

Hearing Submission

Kenepuru and Central Sounds Residents' Association (KCSRA)

**Re Applications U190357 and U140294 – Waitata Reach, Pelorus Sound.
From New Zealand King Salmon Company Limited (NZKS).**

Expansion and then operation of the resultant expanded footprint site under existing consent conditions.

Introduction

1. On behalf of the Kenepuru and Central Sounds Residents' Association (**KCSRA**). I would like to thank the Council for the opportunity to talk to our submission on above matter.
2. My name is Andrew Caddie and I am the President of KCSRA. The Association was incorporated in 1991 and currently has over 270 members (mainly household) who predominately reside full or part time in the Kenepuru Sound and Central Pelorus. Our objectives include among other things to coordinate dealings with central and local government. We are an active organisation dealing with a wide range of matters of concern and/or interest to members. For a fuller grasp of our activities go to our website www.kcsra.org.nz.
3. In terms of my professional background I hold two tertiary qualifications - a Bachelor of Forestry Science and a LLB, both from Canterbury University. I was a forester for a number of years with the then NZ Forest Service. Following a period of OE I obtained my LLB and practiced law as a commercial solicitor for a number of years at various large National legal firms.
4. I have been a member of KCSRA since the early 1990's and in 2010 agreed to become a committee member. Following a period as Vice President I am now in my second year as President. Our submission details why we are involved in opposing this application but suffice to say KCSRA has been forced to take an active interest as NZKS has sought to massively expand its operations in an area of great interest to our members- the Pelorus.
5. A most unusual aspect of the NZKS application has been the oft acknowledged absence or lack of information to give a definitive answer to the many troubling aspects of this unnecessary application. I particularly refer to the Sections 42 A of the RMA report the Council had its Senior Resource Management Officer Mr Peter Johnson prepare. In order to fill those gaps KCSRA (a voluntary and under resourced community organization whose major asset is its dedicated and diverse committee members) had to utilize the talents and experience of these members.
6. Accordingly, both KCSRA and I are greatly indebted to the work of Hanneke Kroon who appears with me today. Hanneke holds a Masters of Science degree in Electrical Engineering from a Dutch university and worked in the field of factory automation. Together with her husband she sailed from the Netherlands to New Zealand during the early nineties and gained residency here, working in Auckland as a project manager until relocating to the Sounds – Elie Bay. With her professional background Hanneke has excellent analytical and numerical skills and we used those to good effect to try and fill some of these troubling data and information gaps.

7. By way of a quick aside the Association wishes to record its amazement at the audacity of NZKS proceeding with this hearing. It is extraordinary to work through the Section 42 A report (Agenda bundle) and see the number of times the Council planning officer has concluded that the Council had inadequate information to determine the proposal. The harbormasters report in the Agenda bundle (appendix 11) is particularly sobering and enlightening as to why the matter had to be left on the basis of being unable to determine if the proposed amended structure would be safe and secure. Dr Giles report (appendix 12 of the agenda bundle) is also extraordinary for the amount of times she notes the lack of information or the need to review matters before proceeding. And then there are the significant concerns and issues raised in the expert evidence of Mr Schuckard for FRIENDS.
8. Accordingly, the Association has no difficulty or indeed an alternative other than today to reiterate its submission request that the application is inadequate in many areas and thus the **application should be declined**.
9. Before I move into the substance of our presentation today I would like to briefly set the scene by showing some photos we took of the site.

Background –Precautionary approach to uncertainty Principle

10. One of the submitters has been able to instruct Counsel to give legal submissions on its behalf today. The Association endorses and commends those submissions to you. Accordingly, the Association will not be making detailed legal submissions on the various legal issues this application generates. However there is one area of law we do wish to touch on.
11. Over the years when one deals with scientific evidence as to the existence (or not) of adverse effects, be they cumulative or one off, from an activity then one is struck by the oft repeated call that we cannot be sure that the adverse effect is that bad. Really, so the song seems to go, we need to do more work before we can be confident, or state emphatically, that the adverse effect can be quantified in this or that way and thus should be avoided. In many ways this approach seems to take the view that the degree of proof required in the RMA context is that of beyond reasonable doubt rather than on the balance of probabilities.
12. However Parliament has recognized this issue and in the context of this application has through the New Zealand Coastal Policy Statement (NZCPS) provided direction to RMA decision makers as to how to handle scientific uncertainty.
13. The NZCPS at policy 3 (1) is quite directive on this issue, *“Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown or little understood but potentially significantly adverse”*.
14. By way of further example in her last publication as the Parliamentary Commissioner for the Environment Ms Wright when considering how best to look at what the precautionary approach required noted *“in other words, when it comes to the environment full scientific certainty will always be elusive and we cannot prevent environmental degradation without taking action.”*¹
15. The Association submits that there are many aspects of this application where this principle and policy needs to apply and the application **declined**.

