From: s 9(2)(a)
To: s 9(2)(a)
Cc: Fast Track Consenting; s 9(2)(a)
Subject: RE: [COMMERCIAL]Hananui Aquaculture Project
Date: Wednesday, 19 May 2021 3:22:35 pm
Attachments: image002.png
image003.png
image011.png
image012.png
image013.png
image014.png
image015.png
Request for Further Information s92.1 APP-20191561.pdf

MFE CYBER SECURITY WARNING
This email originated from outside our organisation. Please take extra care when clicking on any links or opening any attachments.

Hi Rachel

I have attached the s92 request from Environment Southland to this message for you. To date we have provided responses to all parts of the request with the exception of Part K (the wild fish assessment) and the cultural impact assessment requested under Part A. Suitable technical experts to prepare wild fish assessments are thin on the ground in New Zealand and the expert we have been working with, Paul Taylor of Statfishtics is fairly time constrained. We expect his report to be available in June however. In terms of timing for the completion of the s92 response, the responses to the questions around the benthic assessment led to further modelling work being completed last year, which resulted in a change to the original proposal (to the proposed farm layout that has been included in the application for referral). As a result of that change, while not subject to the s92 request, both the original landscape and natural character assessment and the covering application document and overall assessment of effects prepared by Stantec also need to be updated. We have therefore recently advised Environment Southland that, with the time constraints on the author of the wild fish assessment and the need to update two other documents, we would provide the Council with one final package of information in response to the s92 request, which would include the wild fish assessment, the cultural impact assessment, an updated landscape and natural character assessment and an updated overall application document. While this delays the final response to the s92 request, it does mean that a comprehensive and consistent set of documentation can be provided. We have advised Environment Southland that the information would be provided to the Council by late August this year.

Our principal contacts at Environment Southland are Bruce Halligan, the Acting Consents Manager, and Lacey Bragg, a Team Leader Consents. From a planning perspective, Environment Southland has contracted Maurice Dale of Boffa Miskell to be the reporting officer, although I guess from the referral decision side of things it is the Environment Southland staff who are more relevant to you? Ngāi Tahu Seafood has also regularly kept Rob Phillips, the CE of Environment Southland, informed about progress with the project and the application.

Please feel free to contact me if you have any further questions.

Regards
Frances

Frances Lojkine
BSc, MRRP
Principal Planner
s 9(2)(a)

Stantec New Zealand
Hazeldean Business Park
6 Hazeldean Road
P O Box 13-052
Christchurch 8141
New Zealand

Stantec

From: Rachel Ducker <s 9(2)(a) >
Sent: Tuesday, May 18, 2021 4:47 PM
To: Lojkine, Frances s 9(2)(a)

Cc: Fast Track Consenting <fasttrackconsenting@mfe.govt.nz>
Subject: [COMMERCIAL]Hananui Aquaculture Project

Hi Frances,

It was good talking to you earlier today about the above application.

As mentioned I will coordinate assessment of your application with the Department of Conservation (DoC) to identify any further information we require. I have since arranged a meeting with DoC for later this week so we may not be in a position to formally identify any additional information needs until after that meeting is held.

In the meantime are you able to help me out with the status of the current application lodged with Environment Southland which is referred in your application?

> Ngāi Tahu Seafood has worked closely with Environment Southland both prior to and following lodgement and acceptance of the application. Environment Southland staff and consultants have reviewed the application and generated a section 92 request for further information, and consultants are reviewing each technical report that is provided in response to the section 92 request. Ngāi Tahu Seafood (and its planning consultant, Stantec New Zealand) has met regularly with Environment Southland staff to discuss the application and progress and approaches to its processing. Environment Southland staff are aware that Ngāi Tahu Seafood is making this application for referral of the Hananui Aquaculture project under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

It would be helpful to have a copy of the Section 92 letter sent from Southland Regional Council to the applicant regarding this application and also to have some understanding of the proposed timing for completion of any technical work requested in this letter. We are interested in having a copy of this letter before Thursday if possible.

Are you also able to tell me who your primary contact at Southland Regional Council is for the RMA application?

Thanks

Rachel Ducker
Senior Analyst | Kaitātari Matua
Fast Track Consenting

Ministry for the Environment | Manatū Mō Te Taiao
s 9(2)(a) | mfe.govt.nz

Ministry staff work flexibly by default. For me, this means you may receive an email outside of usual working hours – this works for me. Please respond at a time that is convenient for you.

****

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Our reference: APP-20191561
Enquiries to: s 9(2)(a)

10 February 2020

Ngāi Tahu Seafood Resources
C/- Stantec New Zealand
P O Box 13052
Christchurch 8024

Attention: Frances Lojkine

Dear Frances

Request for Further Information under Section 92(1) of the Resource Management Act 1991 - Application for Resource Consent - Ngāi Tahu Seafood Resources

Thank you for your application on behalf of Ngāi Tahu Seafood Resources (NTS) to develop approximately 2,500 hectares of the coastal marine area offshore from the northern coast of Rakiura/Stewart Island for fin fish farming.

We have reviewed the application, and require the following further information to better understand your proposal before we can make a determination on the notification of the application. For clarity, this further information request adopts the following structure to align with the AEE and technical reports:

A. Overall proposal, AEE, and general matters.
B. Water column assessment.
C. Seabed assessment.
D. Oyster assessment.
E. Marine mammals assessment.
F. Seabird assessment.
G. Shark assessment.
H. Navigation risk assessment.
I. Disease risk assessment.
J. Biosecurity assessment.
K. Wild fish assessment.

Please provide[1], in accordance with Section 92(1) of the Resource Management Act, the following information:

A. OVERALL PROPOSAL, AEE, AND GENERAL MATTERS.

Information required is structured as follows:

- Scope of proposal
- Consents required and statutory framework
- Effects on cultural values
- Codes of practice, standards, and frameworks
- General matters

Scope of proposal

AEE page 18 – Feed barges/vessels

The application refers to each smolt and grow out farm as having an associated feed barge, and that a barge similar to the Akva AC600 PV design will be used. It is appreciated that it may be too early for NTS to confirm the specific barge design to be used, however sufficient information that details the intended character, scale and design of the barges to be used in order to determine their visual and navigation risk effects in particular is required. It is also unclear from the application whether it is intended for the barges to contain accommodation and have permanent on site staff.

1. Please provide maximum design parameters (e.g. height, footprint) for the barges.

2. Please confirm whether the barges will have accommodation and have permanent staff on site.

AEE page 18 – Feed discharges and staging

The application states that: "Ngāi Tahu Seafood is proposing a staged development for the project, both to allow trialling of equipment and locations for marine farming structures within the proposed site, and to allow for gradual development and monitoring of environmental effects on the seabed and water column from the discharge of feed" and "In order to ensure seabed effects can be maintained within acceptable limits at each farm site, each new site would commence at a discharge level of 75% of the modelled maximum, to provide a buffer against seabed effects being greater than anticipated by the modelling" (p.18).

The proposed stages are shown below (Table 4-1 of the Application).

Table 4-1: Proposed staged development approach

Stage	Grow-out farms	% feed	Smolt farms	% feed	Broodstock farm	% feed	Feed increase (tpa)	Feed total (tpa)
1	G2	75%	½ S1 (10 pens)	75%	B1	100%		8,918
2	G2, G4	75%	S1	75%	B1	100%	8,438	17,355
3	G2, G4	100%	S1	100%	B1	100%	5,625	22,980
4	G2, G4 G1	100% 75%	S1 ½ S2	100% 75%	B1	100%	9,938	32,918
5	G2, G4 G1, G3	100% 75%	S1 S2	100% 75%	B1	100%	9,938	42,855
6	G2, G4, G1, G3	100%	S1, S2	100%	B1	100%	6,625	49,480

Section 18 describes that "Monitoring of the effects on the seabed and water column during farm operation, at both impact and reference monitoring sites during each stage of development, with a period of 2-3 years monitoring of any given stage before a decision to increase production is made".

3. Please confirm does the "period of 2-3 years monitoring of any given stage" refer to 2-3 years at 100% of the respective stage feed input or to any feed input, i.e. potentially only 75% for some (or all) of the monitoring period?

Consents required and statutory framework

AEE page 20 - Table 5-1: RCP rules that result in consent being required

In addition to the rules identified in Table 5-1, the following additional rules of the Regional Coastal Plan may be relevant to the proposal:

4. Rule 5.4.3.2 – Introduction of exotic fauna, and indigenous fauna not of local genetic stock, into the coastal waters of Stewart Island, Fiordland and their offshore islands. The rule may be relevant where the fish to be used is not of local genetic stock.
5. Rules 7.3.8.2.3 - 7.3.8.2.5 – Hull cleaning of ships in the costal marine area. The barges are defined as "ships" under the Regional Coastal Plan and therefore the rule may be relevant where hull cleaning is proposed in the CMA. Note that under rule 7.3.8.2.5, the hull cleaning of ships where unwanted or pest marine organisms enter the coastal marine area, is a prohibited activity.
6. Rule 10.1.6 – Disturbance of the seabed or foreshore. Disturbance of the seabed associated with the placement of anchoring structures would be a discretionary activity under this rule.

