

Appendix CC Proposed resource consent conditions



Details of Permit

Purpose for which permit is granted:	Marine farming of King Salmon (<i>Oncorhynchus tshawytscha</i>) at a site located off the northern coast of Rakiura/Stewart Island, including: (a) All associated structures, activities in the coastal marine area, occupation of the common marine and coastal area, disturbance of damage to and deposition on the seabed, and any other ancillary activities (b) All associated discharges to water (c) The associated use of coastal water for marine farming.	
Location:	- site locality	Coastal marine area from between 2 and 6 kilometres offshore from mean high water springs along the northern coastline of Rakiura/Stewart Island, as shown on Plan A in Appendix B.
	- receiving environment	Coastal marine area
Expiry date:	25 years from the commencement of the consent	

SCHEDULE OF CONDITIONS

Interpretation

Wherever used in the conditions **SQEP** means a suitably qualified and experienced professional.

General conditions

1. The activities authorised by this consent must be undertaken in general accordance with the application lodged with the Environmental Protection Authority on **date (reference XX)** and the documents identified in Appendix A of this consent, except where modified by the conditions of this consent.
2. Where these resource consent conditions require a document (such as a report, Management Plan or amendment or review of a Management Plan) to be 'certified' the following process shall be followed:
 - a. The consent holder shall give the consent authority at least 20 working days' notice that certification is going to be requested, to allow the consent authority to organise any technical experts it may require;
 - b. The document shall be provided to Manager Resource Management, Environment Southland for certification that it:
 - i. sets out actions and procedures that will achieve the objectives of the document;
 - ii. contains the information required to be included in the document by consent conditions.
 - c. Environment Southland may take such advice from suitably qualified persons as it considers necessary to satisfy itself that the document submitted for certification achieves the requirement of the relevant condition(s);
 - d. Should the document, in the opinion of the consent authority, achieve the criteria identified in the applicable consent conditions, the consent authority shall notify the consent holder accordingly and the consent holder may commence activities consistent with the document on receipt of written confirmation (certification) from Manager, Resource Management, Environment Southland;
 - e. If the consent holder receives written notice from the consent authority that certification of a document will not be provided, the consent holder may re-submit the document following

- review of the consent authority's reasons, and with any necessary amendments, and request certification again;
- f. Minor and technical amendments to each certified document (such as updating relevant contact details, hyperlinks or references to external content) may be made without certification by Manager Resource Management, Environment Southland. A version of the document with minor and technical amendments must be provided to the Manager Resource Management, Environment Southland within one month of the amendment.
3. The Consent Holder must implement the certified documents required by the conditions of this consent and all works and activities authorised by this consent must be carried out in accordance with the certified documents required by the conditions of this consent.
 4. If there are inconsistencies between the conditions of this consent and the documents identified in Appendix A of this consent, the conditions of this consent shall prevail.
 5. The Consent Holder must pay any monitoring charge or charges to recover the actual and reasonable costs incurred by the Consent Authority, including charges incurred through the use of technical experts/specialists engaged by the Consent Authority for the purposes of monitoring conditions of this consent (such as reviews of the required Management Plans) to ensure compliance with the conditions of this consent.

Lapse date

6. This consent shall lapse five years from the date of commencement. The consent shall not lapse if baseline monitoring required by Condition 72 has commenced.

Occupation

7. Exclusive occupation of the common marine and coastal area (to the exclusion of the public and other users of the coastal marine area) shall be limited to the area of the marine farm structures, including mooring lines and anchors, not exceeding more than 200 metres around the structures (measured outwards from the compensation buoys on the mooring grid and from the sides of the feed barges) or extending beyond the area shown on Plan A attached to and forming part of these conditions.
8. Exclusive occupation must not exceed an area of 460 hectares across all the marine farms authorised by this consent and exclusive occupation areas around farms blocks relocated in accordance with conditions 10 and 83 may be substituted for those shown on Plan A.
9. This consent provides for preferential occupation of the consented area shown on Plan A attached to and forming part of these conditions, with the exception of the area identified in Condition 7. Except to the extent that it is necessary for public safety or to achieve the purpose of this consent, members of the public must not be excluded from the area of preferential occupation.

Structures

10. Marine farm structures first installed at the consented site must be located generally as shown on Plan A attached to and forming part of this consent or within 250 metres of the positions shown on that plan. If any farms are relocated in accordance with Condition 83 they must be located generally in the alternative farm locations shown on Plan A or within 500 metres of any initial farm positions shown on Plan A.
11. At least 20 working days prior to the first installation of marine farming structures at the site, the Consent Holder must provide to the Consent Authority a peer reviewed Engineering Design Report prepared by a SQEP that includes the following information:
 - a. The consented site's estimated extreme environmental conditions associated with a minimum 1-in-50-year return period (peak current speed, significant wave height, and wind speed) and reasonably predictable natural hazards within which the sea pens and feed barges fixings and moorings have been designed to function securely;
 - b. Design drawings for the mooring systems, anchors and anchor blocks required for securing the sea pens and feed barges at the site;

- c. An analysis demonstrating that the specified anchors, anchor blocks, moorings (i.e. ropes and chains), connecting hardware (e.g. plates and shackles) and containment systems are designed to function within the design limits specified for the site's estimated extreme environmental conditions; and
- d. Specifications and design of the sea pens (floating collars and fish enclosures) to be utilised and an analysis demonstrating that they are designed to function within the site's estimated extreme environmental conditions.

Condition 11 notes:

- *For the purposes of condition 11, a SQEP shall be a Chartered Professional Engineer or hold a similar professional title from an appropriate engineering registration authority that is a signatory of the Washington Accord (1989), e.g. European Engineer (EUR ING) or P.Eng (registered professional engineer).*
- *The combination of design conditions should reflect realistic extreme events, consistent with best practice for the design of marine structures. The baseline conditions, based on the initial assessment included in the application, are as follows:*
 - o *Peak current speed at 5 to 7 m depth: 1.57 m/s*
 - o *Significant wave height (Hs): 3.48 m*
 - o *10-minute mean wind speed at 10 m elevation: 29.5 m/s*

These values may be refined through future studies to improve the accuracy of the design basis prior to the completion of the Report required by condition 11.

12. At least 20 working days prior to the first installation of marine farming structures at the site, the Consent Holder must provide to the Consent Authority a Maritime Construction Safety Management Plan (MCSMP) that has been prepared by a SQEP in consultation with the Harbourmaster.
13. The objective of the MCSMP is to mitigate the risks associated with marine farm construction activities that occur within the marine environment to staff and contractors at the marine farm and to mariners.
14. The MCSMP must at a minimum include the following information:
 - a. List of parties involved in the construction and their roles and responsibilities
 - b. List of parties who may be impacted by the work and so who need to be communicated with
 - c. The safety priorities
 - d. The construction / installation methodology
 - e. A hazard register
 - f. Controls that will be employed to minimise the identified potential risks
 - g. Communication channels, requirements and triggers.
15. Initial construction and installation of the marine farm and any future construction or installations at the marine farm, including progression to stage 2, shall be undertaken in accordance with the MCSMP.
16. The Consent Holder may review the MCSMP at any time prior to and during construction. Any reviews shall be undertaken by a SQEP in consultation with the Harbourmaster. Any amendment to the MCSMP arising from a review shall be provided to the Consent Authority.
17. Requirements prior to and on commissioning of marine farming structures and associated infrastructure:
 - a. Within 10 working days of completing installation of a set of sea pens and any associated barge, the Consent Holder shall provide 'as built' plans of each block of marine farm structures and barge(s) established, including coordinates for all four corners of each block, and identifying any difference between the 'as built' plans and the engineering report required by Condition 11 to the Consent Authority;

- b. If marine farms are re-located within the consented site under Condition 83, updated 'as built' plans shall be provided, consistent with the requirements of Condition 17.a.;
- c. 30 days prior to laying of the cardinal marks, the Consent Holder shall confirm with the Harbourmaster type / model of cardinal buoys, the design of the shapes and the light characteristics and any radio aids intended to be fitted and the coordinates of the intended placement. The Consent holder is to request the Harbourmaster issue Notices to Mariners (NTMs) notifying of the cardinals and their characteristics and the position of the new recommended large vessel anchorages;
- d. Within 5 working days of laying of the cardinal marks, the Consent Holder shall provide the Harbourmaster and Land Information NZ (LINZ) Hydrographic Office written details of the light characteristics and any radio aids, if fitted, and coordinates of the position of the marks and request for the 'List of Lights' to be updated and for the farm area to be shown on the associated nautical charts. Unless advised otherwise by the Harbourmaster, the communication with LINZ is to include the updated position of the recommended anchorages currently shown on the charts.
- e. Within 10 working days of the construction of each farm block, the Consent Holder shall, provide the Harbourmaster, confirmation that maritime "special marks" have been fitted in accordance with Figure 1 and that their light characteristics are consistent with the extant Maritime NZ Marine farm guidelines.