¹ *“Taonga of an island nation: Saving New Zealand Birds”*: Parliamentary Commissioner for the Environment, 2017, page 96.

Background – Pen Numbers

16. In terms of the 2012 Board Of Inquiry (BOI) process NZKS garnered three new supposedly carefully selected **high flow cool temperature** sites to massively expand its farming operations. The various terms and conditions of these consents - of which the farm the subject of this application (Waitata) is one - were carefully crafted via the public BOI process.
17. The BOI effectively acknowledged that there were a number of real uncertainties surrounding the adverse impacts of the likes of the Waitata farm operation and that these would be managed using: staged development, a tiered monitoring system and ongoing adaptive management as ultimately reflected by the raft of conditions. The consent also envisaged that a total of eight pens would be sufficient. For reasons not explained by NZKS the farm was run using either four or five pens. Only this year (2019) did NZKS increase the then four pens to eight. This is an important point given the lack of data NZKS has (or has disclosed) as to the success or otherwise of using eight pens on fish mortality, health and stress.

Purpose of the application

18. The NZKS application states that the primary purpose of the application is to “...improve fish health by decreasing stock densities in the pens”² However the reasons behind why this is required are not spelt out by NZKS.
19. The elephant in the room is, of course, the regular massive salmon mortality spikes that follow sea temperatures attaining or going beyond 17 degrees centigrade for any period of time. In our submission we have described the importance of sea temperature in attempting to grow salmon in tightly confined sea cages. We also note the discussion in the TAG technical report we tabled earlier³. We drilled down and in our submission showed graphically temperature records over time for this area and thus the problem that NZKS faces at its Pelorus sites.
20. We also describe the biosecurity risks (now realized) stressed fish generate – at least two hitherto unknown to New Zealand pathogens have been discovered in NZKS mortalities going back to 2012. This is also most undesirable for the green clean NZ brand let alone the undoubted suffering from an animal health perspective.
21. To address this rather intractable physical difficulty NZKS seem to place primary reliance on reducing fish density and moving to a single year class farming.
22. There is also talk of mechanical cooling means – an upwelling system dragging deeper and, NZKS hopes, cooler water up into the pens⁴ – air conditioning for fish if you will! However this mechanical innovation still seems to be untested in the Pelorus and the Association has real doubts as to its viability given the Pelorus thermocline. In passing we note with a little concern that NZKS propose the current generator on the platform will be repurposed to do this job. We note there is no information or assessment as to what this will do to the operations carbon footprint, whether this will be a 24/7 requirement and if so over what period, any noise related issues and so on.

² Page One paragraph 2 of the NZKLS application – see Appendix One of the Agenda bundle.

³ See Section 4.1 on page 12 of Report on the Technical Advisory Group Meeting of 30 November to 2 December 2015 - Response Title - NZ-RLO& *T. maritimum* 2015.

⁴ See paragraph 309b0 of Mr Lovell’s Statement of Evidence.

23. NZKS application suggests that increasing pen numbers will allow lower densities of fish and thereby reduce stress and presumably mitigate rising sea temperatures. However, as far as we can ascertain NZKS or its experts **do not address what** those reduced densities would be. We note that the marine expert retained by MDC – Dr Giles – agrees that reducing fish density in a given volume of water is likely to be beneficial. However, Dr Giles does not opine (nor to be clear was she asked too) as to what that lower density of fish might be.

How might we address this data mortality gap - Background?

