FW: New PRV paper by Miller, Di Cicco et al

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>, Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>, Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Sent: May 26, 2021 11:56:19 AM PDT
Attachments: image001.jpg

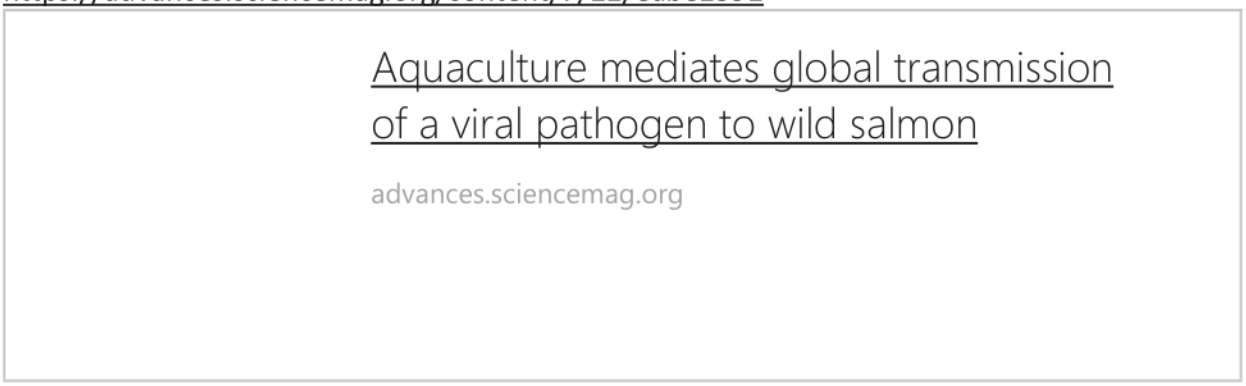
Hi Robert, Dave, and Brian,
Here is a request that I received from Nelson Bennett. Critical to the paper is the omission of information from another peer-reviewed scientific study that a wild-source BC steelhead sampled in 1977 tested positive for PRV. By omitting this information, the paper misleads readers into believing that we have no sequencing information from PRV before Atlantic salmon aquaculture began in BC.
Summary: The new paper says that 1977 PRV-positive test result from a wild-source BC steelhead trout was not sequenced. This is not correct. A 2020 paper cited in the new paper reports that the sample was sequenced. This omission is significant because 1977 predates the importation of Atlantic salmon into BC for aquaculture.
Details:
Here is how the new paper deals with this issue:
"The source and age of PRV in the North East (NE) Pacific is contentious (***23***, ***24***), with very low-load putative detections (unverified by sequencing) as long ago as 1977 (***25***). These detections are considered putative findings only, and to validate them, a peer-reviewed study would need to sequence archival PRV from 1977 and should include sufficient controls to screen out contaminants."
Here is how another peer-reviewed scientific paper dealt with this issue (Siah et al. 2020; emphasis mine):
"…partial PRV-1 S1 and S3 **sequences** from a 1977 Steelhead Trout collected in BC (Marty et al. 2015) were made available in GenBank (MT506522–MT506523) further supporting longer term presence of the virus in the northeast Pacific."
When Nelson Bennett last asked me to comment on a paper from Dr. Miller's group (2019-09-04), I was told by GCPE to refer Mr. Bennett to the authors for comment. Because the authors of the new paper do not cite information about sequencing of the 1977 result, I would not expect them to inform Mr. Bennett about this finding now. How the public will know about this omission unless I inform Mr. Bennett?
Reference: Siah A, Breyta BR, Warheit KI, Gagne N, Purcell MK, Morrison D, Powell JFF, Johnson SC. 2020. Genomes Reveal Genetic Diversity of Piscine Orthoreovirus in Farmed and Free-ranging Salmonids from Canada and USA. Virus Evolution, 6(2):veaa054, https://doi.org/10.1093/ve/veaa054
Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

