

## The New Zealand King Salmon Company Limited- 2016/2017 Compliance Report for Coastal Permit (U140295)

### Assessment of compliance with consent U140295

This report sets out an assessment of compliance with the conditions of the coastal permit (U140295) held by New Zealand King Salmon for their Kopaua salmon farm. The information in this report is based on the Kopaua Salmon Farm: Annual Monitoring Report (2016-2017), Reef Environmental Monitoring Results for the New Zealand King Salmon Company Ltd Salmon Farms: 2016, and the Marine Environmental Monitoring – Adaptive Management Plan for Salmon Farms Ngamahau, Kopaua, and Waitata (2017-2018) prepared by the Cawthron Institute.

Compliance Status has been indicated using a monitoring traffic light system where **green** indicates compliance; **yellow** indicates technical non-compliance; **orange** indicates that a breach of effects based or best practice consent condition has occurred with minor actual or potential adverse environmental effects, and **red** indicates significant non-compliance where a persistent or significant breach has occurred causing adverse environmental effects.

Please note that the following consent conditions are representative only, they do not include the complete list of conditions of consent.

Condition	Comment	Compliance Status								
<p><b>34.</b> The annual tonnage of nitrogen that may be discharged to the marine farm is to be limited to 7% of the tonnage of feed that may be discharged in accordance with Condition 35 and Table 1 (i.e. if up to 3000 tonnes of feed can be discharged then up to 210 tonnes of nitrogen can be discharged).</p>	<p>1,107 tonnes of feed was discharged at the site in the farms first production cycle (May to December 2016). Nitrogen input during this period was 7.03% in technical non-compliance with 7% limit set by condition 34.</p>									
<p><b>35.</b> The annual tonnage of feed that may be discharged to the marine farm is limited as follows:  a. The initial feed discharged (in at least each of the first three years) shall not exceed the Maximum Initial Feed Discharge specified in Table 1;  b. In any year, the tonnage of feed discharged shall not exceed the Maximum feed Discharge specified in Table 1;  c. Any increase in feed discharged (from one year to the next) shall not exceed the Maximum Increase in Feed Discharge specified in Table 1;  d. Whether or not the annual tonnage of feed discharge may increase above the Maximum Initial Feed Discharge, or may reach the Maximum Feed Discharge, is dependent upon compliance with Condition 36 below.</p>	<p>1,107 tonnes of feed was discharged at the site in the farms first production cycle in compliance with the 1,500 tonne limit set in table 1.</p>									
<p><b>36.</b> The annual tonnage of feed discharged to the marine farm may only be increased above the Maximum Initial Feed Discharge specified in condition 35, or above any subsequent allowable annual feed discharge level, if the following requirements are met:  The requirements of Condition 37  The requirements of conditions 38-44 (relating to compliance with Environmental Quality Standards (EQS)); and  Any specifications for marine farm management in the Marine Environmental Monitoring and Adaptive Management Plan (MEM-AMP) for that year (condition 65).</p> <p><b>Table 1: Maximum initial and maximum annual feed discharges, and maximum increases in annual feed discharges (from one year to the next)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Farm</th> <th>Maximum Initial Feed Discharge (tonnes per annum)</th> <th>Maximum Increase in Feed Discharge (tonnes per annum)</th> <th>Maximum Feed Discharge (tonnes per annum)</th> </tr> </thead> <tbody> <tr> <td>Richmond</td> <td>1500</td> <td>500</td> <td>4000</td> </tr> </tbody> </table>	Farm	Maximum Initial Feed Discharge (tonnes per annum)	Maximum Increase in Feed Discharge (tonnes per annum)	Maximum Feed Discharge (tonnes per annum)	Richmond	1500	500	4000	<p>1,107 tonnes of feed was discharged at the site in the farms first production cycle in compliance with the 1,500 tonne limit set in table 1.</p>	
Farm	Maximum Initial Feed Discharge (tonnes per annum)	Maximum Increase in Feed Discharge (tonnes per annum)	Maximum Feed Discharge (tonnes per annum)							
Richmond	1500	500	4000							

**Environmental Quality Standards (EQS)**

**38.** The discharge of feed, marine biofouling and antifouling at the marine farm shall meet the requirements of conditions 39-44 relating to Environmental Quality Standards (EQS) at all times. Any breach of these requirements shall, as soon as practicable, be notified to the Marlborough District Council and the members of the Tangata Whenua Panel (refer to condition 77).

The EQS was not breached at any of the monitoring sites. No notification to Council or iwi was required.

**Environmental Quality Standards (EQS) - Seabed Deposition**

**39.** EQS Compliance Zones shall be defined for the marine farm, in accordance with Figure 3 and the dimensions and area contained in Table 2.