It is unclear to what extent the proposal will comply with these rules or require resource consent.

7. Please confirm whether the proposal complies with the Regional Coastal Plan rules listed above.

Effects on Cultural Values

AEE – page 56 – Effects on cultural values

This activity is within Rakiura/Te Ara A Kiwa (Raikura/Foveaux Strait Coastal Marine Area) which is a statutory acknowledgement area under Schedule 104 of the Ngāi Tahu Claims Settlement Act 1998, and recognises Te Rūnanga o Ngāi Tahu's cultural, spiritual, historic, and traditional associations with this area. The AEE recognises these associations, and notes the intention to provide a completed cultural impact assessment and finalised cultural values report as soon as it completed.

8. Please provide a cultural impact assessment and finalised cultural values report.

Codes of practice, standards and frameworks

9. Please confirm to what extent Ngāi Tahu Seafood Resources is committed to adhere to the following:

    - New Zealand Salmon Farmers Association's Finfish Aquaculture Environmental Code of Practice;
    - Sustainable Management Framework (SMF) for New Zealand Salmon (Aquaculture NZ 2015); and
    - A+ Sustainable Aquaculture Salmon Biosecurity Standards.

General Matters

The supporting technical assessments have strongly focussed on the western part of the application area, with all modelling scenarios based on cages along that side. It is not clear how (if) the eastern part of the proposal area is intended to be used for cages at a later point. Information about the potential future use of the eastern part in some reports provided with the application implies that this area will not be used, for example:

- The seabed assessment report states "The proposed farms have been placed so that primary organic deposition, and the associated effects, are unlikely to occur in areas of high-value habitats (high biogenic cover)" (p.ii).
- The oyster assessment report states that the part of the proposal area not comprising sand substrate "comprises biogenic habitat and ecologically important taxa that will be protected" (p 7, par 2).

However, other statements in the AEE, seabed, water column and biosecurity assessments and the BMP refer to cage rotation, fallowing, potential future rearrangement of farm sites and cage distances, which indicates a possible intent to use the eastern part of the proposal.

10. Please clarify whether there is a possibility that finfish cages will be placed in the eastern part of the proposal area at any time during the consent period.

11. If there is the intent to place cages along the eastern part of the proposal area at any time during the consent period, please confirm what process is proposed to ensure seabed effects are acceptable, particularly on biogenic habitat and ecologically important taxa. For example, is it intended that any change would be by way of a process described in consent conditions, or by way of an application under s127 of the RMA?

The application does not state the duration of resource consent sought under section 123A RMA, or the consent lapse date sought under section 125 RMA.

12. Please confirm the duration and lapse dates that are sought for the resource consents.

B. WATER COLUMN ASSESSMENT

Information required on the water column assessment is structured as follows:

- Hydrodynamic data.
- Dissolved oxygen, chlorophyll and nutrients.
- Modelling.
- Artificial light.
- General information requests.

Hydrodynamic data

Page 18

The current velocities shown in Table 2 do not appear to match the velocity profile shown in Figure 6. Particularly near-seabed current velocities in Table 2 are considerably higher than those indicated in Figure 6 and mid-depth velocities for the Workhorse and Buoy ADCPs also appear higher in Table 2 than in Figure 6.

1. Please explain the differences between current speeds shown in Table 2 and Figure 6.
2. Based on the current profiles shown, it is counter-intuitive that the mean depth-averaged current speed is smaller than the current speed at all three measured locations. Please describe how mean depth-averaged current speed was calculated and which section(s) of the water column experience the lowest current speeds.

Table 2. Depth-averaged current velocities measured by the three ADPC deployments.

ADCP	Workhorse ADCP (WS 2)	Buoy ADCP (WS 3)	Sentinel ADCP (WS 4)
Depth at deployment (below MSL[1]) (m)	25	32	37
Principal current direction	WNW / ESE	NW / SE	NW / SE
Mean depth-averaged current speed[2] ($cm.s^{-1}$)	38	39	44
Mean near-surface current speed ($cm.s^{-1}$)	59	47	50
Mean mid-depth current speed ($cm.s^{-1}$)	56	46	46
Mean near-seabed current speed ($cm.s^{-1}$)	41	40	39

[1] MSL = Mean sea level.
[2] Depth-averaging was done between the near-surface and near-seabed depths (see Appendix 2).

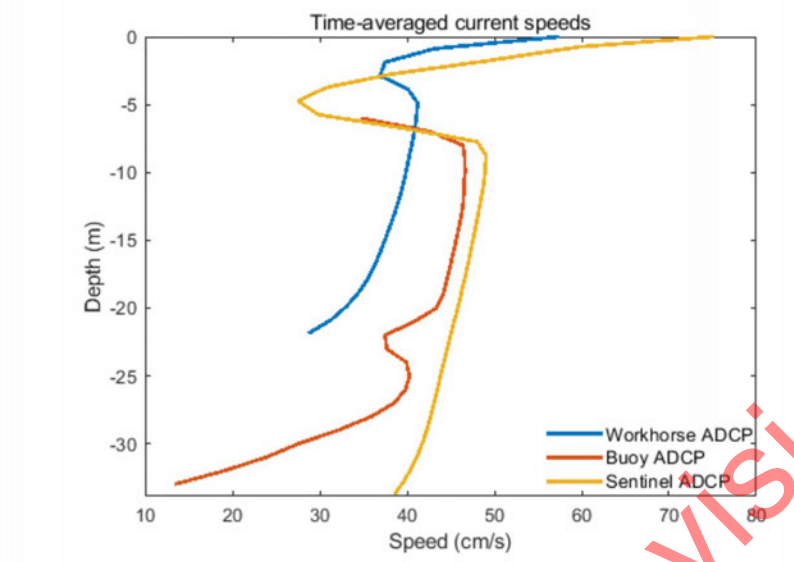


Figure 6. Time-averaged current speeds measured from the three deployed ADCPs.

Dissolved oxygen, chlorophyll and nutrients

Page 36 (and others)

Results of nutrient and chlorophyll a analyses at sites 2, 3 and 4 are shown combined. These three sites are arranged along a transect from nearshore to offshore through the proposed farm area; however, the presentation of results does not allow for an assessment of potential differences along this transect.

Results from individual site and sampling events are not shown. Such detail is useful for assessing variability and identifying potential initial water column limits for monitoring.

3. Please provide the results of analyses conducted at sites 2, 3 and 4 separately, so that changes along the transect from nearshore to offshore can be assessed. Please present these data in tabular format (i.e. like Table 3 but separated by site).
4. Please also provide a table showing raw data of all nutrient and chlorophyll a measurements.

Page 37

Comparisons are made to nutrient concentrations in Paterson Inlet and Big Glory Bay published in 1992 and it is hypothesised that the proposed site may be less susceptible to nutrient inputs than those locations.

5. Please confirm the number of finfish farms in Big Glory Bay at the time that measurements were made.
6. The report postulates that "[c]onsequently, these environments may be more susceptible to new nitrogen inputs". Following the years of finfish farming in Big Glory Bay, please confirm how susceptible has that environment been to the nitrogen input?

Pages 36, 37, 38, 39

Reference is made to nutrient concentrations measured at other locations (Port Gore, Port Pegasus [North and South], Queen Charlotte Sound, Pelorus Sound).

7. Please provide a map showing the locations of these measurements so that the general environmental characteristics can be compared to the proposed farm location (i.e. proximity to shore, exposure of location).

Pages 38, 39

Reference is made to Marlborough District Council monitoring data but no reference to the data source is provided that would allow sighting or requesting the data.

8. Please provide a reference for the DRP concentrations in Queen Charlotte and Pelorus Sounds described as follows: "Concentrations of dissolved reactive phosphorus (DRP) in Foveaux Strait were within the ranges observed in Port Pegasus (Table 5) and other coastal waters such as Queen Charlotte and Pelorus sounds (mean 14 and 13 mg.m-3, respectively; Marlborough District Council monitoring data)."
9. Please provided a reference for the DIN:DRP ratios in Queen Charlotte Sound described as follows: "For example, in Queen Charlotte Sound, winter and summer DIN:DRP ratios average 10.6 and 6.1, respectively (MDC monitoring data) which are similar to the ratios observed in Foveaux Strait".

