

**From:** Morel, David P ENV:EX []  
**To:** 'Tavish Campbell' [tavishcampbell@gmail.com]  
**CC:** Xia, Eveline ENV:EX [Eveline.Xia@gov.bc.ca]; Tony Allard [tony@hsinv.ca]; Alex Morton [alexandramorton5@gmail.com]; Zacharias, Mark ENV:EX [Mark.Zacharias@gov.bc.ca]; Graham, Tessa ENV:EX [Tessa.Graham@gov.bc.ca]; Buttman, Ashley ENV:EX [Ashley.Buttman@gov.bc.ca]; Graham, Tessa ENV:EX [Tessa.Graham@gov.bc.ca]  
**Subject:** RE: Enterococcus Urgent Questions  
**Date:** Wednesday, March 21, 2018 10:44:21

---

Hi Tavish

Will see what we can get organized on short notice.

David

**From:** Tavish Campbell [mailto:tavishcampbell@gmail.com]  
**Sent:** Tuesday, March 20, 2018 5:40 PM  
**To:** Morel, David P ENV:EX  
**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX  
**Subject:** Re: Enterococcus Urgent Questions

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish



**Tavish Campbell**  
250-203-2903  
tavishcampbell.ca | Skype: tavishcampbell  
Box 30 Heriot Bay B.C. V0P 1H0



On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:  
Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel  
Assistant Deputy Minister  
Environmental Protection Division  
Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]  
**Sent:** Monday, February 19, 2018 11:32 AM  
**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



**Tavish Campbell**  
250-203-2903  
tavishcampbell.ca | Skype: tavishcampbell  
Box 30 Heriot Bay B.C. V0P 1H0



----- Forwarded message -----

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>  
**Date:** Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <George.Heyman.MLA@leg.bc.ca>

Cc: "Popham, Lana" s.17

Donald Svanvik <donsvanvik@hotmail.com>,

Willie Moon <willieamoon@gmail.com>, "bobc@khfn.ca" <bobc@khfn.ca>, Rick Johnson

<rjohnson@khfn.ca>, tonyroberts@weiwaikum.ca, Chief Steven Dick <kwiakah@telus.net>,

Frank Voelker <fvoelker@telus.net>, Mike Willie <mikewillie4@gmail.com>, s.22

s.22

, Midori Nicholson <midorin@telus.net>, Tania Dick

<tania.dick@kingcome.ca>, s.22

, Dawn Nicolson

<nicolson.dawn@shaw.ca>, Nic Dedeluk <NicD@namgis.bc.ca>, Tony Allard

<tony@hsinv.ca>, Tavish Campbell <tavishcampbell@gmail.com>, Brian Riddell

<briddell@psf.ca>, "Meggs, Geoff PREM:EX" <Geoff.Meggs@gov.bc.ca>, s.22

s.22 , Karen Wristen <kwristen@livingoceans.org>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton  
250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a



product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton  
250-974-7086

*"From first glance, I can see that the 'Brown's Bay effluent' is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water', which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

From: [Morel, David P ENV:EX](#)  
To: [Zacharias, Mark ENV:EX](#)  
Cc: [Graham, Tessa ENV:EX](#)  
Subject: Fwd: Enterococcus Bullets  
Date: Sunday, March 4, 2018 8:59:24 AM

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Further background from Tessa below. Do you want me to build into points or was this for your background.

David

Sent from my iPhone

Begin forwarded message:

**From:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>  
**Date:** March 4, 2018 at 7:13:31 AM PST  
**To:** "Morel, David P ENV:EX" <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)>  
**Subject:** Enterococcus Bullets

Good morning Dave,

Here is some more information re the bacteria and jurisdiction. Also, I note that the due date of the Alex Morton letter assigned in approvals is March 7 so you should be getting it this week. I have also forwarded the train of emails on this subject so you have more background info if needed.

- standard bacteria testing was done at Browns Bay as part of the overall testing of parameters
- E. Coli bacteria was less than the detection limit and enterococcus was detected in large numbers
- enterococcus is a standard bacteria test for saltwater
- we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is as this level of detail was beyond the parameters of our testing.
- note that this sample was taken from the pipe so we have no info on dispersion once it hit the water and really, this is why, going forward it will be helpful to have monitoring from the receiving environment to better understand impacts
- this is a sentence from Morton's paper she sent. "Enterococci are not always considered harmful to humans, but their presence in the environment may indicate that other disease-causing agents such as viruses, bacteria, and protozoa may be present. Significant amounts of enterococci in a water body can negatively affect the recreational and economic value of the aquatic resource"
- this information, with other audit findings, will inform recommendations from the audit
- this could include more monitoring , including monitoring in the receiving environment, to better understand impacts

Regarding jurisdiction,

- most of her questions about this bacteria do not fall within our jurisdiction
- E.g about testing area around beaches which would be a public health issue and local health authority or about feeding bacteria to fish in fish farms which would fall within DFO jurisdiction

s.13

Tessa

**From:** "Nelless, Brady ENV:EX" <[Brady.Nelless@gov.bc.ca](mailto:Brady.Nelless@gov.bc.ca)>  
**Date:** February 26, 2018 at 7:27:04 AM PST  
**To:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>  
**Subject:** RE: Enterococcus Urgent Questions

Hi Tessa and Ashley,  
I have this in eApprovals - 9237, Cliff – 314070, Due March 7.  
I will use the info below in the response.  
Thanks,  
Brady  
**Brady Nelless RPBio**  
Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial  
Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation  
Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

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**From:** Graham, Tessa ENV:EX  
**Sent:** Monday, February 26, 2018 6:07 AM  
**To:** Buttman, Ashley ENV:EX  
**Cc:** Nelless, Brady ENV:EX  
**Subject:** Re: Enterococcus Urgent Questions

Hi Ashley. Will u assign In eapprovals? This is follow up to a minister meeting.  
Thanks  
Sent from my iPad

On Feb 25, 2018, at 8:12 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Thanks. I do miss a few emails but I saw the points. We will need a response  
letter for Minister.  
David

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**From:** Graham, Tessa ENV:EX  
**Sent:** Sunday, February 25, 2018 6:06 PM  
**To:** Morel, David P ENV:EX  
**Cc:** Buttman, Ashley ENV:EX  
**Subject:** Re: Enterococcus Urgent Questions  
Hi. Just saw your note to Alex Morton so resending this in case you  
missed it.

Sent from my iPad

On Feb 19, 2018, at 10:26 PM, Graham, Tessa ENV:EX  
<[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Hi – As I suspected, these questions are outside our  
scope/jurisdiction so we can't really answer. Below are some  
bullets that may be useful in responding back to Tavish et al.  
Also, see below is Brady's specific response.

<!--[if !supportLists]-->•<!--[endif]-->Thank you for  
raising these questions at the briefing and in the  
follow up email  
<!--[if !supportLists]-->•<!--[endif]-->As mentioned  
during the briefing we would follow up on questions  
that fall within ENV jurisdiction  
<!--[if !supportLists]-->•<!--[endif]-->Upon review of  
the specific questions you raised, most of them fall  
outside ENV jurisdiction as they pertain to salmon  
farms  
<!--[if !supportLists]-->•<!--[endif]-->This means that  
you may be better seeking answers from the Ministry  
of Agriculture and/or the Department of Fisheries  
and Oceans, both of whom have a role in regulating  
fish farms  
<!--[if !supportLists]-->•<!--[endif]-->I can tell that we  
did not test the beach areas adjacent to Brown's Bay  
and Tofino processing plants – if there is a concern  
related to public health, the local health authority  
would be the best contact  
<!--[if !supportLists]-->•<!--[endif]-->Also, we did not  
ask the lab to identify the specific species of

enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

---

**From:** Nelless, Brady ENV:EX  
**Sent:** Monday, February 19, 2018 2:55 PM  
**To:** Graham, Tessa ENV:EX  
**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

2 - what species of enterococcus was detected?

Unknown. We did not request the lab to identify to the species level.

3 – what is the antibiotic resistance profile of the bacteria collected?

Unknown. We did not ask the lab to test for antibiotic resistance.

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

Not that we are aware of but we don't regulate the farming of fish or specifically the feed for fish at fish farms. Suggest contacting Min of Agriculture and Fisheries and Oceans Canada.

5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

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24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

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**From:** Graham, Tessa ENV:EX  
**Sent:** Monday, February 19, 2018 2:14 PM  
**To:** Nelless, Brady ENV:EX  
**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

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**From:** Morel, David P ENV:EX  
**Sent:** Monday, February 19, 2018 12:30 PM  
**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX  
**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel  
Assistant Deputy Minister  
Environmental Protection Division  
Ministry of Environment and Climate Change Strategy  
**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]  
**Sent:** Monday, February 19, 2018 11:32 AM  
**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Subject:** Fwd: Enterococcus Urgent Questions  
Hello David, Eveline and George,  
Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.  
Please see below the email from Alex regarding Enterococcus levels in your samples.  
Here are the questions again:  
1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?  
2 - what species of enterococcus was detected?  
3 - what is the antibiotic resistance profile of the bacteria collected?  
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6 - what are the enterococcus levels found around salmon farms where people are fishing?  
Thank you for looking into these questions and I look forward to hearing from you soon.  
Tavish

photo



**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: [tavishcampbell](https://www.skype.com/en/contacts/tavishcampbell)

Box 30 Heriot Bay B.C. V0P 1H0



----- Forwarded message -----

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>  
**Date:** Fri, Feb 9, 2018 at 11:33 AM  
**Subject:** Enterococcus Urgent Questions  
**To:** "Heyman.MLA, George LASS:EX"  
<[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>  
**Cc:** "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22 s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22 s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22 s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton

<[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent. You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory). Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon

straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut? Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption. Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,  
Alexandra Morton  
[250-974-7086](tel:250-974-7086)

*"From first glance, I can see that the 'Brown's Bay effluent' is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water', which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

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**To:** ["Tavish Campbell"](#)  
**Cc:** [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Alex Morton](#); [Zacharias, Mark ENV:EX](#); [Graham, Tessa ENV:EX](#); [Buttman, Ashley ENV:EX](#); [Graham, Tessa ENV:EX](#)  
**Subject:** RE: Enterococcus Urgent Questions  
**Date:** Wednesday, March 21, 2018 10:44:23 AM

---

Hi Tavish

Will see what we can get organized on short notice.