Table 2: Maximum distances of EQS Compliance Zone 2/3 and Zone 3/4 boundaries from the nearest edge of the marine farm net pens; and the maximum total affected areas of Zones 1, 2 and 3.

Farm	EQS Compliance Zone boundary dimensions (maximum distances)		EQS Compliance Zone Area (Maximum area)
	Distance from nearest net pen to Zone 2/3 boundary	Distance from nearest net pen to Zone 3/4 boundary	Total area of Zones 1, 2 and 3 (the footprint)
	Metres (m)	Metres (m)	Hectares (ha)
Richmond	60	250	10

- a. The above Zones shall be fixed.
- b. Notwithstanding, condition 39A, the size and shape of the above Zones will be reviewed (to enable comparison with the zone dimensions contained in Table 2), after 3 years of operation at the Initial Feed discharge level in Table 1, as part of the Annual Report (refer to condition 67) for that year. The dimension and area of the Zones may be amended as a result of a recommendation in the Annual Report, provided that the total area of Zones 1, 2 and 3 does not exceed by more than 10% from the area specified in Table 2.

The Kopaua Salmon Farm: Annual Monitoring 2016-2017 report details the monitoring of the site in accordance with the EQS compliance zones as shown in table 2 of condition 39.

**40.** At all times, the seabed beneath and in the vicinity of the marine farm shall comply with the EQS specified in Table 3. Zone dimensions and area for compliance purposes shall be defined in accordance with condition 39. Enrichment Stage (ES) shall be defined in accordance with Figure 4 and table 5.

Table 3: Environmental Quality Standards (EQS) – Seabed Deposition

Zone	Compliance Monitoring Location	EQS
Zones 1 & 2 – beside and beneath the net pens	Measured beneath the edge of the net pens – “Pen” Stations on Figure 3	ES ≤ 5.0 No more than one replicate core with no taxa (azbic), No obvious, spontaneous out-gassing (H <sub>2</sub> S/methane), Bacteria mat ( <i>Beggiatoa</i> ) coverage not greater than localized/patchy in distribution.
Zone 3 – near to the net pens	Measured at the Zone 2/3 Boundary Stations on Figure 3	ES ≤ 4.0 Infauna abundance is not significantly higher than at corresponding “Pen” Station Number of taxa >75% of number at relevant / appropriate reference Station(s)
Zone 4 – outside the footprint area	Measured at the Zone 3/4 Boundary Stations on Figure 3	ES < 3.0 Conditions remain statistically comparable with relevant / appropriate reference Station(s)

ES exceedance

- a. In the event that the ES is up to and including 0.3 above the EQS for the 1/2 (Pen), 2/3 or 3/4 Zone Boundary Stations in Table 3, the consent holder shall in the year following receipt of confirmed notice of such an ES result through its monitoring (and allowing one month from any initial notice to provide for re-testing), reduce the amount of feed discharged to the marine farm by 20% of the amount discharged in the year before.
- b. In the event that the ES is greater than 0.3 and not greater than 0.6 above the EQS for the 1/2 Pen, 2/3 or 3/4 Zone Monitoring Locations in Table 3, the consent holder shall in the year following receipt of confirmed notice of such an ES result through its monitoring (and allowing one month from any initial notice to provide for re-testing), reduce the amount of feed discharged to the marine farm by 40% of the amount discharged in the year before.
- c. In the event that the ES is greater than 0.6 above the EQS

The enrichment stage (ES) scores for Pens 1, 2, and 3 were 2.9, 3.8 and 3.8 respectively in compliance with the ≤ 5.0 EQS.

The ES score for the 60N station was 3.2 in compliance with the Zone 1 & 2 EQS of ≤ 5.0.

The ES scores for the 250N and 250S stations were 2.3 and 2.5 respectively in compliance with the Zone 3 EQS ≤ 4.0.

The ES scores for the PS-Ctl-3, PS-Ctl-4, PS-Ctl-5, PS-Ctl-6, and PS-Ctl-7 stations were 2.0, 2.2, 2.1, 2.1, and 2.4 respectively in compliance with the <3.0 EQS.

No EQS breaches were measured so points a – c do not apply.