Page 40

The report states that "[m]olar ratios of DRSi:DIN were reasonably close to the Redfield ratio (Si:N:P = 15:16:1) (Table 6)"

10. Please confirm what is the ecological relevance of deviating from the Redfield ratio and what deviation would not be considered "reasonably close"?

Page 40

The report states "DRSi:DRP ratios were somewhat lower, though again typical of what is observed in other New Zealand coastal waters not significantly impacted by freshwater inflow".

11. The ratios shown were consistently lower (up to less than half) than the Redfield ratio. Please confirm what is the ecological relevance of these deviations from the Redfield ratio?
12. Please confirm what locations does "other New Zealand coastal waters not significantly impacted by freshwater inflow" refer to? Are references available to support this comparison?

Page 46

The report states: "[n]itrate concentrations were lower in summer than in winter suggesting nitrogen limitation".

13. Please confirm what winter concentrations does this statement refer to, considering sampling was only conducted in spring and summer?

Page 46

The report states: "N:P ratios were characteristic of coastal sites with low freshwater inputs".

14. Please confirm were N:P ratios from sites outside the Marlborough Sounds compared to those obtained from the proposed site? and;
15. If not, would it be more appropriate to refer to "coastal sites in the Marlborough Sounds" rather than "coastal sites"?

Page 47

The report states "Therefore, provided concentrations of key nutrients, such as nitrogen, do not deviate greatly from their natural concentrations, the potential for dystrophic effects, such as dissolved oxygen issues, is minimal."

16. Please confirm what level of deviation from natural concentrations is considered "greatly"? How would that be assessed?

Modelling

Page 48

The tracer modelling conducted utilised approximate net pen locations based on initial engineering and navigation advice. It appears that the layout represents the final layout of the proposal. However, confirmation of this is sought.

17. Please confirm if there been any changes to farm layout, staging, feed composition or other aspects of the proposal that may have reduced the comparability of the presented model scenarios and the proposed farm operations? If so, what are the consequences for predicted effects?

Page 48

Figure 23 shows the model grid. It appears that the finer resolution commences at the inshore farm locations. Please confirm:

18. Why was the finer grid only commenced at the farm locations and not further inshore?
19. What is the potential impact on model results from having farms at the boundary of changing resolution?
20. Is it possible that there are boundary effects that influence model results?

21. Considering the relatively high resolution south-east of the farm area, how accurate is the simulated tracer dispersal towards Paterson Inlet?

Page 50

22. Please confirm are all weights in Table 8 dry weight?

Page 50

The references used for values of nitrogen retention by fish, faeces production and percent nitrogen in faeces are very old (1981 and 1982). Considering the progress in feed development and finfish farm efficiencies and optimisation, please confirm why this old data is still relevant; and.

23. Please confirm if more recent data exists, e.g. from research projects, to support these values?

Page 50

A report by NZKS states (at para 313) "It is expected that, for NZ King Salmon's current feed range, about 20% of the dry matter consumed is excreted as faeces" and "Switching to higher-energy diets could potentially reduce faecal dry matter output by 20% or greater. This is likely to be the subject of research in the next few years." The same information is presented in the NZKS operations report from ~2015.

These reports indicate that modelled faeces production of 26% (Table 8) may overestimate actual faeces production by ~25%. It is unclear what consequence this may have on model results.

24. Please comment on whether faeces production may have been overestimated. If so, what are the likely consequence on model results in relation to the assessment of effects?

Page 50

The report states that "Consequently, our simulations aim to provide an estimate of a 'worst-case' nitrogen scenario release and will tend to overestimate nitrogen concentration changes in the water column". In general, this is a useful approach for assessing the effects of the proposal conservatively. However, without information on how far the worst-case scenario potentially is from more realistic scenarios, it is of limited value for assessing the likely effects of the proposal.

While some input parameters can be estimated with relative certainty (e.g. some of the feed composition or fish physiological parameters), others are uncertain. As explained in the report, estimating tracer decay is particularly uncertain. Appendix 9 provides a detailed description of how the rate is calculated. This process includes applications of literature and assumptions, some without explanation and/or reference (e.g. "we assume that only 50% of the indirect C settles on the seabed"). While it is acknowledged that it would be difficult to be more accurate in the estimation of decay rates, it is problematic that no information is provided on the variability introduced to the model results through the assumptions made.

The report includes good descriptions of the model limitations. However, results are presented as exact values and do not provide any indication of the certainty of results (e.g. page 60). This implies a strong sense of confidence in model results that may not be warranted.

25. Please provide an indication of variability or certainty around the parameters used in the model (at least those with high uncertainty, such as tracer decay, and those to which model results are particularly sensitive). How does this variability affect model results?

Page 51

It is not clear what denitrification processes are considered in the estimation of tracer decay.

26. Please clarify if denitrification refers to sediment denitrification, water column denitrification or both.

Page 52

Model results are shown after a two-months model simulation. Please confirm the following:

27. Do model results represent steady-state conditions?
28. What was the rationale for showing results after two months?
29. What would the implication be of choosing a shorter or longer simulation period?

Page 52 and others

Model results are compared to measured concentrations from October, December and January.

30. Please confirm what are the implications of only having one-off spring and summer data for model result comparison and contextualisation?
31. Please confirm is it possible to estimate the likely relative increase in nutrient/decrease in DO for the remaining seasons? The result descriptions, particularly the summary of findings, should be modified to represent either the potential seasonal variations or to clearly state that result only apply to spring and summer conditions.

Appendix 4

Section 4.4 (and others)

Reference is made to the "validating and calibrating processes" but section 5 only describes model validation.

32. Please describe the calibration process undertaken for the hydrodynamic model.

Section 5.1.1

Model performance in simulating elevation was assessed by comparing measured and modelled amplitude and phase at sites P1 and P3 and by comparing measured and modelled tidal elevation at sites Oban, P1 and P3 as well as residual water levels at site P3. It is not clear why no information was provided for site P2 and the selection of sites for demonstrating model performance appears inconsistent, however, may be related to the instruments used.

33. Please explain why only selected sites are shown for assessing model performance.

Section 5.1.2

Model performance in simulating current speed and direction was only assessed at sites P1, P2 and P3 and is limited to visual comparisons of measured and modelled values. No goodness-of-fit statistics are calculated that would provide an objective assessment of model quality, such as differences in peak flow speeds (ebb and flood tides) or mean flow direction (Williams and Esteves 2017). The model appears to overestimate current speed substantially, but this is not discussed in this appendix or the report.

34. Please provide more information (ideally based on objective statistics) on the quality of model performance in simulating current speed and direction.
35. Please describe the implications of model performance on the results presented in the report.

Section 5.1.3

As described for section 5.1.2, no assessment of model performance beyond a visual comparison of modelled vs measured is provided.

36. Please provide more information (ideally based on objective statistics) on the quality of model performance in simulating current speed and direction.
37. Please describe the implications of model performance on the results presented in the report.

Section 6

This section states that "Overall, the model reproduces well the mixed water column of the Foveaux Strait and the tidal dynamics in the study region. The model is suitable for undertaking a study on potential pollution spread from the proposed Salmon farm". Based on the limited information presented on model performance this statement does not appear correct or robustly substantiated.

38. Please include more specific information on model performance, including limitations.
39. Where appropriate, please describe the implications of potential model performance issues on the simulations made for assessing effects of the proposal on the water column.

Artificial light

Page 68

The report states that "Surveys at salmon farms with high current flows in the Marlborough Sounds demonstrated that artificial lighting does not have measurable effects on the aggregation and distribution of zooplankton".

40. Please provide a reference for this statement.

General information requests

Copies of documents are requested that were used to support the assessment of effects but that are not publicly available.

Page 1

41. Please provide the following document:

    Taylor DI, Jary M 2018. Aquaculture Site Scoping: Northern Stewart Island Stage 1a. Prepared for Ministry for Primary Industries. Cawthron Report No. 3163. 31 p. plus appendices.

Page 1

42. Please provide the following document:

    Vennell et al. 2018 (also missing from reference list)

Page 8

43. Please provide the following document:

    Bennett H, Clement D, Fletcher F, Heasman K, Knight B 2019b. Open-ocean salmon farming in a New Zealand context: our current state of knowledge of potential environmental effects. Prepared for Fisheries New Zealand. Cawthron Report No. 3396. 13 p.

C. SEABED ASSESSMENT.

Information required on the seabed assessment is structured as follows:

- Effects on sensitive taxa.
- Model sensitivity and assumptions.
- Mitigation and management of seabed effects.
- Reference to guidance for salmon farming in the Marlborough Sounds.
- General information requests.