David

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish



**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: [tavishcampbell](#)

Box 30 Heriot Bay B.C. V0P 1H0



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David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples. Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
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- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: tavishcampbell

Box 30 Heriot Bay B.C. V0P 1H0



----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17

Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, s.22

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson

<[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, [tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, s.22

Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22

, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania

Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22

>, Dawn

Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard

<[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell

<[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22

s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

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From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent. You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.  
All the best,

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**From:** Alex Morton  
**To:** [Morel, David P ENV:EX](#)  
**Cc:** [Tavish Campbell](#); [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Zacharias, Mark ENV:EX](#); [Graham, Tessa ENV:EX](#); [Buttman, Ashley ENV:EX](#)  
**Subject:** Re: Enterococcus Urgent Questions  
**Date:** Monday, February 19, 2018 1:06:45 PM  
**Attachments:** [Enterococcus.pdf](#)  
[ATT00001.htm](#)

---

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex

## Enterococcus

Copyright

Page 13 to/à Page 14

Withheld pursuant to/removed as

Copyright

On Feb 19, 2018, at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel  
Assistant Deputy Minister  
Environmental Protection Division  
Ministry of Environment and Climate Change Strategy

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Cc: "Popham, Lana" s.17 Donald Svanvik <donsvanvik@hotmail.com>, Willie Moon  
<willieamoon@gmail.com>, "bobc@khfn.ca" <bobc@khfn.ca>, Rick Johnson <rjohnson@khfn.ca>,  
tonyroberts@weiwaikum.ca, Chief Steven Dick <kwiakah@telus.net>, Frank Voelker  
<fvoelker@telus.net>, Mike Willie <mikewillie4@gmail.com>, s.22  
s.22, Midori Nicholson <midorin@telus.net>, Tania Dick  
<tania.dick@kingcome.ca>, s.22, Dawn Nicolson  
<nicolson.dawn@shaw.ca>, Nic Dedeluk <NicD@namgis.bc.ca>, Tony Allard <tony@hsinv.ca>, Tavish  
Campbell <tavishcampbell@gmail.com>, Brian Riddell <briddell@psf.ca>, "Meggs, Geoff PREM:EX"  
<Geoff.Meggs@gov.bc.ca>, s.22, Karen Wristen  
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To: [Morel, David P ENV:EX](#)  
Cc: [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Alex Morton](#); [Zacharias, Mark ENV:EX](#); [Graham, Tessa ENV:EX](#); [Buttman, Ashley ENV:EX](#)  
Subject: Re: Enterococcus Urgent Questions  
Date: Tuesday, March 20, 2018 5:40:59 PM

---

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish



**Tavish Campbell**

250-203-2903  
[tavishcampbell.ca](http://tavishcampbell.ca) | Skype: [tavishcampbell](#)  
Box 30 Heriot Bay B.C. V0P 1H0



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Environmental Protection Division

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From: [Graham, Tessa ENV:EX](#)  
To: [Morel, David P ENV:EX](#)  
Cc: [Buttman, Ashley ENV:EX](#)  
Subject: Re: Enterococcus Urgent Questions  
Date: Sunday, February 25, 2018 6:06:06 PM

---

Hi. Just saw your note to Alex Morton so resending this in case you missed it.

Sent from my iPad

On Feb 19, 2018, at 10:26 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- <!--[if !supportLists]-->•<!--[endif]-->Thank you for raising these questions at the briefing and in the follow up email
- <!--[if !supportLists]-->•<!--[endif]-->As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- <!--[if !supportLists]-->•<!--[endif]-->Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- <!--[if !supportLists]-->•<!--[endif]-->This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- <!--[if !supportLists]-->•<!--[endif]-->I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- <!--[if !supportLists]-->•<!--[endif]-->Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

---

**From:** Nelles, Brady ENV:EX  
**Sent:** Monday, February 19, 2018 2:55 PM  
**To:** Graham, Tessa ENV:EX  
**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

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Oceans Canada.

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Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelles RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

---

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 19, 2018 2:14 PM

**To:** Nelles, Brady ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

---

**From:** Morel, David P ENV:EX

**Sent:** Monday, February 19, 2018 12:30 PM

**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttmann, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

2 - what species of enterococcus was detected?

3 - what is the antibiotic resistance profile of the bacteria collected?

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

5 - what is the explanation for these high counts?

6 - what are the enterococcus levels found around salmon farms where people are

fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: [tavishcampbell](#)

Box 30 Heriot Bay B.C. V0P 1H0



----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17

Donald Svanvik

<[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>,

"[bobc@khfn.ca](mailto:bobc@khfn.ca)" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>,

[tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker

<[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22

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, Dawn

Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony

Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian

Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>,

s.22

, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

2 - what species of enterococcus was detected?

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6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the

meantime I will initiate testing for enterococcus around salmon farms.  
Thank you so much for performing these tests, and alerting us to this concern.  
Alexandra Morton  
250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,  
Alexandra Morton  
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*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

From: [Graham, Tessa ENV:EX](#)  
To: [Morel, David P ENV:EX](#)  
Cc: [Buttman, Ashley ENV:EX](#)  
Subject: FW: Enterococcus Urgent Questions  
Date: Monday, February 19, 2018 10:26:24 PM

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Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow up email
- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

---

From: Nelless, Brady ENV:EX  
Sent: Monday, February 19, 2018 2:55 PM  
To: Graham, Tessa ENV:EX  
Subject: RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

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No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

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Unknown. We did not request the lab to identify to the species level.

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5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

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Cell: 778 349-6051

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[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

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**Sent:** Monday, February 19, 2018 2:14 PM

**To:** Nelless, Brady ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

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**From:** Morel, David P ENV:EX

**Sent:** Monday, February 19, 2018 12:30 PM

**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples. Here are the questions again:

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Tavish Campbell

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: [tavishcampbell](https://www.skype.com/user/tavishcampbell)

Box 30 Heriot Bay B.C. V0P 1H0



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From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>,

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson

<[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, [tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>,

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s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania

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s.22, Karen Wrysten <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

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I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,  
Alexandra Morton  
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*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with*



*total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

**From:** Alex Morton  
**To:** [Morel, David P ENV:EX](#)  
**Cc:** [Tavish Campbell](#); [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Zacharias, Mark ENV:EX](#); [Graham, Tessa ENV:EX](#); [Buttman, Ashley ENV:EX](#)  
**Subject:** Re: Enterococcus Urgent Questions  
**Date:** Monday, February 19, 2018 1:06:45 PM  
**Attachments:** [Enterococcus.pdf](#)  
[ATT00001.htm](#)

---

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex

From: Tavish Campbell  
To: [Morel, David P ENV:EX](#); [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Alex Morton](#)  
Subject: Fwd: Enterococcus Urgent Questions  
Date: Monday, February 19, 2018 11:32:36 AM  
Attachments: [Enterococcus.pdf](#)

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Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

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Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
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Box 30 Heriot Bay B.C. V0P 1H0



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Cc: "Popham, Lana" s.17

Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>,

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "[bobc@khfn.ca](mailto:bobc@khfn.ca)" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson  
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- 5 - what is the explanation for these high counts?
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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton  
[250-974-7086](tel:250-974-7086)

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

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freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

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**From:** [Graham, Tessa ENV:EX](#)  
**To:** ["Tavish Campbell"](#)  
**Cc:** [Buttman, Ashley ENV:EX](#); [Morel, David P ENV:EX](#); [Miller, Mary ENV:EX](#)  
**Subject:** RE: Enterococcus Urgent Questions  
**Date:** Wednesday, March 21, 2018 1:28:32 PM

---

Hi Tavish –

I am following up on your email of Tuesday requesting a follow up phone call. I would be happy to speak with you and go over the questions you raised at the Feb. 16 meeting. I will look to find us a time this Friday if that works for you. Thanks. Tessa

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish



**Tavish Campbell**

[250-203-2903](tel:250-203-2903)

[tavishcampbell.ca](http://tavishcampbell.ca) | Skype: [tavishcampbell](#)

Box 30 Heriot Bay B.C. V0P 1H0



On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples. Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?

- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: tavishcampbell

Box 30 Heriot Bay B.C. V0P 1H0



----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17

Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, s.22

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson

<[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, [tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, s.22

Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22

, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania

Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22

, Dawn

Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard

<[tony@hsmv.ca](mailto:tony@hsmv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell

<[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22

s.22, Karen Wrsten <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

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Alexandra Morton

250-974-7086

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All the best,

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From: Tavish Campbell  
To: [Morel, David P ENV:EX](#)  
Cc: [Xia, Eveline ENV:EX](#); [Tony Allard](#); [Alex Morton](#); [Zacharias, Mark ENV:EX](#); [Graham, Tessa ENV:EX](#); [Buttman, Ashley ENV:EX](#)  
Subject: Re: Enterococcus Urgent Questions  
Date: Tuesday, March 20, 2018 5:40:59 PM

---

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish



**Tavish Campbell**

250-203-2903  
[tavishcampbell.ca](http://tavishcampbell.ca) | Skype: [tavishcampbell](#)  
Box 30 Heriot Bay B.C. V0P 1H0



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Environmental Protection Division

Ministry of Environment and Climate Change Strategy

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Here are the questions again:

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Subject: Enterococcus Urgent Questions

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Donald Svanvik

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Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22

s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk

<[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell

<[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff

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## FW: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
12:13 PM

Subject	<b>FW: Enterococcus Urgent Questions</b>
From	Graham, Tessa ENV:EX
To	Morel, David P ENV:EX
Cc	Buttman, Ashley ENV:EX
Sent	Monday, February 19, 2018 10:26 PM

Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow up email
- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

**From:** Nelless, Brady ENV:EX

**Sent:** Monday, February 19, 2018 2:55 PM

**To:** Graham, Tessa ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

2 - what species of enterococcus was detected?