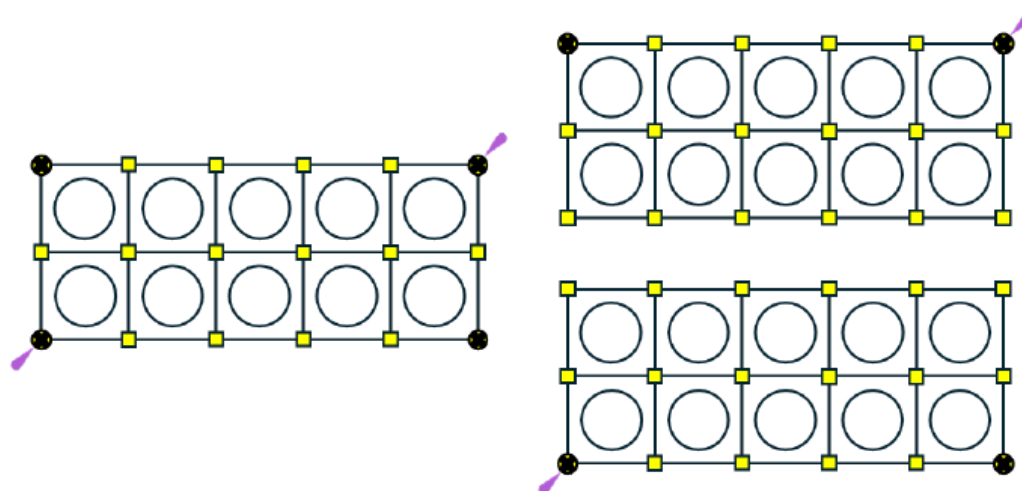


Figure 1: Proposed marine farm lighting (left: stage one, right: stage two) where a yellow square denotes a yellow compensation buoy, a yellow circle with an 'X' denotes a yellow special mark with a yellow cross shape on a short post, and a purple drop denotes a flashing yellow light.

18. Structures and feed barges installed at any marine farm within the consented site must comply with the following limits and standards:

Table 1: Structures and feed barges limits and standards

Structures/feed barges	Limit
Number of marine farms	Maximum of four
Number of fixed barges	One per marine farm Maximum length of 40 metres and width of 12 metres Maximum air draught (overall height above the waterline) shall not exceed 14 metres (excluding appurtenances including aerials, satellite

Structures/feed barges	Limit
	dishes, cranes and other non-superstructure equipment) under any design load conditions
Blocks of sea pens	Maximum of two blocks per marine farm and eight blocks in total
Sea pens	<p>Maximum of 10 (maximum circumference of 168 metres) circular pens per block, set out in a 5 x 2 pattern, including above water predator nets up to 6 metres high above water and below water nets up to 22 metres depth, with a minimum clearance of 5m to the seabed</p> <p>Maximum of 80 sea pens in total.</p> <p>Above water bird nets shall be installed and maintained on all sea pen structures.</p> <p>All above and below water structures, including nets, must be made of, painted or otherwise finished in dark material and recessive colours</p> <p>All above water predator nets must have a mesh size equal to or less than 60 millimetres half mesh (knot to knot)</p> <p>There must only be a single below water net for each pen, excluding installed false bottoms.</p> <p>All below water nets used for sea pens must have a mesh size no larger than 40 millimetres half mesh (knot to knot)</p> <p>All nets shall be constructed from predator resistant materials designed, installed and maintained to resist tearing of the nets by seabirds, marine mammals and sharks</p>
Under water lighting	Maximum of eight 680 watt LED lights per sea pen

19. Except buoys, navigational marks, feed pipes and electrical cables / conduit or otherwise as specifically required by the Harbourmaster or as provided for in the Maritime Construction Safety Management Plan, MMMP or SBMP (whose requirements shall prevail over this condition):
 - a. The upper works of each barge above the gunwales shall be painted in a nautical colour scheme (such as white and blue);
 - b. The hull of each barge shall be a dark colour(s) (such as black);
 - c. All other surface structures at each Salmon Farm shall:
 - i. Be painted or finished in dark or recessive colour(s); or
 - ii. Be the natural colour of the materials if these are recessive (such as galvanised carbon steel); and
 - d. Where reasonably practicable, structures of the same type shall be painted or finished in such a way to allow the whole of each floating part to be discernible and contiguous (such as by using consistent and coherent colours).
20. The Consent Holder must, at all times during the exercise of this consent:
 - a. maintain the marine farm structures, including but not restricted to the associated anchors, lines, buoys, sea pens, nets and feed barges, in good repair, appearance and condition; and
 - b. ensure the marine farm structures are secured and marked by appropriate navigational aids, so as not to create a navigation safety hazard.
21. Except during maintenance activities (including biosecurity operations) and supervised operational activities that require the lifting of nets or movement of pens:
 - a. All nets (above and below water), ropes and mooring lines shall be kept under tension to minimise the potential for entanglement while in use for fish farming; and

- b. If nets are not in use for fish farming they shall either be kept taut and weighted, or be removed from the water and stored so that they will not entangle seabirds, sharks or mammals.
- 22. If nets, ropes and mooring lines need to be loosened during maintenance activities and supervised operational activities that require the lifting of nets, measures as specified in the Marine Mammal Management Plan, Shark Management Plan and Seabird Management Plan must be implemented to avoid and/or minimise the risk of entanglement.
- 23. Nets used for sea pens shall be constructed to avoid as far as practicable and otherwise minimise the ability of marine mammals, sharks and diving birds to access dead fish from the bottom of the sea pens.
- 24. Upon expiry (unless operating under section 165ZH of the RMA or an equivalent provision), surrender or cancellation of the consent, the Consent Holder must remove all marine farm and associated structures from the site and restore any damage or disturbance to the site caused by the physical presence of the structures so that the site is restored as near as practicable to its condition prior to the exercise of this consent within six months of the date of expiry, surrender or cancellation of consent. If the Consent Holder fails to do so, the Council may cause the marine farm structures, including all associated structures, to be removed and the site restored, and may recover the costs incurred by the removal and restoration from the consent holder.

Navigational safety

- 25. The type, design, functionality, and placement of marine farm lighting and marking shall be in accordance with International Association of Marine Aids to Navigation and Lighthouse Authority Guidelines and shall be installed in accordance with the approval provided by the Harbourmaster under his or her Maritime Delegation from the Director of Maritime New Zealand pursuant to sections 200, 444(2) and 444(4) of the Maritime Transport Act 1994.
- 26. At least 20 working days prior to the first installation of marine farming structures at the consented site or changes to the location and layout in accordance with condition 83, the Consent Holder must advise the Harbourmaster and must comply with any directions from the Harbourmaster concerning notification of the presence of the marine farming structures to coastal users.