Effects on sensitive taxa

Page 23

Three main seabed habitat types were observed within the proposal area (sand with shell hash, bushy bryozoan thickets and bryozoan-sponge reefs). Two of these were found to contain sensitive taxa. Specific information presented in section 3.4.1 Sensitive taxa includes:

- "Several taxa or groups of taxa were identified within the surveyed area that are of particular ecological significance and are known to be sensitive to anthropogenic impacts. These taxa include bryozoans, sponges, calcareous tubeworms, brachiopods, and several large bivalve taxa (scallops, dredge oysters, horse mussels and dog cockles)."
- "Based on these descriptions, the bryozoan communities [bryozoan beds, or thickets] within the survey area are considered significant."
- "While these taxa [bushy clown-hair bryozoan] are not listed as 'significant', we consider that this is a valuable habitat that warrants protection from potentially adverse human activity."
- "Based on this description, we consider the sponge communities within the survey area to be significant."
- "While rarely mound forming, we consider tubeworm abundance to be of ecological significance where observed in moderate to abundant cover."
- "in some areas, the percentage cover of empty large bivalve shells (predominantly oyster shells) was greater than 30% (Figure 24) so in these areas, we consider habitat formed by oysters to be significant."
- "While not dense enough to be defined as 'significant' by MacDiarmid et al (2013), where abundance was moderate to abundant, we consider brachiopods to warrant protection from potentially adverse activity."

1. Please confirm do any of these species or habitats potentially meet criteria in NZCPS Policy 11 (Indigenous biological diversity (biodiversity))? If so, which one(s)?; and
2. Do any of these species or habitats potentially fall under Southland Coastal Plan Policy 5.4.1.2 (Protect the habitats of species in the coastal marine area which are important for commercial, recreational, traditional or cultural purposes)?; and
3. Do any of these species or habitats potentially fall under Southland Coastal Plan Policy 5.4.1.3 (To preserve the habitat of distinctive communities)?
4. Very little information is provided from outside the proposal area. Are you able to provide any indication of whether bushy bryozoan thickets and bryozoan-sponge reefs occur outside the proposal area and how common they are in the Southland region?

Page 65

The report states “While these taxa [bryozoans, sponges, tubeworms, large bivalves and brachiopods] are likely to tolerate (or possibly benefit from) low levels of deposition, if the level of deposition is high enough (such as may be seen in depositional hotspots) undesirable effects on growth, recruitment and abundance could occur.”

5. Please confirm what level of deposition would lead to the undesirable effects described?
6. What would adverse effects on each of these species/habitats look like and how could this be detected?

Page 65

The first and second part of the sentence “While the level of dispersed waste accumulating on the seabed outside of the farms is likely to be below ecologically detectable levels, effects may manifest where these communities occur in accumulation hot-spots; e.g. to the north-west of the proposal area” appear inconsistent.

7. Please confirm what does “below ecologically detectable levels” refer to if it does not include manifestation of effects on benthic communities?
8. How confident are you that the hot-spots are predicted accurately? Should monitoring just focus on the predicted hotspots or are there other areas that should be monitored for potential effects on sensitive taxa? (please note the separate request for a map showing an overlay of resuspension model results with mapped habitats that might assist in identifying potential monitoring sites).

Page 65

The report states “Monitoring of communities within this hot-spot is imperative”. It is understood that a monitoring plan is still being prepared and that challenges for monitoring the proposal area are described on page 70. However, additional information on the feasibility of monitoring effects on sensitive taxa is important for assessing whether they can be effectively monitored and thus managed within the recommended “effects-based management strategy”.

9. Please confirm how would adverse effects on bryozoans, sponges, tubeworms, large bivalves and brachiopods manifest?
10. What methods exist (and are practicable in the proposal area) to detect potential adverse effects on bryozoans, sponges, tubeworms, large bivalves and brachiopods?
11. Are effects reversible?
12. If there are gaps in our ability to monitor these communities, what are the implications on the statement that monitoring is imperative?

Page 68

The report summarises effects on biogenic habitats as "Effects on biogenic habitat including bushy bryozoan thickets and bryozoan-sponge reefs (and associated sensitive taxa) from deposition of organic material, and (to a lesser extent) potential contaminants. The placement of the proposed farms is such that these effects should be reduced to minor. However, it is important that monitoring includes these habitats to determine whether far-field effects are occurring, particularly in potential accumulation hot-spots".

13. Does the phrase "reduced to minor" refer to RMA terminology of significance of effects?
14. Please explain how this conclusion was derived considering several taxa were identified as ecologically significant and the executive summary states "hot-spots of redeposition may occur, and if the level of redeposition is high enough, communities containing sensitive and significant taxa may be smothered".

Page 69

The environmental implications of deposition effects on epibiota within the footprint (presumably the initial deposition area) are described as "Alteration to epifaunal communities and sensitive taxa. Effect will occur throughout deposition zone, but intensity will be higher in the middle. Effect reversible if farm removed; recovery on the scale of years depending on the level of effect" and outside this area as "Increased food availability for sessile filter feeders. Low-level enrichment may result in localised reductions in abundance, growth and recruitment, potential increased epiphyte growth resulting in competitive exclusion, and an increased abundance of grazing species. Localised effects, reversible within months to years following farm removal".

15. Please confirm does that mean that all potential effects on epibiota, including sensitive taxa, are considered reversible? This appears contradictory to the executive summary statement that "hot-spots of redeposition may occur, and if the level of redeposition is high enough, communities containing sensitive and significant taxa may be smothered".

Model sensitivity and assumptions

The report provides a good description of the modelling undertaken, the rationale for the model scenarios and the limitations of the modelling approach. However, some aspects of parameterisation, assumptions and model structure are not well described and there is uncertainty around the sensitivity of model results to these aspects. This creates difficulties in interpreting model results, particularly the uncertainty around quantitative predictions. To address these matters, the following information is required:

Page 51

The report states "Primary deposition is described as one-way flux; i.e. the rate of fall of material to the seabed. This approach is widely used (in current best practise and other available literature) to draw relationships between levels of deposition and enrichment levels (which in turn lead to ecological change; e.g. MPI 2019)." The MPI (2019) guidance applies to the Marlborough Sounds and it would be helpful to review how the approach is applied in other environments, particularly those more similar to the proposal area.

16. Please provide additional examples of current best practise that uses this approach, ideally from environments similar to the proposal area.

Page 51

The report states "The one-way flux (primary deposition) is an important consideration, as it provides for comparison with other salmon-farming operations in New Zealand". As described in the report, most other salmon-farming operations in New Zealand are in sheltered environments with different hydrodynamic regimes. For this reason, the ecological consequence of primary deposition in these environments is very different as less deposited material is resuspended after initial deposition.

Primary deposition in high energy environments is therefore a less realistic representation of actual deposition than in low energy environments. Comparing primary deposition in such different environment may provide information on the scale of the finfish farm operation; however, in regard to assessing ecological effects it could be argued that such comparisons are not meaningful. It is therefore not clear why such comparisons are considered important.

17. Please explain why it is considered important to compare primary deposition between the proposal area and existing salmon farm operations in New Zealand. Please comment on what specific aspects of such comparisons are considered helpful for assessing ecological effects and what the limitations of such comparisons are.

Page 51

Following the description of the resuspension model, the report states "a limitation of this approach is that it is not yet possible to relate the calculation of residual solids to an expected organic loading and potential ecological change".

18. Does this statement mean it is possible to relate the results of the primary deposition modelling presented as part of the seabed assessment to ecological change?

Page 52

The report states "The 'resuspension' component of the model (calculating the mass of residual solids) can be calculated with the resuspension component set to zero. This allows us to view the deposition in the units used in the resuspension calculations, but without particles having been moved after they first settled".

19. Is that the same as adding decay to the primary deposition model?

Page 53

The report states that particle decay was "assumed to be exponential with a half-life of 8 days, approximated from Keeley et al. 2019".

20. Please explain how this was calculated with reference to the data shown in Keeley et al. (2019).

21. What is the approximate uncertainty of the decay constant applied in the model and what is the sensitivity of the model results to this parameter?

Page 52 and others

22. Please confirm if the model scenarios presented (including resuspension and the scenario in which the resuspension component was set to zero) represent steady state conditions? If any scenarios don't represent steady-state conditions, how was the simulation length chosen and what impact does this have on model results?

Page 54

It appears that only selected model results are provided, and most results are only described in paragraphs, which makes it difficult to compare results for the different farms and stages.

23. Please provide a table showing all 6 modelled farms (all three farm types), maximum flux, distance to 1 kg m-2 y-1 (=extent of primary footprint), primary footprint area, extent of total footprint and total footprint area. Please provide this for all 6 development stages.