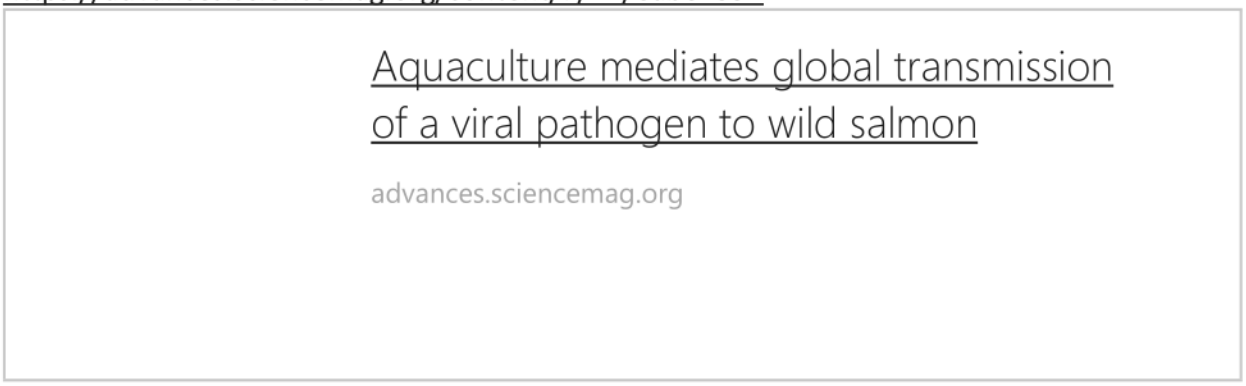
From: Nelson Bennett <nbennett@biv.com>
Sent: May 26, 2021 11:14 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: New PRV paper by Miller, Di Cicco et al

Dr. Marty: I don't know if I'm even going to have time to cover this, but within seconds of UBC announcing publication of this new paper, I got a media interview pitch from Alexandra Morton's PR person, so you can bet some media will be picking up on it.
I'm hoping you can take a look and let me know what you think about the conclusions: i.e. Atlantic salmon aquaculture is responsible for PRV in BC.

https://advances.sciencemag.org/content/7/22/eabe2592



https://advances.sciencemag.org/content/7/22/eabe2592



Nelson Bennett
Business in Vancouver
s.22

Automatic reply: New PRV paper by Miller, Di Cicco et al

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 11:56:20 AM PDT

Hi, I'm out of the office but back on Thursday. Please contact Dave Townsend or Brian Cotton if you need immediate help. Thanks very much.

RE: Salmon virus originally from the Atlantic, spread to B.C. wild salmon from farms: Study

From: Raverty, Stephen AFF:EX <Stephen.Raverty@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 12:11:30 PM PDT

Yes, even the last sentence in the abstract was not appropriate, was surprised that the editors may no have picked up on it.
S

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 12:10 PM
To: Raverty, Stephen AFF:EX <Stephen.Raverty@gov.bc.ca>
Subject: RE: Salmon virus originally from the Atlantic, spread to B.C. wild salmon from farms: Study
Hi Stephen,
Thanks for sending this. I am getting media enquiries, but I had not yet read the press release. I find it interesting how they state the following:
What is mentioned: "A recent Norwegian study found that a Canadian isolate of the virus causes heart lesions in Atlantic salmon."
What is not mentioned: We already knew that western Canadian PRV can cause minor heart lesions (published in 2019). The 2020 Norwegian study confirmed that the Canadian isolate of the virus did not cause HSMI.
Best regards,
Gary

From: Raverty, Stephen AFF:EX <Stephen.Raverty@gov.bc.ca>
Sent: May 26, 2021 11:42 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: FW: Salmon virus originally from the Atlantic, spread to B.C. wild salmon from farms: Study
From: UBC Media Relations <media.relations@ubc.ca>
Sent: May 26, 2021 11:00 AM
To: Raverty, Stephen AFF:EX <Stephen.Raverty@gov.bc.ca>
Subject: Salmon virus originally from the Atlantic, spread to B.C. wild salmon from farms: Study