Farm operations

- 27. The consent holder shall ensure that the marine farms are operated so that
 - a. best practicable measures are implemented to minimise feed loss from the pens;
 - b. Fish feeding behaviour and feed loss are monitored during feeding; and
 - c. Total annual feed discharge across all four farms does not exceed:
 - i. During stage 1, 15,000 tonnes;
 - ii. During stage 2, 25,000 tonnes; or
 - iii. During an alternative stage that is undertaken in accordance with recommendations in a certified Stage Progression Report (SPR), an alternative total annual feed discharge, less than 25,000 tonnes, as provided for in the SPR.
- 28. Marine farms must be operated as single year class farms and the four marine farms shall be managed on a rotational stocking basis, which means that the farms will be stocked at staggered intervals and that farms will be at different stages across the production cycle.
- 29. Following harvest each marine farm must be fallowed (hold no fish) for a period of no less than three months before introduction of the next year class of smolt. The Consent Holder must keep a record of the date of harvest, the date of restocking, the period of time each marine farm is operating at peak discharge, the dates each farm is fallow and provide a copy to the Consent Authority annually as part of the Annual Report required under condition 84.
- 30. Dead fish shall be removed from the sea pens at least twice a week, and daily where possible, provided that weather conditions, farm maintenance, and health and safety requirements permit, and otherwise at the first available period where weather conditions, farm maintenance and

health and safety requirements permit. Dead fish removed from sea pens shall be treated and/or stored in such a manner that is bio-secure and does not attract predators and must be disposed of on mainland New Zealand in a biosecure manner.

Marine mammals

31. The Consent Holder must undertake the activity authorised by this resource consent so as to:
 - a. Avoid adverse effects on indigenous marine mammal taxa that are listed as threatened or at risk in the New Zealand Threat Classification System (NZTCS) lists and marine mammals that are listed by the International Union for Conservation of Nature and Natural Resources as threatened.
 - b. Avoid and/or minimise the risk of entrapment, injury or entanglement of marine mammals and record and report any incidence of injury or mortality of any marine mammals in accordance with measures in a Marine Mammal Management Plan (MMMP).
 - c. Ensure that its staff and contractors do not:
 - i. feed any marine mammals or discharge/discard anything within the coastal marine area that would attract marine mammals (unless the discharge is authorised and in accordance with the conditions of this consent) in the vicinity of the marine farms or the consented site nor intentionally interact with marine mammals except where such an interaction is authorised by the conditions of this consent.
 - ii. undertake recreational fishing activities at any of the marine farms or while transiting between the marine farms.
32. Prior to the introduction of marine farm structures, including pens, mooring lines and anchors, the Consent Holder must submit a MMMP prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
33. The objective of the MMMP is to:
 - a. define the methodology to be used for monitoring, recording and reporting the level of marine mammal presence around the marine farms at the consented site;
 - b. achieve compliance with the conditions of this consent;
 - c. minimise and/or mitigate the attraction or avoidance of marine mammals to the marine farms at the consented site;
 - d. minimise and/or mitigate interactions between marine mammals and marine farm activities and structures; and
 - e. meet the requirements of the Marine Mammals Protection Regulations 1992 (as may be amended or replaced from time to time) and any permit granted under the Marine Mammals Protection Act 1978.
34. The MMMP must at a minimum include the following information:
 - a. a monitoring programme with procedures for recording and reporting:
 - i. marine mammal presence in the vicinity of farm structures;
 - b. a framework for mitigation and management actions and techniques to avoid and otherwise minimise harmful marine mammal interactions and incidents with farm structures;
 - c. measures to record and respond to marine mammal interactions/incidents with farm structures;
 - d. procedures for the implementation of the MMMP, including the training of staff;
 - e. timeframes for reporting of incidents (entrapment, live entanglement, injury and mortality) to the Consent Authority, the Department of Conservation and papatipu rūnanga;
 - f. Actions to be taken in the event of any injury or mortality;
 - g. a process for reviewing the effectiveness of the MMMP at achieving the objectives set out in Condition 33 and updating the MMMP if required to improve its effectiveness;

- h. a management review process that has the flexibility to accommodate future advances in infrastructure and other developments in line with the evolution of the science behind best management practices for management of marine mammal interactions and incidents with marine farms;
 - i. Contact details for the person who is responsible for the monitoring, reporting and implementation of the MMMP.
- 35. The MMMP shall be reviewed by a SQEP as follows:
 - a. two years after the installation of the first net pens at the site, and every five years thereafter
 - b. within 30 calendar days of the discovery of any marine mammal mortality or serious injury associated with or resulting from the consent holder's activities.
- 36. Any amendment to the MMMP arising from the reviews set out in condition 35 shall be submitted to Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
- 37. In preparing the MMMP under condition 32, and undertaking any reviews under condition 35, the Consent Holder shall seek feedback from:
 - a. The Department of Conservation; and
 - b. a representative or representatives of Ngā Rūnanga ki Murihiku.

Feedback from these parties, along with an explanation of the Consent Holder's response to the feedback, shall be provided to the Manager Resource Management, Environment Southland as part of material submitted for certification.

Seabirds

- 38. The Consent Holder must undertake the activity authorised by this resource consent so as to:
 - a. avoid adverse effects on:
 - i. NZTCS Threatened and At Risk seabird species (including juveniles from nearby nesting or roosting sites); and
 - ii. Taxa that are listed by the International Union for Conservation of Nature and Natural Resources (IUCN) as threatened;
 - b. Otherwise minimise risks to seabirds from debris and foreign objects (including physical structures), artificial lighting, entanglement or collisions, and disturbance of nesting or roosting sites.
 - c. Minimise and/or mitigate the effects of the attraction of seabirds to the marine farms at the Hananui Aquaculture site
 - d. Minimise and/or mitigate interactions between seabirds and marine farm activities and structures.
 - e. Avoid and/or mitigate the risk of entrapment, injury or entanglement of seabirds and record and report any incidence of injury or mortality of any seabirds in accordance with a Seabird Management Plan (SBMP);
 - f. Ensure that its staff and contractors do not intentionally feed seabirds or discharge/discard anything within the coastal marine area that would attract seabirds (unless the discharge is authorised and in accordance with the conditions of this consent) in the vicinity of the marine farms or while transiting between marine farms.
- 39. Prior to the introduction of marine farm structures, including pens, mooring lines and anchors, the Consent Holder must submit a SBMP prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
- 40. The objective of the SBMP is to:
 - a. achieve compliance with conditions of this consent;

- b. define the methodology to be used for monitoring, recording and reporting seabird interactions around the marine farms;
 - c. for the first two years of operation of the marine farms at the site, monitor, record and report on seabird behaviours around the marine farms
- 41. The SBMP must at a minimum include the following information:
 - a. A monitoring programme with procedures for recording and reporting seabird interactions and behaviours in the vicinity of marine farms.
 - b. Mitigation and management actions and techniques to minimise seabird interactions and incidents with farm structures in order to achieve Condition 40.
 - c. Procedures to record, respond to and report seabird interactions/incidents with farm structures, and timeframes for reporting.
 - d. Procedures for the implementation of the SBMP, including training of staff.
 - e. A process for reviewing the effectiveness of the SBMP at achieving the objectives set out in Condition 40 and updating the SBMP if required to improve its effectiveness
 - f. A management review process that has the flexibility to accommodate future advances in infrastructure and other developments in line with the evolution of the science behind best management practices for management of seabird interactions and incidents with marine farms.
- 42. The SBMP shall be subject to review, by a SQEP:
 - a. two years after the installation of the first net pens at the Hananui Aquaculture site; and
 - b. every five years thereafter.
- 43. Any amendment to the SBMP arising from the reviews set out in condition 42 shall be submitted to Manager Resource Management, Environment Southland for certification in accordance with condition 2.
- 44. In preparing the SBMP under condition 39, and undertaking any reviews under condition 42, the Consent Holder shall seek feedback from:
 - a. The Department of Conservation; and
 - b. a representative or representatives of Ngā Rūnanga ki Murihiku.

Feedback from these parties, along with an explanation of the Consent Holder's response to the feedback, shall be provided to the Manager Resource Management, Environment Southland as part of material submitted for certification.

