policy Statement (RPS), and the Marlborough Sounds Resource Management Plan.

The RPS includes policies for activities in the coastal environment including for activities such as marine farming.

The Marlborough Sounds Resource Management Plan is a combined regional, regional coastal and district plan. The Council is required by the RMA to have a regional coastal plan. The regional coastal parts of the Plan are required to be signed off by the Minister of Conservation.

The Resource Management Act also requires that the Council review its regional policy statement, regional plan and district plan every ten years. Each Council is required to continually monitor the state of its environment, the suitability and effectiveness of its policies and plans, and the exercise of resource consents. These processes are imposed to ensure that Councils remain aware of the issues within their regions and the policies and planning provisions remain current.

Individuals can also seek changes to plans or parts of plans to enable developments, modify requirements or impose controls on effects.

Plan changes and reviews require a public consultation process that is very different to the processing resource consent applications. Changes are notified with opportunities for the public to submit.

1.5. Seeking a Coastal Permit for a Marine Farm

A coastal permit is required to install structures, disturb the seabed, occupy coastal space and to discharge any substance to the coastal marine area from a marine farm. Each coastal permit will have a term and a set of compliance conditions. At the conclusion of the term, the consent holder must either remove/stop the consented activity/discharge or apply anew.

Applications for aquaculture activities must comply (as a minimum) with Schedule 4 of the Resource Management Act. Generally this schedule requires an application to provide a description of the activity, its effects on the environment, any mitigation, affected parties, and whether any monitoring is required. Applications should also address any policy and plan requirements which are listed under assessment criteria. Given the importance of public space, its vast number of uses and users, and concerns around discharges, the degree and amount of detail in finfish aquaculture applications is generally very high. Also generally, finfish applications are processed through a public process with a public hearing. The community are able to raise concerns with a proposal through the submission and hearings process. The Council evaluates these concerns against the applicant's evidence and the statutory policy documents before making a decision.

If successful in gaining a coastal permit from the Council and once beyond any challenges to the Courts, an assessment must be undertaken by the Ministry of Primary Industries against the Fisheries Act 1996 for Undue, Adverse Effects on commercial, cultural, and recreational fishing. Through this process, the Ministry consults with the different sectors of the fishing industry and makes a determination to confirm, alter or overturn the Council's decision.

Only after these two processes are completed can a finfish farm be established and operations begin.

1.6. Compliance

Resource consents are usually granted subject to conditions which can require the consent holder to undertake certain activities, impose time limits, monitor environmental impacts, maintain specified environmental thresholds or any other environmental aspect of the activity that the Council thinks is relevant to avoid, reduce or mitigate adverse effects on natural and physical resources. Conditions are imposed as ongoing requirements of the consent holder and, unless otherwise specified, are enforceable and required to be complied with, for the term of the resource consent.

Failure to comply with conditions can lead to the instigation of formal enforcement action. Under the Resource Management Act, these actions can come in the form of Enforcement Orders, Abatement Notices, Infringement Notices or prosecutions. Whilst there is a right of appeal to such notices, non-compliance can lead to prosecution proceedings and a fine.

The Resource Management Act provides a range of penalties depending on the nature of the offending and the type of offender. As a maximum, the Act provides a fine of \$300,000 and 2 years imprisonment for a natural person and a maximum fine of \$600,000 for a company.

1.7. Infringement Notices

An Infringement Notice is a fine that can be issued for certain non-compliances. The fines range from \$300 - \$1000 depending on the type and extent of non-compliance and gravity of adverse effect. An infringement notice is served on an individual by an enforcement officer.

1.8. Abatement Notices

An abatement notice is a warning to the consent holder, issued by an enforcement officer, that they are not complying with the Act, regulations, Regional or District Plan, resource consent, or the activity is having adverse effects.

Abatement notices can require the recipient to refrain from carrying out an activity or action, and/or to carry out set tasks to ensure compliance with the Resource Management Act or resource consent.

Failure to comply with the requirements of an abatement notice constitutes a breach of the notice. This is considered a serious matter and may result in an infringement notice (fine) being served or even a prosecution.

1.9. Enforcement Orders

Enforcement Orders can be sought from the Environment Court by any person in cases of non-compliance with the Resource Management Act, a resource consent condition, or a Regional or District Plan rule. These orders can require a consent holder to: cease activity; initiate action; remedy or mitigate any adverse effects; pay monies; and/or change or cancel a resource consent. These orders can also be brought to bear on an individual, representatives or successors of the consent holder and are liable for the maximum penalties under the Act.

1.10. Prosecutions

Prosecution is the most serious form of enforcement action to address non-compliance. The purpose of prosecution is to punish the offender and to deter potential offenders. A prosecution is brought before a Court to establish guilt to a criminal standard, and therefore the potential to impose a criminal sentence on the offender be it an individual, a group, or a company.

The decision to prosecute will be made based on factors like the nature and scale of the non-compliance, the effects generated by it, and the perceived level of deterrence required.

Appendix 2 - References

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Other Useful Websites:

AQNZ	http://aquaculture.org.nz/
MPI	http://www.mpi.govt.nz/home
NZKS	http://www.kingsalmon.co.nz/
MDC	http://www.marlborough.govt.nz/

Appendix 3 - List of Participants at 1st workshop

Professor Kenny Black	SAMS
Dr Catriona MacLeod	University of Tasmania
Grant Rosewarne	NZKS
Mark Gillard	NZKS
Grant Lovell	NZKS
Mark Preece	NZKS
Karen Mant	NZKS
Mat Bartholomew	Ministry for Primary Industries
Dr Richard Ford	Ministry for Primary Industries
Dr Dave Taylor	Cawthron Institute
Nigel Keeley	Cawthron Institute
Dr Chris Cornelisen	Cawthron Institute
Dr Niall Broekhuizen	NIWA
Dr Steve Ulrich	Marlborough District Council
Bruno Brosnan	Marlborough District Council
Rob Schuckard	Sounds Advisory Group
Eric Jorgensen	Sounds Advisory Group
Merv Whipp	Ngai Tahu
Graeme Coates	Marine Farming Association
Colin Johnston	Aquaculture New Zealand

Working Groups

Benthic & water quality

Nigel Keeley	Cawthron Institute
Mark Gillard	NZKS
Niall Broekhuizen	NIWA
Richard Ford	Ministry for Primary Industries
Rob Schuckard	Sounds Advisory Group
Steve Urlich	Marlborough District Council

Farm Operations

Mark Gillard	NZKS
Mark Preece	NZKS
Grant Lovell	NZKS
Eric Jorgensen	Sounds Advisory Group
Bruno Brosnan	Marlborough District Council