

**From:** Mark Preece  
**Sent:** 7 May 2020 16:49:31 +1200  
**To:** Claire Frooms-8094;monitoring  
**Subject:** RE: Response to queries on low flow sites  
**Attachments:** CAL\_2029\_Fletcher\_NZKS\_Management response for Forsyth Bay salmon farm\_20200507.pdf

Hi Claire

Trust all is well.

Please see attached Cawthron's letter addressing the suitability of the proposed management responses. Please let me know if you want to catch up (via phone/zoom), as we are wanting to mobilise our operational team as soon as possible to execute the management response.

Mant thanks.

From  
Mark

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**From:** Claire Frooms-8094 <Claire.Frooms@marlborough.govt.nz>  
**Sent:** Wednesday, 6 May 2020 7:17 AM  
**To:** Mark Preece <Mark.Preece@kingsalmon.co.nz>  
**Subject:** Fwd: Response to queries on low flow sites

Hi Mark,

Thanks for sending this through. Can I just confirm will we be seeing something else from Cawthron which addresses their views of the management options you proposed for Forsyth Bay. If you're able to get them to provide something in relation to that it would be very helpful.

With thanks,

Claire

Sent from my iPhone

Begin forwarded message:

**From:** monitoring <[monitoring@marlborough.govt.nz](mailto:monitoring@marlborough.govt.nz)>  
**Date:** 30 April 2020 at 8:23:55 AM NZST  
**To:** Claire Frooms-8094 <[Claire.Frooms@marlborough.govt.nz](mailto:Claire.Frooms@marlborough.govt.nz)>  
**Subject:** FW: Response to queries on low flow sites

Hi Claire,

Received in monitoring inbox.

Thanks,  
Rachel

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**From:** Mark Preece [<mailto:Mark.Preece@kingsalmon.co.nz>]  
**Sent:** Wednesday, 29 April 2020 2:29 PM  
**To:** monitoring  
**Subject:** Response to queries on low flow sites

Kia ora Claire

See attached a letter prepared by Cawthron to address the queries MDC had about the low flow site reports. If you have any other queries, please don't hesitate to contact me

Thanks

Me rongo

Mark

**Mark Preece**

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7 May 2020

Mark Preece  
The New Zealand King Salmon Co. Ltd.  
43 Dublin Street  
Picton 7220

ID: 2029

## **Re: Management response for the Forsyth Bay salmon farm**

Dear Mark

The Cawthron Institute (Cawthron) has been asked to provide context around the appropriateness of the management response proposed by New Zealand King Salmon (NZKS) with regards to the results of the 2019 annual environmental monitoring for the Forsyth Bay farm<sup>1</sup>. We have been told that moving the farm within the existing consent boundaries is the preferred response of four management options, but we will discuss each of the possible options.

### **Background: Seabed enrichment adjacent to the Forsyth farm**

Environmental monitoring was undertaken by Cawthron on 12 November 2019 and addressed depositional effects on soft-sediment habitats, as well as effects on some aspects of water quality. The soft-sediment sampling design comprised seven compliance monitoring stations: three pen stations within the zone of maximum effects (ZME), one station at the boundary of the transitional zone (50 m), one station at the outer limit of effects (OLE; 150 m), and two reference stations (see Figure 1). Enrichment levels at the pen stations were found to be very high, with a considerable increase in Enrichment Stage (ES) scores over the previous 12 months (October 2018: ES 3.2–4.4, November 2019: ES 5.6–6.1). Seabed enrichment at the Pen 1 station (ES 6.1 ± 0.6) was not compliant with the consented environmental quality standards (EQS) set out in the resource consent (assumed ES < 6.0).