24. In 2015 MPI investigated the mass mortalities and produced a report⁵. A Technical Advisory Group was also convened to help MPI Biosecurity with the investigation. In their report⁶ they looked at fish density as one of many contributing factors in fish mortality. NZKS reported to the TAG that they stock their pens at 15 kg/cubic meter but at certain times, it may reach 25 kg/cubic meter. By comparison, in Canada, stocking density for Chinook salmon is generally targeted not to exceed 12 kg/cubic meter. Note that the highest density of the salmon in the Pelorus Sound farms occurs during winter, just before harvesting in spring.
25. NZKS gives no rationale as to why 12 cages are necessary given that it has only recently moved to eight.
26. Up until 2019, there were only four or five cages (pens) used in the Waitata farm for growing salmon⁷. As the Initial maximum feed discharge level is set to half of the Maximum feed discharge for this farm, using only half of the consented farm cages was one option. Using all 8 cages has only been done in 2019, when 4 cages in a 2x2 configuration, filled with salmon, were towed from the Waihinau farm to the Waitata farm and added to the four existing cages.
27. As these salmon have only recently been harvested (October 2019), we have no knowledge of the harvested tonnage of this cohort of salmon. To correct this gap we need this data along with the feed discharge data and the mortality data for 2019 for the Waitata farm, data as to the results of the 2019 harvested fish and fish mortality compared with the 2018 figures and so on. Given the seeming slowness or reluctance of NZKS to supply information when requested by the regulator I suspect receipt of such information will be a long time coming.
28. To be clear, the Association knows the relevant mortality data exists. After the 2015 Mortality spike and the resultant investigations exposed a slack NZKS biosecurity culture MPI issued a series of directions to NZKS. Among which was the requirement to supply mortality data on a farm-by-farm basis on a regular basis. Any sensible discussion and analysis of the effects of sea temperature and sustainable fish densities per pen on a per farm basis are currently stymied by the reluctance of both MPI and NZKS to release any farm specific mortality data. We know this is because we tried via the official information Act in 2012 and again in 2018 with no success. MPI cites commercial sensitivity and recently that releasing this information will discourage the flow of the same.

⁵ J. Fischer, J. Appleby: Intelligence Report, Nz-RLO & T. maritimum 2015 response, MPI Technical Paper No. 2017/39, May 2017.

⁶ NZ-RLO & T. maritimum 2015 response: Report on the Technical Advisory Group Meeting, Pastoral House, Wellington 30 November – 2 December 2015. See page 18.

⁷ Applicant evidence G. Lovell, page 15, table with pen configurations at Waitata farm.

29. In order to address this lack of information as to what the current mortality rates for Waitata might be in fact and thereby work back as to what the appropriate feed discharge /fish densities levels on a per pen basis might be the Association was forced to do its own calculations. We set out our go at this at Schedule One to this presentation. **We would like to turn to that schedule now.**
30. So picking up the narrative again. We have calculated using the best available data a mortality rate at Waitata in the last monitoring year of around 40 %. Bear in mind this was a cool, high flow site where this was not supposed to happen. The Association submits this is not sustainable management nor environmentally desirable. We have covered the clear biosecurity risks not only to NZKS operations but to the surrounding environment earlier.
31. However, the NZKS approach is to double down. Argue for a 33% increase in feed discharge and say the risks can be mitigated by spreading the operation across more pens. We say this is not adaptive management. It is merely a high-risk “*full steam ahead and damm the torpedo’s*” style of management.
32. We submit that this situation cries out for a more principled approach of real adaptive management to address the purpose of this application. In short the applicant should be encouraged to grow less fish on the existing footprint of eight pens. Bear in mind the applicant has only recently brought the number of pens up to the consented eight.
33. With the move to single year class operation it would be ideal to approach the density issue on a per fish basis. However in the absence of such information then the proxy of total feed discharge has to be used. We say take the last known discharge of feed of approximately 2200 tonne as a baseline figure. Then reduce that by say 10% to a target discharge of 2000 tonne but now spread over eight pens instead of four (approx. 250 tonne per pen).
34. Using this figure NZKS would, we are sure, be able to work backwards and arrive at the initial density of juvenile fish per pen. If elevated levels of mortality (above 10%) are still experienced at this density reduce the feed level by a further 10% for the next crop rotation.