Unknown. We did not request the lab to identify to the species level.

3 – what is the antibiotic resistance profile of the bacteria collected?

Unknown. We did not ask the lab to test for antibiotic resistance.

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

Not that we are aware of but we don't regulate the farming of fish or specifically the feed for fish at fish farms. Suggest contacting Min of Agriculture and Fisheries and Oceans Canada.

5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.



**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 19, 2018 2:14 PM

**To:** Nelless, Brady ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

**From:** Morel, David P ENV:EX

**Sent:** Monday, February 19, 2018 12:30 PM

**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

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Here are the questions again:

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Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



**Tavish Campbell**

[250-203-2903](tel:250-203-2903)

[tavishcampbell.ca](http://tavishcampbell.ca) | Skype: [tavishcampbell](https://www.skype.com/en/contacts/tavishcampbell)

Box 30 Heriot Bay B.C. V0P 1H0

----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22 s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsv.ca](mailto:tony@hsv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22 s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College. As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the 'Brown's Bay effluent' is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water', which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are opportunistic pathogens, dangerous for humans as they can promote disease and are a sign of fecal contamination (human and/or other species)."*

## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018

12:20 PM

Subject	RE: Enterococcus Urgent Questions
From	Morel, David P ENV:EX
To	'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton
Cc	Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX
Sent	Monday, February 19, 2018 12:30 PM

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

2 - what species of enterococcus was detected?

3 - what is the antibiotic resistance profile of the bacteria collected?


4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

5 - what is the explanation for these high counts?

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish

	<b>Tavish Campbell</b> <a href="tel:250-203-2903">250-203-2903</a> <a href="http://tavishcampbell.ca">tavishcampbell.ca</a>   Skype: <a href="https://www.skype.com/people/tavishcampbell">tavishcampbell</a> Box 30 Heriot Bay B.C. V0P 1H0
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----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17 Donald Svanvik <donsvanvik@hotmail.com>, Willie Moon <willieamoon@gmail.com>, "bobc@khfn.ca" <bobc@khfn.ca>, Rick Johnson <rjohnson@khfn.ca>, tonyroberts@weiwaikum.ca, Chief Steven Dick <kwiakah@telus.net>, Frank Voelker <fvoelker@telus.net>, Mike Willie <mikewillie4@gmail.com>, s.22 s.22, Midori Nicholson <midorin@telus.net>, Tania Dick <tania.dick@kingcome.ca>, s.22, Dawn Nicolson <nicolson.dawn@shaw.ca>, Nic Dedeluk <NicD@namgis.bc.ca>, Tony Allard <tony@hsinv.ca>, Tavish Campbell <tavishcampbell@gmail.com>, Brian Riddell <briddell@psf.ca>, "Meggs, Geoff PREM:EX" <Geoff.Meggs@gov.bc.ca>, s.22 s.22, Karen Wristen <kwristen@livingoceans.org>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College. As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <alexandramorton5@gmail.com> wrote:

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You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

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I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,



Alexandra Morton

250-974-7086

*"From first glance, I can see that the 'Brown's Bay effluent' is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water', which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are opportunistic pathogens, dangerous for humans as they can promote disease and are a sign of fecal contamination (human and/or other species)."*

## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
12:23 PM

Subject	<b>Re: Enterococcus Urgent Questions</b>
From	<a href="#">Alex Morton</a>
To	Morel, David P ENV:EX
Cc	Tavish Campbell; Xia, Eveline ENV:EX; Tony Allard; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX
Sent	Monday, February 19, 2018 1:06 PM
Attachments	 Enterococcus  ATT00001

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex

## Enterococcus

Copyright



Page 10 to/à Page 11

Withheld pursuant to/removed as

Copyright

## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018

12:25 PM

Subject	RE: Enterococcus Urgent Questions
From	Morel, David P ENV:EX
To	'Alex Morton'
Cc	Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX
Sent	Sunday, February 25, 2018 3:32 PM

Hi Alex

We are looking into questions and will get back to you shortly.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Monday, February 19, 2018 1:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell; Xia, Eveline ENV:EX; Tony Allard; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

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## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018

12:27 PM

Subject	<b>RE: Enterococcus Urgent Questions</b>
From	Nelless, Brady ENV:EX
To	Graham, Tessa ENV:EX
Sent	Saturday, March 3, 2018 2:33 PM

Not something we regulate or have authority to regulate under EMA.

Min of Agriculture or DFO regarding food for farmed fish.

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Saturday, March 3, 2018 12:42 PM

**To:** Nelless, Brady ENV:EX

**Subject:** Fwd: Enterococcus Urgent Questions

There is one more email I will track down

Sent from my iPhone

Begin forwarded message:

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

**Date:** February 25, 2018 at 7:47:03 PM PST

**To:** "Morel, David P ENV:EX" <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)>

**Cc:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>

**Subject: Re: Enterococcus Urgent Questions**

David

Thank you, certainly an unexpected result.

Alex

On Feb 25, 2018, at 3:32 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Alex

We are looking into questions and will get back to you shortly.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Monday, February 19, 2018 1:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell; Xia, Eveline ENV:EX; Tony Allard; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex

## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018

12:41 PM

Subject	<b>RE: Enterococcus Urgent Questions</b>
From	Nelless, Brady ENV:EX
To	Graham, Tessa ENV:EX
Sent	Saturday, March 3, 2018 2:45 PM

- Browns Bay Packing samples for bacteria exceeded hold times (not arriving at the laboratory in the specified time) that may have had some impact on sample integrity.
- E.Coli bacteria were still less than detection limit and enterococcus was detected in large numbers.
- Enterococcus is a standard bacteria test for saltwater and E. Coli is a standard bacteria test in freshwater.
- ENV will use the sample results to inform the Fish Processing Audit.
- Staff are still drafting a response to the eApproval (9237)
- Draft language that will be incorporated into the eApproval response:
- *Thank you for raising these questions at the briefing and in the follow up email*
- *As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction*
- *Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms*
- *This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms*
- *I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact*
- *Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.*

Hope this helps. Let me know if you need anything else.

Brady

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

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[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Saturday, March 3, 2018 12:43 PM

**To:** Nelless, Brady ENV:EX

**Subject:** Fwd: Enterococcus Urgent Questions

Sent from my iPhone

Begin forwarded message:

**From:** "Nelless, Brady ENV:EX" <[Brady.Nelless@gov.bc.ca](mailto:Brady.Nelless@gov.bc.ca)>

**Date:** February 26, 2018 at 7:27:04 AM PST

**To:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>

**Subject: RE: Enterococcus Urgent Questions**

Hi Tessa and Ashley,

I have this in eApprovals - 9237, Cliff – 314070, Due March 7.

I will use the info below in the response.

Thanks,

Brady

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

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[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 26, 2018 6:07 AM

**To:** Buttman, Ashley ENV:EX

**Cc:** Nelless, Brady ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi Ashley. Will u assign In eapprovals? This is follow up to a minister meeting. Thanks

Sent from my iPad

On Feb 25, 2018, at 8:12 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Thanks. I do miss a few emails but I saw the points. We will need a response letter for Minister.

David

**From:** Graham, Tessa ENV:EX

**Sent:** Sunday, February 25, 2018 6:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi. Just saw your note to Alex Morton so resending this in case you missed it.

Sent from my iPad

On Feb 19, 2018, at 10:26 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow

up email

- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

**From:** Nelles, Brady ENV:EX

**Sent:** Monday, February 19, 2018 2:55 PM

**To:** Graham, Tessa ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

2 - what species of enterococcus was detected?

Unknown. We did not request the lab to identify to the species level.

3 – what is the antibiotic resistance profile of the bacteria collected?

Unknown. We did not ask the lab to test for antibiotic resistance.

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

Not that we are aware of but we don't regulate the farming of fish or specifically the feed for fish at fish farms. Suggest contacting Min of Agriculture and Fisheries and Oceans Canada.

5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelles RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

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**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 19, 2018 2:14 PM

**To:** Nelless, Brady ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

**From:** Morel, David P ENV:EX

**Sent:** Monday, February 19, 2018 12:30 PM

**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

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Assistant Deputy Minister

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Ministry of Environment and Climate Change Strategy

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**Sent:** Monday, February 19, 2018 11:32 AM

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**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
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- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish

	<b>Tavish Campbell</b> <a href="tel:250-203-2903">250-203-2903</a> <a href="http://tavishcampbell.ca">tavishcampbell.ca</a>   Skype: <a href="https://www.skype.com/people/tavishcampbell">tavishcampbell</a> Box 30 Heriot Bay B.C. V0P 1H0
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----- Forwarded message -----

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

**Date:** Fri, Feb 9, 2018 at 11:33 AM

**Subject:** Enterococcus Urgent Questions

**To:** "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

**Cc:** "Popham, Lana" s.17

Donald Svanvik

<[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>



"bobc@khfn.ca" <bobc@khfn.ca>, Rick Johnson <rjohnson@khfn.ca>, tonyroberts@weiwaikum.ca, Chief Steven Dick <kwiakah@telus.net>, Frank Voelker <fvoelker@telus.net>, Mike Willie <mikewillie4@gmail.com>, s.22, Midori Nicholson <midorin@telus.net>, Tania Dick <tania.dick@kingcome.ca>, s.22, Dawn Nicolson <nicolson.dawn@shaw.ca>, Nic Dedeluk <NicD@namgis.bc.ca>, Tony Allard <tony@hsinv.ca>, Tavish Campbell <tavishcampbell@gmail.com>, Brian Riddell <briddell@psf.ca>, "Meggs, Geoff PREM:EX" <Geoff.Meggs@gov.bc.ca>, s.22, Karen Wristen <kwristen@livingoceans.org>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

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From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

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Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <alexandramorton5@gmail.com> wrote:

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You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for

prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc. I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

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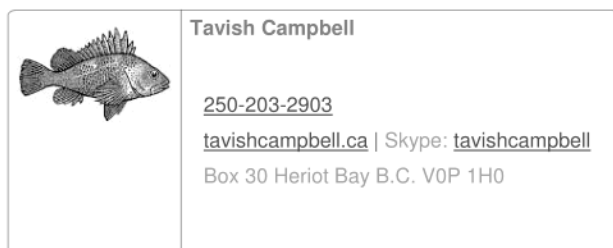
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## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
12:43 PM

Subject	Re: Enterococcus Urgent Questions
From	Tavish Campbell
To	Morel, David P ENV:EX
Cc	Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX
Sent	Tuesday, March 20, 2018 5:39 PM

Hello David,  
I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.  
Is it possible to have a phone call tomorrow?  
Thank you,  
Tavish



Tavish Campbell

250-203-2903

tavishcampbell.ca | Skype: tavishcampbell

Box 30 Heriot Bay B.C. V0P 1H0

On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:  
Hi Tavish

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David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

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## FW: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:11 PM

Subject	<b>FW: Enterococcus Urgent Questions</b>
From	Graham, Tessa ENV:EX
To	Payette, Leslie ENV:EX
Cc	Miller, Mary ENV:EX; Buttman, Ashley ENV:EX
Sent	Wednesday, March 21, 2018 1:25 PM

Hi Leslie –

This is a heads up that I will ask you to join me on this call with Tavish Campbell – Dave has asked us to take on his behalf. The letter to A. Morton (which are the same qx Tavish raised) is with Dave and he plans to finalize tonight and send to her. Once I get a copy, we can have this meeting with Tavish. So....Ashley, can you send Leslie and I a copy of the letter once Dave sends.

