

The Hearing Panel

25 March 2019  
9.30 am

## Staff Report for Hearing

*The recommendation in the staff report represents the opinion of the writer and it is not binding on the Hearing Panel. The report is evidence and has no greater weight than any other evidence that the Panel will hear and consider.*

### Hearing of Application - APP-20157616-V1

#### Sanford Limited

Compiled by Danielle Korevaar, Resource Management Consultant

- Hearing: The hearing is scheduled to commence at 9.00 am on Monday, 25 March 2019 in the Council Chambers, Environment Southland, corner of Price Street and North Road, Waikiwi, Invercargill.
- Application: Sanford Limited has applied has applied to change conditions of seven coastal permits that authorise marine farming in Big Glory Bay. The current permits allow for a total of 332.064 tonnes per year of nitrogen input from feed, with site specific limits for each of the seven farms. The applicant proposes increasing this limit to 659 tonnes per year, with increases to site specific limits at two of the farms.
- Notification: The application was publicly notified on 24 May 2018 and five valid submissions were received.
- Executive Summary: This is an application for change to conditions of seven coastal permits. As outlined in this report the key issues are:
- exclusive or preferential occupation of the Coastal Marine Area;
  - potential effects on water quality; and
  - potential effect on the benthic environment.

## **1. Introduction**

### **1.1 About the author**

My name is Danielle Korevaar. I am a Resource Management Consultant with Incite (Chch) Limited. I have been employed by Incite since October 2018 and have previously worked as a Consents Planner at Canterbury Regional Council.

I hold the following qualifications:

- Bachelor of Science in Geography and Economics from the University of Canterbury, Christchurch.
- Intermediate and Advanced Certificates of Sustainable Nutrient Management from Massey University, Palmerston North.

I have been contracted by Southland Regional Council as the processing officer for this application since December 2018. Before this time Southland Regional Council was processing the application internally.

### **1.2 Purpose of this report**

This report is prepared under the provisions of Section 42A of the Resource Management Act 1991 (RMA). This section of the RMA allows a council officer to provide a report to a decision-maker on a resource consent application made to the Council and allows the decision-maker to consider the report at the hearing. Section 41(4) of the RMA allows the decision-maker to request and receive from any person who makes a report under Section 42A *"any information or advice that is relevant and reasonably necessary to determine the application."*

This report will provide the decision-maker with information and advice related to:

- the background to the application;
- details of the notification of the application and submissions received;
- an outline of the relevant legal and planning provisions;
  - Resource Management Act 1991 (RMA)
  - New Zealand Coastal Policy Statement 2010 (NZCPS)
  - Southland Regional Policy Statement 2017 (RPS)
  - Regional Coastal Plan for Southland 2013 (RCP)
  - Te Tangi a Tauira, Ngāi Tahu ki Murihiku Natural Resource and Environmental Iwi Management Plan 2008 (IMP)
- comments on the assessment of environmental effects provided;
- comments in relation to the matters specified in Part 2 of the RMA;
- comments on the decision to be made by the decision-maker including:
  - comments on whether the application can be granted or should be declined;
  - if the application is to be granted what measures are required to avoid, remedy or mitigate any adverse effects and what monitoring could be undertaken

It should be emphasised any conclusions reached, or recommendations made, are not binding on the decision-maker. It should not be assumed the decision-maker will reach the same conclusion or decision having considered all the evidence to be brought before it by the applicant and submitters.

### 1.3 Executive Summary

Sanford Limited (the applicant) has applied to change conditions of seven coastal permits that authorise marine farming in Big Glory Bay. The current permits allow for a total of 332.064 tonnes per year of nitrogen input from feed, with site specific limits for each of the seven farms. The applicant proposes increasing this limit to 659 tonnes per year, with increases to site specific limits at two of the farms.

Following public notification (including re-notification to the Minister of Conservation) of the application, five submissions were received, with two supporting the application, one not opposed if Council is satisfied with the supporting science, and two opposed to the proposal.

The key issues addressed by this report are:

- exclusive or preferential occupation of the Coastal Marine Area;
- potential effects on water quality
- potential effect on the benthic environment,

Overall, I recommend granting each of the seven consents that form part of this application, subject to conditions.

## 2. The proposal

### 2.1 Background

The application relates to seven existing coastal consents, which allow the applicant to place structures in, on and over the seabed, to occupy the coastal marine area (CMA) and to discharge or deposit contaminants for the purpose of undertaking marine farming activities in Big Glory Bay (BGB). Under all consents, the applicant is authorised to farm the following species:

- Green-lipped mussels (*Perna canaliculus*)
- Blue mussels (*Mytilus galloprovincialis*)
- Bluff dredge oysters (*Tiostrea chilensis*)
- Scallops (*Pecten novaezelandiae*)
- Quinnet salmon (*Oncorhynchus tshawytscha*)

Three of the sites are active salmon farms, with one (MF 249) being fallowed.

All of the consents include a restriction on total nitrogen input from feed for salmon, with site specific limits as described in Table 1 on page 11 of this report, and a total limit of 332.064 tonnes between 1 July and the following 30 June the following year.

Five of the marine farms (Sites 'LI—') were originally authorised by Marine Farming Licences, issued by the Ministry of Fisheries under the Fisheries Act 1996. These were subsequently granted as coastal consents on 1 January 2005, with a total nitrogen input from feed of 332.064 t/yr, as described in Table 1.

The two additional marine farms that are included under this application were granted on 8 August 2011 (MF 249) and 29 January 2016 (MF 246), and do not authorise any additional nitrogen inputs, so the total load across all farms was maintained at 332.064 t/yr.

A summary of the current consented environment in BGB outside the consents subject to this application is provided in section 5.6 of this report.

## **2.2 Proposed variation**

Existing condition 4/5 of each consent (numbering varies per consent) currently sets out the total nitrogen input for each marine farm and allows the consent holder to share the total nitrogen input across its farms, provided significant adverse effects on the seabed are avoided, and other effects can be remedied or mitigated. Under the current consents, a significant adverse effect is considered to have occurred if no marine life exists under the salmon cages.

The applicant is proposing to increase the total nitrogen input from feed across seven marine farm sites from 332.064 t/yr to 659 t/yr, with increases to the specific nitrogen input limits on some sites, as described in Table 1.

The proposal will not increase the consented area that is currently available to the applicant but will offer the ability to increase stocking densities within these areas.

The applicant proposes this variation will be a step in working towards a Southland Regional Development Strategy goal of increasing salmon production in the region.

Following notification, the applicant proposed several amendments to the conditions originally applied for. These proposed conditions were provided without prejudice for discussion purposes, and while not a formal amendment to the application, I consider they provide a more robust condition framework than those originally proposed. Specifically, while there is no change to the proposed total nitrogen input of 659 t/yr, they do change the mechanics by which this total will be accessed, with a staging system based on measured environmental outcomes.

A copy of the existing conditions (two sets across the seven existing consents) has been provided, alongside the condition amendments as per the application and the most recent conditions that have been provided by the applicant for discussion. The revised conditions provided below would be replicated across all consents.

### **Existing conditions**

There are there are two sets of existing conditions related to the nitrogen input from feed. The first includes empirical limits only, while the second refers to modelled limits.

Set One (existing consent AUTH-20157616 only):

4.
  - a. The total nitrogen input from feed for salmon at the marine farm site between 1 July and 30 June the following year shall be restricted to 73.8 tonnes. Where the consent holder has the right to use an additional site or sites consented for salmon farming within Big Glory Bay, the total nitrogen input from feed can be deployed, either wholly or in part, between any or all of the consent holder's marine farm sites provided that

significant adverse effects on the seabed are avoided and other effects can be remedied or mitigated.

- b. The consent holder shall provide an annual report summarising the:
  - i. monthly volume of feed for salmon supplied to the marine farm site; and
  - ii. monthly loading (in tonnes) of total nitrogen supplied to the marine farm site as a result of feeding salmon;
  - iii. between 1 July and 30 June the following year. This report shall be provided to the Consent Authority by 31 July each year, or upon request.

Set Two (all other existing consents):

5. The total nitrogen input from feed at the marine farm site for salmon between 1 July and 30 June each year shall be restricted to 73.792 tonnes. Where the consent holder has the right to use an additional site or sites consented for salmon farming within Big Glory Bay, the total nitrogen input from feed can be deployed, either wholly or in part, between any or all of the consent holder's marine farm sites provided that significant adverse effects on the seabed are avoided and other effects can be remedied or mitigated. A significant adverse effect is considered to have occurred if no marine life exists under the salmon cages.

#### **Proposed conditions as per application dated 16 November 2017**

There are there are two sets of conditions proposed, with each set to be used on some of the existing consents. The first includes empirical limits only, while the second refers to modelled limits.

Set One:

4.
  - a. The nitrogen input from feed at the marine farm site for salmon between 1 July and 30 June each year shall be restricted to 415.1 tonnes provided that:
    - i. the total nitrogen input from feed used in Big Glory Bay between 1 July and 30 June each year does not exceed 659 tonnes; and
    - ii. a binding agent is contained within the feed.
  - b. Activities authorised by Condition 4(a) shall not:
    - i. Increase the average excess total ammonia nitrogen in Big Glory Bay by more than 30 µg/L at the surface; or
    - ii. Increase the average excess of chlorophyll-a in Big Glory Bay by more than 4 µg/L at the surface or;
    - iii. Reduce the average dissolved oxygen concentration in Big Glory Bay below 7 mg/L at the surface; or
    - iv. Result in total organic carbon deposition greater than 0.73 kg/m<sup>2</sup>/year more than 100 metres from the boundary of the site; or
    - v. Result in total faeces and solid waste deposition greater than 5 kg/m<sup>2</sup>/year more than 100 metres from the boundary of the site.
  - c. Notwithstanding Condition 16, a suitably qualified, experienced and independent person shall prepare a monitoring plan, the purpose of which is to enable compliance with those standards in Condition 4(b) to be assessed.
  - d. The monitoring plan shall be submitted to Environment Southland for approval in a technical capacity two months before the consent holder's total nitrogen input from feed is increased above 332.064 tonnes/year.
  - e. The consent holder shall provide an annual report summarising the:
    - i. monthly volume of feed for salmon supplied to the marine farm site; and
    - ii. monthly loading (in tonnes) of total nitrogen supplied to the marine farm site as a result of feeding salmon;Between 1 July and 30 June the following year. This report shall be provided to the Consent Authority by 31 July each year, or upon request.

Set two:

5.
  - a. Except where Condition 5(b) applies, the nitrogen input from feed at the marine farm site for salmon between 1 July and 30 June each year shall be restricted to 73.792 tonnes.
  - b. Where the consent holder:
    - i. holds additional resource consents that authorise salmon farming in Big Glory Bay that have conditions specifying allowable nitrogen input from feed; and/or
    - ii. has the written agreement of another consent holder in Big Glory Bay that holds a resource consent with conditions specifying allowable nitrogen input;the consent holder may utilise that nitrogen input from feed, either wholly or in part, between any or all of the consent holder's marine farm sites provided that:
    - iii. the total nitrogen input from feed used in Big Glory Bay between 1 July and 30 June each year does not exceed 659 tonnes; and
    - iv. modelling in DELFT3D, or alternative modelling software agreed to in writing by Environment Southland, has been undertaken by a suitably qualified, experienced, and independent person, which demonstrates that an additional amount of nitrogen input from feed above that authorised by Condition 5(a) shall not:
      1. Increase the average excess total ammoniacal nitrogen in Big Glory Bay by more than 30 µg/L at the surface; or
      2. Increase the average excess of chlorophyll-a in Big Glory Bay by more than 4 µg/L at the surface; or
      3. Reduce the average dissolved oxygen concentration in Big Glory Bay below 7 mg/L at the surface; or
      4. Result in total organic carbon deposition greater than 0.73 kg/m<sup>2</sup>/year more than 100 metres from the boundary of the site; or
      5. Result in total faeces and solid waste deposition greater than 5 kg/m<sup>2</sup>/year more than 100 metres from the boundary of the site; and
    - v. the additional nitrogen input from feed allows compliance with criteria listed in Condition 5(b)(iv); and
    - vi. the feed deployed shall be consistent with the parameters of the feed modelled.
  - c. Notwithstanding Condition 16, a suitably qualified, experienced and independent person shall prepare a monitoring plan, the purpose of which is to enable compliance with those standards in Condition 5(b)(iv) to be assessed.
  - d. The monitoring plan shall be submitted to Environment Southland for approval in a technical capacity two months before the consent holder's total nitrogen input from feed is increased to a rate that would result in an exceedance of 332.064 plus any allowable nitrogen input from feed referred to in Condition 5(b)(ii).

#### **Revised set of conditions for discussion dated 18 December 2018**

Conditions proposed for each individual existing consent:

4.
  - a. The total nitrogen input from feed at the marine farm site for salmon between 1 July and 30 June each year shall be restricted to 415.1 tonnes provided that:
    - i. the total nitrogen input from feed used in Big Glory Bay between 1 July and 30 June each year does not exceed 659 tonnes across all farms in Big Glory Bay, irrespective of ownership; except that
    - ii. until such time as the requirements of Condition YY [Staging] have been satisfied, the total nitrogen input from feed used in Big Glory Bay between 1 July and 30 June each year shall not exceed 583 tonnes across all farms in Big Glory Bay, irrespective of ownership.

**Water Quality Objectives:**

- b. The marine farm shall be operated in such a way to achieve the following water quality objectives for the water column:
  - i. To not cause a shift in the trophic state of the water column (i.e. change towards a eutrophic state), beyond that which is likely to occur naturally.
  - ii. To not increase the frequency, intensity, or duration of phytoplankton blooms (i.e. chlorophyll-a concentrations  $\geq 5 \mu\text{g/l}$ ).
  - iii. To not cause elevated nutrient concentrations outside the confines of established natural variation for the location and time of the year, beyond 250m from the edge of the farm.
  - iv. To not cause reduction in dissolved oxygen concentrations to levels that are potentially harmful to marine biota beyond 250 m from the edge of the farm.

**Environmental Quality Standards-water (EQS-water):**

- c. Activities authorised by Condition 4(a), in combination with activities authorised by consents [insert all the other consent numbers] shall not result in any one of the following:
  - i. Tier one standard (see condition 4 (e)): the monthly median concentrations of chlorophyll-a in the water column within Big Glory Bay (monthly median from a data set of all monitoring sites) being greater than  $3.5 \mu\text{g/l}$  for three consecutive months; or
  - ii. Tier two standard (see condition 4(e)): for three consecutive months, the concentration of chlorophyll-a in the water column (monthly median at any sampling site within Big Glory Bay) exceeding  $5 \mu\text{g/L}$ :
    - 1. at two or more sites for two of those three consecutive months; and
    - 2. at one or more sites for one of those three consecutive months.
  - iii. Tier two standard (see condition 4 (e)): an increase in the average monthly excess total ammonia nitrogen in Big Glory Bay of more than  $30 \mu\text{g/L}$  at the surface of the water column, when compared with baseline data from the same or comparable sampling sites from the period July 2015 to December 2017; or
  - iv. Tier two standard (see condition 4 (e)): the dissolved oxygen saturation in the water column at any sampling point more than 250 metres from the farm falling below 70% for three consecutive months (measured using 1 metre bins to 2 metres from the seabed).

**Environmental Quality Standards-seabed (EQS-seabed):**

- d. Tier two standard (see condition 4 (e)): Activities authorised by Condition 4(a) shall meet the following Environmental Quality Standards (EQS) for the seabed within 10 metres of the edge of the pens:
  - i. The benthic community retains a diversity and abundance of marine taxa (other than one or two opportunistic enrichment-tolerant taxa such as Capitellid and Dorvillea worms, and nematodes) at levels which allow for sustained farm waste assimilative capacity and sufficient seabed recovery to support a farm rotation cycle with a fallowing period of not less than 5 years.
  - ii. No more than 20% of the not less than 5 replicate cores collected have no taxa present (azoic). In any assessment under this condition, the effects of mussel shell substrate on benthic communities are to be ignored.
  - iii. No obvious, spontaneous out-gassing ( $\text{H}_2\text{S}$ /methane)
  - iv. Bacteria mat (Beggiatoa) coverage not greater than 50% of the sampled area.