Page 60

24. Please confirm what farm development stage does the map of deposition represent?
25. Does this map represent a steady state? If not, what does the predicted maximum mean residual solid accumulation represent?
26. Could results be presented as g carbon?
27. Please provide a map of results of the resuspension modelling overlaying the habitat maps, similar to the maps in Figures 31 and 32. Please use the most realistic resuspension results and describe the extent to which the model results indicate deposition on biogenic habitats.

Page 61

The report states that "Large areas of the total footprint with resuspension include areas with residual solids of < 5 g m-2. At very low levels of deposition we would not expect significant ecological effects to manifest, however, in the absence of data from the site it is not yet possible to predict community change at low levels of deposition or to define thresholds."

28. Please confirm ss there an ecological reason for referring to values < 5 g m-2 or is it just an arbitrary threshold relative to the maximum modelled deposition?

Page 64

The report states that "Due to the non-cohesive nature of the coarse sediments and significant resuspension likely at the proposal area, the accumulation of organic material within the sediments under and near the pens is expected to be significantly less than that predicted using the depositional model without resuspension (e.g. modelling with resuspension demonstrates the level of solids accumulating on the seabed to be 10 times less)".

It appears inconsistent that, on the one hand, the report describes the importance of resuspension at the site but, on the other hand, places such strong focus on the initial dispersal model results to then conclude that results are 'significantly' overestimated. It seems that it would have been more meaningful if the 'most likely' model results were presented with estimates of uncertainty, considering the effort undertaken to simulate resuspension.

29. Please confirm why are the initial dispersal modelling presented as the primary results in the report rather than a scenario representing 'most likely' results?

Page 64

The paragraph quoted above continues with "However, it is important to note that even at dispersive sites where organic deposition is reduced, changes to macrofaunal communities are possible (Keeley et al. 2012). These changes may include increases in abundance and diversity. Changes are particularly likely to occur at the proposal area because background organic content is low so even a small increased organic load is likely to cause some changes to local macrofaunal communities (Hyland et al. 2005)."

It could be argued that this section supports the importance of focussing on the spatial extent of deposition over the intensity of deposition (i.e. model results including resuspension rather than the initial dispersal scenario) because both of the points made regarding organic loading to low background organic content apply to near and far field effects. In addition to the effects on organic matter processing in soft sediments, the spatial extent of deposition is also important for assessing potential effects on biogenic habitats identified in and near the proposal area.

30. Based on all modelling conducted, please confirm which model results are considered the most realistic scenario regarding the spatial extent of farm waste deposition?

Page 64 and page 60

On page 64 the report states "While levels of residual solids predicted using the resuspension-capable model are generally low, a few potential hot-spots were identified. These included a deeper pocket on the north- western boundary of the proposal area as well as areas along the coastline where between 10 to 15 g solids m could accumulate at a given time. Monitoring of these potential hot spots should be undertaken to ensure adverse effects do not manifest".

However, the caption of Figure 33 states "Note that hotspots of solids accumulation in inshore coastal areas are almost certainly an artefact of the model".

31. Please clarify whether the hotspots shown in Figure 33 are potential actual hotspots or more likely model artefacts. If they are potential hotspots, please provide a version of Figure 33 that makes it easier to identify them as they are very hard to see in Figure 33.

Page 91

The report states "Sinking velocities of 0.032 m s and 0.095 m s were used for faeces and feed pellets, respectively (Cromey et al. 2002)". The faeces sinking velocities used here are slightly lower than those measured by Chen et al. (2003) for Atlantic salmon, who found that settling velocities for salmon faeces ranged from 3.7 to 9.2 cm/s but found no statistically significant difference in sinking velocity of fish fed different diets. Cromey et al. (2002) state "Settling characteristics of fish feed and faeces required as model input data are likely to change depending on fish size, feed composition and physical properties of the seawater". Considering the amount of research that has gone into the optimisation of farmed fish feed (to minimise environmental impact and reduce the use of wild fish), it is conceivable that sinking velocities have changed since the early 2000s.

32. Please confirm does any NZ information exist to illustrate if the velocities used are relevant?
33. Are there any differences in species physiology or feed composition/structure between aquaculture operations in New Zealand and those overseas from which published sinking velocities have been obtained?
34. What changes to sinking velocities (if any) would be expected from the research into optimising finfish feed for aquaculture operations.
35. What impacts could any of these factors (1. to 3.) have on the modelled farm footprints?

Page 92

Table A6.1 shows the input values used for depositional modelling, which were taken from Cromey et al. (2002).

36. Please confirm how do these values compare to the feed composition and fish characteristics of the proposal?

A NZKS operations report (year unknown) states "New Zealand King Salmon has carried out initial experiments to measure feed loss at two of its farms using existing feeding equipment. The trials were conducted at Te Pangu, a high flow site where the Akva camera feeding equipment is used, and Ruakaka, a lower flow site where the spinners are employed. Te Pangu: At the end of the month long trial, the percentage waste was calculated as a proportion of the total amount fed, and was found to be far less than 0.1%. Ruakaka: no waste (nets fouled)". Compared to these data the 3% (food wasted as percent of food fed) used in the model appears high.

37. Please confirm what is the anticipated food waste percentage of the proposal? How does it compare to the parameter used in the model? If it is different, what are the implications for model the results presented?

Page 92

Critical velocity thresholds from Law (2019) were used instead of the value from Cromey et al. (2002) but it is not clear why those values were chosen. As there is an order of magnitude difference, it would be helpful to understand the rationale for this selection.

38. Please confirm why were the critical velocity thresholds from Law (2019) considered more appropriate for this modelling study than the value from Cromey et al. (2002)?

Law et al. (2016) demonstrated that the amount of salmon waste material eroded differs depending on substrate ("On average >97% of salmon waste material added to the mud substrate was eroded, while <25% of the material added to the cobble substrate was removed (Fig. 2). The substrates composed of sand averaged ~65% removal from the bed (Fig. 2)").

39. Please clarify was the substrate in the proposal area considered in the parameterisation of the resuspension model?

Mitigation and management of seabed effects

Page 71 and iii

The report recommends that site fallowing and rotation are incorporated in an adaptive management approach (e.g. "Adaptive management actions to limit the effect of seabed deposition during active farming operations could include site fallowing and rotation, and reduction of planned farming intensity", p.iii).

40. Please clarify if fallowing and rotation are recommended to take place within the footprint of the currently proposed farm blocks, i.e. the blocks shown in Figure 2 of the Seabed assessment report, or whether implementing this recommendation would require using (parts of) the remaining space within the proposal area.

Reference to guidance for salmon farming in the Marlborough Sounds

Page i, page 51

Depositional model results are interpreted with reference to guidance for salmon farming in the Marlborough Sounds (e.g. "Depositional modelling (without resuspension) indicated that 'very high' enrichment (defined in Marlborough Sounds guidance as > 13 kg m yr) would not occur even at full development" and "Enrichment stages have been developed for the Marlborough Sounds on the basis of one-way flux, and interpretation of the Stewart Island / Rakiura proposal on this basis is of value")

These guidelines were developed specifically for the environmental conditions (including hydrodynamics and seabed characteristics) of the inner Marlborough Sounds.

41. Please provide some commentary on how applicable these guidelines likely are for the proposal area. Please explain what aspects may not be applicable or require some level of validation or assessment before application to the proposal area can be considered.

Page 54

The area affected by deposition in the six scenarios is described by reference to the corresponding category of enrichment (low, moderate, high, very high) approximated from Keeley et al. (2013) and MPI (2019) for high-flow (dispersive) sites.

In Keeley et al (2013) it was stated that "This retrospective validation allows a more realistic estimation of the depositional flux required, suggesting that approximately twice the flux was needed to induce an effect level at the dispersive sites equivalent to that at the non-dispersive sites. Moderate enrichment was associated with a flux of ~0.4 and ~1 kg m2 yr-1, whilst highly enriched conditions occurred in response to 6 and 13 kg m2 yr-1, for low and dispersive sites, respectively". I presume that this difference was mainly caused by the increased resuspension at the dispersive sites.

Another aspect critical for assessing the ecological response of benthic environments to organic deposition (and thus influencing the definition of meaningful categories of enrichment) is the assimilative capacity of the seabed. Sites in areas with lower natural organic matter deposition (including offshore marine farm sites) may have a lower capacity for organic enrichment (Holmer 2010). If the proposal area represents such a site, the thresholds shown in Table 6 may underestimate the intensity of effects.

The purpose of this information request is to obtain a better understanding of the applicability of Keeley et al. (2013) and MPI (2019) to the proposal area. It is acknowledged that the report comments on differences between the habitats in footnote 10 of page 54 but it does not provide the information necessary for contextualising the presented results.

42. Please confirm how comparable is the proposed site to the dispersive sites in Keeley et al (2013) regarding its likely ability to assimilate organic farm waste?

43. How would differences in assimilative capacity or uncertainty around this seabed property influence the results shown in Table 6?