<p>for the 1/2 Pen, 2/3 or 3/4 Zone Monitoring Locations in Table 3, the consent holder shall with four months from the date the consent holder receives confirmed notice of such an ES result through its monitoring (and allowing one month from any initial notice to provide for re-testing), remove stock and fallow the site until compliance is achieved. Upon any re-stocking, the consent holder shall ensure that the amount of stock shall be designed to ensure that the ES levels required in Table 3 for the 1/2 Pen, 2/3 and 3/4 Zones Monitoring Locations will be met in the following year.</p>		
<p><b>Environmental Quality Standards (EQS) - Copper and Zinc Levels</b>  <b>41.</b> Composite samples of sediments beneath and beside the net pens (measured beneath the edge of the net pen - Pen Stations on Figure 3) shall be assessed against the ANZECC (2000) ISQG-Low criteria for copper and zinc; as a first tier trigger level.</p>	<p>Total recoverable copper and zinc concentrations were significantly below the ANZECC ISQG-Low trigger levels. The measured copper and zinc concentrations were also within the baseline survey and previous reference concentrations.</p>	
<p><b>Environmental Quality Standards (EQS) - Water Column</b>  <b>43.</b> The marine farm shall be operated at all times in such a way as to achieve the following Water Quality Objectives in the water column:</p> <ul style="list-style-type: none"> <li>a. To not cause an increase in the frequency, intensity or duration of phytoplankton blooms (i.e. chlorophyll a concentrations greater than or equal to 5 mg/m<sup>3</sup>) [Note: water clarity as affected by chlorophyll a concentrations is addressed by this objective];</li> <li>b. To not cause a change in the typical seasonal patterns of phytoplankton community structure (i.e. diatoms vs. dinoflagellates), and with no increased frequency of harmful algal blooms (HAB's) (i.e. exceeding toxicity thresholds for HAB species);</li> <li>c. To not cause reduction in dissolved oxygen concentrations to levels that are potentially harmful to marine biota [Note: Near bottom dissolved oxygen under the net pens is addressed separately through the EQS – Seabed Deposition];</li> <li>d. To not cause elevation of nutrient concentrations outside the confines of established natural variation for the location and time of year, beyond 250m from the edge of the net pens;</li> <li>e. To not cause a statistically significant shift, beyond that which is likely to occur naturally, from an oligotrophic/mesotrophic state towards a eutrophic state;</li> <li>f. To not cause an obvious or noxious build-up of macroalgal (e.g. sea lettuce) biomass [Note: to be monitored in accordance with condition 66h].</li> </ul>	<ul style="list-style-type: none"> <li>a. The maximum measured Chl-a concentration was 2.1 mg/m<sup>3</sup>, well within the consented limit of <math>\geq 5.0</math> mg/m<sup>3</sup>.</li> <li>b. The observed variation in phytoplankton biomass and composition was consistent with that observed in the baseline survey.</li> <li>c. Dissolved oxygen (DO) saturations were within the DO water quality standard (WQS) beside the net pens. The first and second step DO WQS was breached on one occasion at the NZKS04 station. Due to there being only a single breach no further action was required or recommended.</li> <li>d. All total nitrogen (TN) results within the WQS (<math>\leq 300</math> mg-N/m<sup>3</sup>). Elevated TN concentrations were measured beside the net pens but the concentrations did not exceed the WQS. TN concentrations were 10mg/m<sup>3</sup> higher at the 500N and 500S stations compared to the far field reference stations but the report states that it is difficult to determine if the increases are meaningful in light of high variability in the observed concentrations from the triplicate sampling.</li> <li>e. There was no conclusions drawn that suggested that any statistically significant shift beyond any natural occurring shift towards a eutrophic state was occurring.</li> <li>f. There is no comment indicating that an obvious or noxious build-up of macroalgal biomass has occurred. The reef monitoring report found no farm related effects on macroalgal biomass.</li> </ul>	
<p><b>44.</b> The marine farm shall be operated at all times in such a way as to comply with Water Quality Standards (WQS), and associated responses, for the near-farm and wider-scale water column environment of Pelorus Sound. Two tiers of response to potential breaches of WQS shall be set, the first trigger further monitoring and the second to require reduced stocking on the marine farm following the next harvest of salmon on the marine farm. The WQS and responses shall be established as follows:</p> <ul style="list-style-type: none"> <li>a. For the first three years of marine farm operation, initial WQS for chlorophyll a (chl a), dissolved oxygen (DO), Total Nitrogen (TN) concentrations and an integrated trophic index to achieve the qualitative Water Quality Objectives a, c, d and e of condition 43 shall be specified in the Baseline Report (condition 64) and may be reviewed in the Annual Report at the end of the first and second years of marine farm operation (condition 67).</li> <li>b. The initial WQS shall be reviewed in the Annual Report at the</li> </ul>	<p>The Kopaua site is being operated in compliance with the Water Quality Standards therefore no WQS response is required.</p> <p>The report covers the chl-a, TN and DO results as well as other water column monitoring to assess the WQS. The WQS have been assessed at the locations required by 44 c).</p> <p>There was only one single breach of the DO WQS; as three consecutive months of breaches did not occur Amber Light response actions were not required.</p>	