Mary – will cc you on an email to Tavish and ask that you find us 30 minutes – likely on Friday...Thanks. Tessa

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

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		<b>Tavish Campbell</b> <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0
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Assistant Deputy Minister

Environmental Protection Division

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**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

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## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
12:44 PM

Subject	RE: Enterococcus Urgent Questions
From	Graham, Tessa ENV:EX
To	'Tavish Campbell'
Cc	Buttman, Ashley ENV:EX; Morel, David P ENV:EX; Miller, Mary ENV:EX
Sent	Wednesday, March 21, 2018 1:28 PM

Hi Tavish –

I am following up on your email of Tuesday requesting a follow up phone call. I would be happy to speak with you and go over the questions you raised at the Feb. 16 meeting. I will look to find us a time this Friday if that works for you. Thanks. Tessa

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	<p><b>Tavish Campbell</b> <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0</p>
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On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <David.Morel@gov.bc.ca> wrote:

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [mailto:tavishcampbell@gmail.com]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

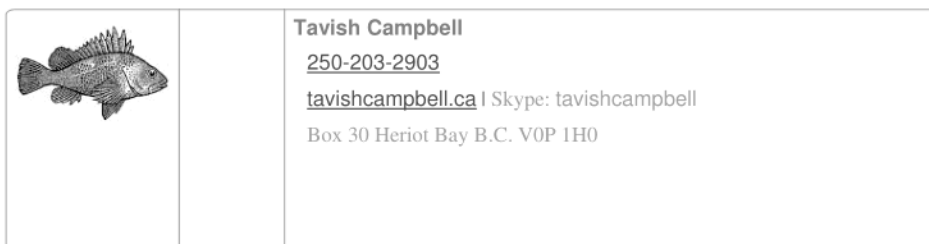
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Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

2 - what species of enterococcus was detected?  
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 Thank you for looking into these questions and I look forward to hearing from you soon.  
 Tavish



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From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22 s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22 s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

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From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
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5 - what is the explanation for these high counts?  
6 - what are the enterococcus levels found around salmon farms where people are fishing?  
Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.  
Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

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Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

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## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
12:44 PM

Subject	RE: Enterococcus Urgent Questions
From	Payette, Leslie ENV:EX
To	Graham, Tessa ENV:EX
Cc	Miller, Mary ENV:EX; Buttman, Ashley ENV:EX
Sent	Wednesday, March 21, 2018 1:29 PM

Thanks will do – I have at least one other eapproval from another concerned citizen on the same issue too, L.

**From:** Graham, Tessa ENV:EX

**Sent:** Wednesday, March 21, 2018 1:25 PM

**To:** Payette, Leslie ENV:EX

**Cc:** Miller, Mary ENV:EX; Buttman, Ashley ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Hi Leslie –

This is a heads up that I will ask you to join me on this call with Tavish Campbell – Dave has asked us to take on his behalf. The letter to A. Morton (which are the same qx Tavish raised) is with Dave and he plans to finalize tonight and send to her. Once I get a copy, we can have this meeting with Tavish. So....Ashley, can you send Leslie and I a copy of the letter once Dave sends.

Mary – will cc you on an email to Tavish and ask that you find us 30 minutes – likely on

Friday...Thanks. Tessa

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish

		<b>Tavish Campbell</b> <u>250-203-2903</u> <u><a href="http://tavishcampbell.ca">tavishcampbell.ca</a></u>   Skype: <u><a href="https://www.skype.com/people/tavishcampbell">tavishcampbell</a></u> Box 30 Heriot Bay B.C. V0P 1H0
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Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

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Cc: "Popham, Lana" s.17

Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22

s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn

Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard

<[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22

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## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018

12:45 PM

Subject	Re: Enterococcus Urgent Questions
From	Tavish Campbell
To	Graham, Tessa ENV:EX; Alex Morton
Cc	Buttman, Ashley ENV:EX; Morel, David P ENV:EX; Miller, Mary ENV:EX
Sent	Wednesday, March 21, 2018 2:51 PM

Yes, Friday would work for me, thank you.  
I'll await a time and confirmation from you.  
Alex Morton will join as well.  
Tavish

	<b>Tavish Campbell</b>  <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0
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On Wed, Mar 21, 2018 at 1:28 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:  
Hi Tavish –

I am following up on your email of Tuesday requesting a follow up phone call. I would be happy to speak with you and go over the questions you raised at the Feb. 16 meeting. I will look to find us a time this Friday if that works for you. Thanks. Tessa

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

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Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and

Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*


## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:08 PM

Subject	Re: Enterococcus Urgent Questions
From	Tavish Campbell
To	Graham, Tessa ENV:EX; Alex Morton
Cc	Buttman, Ashley ENV:EX; Morel, David P ENV:EX; Miller, Mary ENV:EX
Sent	Wednesday, March 21, 2018 2:51 PM

Yes, Friday would work for me, thank you.  
I'll await a time and confirmation from you.  
Alex Morton will join as well.  
Tavish

	<b>Tavish Campbell</b>  <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0
-----------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------

On Wed, Mar 21, 2018 at 1:28 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:  
Hi Tavish –

I am following up on your email of Tuesday requesting a follow up phone call. I would be happy to speak with you and go over the questions you raised at the Feb. 16 meeting. I will look to find us a time this Friday if that works for you. Thanks. Tessa

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions


Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish

	<b>Tavish Campbell</b>  <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0
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On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:  
Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division  
Ministry of Environment and Climate Change Strategy  
**From:** Tavish Campbell [mailto:[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)]  
**Sent:** Monday, February 19, 2018 11:32 AM  
**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

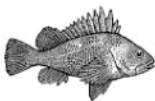
Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish

	<p><b>Tavish Campbell</b> <a href="tel:250-203-2903">250-203-2903</a> <a href="http://tavishcampbell.ca">tavishcampbell.ca</a>   Skype: <b>tavishcampbell</b> Box 30 Heriot Bay B.C. V0P 1H0</p>
-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

----- Forwarded message -----

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

**Date:** Fri, Feb 9, 2018 at 11:33 AM

**Subject:** Enterococcus Urgent Questions

**To:** "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

**Cc:** "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises

the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent. You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and



Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

## FW: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:31 PM

Subject	<b>FW: Enterococcus Urgent Questions</b>
From	Morel, David P ENV:EX
To	Graham, Tessa ENV:EX
Sent	Friday, March 23, 2018 11:51 AM

Question you may get this afternoon.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, March 23, 2018 11:41 AM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell

**Subject:** Re: Enterococcus Urgent Questions

David

Thank you for your response.

This provincial website reports that Enterococci levels are monitored at salt water beaches and beaches are closed if levels are high to protect people from “unacceptable levels of bacteria.” [http://www.viha.ca/mho/recreation/beach\\_reports.htm#Why%20monitor%20beaches](http://www.viha.ca/mho/recreation/beach_reports.htm#Why%20monitor%20beaches)

BC salmon farm use of antibiotics is high, second only to Chile.

Enterococcus is particularly prone to developing antibiotic resistance, and swapping genes with other bacteria and antibiotic resistance is a recognized threat to human health globally. I am assuming that you must have alerted Island Health to the extraordinary levels that you detected in the bloodwater from Browns Bay and Tofino and I would like to follow up with them. Can you provide your contact at Island Health?

Thank you for your work on this.

Alexandra Morton

On Mar 23, 2018, at 10:54 AM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Reference: 314070

*March 23, 2018*

Alexandra Morton

Phone: 250-974-7086

Email: [alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)

Dear Ms. Morton:

Thank you for your emails of February 9 and 13, 2018, regarding the high counts of enterococcus and for raising a number of questions including who would take the lead on these issues. I want to ensure you that protecting our marine environment is taken seriously by the Ministry as we work to better understand the impacts of fish processing discharge into the environment.

Many of the questions you raised in your letter pertain to salmon farming (for example questions related to feeding) and are outside the jurisdiction of the Ministry of Environment and Climate Change Strategy. They would be best addressed by the Department of Fisheries and Oceans Canada.

In terms of your questions about enterococcus, we did not test the beach areas adjacent to Brown's Bay Packing Co. and Lion's Gate Fisheries (Tofino) nor did we ask the lab to identify the specific species of enterococcus or test the antibiotic resistance profile. This level of detail was beyond the parameters of our testing.

Regarding lab results on fish health and the Piscine Orthoreovirus and its potential link to heart and skeletal muscle inflammation disease, I have directed my staff to conduct a review on the state of the science on this issue. This review is currently underway and will help to

inform the audit of fish processing plants which should be completed by late spring.

Thank you again for following up with your concerns.