- e. Two tiers of responses in support of maintaining the Environmental Quality Standards (EQS) specified in Conditions 4 (c)(i) – (iv) and 4 (d) shall apply.
  - i. Tier one: a breach of Condition 4(c)(i) shall trigger further water quality monitoring, consideration of the wider environment, and investigations aimed to determine any contributing effect from farm operations on chlorophyll-a levels. Where relevant, this Tier one response shall also include the consideration of, and planning for, future management responses to avoid further breaches.
  - ii. Tier two: a breach of any of the Tier two standards (Conditions 4 (c)(ii), (iii) and (iv), and 4(d)) shall require reduced stocking and/or fallowing of the marine farm following the next harvest of salmon on that farm to achieve full compliance with the EQS-water or EQS-seabed within 24 months of the date the consent holder receives confirmed notice of such a EQS result through its monitoring. A substantive improvement within 12 months of that date is required.
- f. Water quality monitoring will be detailed in the Big Glory Bay Salmon Farm Environmental Management Plan (“BGBSFEMP”) required by the conditions of this consent and shall include monthly sampling of nutrients (total ammoniacal nitrogen, NO<sub>3</sub>-N, NO<sub>2</sub>-N, DRP, TN and TP), chlorophyll a, phytoplankton composition (reference sites), temperature, dissolved oxygen (DO), water clarity, salinity at the locations specified in the BGBSFEMP. A new “Reference” site outside Big Glory Bay shall be established.
- g. Seabed monitoring will be detailed in the BGBSFEMP and shall include annual monitoring at the locations specified in the BGBSFEMP for sediment grain size, total organic matter (TOM), total organic carbon (TOC), copper and zinc, appearance of sulphide depth and general colour, depth of redox layer, obvious outgassing, mat forming bacteria, epifauna and infauna. If any benthic sample contains a large number of mussel shells or the grab is prevented from closing due to the presence of mussel shells, the sample shall be retaken. In the event that three grab samples at any one location all contain a large number of mussel shells or the grab is prevented from closing due to the presence of mussel shells the sampling location shall be relocated approximately 10 metres distant.
- h. Notwithstanding any other condition of this consent, a suitably qualified, experienced and independent person shall prepare a monitoring plan, the purpose of which is to enable compliance with the standards in Conditions 4(c) and 4 (d) to be assessed. The monitoring plan shall be submitted to Environment Southland for approval in a technical certification capacity two months before the total nitrogen input from feed in Big Glory Bay authorised by consents [list to come] is increased above 483 tonnes/year.
- i. In addition to the requirements of conditions 4(f) and (g), the BGBSFEMP shall set out the details of:
  - i. Possible responses to a Tier one standard breach requiring further monitoring and/or analysis to determine whether the operation of the marine farm is causing the relevant EQS-water not to be achieved; and
  - ii. Possible management responses to a Tier two standard breach requiring a clear decision process and plan of action, with clear timeframes to reduce effects on the water column or seabed and achieve full compliance with the EQS-water or EQS-seabed in accordance with Condition 4(e)(ii).

**Advice note:** *This consent expires in 2025, following which the on-going efficacy of the conditions of this consent, and especially Conditions 4 (b), 4 (c) and 4 (d), will need to be reassessed, having particular regard to the monitoring undertaken in accordance with Condition XXX.*



Additional conditions proposed to be included on each individual consent:

**Big Glory Bay Salmon Farm Environmental Management Plan (BGBSFEMP)**

1. Notwithstanding any other conditions of this consent, the consent holder shall, no later than [insert date], submit to Environment Southland, a Big Glory Bay Salmon Farm Environmental Management Plan (“BGBSFEMP”) for approval in a technical certification capacity.
2. The BGBSFEMP required by Condition 1:
  - a. May be updated by the consent holder at any time; and
  - b. Shall be updated by the consent holder at least once in every two year period;
  - c. Address relevant matters identified in the latest Technology Update Report;provided that any updated provisions shall only apply, once the updated BGBSFEMP has been approved in a technical certification capacity by Environment Southland.
3. The purpose of the BGBSFEMP required by Condition 1, or any updated BGBSFEMP prepared in accordance with Condition 2, is, as a minimum, to set out:
  - a. The procedures and practices to be implemented by the consent holder in order to ensure compliance with Conditions 4(c), 4(d) and 4(e) of consent AUTH-20157616 [and the other consents having the same requirement];] of this consent; and
  - b. The proposed layout of each salmon farm site and how this is expected to change over each two year period; and
  - c. The maintenance procedures to be followed to ensure the ongoing efficacy of all salmon farm structures; and
  - d. The procedures and practices to be implemented to minimise, to the extent practicable, the interactions of marine mammals and seabirds with the farm site; and
  - e. The procedures, practices and monitoring to be implemented to meet the objective of reducing historically elevated concentrations of copper and zinc in sediments beneath the farm site to those that satisfy the ANZECC (2000) Interim Sediment Quality Guidelines; and
  - f. How the results of the monitoring required by the conditions of this consent will be utilised to adapt, as quickly as practicable, operational farming practices, including but not limited to the fallowing of individual sites, in the event that monitoring indicates that unforeseen environmental effects may arise;
  - g. Any changes in salmon farming technology and/or farm management practices identified in the Technology Update Report required by Condition 5 that the consent holder proposes to implement: and
  - h. Provide robust environmental data to inform the applications for replacement consents once these consents expire in 2025.
4. When determining practicability for the purposes of Condition 3 f), the following factors will be considered:
  - a. The requirements of Conditions 4(c), 4(d) and 4(e) of consent AUTH-20157616 [and the other consents having the same requirement]; and
  - b. Fish should be allowed to grow to market ready size before being harvested; and
  - c. Salmon cage relocation to allow fallowing should not compromise fish health or the scheduling of fish harvesting.

**Technology update report**

5. At three yearly intervals during the term of this consent, the consent holder shall engage an appropriately qualified and experienced professional to prepare a Technology Update Report and, following consultation with Environment Southland, provide it to Environment Southland. The purpose of the Technology Update Report is to:
  - a. Evaluate and report on any new developments in salmon farming technology and/or farm management practices that have the potential to reduce the deposition on the seafloor of:
    - i. Uneaten salmon feed; and

- ii. Salmon faeces.
- b. Any environmental benefits that could be expected by adopting that technology and/or farm management practice; and
- c. The feasibility of adopting that technology and/or farm management practice, including, but not limited to financial implications.

**Advice Note:** Conditions 1 – 4 are included on each of the consent holder's salmon farming resource consents in Big Glory Bay. It is envisaged the one BGSFEMP and one Technology Update Report will be prepared that addresses all the consent holder's salmon farms in Big Glory Bay, rather than having a number of individual documents.

**To be added to the existing monitoring condition**

- 6. The annual monitoring report required by Condition [y] of this consent shall include:
  - a. A comparison with the results of previous monitoring at the same salmon farm site;
  - b. Identification of any potential environmentally significant monitoring trends, at both the site and Big Glory Bay scales; and
  - c. Identification of any proposed additional monitoring, including the rationale for it, and the proposed scale, extent and timeframes involved.
  - d. An evaluation of the potential implications of the monitoring results from all salmon farming operations undertaken in Big Glory Bay by the consent holder on the environmental quality of Big Glory Bay;
  - e. The extent to which the monitoring results indicate that farming practices may need to be adapted in order to address unforeseen environmental effects indicated by the monitoring results.

**To be added to the existing review condition**

- 7. Adding or amending conditions in order to address any matter raised in:
  - a. The annual monitoring report insofar as it relates to Condition [X immediately above]; or
  - b. The Technology Update Report required by Condition 5.

**Staging**

- 8. The total nitrogen input from feed used in Big Glory Bay between 1 July and 30 June each year shall not exceed 583 tonnes across all farms in Big Glory Bay, irrespective of ownership until:
  - a. At least 1 July 2021; and
  - b. The total nitrogen in feed used in Big Glory Bay between 1 July and 30 June in each of three successive years has been at least 466 tonnes; and
  - c. The relevant farm(s) has operated for a period of three successive years at levels of between 85- 100% of its allowable individual nitrogen input; and
  - d. Monitoring results of the past two successive years for both seabed and water quality are not indicating results and/or statistically significant trends towards progressively greater environmental effects of the farms.
  - e. A suitably qualified, experienced and independent person has confirmed, in writing, that the increased input of nitrogen in feed should meet the requirements of Conditions 4(c) and 4(d) of consent AUTH-20157616 [and the other consents having the same requirement] and that the requirements of a – d above have been satisfied; and
  - f. Environment Southland certifies that the requirements of clause b and c of this condition have been satisfied.

**Table 1: Summary of current and proposed permits**

Existing coastal permit	AUTH-20157616	AUTH-207256	AUTH-203236	AUTH-203237	AUTH-203240	AUTH-203241	AUTH-203242
Proposed coastal permit	APP-20157616-V1	APP-207256-V1	APP-203236-V1	APP-203237-V1	APP-203240-V1	APP-203241-V1	APP-203242-V1
Marine farm site	MF 246	MF 249	LI 320	LI 321	LI 338	LI 339	LI 340
Central location NZTM2000	1229887E, 4785945N	1227982E, 4785544N	1228150E, 4786212N	1228064E, 4784314N	1228243E, 4784548N	1229500E, 4784967N	1229305E, 4784758N
Total Area (hectares)	6.0	12.0	3.0	3.0	4.5	4.0	4.0
Nitrogen input from feed at the marine farm sites for salmon between 1 July and 30 June each year (tonnes)							
Current per site	73.8	73.792	73.792	73.792	73.792	55.344	55.344
Proposed per site	415.1		200.6				
2005 total	NA		332.064				
Current total	332.064						
Proposed total	659, although only available following staging process						

### 3. Notification and submissions

#### 3.1 Lodgement

The applications were lodged with Southland Regional Council (SRC) on 16 November 2017 and SRC sent the applicant a letter confirming the applications had been accepted as complete under s88 of the RMA on 29 November 2017.

#### 3.2 Request for notification

Section 95A of the RMA states that:

1. *A consent authority must follow the steps set out in this section, in the order given, to determine whether to publicly notify an application for a resource consent.*  
Step 1: mandatory public notification in certain circumstances
2. *Determine whether the application meets any of the criteria set out in subsection (3) and,—*
  - a. *if the answer is yes, publicly notify the application; and*
  - b. *if the answer is no, go to step 2.*
3. *The criteria for step 1 are as follows:*
  - a. *the applicant has requested that the application be publicly notified;*
  - b. *public notification is required under [section 95C](#);*
  - c. *the application is made jointly with an application to exchange recreation reserve land under [section 15AA](#) of the Reserves Act 1977.*

Following discussions with SRC, the applicant requested public notification of the applications on 21 May 2018.

#### 3.3 Notification advert

The applications were notified on 24 May 2018 in the Southland Times, with a copy of the notification advert below.

**Sanford Limited, Big Glory Bay, Stewart Island**

**Application: APP-20157616-V1**

**Variation to seven Coastal Permits;** to increase the nitrogen input from all Sanford Limited marine farms from salmon feed from 332 tonnes per year, to 659 tonnes per year and to update the monitoring regime based on existing and proposed modelling using the DELFT3D model; and to enable Sanford Limited to use nitrogen allocation which is currently consented on other marine farms for their operation. This application has been made under Section 127 of the Resource Management Act 1991 (RMA), and is a discretionary activity under s87B of the RMA.

**Purpose:** Coastal Permit for Marine Farming

**Location:** Big Glory Bay, Stewart Island

Permit Number	Marine farm number	NZTM 2000 Map Reference
20157616	MF 246	1229887E 4785945N
207256	MF 249	1227982E 4785544N
203236	LI 320	1228150E 4786212N
203237	LI 321	1228064E 4784314N
203240	LI 338	1228243E 4784548N
203241	LI 339	1229500E 4784967N

Permit Number	Marine farm number	NZTM 2000 Map Reference
203242	LI 340	1229305E 4784758N

*Table 1: Identifying the permits and their location*

Please note the map references have been converted from NZMG to NZTM 2000 and have been aerially placed as being about the centre of the consented marine farm site. Each marine farm has specific map references outlining the extent of the marine farm site and this is available as an appendix to the consent.

**Legal Description of Property:** Marine and Coastal Area.

**Reasons for public notification:** The applicant has requested public notification.

**Address for Service:** Sanford Limited, PO Box 443, Shortland Street, Auckland 1140, Attn: Ali Undorf-Lay

Full details of this application are also available for inspection at Environment Southland, corner of Price Street and North Road, Waikiwi, Invercargill during working hours (8.00 am to 5.00 pm). Enquiries may be directed to Courtney Guise by phone to (03) 211 5115 or by email to [courtney.guise@es.govt.nz](mailto:courtney.guise@es.govt.nz).

The application was subsequently re-notified to the Minister of Conservation on 10 January 2019.

### 3.4 Submissions received

Five valid submissions were received on the application, with submitters and details of the submissions summarised in Table 2 below.

One submission was received 45 minutes after the deadline, so the applicant agreed to extend notification by one day to allow for this submission to be considered.

One submission was received from Forest and Bird, requesting the application be declined. This submission was not accepted as valid by Environment Southland, as it was served but not in the prescribed form, did not outline if the submission was in support/neutral/opposed to the whole or part of the application, and provided no reasoning to support the submission.

**Table 2: Submissions summary**

Submitter	Position	To be heard	Trade Competitor
Bruce J Ford	Support	No	No
	<ul style="list-style-type: none"> <li>• Applicant is a well-established salmon operation and have proved that they can survive the many commercial vagaries that occur in aquaculture operations. They have developed efficiencies that minimize – and likely, eliminate – fish food falling to the sea floor, and through innovation has reduced the possibility of contamination. The operation is of substantial benefit to the Stewart Island community financial income given the many staff and to local businesses, and applicant maintain staff ashore in Oban, with the benefits that entails.</li> <li>• Applicant is known to appreciate the community goodwill, and consequently, it is in its best interests to demonstrate sustainable values and the continuation of support to Stewart Island and to the wider community of Southland and NZ. Have been substantial changes in salmon farming operations in the Bay in order to perfect and optimize production and economics.</li> <li>• Given applicant’s innovations and efficiencies it is appropriate that additional production be permitted on the sites licensed for that purpose.</li> </ul>		
Department of Conservation  Contact Nardia Yoizin	Oppose in part	No, but encouragement of pre-hearing meeting	No
	<ul style="list-style-type: none"> <li>• No concerns with increases in production levels or associated discharges, provided they are within sustainable environmental limits.</li> <li>• No concerns with effect on marine mammals, seabirds, recreation, amenity or landscape values</li> <li>• Concerned with ability of the Bay to cope with nitrogen increases, and how this will affect water quality and benthic environment, both near the farms and in the wider bay. In particular the following aspects are deficient or unclear: <ul style="list-style-type: none"> <li>○ How nitrogen cap across the Bay will be managed and not exceeded, confirmation of increase above existing (327 or 179 tonnes), absence of staged or adaptive management.</li> <li>○ Lack of nutrient-phytoplankton-zooplankton-detritus water quality model (current best practice), and absence of information about key assumptions relating to nitrogen performance of the farms.</li> <li>○ Concerns relating to the scale of predicted change in water quality, whether maximum change would be persistent, and no identification of baseline against which to compare changes, how averages will be determined spatially and temporally.</li> <li>○ Need for dissolved oxygen to be measured at all depth layers, not just at the surface.</li> <li>○ Application fundamentals missing, including justification for increased operational efficiency and efficacy of the binding agent.</li> <li>○ No management plan for managing legacy and future issues around the effect of other contaminants under and surrounding the farms.</li> </ul> </li> </ul>		
Harald Gordon (Joe) Cave	Support	No	Yes
	<ul style="list-style-type: none"> <li>• Additional nitrogen has the potential to stimulate algal blooms, which negatively affect the oxygen levels, in turn negatively affecting mussel growth.</li> <li>• Support a cautious approach to expand nitrogen level by 25% every year for four years, with increases only allowed if environmental monitoring shows no undesirable change, with oxygen levels no less than 7 mg/L at any stage, and 8 mg/L during winter and spring months. Weekly</li> </ul>		

Submitter	Position	To be heard	Trade Competitor
	average levels would be acceptable, but no annual average. • If environmental levels not meant, then no support for additional allocation.		
Southland Conservation Board	Not opposed provided council is satisfied with the supporting science	No	No
	• Serves conservation interests best if optimum sustainable use is made of areas already allocated for marine farming, in preference to allocation of new areas.		
Te Rūnanga o Ngāi Tahu and Te Rūnanga o Awarua	Oppose	Yes	No
Contact Stevie-Rae Blair	• Concerns about the nitrogen increase sought, and potential environmental impacts as a result. • If council is of a mind to grant, consideration of appropriate mitigation conditions, in which Ngāi Tahu wishes to participate.		

## 4. Legal and Planning matters

### 4.1 Status of application

The original application was lodged and accepted by SRC as a change in conditions to seven existing consents in accordance with s127 of the RMA.

Subsequent to the original application and responses to a formal request for further information, the applicant provided two additional sets of conditions for discussion in October and November 2018. These condition sets removed the requirement for the use of a binding agent, altered the monitoring regime, parameters and limits, and introduced staging of the proposed increase in nitrogen discharge.

When receiving a change in conditions application, there are three tests the Council should apply to assess whether the circumstances are within jurisdiction (*Coull v Christchurch City Council* (EnvC C077/06)). These are:

- Does the change increase the scale or intensity of the activity?
- Does the change exacerbate or mitigate the impacts of the activity, both in terms of adverse effects and in terms of the plan and other superior documents?
- Would parties who have not made submission have done so if they were aware of the change?

Following the proposed changes to consent conditions in October and November 2018, SRC considered that:

- there **will** likely be a change to the scale and intensity of the activity originally proposed, particularly as a result of the change to the use of the binding agent and limits to be met through monitoring;
- the environmental impacts of the proposed changes are difficult to establish, especially considering that an assessment of environmental effects relating to each change has not been provided to date (rather, only a set of altered conditions was provided). However, the change to the use of the binding agent in particular suggests **greater effects** may occur than those described in the application that was notified, particularly outside of the salmon pens; and
- from the small number of submissions received it is difficult to conclude whether further submissions would have been received. However it is **possible** that members of the public may be prejudiced by these changes as they have not been able to make submissions on the application as it now stands. Rather, they had a chance to submit on an earlier and now outdated iteration with likely different environmental effects.

Based on the reasons above, the applicant was notified on 21 November 2018, that Council determined that these changes to conditions were outside the scope of the original application and proceeded to treat the application as new.