<p>end of the third year of marine farm operation (condition 67) and WQS specified to achieve the Water Quality Objectives a-e of condition 43. These WQS shall be reviewed through the Annual Report every three years thereafter unless any other Annual report (condition 67) necessitates earlier review.</p> <p>c. WQS shall be specified at the locations specified in condition 63c.</p> <p>d. In the Baseline Report and each Annual Report, a hierarchy of responses to potential breaches of the WQS shall be specified, including:</p> <ul style="list-style-type: none"> <li>i. A first level response requiring further monitoring and/or analysis to determine the operation of the marine farm is causing the relevant WQS not to be achieved; and</li> <li>ii. A second level response requiring a plan of action as soon as practicable, with clear timeframes to reduce effects on the water column and achieve full compliance with e WQS, through reduced stocking on the marine farm flowing the next harvest of salmon on the marine farm.</li> </ul>		
<p><b>Discharge of Greywater to Coastal Water</b></p> <p><b>45.</b> Greywater may be discharged from the staff facilities on the marine farm, including from showers, wash basin, kitchen and laundry facilities. The greywater discharge shall not exceed 1m<sup>3</sup> per day from the marine farm. The consent holder shall ensure that an appropriate system is operated at the marine farm to determine the volume of greywater discharge. The results shall be provided to the Council not less frequently than once a year. The consent holder shall notify the Council of a non-compliance with this condition, and explain the reason for it, within one month of the consent holder becoming aware of the non-compliance.</p>	<p>Condition 45 greywater discharge volumes have not been provided to Council in technical non-compliance with this condition of consent.</p>	
<p><b>56.</b> The following plans and reports shall be prepared by the consent holder, in order to address the potential effects set out in condition 54 and achieve the Purposes in condition 55.</p> <ul style="list-style-type: none"> <li>a. Prior to the initial placement of the first structure(s) at the marine farm, a Baseline Plan to specify the monitoring and analysis to be undertaken in order that baseline information can be obtained and analysed prior to the initial placement of the first structure(s) at the marine farm;</li> <li>b. Prior to initial placement of the first structure(s) at the marine farm, a baseline Report which presents the results from the monitoring and analysis undertaken in accordance with the Baseline Plan, makes recommendation for the development of the marine farm and the monitoring to be undertaken in the first year of operation of the marine farm, and specifies the initial WQS and responses in accordance with condition 44;</li> <li>c. For each year of operation of the marine farm, a MEM-AMP to provide a summary of the relevant recommendations from the previous year's Baseline Report or Annual Report, and specify the proposed monitoring and marine farm management actions for the following year. The MEM_AMP may be prepared as on Plan jointly with the MEM-AMP(s) for other marine farms managed by the same consent holder.</li> <li>d. For each year of operation of the marine farm, and Annual Report to provide details of the monitoring results from the previous year, an analysis of the monitoring results (including in terms of compliance with the EQS), and recommendations for changes to the monitoring and marine farm management actions for the following year. The Annual Report may be prepared jointly with Annual Reports for other marine farms managed by the same consent holder.</li> </ul>	<ul style="list-style-type: none"> <li>a. a baseline monitoring plan produced by NIWA dated May 2014 has been provided to Council.</li> <li>b. a baseline report produced by NIWA dated May 2015 has been provided to Council.</li> <li>c. a marine environmental monitoring adaptive management plan 2016-2017 produced by Cawthron dated October 2016 has been provided to Council.</li> <li>d. An annual report produced by Cawthron which provides details of the first year of monitoring was provided to Council in May 2017. This report covers all aspects required by condition 56 d).</li> </ul>	
<p><b>58.</b> Prior to finalising the plans and reports specified in condition 56, the consent holder shall provide them in draft form to the Peer Review Panel for its review, assessment, recommendations and reports, in accordance with conditions 68-74. The consent holder shall have particular regard to any recommendations from the Peer Review Panel in finalising these plans and reports. The plans and reports shall specify how the consent holder has had regard to any recommendations from the Peer Review Panel, if any recommendations have been adopted and the reasons why.</p>	<p>The annual report was reviewed by the Peer Review Panel. The comments received following the PRP review of the report have been responded to and the required alterations have been made in the report.</p>	