When is an Increase not an increase?

35. The NZKS application states that no additional feed discharge is being sought. In our submission we covered the actual situation as a result of NZKS’s successful non-notified application (U140294). Our understanding then being that NZKS did not have to, **in fact**, achieve a given feed discharge level (3000 tonne +or – 15%) but rather only achieve that virtually. This aspect has created some confusion as to what is the current maximum permitted level of discharge, even among the experts.
36. It is thus a little helpful to see the NZKS employee Mr Lovell state his view that yes they can go to 4000 tonnes but subject to a sign off from the Council⁸. In other words from the NZKS point of view they have already achieved an increase in feed discharge.
37. The answer to our question from the NZKS perspective thus seems to be that there is no increase if you have already laid the path to get an increase!
38. Of course the reality on the ground (or around the farm) is somewhat different. In the 2018/19 monitoring report we note a sharp drop in feed discharges – by some 28%.

⁸ See Mr Lovell’s paragraph 20 and 61 of his statement of evidence.

This fact must not be lost when talking about the less than satisfactory outcomes around the various descriptors (eg TFS) making up the total ES values. In other words adverse environmental effects are accumulating **even at the historically very low feed discharge levels recorded in the last monitoring report**. This is not a stable situation.

39. How much flexibility the Council has to decline an increase in feed discharge (having already agreed to remove the main condition) and where that leaves NZKS and the receiving environment is, at writing, still unclear.
40. However, should NZKS clear expectations that they will be permitted to go to 4000 tonne of discharge be realized then clearly the likely impact on the benthic and the monitoring indicators will be even more dramatic and adverse. In this regard we note that despite our requests in our submission to see some modeling of the 2018/19 EQS figures showing the impact of increasing the discharge levels even to the 2017/18 year let alone 4000 tonne – none has been supplied in the statements of evidence presented by NZKS. On this basis we submit it must be assumed that the results would be adverse and show serious non-compliance with consent conditions.

Benthic effects

41. The results of the last monitoring report (Cawthron 2018/19) is one we find the most problematic and which in our view presents the applicant with an insurmountable problem. In a nutshell we submit the evidence tabled and the commentary from the likes of an independent expert (Dr Giles) and the expert witness from FRIENDS (Mr Schuckard) as to the adverse impacts on the benthic showing no sign of stabilizing and that there are two areas in which the applicants current application are non compliant with the existing consent conditions, require that the application be declined.
42. We stress again the need to bear in mind these disturbing results from the 2018/19 report reflect a year of historically very low feed discharge – in other words the adverse cumulative effects of the farm operations appear to be accelerating and becoming more noticeable even at these historically low levels of discharge.
43. **Dr Giles Report of 4 November** – We found Dr Giles report most helpful in identifying the numerous areas and ways this application and its assessment of effects is deficient. It is clear that Dr Giles had commented extensively, in a technical memo to the regulator, on the last monitoring report back in October 2019 (in passing we note that unfortunately, as far as we can ascertain, the Agenda bundle does not contain a copy of that report). Accordingly, Dr Giles's November report is something of a summary and higher level comment on the application and the matters raised in that earlier memo.
44. At this juncture we too intend to deal with this most useful, albeit disturbing, report at a high level.
45. The NZKS commissioned expert and Dr Giles agree that the current operation is **non compliant** with those conditions of consent relating to the depositional footprint. The two agree on the non-critical nature of seabed metal depositions and effects of seabed disturbance. However, what is most striking is the number of times Dr Giles recommends and/or seeks clarification of a whole host of matters as a prerequisite to the proposal proceeding. We stopped counting after identifying 10 areas which Dr Giles expressly stated a matter needed clarification and/or recommended clarification.