For completeness, an assessment of the application as a change in conditions, and a new activity has been provided below.



## Change in conditions

Section 127 of the RMA states:

1. *The holder of a resource consent may apply to a consent authority for a change or cancellation of a condition of the consent, subject to the following:*
  - a. *the holder of a subdivision consent must apply under this section for a change or cancellation of the consent before the deposit of the survey plan (and must apply under section 221 for a variation or cancellation of a consent notice after the deposit of the survey plan); and*
  - b. *no holder of any consent may apply for a change or cancellation of a condition on the duration of the consent.*
2. *Sections 88 to 121 apply, with all necessary modifications, as if—*
  - a. *the application were an application for a resource consent for a discretionary activity; and*
  - b. *the references to a resource consent and to the activity were references only to the change or cancellation of a condition and the effects of the change or cancellation respectively.*
3. *If the resource consent is a coastal permit authorising aquaculture activities to be undertaken in the coastal marine area, no aquaculture decision is required in respect of the application if the application is for a change or cancellation of a condition of the consent and does not relate to a condition that has been specified under section 186H(3) of the Fisheries Act 1996 as a condition that may not be changed or cancelled until the chief executive of the Ministry of Fisheries makes a further aquaculture decision.*
4. *For the purposes of determining who is adversely affected by the change or cancellation, the consent authority must consider, in particular, every person who—*
  - a. *made a submission on the original application; and*
  - b. *may be affected by the change or cancellation.*

Subsections (1)(a) and (b) are not relevant for this application.

In accordance with Section 127(2)(a) the application will be treated as a **discretionary** activity.

In accordance with Section 127(3), no aquaculture decision is required as the conditions to be changed have not been specified under Section 186H(3) of the Fisheries Act 1996.

In accordance with Section 127(4), no submissions were made on the original applications.

## New activity

Under the current planning framing work in Southland, consents for coastal activities are required under the Regional Coastal Plan for Southland.

Resource consent is required in accordance with the following rules of the RCP:

- Rule 7.3.8.1.1 allows for the application of fauna health products and feeding of nutrients to vegetation and fauna as a **discretionary** activity.
- Rule 9.1.1 allows for exclusive or preferential occupation of the coastal marine area as a **discretionary** activity, where not provided for elsewhere in the plan.
- Rule 9.1.2 allows for occupation of the coastal marine area as a **discretionary** activity, where:
  - the area of exclusion is greater than 10 ha; or
  - the activity would exclude public from more than 316 m along the length of the foreshore; or

- the activity involves occupation of more than 50 ha, and would restrict public access to or through such areas.
- *Rule 9.1.4 allows for a coastal occupation charge to be imposed on all coastal permits for occupation issued under the RMA. The charge for any commercial marine farm is \$425.00 per annum, adjusted in accordance with the Consumer Price Index.*
- Rule 9.1.6 allows for the occupation by suspended cables, aerial wires, power and telephone lines as a **discretionary** activity.
- Rule 9.1.7 allows for the occupation by submarine lines or cables as a **restricted discretionary** activity.
- Rule 10.2.2 allows for the deposition of less than 50,000 cubic metres of any material on the foreshore in any one year as a **discretionary** activity.
- Rule 10.2.4 allows for the deposition of material on the seabed in the CMA as a **discretionary** activity.
- Rule 11.2.6 (2) allows for the erection of temporary or permanent structures in the CMA as a **discretionary** activity.
- Rule 15.1.7 allows for marine farming in areas other than those referred to in Rule 15.1.2 – 15.1.6 as a **discretionary** activity.

In addition to the rules listed above, Rule 7.2.2.1 sets out water quality limits that must be met where waters are being managed for the purposes of People and Aquatic Life.

All of the rules included above provide for marine farming and/or ancillary activities as a **restricted discretionary** or **discretionary** activity.

The various components of the proposal for which consent is required are considered to be closely related and to have overlapping effects. The application should therefore be “bundled” and considered in terms of the most restrictive activity status. As a result, the application is considered to be an overall **discretionary** activity.

### **Overall**

Regardless of how the application is treated, the activity status remains **discretionary**, so the determination of the application in accordance with Section 104B of the RMA as described in Section 4.3 remains the same.

The key difference in assessment between a change in conditions or new application is that under the former, discretion is limited to the effects that may change as a result of the variation, while as a new activity discretion is open to consider all actual and potential effects of the activity.

I consider that this will have little material difference in the context of this report, as the effects of the activity are assessed against the existing environment, which includes activities carried out under existing consents (*Queenstown Lakes District Council v Hawthorn Estate Limited* [2006] NZRMA 424 (CA)). Given some aspects of the existing operation are not proposed to change as a result of the increase in nitrogen input from feed, I consider the bulk of discussion and assessment, regardless of how the application is treated, will focus on the same effects.

## **5. Description of the environment**

The description of the environment is based on that provided in the original application, and the further information as part of a s92 request for further information pre-notification. Further detail is provided in the application documents, with the information here intended as a summary only.

### **5.1 Physical environment**

The marine farms are located within BGB, which lies on the eastern side of Stewart Island. As per Chapter 3.14 of the RCP, all of Stewart Island's coastal area is classified as containing significant values, with the exception of BGB, which is the only area on the island available for aquaculture. The RCP states in relation to Rule 11.2.6 (Other structures) that given significant development has occurred in Big Glory Bay, the pristine nature of this area has already been compromised.

BGB is part of Landscape Unit 29 (Eastern Bays), and has a naturalness rating of 3+, making it a modified environment, though still with key natural features outside the marine farms specifically in BGB. These key features include crescent shaped bays with golden sand beaches, and the coastal ridgelines and arms that form the bays.

The bay is approximately 12 km<sup>2</sup> in area, with a 700 m wide mouth and average depth of 20 m. There are shallow, rocky reefs along the north and south sides, and a shallow area at the west. The land surrounding the Bay is covered in native bush as can be seen on aerial photography, with some clearance and a building on Bravo Island, at the Bay's mouth. There are multiple small bays along the shoreline, with some having sandy beaches.

A channel is maintained through the middle of the Bay to allow access.

### **5.2 Hydrodynamics**

As per Section 3.3 of the applicant's Assessment of Environmental Effects (AEE), the Bay has generally weak flow (currents < 5 cm/s), though this is stronger toward the mouth. Flow is generally mouth ward along the southern and northern banks of the bay. The direction of currents is variable, with several eddies present. There is little change in currents through different seasons.

Based on the release of a tracer, flushing time or residence time has been estimated at approximately one month. As per the AEE, the tracer concentration in the Bay was as follows:

- Day 1 = 100%
- Day 7 < 70%
- Day 14 = 40%
- Day 28 < 10-15%

As with the current, little change in flushing through different seasons has been identified.

### **5.3 Water quality**

The applicant has monitored water quality in the Bay as part of the existing Big Glory Bay Monitoring Programme, with results used to form the knowledge of the existing environment.

Known environmental limits are provided where possible, to allow for a comparison of the current situation against what is required to sustain a healthy aquatic environment.

In general:

- Nitrogen (limiting nutrient for phytoplankton growth)
  - Total Ammonia Nitrogen (TAN) has lower concentrations in spring/summer (as a result of phytoplankton uptake), and higher in autumn/winter.
    - ◆ Spring/summer concentrations range from <10 g µg/L to 38 g µg/L
    - ◆ Autumn/winter concentrations range from 15.5 µg/L to 58.5 µg/L
  - 2016/17 summer concentrations similar to 1989, but higher than 1988.
  - Environmental guidelines for ammonia-N and Nitrate-N in estuarine and coastal environments are 15 and 5 µg/L. Guidelines for harbour waters, as accepted by Auckland Council (Vaughan & Walker 2014), are 89 and 105 µg/L respectively.
    - ◆ Median concentrations in BGB in 2016/17 were 30 and 21 µg/L respectively.
  - Total nitrogen (TAN + nitrate + particulate nitrogen) follows a similar pattern to TAN.
- Chlorophyll-*a* (a proxy for phytoplankton biomass)
  - Highest concentrations in late winter/spring, and lowest in late autumn/early winter.
  - Variation in average monthly concentration from 0.3 µg/L to 6.5 µg/L.
  - 2016/17 summer concentrations similar to the 1998-2005 period.
- Dissolved oxygen (requirement for fish and wider environmental health)
  - Varies seasonally from 6 to 9 mg/L.
  - The applicant references that environmental limits require at least 6 mg/L to maintain healthy farmed salmon. Below this, 2 mg/L is the critical level for maintaining respiration, while 4 mg/L is the threshold for stressing most aerobic organisms.
  - Submitter Mr Harald Gordon Cave refers to a lower limit of 7 mg/L at any time of year, and 8 mg/L during winter and spring.

The applicant concludes that there are no detectable adverse water quality issues within BGB under the current consented environment.

There may be interaction between the salmon farms and mussel farms, with mussels consuming phytoplankton during the summer months, which in turn reduces chl-*a* and TAN concentrations, however this is otherwise unproven through research.

Based on the preliminary national objective framework triggers for estuaries, BGB would be considered “good”.

#### 5.4 Benthic environment

The applicant has monitored various aspects of the benthic environment in the Bay as part of the Big Glory Bay Monitoring Programme, with results used to form the knowledge of the existing environment.

Known environmental limits are provided where possible, to allow for a comparison of the current situation against what is required to sustain a healthy aquatic environment.

In general:

- higher proportion of mud at sites near the head of the bay than in the middle or mouth, including controls;
- organic matter and total organic carbon levels at control sites are within range, but elsewhere higher at the mouth than head of the Bay;
- the applicant considers total carbon deposition of 0.73 kg/m<sup>2</sup>/yr and total faeces and solid waste deposition of 5 kg/m<sup>2</sup>/yr conservative limits to allow functioning benthic processes;
- organic enrichment is generally below 10%, similar to control sites in most cases:
  - where higher below farms, is improved to a control site comparable level at 100 m distance;
- Zinc (ingredient in salmon feed) and copper (used in anti-foulant) concentrations are higher under some farms, but below ANZECC thresholds at a distance of 100 m, and control sites;
- species richness is moderately high below most farms and control sites:
  - opportunistic polychaete beneath all farms, with a range polychaetes and bivalves at farm and control sites;
  - more diversity and more pristine environment near mouth of BGB;
- salmon farms that have been fallowed show improved quality of benthic environment, with overall improvement over 2016/17.

The applicant concludes that in general, seabed conditions have improved across Big Glory Bay farms in the sample period, although there is organic enrichment below each of the farm sites when compared to the control sites.

## 5.5 Wildlife

Various species are found in Big Glory Bay and its surrounds, with details below:

- in accordance with Section 3(1)(b) of the Fisheries (Southland and Sub-Antarctic Areas Commercial Fishing) Regulations 1986, commercial fishing is banned in Paterson Inlet, which includes all of BGB;
- some recreational cultural fisheries are likely, and include blue cod, flatfish, moki, butterfish, terakihi, trumpeter, wrass and rig;
- three species of sharks and several marine mammal species are known to frequent the area;
- as per Section 3.14 of the RCP, there are several seabirds found in the eastern bays area, including shags, penguins, gulls, terns and shearwaters (mutton birds).

## 5.6 Existing consented activities

As per Section 15 of the RCP, the Ministry of Fisheries determined in 1983 that coastal waters surrounding Stewart Island, except BGB, were unavailable for marine farm leasing or licensing. As such, all Stewart Island marine fishing operations are concentrated in BGB, with 37 marine farms having consent to operate there.

Table 3 below shows all current consents for marine farming in Big Glory Bay.

There are four consents that authorise the farming of salmon in the Bay that are not subject to this application.

- AUTH-203230 (LI366) is held by the applicant and has a nitrogen input limit of 55.344 t/yr;
- AUTH-203231(LI474) is held by the applicant and has a nitrogen input limit of 55.344 t/yr;
- AUTH-202102 and AUTH-205773 (LI342) are held by Schofield Sea Farm Limited and the applicant, and have a nitrogen input limit of 40.25 t/yr.

Between the consents subject to this application, and those listed above, the total nitrogen input from feed authorised across BGB is 482.998 t N/yr.

**Table 3 – Summary of consents in Big Glory Bay**

Consent number	Consent holder	Marine farm site	Species authorised					Nitrogen allocation
			Mussels	Oysters	Scallops	Seaweed	Salmon	
AUTH-20157616	Sanford Ltd	MF246	x	x	x		x	<b>73.8</b>
AUTH-203102 and AUTH-205773	Schofield Sea Farm Ltd & Sanford Ltd	LI342	x	x	x		x	<b>40.25</b>
AUTH-203103 & 205775	Schofield Sea Farm Ltd	LI319	x	x	x			
AUTH-203104 & AUTH-205774	Schofield Sea Farm Ltd	LI318	x	x	x			
AUTH-203122	Sanford Ltd	LI418	x					
AUTH-203123	Sanford Ltd	LI325	X	x	x			
AUTH-203124	Sanford Ltd	LI324	x	x	x			
AUTH-203125	Sanford Ltd	LI315	x	x	x			
AUTH-203126	Sanford Ltd	LI316	x	x	x			
AUTH-203154	Campbelltown Seafoods Ltd	LI149	x	x	x	x		
AUTH-203230	Sanford Limited	LI366	x	x			x	<b>55.344</b>
AUTH-203231	Sanford Limited	LI474	x	x			x	<b>55.344</b>
AUTH-203233	Gorton's Fisheries Ltd	LI322	x	x	x			
AUTH-203235	Sanford Ltd	LI317	x	x	x			
AUTH-203236	Sanford Ltd	LI320	x	x	x		x	<b>73.79</b>
AUTH-203237	Sanford Ltd	LI321	x	x	x		x	<b>73.79</b>
AUTH-203238	Sanford Ltd	LI323	x	x	x			
AUTH-203239	Sanford Ltd	LI337	x	x	x			
AUTH-203240	Sanford Ltd	LI338	x	x	x		x	<b>73.79</b>
AUTH-203241	Sanford Ltd	LI339	x	x	x		x	<b>55.34</b>
AUTH-203242	Sanford Ltd	LI340	x	x	x		x	<b>55.34</b>
AUTH-203243	Sanford Ltd	LI461	x	x	x			
AUTH-203244	Sanford Ltd	LI475	x	x	x			
AUTH-207251	Sanford Ltd	MF244	x	x	x			
AUTH-207252	Sanford Ltd	MF245	x	x	x			
AUTH-207253	Sanford Ltd	MF246	x	x	x			
AUTH-207254	Sanford Ltd	MF247	x	x	x			
AUTH-207255	Sanford Ltd	MF248	x	x	x			
AUTH-207256	Sanford Ltd	MF249	x	x	x		x	<b>73.79</b>
AUTH-207257	Sanford Ltd	MF250	x	x	x			
AUTH-300164	EEC Ltd	MF271	x	x	x			

Consent number	Consent holder	Marine farm site	Species authorised					Nitrogen allocation
			Mussels	Oysters	Scallops	Seaweed	Salmon	
AUTH-300165	EEC Ltd	MF272	x	x	x			
AUTH-300166	EEC Ltd	MF273	x	x	x			
AUTH-300167	EEC Ltd	MF274	x	x	x			
AUTH-300168	EEC Ltd	MD275	x	x	x			
AUTH-300169	EEC Ltd	MF326	x	x	x			
AUTH-300768	Maass Mussels & Oysters Ltd	MF365	x	x	x			

*Highlighted consents are subject to this change in conditions application.*



## 5.7 Cultural Values

The Rakiura/Te Ara A Kiwa (Stewart Island/Foveaux Strait) coastal marine area is identified as a statutory acknowledgment area under Schedule 104 of the Ngāi Tahu Claims Settlement Act 1998.

Rakiura/Stewart Island is a rich Ngāi Tahu cultural landscape, and includes traditions around the formation of the landscape, wāhi ingoa/place names, wāhi tapu/archaeological sites, ara/trails, Maori lands and extensive mahinga kai and freshwater fisheries. Schedule 104 of the Ngāi Tahu Claims Settlement Act 1998 sums up the importance of Rakiura by saying:

*The mauri of the coastal area represent the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngai Tahu Whanui with the coastal area.*

Te Tangi a Taurira, the Iwi Management Plan (IMP) for Murihiku/Southland identifies Rakiura and the Coastal Marine Area as representing an area of historical and cultural identity for Ngāi Tahu. BGB is excluded from the Mātaitai reserve areas covering other parts of Paterson Inlet.

The IMP provides specific policy guidance on aquaculture, which will be discussed further in Section 7.

## 6. Assessment of actual and potential effects

Section 15 (Marine Farming) of the RCP, lists the adverse effects that may result from marine farming. These will be used as guidance in assessing the actual and potential effects of the proposal.

All relevant effects have been listed and assessed below. Although the application was lodged as a change in conditions, it has been assessed as a new consent by the Council, taking into consideration the existing consented environment where necessary, as discussed in Section 3 of this report.

Dr Ken Grange, Principal Scientist – Marine Ecology at the National Institute for Water and Atmospheric Research (NIWA) has provided technical comment on the water quality and benthic environment aspects of the application. Dr Grange's comments have been taken into account in the assessment below, and his evidence will be attached to this report.

### 6.1 Exclusive or preferential occupation

Regardless of whether the application is treated as a change in conditions or new, consideration must be given to the exclusive occupation of the CMA that is required by marine farming, and how this sits within the planning framework. The relevant policy documents provide some support and requirements for exclusive or preferential occupation, and recognise the rights of existing activities, as detailed below.