<p><b>59.</b> Prior to finalising the plans and reports specified in condition 56, the consent holder shall provide them to the members of the Tangata Whenua Panel (see condition 77), and provide that Panel with the opportunity to:</p> <p>a. Receive and discuss with the consent holder the results of all monitoring and analysis required by the conditions of this consent;</p> <p>b. Review and provide input to the preparation of the Baseline Plan and Baseline report, the MEM-Amp and the Annual Report, required by condition 56.</p>	<p>The plan and reports were provided and the feedback relating to the MEM-AMP was addressed by Cawthron in compliance with this condition of consent.</p>	
<p><b>60.</b> Having had particular regard to any recommendations from the Peer Review Panel, the consent holder shall provide the following final plans and reports to the Council for its approval in terms of the conditions of this consent:</p> <p>a. Baseline Plan;</p> <p>b. The Baseline Report; and</p> <p>c. Any Annual report which includes:</p> <p>i. Any changes in any WQS;</p> <p>ii. Any adjustment to the area and dimensions of the seabed EQS Compliance Zones; or</p> <p>iii. Any increase in the maximum annual tonnage of feed that may be discharged to the marine farm.</p> <p>The monitoring and analysis required in terms of the Baseline Plan shall not be commenced until the Baseline Plan has been approved by Council.</p> <p>No structure(s) shall be placed on the marine farm until the Baseline Report has been approved by the Council.</p> <p>No change may be made to any WQS, no adjustment may be made to the area or dimensions of any seabed EQS Compliance Zone, and there shall be no increase in annual tonnage of feed that may be discharged to the marine farm, until the relevant aspects of the Annual Report that includes that/those recommendations(s) is approved by the Council.</p> <p>Following its approval by the Council, the consent holder shall provide copies of the relevant final plans and reports to the Tangata Whenua Panel (refer condition 77).</p>	<p>c. The final annual report was provided to Council on following a review from the peer review panel.</p>	
<p><b>61.</b> Other than as specified in condition 60, having had particular regard to any recommendations from the Peer Review Panel, the consent holder shall provide the following plans and reports specified in condition 56 to the Council and the Tangata Whenua Panel (refer condition 77), in accordance with the following timing:</p> <p>a. The first MEM-AMP - following the provision of the Baseline Report to the Council and prior to the first discharge of feed to the marine farm;</p> <p>b. Each subsequent annual MEM-AMP - 31 July each year.</p> <p>c. The Annual report - by 30 April each year.</p>	<p>b. the MEM-AMP for 2017/2018 was provided to Council on 31 July 2017.</p> <p>c. the Annual report for 2016/2017 was provided to Council prior to 30 April 2017.</p>	
<p><b>65. The MEM-AMP shall specify the following:</b></p> <p>a. A summary of the recommendation from the Baseline Report (in the case of the first MEM-AMP for the marine farm) or from the previous year's Annual Report regarding marine farm management actions and monitoring (including any increases or decreases in the tonnage of feed to be discharged).</p> <p>b. A description of all monitoring to be undertaken for the coming year (detailed monitoring requirements are set out in condition 66). This shall include the methods, locations and frequency of the monitoring, including any control/reference sites. This shall give effect to any recommendations contained in the Annual Report for amendments to the dimensions and area of the EQS compliance Zones specified in Table 2 and/or to the location of the representative compliance monitoring Stations specified in Table 3, following the review of the results of the monitoring undertaken after 3 years of operation at the initial Feed Discharge level in Table 1.</p> <p>c. All monitoring and management actions to be undertaken at the marine farm in order to meet the requirements of conditions 38-44 (including any areas or decreases in the tonnage of feed to be discharged).</p> <p>d. Any other actions to be undertaken in order to address the potential effects from the operation of the marine farm set out in</p>	<p>a. recommendations from the previous reports have been used in the MEMAMP. It has been highlighted that fine scale water column monitoring is unlikely to detect farm related effects; an s127 application has been lodged to vary condition 66 e) relating to this sampling.</p> <p>b. The monitoring for each of the requirements of condition 65 has been outlined in the MEMAMP. The methods, locations and frequency of the monitoring of the three farms have been detailed. The recommendations from previous monitoring reports have been taken into account for the 2017/18 monitoring.</p> <p>c. The monitoring for EQS and WQS are detailed in the MEMAMP.</p> <p>d. The MEMAMP includes the monitoring for soft sediment habitats, reef habitats, the water column, and lighting effects in accordance with the condition of consent.</p>	