Additional benthic sampling was carried out by NZKS (led by yourself) in early April 2020 to qualitatively assess infauna communities and visual seabed characteristics. Single replicate sediment samples were collected at > 20 locations around the perimeter of the farm, using a hand-operated van Veen grab. Samples were processed largely following the Type 1 benthic monitoring protocol (infauna samples only) as outlined in the Best Management Practice (BMP) guidelines<sup>2</sup>. In addition, video footage of the seabed along

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<sup>1</sup> Fletcher L, McGrath E, Newcombe E, Elvines E 2020. Annual environmental monitoring at the Forsyth Bay, Waihinu Bay, Otanerau Bay and Ruakaka Bay salmon farms 2019. Prepared for The New Zealand King Salmon Co. Ltd. Cawthron Report No. 3483. 61 p. plus appendices.

<sup>2</sup> MPI 2019. Best Management Practice guidelines for salmon farms in the Marlborough Sounds: Part 1: Benthic environmental quality standards and monitoring protocol (Version 1.1 January 2018). New Zealand Aquatic Environment and Biodiversity Report No 219. Prepared for Fisheries New Zealand by the Benthic Standards Working Group (N Keeley, M Gillard, N Broekhuizen, R Ford, R Schuckard, S Ulrich). 33 p. plus appendices.

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two transects was obtained using a remotely operated vehicle (ROV). We are told that the results largely corresponded with the full-suite monitoring which had occurred 5 months prior. Visual inspection of macrofaunal communities present indicated a zone of severe enrichment adjacent to the northern pens, on the inshore side of the structures.