## Resource Management Act

Section 165ZH of the RMA relates to the processing of applications for existing permit holders. Subsection 1 sets out where it applies, with the following points of relevance to this application:

- a person holds a coastal permit to occupy space in the marine area for aquaculture activities; the permit is in force at the time of application and not a prohibited activity;
- the application is for a new coastal permit that is for occupation of the same space, for an aquaculture activity and accompanied by other required coastal permit applications;
- the application is made to the appropriate consent authority and made at least six months before expiry.

Although the application was applied for as a change in conditions, it has been subsequently accepted by council as a new application to replace seven existing consents, so Section 165ZH may be considered. Subsection 2 sets out how the application must be processed:

- a. the applications, must be processed and determined before any other application for a coastal permit to occupy the space that the permit applies to; and*
- b. no other application to occupy the space that the application relates to may be accepted before the determination of the application; and*
- c. the holder may continue to operate under the existing coastal permit until—*
  - i. a new coastal permit is granted and all appeals are determined; or*
  - ii. a new coastal permit is declined and all appeals are determined.*

Section 165ZH effectively allows for consent applications where the aquaculture activity is already consented at that site to be processed first for a change in conditions or renewal/replacement.

## New Zealand Coastal Policy Statement

The NZCPS recognises that some activities are important to the social, economic and cultural well-being of people and communities, and that some activities have a functional need to be located within the CMA (Policy 6(1)(a) and (2)(c)). Policy 8 builds on this in relation to aquaculture, recognising that provisions for aquaculture activities in appropriate places should be included in regional policy statements and coastal plans, taking account of the social and economic benefits of aquaculture, and ensuring water quality is not made unfit for aquaculture through development in the coastal environment.

The following policies provide effects-based guidance that is relevant to aquaculture:

- Policy 3 recommends a precautionary approach be taken to activities whose effects on the coastal environment are uncertain or unknown, but potentially significantly adverse.
- Policy 11 requires the protection of indigenous biodiversity, with guidance to avoid, remedy or mitigate effects on indigenous taxa, species habitats and ecological corridors.
- Policy 18 recognises the need for public open space within the CMA, and that this be provided for in a way that is compatible with the natural character, features, landscapes and amenity values of the coastal environment, while taking account of future need for public space.

## Regional Coastal Plan

The RCP expands on the provisions set out by the predecessor to the current NZCPS and includes similar discussion through Objective 4.2.1 and Policy 4.2.1 that some activities and developments

have a functional need to be located in the CMA, and that proposals for such activities should justify the functional necessity for the location within the CMA. Objective 4.4.1 and Policy 4.4.1 go further in recognising that exclusive or preferential occupation of the CMA is required for some activities, but again ensures that it is necessary and fully justified. Policy 4.4.2 also requires that any activity that restricts public use of the CMA justify the necessity for the restriction.

Chapter 9 of the RCP relates to occupation, with Objective 9.1.2 anticipating exclusive or preferential occupation of the CMA provided it is justified, and Policies 9.1.1 to 9.1.7 including more specific guidance, requiring that:

- interests of recreational and other lawful users be protected;
- preferential occupation is favoured over exclusive occupation;
- if a right for exclusive occupation is not fully exercised within a reasonable period, it may be subject to review;
- the area of exclusive occupation is limited/minimised;
- the provision of buffer zones to avoid, remedy or mitigate effects is avoided;
- durations are limited to a period that will satisfy the immediate foreseeable future; and
- where a right to occupy is about to expire and there is competing interest in the space, the existing legal occupier will have a preferential right of renewal.

Chapter 15 of the RCP relates to marine farming and also has provisions around occupation of the CMA. Specifically, Policy 15.1.2 states that where new and changing activities are proposed in areas with a current occupation right, preference will be given to the current occupier, provided effects of the activity are avoided, remedied or mitigated.

Chapter 7 provides further effects-based guidance that is relevant to aquaculture:

- Objective 7.2.2.1 provides for the maintenance and/or enhancement of coastal water quality, with Policies 7.2.2.1, 7.2.2.3 and 7.2.2.4 providing more specific guidance, requiring that:
  - adverse effects on the CMA from any human alteration to water quality is avoided, remedied or mitigated;
  - waters that are not in their natural state are managed for the purposes of people and aquatic life;
  - waters in the CMA are managed having regard to those characteristics which have a direct bearing upon cultural or spiritual values.
- Section 7.3.8.1 relates specifically to marine farming discharges, with Policy 7.3.8.1.1 encouraging the efficient application of nutrients discharged to the CMA as a feed source, while Policy 7.3.8.1.2 encourages the efficient application of fauna health products for the target farmed species in the CMA.

Additionally, all elements of the occupation of the CMA related to this application are allowed for as **discretionary** activities at worst, as detailed in rule assessment above.

In terms of the current application, I consider marine farming is an activity that requires exclusive occupation of the CMA. The applicant is the current occupier of the seven marine farm sites, and is not proposing any change to the size, location or general operating parameters of the marine farm sites outside the increase in nitrogen input from feed.

## **Conclusion**

Overall, I consider the planning framework discussed above provides for exclusive occupation of the CMA where it is justified, and adverse effects are avoided as best possible. In addition, it provides for existing occupiers to have preferential rights when changing, renewing or replacing coastal consents for occupation at the same site.

The marine farming operations subject to this application have a functional need to locate in the CMA and require exclusive occupation of CMA, as per the boundaries of the existing consents. In the light of the planning documents referred to above, exclusive occupation is considered appropriate.

### **6.2 Landscape and visual amenity and natural character**

Given there will be no change to the size or location of the marine farms, I consider there will be no change to the effects of the marine farm operations on landscape and visual amenity and natural character, beyond what is already occurring as a part of the existing consented environment.

The effects of the operation on landscape and visual amenity and natural character have previously been accepted as no more than minor.

### **6.3 Navigation and recreation**

Given there will be no change to the size or location of the marine farms, or to any of the operational restrictions outside nitrogen input and related environmental limits, I consider there will be no change to the effects of the marine farm operations on navigation and recreation safety and values, beyond what is already occurring as a part of the existing consented environment.

The effects of the operation on navigation and recreation have previously been accepted as no more than minor.

### **6.4 Wildlife**

Given there will be no change to the size or location of the marine farms, or to any of the operational restrictions outside nitrogen input and related environmental limits, I consider there will be no change to the effects of the marine farm operations on wildlife, beyond what is already occurring as a part of the existing consented environment.

These effects of the operation on wildlife have previously been accepted as no more than minor.

### **6.5 Water quality**

The assessment on water quality will be split into two key aspects, nutrient enrichment and dissolved oxygen.

#### **Nutrient enrichment**

Increased nutrients in the water column can stimulate phytoplankton growth and blooms and change the composition of any growths. Excess nutrients can result in a water body becoming eutrophic, stimulating high biological productivity including algal blooms. Nitrogen is considered the limiting nutrient in phytoplankton growth, and such growths and eutrophication can reduce water quality, deplete dissolved oxygen and increase organic matter.

In addition to stimulating phytoplankton growth, excess ammonia-N can be toxic to marine life.

In order to assess the potential effects, the applicant undertook hydrodynamic modelling mostly with DELFT3D, with three scenarios run:

- **Baseline** – estimated existing release of nitrogen in feed input of 390 t/yr from marine farm MF 246.
- **Scenario 1 (Conservative)** – Nitrogen in feed input of 621.4 t/yr, resulting in total TAN of 358.28 t/yr. Baseline oxygen drawdown set to 8.85 t/day.
- **Scenario 2 (Maximum proposed)** – Nitrogen in feed input of 659 t/yr, resulting in total TAN of 381.2 t/yr. Baseline oxygen drawdown set to 9.315 t/day.

Since this modelling was undertaken, a change to the proposed conditions was made by the applicant, with a staged approach to the increase in total nitrogen input from feed. Rather than being able to increase immediately to the maximum total load of 659 t N/yr, the applicant will first be able to increase to 583 t N/yr, with an increase to the full load only possible if environmental limits are met.

Under the baseline scenario, the model estimates:

- TAN concentrations from 30 to 60 g/m<sup>3</sup> - these are generally consistent with the observed TAN, which has varied from > 10 to 58.5 g/m<sup>3</sup>;
- Chl-*a* concentrations of 4 to 8 µg/L, which is generally higher than the observed range - the applicant considers that this is due to the model not being able to account for additional processes in the BGB environment, particularly the consumption of phytoplankton (which uptake TAN) by mussels.

Under Scenario 2, the model estimates:

- an increase in TAN concentrations of 20 to 30 g/m<sup>3</sup> above the baseline;
- an increase in Chl-*a* concentrations of 2.5 to 4.0 g/m<sup>3</sup> above the baseline;
- an increase in Total N of 10% compared to the observed levels.

As with the baseline scenario, the applicant considers that Scenario 2 provides an over-estimation of TAN and Chl-*a* as it does not account the mussel farming in the area.

The applicant considers the increase in TAN released into BGB is within the bay's flushing capacity and is unlikely to destabilise the BGB system which at current is considered slightly to moderately disturbed as a result of the long-term presence of marine farms. No change to the trophic classification of the bay is expected.

The applicant does not expect nitrogen levels to increase to a point where they may result in toxicity.

As part of the most recent conditions listed in Section 2.2, the applicant has proposed the following nutrient enrichment limits:

- No change in the trophic state of the water column (towards eutrophic) beyond what is likely to occur naturally.
- No increase in the frequency, intensity or duration of phytoplankton blooms.

- Chl-*a* concentrations no more than 5 µg/L.
- No elevated nutrient concentrations outside the confines of natural variation beyond 250 m from the edge of the farm.
- Monthly median concentrations of Chl-*a* not exceeding:
  - 3.5 µg/L for three consecutive months (tier one)
  - 5 µg/L for three consecutive months (tier two)
- An increase in monthly TAN not exceeding 30 µg/L at the surface of the water column when compared to same or comparable sampling sites from the baseline period (July 2015 – December 2017) (tier two).

The tiered limits are linked to a response system that will trigger:

- **Tier One** - further water quality monitoring, consideration of the wider environment and investigation to determine the cause of the breach, and future management responses to avoid further breaches;
- **Tier Two** - reduced stocking and/or fallowing of the marine farming to allow for full compliance with water quality limits within 24 months, and substantive improvement within 12 months.

Dr Grange has reviewed the applicant's effects assessment and the proposed conditions relating to nutrient enrichment.

On the effects assessment and modelling used, Dr Grange considers that the DELFT3D model is fit for purpose, and probably provides a worst-case scenario in terms of Chl-*a* enhancement. Dr Grange does however consider that there maybe be previously developed models that may provide a more comprehensive assessment through the use of more parameters.

While the applicant predicts the modelled 2-4 fold increase in Chl-*a* to a concentration of 6 µg/L will not cause a significant decrease in water quality, Dr Grange does consider this increase significant, and recommends based on his review of other salmon farm consents that the condition limit the persistent concentration of Chl-*a* to no more than 5 µg/L, with a trigger level for investigation of 3.5 µg/L.

### **Dissolved oxygen**

The applicant considers dissolved oxygen to be a self-regulating component of marine farming, as low levels will stress fish stocks, so it is vital to maintain oxygen levels to sustain farmed fish, which in turn should be sufficient for the wider BGB environment.

Modelling indicates that dissolved oxygen is expected to decrease 0.25 g/m<sup>3</sup> inside BGB, and up to 1.5 g/m<sup>3</sup> within the marine farm cages, with little difference between the two proposed scenarios. With these changes in mind, dissolved oxygen levels are predicted to be >7 mg/L outside the marine farms, and >6 mg/L within the marine farms. A dissolved oxygen level >6 mg/L is considered to protect both farmed and wild fisheries in BGB.

Modelling indicated little change in oxygen levels with water depth.

As part of the most recent conditions listed in Section 2.2, the applicant has proposed the following nutrient enrichment limits:

- no reduction in dissolved oxygen concentration to levels that are potentially harmful to marine biota beyond 250 m from the edge of the farm;
- Tier Two: Dissolved oxygen saturation in the water column at any sampling point more than 250 m from the farm falling below 70% for three consecutive months.

As with the nutrient enrichment above, the tiered limit is linked to a response system that will trigger:

- Tier Two: Reduced stocking and/or fallowing of the marine farming to allow for full compliance with water quality limits within 24 months, and substantive improvement within 12 months.

Dr Grange agrees that it is in the best interests of the farm operators to ensure dissolved oxygen levels remain above 6 mg/L. The modelling results indicate that levels will not cause significant impacts to fish and surrounding biota, but it is unclear whether these predictions are for surface water or throughout the water column. Dr Grange confirms that if the former, then lower dissolved oxygen levels may occur in deeper water, particularly below the pens.

### **Concluding comments**

Following Dr Grange's comments in May 2018, the revised conditions provided by the applicant generally address his concerns, through the change in sampling protocols, the inclusion of specific trigger values and staged development within a comprehensive monitoring plan. He considers monthly monitoring appropriate for effects on water quality. Dr Grange has one outstanding concern relating to the potential for phytoplankton blooms, where monthly monitoring should be able to identify persistent breaches, but may not be able to detect short-term blooms.

Taking into consideration the applicant's assessment, submitters concerns and Dr Grange's review of both the modelling and conditions, I consider it is likely that the effects of the proposal on water quality in Big Glory Bay may be more than minor. However, in line with Dr Grange's comments, I consider the most recent condition set provides a good monitoring plan with specific protocols and trigger values with tiered response and a staged development, which will allow council to closely monitor what is happening on farm, and work with the applicant to manage any adverse effects.

## **6.6 Benthic Environment**

Marine farming results in the concentrated deposition of wasted feed, fish faeces and biofouling material below the farm sites, which through dispersion may extend beyond the marine farming boundaries.

For modelling the deposition and effect on the benthic environment, new DEPOMOD was used. Six scenarios were modelled across three farm locations:

- MF 246 is near the mouth of BGB and has the best flushing. It is also the best grower farm in the bay:
  - Scenario 1 – Traditional feed properties
  - Scenario 2 – Feed with binding agents

- LI 320 is an existing farm, and has been fallowed for a number of years, with the seabed now recovered:
  - Scenario 3 – Mid level stocking density of 12 kg/m<sup>2</sup>
  - Scenario 4 – High level stocking density of 14 kg/m<sup>2</sup>
- LI 339 is an existing smolt farm:
  - Scenario 5 – Mid level stocking density of 3 kg/m<sup>2</sup>
  - Scenario 6 – High level stocking density of 4.2 kg/m<sup>2</sup>

The binding agent was used at MF 246 as re-suspension is considered an issue and could increase dispersion of wasted feed. This has not been identified as a problem on the other two modelled sites, so a binding agent was not included in modelling.

The most recent set of conditions do not include the use of a binding agent. This was confirmed with the applicant during a meeting held at SRC on 25 January 2019.

The applicant considers the following are acceptable concentrations:

- 0.73 kg/m<sup>2</sup>/yr for total organic carbon;
- 5 kg/m<sup>2</sup>/yr for total faeces and feed solid waste.

In general modelling indicates deposition is concentrated directly below the pens, with total organic carbon and total faeces and feed solid waste having similar trends. In particular:

- the concentration of total organic carbon is more than 0.73 kg/m<sup>2</sup>/yr within the farm sites, with the highest levels being over 16 kg/m<sup>2</sup>/yr;
- the concentration of total faeces and feed solid waste is more than 5 kg/m<sup>2</sup>/yr within the farm sites, with the highest levels being over 45 kg/m<sup>2</sup>/yr. Concentrations beyond the marine farm boundaries are significantly lower, with all modelled sites showing 'acceptable' levels beyond 100 m of the marine farm boundaries.

The acceptable concentrations were originally proposed as limits for part of the original conditions but have since been removed in subsequent versions of conditions, as discussed below.

Technical assessment included with the application include some discussion of the current and expected scores of the marine farms and surrounding area on the Enrichment Scale, but no further discussion is provided.

As part of the most recent conditions listed in Section 2.2, the applicant has proposed the following nutrient enrichment limits, all of which are at a tier two phase:

- maintaining diversity and abundance of marine taxa at levels which allow for sufficient seabed recovery to support a farm rotation cycle with a fallowing period of not less than five years;
- no more than 20 % of core samples to have no taxa present;
- no obvious, spontaneous out gassing of hydrogen sulphide or methane;
- *Beggiatoa* (bacteria mat) coverage not greater than 50% of the sampled area.



As with the water quality limits discussed previously, all of limits above are linked to the tier two response system that will trigger:

- reduced stocking and/or fallowing of the marine farming to allow for full compliance with water quality limits within 24 months, and substantive improvement within 12 months.

In addition to the proposed conditions above, the most recently granted consent in the bundle (AUTH-20157616) includes a Fallowing Plan, which incorporates all of the marine farm sites under this application and sets out how the marine farm areas shall be utilised and fallowed. Each farm site (collection of pens) is able to be farmed for two years, before at least five years of fallowing, resulting in a minimum seven-year rotation cycle. Fallowing is intended to ensure recovery of the benthic environment and allow it to withstand further enrichment without suffering cumulative deterioration. No changes are proposed to the current fallowing arrangement.

Dr Grange considers the modelling indicates extremely high deposition within the sites, which will result in significant impacts beneath the pens, possibly leading to anoxia and *Beggiatoa* mats within the site boundaries. No assessment of these effects is provided with the application.