General information requests

Page 39

Information is provided from a report that is not publicly available (Bennet et al., 2018). It is not clear from the Seabed assessment report what data were used to inform the index of suitable location and how exactly site suitability was calculated.

44. Please provide a copy of:

    Bennett H, Smeaton M, Jary M, Taylor D 2018. Aquaculture site scoping: northern Stewart Island Stage 1b. Prepared for Ministry for Primary Industries. Cawthron Report No. 3221. 48 p. plus appendices

Page 49

45. Please provide a full reference for Papageorgiou et al. (2009) (missing from reference list).

Page 52

46. Please provide a copy of Smeaton et al. (in prep.)

Page 72 and 73

The key findings refer to primary depositional footprint, total footprint and main footprint without providing a clear overview of what exactly these terms refer to. This makes it difficult to understand the findings.

47. Please simplify and clarify the references to 'footprint' in the key findings. This could be supported by adding a table explaining terms with specific meaning used in the report.

Page 91

48. Please provide a copy of Smeaton & Vennell (2019)

Appendix P

49. Please conform what model scenario and development stage does this table refer to?
50. What do the numbers in the top row relate to?

D. OYSTER ASSESSMENT.

Page 14 and others

The description of survey results throughout the report (including mapped densities) focusses strongly on recruit-sized oysters.

1. Why do the results focus strongly on recruit-sized oysters?

Page 15 and others

The axis labels in Figure 2-3 are not visible because of the poor quality of the report. The same applies to several other figures.

2. Please provide a version of the report in which all figures are legible.

Page 17

Figure 2-6 shows two measures of oyster density. It is not clear what exactly these two measures represent.

3. It appears that both measures represent oyster densities between 1992 and 2018 but it is not clear how these two measures relate to each other. Please explain this in more detail.
4. What does the size of circles represent?
5. What is the unit of kernel density?

Page 18 and others

Reference is made to distributions of percentage annual catch shown in Figures 2-2 to 2-13. These figures should be 2-7 to 2-19.

6. Please correct figure references throughout the report.

Page 34

The report cites a draft Biosecurity Management Plan as Johnston and Forrest, (2019).

7. Is Johnston and Forrest (2019) the draft Biosecurity Management Plan provided with the application (i.e. Appendix M of the application)?

Page 38

The report describes that the most important risk to the oyster fishery relates to biosecurity, that Foveaux Strait is a challenging setting for aquaculture and that the removal of biofouling from farm strucures has proven to be difficult internationally. The report does not provide a rating of the predicted effect intensity or a statement regarding the acceptability of effects. Instead, the report states that "The NTS Biosecurity Management Plan provides strategies that can substantially minimise biofouling including by oysters. The effectiveness of the BMP will be dependent on compliance and regular monitoring".

8. Please confirm what is the predicted severity/intensity of effects if the draft BMP (version provided as Appendix M with the application) is fully complied with?
9. Are the residual effects ecologically acceptable?
10. What mitigation measures in the draft BMP are specifically important for mitigating effects on oysters?

Page 47

Table A-3 describes oyster size.

11. How do these size categories relate to oyster age (approximately)?

E. MARINE MAMMALS ASSESSMENT.

Page 5

Table 1 lists species referred to as "more prevalent and commonly reported […] within the AOI" and these species are referred to in the table caption as "the marine mammal species most relevant to the proposal and known to frequent the Area of Interest" and on page 8 as "The more common species occurring within the AOI, and those therefore most likely to be affected by the proposed project".

On page i the report states "While the overall likelihoods of these effects are considered low, the consequences of a rare event such as the death of an endangered species warrants appropriate mitigation actions". This implies that selecting species based on “prevalence” and “commonness” may not be appropriate.

This selection process narrowed the ~28+ species described on page 4 down to 14 species listed in Table 1.

1. Please confirm what are the potential effects of the proposal on species not listed in Table 1? Do any of these species have a low likelihood of occurrence but potentially severe consequence of interactions with the farm?

Page 24, 26

The report concludes that “the likelihood of any potential adverse impacts from aquaculture activities affecting local and visiting marine mammals is assessed as low”. However, this statement is followed by “However, given that some of the possible consequences of rare events (i.e. entanglement) could have severe regional and / or population level effects (i.e. injury or death of an endangered or threatened animal), mitigation is warranted and several recommended actions are listed in Table 3 to help reduce these risks to as close to zero as possible”. This does create some uncertainty on the status of the proposed BMPs in Table 3.

2. Are any of the BMPs in Table 3 legislative requirements?
3. Please clarify was adherence to are any of the BMPs in Table 3 used as an assumption in the effects assessment? In other words, if consent is granted and none of the BMPs in Table 3 are implemented, would this change the conclusion that the likelihood of any potential adverse impacts from aquaculture activities affecting local and visiting marine mammals is assessed as low”?

F. SEABIRD ASSESSMENT.

Page 1

The report used data from the Ornithological Society of New Zealand’s (OSNZ) atlas to inform the desktop investigation. It acknowledges that no data were available from this source for a large part of the proposal area.

1. Please confirm have other data sources been explored for potential seabird data in the part of the proposal area not covered by the OSNZ squares? For example, seabird records made by fisheries observers[1] might be available for this area.

Page 2

Section 2.3 lists information used to support the assessment.

[1] e.g. https://seabird-counts.dragonfly.co.nz/

2. Has information contained in the Environment Southland Coastal Plan (specifically 3.14.3 and Appendix 5 ASCVs) been incorporated in the assessment?

Page 2

Reference is made to Appendix 1 for relevant literature and databases but Appendix 1 shows photos.

3. Please correct this reference and ensure that all information is provided.

Page 3 and 4

Little information is provided about how Tables 1, 2 and 3 were populated. Particularly, the assignment of 'value ratings' [very high, high, …]) to protection status, the assignment of 'magnitude rating' to magnitude description and the population of Table 3 are not supported by a description of an ecologically-relevant rationale.

The EIANZ guidelines require such descriptions, e.g.:

- Magnitude of effect is a measure of the extent or scale of the impact and the degree of change that it will cause. A typical scale of magnitude ranges from very high/severe to negligible. The scale should be explained for each assessment context (p.75);
- Level of effect is determined by the magnitude of effect and the value of the affected biodiversity or ecological component. A typical scale ranges from very high to negligible, depending on the magnitude and nature of the effect and the importance of the affected ecological feature. The scale should be explained for each assessment context. Positive effects should also be assessed (p.75); and
- Whatever scale and categories are used should be explained and documented in the EcIA report (p.69).

4. Please describe how Tables 1, 2 and 3 were populated and specifically how ratings and threshold between ratings were identified (also see specific information request related to Tables 2 and 3 below).

Page 4

Table 2 describes the magnitude of effect in phrases such as "Total loss of, or very major alteration, to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether". Terms used in these descriptions are not well defined (e.g. 'key elements', 'post development character') and it is not clear how these descriptors relate to seabirds and the potential effects of the proposed finfish farm on seabirds.

As Table 2 is a critical step in the assessment, it is not clear how the level of effect derived from the application of the EIANZ guidelines relates to the interaction of seabirds with the proposed farm and the specific features of the proposal.

5. Please explain the content of Table 2 in the context of the proposed finfish farm and the potential effects on seabirds.

Page 4

It is not clear how the approach taken aligns with NZCPS Policy 11 or Southland Coastal Plan policies, specifically regarding the requirement to identify species that require different protection status.

6. Please clarify how does the approach taken consider ecological or conservation values where no level of adverse effect is considered appropriate, i.e. threatened species at the brink of extinction?

7. Does the approach taken align with NZCPS Policy 11? If so, how does it assist in identifying seabird species or their habitats requiring the varying levels of protection?

8. Do any of the species or their habitats potentially fall under Southland Coastal Plan Policy 5.4.1.2 (Protect the habitats of species in the coastal marine area which are important for commercial, recreational, traditional or cultural purposes)?

9. Do any of the species or their habitats potentially fall under Southland Coastal Plan Policy 5.4.1.3 (To preserve the habitat of distinctive communities)?

Page 5

A total of 28 marine avifauna species have been recorded from either the OSNZ atlas data or the site visit and one additional species was added from other sources.

10. Please clarify how confident are you that no species were missed, particularly species potentially using the proposal area not covered by the OSNZ atlas (and considering that the Fiordland crested penguin not included in the OSNZ atlas data)?

Page 20 and 21

It is not clear how key species were identified, i.e. how the contributing factors were applied. Several species were described as surface feeders but not identified as key species. Surface feeders can still become entangled. Considering that effects of the proposal are only assessed for key species, this is a critical step of the assessment.

11. Please provide a description of how the contributing factors were applied to identify species not described as key species for this assessment.