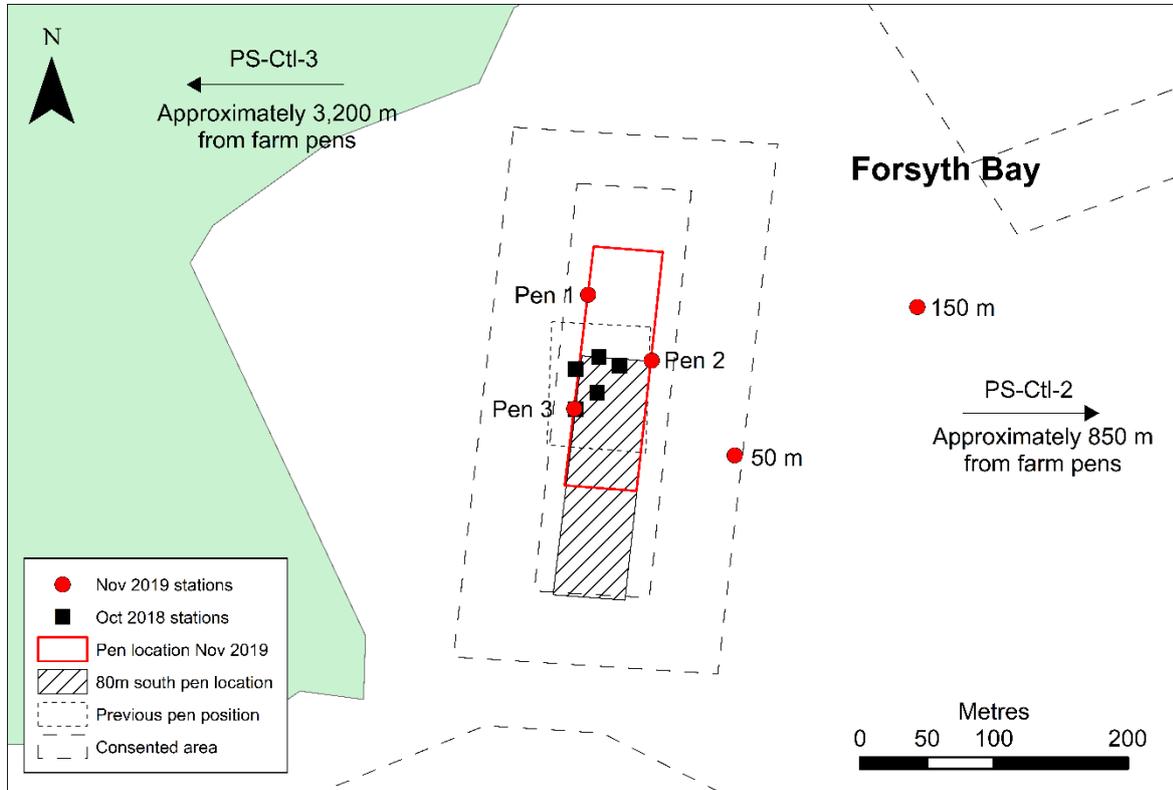


Figure 1. Pen locations and environmental monitoring sampling stations at the Forsyth Bay salmon farm. 'PS-Ctl' = Pelorus Sound Control. Position accuracy is  $\pm 5$  m.

Current enrichment levels at the northern end of the Forsyth farm are considered undesirable as conditions are at the point that even the hardy opportunistic species are being compromised. This means that the benthos is theoretically past the point of maximum organic assimilation and is shifting into a phase of organic accumulation, which will prolong the recovery times. A management response is therefore required to avoid further degradation of the seabed at this site.

### Proposed management response options

NZKS have outlined four potential management response options:

1. Leave the farm in the current location
2. Move the farm ~80 m southwards within the 2 ha authorised area
3. Immediate harvest of 'underweight' fish
4. Relocation of the farm to Waihinau Bay, followed by relocation to Crail Bay

NZKS have indicated that for both Options 1 and 2 the current production cycle would be completed using an interim harvest (July and August 2020) to minimise feed discharge (predicted reduction of 321 tonnes). Final harvest would then be brought forward one month and completed by November 2020. The use of aeration systems ('upwellers') would also be maintained to induce water flow over the benthos. In addition, NZKS would commit to undertaking a site remediation project, and re-stocking of the site in the future would be reviewed and only continued after the site has remediated.

The suitability of each management option is discussed separately below.

### **Option 1: Leave the farm in the current location**

The annual monitoring indicated very high levels of seabed enrichment adjacent to the pens at the Forsyth farm. This was particularly evident for the northern end of the farm and it is likely that seabed conditions have further deteriorated since this time<sup>3</sup>. Leaving the farm in the current location will mean an additional 6 months of feed (~750 tonnes) is discharged over the most severely impacted zone. This will likely result in a further deterioration in ES scores for this station, and an associated higher degree of non-compliance, at the next environmental monitoring to be undertaken during October 2020. We would therefore be hesitant to support Option 1 due to the cumulative negative environmental effects at the northern end of the pens.

### **Option 2: Move the farm ~80 m southwards within the 2 ha authorised area**

Relocation of the farm ~80 m southwards would reduce waste deposition to the most severely impacted area of seabed. The southern portion of the authorised area has not had stocked pens present since the farm was previously fallowed in October 2013. A smaller farm structure was installed when the site was reinstated in May 2015, which roughly covered only the central third of the authorised area (see Figure 1). As the Forsyth site has very low water flow, the waste footprint is relatively small and centred very near to the pen structures. This is confirmed by the comparatively minor enrichment levels measured at the 50 m sampling station ( $ES\ 2.6 \pm 0.3$ ; see Figure 1). Seabed conditions in the southern portion of the lease area are therefore expected to have a higher assimilative capacity<sup>4</sup> than sediments beneath the northern portion of the site. Moving the farm will result in an extension to the current depositional footprint southwards, with little or low levels of organic waste deposited at the highly impacted northern portion. Cawthron is supportive of this approach.

### **Option 3: Immediate harvest of 'underweight' fish**

NZKS have advised that there is currently a lack of humane harvest methods (i.e. harvest vessel operating in Tory Channel) as well as processing, freezing and sales capacity. In addition, harvest of stock to landfill is not seen as a socially acceptable option. As such, Option 3 is considered undesirable.

<sup>3</sup> While interim sampling was carried out by NZKS in April 2020, this only coarsely assessed macrofaunal community composition and abundance and did not quantify other environmental indicators such as sediment organic content, redox potential and total free sulphide levels.