With regard to the use of the Enrichment Scale, previous salmon farms have been required to be below 5 on the ES scale, which the modelling indicates two of the farm sites would be in excess of.

### **Concluding comments**

Following Dr Granges comments in May 2018, the revised conditions provided by the applicant generally address his concerns, through the change in sampling protocols, the inclusion of specific trigger values and staged development within a comprehensive monitoring plan. He considers annual monitoring to be appropriate for effects on the benthic environment. Dr Grange has one outstanding concern relating to impact of deposition on benthic communities, where the intended five year fallowing cycle may not be sufficient to enable recovery of the farm sites.

Taking into consideration the applicant's assessment, submitters concerns and Dr Grange's review of both the modelling and conditions, I consider it is likely that the effects of the proposal on the benthic environment may be more than minor, particularly directly below the farm sites and within 100 m of their boundaries. As with the effects on water quality, I consider the most recent condition set provides a good monitoring plan with specific protocols and trigger values with tiered response and a staged development, which will allow council to closely monitor what is happening on farm, and work with the applicant to manage any adverse effects.

## **6.7 Cultural values**

The Rakiura/Te Ara A Kiwa (Stewart Island/Foveaux Strait) coastal marine area within which the marine farms operate is identified as a Statutory Acknowledgment Area under Schedule 104 of the Ngāi Tahu Claims Settlement Act 1998.

Through the publicly notified process, Te Rūnanga o Ngāi Tahu and Te Rūnanga o Awarua put forward a joint submission in opposition of the application. Their submission raised concerns about the increase in nitrogen sought and the potential environmental impacts this may cause. They also wished to participate in consideration of appropriate mitigating conditions, should Council be of a mind to grant the application.

The applicant advised that they have engaged with Ngāi Tahu during the processing of this application, have taken representatives to the marine farming sites, and have provided them with copies of the revised set of conditions referred to in this report.

Without comment from Rūnanga, who have advised that wish to be heard at the hearing, at the time of writing this report I consider it prudent to withhold making a conclusion as to the potential effects of the proposal on cultural values.

## 6.8 Conditions

In Sections 6.5 and 6.6, discussion has been provided around the effect specific environmental objectives and limits that the applicant has proposed as part of the revised condition set. In addition to these limits and mitigations, the applicant has proposed several new conditions, as well as amendments to the existing conditions, which will be discussed below.

### Staging

The proposed staging of the increased nitrogen input from feed has been alluded to throughout this report and was included by the applicant as part of the revised condition set. Condition limits the total nitrogen in feed across BGB to 583 t N/yr initially, with an increase to 659 t N/yr not available until at least 1 July 2021, and then only after sustained increased feed usage with monitoring results indicating no result or statistically significant trends towards progressively greater environmental effects on the farms, and that the environmental limits discussed in earlier sections are being met.

Submitter Mr Harald Gordon Cave supported a similar staged approach, with 25% increases in nitrogen input from feed every four years, provided environmental monitoring shows no undesirable change. In their submission, the Department of Conservation also questioned the absence of any staged or adaptive management conditions provided in the original application.

I consider the staging proposal is a sensible way to provide certainty to the applicant of their potential future capacity, while ensuring that the full load is only available when environmental limits are shown to be met with measured data.

A further point to note with regard to the staging and nitrogen limit in general is that the total nitrogen input proposed is a BGB wide figure, covering all nitrogen inputs from consented salmon farms in BGB. The current and proposed consented nitrogen limits are listed in Table 4 below.

**Table 4: Current and proposed nitrogen input loads for all salmon farms in Big Glory Bay**

	Consents subject to this application	AUTH-203102 and AUTH-205773	AUTH-230230	AUTH-203231	BGB TOTAL
Current	332.064 t N/yr	40.25 t N/yr	55.344 t N/yr	55.344 t N/yr	482.002 t N/yr
Proposed					659 t N/yr

With no changes to the salmon farm consents outside this application, the proposed BGB total nitrogen input will allow a nitrogen input of 508.062 t N/yr on the farms that are subject to this application, assuming no sharing across the other three farms is undertaken.

While the applicant has not provided any information on how the load will be shared across these other farms, the consents listed above are all held by the applicant (one jointly with Schofield Sea

Farm Limited), following name only transfers of the consents in January 2018. These consents also all allow for sharing of the total nitrogen input from other consented salmon farm sites, provided adverse effects can be avoided, remedied or mitigated, as per the existing consents subject to this application.

### **Big Glory Bay Salmon Farm Environmental Management Plan (BGBSFEMP)**

While not introducing any environmental limits or standards, the BGBSFEMP will be required to set out:

- procedures and practises to ensure compliance with consented limits;
- proposed layout of each salmon farm and changes over each two year period;
- maintenance procedures to ensure efficacy of farm structures;
- procedures and practises to minimise interactions of marine mammals and seabirds with the farm sites;
- procedures, practises and monitoring to meet the objective of reducing historically high levels of copper and zinc in sediment beneath the farm sites;
- how monitoring results will be used to adapt operational farming practises where unforeseen environmental effects arise;
- any changes to salmon farming technology and/or farm management practices.

The BGBSFEMP will also provide robust environmental data of the marine farms and wider BGB environment for any replacement or renewal consents required at a later date.

The plan will be updated whenever necessary, but at least once every year two years.

A draft of the BRBSFEMP has been provided to SRC and submitters for consultation.

I consider the establishment of a BGBSFEMP will be a useful tool for the applicant and Council compliance staff to check how the marine farms are tracking against baseline data and consented environmental limits.

### **Technology Update Report**

The Technology Update Report is proposed to be prepared on a three-yearly basis, with its purpose to evaluate and report on:

- new developments in salmon farming or management practises that have the potential to reduce deposition;
- environmental benefits that could be expected from adopting new technology and/or management practices;
- the feasibility of adopting new technology and/or management practices.

I consider the preparation of this report, like the BGBSFEMP, will be a useful tool for the applicant and council compliance staff to track progress of the applicant's marine farming operations, and see how they compare against other similar operations in terms of the technology and practices used.

### **Annual Monitoring Report**

In addition to the annual reporting requirements currently required under all of the consents, the applicant has proposed the addition of the following inclusions to the report:

- comparison with the results of previous monitoring at the same site;
- identification of any potentially environmentally significant trends, at both a farm and BGB wide scale;
- identification of any proposed additional monitoring, including the rationale, scale, extent and timeframes;
- extent to which monitoring results indicate that farming practices may need to be adapted to address unforeseen environmental effects.

The additions to these reporting requirements will allow for all monitoring results and trends to be reported on, and any potential improvements or changes identified through the results, BGBSFEMP and/or Technology Update Report to be discussed on an annual basis.

### **Review condition**

Changes to the review condition on existing consents have been proposed to include the amended and new conditions to ensure the Council has full abilities to address matters raised in either the Technology Update or Annual Monitoring Reports. The BGBSFEMP is not included, as this plan relates to the mechanics of monitoring, rather than the results themselves.

### **Concluding comments**

As discussed in relation to the effects' specific assessments, the revised conditions provided by the applicant generally address Dr Grange's concerns, through the change in sampling protocols, the inclusion of specific trigger values and staged development within a comprehensive monitoring plan.

I agree that they will provide clarity and certainty for both the applicant and Council as to how the increase in nitrogen input may be accessed, and how effects will be monitored, assessed against trigger values, and any adverse effects remedied or mitigated.

## **6.9 Summary**

Taking into consideration the discussion on effects and conditions above, I consider that, the effects of the proposal on water quality and the benthic environment may be more than minor, when taking into consideration the existing consented environment authorised under the application that are subject to the change/replacement.

Where uncertainty remains regarding the actual level of effects, when compared to the modelled outcomes, I consider the proposed trigger values and staged development within the comprehensive monitoring plan will allow for accurate, measured data of any changes to the benthic environment. If the timely monitoring demonstrates that the proposed limits are exceeded, the proposed conditions would ensure no further increase in nitrogen is possible until these effects are able to be mitigated.

## 7. Objectives and Policies

In accordance with Section 104(1)(b), the consent authority must have regard to:

- b. any relevant provisions of—
  - i. a national environmental standard:
  - ii. other regulations:
  - iii. a national policy statement:
  - iv. a New Zealand coastal policy statement:
  - v. a regional policy statement or proposed regional policy statement:
  - vi. a plan or proposed plan; and
- c. any other matter the consent authority considers relevant and reasonably necessary to determine the application.

The relevant provisions have been set out in the following sections in the same order as that provided above.

There are no national environmental standards or other regulations that are considered relevant to the application.

### 7.1 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement took effect on 3 December 2010. Its purpose is to state policies in order to achieve the purpose of the RMA in relation to the coastal environment of New Zealand. The New Zealand Coastal Policy Statement is a relevant consideration under Section 104(1)(b)(iv) of the RMA and an assessment of the relevant objectives and policies is provided below.

Objectives		
Objective 1	Safeguard the integrity, for, functioning and resilience of the coastal environment	<i>BGB has previously been designated as an aquaculture area, and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Objective 2	Preserve the natural character of the coastal environment, and protect natural features and landscape values	<i>This application will be occurring within the BGB environment, with particular emphasis given to water quality and the benthic environment.</i>
Objective 3	Take account of the principles of the Treaty of Waitangi	<i>The effects on cultural values have been assessed, and the relevant IMP discussed in Section 7.4</i>
Objective 4	Maintain and enhance the public open space qualities and recreation opportunities of the coastal environment	<i>No change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters outside the Nitrogen input from feed. Effects on water quality and benthic environment are generally expected to be no more than minor.</i>
Objective 6	Enable people and communities to provide for social, economic and cultural wellbeing and their health and safety	<i>The applicant is a provider of economic benefits for the Stewart Island and wider Southland community, with one submitter acknowledging the benefits the applicant provides through their marine farming operation.</i>

<b>Policies</b>		
Policy 1	Extent and characteristics of the coastal environment	<i>This application will be occurring within the BGB environment, with particular emphasis given to water quality and the benthic environment.</i>
Policy 2	The treaty of Waitangi, tangata whenua and Māori heritage	<i>The effects on cultural values have been assessed, and the relevant IMP discussed in Section 7.4</i>
Policy 3	Adopt a precautionary approach where effects are uncertain, unknown or little understood but potentially significantly adverse	<i>Based on the measured effects of marine farming to date, and the modelled predictions as a result of this application, the effects are unlikely to be significantly adverse.</i>
Policy 4	Integrated management of natural and physical resources	<i>BGB has previously been designated as an aquaculture area, and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Policy 6	Activities in the coastal environment	<i>The proposal provides social and economic benefits to the Stewart Island and Southland communities, with change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters outside the Nitrogen input from feed.</i>
Policy 8	Aquaculture	<i>Aquaculture is provided for through the RPS and RCP, which will be discussed in sections 7.2 and 7.3.</i>
Policy 13	Preservation of natural character	<i>No change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters outside the nitrogen input from feed.</i>
Policy 15	Natural features and natural landscapes	
Policy 18	Public open space	
Policy 21	Enhancement of water quality	<i>Water quality will be required to meet certain standards to ensure farmed fish stocks are healthy with no unnecessary mortalities.</i>
Policy 23	Discharge of contaminants	<i>In accordance with s107 of the RMA, the sensitivity and capacity of the receiving environment, the nature of the discharge and methods to minimise adverse effects have been assessed.</i>

## 7.2 Southland Regional Policy Statement

The Southland Regional Policy Statement took effect on 9 October 2017. The Policy Statement guides resource management policy and practice in the region, and includes measures to indicate whether objectives have been achieved. The Southland Regional Policy Statement is a relevant consideration under Section 104(1)(b)(v) of the RMA and an assessment of the relevant objectives and policies is provided below.

<b>Chapter 3 – Tangata Whenua</b>		
Objective TW.1	Decision making and partnerships with tangata whenua	<i>Stewart Island is a Statutory Acknowledgement Area, with Rūnanga submitting on the application during the notification period. Sections 6 and 7.4 discuss cultural values and the IMP.</i>
Objective TW.2	Provision for iwi management plans	
Objective TW.3	Tangata whenua spiritual values and customary resources	

Policy TW.1	Treaty of Waitangi	
Policy TW.2	Partnerships and relationship agreements	
Policy TW.3	Iwi management plans	
Policy TW.4	Decision making	
<b>Chapter 7 – Coast</b>		
Objective COAST.1	Direction on activities within the coastal environment	<i>BGB has previously been designated as an aquaculture area, and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Objective COAST.2	Activities in the coastal environment	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions. The proposal will allow for more intensive use of existing consented and occupied marine farms.</i>
Policy COAST.1	Direction on locations for activities	<i>BGB has previously been designated as an aquaculture area, and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Policy COAST.2	Management of activities in the coastal environment	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Policy COAST.3	Protection of the coastal environment	
Policy COAST.4	Infrastructure, port, aquaculture, mineral extraction and energy projects	<i>BGB has previously been designated as an aquaculture area, and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Policy COAST.5	Management of effects on coastal water quality and ecosystems	<i>As discussed in Section 6, effects on water quality have been accepted as no more than minor, and it is in the applicant's interest to maintain the quality at a level to maintain fish health.</i>
Objective COAST.4	Natural character	<i>Although altered through the concentration of aquaculture activities, BGB still has some degree of natural character. No change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters outside the nitrogen input from feed.</i>
Policy COAST.6	Natural character	
Objective COAST.5	Aquaculture	<i>The applicant is a provider of economic benefits for the Stewart Island and wider Southland community, with one submitter acknowledging the benefits the applicant provides through their marine farming operation. Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Policy COAST.7	Management of activities in the coastal marine area	

### 7.3 Regional Coastal Plan for Southland

The Regional Coastal Plan for Southland became fully operative on 16 March 2013. The relevant objectives and policies in the Chapters on fundamental principles, general matters, coastal water and marine farming and are discussed below. The Regional Coastal Plan for Southland is a relevant consideration under section 104(1)(b)(vi) of the RMA and an assessment of the relevant objectives and policies is provided below.

Chapter 3.14 lists the coastal values of Stewart Island, and has been referred to previously in this report, with the principal issues in Section 3.14.11 listed as:

1. Preservation of natural character, heritage sites and amenity values
2. Preservation of water quality.
3. Effects of increasing tourism.
4. Potential impact of increased marine farming.
5. Lack of local non-marine sources of sand and shingle.

<b>Chapter 4 – Fundamental principles</b>		
Objective 4.1.1	Adverse effects	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Objective 4.1.2	Significant conservation values	<i>BGB has previously been designated as an aquaculture area and has been excluded from classifications of Stewart Island as an area containing significant conservation values.</i>
Objective 4.2.1	Need for coastal location	<i>Marine farming on the scale proposed by the applicant is only really possible in the CMA, and BGB has previously been designated as an aquaculture area and allows for marine farms to be concentrated in a single area, minimising impacts on public use elsewhere.</i>
Policy 4.2.1	Justifying coastal location	
Policy 4.2.2	Consideration of alternatives	<i>In accordance with Schedule 4 of the RMA, alternatives to the proposal have been considered, but are either not practicable, or environmentally and commercially inefficient when compared to the status quo.</i>
Objective 4.4.1	Need to justify exclusive or preferential occupation of coastal marine area	<i>As discussed in Section 6, this activity does require exclusive occupation of the CMA, but is an existing consented activity with no change to location or total area occupied.</i>
Policy 4.4.1	Need for exclusive occupation	
Objective 4.5.1	The public value of the CMA can be diminished by use and development	<i>The payment of council charges as per the policy linked to this objective is included on all existing consents subject to the application and will be retained.</i>
Policy 4.5.1	Financial contributions to be obtained	
Objective 4.6.1	Concentrating use and development	<i>Big Glory Bay is currently used for several marine farming operations, undertaken by various parties including the applicant. The Southland Conservation Board submission provided a similar view, with a preference to make optimum sustainable use of already allocated areas, rather than allocating new areas for marine farming.</i>
Policy 4.6.1	Concentrate compatible activities	