<p>condition 54 and achieve the Purpose in condition 55, including to avoiding, remedying or mitigating any significant adverse effects from the operation of the marine farm identified in the previous year's Annual Report.</p>		
<p><b>66. The MEM-AMP shall include the following monitoring:</b></p> <p>a. The level of sampling and range of environmental variables, (e.g. sediment grain size, infauna, percent organic matter, redox &amp; sulphides) to be measured annually at each of the near-farm benthic (soft-sediment) monitoring stations in order to determine compliance with the EQS - Seabed Deposition in condition 40. This includes appropriate farm-specific reference station, which may also double as far-field soft-sediment monitoring sites (see condition 66f);</p> <p>b. Monitoring in order to determine compliance with the EQS - Copper and Zinc levels required by conditions 41 and 42 using a decision-tree approach, whereby monitoring effort increases in focus and intensity as trigger levels (representing the increased likelihood of ecological effects) are reached.</p> <p>c. Monitoring in order to determine compliance with the WQS in condition 44. Throughout the term of the consent this shall include long-term water column monitoring for nutrient (NH<sub>4</sub>-N, NO<sub>3</sub>-N, NO<sub>2</sub>-N, DRP, Si, TN and TP) and chlorophyll a concentrations, phytoplankton composition and biomass, salinity, clarity, temperature, turbidity and dissolved oxygen (DO) at locations stipulated in condition 63c. The precise location of the long-term monitoring stations and the range of specific nutrient parameters monitored may, however, be adjusted over time in response to monitoring results and/or in response to modelling considered necessary by the Peer Review Panel in accordance with condition 70c. This monitoring is to be undertaken at least four times per year with at least two surveys occurring during mid-summer periods of highest salmon feed discharge rates and at least two surveys occurring periods associated with winter/spring and/or autumn diatom maxima.</p> <p>d. Monitoring intensity of a-c above shall be dependent upon the age of the marine farm, how stable the feed discharge levels have been over the 12 months, and whether or not the marine farm had been compliant with the EQS over the last 2 years (and the nature of any breaches).</p> <p>e. Targeted water column surveys to quantify the localised effect of the marine farm on surrounding water quality, for the purpose of obtaining information regarding marine farm-specific, near-farm mixing properties in order to provide a context for evaluating compliance with the EQS – WQS in condition 44. This shall involve a series of fine-scale surveys in the vicinity of the marine farm (within 1km from the net pens) measuring: salinity, clarity, temperature, chlorophyll a, turbidity, dissolved oxygen (DO), nutrient concentrations (NH<sub>4</sub>-N, NO<sub>3</sub>-N, NO<sub>2</sub>-N, DRP, Si, TN and TP) phytoplankton composition and biomass along transects that move away from the marine farm and span potential nutrient gradients. The surveys shall be undertaken at least twice per year and continued for at least two years after the marine farm has reached stable maximum feed discharge levels and not future increases are proposed.</p> <p>f. Annual quantitative and qualitative monitoring for potential effects at soft sediment sites in neighbouring bays near to, and removed from, the marine farm, in order to ensure that the marine farm is not resulting in seabed enrichment in areas of natural deposition in neighbouring bays. The sites shall be chosen based on potential exposure to increased biodeposition including any areas in those bays identified by the Tangata Whenua Panel (refer to condition 77) as customary kaimoana gathering areas. This monitoring shall be undertaken at a selection of representative soft sediment sites, which may also double as reference sites for near-farm monitoring (see condition 66a), and shall be continued until at least 5 years after the marine farm has reached a stable level of feed discharge and no future increases are proposed. [The same monitoring may be undertaken for a group of marine farms, as it will assess the cumulative effects from all marine farms in that group.]</p>	<p>a. The level of sampling, analytes, sampling methods, locations and timing have been provided in table 2 and throughout part 3 of the MEMAMP.</p> <p>b. The copper and zinc monitoring has been outlined in the MEMAMP. A grab sample is to be taken between January and March 2018. The decision tree from the BMP will be used. The decision tree has not been included in the MEMAMP but should be added for completeness of the MEMAMP as a standalone document.</p> <p>c. Routine and full suite monitoring of the water column are being used to determine compliance with WQS. The required parameters have been outlined for monitoring in the MEMAMP. Monitoring has been outlined for February, March, July and August.</p> <p>d. The monitoring intensity of the marine farm is reflective of the age of the marine farms. Therefore the MEMAMP for the three new farms has been combined.</p> <p>e. Part 4 of the MEMAMP discusses water column monitoring. Fine scale monitoring is to be used to fulfil part e. All of the required parameters have been outlined in the MEMAMP for monitoring. Surveys are planned for August and March.</p> <p>f. Reference stations are being used for monitoring of farm effects in neighbouring bays. The reference stations used in the 2016/2017 monitoring will continue to be used.</p> <p>g. The MEMAMP outlines that there are two potential impact sites at the Kopaua marine farm. Reference sites for these impact sites are also outlined. The MEMAMP outlines that reef monitoring will be carried out in November/ December 2017. Permanent station photo quadrants, random photo quadrants, and video footage around the site will be obtained to assess taxa presence/absence, composition or sedimentation. Established permanent transects will be used and five 1m<sup>2</sup> quadrants along the transect will be surveyed. Dominant habitat boundaries and abundance of fish will be noted.</p> <p>h. the monitoring of ephemeral macroalgae has been outlined with the Reef Monitoring information in the MEMAMP. Macroalgae, sessile invertebrates, mobile invertebrates and fish abundance will be monitored using fixed transects. Site RB4 has been incorporated into the monitoring programme as an area identified by Tangata Whenua as a customary kaimoana gathering area.</p> <p>i. N/A</p> <p>j. The MEMAMP outlines sampling to address lighting effects on water column biology. Sampling of zooplankton to assess zooplankton abundance, and community composition of zooplankton and larval fish will be carried out by approximately 12 vertical tows within and outside the lighted pens.</p> <p>k. The lighting effects are monitored by NZKS staff on four occasions between April and October. The methodology for monitoring is outlined in the MEMAMP.</p>	