Page 28, 35, 37

The assessment of potential effects from entanglement and effects on sooty shearwater were made after consideration of a range of mitigation measures (bullet points in section 6.1.3 and 6.8.1). This is further confirmed in section 7, where measures are listed that "will be incorporated into the proposed salmon farming project design".

12. Please confirm how will these measures be documented to ensure they are implemented (e.g. in a seabird management plan)?

The measures include the trial of a predator net spanning the perimeter of the cage, creating a separating distance to the containment net which hold the fish.

13. How can a planned trial contribute to a low/very low rating of potential effects?
14. What are the implications on the assessment of effects if the trial fails?

Page 28

The assessment concludes that the potential risk of entanglement is considered to be at a local scale but it is not clear how the scale of potential effects was assessed.

15. Please explain how the scale of effects was assessed.

Page 28 and others

The section 'key species' lists species as being included in this category. This applies to several effects assessments.

16. Are the species listed all key species or just a subset of key species affected by the potential effect?

Page 29, 35 and others

Summary tables are presented of the application of the various matrices of the assessment method on a subset of species. No explanation is provided how ratings were applied to specific species and why the magnitude of effect differs among species (page 35). The terminology used creates further difficulty matching information in the descriptions with tables. For example, on page 28 a conclusion is presented on the "potential risk of entanglement", rather than in relation to effects and on page 29 effects are described as "insignificant" rather than using the descriptors of the magnitude of effect (it is also unclear whether 'insignificant' is meant in an ecological, statistical or RMA sense).

17. Please provide better alignment between the information provided in the descriptive parts of the assessment and the tables used to summarise effects.

Page 33

The report refers to a waste management plan that will be prepared.

18. Please clarify were effects assessed based on the assumptions that a waste management plan is in place?
19. Are there any specific practices that have been assumed to be in place for the effects assessment?
20. Are there any best management practices relating to litter that are suggested for the proposed activity?

Page 35

A separate assessment for sooty shearwater is provided after the assessment summary, which included sooty shearwater.

21. Please clarify why is the assessment for sooty shearwater provided separately? Does this contain information that needs to be considered in addition to the summary provided in Table 7?

G. SHARK ASSESSMENT.

Page 5

The report focusses on two sharks species that are described as the species most likely to interact with a farm in the proposed location (great white shark (*Carcharodon carcharias*) and the broadnose sevengill shark (*Notorynchus cepedianus*)). Other shark species occurring in the area are not considered because they are "too small (school shark) or too uncommon in the area (mako and blue sharks) to be a problem" or are "not known to interact significantly with fish farms elsewhere". No information about sharks other than the great white and broadnose sevengill sharks is provided to support these statements.

1. Please provide information about shark species in the proposal area (and Foveaux Strait) to support the decision not to assess them because they are uncommon in the area.

Excluding shark species from the assessment because their interactions with finfish farms at other locations is considered "not significant" is problematic, especially since we have no experience with offshore finfish farms in New Zealand.

2. Please provide more information about shark species excluded from the assessment because their interactions with finfish farms at other locations is considered not significant and consider including them in the assessment.

Page 11

It is acknowledged that little information exists on the interaction of sharks with finfish farms and that it is therefore difficult to draw specific conclusions on the predicted effects from the proposal. Under such uncertain conditions, it is important to ensure an effective approach is taken for identifying and managing potential effects on sharks. The report provides recommendations for reducing or mitigating interactions between sharks and the proposed farm, but it is not clear whether any of the recommendations are considered necessary to effectively manage the risk of adverse effects on sharks or whether they are considered discretionary.

3. Please confirm are any of the recommended avoidance and mitigation measures considered necessary to reduce risk (esp. to white sharks) to an 'acceptable' level? If so, which ones?
4. What would the consequence be of not implementing any or all of the recommendations?
5. Are any of the recommendations necessary to ensure compliance with NZCPS Policy 11 relating to potential effects on white sharks?

H. NAVIGATION RISK ASSESSMENT.

Page 8 – The proposed location

The "navigation boundary" shown in red on figure 4-1, and the boundary of the area of preferential occupation for the farm do not align along the north eastern side of the farm. Furthermore, in section 5.9 of the report, the north eastern extent of the farm falls outside the boundary of the proposed navigation aids as shown in figure 5-6. On the assumption that this north eastern corner forms part of the area of preferential occupation within which farms could in theory be located in the future (through rotation/fallowing), it is unclear how navigation risks in this area will be managed.

1. Please describe how navigation risks will be managed in the event that farms in the north eastern corner of the area of preferential occupation are located outside of the boundary of the proposed navigation aids.

I. DISEASE RISK ASSESSMENT.

The report provides a clear conclusion on the risks assessed without mitigation ("unrestricted risk") and provides recommendations to reduce the risks associated with the proposed development to acceptable levels.

The report does not refer specifically to the draft Biosecurity Management Plan (BMP) and it is not clear whether the proposed BMP incorporates the recommendations considered necessary to reduce disease risk to acceptable levels.

1. Does the draft BMP provided as Appendix M of the Application incorporate all recommendations made in the disease assessment considered necessary to reduce disease risk to acceptable levels?

J. BIOSECURITY ASSESSMENT.

Biosecurity assessment page 20, and BMP page 18

The report explains that at present there is a biosecurity risk to the proposed farm site from domestic vessels (and to a lesser extent, international vessels) using the nearby anchorage areas and that the resource consent application includes a proposal that the Murray River anchorage be moved away from the farm site. The report further states that "If this proposal is accepted, much of the risk from movement of vessels unrelated to the farm will be removed". Related to this, the BMP requires that "no anchoring of vessel within 1.5 km of farm site".

Even if the Murray River anchorage did not remain a designated anchorage, it is our understanding vessels could still choose to anchor in that location inshore of the farm boundary, or in other locations around the perimeter of the farm. Related to this, while the BMP requires no anchoring of vessels within 1.5km of the farm site, the mechanism to achieve and enforce this in practice is uncertain. The resulting biosecurity implications are therefore unclear.

1. Please confirm what mechanism is proposed to ensure vessels do not anchor within 1.5km of the farm.

2. If vessels were able to anchor within 1.5km of the farm, how would any associated biosecurity risk be managed to acceptable levels?

Biosecurity assessment page 22

The report states "As an alternative to the clean hull thresholds described in the BMP, the vessel operator 'may commission a hull inspection and risk assessment by a suitably qualified expert'. The vessel will be considered to meet the clean hull requirements 'if the assessment demonstrates that the level of risk is equivalent or less than that posed by the clean hull thresholds'. How this might be achieved or quantified is not specified in the BMP but presumably relates to application of the thresholds in Annex 5".

3. Please explain what this 'risk assessment' would entail and how the level of risk would be assessed.

Biosecurity assessment page 23

The report states: "Nets and cages will be kept free of biofouling by continuous cleaning in situ. Cleaning will be done as often as required to maintain water quality in the pens. The specific frequency will be determined according to the range of biofouling development on the nets".

4. Please confirm what biofouling development on the nets will be considered the threshold requiring cleaning and how will this be assessed? Considering the objective is to keep nets and cages "free" from biofouling, this implies that cleaning will take place at very low developments.

Biosecurity assessment page 24

The report states "Surveillance to ensure early detection of known pest species, and implementation of effective response measures, are also recommended". The draft BMP describes planned passive on farm surveillance (page BMP 18).

5. Does the surveillance described in the BMP implement the recommendation made in the biosecurity assessment?

Biosecurity assessment page 24

"Anchors, chains and anchor blocks will be located in areas of seabed with maximum water movement so that scouring by sand carried by water movement will minimise the amount of fouling on these structures". The draft BMP describes passive surveillance, but it is not clear whether there will be a regular systematic surveillance of the full farm structures.

6. Please confirm whether there be a regular systematic surveillance of the farm structures (including underwater components, such as nets and anchor chains)? If yes, how will this be conducted and recorded? If not, what biosecurity risks would this pose?

Biosecurity assessment page 25

The report states "Based on current information on the design and operation of the proposed farm, and on proposed mitigation measures, the biosecurity risk associated with the proposed farm is considered minor if best-practice mitigation measures are implemented".

7. Does the draft BMP provided as Appendix M of the Application reflect "best-practice mitigation measures" as referred to in the report?

BMP page 4

"The BMP takes account of the best practices and principles for effective biosecurity outlined in MPI's Aquaculture Biosecurity Handbook and related technical documentation".

8. Does the BMP adopt the practices and principles that are relevant and appropriate for the proposed finfish farm operation?

BMP page 4

The BMP states "There may, however, be a need to amend the BMP as the stage of development and operational plans change". The BMP may also require amendments if new pathogens or marine pests are identified that require specific management.