Objective 4.7.1	Avoid, remedy or mitigate cumulative adverse effects	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Objective 4.7.2	Obtain an appropriate level of use in the coastal marine area	<i>The proposal will allow for more intensive use of existing consented and occupied marine farms.</i>
Policy 4.7.1	Avoid, remedy or mitigate adverse cumulative effects	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Objective 4.8.1	Distinguish between commercial and non-commercial surface water activities	<i>The applicant is a commercial operator within Big Glory Bay.</i>
Policy 4.8.1	Commercial activities in the coastal marine area	
Objective 4.9.1	Consultation with territorial authorities, iwi and government agencies	<i>Through the public notification, all interested parties have had an opportunity to submit on the application, with Rūnanga to be presenting at hearing. The applicant has also advised that they have consulted with various members of the Stewart Island and Southland community. The Ministry of Conservation has been contacted as part of the notification process.</i>
Objective 4.9.2	Consultation with the community	
<b>Chapter 5 – General Matters</b>		
Objective 5.1.1	Preserve natural character	<i>Although altered through the concentration of aquaculture activities, BGB still has some degree of natural character.</i>
Policy 5.1.1	Adopt NZCPS policies	<i>Discussed in Section 7.1.</i>
Objective 5.2.1	Protect outstanding natural features and landscapes	<i>Stewart Island (excluding the modified area of Oban and Halfmoon Bay) is identified as a largely natural landscape with extraordinary landform and coastal diversity. No change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters outside the nitrogen input from feed.</i>
Policy 5.2.1	Identify and protect natural features and landscapes	
Policy 5.2.3	Importance of landscape and natural features to tangata whenua	<i>Stewart Island is a Statutory Acknowledgement Area, with Rūnanga submitting on the application during the notification period. Section 6 and 7.4 discuss cultural values and the IMP.</i>
Objective 5.3.1	Protection of amenity values	<i>No change from the existing environment relating to amenity is proposed in terms of marine farm size, location or physical operating parameters outside the nitrogen input from feed.</i>
Policy 5.3.1	Protection of amenity values	
Policy 5.3.2	Maintain and enhance open space values	
Objective 5.6.1	Recognise values of Ngai Tahu	<i>Stewart Island is a Statutory Acknowledgement Area, with Rūnanga submitting on the application during the notification period. Section 6 and 7.4 discuss cultural values and the IMP.</i>
Objective 5.6.2	Consultation with tangata whenua	
Policy 5.6.1	Kaitiakitaka	
Objective 5.8.1	Efficient use and development of natural and physical resources	<i>The application will result in further intensification of marine farming on existing sites, which may result in a more efficient use of the existing marine farm areas, provided adverse effects are able to be avoided, remedied or mitigated.</i>
Policy 5.8.1	Efficient use and development of natural and physical resources	
Objective 5.10.1	Social, cultural and economic reliance on the coastal marine area	<i>The applicant is a provider of economic benefits for the Stewart Island and wider Southland community, with one submitter acknowledging the benefits the applicant provides through their marine farming operation.</i>
Policy 5.10.1	Recognising the social, cultural and economic reliance on the coastal marine area	

<b>Chapter 7 – Coastal Water</b>		
Objective 7.2.2.1	Maintenance of coastal water quality	<i>As discussed in Section 6, effects on water quality have been accepted as no more than minor, and it is in the applicant's interest to maintain the quality at a level to maintain fish health.</i>
Policy 7.2.2.1	Importance of fresh water	
Policy 7.2.2.3	Water quality standards in areas not in Natural State	
Policy 7.3.8.1.1	Feeding of farmed species	<i>It is in the best interest of the applicant to ensure food and health products are used efficiently from both an economic and environmental stand point</i>
Policy 7.3.8.1.2	Health product usage of farmed species	
<b>Chapter 11 – Structures</b>		
Objective 11.2.1	Location of structures	<i>No change from the existing environment is proposed in terms of marine farm size, location or physical operating parameters including the existing structures.</i>
Policy 11.2.1	New structures and extensions to existing structures	
<b>Chapter 15 – Marine Farming</b>		
Objective 15.1.1	Avoid, remedy or mitigate any adverse effects	<i>Actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Policy 15.1.1	Resource consents required	<i>Resource consent is required as a discretionary activity.</i>
Policy 15.1.2	New and changing activities in the same area	<i>The proposal, regardless of change or new status, is occurring at the same sites as those currently occupied, with actual and potential adverse have been discussed in Section 6 of this report, alongside discussion of proposed mitigation through conditions.</i>
Policy 15.1.4	Monitoring the effects of marine farming	<i>The existing consents already require annual monitoring and the provision of these results, with additional monitoring proposed under this proposal.</i>

#### **7.4 Te Tangi a Tauria**

Te Tangi a Tauria is the Natural Resource and Environmental Iwi Management Plan (IMP) for Ngāi Tahu ki Murihiku, and includes the rohe of the following Papatipu Rūnanga:

- Te Rūnanga o Awarua;
- Te Rūnanga of Oraka/Aparima;
- Te Rūnanga o Hokonui; and
- Te Rūnanga o Waihopai.

The IMP reflects the attitudes and values of the four Rūnanga Papatipu o Murihiku, and provides information on the indigenous understanding of the environment, which can be used to help address issues faced by Rūnanga with regard to environmental management. The Southland Regional Policy Statement is a relevant consideration under Section 104(1)(c) of the RMA and an assessment of the relevant objectives and policies is provided below.

<b>Chapter 3.6.1 – General Policy for Southland’s Coastal Environment</b>		
Policy 1	Ensure the land, water and biodiversity at the interface of Southland’s coastal environment are managed in an integrated way through careful planning and policy Instruments.	<i>Activities in the CMA, including aquaculture are provided for through the RPS and RCP, which will have been discussed in sections 7.2 and 7.3. BGB has previously been designated as an aquaculture area and has been excluded from classifications of Stewart Island as an area containing significant conservation values.</i>
Policy 2	Recognise that the degree of connection between the coastal and inland environments is inherent when developing robust systems to address areas of degradation and mitigate for future and potential environmental effects.	
Policy 3	Promote communication and collaboration between groups with an interest in or have links with the coastal environment and its management.	<i>The applicant has advised of positive interactions with local Rūnanga, and the Stewart Island and Southland communities, with one submitter acknowledging the benefits the applicant provides through their marine farming operation.</i>
<b>Chapter 3.6.3 – Structures in the Coastal Marine Area</b>		
Policy 1	Any activity within, adjacent to or that may potentially impact on Statutory Acknowledgment areas will require consultation with both Te Rūnanga o Ngāi Tahu, Ngāi Tahu ki Murihiku and Tangata Tiaki gazetted under the South Island Customary Fishing Regulations.	<i>Stewart Island is a Statutory Acknowledgement Area, with Rūnanga submitting on the application during the notification period.</i>
Policy 2	Promote awareness among coastal users that the coastal marine area is a finite resource and the number of suitable sites for some structures is limited, therefore the utilisation of coastal space must be efficient and sustainable.	<i>The application will result in further intensification of marine farming on existing sites, which may result in a more efficient use of the existing marine farm areas, provided adverse effects are able to be avoided, remedied or mitigated.</i>
Policy 3	Promote a precautionary approach toward new proposals.	
Policy 4	Avoid the placement of structures in the coastal marine environment that will have significant effects.	
Policy 5	Ensure that structures in the coastal environment are soundly constructed, are compatible with the natural character of the surrounding coastal environment and adjacent lands and do not have adverse effects on other people using the coast area.	
Policy 6	Ensure that structures located in the coastal marine area justify the functional necessity for that location and do not impact on the coastal environment when an	<i>As discussed in Section 6, this activity does require exclusive occupation of the CMA, but is an existing consented activity with no change proposed in terms of marine farm size, location or physical operating parameters including the existing</i>

	alternative location may be more readily suited for that type of development.	<i>structures.</i>
<b>Chapter 3.6.11 – Aquaculture and marine farms</b>		
Policy 1	Ensure that aquaculture activities recognise and provide for pre-existing customary rights and commercial fishing rights provided by the Māori Fisheries Settlement in 1992.	<i>Aquaculture is provided for through the RPS and RCP, which has been discussed in sections 7.2 and 7.3.</i>
Policy 2	Establish a process with local government agencies to identify suitable areas for aquaculture and the allocation of coastal space to ensure Ngāi Tahu ki Murihiku rights are protected.	<i>Big Glory Bay has previously been identified as the only area for commercial aquaculture on Stewart Island.</i>
Policy 3	Have active involvement in the consent process for aquaculture and marine farming. Operations should include information on waste disposal and provisions for reducing effects on existing local species.	<i>Rūnanga have submitted on the application through the public notification process, and wish to be heard.</i>
Policy 5	Ensure participation into research of the impacts of marine farms on natural character and visual amenities.	<i>The reporting undertaken as part of existing and proposed conditions will be submitted to SRC, and be available to the public on request.</i>
Policy 6	Ensure participation into research that investigates increased sediment dispersal, and the effects of such on seabed habitats under and around marine farms.	
Policy 7	Ensure that aquaculture does not have adverse effects on customary fishing and practices, fishing resources or fisheries. This includes maintaining access to sources of abundant local kaimoana, kaimātaimai and mahinga kai populations.	<i>The marine farm locations are outside the mataitai areas on Stewart Island, and</i>
Policy 9	To ensure that the potential introduction of unwanted organisms is monitored to ensure impacts on existing biodiversity is limited.	<i>The proposal will not result in the introduction of any new species beyond those already authorised to be farmed in BGB.</i>

## 8. Part 2 of the Resource Management Act

Under s104(1) of the RMA, the consent authority must consider applications for resource consent subject to Part 2 of the RMA. Part 2 is made up of 4 sections, as discussed below.

### 8.1 Section 5 (Purpose of the RMA)

1. *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
2. *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; and*
  - b. *safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
  - c. *avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The framework set out in the NZCPS, RPS and RCP address the sustainable management of the coastal marine area. I consider the application is generally consistent with the relevant objectives and policies in these documents, as discussed in Sections 7.1 to 7.3 of this report. Given this, I consider the purpose of the RMA will be achieved by this application.

### 8.2 Section 6 (Matters of National Importance)

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:*

- a. *the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
- b. *the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:*
- c. *the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:*
- d. *the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:*
- e. *the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:*
- f. *the protection of historic heritage from inappropriate subdivision, use, and development:*
- g. *the protection of protected customary rights:*
- h. *the management of significant risks from natural hazards.*

I consider these matters will be provided for by the proposal, given BGB is effectively a designated area for marine farming on Stewart Island, and there will be no change to the location or size of the existing marine farms subject to this application.

### 8.3 Section 7 (Other Matters)

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—*

- a. kaitiakitanga:*
- aa. the ethic of stewardship:*
- b. the efficient use and development of natural and physical resources:*
- ba. the efficiency of the end use of energy:*
- c. the maintenance and enhancement of amenity values:*
- d. intrinsic values of ecosystems:*
- e. [Repealed]*
- f. maintenance and enhancement of the quality of the environment:*
- g. any finite characteristics of natural and physical resources:*
- h. the protection of the habitat of trout and salmon:*
- i. the effects of climate change:*
- j. the benefits to be derived from the use and development of renewable energy.*

I consider sections aa, b, and c to f are of particular relevance to this application. Given the reliance of the proposal on a healthy natural environment in order to sustain the farmed fish, and the previous discussion regarding actual and potential effects, and proposed mitigations, I consider the proposal will ensure the value of the natural environment is maintained, while increasing the efficiency of their existing marine farms.

### 8.4 Section 8 (Principles of the Treaty of Waitangi)

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the [Treaty of Waitangi](#) (Te Tiriti o Waitangi).*

As discussed, local Rūnanga have submitted on the application through the hearing, and will be providing evidence at the hearing.

I have used the guidance of the IMP, and do not consider the application contravenes the principles of the Treaty of Waitangi.

## 9. Other matters considered relevant

### 9.1 Restriction on discharges

Section 107 of the RMA restricts the grant of discharge and coastal permits, as set out below:

- 1. Except as provided in subsection (2), a consent authority shall not grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A allowing—*
  - a. the discharge of a contaminant or water into water; or*
  - b. a discharge of a contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
  - ba. the dumping in the coastal marine area from any ship, aircraft, or offshore installation of any waste or other matter that is a contaminant,—*

*if, after reasonable mixing, the contaminant or water discharged (either by itself or in combination with the same, similar, or other contaminants or water), is likely to give rise to all or any of the following effects in the receiving waters:*

- c. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:*
  - d. any conspicuous change in the colour or visual clarity:*
  - e. any emission of objectionable odour:*
  - f. the rendering of fresh water unsuitable for consumption by farm animals:*
  - g. any significant adverse effects on aquatic life.*
2. *A consent authority may grant a discharge permit or a coastal permit to do something that would otherwise contravene section 15 or section 15A that may allow any of the effects described in subsection (1) if it is satisfied—*
- a. that exceptional circumstances justify the granting of the permit; or*
  - b. that the discharge is of a temporary nature; or*
  - c. that the discharge is associated with necessary maintenance work—*  
*and that it is consistent with the purpose of this Act to do so.*
3. *In addition to any other conditions imposed under this Act, a discharge permit or coastal permit may include conditions requiring the holder of the permit to undertake such works in such stages throughout the term of the permit as will ensure that upon the expiry of the permit the holder can meet the requirements of subsection (1) and of any relevant regional rules.*

The proposal will result in the discharge of a contaminant to the coastal marine environment, but I consider that it is unlikely to result in any of the effects listed in Section 1(c) to (g), as discussed in Section 6 of this report. As such, Section 107 of the RMA does not restrict the granting of this application.

## **9.2 Consideration of alternatives**

As per Schedule 4(6)(1)(d) of the RMA, where an activity includes the discharge of any contaminant, the application must include a description of:

- i. the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
- ii. any possible alternative methods of discharge, including discharge into any other receiving environment:*

For applications for discharge permits or coastal permits that contravene Section 15, Section 105 of the RMA requires that the consent authority have regard to:

- a. the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
- b. the applicant's reasons for the proposed choice; and*
- c. any possible alternative methods of discharge, including discharge into any other receiving environment.*

I consider the nature of the discharge and the receiving environment has been discussed in earlier sections of this report.

The applicant has identified the following alternatives to the proposed variation:

- changing the composition of the feed such that nitrogen is no longer included;
- relocating salmon farming activities, or undertaking salmon farming at a new site.

The applicant has advised that changing the feed composition is not considered a practicable alternative, as the protein that is required in the fish feed contains a percentage of nitrogen, which is not able to be removed without compromising fish growth.

In terms of relocating the salmon farms, the applicant considers it is commercially and environmentally more efficient to consolidate activities at an existing location, rather than relocate or expand to a new site.

I consider the applicant has provided a sufficient discussion of the alternatives to the current proposal, and agree that increasing the feed input at the existing marine farm sites is the most feasible option currently available.

### **9.3 Compliance History**

The compliance reports for all existing consents subject to this application indicate full compliance, since the last change in conditions in 2017, with the annual reporting requirements regarding water quality and seabed analysis fulfilled, and inspections undertaken.

## **10. Duration**

The application was applied for as a change in conditions, so the existing expiry date of 1 January 2025 across all consents was to be maintained, and no further discussion was provided by the applicant in relation to duration.

However, since SRC determined the applications to be treated as a new application the duration of the consents must be considered.

The RMA and relevant plans provide the following guidance on duration:

- Section 123A of the RMA limits the duration of coastal permits for aquaculture activities to at least 20 years unless a shorter period is requested by the applicant or is required to ensure adverse effects on the environment are adequately managed, and no more than 35 years;
- the CPS, RPS and RCP do not provide any specific guidance on duration for aquaculture consents;
- the Te Tangi a Tauria IMP provides guidance that durations over 25 years are essentially making decision for the next generation, and consents should not be granted where we do not know what the effects may be over the long term.

Based on the policy direction above, and the remaining uncertainty about the level of effects and management thereof, particularly on the benthic environment, I recommend a 20 year duration, should the consents be granted.



## 11. Recommendation

### 11.1 Consideration of application

Section 104 of the RMA states:

1. *When considering an application for a resource consent and any submissions received, the consent authority must, subject to [Part 2](#), have regard to—*
  - a. *any actual and potential effects on the environment of allowing the activity; and*
  - ab. *any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
  - b. *any relevant provisions of—*
    - i. *a national environmental standard;*
    - ii. *other regulations;*
    - iii. *a national policy statement;*
    - iv. *a New Zealand coastal policy statement;*
    - v. *a regional policy statement or proposed regional policy statement;*
    - vi. *a plan or proposed plan; and*
  - c. *any other matter the consent authority considers relevant and reasonably necessary to determine the application.*
2. *When forming an opinion for the purposes of subsection (1)(a), a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard or the plan permits an activity with that effect.*
- 2A. *When considering an application affected by section 124 or 165ZH(1)(c), the consent authority must have regard to the value of the investment of the existing consent holder.*
- 2B. *When considering a resource consent application for an activity in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, a consent authority must have regard to any resource management matters set out in that planning document.*
- 2C. *Subsection (2B) applies until such time as the regional council, in the case of a consent authority that is a regional council, has completed its obligations in relation to its regional planning documents under section 93 of the Marine and Coastal Area (Takutai Moana) Act 2011.*
3. *A consent authority must not,—*
  - a. *when considering an application, have regard to—*
    - i. *trade competition or the effects of trade competition; or*
    - ii. *any effect on a person who has given written approval to the application;*
  - b. *[Repealed]*
  - c. *grant a resource consent contrary to—*
    - i. *section 107, 107A, or 217;*
    - ii. *an Order in Council in force under section 152;*
    - iii. *any regulations;*
    - iv. *wāhi tapu conditions included in a customary marine title order or agreement;*
    - v. *section 55(2) of the Marine and Coastal Area (Takutai Moana) Act 2011;*
  - d. *grant a resource consent if the application should have been notified and was not.*
4. *A consent authority considering an application must ignore subsection (3)(a)(ii) if the person withdraws the approval in a written notice received by the consent authority before the date of the hearing, if there is one, or, if there is not, before the application is determined.*
5. *A consent authority may grant a resource consent on the basis that the activity is a controlled activity, a restricted discretionary activity, a discretionary activity, or a non-complying activity, regardless of what type of activity the application was expressed to be for.*
6. *A consent authority may decline an application for a resource consent on the grounds that it has inadequate information to determine the application.*

7. *In making an assessment on the adequacy of the information, the consent authority must have regard to whether any request made of the applicant for further information or reports resulted in further information or any report being available.*

Subsection 1 has been assessed in Sections 6 and 7 of this report. Those sections conclude that effects may be more than minor, but proposed monitoring and staging in the proposed conditions will ensure no further increase in nitrogen is possible until these effects are able to be mitigated, and that the proposal is generally consistent with the relevant objectives and policies.