UBC Media Relations | May 26, 2021

Media Release

Salmon virus originally from the Atlantic, spread to B.C. wild salmon from farms: Study

Contact: Chris Balma *(info at bottom)*

Permalink:
https://news.ubc.ca/2021/05/26/salmon-virus-originally-from-the-atlantic-spread-to-b-c-wild-salmon-from-farms-study/#contact-box

Links to Media Assets:

- Study link/journal: article

Contact:

Chris Balma
UBC Science

Cel: 604.202.5047

Email: balma@science.ubc.ca

UBC Media Relations
6251 Cecil Green Park Road
Vancouver, BC

Tel: 604 822 6397
Email: media.relations@ubc.ca

news.ubc.ca

Re: Your submission to BMC Biology - BMCB-D-21-00018R1 - Accepted

From: Farrell, Anthony <tony.farrell@ubc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>, Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>, Yangfan Zhang <yangfan@zoology.ubc.ca>, Phillip Morrison <morrison@zoology.ubc.ca>, Colin Brauner <brauner@zoology.ubc.ca>, Garver, Kyle <Kyle.Garver@dfo-mpo.gc.ca>
Sent: May 26, 2021 2:38:32 PM PDT

Gary
Thanks for flagging this. I will make sure that UBC news gives a comparable coverage of our work. I will call Chris Balma directly once the m/s is accepted and an on-line preprint is available (Mark let me know as I am not getting emails from BMC Biol)
However, UBC press is not the forum for challenging the quality of a story and what it chose to exclude from the story. There are several Journals that give limited space to “opinion” pieces – J Fish Biology is one for example. Perhaps this avenue could be used to get a more balanced message out.
Cheers
Tony

From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>
Date: Wednesday, May 26, 2021 at 12:29 PM
To: "Farrell, Anthony" <tony.farrell@ubc.ca>, "'Polinski, Mark'" <Mark.Polinski@dfo-mpo.gc.ca>, Yangfan Zhang <yangfan@zoology.ubc.ca>, Phillip Morrison <morrison@zoology.ubc.ca>, Colin Brauner <brauner@zoology.ubc.ca>, Kyle Garver <Kyle.Garver@dfo-mpo.gc.ca>
Subject: RE: Your submission to BMC Biology - BMCB-D-21-00018R1 - Accepted
[**CAUTION:** Non-UBC Email]
Dear Coauthors,
I am glad to hear that a press release is planned. I would like to see it provide information that addresses concerns raised in today's UBC press release about another paper (our press release does need to cite this paper or press release, but it can highlight the evidence we provide that the threat of BC PRV to sockeye salmon is no more than minimal):
https://advances.sciencemag.org/content/7/22/eabe2592
https://news.ubc.ca/2021/05/26/salmon-virus-originally-from-the-atlantic-spread-to-b-c-wild-salmon-from-farms-study/#contact-box
Here is one thing I noted about the article:
Critical to the paper is the omission of information from another peer-reviewed scientific study that a wild-source BC steelhead sampled in 1977 tested positive for PRV. By omitting this information, the paper misleads readers into believing that we have no sequencing information from PRV before Atlantic salmon aquaculture began in BC.
Summary: The new paper says that 1977 PRV-positive test result from a wild-source BC steelhead trout was not sequenced. This is not correct. A 2020 paper cited in the new paper reports that the sample was sequenced. This omission is significant because 1977 predates the importation of Atlantic salmon into BC for aquaculture.
Details:
Here is how the new paper deals with this issue:

Here is how another peer-reviewed scientific paper dealt with this issue (Siah et al. 2020; emphasis mine):

"…partial PRV-1 S1 and S3 sequences from a 1977 Steelhead Trout collected in BC (Marty et al. 2015) were made available in GenBank (MT506522–MT506523) further supporting longer term presence of the virus in the northeast Pacific."