Sincerely,

David Morel

Assistant Deputy Minister

Environmental Protection Division

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, February 9, 2018 11:33 AM

**To:** Heyman.MLA, George <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

**Cc:** Popham, Lana s.17 <[s.17@popham.ca](mailto:s.17@popham.ca)>; Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>; Willie Moon

<[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>; bobc@khfn.ca; Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>;

tonyroberts@weiwaikum.ca; Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>; Frank Voelker

<[fvoelker@telus.net](mailto:fvoelker@telus.net)>; Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>; s.22

s.22 <[s.22@kingcome.ca](mailto:s.22@kingcome.ca)>; Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>; Tania Dick

<[taniamoon@kingcome.ca](mailto:taniamoon@kingcome.ca)>; s.22 <[s.22@kingcome.ca](mailto:s.22@kingcome.ca)>; Dawn Nicolson

<[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>; Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>; Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>;

Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>; Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>; Meggs, Geoff

PREM:EX <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>; s.22

<[kwrysten@livingoceans.org](mailto:kwrysten@livingoceans.org)>; Karen Wristen

<[kwrysten@livingoceans.org](mailto:kwrysten@livingoceans.org)>

**Subject:** Enterococcus Urgent Questions

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College. As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

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5 - what is the explanation for these high counts?

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.


Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018  
1:32 PM

Subject	<b>RE: Enterococcus Urgent Questions</b>
From	Payette, Leslie ENV:EX
To	Graham, Tessa ENV:EX; Lachance, Luc ENV:EX
Sent	Friday, March 23, 2018 12:56 PM
Attachments	 Island Health Co...

Yes we've been in contact, but no I don't have the exact name (all staff on flex), see attached email, I will try and reach Sharon for the name, L.

**From:** Graham, Tessa ENV:EX

**Sent:** Friday, March 23, 2018 12:04 PM

**To:** Lachance, Luc ENV:EX; Payette, Leslie ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Do either of you have a contact at Island Health?

**From:** Morel, David P ENV:EX

**Sent:** Friday, March 23, 2018 11:52 AM

**To:** Graham, Tessa ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Question you may get this afternoon.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, March 23, 2018 11:41 AM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell

**Subject:** Re: Enterococcus Urgent Questions

David

Thank you for your response.

This provincial website reports that Enterococci levels are monitored at salt water beaches and beaches are closed if levels are high to protect people from "unacceptable levels of bacteria."

[http://www.viha.ca/mho/recreation/beach\\_reports.htm#Why%20monitor%20beaches](http://www.viha.ca/mho/recreation/beach_reports.htm#Why%20monitor%20beaches)

BC salmon farm use of antibiotics is high, second only to Chile.

Enterococcus is particularly prone to developing antibiotic resistance, and swapping genes with other bacteria and antibiotic resistance is a recognized threat to human health globally.

I am assuming that you must have alerted Island Health to the extraordinary levels that you detected in the bloodwater from Browns Bay and Tofino and I would like to follow up with them. Can you provide your contact at Island Health?

Thank you for your work on this.

Alexandra Morton

On Mar 23, 2018, at 10:54 AM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Reference: 314070

March 23, 2018

Alexandra Morton

Phone: 250-974-7086

Email: [alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)

Dear Ms. Morton:

Thank you for your emails of February 9 and 13, 2018, regarding the high counts of enterococcus and for raising a number of questions including who would take the lead on these issues. I want to ensure you that protecting our marine environment is taken seriously by the Ministry as we work to better understand the impacts of fish processing discharge into the environment.

Many of the questions you raised in your letter pertain to salmon farming (for example questions related to feeding) and are outside the jurisdiction of the Ministry of Environment and Climate Change Strategy. They would be best addressed by the Department of Fisheries and Oceans Canada.

In terms of your questions about enterococcus, we did not test the beach areas adjacent to Brown's Bay Packing Co. and Lion's Gate Fisheries (Tofino) nor did we ask the lab to identify the specific species of enterococcus or test the antibiotic resistance profile. This level of detail was beyond the parameters of our testing.

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should be completed by late spring.  
Thank you again for following up with your concerns.

Sincerely,

David Morel

Assistant Deputy Minister  
Environmental Protection Division

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, February 9, 2018 11:33 AM

**To:** Heyman.MLA, George <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

**Cc:** Popham, Lana s.17; Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>; Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>; bobc@khfn.ca; Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>; tonyroberts@weiwaikum.ca; Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>; Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>; Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>; s.22; Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>; Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>; s.22; Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>; Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>; Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>; Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>; Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>; Meggs, Geoff PREM:EX <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>; s.22; Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

**Subject:** Enterococcus Urgent Questions

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

**Balsom, Tami CSNR:EX**

---

**From:** Bennett, Sharon ENV:EX  
**Sent:** Thursday, March 8, 2018 9:40 AM  
**To:** Payette, Leslie ENV:EX  
**Subject:** Island Health Contact

Hi Leslie,

FYI – had a chat with someone at Island Health re: Enterococcus and Fish Processing Plants.

The issues could be stemming from faulty septic systems associated with the plants.

He is going to chat with his colleagues and see who the best contact is and what info they can provide.

Call me if you like to discuss.

*Sharon*

Sharon Bennett, M.Sc. A.Ag.  
Environmental Protection Officer, Compliance Promotion

Phone: 250 565-6442

## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:13 PM

Subject	Re: Enterococcus Urgent Questions
From	Lachance, Luc ENV:EX
To	Graham, Tessa ENV:EX
Cc	Payette, Leslie ENV:EX
Sent	Friday, March 23, 2018 5:42 PM

Hello Tessa,  
Lynne Magee is the person I talk to regularly at VIHA.  
I will send her contact in another email.

Luc Lachance

Ministry of Environment and Climate Change Strategy

On Mar 23, 2018, at 12:03 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Do either of you have a contact at Island Health?

**From:** Morel, David P ENV:EX

**Sent:** Friday, March 23, 2018 11:52 AM

**To:** Graham, Tessa ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Question you may get this afternoon.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, March 23, 2018 11:41 AM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell

**Subject:** Re: Enterococcus Urgent Questions

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On Mar 23, 2018, at 10:54 AM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Reference: 314070

March 23, 2018

Alexandra Morton

Phone: 250-974-7086

Email: [alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)

Dear Ms. Morton:

Thank you for your emails of February 9 and 13, 2018, regarding the high counts of

enterococcus and for raising a number of questions including who would take the lead on these issues. I want to ensure you that protecting our marine environment is taken seriously by the Ministry as we work to better understand the impacts of fish processing discharge into the environment.

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**Cc:** Popham, Lana s.17

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Thank you so much for performing these tests, and alerting us to this concern.  
Alexandra Morton  
250-974-7086

## Re: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:31 PM

Subject	Re: Enterococcus Urgent Questions
From	Lachance, Luc ENV:EX
To	Payette, Leslie ENV:EX
Cc	Graham, Tessa ENV:EX
Sent	Friday, March 23, 2018 5:44 PM

Lynne Magee, BSc, CPHI(C)  
Regional Drinking Water Coordinator  
Island Health

3rd Floor, 6475 Metral Drive

Nanaimo, BC V9T 2L9

Phone: 250-755-3339

Fax: 250-755-3372

Email: lynne.magee@viha.ca

Luc Lachance

Ministry of Environment and Climate Change Strategy

On Mar 23, 2018, at 12:56 PM, Payette, Leslie ENV:EX <[Leslie.Payette@gov.bc.ca](mailto:Leslie.Payette@gov.bc.ca)> wrote:

Yes we've been in contact, but no I don't have the exact name (all staff on flex), see attached email, I will try and reach Sharon for the name, L.

**From:** Graham, Tessa ENV:EX

**Sent:** Friday, March 23, 2018 12:04 PM

**To:** Lachance, Luc ENV:EX; Payette, Leslie ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

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**Sent:** Friday, March 23, 2018 11:52 AM

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**Subject:** Re: Enterococcus Urgent Questions

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Reference: 314070

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250-974-7086

## RE: Enterococcus Urgent Questions

Wednesday, May 2, 2018

1:33 PM

Subject	RE: Enterococcus Urgent Questions
From	Morel, David P ENV:EX
To	'Alex Morton'
Cc	Tavish Campbell; Graham, Tessa ENV:EX
Sent	Saturday, March 24, 2018 2:20 PM

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Cc	Tavish Campbell; Graham, Tessa ENV:EX
Sent	Saturday, March 24, 2018 6:39 PM

David,

Yes, there was a phone call with Tessa and staff and they will be forwarding me the contact of the people looking into the Enterococcus issue from VIHA. I am surprised there has been no effort to identify which species of enterococcus is involved and whether it exhibits antibiotic resistance as this pathogen is a human health issue and the levels are so high. This is not unlike the current cholera discovery in the herring roe.

It was also surprising that there has been no plan devised to protect juvenile out-migrating salmon from the PRV in the effluent as it is now recognized as a *disease agent* in BC and as such is prohibited from release into the ocean. We discussed the potential for the company using sewage trucks to receive the waste and dispose of it properly given the fact that so many Fraser River salmon stocks are now recommended for listing under the species-at-risk-Act. Alternatively they could use a barge that could be pumped out.

From my perspective I would certainly welcome the opportunity to applaud the BC government for taking such a step.

I appreciate you following up and I am hoping that I don't need to do the testing of the beaches myself, but I will if government is unable to do so.

All the best,

Alex

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- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086



## RE: Enterococcus Urgent Questions 3

Wednesday, May 16, 2018

7:47 AM

Subject	RE: Enterococcus Urgent Questions 3
From	Buttman, Ashley ENV:EX
To	Nelles, Brady ENV:EX
Sent	Monday, February 26, 2018 10:58 AM

Thanks Brady.

**From:** Nelles, Brady ENV:EX

**Sent:** Monday, February 26, 2018 7:27 AM

**To:** Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tessa and Ashley,

I have this in eApprovals - 9237, Cliff – 314070, Due March 7.

I will use the info below in the response.

Thanks,

Brady

**Brady Nelles RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 26, 2018 6:07 AM

**To:** Buttman, Ashley ENV:EX

**Cc:** Nelles, Brady ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi Ashley. Will u assign In eapprovals? This is follow up to a minister meeting. Thanks  
Sent from my iPad

On Feb 25, 2018, at 8:12 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Thanks. I do miss a few emails but I saw the points. We will need a response letter for Minister.