Subsection 2 is not relevant for this application.

Given the application is affected by Section 165ZH of the RMA, section 2A is relevant. Given the applications relate to seven existing marine farm sites, I consider the applicant has made a significant investment in both the direct marine farm infrastructure, as well as investing in the wider Stewart Island and Southland communities. Without this application, the applicant would be authorised to continue the current operations until 2025, at which point a consent renewal process would be required.

Subsections 2B and 2C are not relevant as no marine titles are in place. For completeness, several customary marine title applications have been lodged covering Big Glory Bay by Te Rūnanga o Ngāi Tahu, the New Zealand Maori Council, and Customary Marine Title for all Maori. The applicant notified these parties, but has not advised SRC whether any response has been received.

In accordance with subsection 3, trade competition has not been taken into consideration, and no parties have provided their written approval, although two have provided support through the submission process. In addition, the application is not contrary to any of the documents set out in sub-paragraph c.

Subsection 4 is not relevant for this application.

In accordance with subsection 5, the application has been assessed as a discretionary activity.

In accordance with Section 6 and 7, information inadequacies have been dealt with through formal requests for further information, and although there may still be some uncertainties, there is considered to be adequate information for a decision to be made.

## **11.2 Determination of application**

The application is to be treated as a **discretionary** activity.

Section 104B of the RMA states:

1. *After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority—*
  - a. *may grant or refuse the application; and*
  - b. *if it grants the application, may impose conditions under [section 108](#).*

### 11.3 Grant or refuse

Taking into consideration the submissions received, assessment of actual and potential effects, proposed mitigations through the most recent set of conditions and relevant policy documents, I consider there is scope to grant these applications.

However, I consider further discussion between the applicant and Council is warranted, to ensure any concerns around the accuracy and/or efficacy of the proposed conditions are able to be suitably dealt with.



Danielle Korevaar  
**Resource Management Consultant**



Aurora Grant  
**Acting Consents Manager**

1 March 2019



## **Consents Hearing 25 March 2019**

**Sanford Limited –  
APP-20157616-V1**

**Appendix –  
K Grange Evidence**



**Consents Hearing**

**25 March 2019**

**Sanford Limited – APP20157616-V1**

**EVIDENCE OF KENNETH ROBERT GRANGE**

**Dated this 25<sup>th</sup> day of February 2019**

## **1. BACKGROUND**

- 1.1. My full name is Kenneth Robert Grange. My formal qualifications include MSc (1<sup>st</sup> Class Hons) and PhD, both in marine ecology. I have been employed as a marine ecologist by the National Institute of Water and Atmospheric Research (NIWA) (and its predecessor, DSIR) since 1974, and from 1994-2017 I was the Regional Manager of NIWA in Nelson. In April 2017, I retired from my Regional Manager position, but I continue to be employed on a casual, part-time basis by NIWA as a Principal Scientist, Marine Ecology. I am past-president of the NZ Marine Sciences Society, a member of the Royal Society of New Zealand, and the NZ Coastal Science Society. I was a member of the Global Steering Committee for the Bivalve Aquaculture Dialogue, charged with developing environmental and social sustainability standards for bivalve aquaculture, and I until very recently was one of the Fiordland Marine Guardians, appointed by the Minister for the Environment.
- 1.2. Part of my role in NIWA is to lead research programmes and consultancy services in marine ecology, environmental assessment, aquaculture, and resource use and protection. I have published over 40 papers in international, peer-reviewed scientific journals and more than 240 consultancy reports over the past 40 years, with a substantial proportion of those detailing marine ecological assessments of marine farming.
- 1.3. I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court of New Zealand Practice Note 1 December 2014 and I agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.
- 1.4. I have been commissioned by Environment Southland to provide technical advice associated with the application by Sanford Limited to change their resource consents for farming chinook salmon in pens within Big Glory Bay, Stewart Island. My role in providing this advice included reviewing the original application, accompanying Sanford (and their consultants) and Environment Southland on a site visit, attending workshops and teleconferences, providing reports to Environment Southland on matters of potential concern in the application, reviewing proposed consent conditions as developed by Sanford, and finally reviewing the draft monitoring plan as provided by Sanford. Throughout this process I was assisted by Dr Niall Broekhuizen, Principal Scientist, NIWA, particularly in matters of water

column effects. Attached as Appendix 1 are copies of the main documents produced as part of this process.

## **2. THE APPLICATION**

- 2.1. I do not intend to summarise the application as I am sure other parties will provide this for the hearing panel, but basically, the application is to change the present conditions to allow an increase in farm production over the existing salmon farms in Big Glory Bay, mainly by providing more flexibility in the way each farm is used, allowing for an overall increase in nitrogen input from feed (within Bay-wide limits as well as individual farm limits), rotational use of farms, including fallowing periods, and monitoring.
- 2.2. The application included information on the history of the farms and previous uses, some historical monitoring results for water quality and benthic sampling, and ecological modelling of predicted effects from 3 of the farms. The modelling indicated that the increased nitrogen will lead to increased Chl a, nutrients, and benthic deposition, and lower surface O<sub>2</sub>. The application argues that these effects will be within the assimilative capacity of Big Glory Bay.
- 2.3. The application and modelling did indicate considerable benthic deposition beneath the pens and within approximately 100 m of the farm boundaries. Two responses were suggested in the application to mitigate significant adverse effects of this to both the benthic environment and the health of the fish themselves. One was to add a binding agent to the feed at MF246 to reduce the spread of benthic deposition, and the other was to continue to operate the farms by 2 years of production followed by 5 years of fallowing to allow benthic recovery. Both responses have been further clarified in the proposed conditions and addressed in the proposed monitoring plan. For instance, the monitoring plan will sample and report on the benthic communities and ecological “health” (as defined by species abundance and other parameters) to ensure effects beyond 100 m from the pen boundaries are within acceptable limits (as defined in the conditions and subsequent monitoring plan). This monitoring removes the need to address whether a binding agent should or should not be required, as operational and management responses will be driven by monitoring results. Monitoring will also report on the recovery of the benthic communities during fallowing, and permit restocking of the pens only when recovery has occurred to a state as defined in the monitoring plan and agreed by Environment Southland.

### 3. RESPONSES TO TECHNICAL CONCERNS

3.1. Following submission of the original consent application in November 2017, Sanford Ltd, Sanford consultants, Environment Southland, and NIWA experts commissioned by ES have produced a series of reports where many of the concerns and questions in the original application have been discussed and clarified. During that process, Sanford Ltd have largely addressed the concerns, either by changing sampling protocols (e.g. to include water column rather than surface samples for dissolved oxygen and Chl a), increasing the number of replicates required for benthic sampling, and including specific trigger values and staged development within a comprehensive monitoring plan. In my opinion, there are 2 main (potential) concerns outstanding:

- The levels of nutrients within both the farms and the bay will be increased, with a potential associated increase in Chl a. While this is predicted not to cause nuisance phytoplankton blooms, the trigger values<sup>1</sup> on average are higher than previously recorded in Big Glory Bay, and quite high compared to coastal NZ waters. Phytoplankton blooms have the potential to develop quite rapidly, and the monthly monitoring that has been offered should identify persistent breaches but may not be sufficiently fine-scale to reliably detect short-term blooms.
- The modelled and predicted benthic deposition within the pens is very high and will certainly impact benthic communities. The level of impact may be such that the intended fallowing cycle will not be compatible with sufficient recovery to allow the sites to be used again after 5 years of monitoring during fallowing. Monitoring is suggested to occur only annually on the benthic environment. This is designed to reflect the growing/farming cycle of each site. The pens will be stocked with fingerlings (about 6 months old) in the first year, with the first benthic monitoring occurring at the end of the year. Over that first year the fish will still be relatively small and will have required lower feed volumes (and hence nutrient release into the environment) over that year. The next monitoring period will be at the end of the second year and just before the fish are ready for harvest. Should trigger levels be reached in those samples, then the management response will be to harvest the fish and leave the site fallow, as it would if the monitoring results showed no effects beyond the trigger levels. Annual monitoring for benthic effects therefore seems appropriate.

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<sup>1</sup> EQS-W1 and EQS-W2, draft environmental monitoring plan, 22 January 2109



3.2 Big Glory Bay also supports several mussel farms. I have received some questions around the effects those farms may have on increasing nutrients along with the salmon farms and whether these effects should also be considered. Bivalve farms, such as mussel farms, are stocked with filter feeding shellfish. The crop filters the particulate-organic matter (incl. bound nutrients) from the surrounding water, and they do not require additional feeding. As such, these shellfish farms do not, in themselves, add additional feed (or nutrient) to the Bay. Some small increases in dissolved nutrients and deposition of particulates to the seabed may be caused by the waste products (ammonium, faeces and pseudofaeces) from the mussels, but these will be very small in comparison to the nutrients added by feeding fish. The mussels may reduce the Chl a and absorb some particulate nutrients that stem (directly or indirectly) from the salmon farms through their filter feeding activities.

#### 4 SUMMARY

I have not been asked by Environment Southland to provide a recommendation as to whether the Sanford Limited application should be approved or declined on marine ecological grounds. The application seeks to increase fish production without increasing consented space and takes a bay-wide approach to mitigating ecological effects. While the modelling suggests the application is within the assimilative capacity of Big Glory Bay overall, I believe there are likely to be significant adverse impacts within and beneath each consented farm site. I have some reservations about the ability of the benthic community to assimilate the deposition beneath the pens. However, the applicants have provided a comprehensive monitoring plan, which includes staged development to nutrient input and regular sampling and reporting against trigger levels. This plan should provide some assurance to the applicant and Environment Southland that should the effects be greater than predicted, management responses may be agreed to prevent long-term environmental degradation.

I am happy to answer any questions.

A handwritten signature in black ink that reads "J.K. Grange". The signature is written in a cursive style with a long horizontal stroke at the bottom.

## **APPENDIX 1**

The following documents are included in this Appendix:

1. Big Glory Bay Technical review, May 2018.
2. Grange report to draft consent conditions, October 2018.
3. Further Grange comments, January 2019.
4. Draft EMP comments (email message) February 2019.

# Big Glory Bay Salmon Farms - Change of Conditions Application by Sanford Ltd

Technical Review

*Prepared for Environment Southland, Invercargill*

*May 2018*

Prepared by:

K. Grange and N. Broekhuizen

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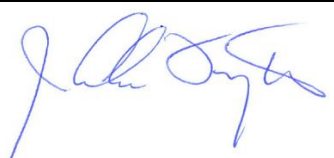
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NIWA CLIENT REPORT No: 2018097HN

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## 1 Introduction

The application for a change in conditions to the existing salmon farming sites owned or operated by Sanford Ltd in Big Glory Bay was presented to Environment Southland in November 2017. The application included an outline of the changes sought and an assessment of environmental effects. The application is complicated by the number of farms (7 in total with a further 2 that may be used in the future), the history of the sites (some have been mussel farms, some used for smolt, some for broodstock, some for on-growing, and some fallowed), and the intention to use some farms for some of those activities in the future, along with a fallowing routine to allow the sea bed to recover after a period of farming. The history of the sites and their intended use is summarised in the application (Sanford 2017) and Aquatic Environmental Sciences (2018) and is not repeated here.

Upon receipt of the change of conditions application, Environment Southland commissioned NIWA to complete a technical review of the application as background to the resource consent evaluation process. NIWA was invited by Sanford to attend a site visit and a workshop in February 2018. Following a subsequent debrief meeting with Environment Southland, NIWA requested further clarification around the actual and potential effects of the proposal. Consequently, Sanford commissioned Aquatic Environmental Sciences to provide further information around the predicted effects of the proposal based on the AEE by Aquadynamic Solutions (ADS 2017a-e).

This report briefly summarises the information supplied with the application, with comment on technical aspects that may be useful for Environment Southland leading up to public notification and any hearing. This report does not repeat the technical information or methodology used to assess the potential environmental effects, but concentrates on issues that may require further clarification or discussion. It does not offer solutions to those issues.

## 2 The application in a nut shell

Sanford wish to farm the sites more intensively. They do not intend to increase their consented space, but by increasing stocking densities (numbers of pens per site) with rotation of pens among sites. To achieve this will require increased feed volumes, defined in the application by increased nitrogen input bay-wide. The total amount of nitrogen being applied for is based on the results of modelling undertaken for 3 of the possible 9 sites. The modelling indicates that the increased nitrogen will lead to increased Chl  $a$ , nutrients, and benthic deposition, and lower surface  $O_2$ . The application argues that these effects will be within the assimilative capacity of Big Glory Bay.

## 3 Modelling

The model used predominantly in the application was DELFT3D, which was run by Aquadynamic Solutions (ADS) and calibrated against current speed and direction at two locations within Big Glory Bay. After comparing the measured data with the model results, ADS report the model is fit for purpose. We have no reason to believe the model used was inappropriate, and similar models have been used in the assessment of other salmon farms in the Marlborough Sounds. That is not to say there are not perhaps better models available that include more parameters than a total ammonium approach. Dr Hartstein, one of the authors of the ADS reports, has previously developed a full NPZD (nutrient-phytoplankton-zooplankton-detritus) model for Big Glory Bay, which may have provided a more comprehensive assessment, and we wonder why that was not used in the present assessment. We do believe, however, that the DELFT3D model probably provides a “worse case” scenario in terms of Chl  $a$  enhancement.

## 3.1 Water quality

### 3.1.1 Chlorophyll *a*

The monitoring data suggest that algal blooms have been rare to date and at present the usual Chl *a* level is <2 mg/m<sup>3</sup>. The modelling suggests that the additional nitrogen being applied for over all farms will increase that level to around 6 mg/m<sup>3</sup>, or an increase of around 4 mg/m<sup>3</sup>, a 2-4 fold increase relative to the present. This is predicted not to cause a significant decrease in water quality, and Sanford have offered a condition that keeps the average bay-wide additional surface Chl *a* levels to < 4 mg/m<sup>3</sup>. A 2-4 fold increase is a significant increase. For comparison, the present conditions for NZ King Salmon in the Marlborough Sounds aim to ensure that Chl *a* is not persistently greater than 5 mg/m<sup>3</sup>, with a trigger level for further investigation of 3.5 mg/m<sup>3</sup>.

Further thought needs to be given to the spatial and temporal frequency of sampling to monitor that condition, how many replicates are required, and what is the response if some of those replicates exceed the limit. The conditions also refer to the limits as “at the surface”. This is ambiguous, and should follow what is normally considered best practice and refer to an integrated sample taken over the top 5 m of the water column.

### 3.1.2 Dissolved Oxygen

The levels of dissolved oxygen (DO) are reported to be well above 6 mg/L on average throughout the water of the Bay at all depths, with only slight differences between seasons at monitoring sites. DO depletion has only been observed in the immediate vicinity of farms, where levels within the pens have been observed to drop by up to 1.5 mg/L. Modelling results predict that levels will remain > 7mg/L overall and > 6 mg/L within the farms. These levels are high enough to not cause significant impacts to the fish and surrounding biota, but it is unclear whether these predictions are for surface waters or throughout the water column. The suggested conditions are that that DO will remain > 6mg/L in Big Glory Bay. If this is at the surface, then lower levels may become present in deeper water, especially beneath the pens.

It is in the best interests of the farm operators to ensure DO levels remain higher than 6 mg/L minimum to avoid stress on the fish themselves. The increased nutrient discharge being applied for will increase sea bed deposition and hence oxygen consumption. DO should be measured throughout the water column as part of the consent conditions. It is quite plausible that levels at the surface may remain high due to exchange with the atmosphere, but be lower near the sea bed or under/within the pens.

## 3.2 Benthic environment

There is uncertainty in the application about what the applicants consider to be acceptable benthic impacts. There will be considerable and significant deposition (with the associated impacts) within the consent boundaries even if the modelling shows acceptable limits 100 m from the consent boundaries. Much of the discussion in the application centres around the depositional footprint beyond the site boundaries, and the proposed conditions/assessments relate to minimising or mitigating effects beyond 100 m from the site boundaries (for those sites that have been modelled).

The benthic effects, based on modelling, indicate extremely high deposition within the sites. For instance, at Farm 246 the predicted total organic carbon is up to 16 kg/m<sup>2</sup>/y (Fig 24A in AES 2018, Part 2) and the total faeces and waste is greater than 45 kg/m<sup>2</sup>/y (Fig 24B in AES 2018, Part 2). The proposed thresholds that allow functioning benthic processes and faunal communities for those



deposition estimates are 0.73 and 5 kg/m<sup>2</sup>/y respectively. Clearly there will be significant impacts beneath the pens, possibly leading to anoxia and *Beggiatoa* mats within the entire site boundaries. The effects of this level of deposition on oxygen depletion and fish health are not addressed in the application.

AES (2018) have provided an assessment of the potential enrichment of the benthic habitats using the modelled deposition rates. They do this by adopting the Enrichment Scale (ES) methodology that has recently been used to set thresholds for salmon farms in the Marlborough Sounds. There is an empirical relationship between deposition and ES, and although that same relationship may not be entirely the same in Big Glory Bay as Marlborough Sounds, it can be assumed to be similar. The ES scale ranges from 1 (pristine, unimpacted) to 7 (extremely enriched and impacted, possibly anoxic). In recent decisions around salmon farms in the Marlborough Sounds, the criteria applied is that ES should be <5 immediately beside and beneath the pens. Using the relationship between deposition and ES, AES (2018) calculate the ES scores for the proposed farms that have been modelled. The results are presented in Figure 27 (AES 2018, Part 2) for Farms 339 and 246. Nowhere within the consent boundaries of those two farms is ES <5, and in the centre of the sites it is higher in both Farm 339 and Farm 246. The ecological and farming consequences of this impact is not addressed in the application or AEE.