Reference: Siah A, Breyta BR, Warheit KI, Gagne N, Purcell MK, Morrison D, Powell JFF, Johnson SC. 2020. Genomes Reveal Genetic Diversity of Piscine Orthoreovirus in Farmed and Free-ranging Salmonids from Canada and USA. Virus Evolution, 6(2):veaa054, https://doi.org/10.1093/ve/veaa054

Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

-----Original Message-----
From: Farrell, Anthony <tony.farrell@ubc.ca>
Sent: May 25, 2021 10:46 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>; 'Polinski, Mark' <Mark.Polinski@dfo-mpo.gc.ca>; Yangfan Zhang <yangfan@zoology.ubc.ca>; Phillip Morrison <morrison@zoology.ubc.ca>; Colin Brauner <brauner@zoology.ubc.ca>; Garver, Kyle <Kyle.Garver@dfo-mpo.gc.ca>
Subject: Re: Your submission to BMC Biology - BMCB-D-21-00018R1 - Accepted

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Gary

This is a good idea. Yangfan is already on it with Land and Food Systems, which may or may not trigger something at the UBC level (if they are interested). Is there any specific messaging that you want sent out?

Cheers

Tony

On 2021-05-25, 10:38 AM, "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca> wrote:

[CAUTION: Non-UBC Email]

Dear Coauthors,

Congratulations for getting this accepted.

On a related note, I perceive a substantial need among provincial and federal decisionmakers as well as the general public to be informed about the main findings in this paper.

Will the UBC coauthors be able to take the lead on a Press Release when this is published? [In my experience, publicizing research is better done by universities than by governments.]

Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

-----Original Message-----
From: Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>
Sent: May 25, 2021 9:46 AM
To: Yangfan Zhang <yangfan@zoology.ubc.ca>; Phillip Morrison <morrison@zoology.ubc.ca>; Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>; Colin Brauner <brauner@zoology.ubc.ca>; Farrell, Anthony <tony.farrell@ubc.ca>; Garver, Kyle <Kyle.Garver@dfo-mpo.gc.ca>
Subject: FW: Your submission to BMC Biology - BMCB-D-21-00018R1 - Accepted

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hello everyone, just wanted to let you know that following a minor revision our manuscript has been accepted for publication in BMC Biology as indicated below. I will address the minor formatting requirements and let you know when the article is published. Thank you all again for your contributions.
Best,
Mark
-----Original Message-----
From: em.bmcb.0.738809.e271a410@editorialmanager.com
<em.bmcb.0.738809.e271a410@editorialmanager.com> On Behalf Of BioMed Central Editorial Office
Sent: Tuesday, May 25, 2021 5:36 AM
To: Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>
Subject: Your submission to BMC Biology - BMCB-D-21-00018R1 - [EMID:c8286cdff7136c86]
BMCB-D-21-00018R1
The vertebrate (salmon) innate antiviral defense demonstrates high energetic efficiency during rhabdovirus and reovirus infection Mark Polinski; Yangfan Zhang; Phillip R Morrison; Gary D Marty; Colin J Brauner; Anthony P Farrell; Kyle A Garver
Dear Dr. Polinski,
Your revised manuscript has now been seen again by reviewer #1, and I am pleased to let you know that we are happy to offer publication in BMC Biology, subject to some further minor revisions to comply with the journal style.
...