9. Is it also envisaged that the BMP will be changed in the event that new pathogens or marine pests are identified that require specific management?

BMP page 4

The BMP states "the BMP will be reviewed annually or when significant changes in farming operations take place"

10. Would NTS be open to involving ES in the review process to ensure regional consistency in biosecurity management?

BMP page 7

The draft BMP states that "The following specific risks, albeit rated at low risk, were identified during the risk assessment process for consent application. While the risks were identified, specific risk mitigation measures were not identified" (referring to the disease assessment and oyster assessment).

This statement is inaccurate. Two risks were rated 'moderate' in the disease assessment (see Table 5 of the disease assessment below) and specific mitigation measures were described (disease assessment sections listed below) to reduce the risks associated with the proposed development to acceptable levels:

- 6.1 Infection of salmon with Piscirickettsia-like bacteria
- 6.2 Infection of Bluff oysters with Bonamia exitiosa
- 6.3 Infection of Bluff oysters with Bonamia ostreae

- 6.4 Infection of Bluff oysters with Bucephalus longicornutus
- 6.5 Infection of Bluff oysters with mudworms

Table 5. List of the diseases of concern that will require risk management.

Disease	Under official control	Occurs in cultured salmon	Occurs in wild Bluff oysters	Risk estimation
SALMON				
BACTERIA				
Piscirickettsia-like bacteria (NZ-RLO)	Yes	Yes	No*	Low risk
BLUFF OYSTERS				
PROTOZOA				
Bonamia exitiosa	Yes	No	Yes	Moderate Risk
Bonamia ostreae	Yes	No	Yes	Moderate Risk
METAZOA				
Bucephalus longicornutus	No	No	Yes**	Low Risk
Mudworms (*Polydora* sp., *Boccardia* sp.)	No	No	Yes***	Low Risk

It is not clear to what extent the draft BMP incorporates the findings of the disease assessment.

11. Please confirm does the draft BMP incorporate the findings and recommendations of the disease assessment? If not, which aspects of the disease assessment have not been incorporated?

BMP page 12

The draft BMP states that dissolved oxygen and water temperature will be measured at least daily and stipulates "nominal water quality specifications". However, it is not clear what process is proposed in the event that these specifications are not met.

12. Please confirm what process is proposed in the event that dissolved oxygen and water temperatures are not within the stipulated specifications?

BMP page 18

The description of passive surveillance does not specify what parts of the farm structure are surveyed in this way.

13. Please clarify what parts of the proposed farm structure are included in passive surveillance; e.g. does this include underwater components?
14. How will passive surveillance be conducted and recorded?
15. What other surveillance will be conducted?

BMP pages 20 to 25

The draft BMP provides a section titled "consideration of specific disease risks identified in the risk assessments". It is not clear whether this section adds information to the disease and oyster assessment or whether it potentially creates inconsistencies to the assessment provided with the Application.

16. Please clarify how the section titled "consideration of specific disease risks identified in the risk assessments" relates to the disease and oyster assessments and whether it is consistent with those assessments.

BMP page 25

The BMP states "To manage any risk from NZLRO, and other pathogenic organisms, each farming site within the farm zone will hold a single year class of fish".

However, the disease assessment states "Finally, the proposal represents an "all in one area" approach to salmon farming, which would not allow spatial separation of different year classes of fish into independent farm management areas separated by buffer zones, nor would it allow for effective site fallowing" (p.7).

It therefore appears that, based on the information provided in the disease assessment, the risk management via year class separation envisaged in the BMP won't be effective.

17. Please provide more information about how holding a single year class of fish at each farming site will manage risk of pathogens, particularly considering the statement made in the disease assessment.

BMP page 25

The BMP states "As the farming zone is developed and better understanding of the benthos and potential locations for farm sites emerges in greater detail, the BMP will re-visit the arrangement of sites […] and site separation standards.

18. Will the potential changes to site arrangement and separation standards include consideration of farms in the eastern part of the proposed area that has not yet been included in modelling studies conducted to assess effects on the water column and the seabed?

BMP Annex 2 (page 28)

19. What information source are the concentrations and alert and action levels presented in Annex 2 based on?

BMP Annex 3 (page 29)

20. What information source are the decontamination standards presented in Annex 3 based on?

BMP Annex 4 (page 30)

21. Please provide the full reference of DAFF 2008 shown in the table caption.

BMP Annex 4 (page 36)

The note following the table states "Levels recommended in this table come from a number of sources and have been provided here as a general guide […] concentrations and contact times given should be viewed as minimum acceptable levels for decontamination purposes". The table caption refers to DAFF (2008), implying this is the source document for the information provided.

22. Please clarify if the information in this table is sourced from DAFF (2008) or multiple sources. If it is based on multiple sources, is it possible to provide these sources or provide some information that supports the methods and doses listed are effective?
23. Please clarify whether the levels in the table are "a general guide" or "minimum acceptable levels".

BMP Annex 4 (page 37 to 39)

24. What information source are the tables ("Efficacy of types of disinfectants against viruses, fungi and spore forming protozoa" and "Example fish viruses and categories for disinfection") presented in Annex 4 based on?

BMP Annex 5 (page 40)

The biofouling thresholds for vessels in this table almost match those of the Craft Risk Management Standard 2018, except for an omission at the third bullet point of the 'main hull' section. In the Standard, this bullet point states: "isolated individuals or small clusters that have no algal overgrowth". In the BMP the underlined part is missing.

25. Please clarify if this difference is intentional or an oversight.

K. WILD FISH ASSESSMENT.

The wild fish assessment does not provide any information on the fish species inhabiting the proposal area and Foveaux Strait that might be affected by the proposed finfish farm. Consequently, no information has been provided on preferred or critical fish habitats in the area. Without information on wild fish species and their specific habitats, it is not possible to assess the effects predicted from the proposal. While section 10.4 provides information on potential effects, further information is required on the existing environment and the predicted effects of the proposal.

1. Please provide information on the fish species found in the proposal area and Foveaux Strait that might be affected by the proposal.
2. Please provide information on habitats utilised by wild fish in the proposal area and nearby Foveaux Strait, with particular focus on identifying important fish habitats (e.g. spawning areas) and the use and importance of the biogenic habitats found in the proposal area for wild fish.
3. Based on the information above (1 and 2), please provide an assessment of the predicted effects of the proposal on wild fish species.

I require this information in order to enable a better understanding of the proposal and the likely environmental effects, and how they will be avoided, remedied, or mitigated.

By 28 February 2020[2], please either provide the information, or tell me, in writing that you agree to provide the information or that you refuse to provide the information.

If you refuse to provide the information requested, or if you do not respond to this request, Environment Southland is required to publicly notify your application, or alternatively it could be declined because there is inadequate information to make any other decisions on the application.

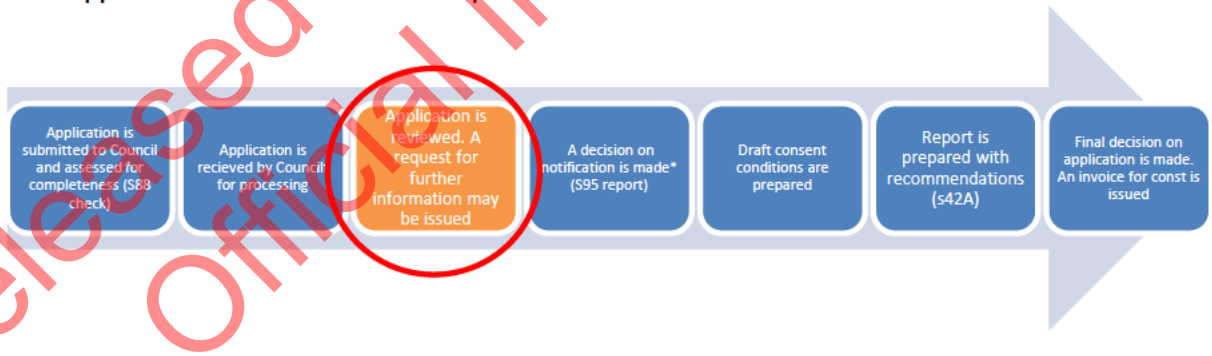
The responses to some information requests may require changes across multiple technical reports and the AEE. For example, changes to the marine science technical reports may also need to be reflected in the landscape and natural character assessment. Recognising this, please note that it would be our preference that a full revised set of AEE and technical documents be provided.

Please contact me if you have any questions regarding this request, and the information required to be provided.

Yours sincerely

Maurice Dale
Consultant Planner

Your application is here in the consent process:



*If your application is assessed as needing to be limited or publically notified, you will be contacted regarding the process for these pathways.

[2] Under Section 92A of the RMA you have until 15 working days from the date of this request to respond.