<p>g. Annual quantitative and qualitative monitoring of habitats that support notable biological features under or within 1km of the net pens ('reef' monitoring), including any area of blue cod habitat or any areas identified by the Tangata Whenua Panel (refer to condition 77) as customary kaimoana gathering area, in order to ensure that the operation of the marine farm is not causing adverse effects as a result of biodeposition. Monitoring shall also include comparable habitats at appropriate reference sites. This monitoring shall be continued until at least 5 years after the marine farm has reached a stable level of feed discharge and no future increases are proposed. For the purposes of this condition 'notable biological features' shall include but not be limited to areas of significant reef, tubeworm mounds and hydroid colonies. [This condition will only apply to those marine farms with notable biological features within 1km of the marine farm.]</p> <p>h. Annual quantitative and qualitative monitoring of ephemeral macroalgae (e.g. <i>Ulva</i> sp.), benthic algal films and perennial algae (e.g. <i>Hormosira banksii</i>) percentage cover and the abundance of grazing invertebrates (e.g. cats' eyes snails (<i>Turbo smaragdus</i>) and Kina (<i>Evechinus chloroticus</i>) on intertidal and shallow subtidal rock reefs, including any reefs identified by the Tangata Whenua Group (refer to condition 77) as customary kaimoana gathering area in order to ensure that the operation of the marine farm does not cause an obvious or noxious build-up of macroalgal (e.g. sea lettuce) biomass. Monitoring shall be undertaken two times during one year at the following locations:</p> <ul style="list-style-type: none"> <li>i. At or near locations expected to have the greatest potential for marine farm-related cumulative enrichment effects (either within 1km of the marine farm or in neighbouring bays);</li> <li>ii. At or near locations further away from the marine farm or groups of marine farms in locations that are expected to have less marine farm-related cumulative enrichment effects.</li> </ul> <p>This monitoring shall be continued until at least 5 years after the marine farm has reached a stable level of feed discharge and no future increases are proposed.</p> <p>i. After 3 years of operation at the Initial Feed Discharge level in Table 1, a repeat of the baseline monitoring undertaken in accordance with condition 63a, in order to review the dimensions and areas of the EQS compliance Zones in Table 2, condition 39, and the location of the compliance monitoring Stations specified in Table 3, condition 40. This monitoring may incorporate the compliance monitoring for the EQS – Seabed Deposition in terms of condition 66a for that year.</p> <p>j. One-off monitoring of the effects of submerged artificial lighting on the biology of the water column (e.g. zooplankton composition and abundance), when the submerged artificial lights are fully operation, to compare with the assessment of effect of submerged artificial lighting undertaken at Clay Point marine farm, in order to confirm that the effects are similar. (To apply to any farm which is exposed to lower current speeds than Clay Point where the assessment of effect of submerged artificial lighting for the application was undertaken.)</p> <p>k. Quarterly monitoring over 2 years by scientifically advised marine farm staff of the effects from submerged artificial lighting on changes in night-time feeding activity by fish, seabirds and marine mammals in and around the illuminated net pens, in order to confirm that the magnitude of these effects are generally as expected.</p> <p>l. Monitoring of feed loss at a range of appropriate times across a full production cycle, once the marine farm has reached a stable level of feed discharge and no future increases are proposed, to establish feed loss levels and their variability through time.</p> <p>m. Seasonal monitoring of the size and composition of aggregations of pelagic and demersal fish beneath the marine farm at a range of appropriate times across one year, once the marine farm has reached a stable level of feed discharge and no future increases are proposed.</p>	<p>l. N/A</p> <p>m. N/A</p> <p>The MEM-AMP meets the requirements of this condition of consent.</p>	
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**67.** The Annual Report shall include, but not be limited to, the following:

- a. A statement as to the tonnage of feed and nitrogen discharged each month over the previous year.
- b. The results of all monitoring undertaken in the previous year.
- c. A comprehensive analysis of the results of that monitoring, including:
  - i. whether the monitoring information obtained is fit for the purpose of determining the effects from the operation of the marine farm and for determining whether compliance with the EQS specified in conditions 38-44 is achieved.
  - ii. whether there are any evident trends of effects from the operation of the marine farm.