Sharks

- 45. The Consent Holder must:
 - a. Avoid adverse effects of activities on indigenous shark taxa listed as threatened or at risk in the NZTCS or threatened in the IUCN red list, excluding shark species managed under the Fisheries Act.
 - b. ensure that its staff and contractors do not feed sharks or undertake recreational fishing activities in the vicinity of the marine farms or while transiting between marine farms; and
 - c. minimise shark interactions with the marine farms.
- 46. Prior to the introduction of marine farm structures, including pens, mooring lines and anchors, the Consent Holder must submit a Shark Management Plan (SMP) prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
- 47. The objective of the SMP is to:
 - a. achieve compliance with conditions of this consent;

- b. determine how the operation of the marine farms will be managed adaptively to avoid, remedy, and mitigate adverse effects on sharks;
 - c. ensure best practice is adopted to avoid entanglement or entrapment of sharks, having regard to best international practice, ongoing research and allowing for technological improvement in net design, construction and maintenance;
 - d. establish reporting and response procedures in the event of protected, threatened, or at-risk shark entrapment, entanglement or death; and
 - e. establish a monitoring programme to assess the effectiveness of the SMP.
48. The SMP must at a minimum include the following information:
- a. a monitoring programme with procedures for recording and reporting interactions and incidents (entanglement, entrapment, injury and mortalities) with sharks at the marine farms;
 - b. mitigation and management actions and techniques to minimise shark interactions and incidents with farm structures in order to achieve Condition 47;
 - c. measures to respond to shark interactions/incidents with farm structures;
 - d. procedures for the implementation of the SMP, including training of staff;
 - e. timeframes for reporting of incidents (entrapment, live entanglement, injury and mortality) to the Consent Authority, the Department of Conservation (when a protected species is involved) and papatipu rūnanga; and
 - f. a management review process that has the flexibility to accommodate future advances in infrastructure and other developments in line with the evolution of the science behind best management practices for management of shark interactions and incidents with marine farms.
49. The SMP shall be subject to review, by a SQEP:
- a. two years after the installation of the first net pens at the site, and no more than every five years thereafter; and
 - b. within 30 calendar days of the discovery of any protected shark species mortality or serious injury associated with or caused by the consent holder's activities.
50. Any amendment to the SMP arising from the reviews set out in condition 49 shall be submitted to Manager Resource Management, Environment Southland for certification.
51. In preparing the SMP under condition 46, and undertaking any reviews under condition 49, the Consent Holder shall seek feedback from:
- a. The Department of Conservation; and
 - b. a representative or representatives of Ngā Rūnanga ki Murihiku.

Feedback from these parties, along with an explanation of the Consent Holder's response to the feedback, shall be provided to the Manager Resource Management, Environment Southland as part of material submitted for certification.

Biosecurity

52. The consent holder shall operate the farms so as to ensure that it avoids to the greatest extent practicable the risk of introducing or spreading:
- a. Marine pests; and
 - b. Disease agents.
53. Prior to the installation of farm structures at the marine farms, the Consent Holder must submit a Biosecurity Management Plan (BMP) prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.

54. The objective of the BMP is to ensure that the risks of introduction or spread of any marine pest(s) and/or diseases from the marine farming activities are managed, and reduced to as low a level as practicable.
55. The BMP must at a minimum include the following information:
 - a. Identification of generic pathway and on-farm pathogen biosecurity measures to be implemented, including those associated with vessel movements to and from the marine farm;
 - b. Identification of additional measures for marine pest and biofouling management specific to the risks posed by salmon farming at the consented site;
 - c. Identification of additional measures for specific disease risks posed by salmon farming at the consented site;
 - d. An outline of staff training to be implemented at the site for mitigating biosecurity risks; and
56. The BMP shall be subject to review by a SQEP:
 - a. Annually;
 - b. When there is a significant change in operating parameters at the Hananui Aquaculture site that potentially present an altered biosecurity risk to the marine farms or their environment;
 - c. If new technologies or methods arise that could significantly improve the biosecurity outcomes for the Hananui area; and
 - d. Where BMP requirements need to be amended to be consistent with any broader regulatory developments (e.g., new regional or national pathway plan rules that are stricter than those currently in the BMP).
57. Any amendment to the BMP arising from the reviews set out in condition 56 shall be submitted to Manager Resource Management, Environment Southland for certification.
58. In preparing the BMP under condition 53, and undertaking any reviews under condition 56, the Consent Holder shall seek feedback from:
 - a. Biosecurity New Zealand; and
 - b. a representative or representatives of Ngā Rūnanga ki Murihiku.

Feedback from these parties, along with an explanation of the Consent Holder's response to the feedback, shall be provided to the Manager Resource Management, Environment Southland as part of material submitted for certification.

Waste management

59.
 - a. Any floating inorganic waste material or debris that is accidentally lost from the marine farms or from the Consent Holder's or contractors' vessels shall be promptly retrieved, stored and then disposed of at an approved waste facility onshore.
 - b. The Consent Holder must implement a Waste Management Plan to avoid and minimise the risk of waste materials such as plastics and marine farm debris being discharged into the coastal marine area, including during any transit to and from the site .
 - c. The Consent Holder must undertake an annual inspection of the adjacent coastline for any marine farm related waste and debris, and remove any inorganic waste material or debris for disposal at an authorised facility. The Consent Holder must keep a record of these inspections and the amount of waste removed, which must be provided to the Consent Authority as part of the Annual Report required under condition 84.

Heritage

60. The Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol, or an accidental discovery protocol modified to reflect the specific project detail, marine environment and marine

conditions that the project is occurring within, shall be operated under for any accidental archaeological discoveries that occur during construction works.

61. The Accidental Discovery Protocol required under Condition 60 shall be accessible on site at all times during work under this consent.

Advice note:

Under the Heritage New Zealand Pouhere Taonga Act 2014, the permission of Heritage New Zealand Pouhere Taonga must be sought prior to the modification, damage or destruction of any archaeological site, whether the site is unrecorded or has been previously recorded. An archaeological site is described in the Act as a place associated with pre-1900 human activity, which may provide evidence relating to the history of New Zealand and includes shipwrecks. These provisions apply regardless of whether a resource consent or building consent has been granted by Council.

Lighting

62. The Consent Holder must, as far as reasonably practicable, minimise non-navigational lighting used at night, by ensuring:
- a. Curtains, blinds or shutters which are effective at preventing light spill at night are provided for all windows on the barges anchored at the marine farms;
 - b. The curtains, blinds and shutters installed in accordance with clause (a) above are closed to prevent light spill at night, unless required to be open to facilitate the safety of staff;
 - c. Only external lighting that is required for navigation, deck and boat handling work, or health and safety purposes is installed at the marine farms;
 - d. Lights for deck and boat handling work are only be used while that work is being undertaken;
 - e. All external work lights fitted to marine farm structures are to be designed, fitted and operated so as to minimise glare, light spill and reflection, except where required for navigation or health and safety purposes;
 - f. Light intensity of fitted lighting units is as low as practicable and longer wavelength ("warm white") colour is used; and
 - g. That where vessels operate at the marine farm at night, except for vessel navigation lighting, any external lights are only be used to:
 - i. Facilitate the safety of staff;
 - ii. Prevent harm to salmon; or
 - iii. Protect each the marine farm structures, or ancillary infrastructure, from damage or failure.

Boat Traffic

63. The Consent Holder must, as far as reasonably practicable, minimise boat traffic associated with the marine farm operation within 200 metres of the coastline, subject to allowing for the requirements outlined in Condition 64 below.
64. Marine farm staff and contractors must only access land on the adjacent coastline via existing landing sites (e.g. those used by tourism and charter operators), unless under specific circumstances (such as search and rescue, clean up, recovery of equipment, pest control, health and safety or attending to an incident involving marine fauna)
65. The requirements of Part 3 of the Marine Mammals Protection Regulations 1992 must be implemented within the areas of exclusive and preferential occupation as specified in the conditions of this consent. The Consent Holder must ensure staff and contractors understand Part 3 of the Marine Mammals Protection Regulations 1992 and that a copy of the requirements of Part 3 of those regulations is displayed on the farm.