David

**From:** Graham, Tessa ENV:EX

**Sent:** Sunday, February 25, 2018 6:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi. Just saw your note to Alex Morton so resending this in case you missed it.

Sent from my iPad

On Feb 19, 2018, at 10:26 PM, Graham, Tessa ENV:EX <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow up email
- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

**From:** Nelless, Brady ENV:EX

**Sent:** Monday, February 19, 2018 2:55 PM

**To:** Graham, Tessa ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

2 - what species of enterococcus was detected?

Unknown. We did not request the lab to identify to the species level.

3 – what is the antibiotic resistance profile of the bacteria collected?

Unknown. We did not ask the lab to test for antibiotic resistance.

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

Not that we are aware of but we don't regulate the farming of fish or specifically the feed for fish at fish farms. Suggest contacting Min of Agriculture and Fisheries and Oceans Canada.

5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

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Office: 250 565-6401

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Officer Service)  
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**From:** Graham, Tessa ENV:EX  
**Sent:** Monday, February 19, 2018 2:14 PM  
**To:** Nelles, Brady ENV:EX  
**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min.  
briefing last week with Tavish Campbell – can you provide bullets for each qx noting that  
a number of these questions fall outside our jurisdiction. Thanks. Tessa

**From:** Morel, David P ENV:EX  
**Sent:** Monday, February 19, 2018 12:30 PM  
**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX  
**Subject:** RE: Enterococcus Urgent Questions  
Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional  
Operations Branch to put together answers to your questions as soon as possible.  
David Morel

Assistant Deputy Minister  
Environmental Protection Division  
Ministry of Environment and Climate Change Strategy  
**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]


**Sent:** Monday, February 19, 2018 11:32 AM  
**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,  
Thank you for meeting with me on Friday. I appreciate your response to  
the seriousness of this situation.  
Please see below the email from Alex regarding Enterococcus levels in  
your samples.

Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and  
Tofino packing plants?
- 2 - what species of enterococcus was detected?
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- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where  
people are fishing?

Thank you for looking into these questions and I look forward to hearing  
from you soon.  
Tavish

	<p><b>Tavish Campbell</b> <u>250-203-2903</u> <a href="http://tavishcampbell.ca">tavishcampbell.ca</a>   Skype: <a href="https://www.skype.com/people/tavishcampbell">tavishcampbell</a> Box 30 Heriot Bay B.C. V0P 1H0</p>
-------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <George.Heyman.MLA@leg.bc.ca>

Cc: "Popham, Lana" s.17 Donald Svanvik  
<donsvanvik@hotmail.com>, Willie Moon <willieamoon@gmail.com>,  
"bobc@khfn.ca" <bobc@khfn.ca>, Rick Johnson <rjohnson@khfn.ca>,  
tonyroberts@weiwaikum.ca, Chief Steven Dick <kwiakah@telus.net>, Frank  
Voelker <fvoelker@telus.net>, Mike Willie <mikewillie4@gmail.com>,  
s.22 , Midori Nicholson  
<midorin@telus.net>, Tania Dick <tania.dick@kingcome.ca>, s.22  
s.22 , Dawn Nicolson <nicolson.dawn@shaw.ca>, Nic  
Dedeluk <NicD@namgis.bc.ca>, Tony Allard <tony@hsinv.ca>, Tavish  
Campbell <tavishcampbell@gmail.com>, Brian Riddell <briddell@psf.ca>,  
"Meggs, Geoff PREM:EX" <Geoff.Meggs@gov.bc.ca>, s.22  
s.22 , Karen Wristen <kwristen@livingoceans.org>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <alexandramorton5@gmail.com> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the 'Brown's Bay effluent' is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water', which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are opportunistic pathogens, dangerous for humans as they can promote disease and are a sign of fecal contamination (human and/or other species)."*

## Fwd: Enterococcus Urgent Questions 2

Wednesday, May 16, 2018

7:45 AM

Subject	<b>Fwd: Enterococcus Urgent Questions 2</b>
From	Graham, Tessa ENV:EX
To	Nelless, Brady ENV:EX
Sent	Saturday, March 3, 2018 12:41 PM

There is one more email I will track down

Sent from my iPhone

Begin forwarded message:

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

**Date:** February 25, 2018 at 7:47:03 PM PST

**To:** "Morel, David P ENV:EX" <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)>

**Cc:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>

**Subject:** Re: Enterococcus Urgent Questions

David

Thank you, certainly an unexpected result.

Alex

On Feb 25, 2018, at 3:32 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Alex

We are looking into questions and will get back to you shortly.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Monday, February 19, 2018 1:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell; Xia, Eveline ENV:EX; Tony Allard; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex

## Fwd: Enterococcus Urgent Questions

Wednesday, May 16, 2018

7:46 AM

Subject	<b>Fwd: Enterococcus Urgent Questions</b>
From	Graham, Tessa ENV:EX
To	Nelless, Brady ENV:EX
Sent	Saturday, March 3, 2018 12:42 PM

Sent from my iPhone

Begin forwarded message:

**From:** "Nelless, Brady ENV:EX" <Brady.Nelless@gov.bc.ca>

**Date:** February 26, 2018 at 7:27:04 AM PST

**To:** "Graham, Tessa ENV:EX" <Tessa.Graham@gov.bc.ca>, "Buttman, Ashley ENV:EX" <Ashley.Buttman@gov.bc.ca>

**Subject:** RE: Enterococcus Urgent Questions

Hi Tessa and Ashley,

I have this in eApprovals - 9237, Cliff – 314070, Due March 7.

I will use the info below in the response.

Thanks,

Brady

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

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(Conservation Officer Service)

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**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 26, 2018 6:07 AM

**To:** Buttman, Ashley ENV:EX

**Cc:** Nelless, Brady ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi Ashley. Will u assign In eapprovals? This is follow up to a minister meeting. Thanks

Sent from my iPad

On Feb 25, 2018, at 8:12 PM, Morel, David P ENV:EX <David.Morel@gov.bc.ca> wrote:

Thanks. I do miss a few emails but I saw the points. We will need a response letter for Minister.

David

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**Cc:** Buttman, Ashley ENV:EX  
**Subject:** Re: Enterococcus Urgent Questions  
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Sent from my iPad

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Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow up email
- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
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- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
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- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

**From:** Nelles, Brady ENV:EX

**Sent:** Monday, February 19, 2018 2:55 PM

**To:** Graham, Tessa ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

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Untreated effluent from a fish processing plant would be expected to have this bacteria.

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Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelles RPBio**



Director, Compliance  
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(Conservation Officer Service)  
[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX  
**Sent:** Monday, February 19, 2018 2:14 PM  
**To:** Nelless, Brady ENV:EX  
**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

**From:** Morel, David P ENV:EX  
**Sent:** Monday, February 19, 2018 12:30 PM  
**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton  
**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions  
Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister  
Environmental Protection Division  
Ministry of Environment and Climate Change Strategy  
**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM  
**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
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Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish

**Tavish Campbell**

250-203-2903

[tavishcampbell.ca](mailto:tavishcampbell.ca) | Skype: [tavishcampbell](https://www.skype.com/user/tavishcampbell)

Box 30 Heriot Bay B.C. V0P 1H0

----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX"  
<[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17 Donald Svanvik  
<[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>,  
"bobb@khfn.ca" <[bobb@khfn.ca](mailto:bobb@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>,  
[tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>,  
Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22  
Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick  
<[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22  
Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk  
<[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell  
<[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs,  
Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22  
s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

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There are urgent questions that arise from these test results:

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250-974-7086

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You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of

the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton.

Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,


Alexandra Morton

250-974-7086

*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

## RE: Enterococcus Urgent Questions

Monday, May 7, 2018  
9:19 AM

Subject	<b>RE: Enterococcus Urgent Questions</b>
From	Payette, Leslie ENV:EX
To	Graham, Tessa ENV:EX; Lachance, Luc ENV:EX
Sent	Friday, March 23, 2018 12:56 PM
Attachments	 Island Health Co...

Yes we've been in contact, but no I don't have the exact name (all staff on flex), see attached email, I will try and reach Sharon for the name, L.

**From:** Graham, Tessa ENV:EX

**Sent:** Friday, March 23, 2018 12:04 PM

**To:** Lachance, Luc ENV:EX; Payette, Leslie ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Do either of you have a contact at Island Health?

**From:** Morel, David P ENV:EX

**Sent:** Friday, March 23, 2018 11:52 AM

**To:** Graham, Tessa ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Question you may get this afternoon.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, March 23, 2018 11:41 AM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell

**Subject:** Re: Enterococcus Urgent Questions

David

Thank you for your response.

This provincial website reports that Enterococci levels are monitored at salt water beaches and beaches are closed if levels are high to protect people from "unacceptable levels of bacteria."

[http://www.viha.ca/mho/recreation/beach\\_reports.htm#Why%20monitor%20beaches](http://www.viha.ca/mho/recreation/beach_reports.htm#Why%20monitor%20beaches)

BC salmon farm use of antibiotics is high, second only to Chile.

Enterococcus is particularly prone to developing antibiotic resistance, and swapping genes with other bacteria and antibiotic resistance is a recognized threat to human health globally.

I am assuming that you must have alerted Island Health to the extraordinary levels that you detected in the bloodwater from Browns Bay and Tofino and I would like to follow up with them. Can you provide your contact at Island Health?

Thank you for your work on this.

Alexandra Morton

On Mar 23, 2018, at 10:54 AM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Reference: 314070

March 23, 2018

Alexandra Morton

Phone: 250-974-7086

Email: [alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)

Dear Ms. Morton:

Thank you for your emails of February 9 and 13, 2018, regarding the high counts of enterococcus and for raising a number of questions including who would take the lead on these issues. I want to ensure you that protecting our marine environment is taken seriously by the Ministry as we work to better understand the impacts of fish processing discharge into the environment.

Many of the questions you raised in your letter pertain to salmon farming (for example questions related to feeding) and are outside the jurisdiction of the Ministry of Environment and Climate Change Strategy. They would be best addressed by the Department of Fisheries and Oceans Canada.