**EQS - Deposition on the Seabed**

- d. An assessment and conclusions as to whether compliance with the EQS specified in condition 48 has, or has not, been achieved for the previous year.
- e. Recommendations as to any amendments to management practices (including any increases or decreases on the tonnage of feed to be discharged) at the marine farm in order to ensure that the EQS in condition 40 are complied with.

**EQS – Copper and Zinc Levels**

- f. An assessment and conclusions as to whether compliance with the ANZECC (2000) ISQG-Low criteria for copper and zinc set out in condition 41 has, or has not, been achieved for the previous year.
- g. Where the ANZECC (2000) ISQG-Low criteria for copper and zinc have been exceeded, recommendation as to any amendments to monitoring and management actions at the marine farm, in accordance with condition 42.

**EQS – Water Column**

- h. An assessment and conclusions as to whether the WQS specified in condition 44 have, or have not, been complied with, for the previous year.
- i. Recommendations as to any amendments to management practices (including any increases or decreases in the tonnage of feed to be discharged) at the marine farm, in order to ensure that the WQS specified in condition 44 continue to be complied with. In the case of non-compliance with the WQS, recommendations as to monitoring, analysis and/or management responses in accordance with condition 44d.

**Review of the Dimensions of the EQS Compliance Zones in Table 2**

- j. Following 3 years of operation at the Initial Feed Discharge level in Table 1, a review of the results of the monitoring undertaken in terms of condition 66i. This shall include a comparison of those monitoring results with the dimensions and areas of the EQS compliance Zones specified in Table 2, condition 39. In accordance with condition 39b, the Annual Report shall specify any recommendations for amendments to the dimensions and areas of the EQS compliance Zones in Table 2, condition 39, and to the location of the representative compliance monitoring Stations specified in table 3, condition 40, for the subsequent years;

**Determination of WQS**

- k. The Annual report will include the relevant reviews of the near farm and wider-scale water column and ecosystem monitoring results and of WQS and associated hierarchy of responses to breaches of the WQS as specified in condition 44. Prior to specifying amendments to the WQS and responses, the consent holder shall consult with the Council and the Department of Conservation.

**Other Recommendations**

- l. Where identified as a result of the monitoring, any recommendations for other actions to be undertaken to address potential effects from the operation of the marine farm set out in condition 54 and to achieve to Purposes in condition 55, including to avoid, remedy or mitigate any significant adverse effects from the operation of the marine farm.
- m. Any other recommendation for amendments to the

- a. The report states the tonnage of feed used over the previous 12 month period.

- b. The results of the monitoring carried out in the 2016/2017 monitoring period are discussed in the report.

- c. The report analysed the monitoring results and determined these against the EQS. The report outlined the summary of findings. The results were compared to the baseline monitoring results.

- d. The report concludes that compliance with the EQS has been achieved.

- e. No recommendations regarding management practices or feed discharge rates were made.

- f. The copper and zinc concentrations were compared against the ANZECC ISQG-low criteria to show that they are compliant with these criteria.

- g. no recommendations are required.

- h. An assessment of the compliance with the WQS has been provided in the results section of the report.

- i. no recommendations to the management practices of the site were made as there were no compliance issues with the WQS.

- j. not applicable.

- k. The report covers the near farm and wider scale water column and ecosystem monitoring and has commented on the compliance with the WQS for these sites. The report states that the WQS are being met and therefore no management response is required.

- l. Recommendations have been made; no recommended actions are required to address potential effects from the operation of the marine farm.

- m. Recommendations have been made in regards to further monitoring including the following: continuing with fine scale monitoring at referenced stations; exclusion of Chlorophyll-a, phytoplankton biomass and community composition, and silicate from fine scale monitoring; reducing fine scale monitoring of phosphorus to near bed samples around the net pen; exclude DRSi and phosphorus, and phytoplankton biomass and composition from full suite monitoring; include urea-N and PN in fine scaling sampling for the next monitoring period; carry out a one-off investigation of diel variation in nutrient and DO concentrations around the net pens; carry out a physical mixing study using an artificial dye tracer.



monitoring programme for the following year.		
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**Please Note:**

Pursuant to section 36 of the Resource Management Act 1991 and the Marlborough District Council's schedule of fees, the consent holder shall be responsible for all costs associated with the monitoring of this consent in accordance with the schedule of fees. Where non-compliance is noted on an inspection visit, remedial action is identified and advised to the consent holder in writing. A follow-up visit may confirm that appropriate remedial action has been taken. No charge is made for this visit if the consent holder is at this stage complying with the consent conditions. If the conditions of the consent are not being complied with the consent holder is charged and subsequent visits maybe require.