Management of seabed and water column effects

66. The Consent Holder shall ensure that the marine farming activities authorised by this consent avoid:
- adverse effects on the ecosystem function of biogenic habitat (bryozoan-sponge reefs and bushy bryozoan thickets);
 - a reduction in dissolved oxygen concentrations that is harmful to aquatic fauna; and
 - a measurable increase in the frequency or magnitude of harmful algal blooms.

Note: “Ecosystem function” in clause (a) refers to the role of habitat-forming taxa in providing structure, supporting biodiversity, and maintaining overall habitat condition.

Adaptive Management

67. The Consent Holder must operate the marine farm in accordance with the adaptive management regime set out in conditions 68 to 83.

Environmental Quality Zones and Standards

68. The draft Environmental Quality Zones (EQZ) and Adaptive Management Triggers (AMT) included in Appendix C to these conditions shall be reviewed and confirmed as part of the preparation and review of an Environmental Monitoring and Management Plan under conditions 74 and 77.

Baseline Monitoring

69. Following the commencement of this consent, the Consent Holder must submit a Baseline Monitoring Plan (BLMP) prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
70. The objective of the BLMP is to improve understanding of the baseline condition of the receiving environment (including natural variation) as it relates to the potential water quality and seabed effects of the marine farm and to inform the selection of sampling methods for monitoring under the Environmental Monitoring and Management Plan.
71. The BLMP must be prepared taking into account relevant recommendations in the “*Recommendations for seabed monitoring at the proposed Hananui salmon farming area*” and the “*Water Column Assessment*” submitted with the application lodged with the Environmental Protection Authority on **date (reference XX)** and at a minimum must include information regarding:
- Sampling locations, including sampling locations that will provide sufficient baseline information should farm locations be amended in accordance with conditions 10 and 83;
 - Duration and timing of sampling;
 - Sampling design; and
 - Parameters to be analysed.
72. Baseline monitoring under the BLMP shall occur for the following minimum durations:
- 24 months for seabed monitoring of biogenic habitats;
 - 12 months for seabed monitoring of sandy habitats;
 - 12 months for water column monitoring.
73. Prior to the introduction of fish to the marine farms, the Consent Holder shall provide a Baseline Monitoring Report which analyses the results of the baseline monitoring, and is prepared by a SQEP, to the Consent Authority. The Baseline Monitoring Report shall include:
- A description of the monitoring undertaken;
 - An assessment of the results of baseline monitoring;
 - Details of the existing environment (environmental parameters, benthic habitats) at the time of monitoring based on the monitoring results;

- d. Recommendations for the monitoring section of the Environmental (Water Column and Seabed) Monitoring and Management Plan (EMMP);
- e. An assessment of the suitability of the draft Environmental Quality Zones (EQZ) and Adaptive Management Triggers (AMT) contained in Appendix C to this consent and recommendations for EQZ and AMT to be confirmed within the EMMP.

Environmental (Water Column and Seabed) Monitoring and Management Plan

- 74. Prior to the first introduction of fish to the marine farms, the Consent Holder must submit an EMMP prepared by a SQEP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2.
- 75. The objectives of the EMMP are to:
 - a. Achieve compliance with condition 66;
 - b. Confirm the EQZ and AMT that will be used for the adaptive management process during different stages under this consent;
 - c. Detail the adaptive management regime that will be implemented under this consent; and
 - d. Detail the monitoring programme that will be implemented to assess the effects of the marine farming activity on the water column and seabed.
- 76. The EMMP must be prepared taking into account relevant recommendations in the “*Recommendations for seabed monitoring at the proposed Hananui salmon farming area*” and the “*Water Column Assessment*” submitted with the application lodged with the Environmental Protection Authority on **date (reference XX)** and, at a minimum, include the following information:
 - a. Confirmation of the AMT against which monitoring results shall be compared and which will be used as triggers for adaptive management actions to ensure compliance with condition 66;
 - b. A description of the different marine farm adaptations that may be implemented if the AMT are exceeded;
 - c. A model review framework that identifies the model validation and re-modelling requirements for progression between stages; and
 - d. The seabed and water column monitoring plan that will be implemented to assess the actual effects of the marine farming activity against the AMT, including:
 - i. Confirmation of the Environmental Quality Zones for the relevant marine farm stage;
 - ii. Sampling locations;
 - iii. Duration and timing of sampling;
 - iv. Sampling design and analytical methods to be used;
 - v. Parameters to be analysed;
 - vi. An assessment of changes from the Baseline Monitoring Plan and why these are justified; and
 - vii. Reporting requirements to be met in the Annual Report.
- 77. The EMMP shall be subject to review, by a SQEP:
 - a. As part of any Stage Progression Report prepared in accordance with condition 80.c; and
 - b. Not more than 5 yearly thereafter.
- 78. The Consent Holder may initiate a review of the EMMP, to be undertaken by a SQEP, at any other time to update content including methodologies, adjust sampling intensity, or expand monitoring scope where monitoring results indicate this is appropriate.
- 79. Any amendment to the EMMP arising from the reviews set out in conditions 77 and 78 shall be submitted to Manager Resource Management, Environment Southland for certification.

Staging

80. Progression from Stage 1, or any alternative stage, to Stage 2 shall only occur if:
 - a. A minimum of two full production cycles has been completed at Stage 1 during which:
 - i. At least 12,500 tonnes of feed has been used across all four farms in two 12-month periods;
 - ii. The marine farm has been operated and monitored in accordance with the certified EMMP; or
 - b. An alternative stage has been completed in accordance with recommendations in the relevant Stage Progression Report (SPR) and has been operated and monitored in accordance with the certified EMMP; and
 - c. a SPR for the completed stage has been prepared by a SQEP and certified by the Manager Resource Management, Environment Southland in accordance with condition 2
81. The objective of the SPR is to determine whether the marine farm can progress to Stage 2, while continuing to comply with condition 66.
82. Each SPR:
 - a. Must include analysis of the results of monitoring undertaken in accordance with EMMP;
 - b. Must include a description and analysis of any modelling required by the EMMP; and
 - c. Must recommend one of the following based on monitoring and modelling:
 - i. Progression to Stage 2;
 - ii. Progression to Stage 2, but incorporating adaptive management measures to address matters identified through monitoring or modelling; or
 - iii. Progression to alternative stage, with maximum annual feed discharge level, farm location and minimum stage duration to be specified in the SPR.

Notes:

- *Any alternative maximum feed discharge level specified in accordance with condition 82.c.iii shall not exceed 25,000 tonnes across all four farms.*
- *While a SPR is being prepared and certified, production may continue under the current stage subject to meeting the compliance limit in condition 66 and other conditions of this consent.*

Alternative farm locations

83. As part of the adaptive management of the marine farm, the Consent Holder may relocate marine farms to the alternative farm sites shown on Plan A and / or to any location within 500 m of the initial farm site, subject to:
 - a. Preparation of a Farm Movement Plan (FMP). The purpose of an FMP is to confirm that the relocation will satisfactorily address issues identified through the adaptive management process and that the potential adverse effects of the changed layout relating to seabed deposition and the safety of the marine farm structures will not exceed those considered at the time of granting the consent. An FMP shall be prepared by SQEPs and, at a minimum, shall include the following information:
 - i. A clear description of the trigger or issue that has prompted the relocation proposal;
 - ii. A seabed survey of the alternative location must confirm that the outside edge of the sea pens will not be located within 500 m of any biogenic habitat situated outside the Proposal Area boundary shown on Plan A;
 - iii. Confirmation that the marine farm structures can be safely and securely installed and maintained at the new location(s);

- iv. Depositional modelling that demonstrates continued compliance with limits in condition 66 and that seabed deposition effects from the relocated farm(s) will remain within the AMT in the EMMP; and
- b. Submission of the FMP to the Manager Resource Management, Environment Southland, for certification in accordance with condition 2; and
- c. Providing updated “as-built” plans to the Consent Authority in accordance with condition 17.b and notifying the Harbourmaster of the relocated farms and the associated amended exclusive occupation area.