46. Dr Giles also uses the phrase need to “review“ in relation to substantive areas of ambiguity or uncertainty at least six times.
47. Dr Giles makes numerous requests for, or identifies areas where additional information is required as a prerequisite in order to properly and better address the proposal. In short Dr Giles report details the how and why this is a badly flawed proposal that contains more uncertainty rather than certainty let alone letting it proceed on the basic thesis of the applicant that the current consent conditions will apply equally as well as to this new proposal..
48. This is a clear and unambiguous situation where a precautionary approach should be adopted and the **application declined** as the proposed activities effects on the coastal environment are uncertain, unknown or little understood but potentially significantly adverse.
49. **The ES debate:** An area where Dr Giles and the NZKS expert clearly differ is around their use and understanding of the Enrichment Stage or ES. We have read very carefully the science expert contributions and a little around the subject. However what follows is a high level plain English approach to what has become an important issue in the context of this application and indeed the future direction of this farm.
50. The deposition of fish faeces and uneaten feed from salmon farming, leads to adverse enrichment of the seabed due to the high organic content of the deposited particles.⁹ The ES number is a measure of the Enrichment Stage of the seabed. It is a construct, a number derived from a series of other physical measurements of various indicators. It is indicative of the level of enrichment due to the discharges of salmon farm waste and uneaten food. It describes the state of the seabed for increasing levels of Enrichment, from Pristine to Anoxic.
51. The ES number is derived by a weighted summation of the average value of several parameters. These parameters are referred to as Environmental Quality Standards (**EQS**). EQS's are measurable environmental values¹⁰ that are selected to reflect ecological indicators of certain stages of enrichment and are usually linked to pre-defined spatial zones surrounding the enrichment source, in this case a salmon farm. Here the 'overall ES' for a location is given by a weighted average of three groups of variables, organic loading, sediment chemistry and infauna composition.
52. ES should be seen, we submit, as a convenient short hand number to describe a level of enrichment at a particular location. Seabed conditions are compared against pre-specified environmental quality standards that measure the magnitude or severity of the Enrichment effects at the zone boundaries of the salmon farm. However it must not be lost that it is a rather crude approximation of actual enrichment and the adverse consequences. Accordingly, one must keep a careful eye on what is happening to the various variables making up the ES as enrichment increases.
53. As we understand it what we have here are ES numbers that are getting borderline as to acceptability. At this point Dr Giles believes an assesment of the underlying variables is required. Mr Schuckard in his expert evidence also supports this

⁹ Literature review of ecological effects of aquaculture, Chaper 3 – benthic effects; MPI publication, August 2013. Author: Nigel Keeley, Cawthron Institute, Nelson.
<https://www.mpi.govt.nz/dmsdocument/3751-literature-review-of-ecological-effects-of-aquaculture-chapter-3-benthic-effects>

¹⁰ *ibid*, section 3.2.4.2.

- approach¹¹. NZKS wants to cling to the ES number alone and avoid looking at what is happening to the measureable variables. Understandable perhaps but hardly scientific.
54. In leaving this undoubtedly complex issue we note and endorse the recommendation of Dr Giles for a review of the effectiveness of adaptive management of the consent around sea bed despositions with consideration to be given to amendments to improve adaptive management of the site¹².
55. **Submission of FRIEND’s Expert Mr Schuckard:** As noted the Councils marine expert Dr Giles did not in her report attached as appendix 12 to the section 42A report go in to a detailed assessment of the various variables. She had done that in an earlier report to the Council which we did not have the benefit of seeing. However, Mr Schuckard in his expert statement of evidence has done exactly that and we support and commend his findings and conclusions to you.
56. Our reading of his evidence paints a disturbing picture of a sharply deteriorating set of benthic indicators and non-compliance with consent conditions around the footprint. As noted, like Dr Giles, Mr Schuckard express’s some real concerns at the continued efficacy of the predictive modeling currently used by the applicant.
57. In our view this all points to the need to step back and gather better information to address (if they can be) the uncertainties that seem to abound and in the interim adopt the precautionary approach and **decline** the application.

Structure Stability and Safety

58. In our submission we raised concerns over the safety and stability of the proposed revised and expanded structure and recommended an independent engineering review. The Council planning officers comments and conclusions on this aspect are eyebrow raising. However, the harbormasters (**HM**) report makes for very disturbing reading. The HM’s report clearly shows that there is a significant number of current areas of concern with this operation as well as **serious concerns** for what is proposed in the future. Clearly our call in our submission for an independent suitably qualified engineering review was spot on – the only pity being that it has not happened. Further it seems that there is no current sign off from a chartered professional engineer on the mooring arrangement (v’s a mooring maintenance policy).
59. The Association notes that back in 2015 the MPI response investigation to the mortality spikes (see page 12 of TAG report previously supplied) records NZKS biosecurity management practices as being somewhat lacking and there was a need for urgent attention to this aspect. The Association is concerned that this application has lifted the lid on a similar “relaxed “ NZKS management attitude to structural safety and maintenance matters. This is not good enough given that the Section 42 A report and the HM report read together reveal significant structural and safety concerns (and actual failures) with the current structure. And the Association thought the spectacular failure of the pen tow noted in our submission when attempting to bring pens into the structure was a one off!