<sup>4</sup> Ideally sediment conditions in this area would be assessed using Type 2 full suite monitoring prior to moving the farm, however, this will not be possible in the short-term due to Covid-19 restrictions.

#### **Option 4: Relocation to Waihinau Bay, followed by relocation to Crail Bay**

There are no EQS relating to seabed effects specified in the consent conditions for the Waihinau farm, so site compliance would not be affected by a deterioration in benthic conditions. However, the required increase in feed discharge at Waihinau will almost certainly negatively impact benthic conditions at this site, which had shown improved enrichment levels in the most recent annual monitoring. This was particularly apparent at the Pen 1 sampling station (ES  $5.2 \pm 0.7$  and ES  $2.7 \pm 0.1$ , October 2018 and November 2019, respectively), likely due to the inshore pens being unstocked. Therefore, increasing the level of farm activities will reverse the recovery in sediment condition that has occurred at this site.

Both the Crail Bay licenses (MFL-32 and MFL-48) have been followed since December 2011 and reintroduction of stock to either of these sites will also have environmental ramifications. The Crail Bay licenses are considered marginal sites for salmon farming. They have the lowest flow regimes of all the consented sites, with average water current speeds of about 2.5–3.0 cm/s<sup>5</sup>. Both sites had also previously been managed under a fallowing strategy, with an associated lower level of impact tolerance than the other low-flow farms. Due to the unsatisfactory site characteristics, it is possible the Crail Bay licenses may become non-compliant with their EQS if the consented amount of feed is discharged.

#### **Appropriateness of the preferred management response**

NZKS have advised that moving the farm ~80 m south, to the boundary of the authorised area, is their preferred management response for the Forsyth farm. We consider this management response to be the most appropriate option as well, as evidenced by the suitability factors discussed above. The size of the impacted area will be increased by moving the pen structures south. However, if the farm remains in the current position there will almost certainly be further site compliance issues. We would recommend that the current pen stations (Pen 1-3; see Figure 1) are included in the next annual monitoring. If the farm is moved south, a further two stations should be included adjacent to the new pen location (i.e. within the southern portion of the lease area). This is to document any changes in seabed condition following movement of the farm.

Although adherence to the BMP guidelines is not required under the current Forsyth farm consent, the guidelines do provide additional context with regards to potential management responses. Under the BMP guidelines, the ES score at Pen 1 (ES  $6.1 \pm 0.6$ ) would elicit a 'major' management response (i.e. as the lower bound of the 95% confidence interval is  $> 5.3$  and  $\leq 5.6$ ; see Table 5 of the BMP guidelines). Under this action level, the consent holder must plan and undertake a significant management response (e.g. substantial feed reduction) appropriate to reduce the enrichment levels to within the required EQS within 24 months from the initial survey that exceeded the

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<sup>5</sup> Dunmore R, Keeley N. 2012. Environmental Impacts of the MFL-32 Salmon Farm: Annual Monitoring Report 2011. Prepared for New Zealand King Salmon Company Limited. Cawthron Report No. 2076. 15 p. plus appendices.  
Dunmore R, Keeley N. 2012. Environmental Impacts of the MFL-48 Salmon Farm: Annual Monitoring Report 2011. Prepared for New Zealand King Salmon Company Limited. Cawthron Report No. 2075. 14 p. plus appendices.

permitted EQS. It is noteworthy that the proposed fallowing of the site at the completion of the current production cycle would meet the requirements for the most severe 'destocking' management response outlined in the BMP guidelines. Based on these proposed management actions, Cawthron is supportive of this approach.

We trust that the above assessment is sufficient for NZKS and Marlborough District Council's needs. However, please do not hesitate to contact us if you require further information.

Yours sincerely,

Scientist



Lauren Fletcher  
Coastal Ecologist  
Cawthron Institute

Reviewed by



Holly Bennett  
Coastal Ecologist  
Cawthron Institute