Annual Reporting

84. The consent holder shall produce an Annual Report and shall provide it to the Consent Authority within three months of the anniversary of the commencement of the consent. The Annual Report shall include:
- a. Details of all monitoring undertaken in accordance with the conditions of this consent;
 - b. Actual Annual Feed discharged during the year covered by the Annual Report;
 - c. A record of harvestable number of salmon;
 - d. Comparison of the annual monitoring data with the compliance limits in condition 66, AMT in the EMMP and requirements in conditions 31 (Marine Mammals), 38 (Seabirds), 45 (Sharks) and 52 (Biosecurity);
 - e. A description of actions that have been or will be implemented where monitoring data or incident records indicate non-compliance with consent conditions or a Management Plan or other document certified under this consent; and
 - f. All other information required to be included in the Annual Report under a condition of this consent and Management Plan or other document certified under this consent.

Review

85. The consent authority may, in accordance with Sections 128 and 129 of the Resource Management Act, serve notice, during the months of August to October each year or if non-compliance with the conditions of this consent is determined, of its intention to review the conditions of the consent for the purposes of:
- a. Dealing with any adverse effect on the environment which may arise from the exercise of this consent and which is appropriate to deal with at a later stage, or
 - b. Considering any changes to information on the effects of marine farming, particularly information gained from monitoring, or
 - c. Complying with the requirements of a regional plan, national environmental standard, or national planning standards.

Hananui Community, Environmental, and Health & Education Funds

86. The Consent Holder shall establish and maintain the following funds to support positive social, cultural, environmental, and community outcomes associated with the Hananui Aquaculture Project:
- a. Hananui Community Funds – to support community projects that are important to local communities. Two separate sub-funds shall be established for the Rakiura and Bluff communities, to be managed by trustees comprising local community representatives, including Rūnanga representatives residing within each community.
 - b. Hananui Environmental Fund – to support local projects and initiatives that enhance or restore the Murihiku environment. The fund shall be governed by the Consent Holder and include a project-selection panel comprising representatives of local organisations, Rūnanga, and external experts as required.
 - c. Hananui Health and Education Fund – to support health and education outcomes for people within the Murihiku takiwā through initiatives such as treatment, targeted public-health

programmes, and scholarships. The fund shall be managed by persons with relevant health-care and education expertise and include Rūnanga representation.

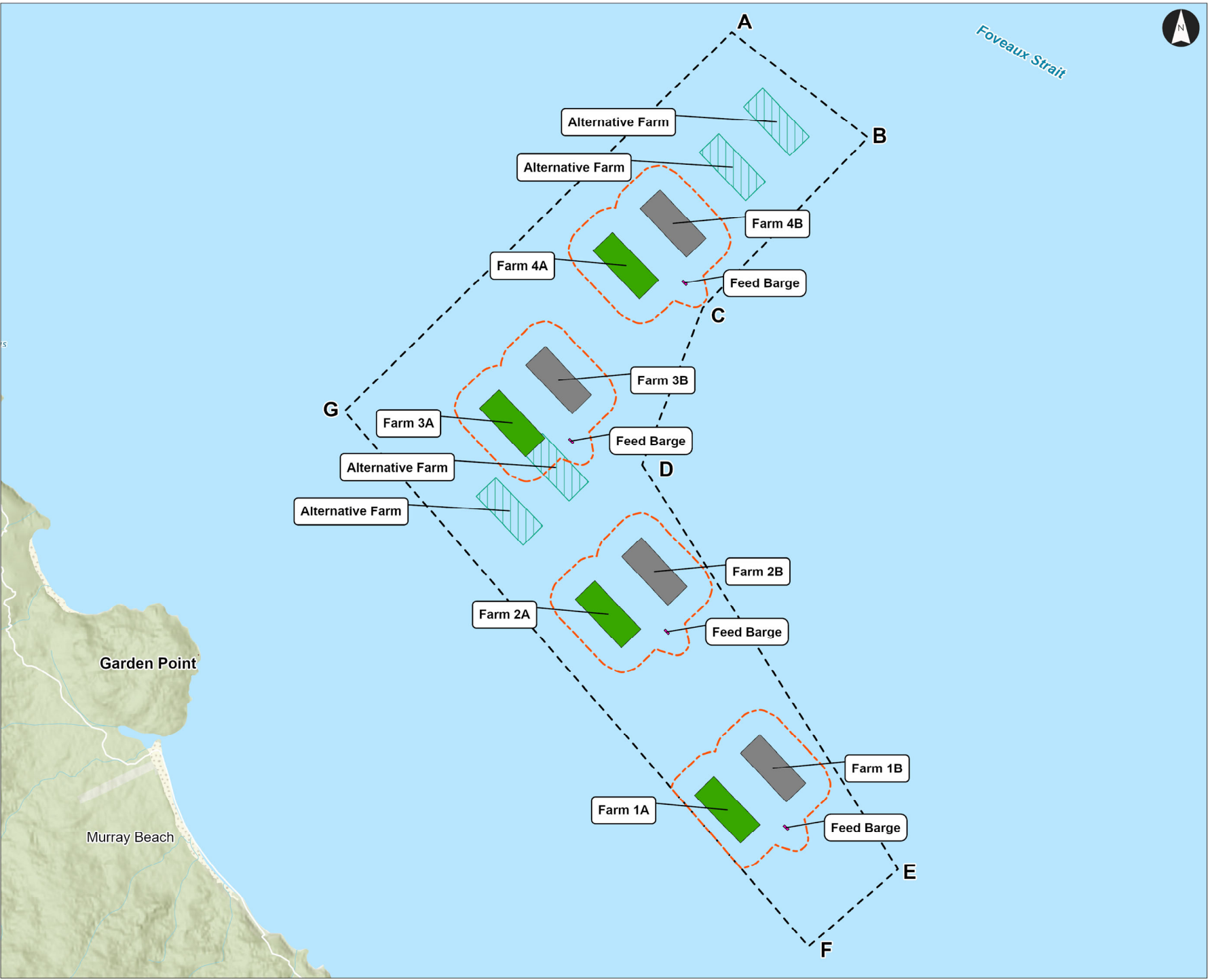
87. Prior to the stocking of Hananui site, the Consent Holder shall prepare a Fund Governance and Implementation Plan. The Plan shall:
 - a. Describe the governance structure, decision-making framework, and membership composition for each fund;
 - b. Identify transparent criteria for the selection, approval, and monitoring of supported projects; and
 - c. Outline annual reporting requirements to the Consent Authority and participating communities.
88. The Consent Holder shall make a total annual financial contribution across all four funds listed in condition 86 of a minimum of 10 cents per fish harvested in the preceding year.
89. In any financial year where the Consent Holder can demonstrate that the aquaculture operations have experienced a material financial loss or other exceptional circumstances, the Consent Holder may defer all or part of the annual contribution, provided that:
 - a. Written notice and justification are provided to the Consent Authority and fund-governance bodies; and
 - b. Deferred contributions are recorded and made up in subsequent financial years once operations return to profitability.
90. The first contribution to each fund shall be made within 12 months of the first commercial harvest from Stage 1 operations.

Condition Appendix A – Schedule of Documents

[Relevant to condition 1]

Conditions Appendix B – Plan A

C:\Users\skarm\Stantec\harris, Casey - 310001082 Hahanui Map\Hahanui Map.aprx | 310001082_Hahanui Aquaculture Site Arrangement | Last updated 2025-11-03 By: skarm



Hananui Aquaculture Site Arrangement

Steward Island, Foveaux Strait, NZ

Figure 1.0

Project Code: 310001082
Drawn By: SK, Checked By: VCS
Revision: 1.0
Date: 2025-11-03

Legend

Farm Blocks

- Stage 1 blocks
- Stage 2 blocks

Alternative Farm Blocks



Feed Barges



Exclusive Occupation Boundary

Up to approx. 460 ha

Proposal Area (preferential occupation)

Approx. 1285 ha

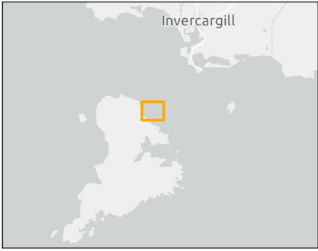
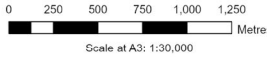
Point	Latitude (S)	Longitude (E)
A	46°43'50.69"	168°3'58.60"
B	46°44'21.00"	168°4'48.83"
C	46°45'3.65"	168°3'40.66"
D	46°45'44.51"	168°3'13.27"
E	46°47'36.70"	168°4'42.66"
F	46°47'55.76"	168°4'6.08"
G	46°45'25.28"	168°1'19.09"

Notes:

- Map displayed in NZGD 2000 New Zealand Transverse Mercator

References:

- NZ Topographic Map Relief (Vector) was provided by Eagle Technologies.
- Other data supplied by DSA Ocean.