In terms of your questions about enterococcus, we did not test the beach areas adjacent to Brown's Bay Packing Co. and Lion's Gate Fisheries (Tofino) nor did we ask the lab to identify the specific species of enterococcus or test the antibiotic resistance profile. This level of detail was beyond the parameters of our testing.

Regarding lab results on fish health and the Piscine Orthoreovirus and its potential link to heart and skeletal muscle inflammation disease, I have directed my staff to conduct a review on the state of the science on this issue. This review is currently underway and will help to inform the audit of fish processing plants which

should be completed by late spring.  
Thank you again for following up with your concerns.

Sincerely,  
David Morel

Assistant Deputy Minister  
Environmental Protection Division

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Friday, February 9, 2018 11:33 AM

**To:** Heyman.MLA, George <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

**Cc:** Popham, Lana s.17; Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>; Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>; bobc@khfn.ca; Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>; tonyroberts@weiwaikum.ca; Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>; Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>; Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>; s.22; Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>; Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>; s.22; Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>; Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>; Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>; Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>; Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>; Meggs, Geoff PREM:EX <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>; s.22; Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

**Subject:** Enterococcus Urgent Questions

Dear George Heyman;

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As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

**Balsom, Tami CSNR:EX**

---

**From:** Bennett, Sharon ENV:EX  
**Sent:** Thursday, March 8, 2018 9:40 AM  
**To:** Payette, Leslie ENV:EX  
**Subject:** Island Health Contact

Hi Leslie,

FYI – had a chat with someone at Island Health re: Enterococcus and Fish Processing Plants.

The issues could be stemming from faulty septic systems associated with the plants.

He is going to chat with his colleagues and see who the best contact is and what info they can provide.

Call me if you like to discuss.

*Sharon*

Sharon Bennett, M.Sc. A.Ag.  
Environmental Protection Officer, Compliance Promotion

Phone: 250 565-6442

## FW: Enterococcus Urgent Questions

Monday, May 7, 2018

9:16 AM

Subject	<b>FW: Enterococcus Urgent Questions</b>
From	Graham, Tessa ENV:EX
To	Payette, Leslie ENV:EX
Cc	Miller, Mary ENV:EX; Buttman, Ashley ENV:EX
Sent	Wednesday, March 21, 2018 1:25 PM

Hi Leslie –

This is a heads up that I will ask you to join me on this call with Tavish Campbell – Dave has asked us to take on his behalf. The letter to A. Morton (which are the same qx Tavish raised) is with Dave and he plans to finalize tonight and send to her. Once I get a copy, we can have this meeting with Tavish. So....Ashley, can you send Leslie and I a copy of the letter once Dave sends.

Mary – will cc you on an email to Tavish and ask that you find us 30 minutes – likely on Friday...Thanks. Tessa

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Tuesday, March 20, 2018 5:40 PM

**To:** Morel, David P ENV:EX

**Cc:** Xia, Eveline ENV:EX; Tony Allard; Alex Morton; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hello David,

I am requesting an update and answers to our enterococcus questions from the Feb. 16 meeting.

Is it possible to have a phone call tomorrow?

Thank you,

Tavish

		<b>Tavish Campbell</b> <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: <u>tavishcampbell</u> Box 30 Heriot Bay B.C. V0P 1H0
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On Mon, Feb 19, 2018 at 12:30 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.



Here are the questions again:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish

		<b>Tavish Campbell</b> <u>250-203-2903</u> <u>tavishcampbell.ca</u>   Skype: tavishcampbell Box 30 Heriot Bay B.C. V0P 1H0
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----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX" <[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17, Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22 s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsmv.ca](mailto:tony@hsmv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22 s.22, Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

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From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?  
2 - what species of enterococcus was detected?  
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4 - are BC salmon farmers feeding this bacteria to the fish in their pens?  
5 - what is the explanation for these high counts?  
6 - what are the enterococcus levels found around salmon farms where people are fishing?  
Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

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I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

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9:20 AM

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From	Payette, Leslie ENV:EX
To	Graham, Tessa ENV:EX
Cc	Miller, Mary ENV:EX; Buttman, Ashley ENV:EX
Sent	Wednesday, March 21, 2018 1:29 PM

Thanks will do – I have at least one other eapproval from another concerned citizen on the same issue too, L.

**From:** Graham, Tessa ENV:EX

**Sent:** Wednesday, March 21, 2018 1:25 PM

**To:** Payette, Leslie ENV:EX

**Cc:** Miller, Mary ENV:EX; Buttman, Ashley ENV:EX

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Cc: "Popham, Lana" s.17

Donald Svanvik <[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>

Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>, "bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>, tonyroberts@weiwaikum.ca, Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>, Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22

s.22, Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick <[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22, Dawn

Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk <[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard

<[tony@hinv.ca](mailto:tony@hinv.ca)>, Tavish Campbell <[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs, Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22

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You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into

tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton. Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

## FW: Enterococcus Urgent Questions (Brady)

Monday, May 7, 2018

9:14 AM

Subject	<b>FW: Enterococcus Urgent Questions (Brady)</b>
From	Nelless, Brady ENV:EX
To	Payette, Leslie ENV:EX
Sent	Friday, May 4, 2018 2:05 PM

**From:** Graham, Tessa ENV:EX

**Sent:** Saturday, March 3, 2018 12:43 PM

**To:** Nelless, Brady ENV:EX

**Subject:** Fwd: Enterococcus Urgent Questions

Sent from my iPhone

Begin forwarded message:

**From:** "Nelless, Brady ENV:EX" <[Brady.Nelless@gov.bc.ca](mailto:Brady.Nelless@gov.bc.ca)>

**Date:** February 26, 2018 at 7:27:04 AM PST

**To:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>

**Subject: RE: Enterococcus Urgent Questions**

Hi Tessa and Ashley,

I have this in eApprovals - 9237, Cliff – 314070, Due March 7.

I will use the info below in the response.

Thanks,

Brady

**Brady Nelless RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 26, 2018 6:07 AM

**To:** Buttman, Ashley ENV:EX

**Cc:** Nelless, Brady ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi Ashley. Will u assign In eapprovals? This is follow up to a minister meeting. Thanks  
Sent from my iPad

On Feb 25, 2018, at 8:12 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)>



wrote:

Thanks. I do miss a few emails but I saw the points. We will need a response letter for Minister.

David

**From:** Graham, Tessa ENV:EX

**Sent:** Sunday, February 25, 2018 6:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Hi. Just saw your note to Alex Morton so resending this in case you missed it.

Sent from my iPad

On Feb 19, 2018, at 10:26 PM, Graham, Tessa ENV:EX

<[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)> wrote:

Hi – As I suspected, these questions are outside our scope/jurisdiction so we can't really answer. Below are some bullets that may be useful in responding back to Tavish et al. Also, see below is Brady's specific response.

- Thank you for raising these questions at the briefing and in the follow up email
- As mentioned during the briefing we would follow up on questions that fall within ENV jurisdiction
- Upon review of the specific questions you raised, most of them fall outside ENV jurisdiction as they pertain to salmon farms
- This means that you may be better seeking answers from the Ministry of Agriculture and/or the Department of Fisheries and Oceans, both of whom have a role in regulating fish farms
- I can tell that we did not test the beach areas adjacent to Brown's Bay and Tofino processing plants – if there is a concern related to public health, the local health authority would be the best contact
- Also, we did not ask the lab to identify the specific species of enterococcus or what the antibiotic resistance profile is – this level of detail was beyond the parameters of our testing.

Pls let me know if you need anything further.

**From:** Nelless, Brady ENV:EX

**Sent:** Monday, February 19, 2018 2:55 PM

**To:** Graham, Tessa ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Not sure how to answer these, as they are outside our scope/jurisdiction and don't think we want to be in a position of going to the different agencies to answer questions each time (as I suspect there will be more questions)

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

No we haven't. Suggest contacting the local Health Authority if the concern is related to public health

2 - what species of enterococcus was detected?

Unknown. We did not request the lab to identify to the species level.

3 – what is the antibiotic resistance profile of the bacteria collected?

Unknown. We did not ask the lab to test for antibiotic resistance.

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

Not that we are aware of but we don't regulate the farming of fish or

specifically the feed for fish at fish farms. Suggest contacting Min of Agriculture and Fisheries and Oceans Canada.

5 - what is the explanation for these high counts?

Untreated effluent from a fish processing plant would be expected to have this bacteria.

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Suggest contacting the local Health Authority if the concern is related to public health.

**Brady Nelles RPBio**

Director, Compliance

**Regional Operations Branch**

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

Office: 250 565-6401

Cell: 778 349-6051

24-hour Spill/Environmental Emergency Reporting: 1-800-663-3456 (Provincial Emergency Program)

24-hour RAPP (Report All Poachers and Polluters) tip-line: 1-877-952-7277 (Conservation Officer Service)

[www.gov.bc.ca/env](http://www.gov.bc.ca/env)

**From:** Graham, Tessa ENV:EX

**Sent:** Monday, February 19, 2018 2:14 PM

**To:** Nelles, Brady ENV:EX

**Subject:** FW: Enterococcus Urgent Questions

Hi Brady – Below are some follow up questions, with regard to a bacteria, from a Min. briefing last week with Tavish Campbell – can you provide bullets for each qx noting that a number of these questions fall outside our jurisdiction. Thanks. Tessa

**From:** Morel, David P ENV:EX

**Sent:** Monday, February 19, 2018 12:30 PM

**To:** 'Tavish Campbell'; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Cc:** Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** RE: Enterococcus Urgent Questions

Hi Tavish

It was good to meet you on Friday and thanks for the email. I will ask our Regional Operations Branch to put together answers to your questions as soon as possible.

David Morel

Assistant Deputy Minister

Environmental Protection Division

Ministry of Environment and Climate Change Strategy

**From:** Tavish Campbell [<mailto:tavishcampbell@gmail.com>]

**Sent:** Monday, February 19, 2018 11:32 AM

**To:** Morel, David P ENV:EX; Xia, Eveline ENV:EX; Tony Allard; Alex Morton

**Subject:** Fwd: Enterococcus Urgent Questions

Hello David, Eveline and George,

Thank you for meeting with me on Friday. I appreciate your response to the seriousness of this situation.