¹¹ See paragraph 25 on page 13 of his expert statement of evidence. “This uncertainty supports a multi metric approach for the analysis of compliance instead of single ES calculation.”

¹² See Section 5.5.1 of Appendix 12 of the Agenda bundle.

60. Not only is it disturbing that a raft of structure and safety matters have seemingly been left untended but that the various sign off requests made by the HM do not seem to have been addressed. For example it is clear to the Association that the HM's call for a Navigation Risk Reduction and Management plan is still outstanding. Mr Lovell of NZKS has attached a Mooring Maintenance Policy but this we submit seems well short of what was requested by the HM. We assume the HM wanted to see more than some nice blank forms but a series of signed off ones (compliance) to say nothing of a schedule timeline.
61. We note the HM's comment that he would like to understand better from the perspective of the AKVA Group as to the suitability of their Wavemaster cages at this site and as proposed. With all due respect we see the AKVA response as somewhat lacking and look forward to hearing the HM's take on the same.
62. It is extraordinary to us to see the HM opine that the mooring plan provided with this application may be impractical or at the least very difficult to implement.
63. The Association submits that the current record of the applicant and the serious unanswered questions around the structural integrity and safety of this proposed 33% increase in structure size, pens etc etc are such that the application **should be declined** under this head alone.

King Shag

64. The Association endorses and supports the concerns raised by Mr Schuckard for FRIENDS around the possible adverse impacts of the application on this critically endangered sea bird.

Landscape and Natural Character

65. The application raises real issues around this area and the Association understands other submitters such as the Marlborough Environment Centre will or have dealt with these aspects in more detail and we endorse their concerns.

Conclusion

66. We are of the view that the applicant has failed to satisfy the appropriate requirements of the RMA when assessing the merits or otherwise of this application and the application should **be declined**.
67. Given the number of information deficits identified and recommendations from experts such as Dr Giles and Mr Schuckard we urge the Commissioner to take the opportunity to give the regulator clear direction as to the areas that a Section 128 review of the existing conditions of the consent would be most beneficial going forward. In this regard we refer you to the examples of various new consent conditions we set out in our submission.

Andrew Caddie
President
Kenepuru and Central Sounds Residents' Association.
25 November 2019

Schedule One – Mortality Estimate at Waitata Farm

Background

In the Pelorus Sound salmon farms, it takes on average 16 months to grow the salmon to harvest size. Smolt is released into the sea farms in May, when the water has cooled down somewhat after the summer. By releasing the smolt in May, these growing salmon in the Pelorus experience two winters but only one summer.

In May 2017 the smolt destined for the Waitata and Kopaūa farms, were released into the Waihināu sea farm, where they remained until they were shifted to the Waitata and Kopaūa farms around December 2017. The salmon harvested from the Waitata farm during September and October 2018, belonged to the 2018 year class.

It is now acknowledged that high summer seawater temperatures in the Pelorus Sound lead to higher salmon mortality¹³. For these mortality calculations, we have had to rely on NZKS publically available data as the only source of data, as OIA requests for mortality data from MPI Biosecurity were refused. In this regard the yearly financial reports of NZKS¹⁴ are useful in that they show the **total** salmon production and mortality as well as the salmon produced per farm. The feed discharge for the Waitata farm in the year 2018 is disclosed in the 2019 Cawthron monitoring report¹⁵.

Data Based on financial reports of NZKS				
Year	Total fish production (tonnes)	Total fish mortality (tonnes)	Total fish production + mortalities	Total fish mortality
FY2017	7223	890	8113	11.0%
FY2018	7779	1990	9769	20.4%
FY2019	7931	2400	10331	23.2%

Mortality Calculation for the Waitata farm in FY2019

The Feed Conversion Rate is 1.8 in FY2019¹⁶, in other words for every kg of salmon, 1.8 kg of salmon feed is required.