Conditions Appendix C – Draft Environmental Quality Zones and Adaptive Management Triggers

C-1 Water Quality

Recommended water quality AMTs, based on recommendations in the Water Column Assessment submitted with the resource consent application, are that the farm operation shall not cause:

- a. Total Nitrogen concentrations at the Proposal Area boundary, as shown on Plan A, to exceed $30 \mu\text{g/L}$ above the highest concentration measured at any reference site in the same month;
- b. Chlorophyll-a concentrations at the Proposal Area boundary, as shown on Plan A, to exceed $3.5 \mu\text{g/L}$ at two or more farm boundary monitoring stations within one month or at the same monitoring station in two consecutive months.
- c. DO concentrations at the Proposal Area boundary, as shown on Plan A, to fall below 5 mg/L . DO concentration shall be measured from a depth profile with data averaged within 5 m depth bins.

C-2 Seabed

C-2.1 Sandy seabed

Recommended Environmental Quality Zones for Stage 1 (Figure 1) are:

- Zone 1 (blue line in figure) or the zone of maximum effect ($0.5 \text{ kg m}^{-2} \text{ yr}^{-1}$ solids flux contour).
- Zone 2 (orange line in figure) is the primary footprint ($7 \text{ g} \cdot \text{m}^{-2}$ residual solids contour).
- Beyond Zone 2 is a spatially defined area extending 3 km in the predominant current flow direction (north-west / south-east) and 2 km cross-current from the Zone 2 boundary. This area encompasses the $0.7 \text{ g} \cdot \text{m}^{-2}$ residual solids footprint and extends beyond it to capture the maximum spatial extent at which farm-related effects may be detectable.

For areas outside of the Beyond Zone 2 area, natural conditions are expected with no effects attributable to farm activities.

Recommended AMTs for each zone are set out in Table C-1.

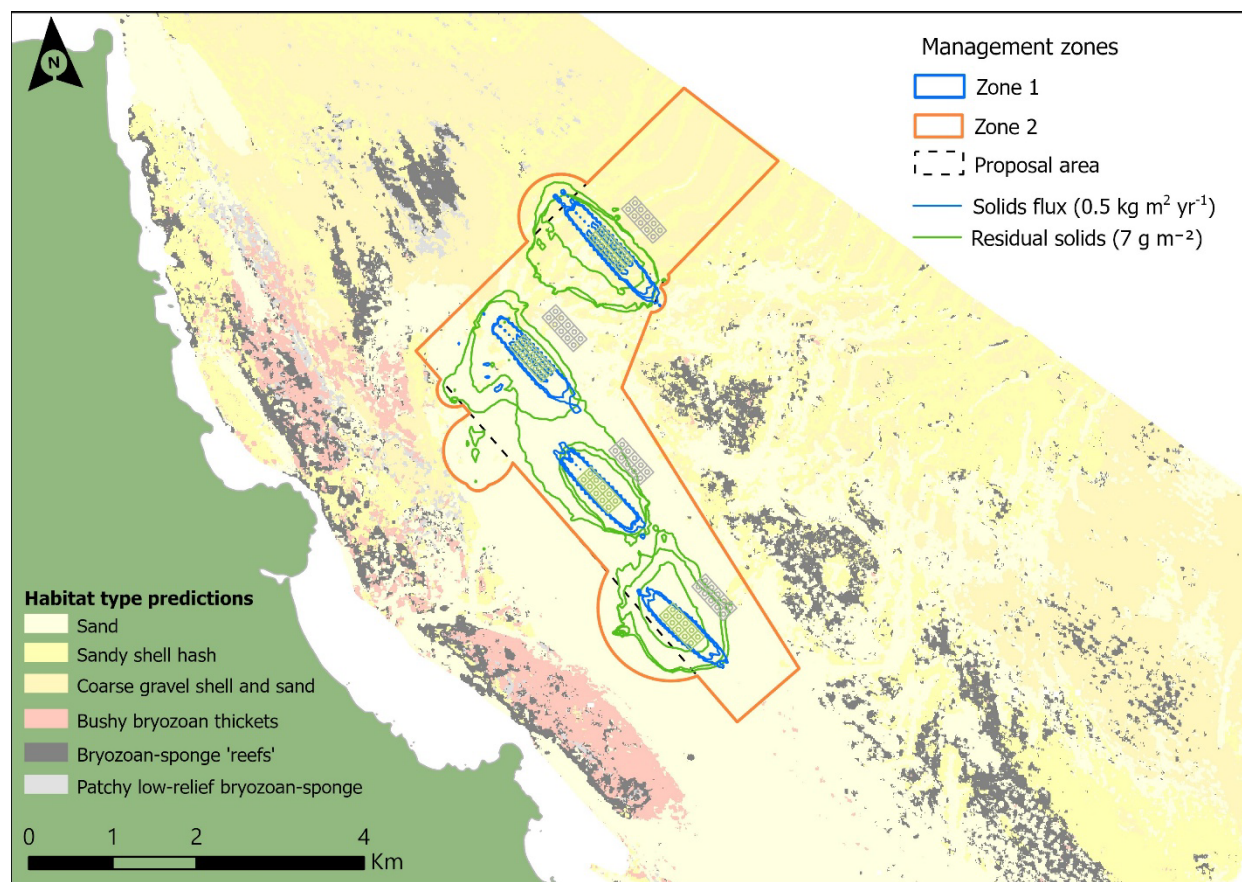


Figure 1. Hananui proposal area with overlaid management zones based on Stage 1 feed inputs. Zone 1 = the zone of maximum effect defined by the $0.5 \text{ kg} \cdot \text{m}^{-2} \cdot \text{yr}^{-1}$ solids flux footprint, Zone 2 = the primary footprint defined by the $7 \text{ g} \cdot \text{m}^{-2}$ residual solids footprint, Beyond Zone 2 = spatially defined area 3 km northwest / southeast and 2 km cross-current from the Zone 2 boundary.

C2-2 Biogenic Habitat

The farm layout has been designed to minimise deposition of farm-derived material on biogenic habitats. While low-level inputs may occur through resuspension, far-field deposition and accumulation are expected to be minimal and may not be readily detectable. Biogenic habitat monitoring is a precautionary measure, designed to provide early detection of an effect if it arises, through an approach that employs a broad range of monitoring tools.

Given the limited precedent for organic enrichment effects on key taxa and the time required for such effects to become detectable, establishing EQS for biogenic habitats at this stage would be premature. Instead, potential adverse impacts to ecosystem function should be assessed through multiple lines of evidence relative to background conditions and over time, allowing farm-related effects to be distinguished from natural variability and changes in individual indicators to be interpreted in the context of broader ecosystem change, in accordance with Table C-2.

Table C-1. Guiding environmental principles, initial-EQS and response triggers for sandy habitats. Tier 1 indicators are to be used routinely to assess environmental impact and, when breached, should trigger Tier 2 surveys. S^{2-}_{UV} = total free sulphides, UV = ultraviolet (spectrophotometry) method, b-MBI = bacterial Metabarcoding Biotic Index, DO = dissolved oxygen, AMBI = AZTI's Marine Biotic Index, BQI = Benthic Quality Index, N = total abundance, S = taxa richness, H' = Shannon–Wiener diversity index, d = Margalef's diversity index, J' = Pielou's evenness.