Please see below the email from Alex regarding Enterococcus levels in your samples.

Here are the questions again:

1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?

2 - what species of enterococcus was detected?

3 - what is the antibiotic resistance profile of the bacteria collected?

4 - are BC salmon farmers feeding this bacteria to the fish in their pens?

5 - what is the explanation for these high counts?

6 - what are the enterococcus levels found around salmon farms where people are fishing?

Thank you for looking into these questions and I look forward to hearing from you soon.

Tavish



----- Forwarded message -----

From: **Alex Morton** <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

Date: Fri, Feb 9, 2018 at 11:33 AM

Subject: Enterococcus Urgent Questions

To: "Heyman.MLA, George LASS:EX"  
<[George.Heyman.MLA@leg.bc.ca](mailto:George.Heyman.MLA@leg.bc.ca)>

Cc: "Popham, Lana" s.17 Donald Svanvik  
<[donsvanvik@hotmail.com](mailto:donsvanvik@hotmail.com)>, Willie Moon <[willieamoon@gmail.com](mailto:willieamoon@gmail.com)>,  
"bobc@khfn.ca" <[bobc@khfn.ca](mailto:bobc@khfn.ca)>, Rick Johnson <[rjohnson@khfn.ca](mailto:rjohnson@khfn.ca)>,  
[tonyroberts@weiwaikum.ca](mailto:tonyroberts@weiwaikum.ca), Chief Steven Dick <[kwiakah@telus.net](mailto:kwiakah@telus.net)>,  
Frank Voelker <[fvoelker@telus.net](mailto:fvoelker@telus.net)>, Mike Willie <[mikewillie4@gmail.com](mailto:mikewillie4@gmail.com)>, s.22  
Midori Nicholson <[midorin@telus.net](mailto:midorin@telus.net)>, Tania Dick  
<[tania.dick@kingcome.ca](mailto:tania.dick@kingcome.ca)>, s.22  
Dawn Nicolson <[nicolson.dawn@shaw.ca](mailto:nicolson.dawn@shaw.ca)>, Nic Dedeluk  
<[NicD@namgis.bc.ca](mailto:NicD@namgis.bc.ca)>, Tony Allard <[tony@hsinv.ca](mailto:tony@hsinv.ca)>, Tavish Campbell  
<[tavishcampbell@gmail.com](mailto:tavishcampbell@gmail.com)>, Brian Riddell <[briddell@psf.ca](mailto:briddell@psf.ca)>, "Meggs,  
Geoff PREM:EX" <[Geoff.Meggs@gov.bc.ca](mailto:Geoff.Meggs@gov.bc.ca)>, s.22  
s.22 , Karen Wristen <[kwristen@livingoceans.org](mailto:kwristen@livingoceans.org)>

Dear George Heyman;

In follow-up to my last email on this issue, attached please find a short briefing on the extremely high enterococcus counts that were detected by the province of BC at the fish farm processing plants in Tofino and Browns Bay. This is in addition to the confirmation of PRV in these samples as originally reported by the Kibenge lab at the Atlantic Veterinary College.

As you will see in my report, 30 - 501cfu/100ml is considered the safe level of enterococcus in marine waters, however the plants are discharging in excess 60,000cfu/100ml. They report there were too many bacteria to count. This discharge is going into water frequented by people and raises the concern that this bacteria of human health concern is also being discharged from individual salmon farms coast-wide where people are exposed in a variety of ways.

From a brief review of the literature I find that **the salmon farming industry has been experimenting with feeding this bacteria to their fish** to produce a probiotic effect, increase growth, and increase resistance to sea lice. Is the high enterococcus count in the blood water a result of this practice?

There are urgent questions that arise from these test results:

- 1 - have you tested the beach areas adjacent to the Browns Bay and Tofino packing plants?
- 2 - what species of enterococcus was detected?
- 3 - what is the antibiotic resistance profile of the bacteria collected?
- 4 - are BC salmon farmers feeding this bacteria to the fish in their pens?
- 5 - what is the explanation for these high counts?
- 6 - what are the enterococcus levels found around salmon farms where people are fishing?

Can you let me know who will be taking the lead in answering these questions? In the meantime I will initiate testing for enterococcus around salmon farms.

Thank you so much for performing these tests, and alerting us to this concern.

Alexandra Morton

250-974-7086

On Feb 7, 2018, at 1:23 PM, Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)> wrote:

Dear Ministers George Heyman and Lana Popham

I forwarded the results of your very thorough farm salmon bloodwater testing to a marine toxicologist who has expressed concern (below) at the high nitrogen content in regards to stimulation of algae blooms, which we have seen increase over the duration of salmon farming in BC, but also the elevated presence of enterococcus, a human pathogen of concern. Both of the Tofino and Browns Bay plants are discharging this pathogen into areas people frequent.

You must know that the salmon farming industry has achieved an exemption from freezing their product prior to serving as sashimi, as well, the BC salmon farming industry has increased their use of antibiotics due to winter ulcer (see attached picture of this disease in the Marine Harvest Glacier Falls salmon farm in Musgamagw Territory).

Drug resistant enterococci are a growing human health concern.

If this bacteria is in farm salmon bloodwater, it seems likely it came directly from the farm fish, which are raised throughout southern BC. People are fishing for prawns, crabs, and wild fish near salmon farms, and people are swimming in water near the processing plants, as well as, washing their boats down etc.

I have focused on pathogens of concern for wild fish, and my work has driven the increased understanding and research into farm salmon viruses and sea lice, however now I am wondering - do I need to extend my work to include pathogens of human concern in farm salmon?

Are we comfortable with people eating raw farm salmon straight from the farms, with this level of enterococcus in the offal? Should people be warned about thoroughly heating seafood caught in salmon farm effluent? Should people be guided to wear gloves when handling farm salmon while preparing to cook it, if they have an open scratch or cut?

Wild salmon are culled continuously by predators and so fish even slightly impaired by a pathogen are removed, this is why studying disease in wild fish is so difficult - the predators get them first! However, as we see in the hours of video taken by First Nations in farms from Campbell River to Alert Bay, there are hundreds of slow swimmers in each pen of each farm, meaning there is much greater risk of pathogen content in farm salmon and elevated exposure to consumers.

Can you tell me what response your ministry has mounted in response to finding the bacteria enterococcus in the effluent from the Lions Bay and Browns Bay processing plants, so I can consider what steps I should take? Perhaps the presence of enterococcus is of no concern, but I believe it needs to be identified to species and tested for drug resistance as this came from a

product destined for human consumption.

Thank you both for the very thorough work by your team and the transparency of sharing the results. This is such a positive and unprecedented step. There is the unfortunate problem that the more you look at farm salmon, the more uncomfortable discoveries are made. As always this and the other problems would be resolved by getting the industry out of the ocean into tanks.

I will leave it to you to share this Premier Horgan as he continues to decide whether to renew the expiring salmon farm tenures in the Broughton.

Browns Bay is processing fish from Musgamagw and Namgis Territory and so as always I have shared my results with them.

All the best,

Alexandra Morton

250-974-7086

*"From first glance, I can see that the "Brown's Bay effluent" is much more contaminated with total nitrogen and enterococcus than the 'Lions gate process water", which is still contaminated. For Brown's Bay, Total nitrogen is 116 mg/L and enterococcus > 6000 which is much higher than what I understand as normal seawater with up to 0.7 mg/L total nitrogen. For Lion's gate, the total nitrogen is 36.5 mg/L, still much higher than normal seawater. This seems like very bad news. Excess nitrogen will promote algae growth that then depletes oxygen, promoting red-tides and eutrophication in the area. The enterococcus are oportunistic pathogens, dangerous for humans as the can promote disease and are a sign of fecal contamination (human and/or other species)."*

## FW: Enterococcus Urgent Questions (Brady)

Monday, May 7, 2018

9:13 AM

Subject	<b>FW: Enterococcus Urgent Questions (Brady)</b>
From	Nelless, Brady ENV:EX
To	Payette, Leslie ENV:EX
Sent	Friday, May 4, 2018 2:04 PM

**From:** Graham, Tessa ENV:EX

**Sent:** Saturday, March 3, 2018 12:42 PM

**To:** Nelless, Brady ENV:EX

**Subject:** Fwd: Enterococcus Urgent Questions

There is one more email I will track down

Sent from my iPhone

Begin forwarded message:

**From:** Alex Morton <[alexandramorton5@gmail.com](mailto:alexandramorton5@gmail.com)>

**Date:** February 25, 2018 at 7:47:03 PM PST

**To:** "Morel, David P ENV:EX" <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)>

**Cc:** "Graham, Tessa ENV:EX" <[Tessa.Graham@gov.bc.ca](mailto:Tessa.Graham@gov.bc.ca)>, "Buttman, Ashley ENV:EX" <[Ashley.Buttman@gov.bc.ca](mailto:Ashley.Buttman@gov.bc.ca)>

**Subject: Re: Enterococcus Urgent Questions**

David

Thank you, certainly an unexpected result.

Alex

On Feb 25, 2018, at 3:32 PM, Morel, David P ENV:EX <[David.Morel@gov.bc.ca](mailto:David.Morel@gov.bc.ca)> wrote:

Hi Alex

We are looking into questions and will get back to you shortly.

David

**From:** Alex Morton [<mailto:alexandramorton5@gmail.com>]

**Sent:** Monday, February 19, 2018 1:06 PM

**To:** Morel, David P ENV:EX

**Cc:** Tavish Campbell; Xia, Eveline ENV:EX; Tony Allard; Zacharias, Mark ENV:EX; Graham, Tessa ENV:EX; Buttman, Ashley ENV:EX

**Subject:** Re: Enterococcus Urgent Questions

Dear David

Attached is a briefing that may be of assistance. In particular, it would be very helpful if you could investigate the current state of the work being done on feeding bacteria such as enterococcus to farm salmon, see attached.

Thank you for your efforts. The openness of your ministry is admirable.

Alex