RE: Media inquiries - PRV study

From: Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>, Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>, Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>
Sent: May 26, 2021 4:47:45 PM PDT

Thanks Gary - I'll run these up the line right now so folks are aware and Rob will likely be in touch tomorrow as I'll be away for a couple days.
Cheers,
Brian

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 4:31 PM
To: Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>; Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>; Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>
Subject: RE: Media inquiries - PRV study

Hi Brian,
Here are some ideas:
I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
Best regards,
Gary

From: Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>
Sent: May 26, 2021 3:14 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>; Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>; Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>
Subject: RE: Media inquiries - PRV study

Hi Gary,
If you could please run a written response by us for both the Dirk and the BIV request so we can flag up the chain that'd be most appreciated.
Thank you,
Brian Cotton
Communications Director
Ministry of Agriculture, Food and Fisheries
Phone: (250) 387-9618
Cell: (250) 818-4233

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 12:06 PM
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>; Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>; Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>
Subject: FW: Media inquiries - PRV study
Importance: High

Another request…

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 11:50 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>

Subject: Media inquiries - PRV study
Importance: High

Hi Gary,
We are receiving media inquiries today - one from Dirk Meissner of Canadian Press who would like industry comment on a new PRV study out today by UBC researchers.
Dirk told us the research was done in conjunction with the Salmon Health Initiative and DFO, using genetics to track PRV and mutations. Their conclusions are that there is strong evidence PRV came from Norway via Atlantic salmon farms when eggs and smolts were imported back in the day, and spread from salmon farms to wild salmon.
We mentioned your paper published in 2015 and have also provided Dirk with your phone number for possible comment. We are also working on further messaging.
The study has been published and can be found here:
https://advances.sciencemag.org/content/7/22/eabe2592?fbclid=IwAR1P6r5dwIxj46rxit_uNJFLjVRXR4E3np7f45vyxkT-0rQ_pTqdE8gkS-k
Not sure you can comment without approval, so hope you are OK with us passing along your contact information.
Thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

Wang Thesis (for discussion)

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: McKenzie, Christina <s.22 >
Sent: May 27, 2021 8:46:25 AM PDT

https://open.library.ubc.ca/cIRcle/collections/ubctheses/24/items/1.0375894

RE: It doesn't stop does it?

From:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To:	hughm@aquatactics.com
Sent:	May 27, 2021 9:22:12 AM PDT
Attachments:	image001.jpg

Hi Hugh,
My understanding is that Dr. Miller's has ~20 more publications planned from the SSHI research. Here are some of my thoughts on the paper:
I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
Summary: The new paper says that 1977 PRV-positive test result from a wild-source BC steelhead trout was not sequenced. This is not correct. A 2020 paper cited in the new paper reports that the sample was sequenced. This omission is significant because 1977 predates the importation of Atlantic salmon into BC for aquaculture.
Details:
Here is how the new paper deals with this issue:
"The source and age of PRV in the North East (NE) Pacific is contentious (23, 24), with very low-load putative detections (unverified by sequencing) as long ago as 1977 (25). These detections are considered putative findings only, and to validate them, a peer-reviewed study would need to sequence archival PRV from 1977 and should include sufficient controls to screen out contaminants."
Here is how another peer-reviewed scientific paper dealt with this issue (Siah et al. 2020; emphasis mine):
"…partial PRV-1 S1 and S3 sequences from a 1977 Steelhead Trout collected in BC (Marty et al. 2015) were made available in GenBank (MT506522–MT506523) further supporting longer term presence of the virus in the northeast Pacific."
Reference: Siah A, Breyta BR, Warheit KI, Gagne N, Purcell MK, Morrison D, Powell JFF, Johnson SC. 2020. Genomes Reveal Genetic Diversity of Piscine Orthoreovirus in Farmed and Free-ranging Salmonids from Canada and USA. Virus Evolution, 6(2):veaa054, https://doi.org/10.1093/ve/veaa054
Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 27, 2021 9:09 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: It doesn't stop does it?