For the FY2019 (June 2018 – June 2019), the average salmon mortality was 23.2% across all NZKS salmon farms, the highest it has ever been.

The mortality is the difference between the salmon (in tonnes) harvested during the FY2019 period and the salmon that would have been harvested if no fish died.

Due to the high salmon mortality at the Waitata farm in 2018, the feed discharge was only 2164 tonnes and not the planned Maximum feed discharge of around 3000 tonnes, which is a requirement of Consent Condition 37 to allow for an increase in the Maximum feed discharge. An additional 1331 tonnes of feed was used in the Waihināu farm in 2017 to feed the salmon destined for the Waitata and Kopaūa farms in 2018.¹⁷

¹³ NZK-FY18-Results-Investor-Presentation.pdf, page 23.

<https://www.kingsalmon.co.nz/investors/reports/>

¹⁴ NZK-FY19-Results-Investor-Presentation.pdf, page 11.

<https://www.kingsalmon.co.nz/investors/reports/>

¹⁵ Cawthron report 3323 – 2018-2019 Annual Environmental Monitoring Summary for the Waitata Reach salmon farm.

¹⁶ Ibid, page 26.

¹⁷ Cawthron report 3124 – Environmental impacts of the Waihināu Bay salmon farm: Annual Monitoring 2017.

It is assumed that based on the different Maximum feed discharge levels, two thirds of these salmon were destined for the Waitata farm and one third for the smaller Kopaūa farm.

It is also assumed that sufficient salmon were grown in the Waihinau farm to supply the Waitata and Kopaūa farm with enough fish to consume all the feed that is allowed to be discharged in these farms.

Waitata farm – FY2019	
Max feed discharge Waitata	3000 tonnes of feed
Waihinau feed discharge for Waitata	$2/3 * 1331 = 888$ tonnes of feed
Maximum total feed discharge	$3000 + 888 = 3888$ tonnes of feed
Feed Conversion Rate	1.8
Maximum fish for harvest if no mortality	3888 divided by $1.8 = 2160$ tonnes of salmon
Actual harvest in 2018	1257 tonnes of salmon
Calculated mortality: Max – Actual harvest	$2160 - 1257 = 903$ tonnes of salmon
Calculated mortality as a percentage	903 divided by $2160 \times 100 = 41.8\%$

Discussion

The mortality percentage as calculated for Waitata is very high compared to the already **high average** mortality of 23.2% across all NZKS sea farms. Clearly other farms achieved better results with lower than average mortality. Bearing this in mind, what were the results for the other BOI farm in the Pelorus Sound, the Kopaūa farm on the opposite side of the Waitata Reach?

Kopaūa farm – FY2019	
Max feed discharge Kopaūa	1500 tonnes of feed
Waihinau feed discharge (1/3 for Kopaūa)	$1/3 * 1331 = 444$ tonnes of feed
Total feed discharge	$1500 + 444 = 1944$ tonnes of feed
Feed Conversion Rate	1.8
Max fish for harvest if no mortality	1944 divided by $1.8 = 1080$ tonnes of salmon
Actual harvest in 2018	980 tonnes of salmon
Calculated mortality: Max – Actual harvest	$1080 - 980 = 100$ tonnes of salmon
Calculated mortality as a percentage	100 divided by $1080 \times 100 = 9.3\%$

Using the methodology above, the mortality is estimated at 41.8% for the Waitata farm and a surprisingly low 9.3% for the Kopaūa farm in FY2019. As both farms occupy the same stretch of water, the Waitata Reach, the difference in the mortality percentages is most interesting. Our hypothesis is that these differences cannot be solely attributed to adverse seawater temperature; perhaps a more intensive pathogen related factor plays a part? We need more information from NZKS, which of course has not been forthcoming.

We also illustrate just how excessively optimistic NZKS is around the whole disturbing saga of fish mortalities. We do this by showing how NZKS predicted in 2015 what their average mortality trend line would be, followed by what has actually happened to date.

Low flow sites have poorer fish health and performance 