There are two mitigation measures suggested in the application to reduce the impact of this deposition to acceptable levels, the use of a binding agent in the feed at Farm 246, and fallowing cycles, both of which are discussed below.

### 3.2.1 Binding agent in the feed

The addition of a binding agent to the feed increases the sinking rate and reduces the fragmentation of the pellets, both result in less spread in the deposition of waste food and faeces. The result is greater deposition in a smaller area. In most situations it is preferable to disperse the deposition as far as possible, but at a lower rate. This is the reasoning behind, for instance, the preference for dispersive farming sites (those in higher currents and deeper water). The addition of binding agents to the feed at Farm 246 reduces the deposition beyond the farm boundaries, but significantly increases it within the site. This may be one of the reasons for the extremely high deposition beneath the pens at that site, and the predicted severe ecological impacts (ES >>7). If that level of deposition and impact affects the health of the fish, then it may have consequences for the attempt to increase fish densities at that site. The balance between the size and area of dispersion is one that Environment Southland may have to decide.

### 3.2.2 Fallowing

The success of the proposal is reliant on the use of a rotational fallowing programme to allow the sea bed to recover after a period of farming. Fallowing is the major mitigation strategy to allow the increased biomass of fish to be farmed. As such, it is important that the strategy is well researched and provides confidence to Environment Southland in its decision making.

The application proposes to use a fallowing programme with 2 years of farming, followed by 5 years of recovery. Pens will either be shifted within existing site boundaries where there is sufficient space, or to other consent sites within Big Glory Bay. As such, it relies on sufficient space within the Bay and that the time-frame for recovery is sustainable. There are three aspects that should be considered, and we believe are not well addressed in the application:

1. The definition of “recovery”. AES (2018) state that recovery is defined as “to a state that the area can be farmed again”. They also provide references to other studies that have either defined or reported on recovery (P 26, Part 2). However, the definition in AES (2018) is not explained further, and Environment Southland will need that definition to be expanded, with data that will show an area can be farmed again.
2. The time of recovery is based on some published references, but in many cases those studies did not follow the entire recovery process, and did not report against the above suggested definition of recovery. There has been minimal sampling undertaken at the presently fallowed Farm 249, and sampling continues at that site. The fallowing cycle of 2 years farming, followed by 5 years fallowing may be acceptable, but there is insufficient information at this stage to assess whether that is the optimal cycle.
3. Previous studies, and the monitoring currently underway at Farm 249 is based on the deposition and impact that was present after current farming practices. The application seeks to significantly increase the benthic deposition within the sites, to a level that is likely to result in anoxia and large impacts to the benthic communities. Fallowing may therefore begin from a much more impacted state and recovery may take longer than anticipated in the application. The application does not provide any information on what the operational response may be should “recovery” take longer than 5 years. Is the sufficient space to move pens among sites should those sites not be available?

## 4 Concluding remarks

Overall, the application is thorough and based on useful information and background data gathering. There are several aspects that Environment Southland may wish to clarify or consider in their deliberations.

- The application is difficult to follow in detail, due to the complicated history of the sites and the proposed conditions. The summaries of past changes and changes as depicted by monitoring results may have been influenced by changes in methodologies over the years and, as such, changes that may have occurred are not recognised. This is not likely to be a significant factor, but could have been addressed in the application.
- It is not clear operationally how more fish will be farmed in the same area, with rotation of cages, and what may happen when additional modelling is undertaken at other sites that have not yet been modelled. The ability to rotate within the predicted time-frame associated with fallowing is crucial to the application, but see comments above.
- “Recovery” needs to be better defined, so it is clear what will be monitored, where, and how often. The recovery cycle is also crucial to the success of the proposal.
- Benthic monitoring is required, but the details are not adequately spelt out in the application, instead leaving to some future environmental monitoring plan to be submitted to Environment Southland. Some details are provided, such as ‘no more than one replicate with no taxa’. What surface area for the core? What depth? How many replicates in total. Clearly, increasing surface area of an individual core reduces the chance of getting no taxa, but increasing the number of replicates increases the

chances of finding one that contains no taxa 'purely by chance'. Similarly, at what spatial scale is *Beggiatoa* to be measured to define "patchy/localized"?

- Overall, the benthic standards being proposed are less stringent than those agreed to by NZ King Salmon. The deposition and resulting impact beneath the pens may affect the health of the fish, completely destroy the benthic communities, and take a long time to recover. The standards appear to protect the benthic environment beyond 100 m from the consent boundaries but almost ignore what happens within the consent boundaries. Is this acceptable to Environment Southland, and is it sustainable for farming?
- Water quality standards are based on Bay-wide sampling and while that may be sufficient to protect the wider Big Glory Bay, will they allow sustainable farming within each site? The Chl *a* values are predicted to have a 2-4 fold increase. While they may not trigger phytoplankton blooms, they may increase the frequency of naturally occurring ones.

## 5 Acknowledgements

We are grateful to Sanford Ltd for providing us access to their commissioned reports and for open discussions during the site visit and workshop.

## 6 References

ADS (2017a). Big Glory Bay benthic and water quality sampling 2016/2017. Report by Aquadynamic Solutions Sdn Bhd to Sanford Ltd, May 2017.

ADS (2017b). Big Glory Bay carrying capacity update, Stewart Island, New Zealand. Volume 1 - Summary of findings. Report by Aquadynamic Solutions Sdn Bhd to Sanford Ltd, May 2017.

ADS (2017c). Big Glory Bay hydrodynamics report. Report by Aquadynamic Solutions Sdn Bhd to Sanford Ltd, May 2017.

ADS (2017d). Big Glory Bay water quality modelling report. Report by Aquadynamic Solutions Sdn Bhd to Sanford Ltd, May 2017.

ADS (2017e). Big Glory Bay benthic footprint report. Report by Aquadynamic Solutions Sdn Bhd to Sanford Ltd, May 2017.

Aquatic Environmental Sciences (2018). Assessment of ecological effects of expanding salmon farming in Big Glory Bay, Stewart Island – Part 1 Description of aquatic ecology, and Part 2 Assessment of effects, prepared for Sanford Ltd.

Sanford Ltd (2017). Big Glory bay salmon farms. Change of conditions Application and assessment of Environmental Effects. Submitted to Environmental Southland.

23 October 2018

Courtney Guise  
Consents Officer,  
Environment Southland

Technical review of proposed consent conditions offered by Sanford Ltd

Dear Courtney,

Thank you for asking for this technical review, and for providing your comments on the proposed conditions that have been offered “without prejudice for discussion purposes”. I have added some specific comments to the PDF document you provided (sent separately), so this covering letter is of a more overview nature, designed to be part of discussions with Sanford Ltd.

In general, Sanford have proposed consent conditions based on their application, and considering a previous technical review by NIWA, and workshop discussions. I am unsure how common it is for an applicant to formally propose their own consent conditions, so my comments below are designed to ensure a balance between the applicant’s ability to farm the sites and ES’s requirement to ensure, as far as possible prior to development, acceptable environmental outcomes.

The proposed conditions require additional explanation, with measurable parameters. For instance, 4(a)(ii) states the nitrogen input will not exceed certain quantities “across all farms in Big Glory Bay, irrespective of ownership”. How will this be achieved? Will Sanford enter into formal agreements with other farmers to share the feed input data, irrespective of confidentiality? This is an important condition and ES will need some assurance that it can be achieved.

Chlorophyll a. These values appear to have changed from previously an increase to an absolute value. They now are defined as an annual median value not exceeding 5.0 (or 3.5 at “reference” sites). An annual median may not identify shorter-term but very high (and potentially enriched) values that may lead to algal bloom conditions and subsequent hypoxia once the blooms decay. A suggestion may be to have a condition that follows more closely the Marlborough Sounds conditions that state a need to investigate if there are 3 or more sequential occurrences of chlorophyll greater than or equal to the limit (in MS that equals 3.5) measured at any stations in the Sound (not necessarily at the same station). The proposed BGB conditions are considerably more relaxed than those set in the Marlborough Sounds and ES may need to address the reasons for that.

The seabed Environmental Quality Standards (EQS) are based on measurements “at the edge of the pens”. While it may not be possible to take all samples at the very edge of the pens, the conditions should state something like “within 10 m of the edge of the pens”. The proposed conditions state no “more than a few opportunistic species”. Does this mean a few species or a few individuals of opportunistic species? Either way, ES must require a definition of “few”. The present proposed conditions do not allow ES to decide if standards have been breached. In enriched benthic states, there is often large numbers of individuals of just a few species. Once again, the numbers of individuals and opportunistic species could be compared with those at reference sites. I could not see how many replicate samples would be collected, or from how many sites, to measure the EQS. As part of the condition for EQS and benthic sampling, it states that should grabs not collect sufficient material due to the presence of mussel shells, then another attempt can be

made within 10 m. This should be within 10 m, within the area defined above. I have a question about why there may be large numbers of mussel shells beneath the edges of the pens, sufficient to prevent a grab sample being taken. I can only assume that these are from fouling on the pen nets, dislodged during cleaning of the nets. If this is the case, I cannot see any reference to the need for the consents to include the discharge of biological and waste material to the seabed during cleaning. Should this be in the application? What effects does this material have on the deposition, or on the organic material on the seabed?

I have provided comments that state the need to define “no obvious, spontaneous out-gassing” and “bacteria mat (*Beggiatoa*) coverage not greater than 50%” in terms of number of samples and or % cover.

The water quality standards cover the parameters required to assess the environmental effects. However, the proposed conditions do not suggest the number of sites to be sampled, how they will be sampled through the water column, and where. I presume this is to be left to the Big Glory Bay Salmon Farm Environmental Management Plan (“BGBSFEMP”). In my opinion, this plan will need to be provided to ES within x months of any consent being granted and prepared in consultation with Sanford and ES. This is to ensure ES has all aspects covered, and to provide at least some baseline information at those sites before development begins. More details of when the plan should be prepared, and methods of sampling and analysis, and the reporting frequency should ideally be part of the consent. In addition, the water quality standards are not, for many parameters, actual standards. There are no standards or trigger levels for such parameters as nutrients. While I agree that the list of parameters included in the proposed conditions are important to collect, there is no management response proposed if some or all exceed certain levels. Perhaps some thought should be given to including a condition that compares the farm sites with those of the reference sites and any deviation of, e.g. more than x% from the reference sites initiates a tier 1 or 2 response.

There appears to be one departure from the original application, which relates to the use of a binding agent at MF 246. The application included a binding agent at this site to reduce the spread of deposition. This was questioned in the technical review, as although the spread may be reduced, the concentration of deposition may be increased beyond acceptable limits beneath the pens. The proposed conditions (para 4A) do not specifically state whether a binding agent will be used or not. If not, what does the modelling state will be the difference to deposition as provided in the application.

Overall, the proposed conditions on chlorophyll a levels should not result in the system “falling over”, but the suggested permitted level of 5 is high for coastal NZ waters, and high to what has been recorded in BGB. Monitoring will be required to be well defined and with reporting times frequent enough to allow management action should the permitted level cause adverse effects.

As expected, the proposed consent conditions are written to give the farmers as much leeway as possible. In my previous technical review, I stated that the level of benthic deposition was likely to cause severe effects beneath the pens. Whether these effects are likely to remain within 10 m of the edges of the pens is an important consideration for the position of monitoring stations, and the need for a relatively large number of stations around each farm site. The position and number of “reference” sites need discussion with ES. Are these to be considered “control” sites where no effects attributable to the farming operations are to be expected, or just reference sites at some distance from the farms as a comparison. Whether these should be located within BGB, or adjacent (Peterson Inlet) or distant (Foveaux Strait) requires further discussion should consent be granted.

Yours sincerely

A handwritten signature in black ink that reads "Ken Grange". The signature is written in a cursive style with a prominent underline.

Ken Grange  
Principal Scientist



## Sanford Ltd Big Glory Bay consent application

### Ken Grange comments 18 January 2019

#### Reply to comments from Danielle 15 December:

- From what I'm reading, there may still be concerns about the potential impacts on the benthic environment directly below the marine farms. On this, to what extent would degradation impact their own salmon farming operations? Unsure what the position is on this in comparison to the wider BGB environment, but would it be a bit of a self-limiting scenario, where they can't cause too much additional degradation without the salmon farms above suffering?
- Based on their modelling, there does seem to be the potential for impacts to the benthic environment beneath the farms. The impacts to the salmon farming operation are likely to firstly manifest themselves with decreased oxygen in the water column, but only if the nutrients in the water and sediments were sufficient to deplete the oxygen in the overlying water. The farmers would be mindful of any effects to their stock and the modelling predicts this is unlikely. However, the monitoring conditions should provide information. As for the wider BGB, the modelling does not predict widespread effects beyond the farm boundaries.
- A few of the proposed condition limits refer to a baseline, but nowhere is there a formal baseline set of data provided for the various measures, aside from the figures referred to in the application.
- What the appropriate baseline data are may need further discussion, but the latest proposed conditions assume the monitoring that has been undertaken over the past few years will form that baseline and be a comparison with a yet-to-be identified "control" site outside BGB. Where that site may be needs discussion.
- The staging proposed through Condition YY seems like a good way to see how things are changing, and will result in a lower than initially proposed total nitrogen input level if the actual effects don't line up with modelled indications.
- Correct.
- Does still seem to be lacking detail about how the load will be monitored across the entire Bay. Unsure how the mussel farming process differs to salmon, but do they also use nitrogen containing feed that will need to be counted?
- I agree. There doesn't yet seem to be any buy-in from other farm operators that they will agree to supply their feed loads to allow the bay-wide calculations to be made. Mussels will not affect nitrogen. There is no added feed supplied to mussels; they simply filter the surrounding water. There is a possibility that mussels may reduce the overall effects of added nitrogen, but I have not seen any hard data on this for BGB. It will depend on how many mussels there are and where they are in relation to the salmon farms.

**Proposed conditions as supplied by Sanford 18 December:**

This set of conditions builds on earlier versions and is labelled as also being agreed to between Sanford and DOC. In general, they are what might be expected to monitor potential effects and provide a management approach should the effects be greater than expected. As such, the proposed conditions are reasonable. The details of monitoring will be developed by the Big Glory Bay Salmon Farm Environmental Management Plan ("BGBSFEMP") as required by the conditions of the consent. The proposed two-tier approach to management intervention is sensible.

My main concern is not with these proposed conditions, but with the predicted levels of waste likely to accumulate on the seabed beneath the farms. The modelling is predicting (for that farm that has been modelled) that waste accumulation will be large in comparison with best practice developed for eg the Marlborough Sounds. This may have consequences for "recovery" during the suggested following cycles. Should Council decide to accept this level of deposition, then the proposed monitoring plan (BGBSFEMP) will need to be developed to provide adequate assurance to Council that the effects are acceptable. The timeframe for monitoring and reporting may need more discussion to ensure Council has information in a timely manner.

---

**From:** Ken Grange <granges@xtra.co.nz>  
**Sent:** Friday, 22 February 2019 11:43 a.m.  
**To:** Ken Grange  
**Subject:** Fwd: Draft EMP for Sanford application BGB

----- Original Message -----

From: Granges <[granges@xtra.co.nz](mailto:granges@xtra.co.nz)>  
To: Mark James <[markj@aquaticsciences.co.nz](mailto:markj@aquaticsciences.co.nz)>  
Cc: [Lacey.Bragg@es.govt.nz](mailto:Lacey.Bragg@es.govt.nz)  
Date: 07 February 2019 at 10:20  
Subject: Draft EMP for Sanford application BGB

Hi Mark and Lacey,

Following the meeting with Sanford and ES on 25 January, it was decided that I would receive and review a copy of the draft environmental monitoring plan for Big Glory Bay salmon farm consent application, and that, if required, I would meet with Dr Mark James to discuss.

I have subsequently received that draft and, after review, do not consider that a formal meeting with Dr James is required. Instead, any subsequent discussion can occur via email.

The draft EMP has been prepared by Drs Giles and James on behalf of Sanford Ltd to support the application for a change of consent for the operation of salmon farms in Big Glory Bay. The plan and details of sampling and analysis reflect the draft change in consent conditions that have been developed following the application for resource consent to increase the allowable nitrogen input from feed over all farms in Big Glory Bay.

The draft plan is comprehensive and reflects the proposed conditions of consent, should the resource consent be granted and those conditions approved by Environment Southland. The draft plan covers all proposed conditions and provides clear rationale of sample sites, sample collection, subsequent analyses, and reporting. It is based on published peer-reviewed literature of relevance to NZ and reflects best practice developed for salmon farms in the Marlborough Sounds. It is written in such a manner that appropriately qualified and experienced researchers would be able to follow all requirements to monitor and report results to Sanford and ES and thus provide consistent management advice and actions should breaches occur.

I did find one small typo. Section 4.4, page 20, second paragraph describes the methodologies of water column samples. At line 1 of that paragraph it refers to "benthic samples" rather than "water column samples".

I believe the draft EMP will allow the collection and reporting of adequate information to support the proposed conditions of consent.

Kind regards,

Ken

Marion and Ken Grange

34 Riverview Rd

Kerikeri