Guiding principles – sandy habitats	Initial-EQS (iEQS) indicators and associated thresholds	Response trigger
Zone 1		
Peak production: full-suite monitoring		
Farm shall not become very highly enriched (all areas < cf. ES 5)	<p>iEQS for identifying very high enrichment (ES 5):</p> <ul style="list-style-type: none"> Quantitative indicators (station average): <ul style="list-style-type: none"> $S^{2-}_{UV} > 800 \mu\text{M}$ or standard method Redox / pH index > 3.0 b-MBI > 4.5 Macrofaunal indicators (AMBI > 5.1, BQI < 2.6, expert judgement that other available indicators [e.g., N, S, H', J' and d] indicate very high enrichment) Station average near-bottom water column DO $< 90\%$ reference White, anaerobic bacterial coverage $> 50\%$. Visible free outgassing from sediments. 	If two or more iEQS indicators are triggered, farm management response actions, as outlined in the adaptive management plan, should be initiated.
Interim stations: tiered monitoring		
Farm shall not become very highly enriched (all areas < cf. ES 5)	<p>Tier 1 iEQS for identifying very high enrichment (ES 5):</p> <ul style="list-style-type: none"> Quantitative indicators (station average): <ul style="list-style-type: none"> $S^{2-}_{UV} > 800 \mu\text{M}$ or standard method / in tandem for a while Redox / pH index > 3.0 Station average near-bottom water column DO $< 90\%$ reference White, anaerobic bacterial coverage $> 50\%$ Visible free outgassing from sediments. <p>Tier 2 iEQS for identifying very high enrichment (ES 5, archived):</p> <ul style="list-style-type: none"> Quantitative indicators (station average): <ul style="list-style-type: none"> b-MBI $> 4.5^1$ 	Tier 2 is triggered when any two or more Tier 1 indicators are triggered at any station or outgassing is observed; archived Tier 2 samples should be processed. If Tier 2 indicators are exceeded, farm management response actions, as outlined in the adaptive management plan, should be initiated.

¹ Incorporation of this index at the Hananui proposal area would require validation against infaunal data over at least 2 years before applicability as a Tier 1 iEQS indicator.

Guiding principles – sandy habitats	Initial-EQS (iEQS) indicators and associated thresholds	Response trigger
	<ul style="list-style-type: none"> Macrofaunal indicators (AMBI > 5.1, BQI < 2.6, expert judgement that other available indicators [e.g., N, S, H', J' and d] indicate very high enrichment). 	
Zone 2		
Zone 2 shall not become highly enriched (all areas < cf. ES 4)	<p>Tier 1 iEQS for identifying high enrichment (ES 4):</p> <ul style="list-style-type: none"> Station average: <ul style="list-style-type: none"> $S^{2-UV} > 500 \mu M^2$ b-MBI > 4.¹⁹ 	Tier 2 should be triggered when either or both Tier 1 indicators are exceeded at any Zone 2 station.
	<p>Tier 2 iEQS for identifying high enrichment (ES 4):</p> <p>Quantitative macrofaunal indicators (station average):</p> <ul style="list-style-type: none"> AMBI > 4.4* BQI < 4.0* Expert judgement that other available indicators (e.g., N, S, H', J' and d) indicate high enrichment. 	<p>Farm management response should be initiated when Tier 2 indicators are triggered (AMBI, BQI, expert judgement) at any Zone 2 station.</p> <p><i>If only expert judgement available, indications of high enrichment = farm response action required. If AMBI and BQI can be calculated, then 2/3 indicators triggered = farm management response triggered.</i></p>
Beyond Zone 2		
Beyond Zone 2 shall not become moderately enriched (all areas < cf. ES 3)	<p>Tier 1 iEQS for identifying moderate enrichment (ES 3):</p> <ul style="list-style-type: none"> Station average: <ul style="list-style-type: none"> $S^{2-UV} > 250 \mu M$ or, > upper 95% CI value for relevant reference stations b-MBI > upper 95% CI value for relevant reference stations.¹⁹ 	Tier 2 should be triggered when either or both Tier 1 indicators are exceeded at the Beyond Zone 2 stations.
Minor enrichment permitted but not sufficient to cause ecological degradation or loss of biodiversity	<p>Tier 2 iEQS for identifying moderate enrichment (ES 3):</p> <p>Quantitative macrofaunal indicators (station average):</p> <ul style="list-style-type: none"> AMBI > upper 95% CI for relevant reference stations BQI < lower 95% CI for relevant reference stations Expert judgement that other available indicators (e.g., N, S, H', J' and d) indicate moderate enrichment. 	<p>Farm response actions should be initiated when Tier 2 indicators are triggered (AMBI, BQI, expert judgement) at any of the Beyond Zone 2 stations.</p> <p><i>If only expert judgement available, indications of moderate enrichment = farm response action required. If AMBI and BQI can be calculated then 2/3 indicators triggered = farm management response triggered.</i></p>

² Point equivalent to approximately the transition between 'Moderate' and 'Poor' status based on international data published by Fisheries and Oceans, Canada, and Cranford et al. (2020), and as recommended in the Aquaculture Stewardship Council benthic monitoring whitepaper (ASC 2022). Assumes use of the UV spectrophotometry of sediment pore water method.

Table C-2. Guiding environmental principles, indicators for identifying adverse effects to ecosystem function and response triggers for biogenic habitats

Guiding principles – biogenic habitats	Indicators for identifying adverse effects to ecosystem function	Response trigger
No adverse effect sufficient to disrupt ecosystem function	<p>Video footage (video and still imagery) analyses</p> <ul style="list-style-type: none"> Quantitative: <ul style="list-style-type: none"> Statistically significant change in the percent cover of key taxa relative to appropriate reference station(s)³ Statistically significant change in community structure (positive or negative) relative to appropriate reference station(s).¹⁷ Qualitative <ul style="list-style-type: none"> Presence of any fish-farm derived material Evidence of physical disturbance. <p>Habitat mapping</p> <ul style="list-style-type: none"> Statistically significant changes in the total area of habitat extent (m²), structural complexity (rugosity), and / or seafloor composition (proportion of different substrate types) over time.¹⁷ <p>Soft sediment sampling (sentinel stations)</p> <p>Tier 1 iEQS for identifying moderate enrichment (ES 3):</p> <ul style="list-style-type: none"> S²_{uv} > 250 µM or, > upper 95% CI value for relevant reference stations b-MBI > upper 95% CI value for relevant reference stations. <p>Tier 2 iEQS for identifying moderate enrichment (ES 3):</p> <p>Quantitative macrofaunal indicators</p> <ul style="list-style-type: none"> AMBI > upper 95% CI for relevant reference stations BQI < lower 95% CI for relevant reference stations Expert judgement that other available indicators (e.g., N, S, H', J' and d) indicate moderate enrichment. 	<p>If a statistically significant change in cover for key taxa or community structure is detected based on the BACI design and in conjunction with farm activities, farm management actions should be initiated.</p> <p>Evidence of physical disturbance should be evaluated using expert judgement alongside other indicators, such as farm-waste tracers, to determine whether the farm or external forces (e.g. ship anchoring, oyster dredging) are the likely source.</p> <p>If a statistically significant change in these parameters is detected based on the BACI design, farm management actions should be initiated.</p> <p>If either or both Tier 1 indicators are triggered, expert judgement should be required to assess whether there is evidence of biogenic habitat impact before proceeding to Tier 2.</p> <p>If Tier 2 indicators are triggered (AMBI, BQI, expert judgement) at any of the Beyond Zone 2 stations, farm management response should be initiated.</p> <p><i>If only expert judgement available, indications of moderate enrichment = farm management response triggered. If AMBI and BQI can be calculated, then 2/3 indicators triggered = farm management response.</i></p>

³ Implies the use of a beyond BACI approach to test for a significant control vs impact interaction term. The same statistical design will be applied for univariate (change in the percentage cover of key taxa, total area of extent, habitat extent, rugosity) and multivariate analyses (change in community structure, seafloor composition).