****

Hugh Mitchell, MS, DVM
AquaTactics Fish Health
12015 115th Ave NE, Suite 120
Kirkland, WA 98034
425-821-6821 (cell and office)
www.aquatactics.com

Correction recommendation for article on salmon virus

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: lmapes@seattletimes.com
Sent: May 27, 2021 12:38:33 PM PDT

Dear Linda,
Thank you for your work to highlight salmon farming issues. I read with interest today's article "Virus spreads from B.C. fish farms to wild Chinook salmon, study finds."
The article contains one sentence that is not correct: "The virus has been shown to sicken fish."
Recommended correct information: "The virus has not been shown to sicken fish."
Background: While the virus has been shown to occur in sick fish, and it has been shown to cause minor microscopic lesions, it has not been shown to sicken fish under controlled laboratory conditions. The difference between minor lesions and disease is fundamental in experimental medicine, and it has significant implications for wild fish health.
The best evidence for the lack of disease with PRV and Chinook salmon is an article led by Seattle's Maureen Purcell:
M. K. Purcell, R. L. Powers, T. Taksdal, D. McKenney, C. M. Conway, D. G. Elliott, M. Polinski, K. Garver, J. Winton, Consequences of Piscine orthoreovirus genotype 1 (PRV-1) infections in Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*) and rainbow trout (*O. mykiss*). J. Fish Dis. 43, 719–728 (2020).
Sincerely,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

FW: Question on wild salmon study

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>, Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>, Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>
Sent: May 27, 2021 5:44:23 PM PDT

Hi Brian, Robert, and Dave,
Here is another request and potential response.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.
2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

My 2015 study:

1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:
    a. 195 samples collected from 1974 – 1994
    b. 86 samples collected from 2000 – 2006
2. The earliest positive test result was from a wild-source steelhead trout sampled in 1977.
3. The PRV in the same 1977 paraffin block was independently sequenced by another researcher and made available in GenBank in 2020 (MT506522–MT506523).
4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

The current paper:

1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.
2. None of the Pacific sequences were collected before 2000 and only six were collected before 2008
    a. sequences from the 1977 BC sample were not used
3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.
4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

Best regards,
Gary

From: Rachel Sapin <rachel.sapin@intrafish.com>
Sent: May 27, 2021 3:59 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Question on wild salmon study

Hi Gary,
I was told by Tim Kennedy you would be a good person to get in touch with regarding a new study that came out regarding PRV-1 being transmitted between farmed salmon and wild salmon. I'm just curious how this compares with your paper that was published in 2015?
https://advances.sciencemag.org/content/7/22/eabe2592
Piscine reovirus in wild and farmed salmonids in British Columbia, Canada: 1974–2013 - Marty - 2015 - Journal of Fish Diseases - Wiley Online Library

Rachel Sapin
Reporter
IntraFish Media
3500 188th St. SW Ste 335

Lynnwood, WA 98037
Office: 206-490-3685
Cell: 617-894-6552
rachel.sapin@intrafish.com

Automatic reply: Question on wild salmon study

From:	Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>
To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 27, 2021 5:44:24 PM PDT

I am away, returning May 31. If you need immediate assistance, please contact Robert.Boelens@gov.bc.ca
Thank you.

Re: PRV study

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Cc: Cotton, Brian GCPE:EX <Brian.Cotton@gov.bc.ca>, Townsend, Dave H GCPE:EX <Dave.H.Townsend@gov.bc.ca>
Sent: May 27, 2021 6:10:02 PM PDT

Thanks Gary, I'll follow up and be in touch tomorrow morning, thanks for your patience

> On May 27, 2021, at 5:52 PM, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca> wrote:
>
> Hi Brian, Robert, and Dave,
> Here is another request. I should be able to respond with the same information that I have suggested for the other two enquiries.
> Gary
>
> **From:** SeaWestNews Editor <editor@seawestnews.com>
> **Sent:** May 27, 2021 4:46 PM
> **To:** Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
> **Subject:** PRV study
>
> **[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.**
>
> Hi Dr Marty, are you able to shine some light on the new PRV study by UBC in relation to your findings on this subject matter..tmr morning will be great
>
> Fabian Dawson
> Editor
> SeaWestNews.com
> editor@seawestnews.com

Page 21 of 95 to/à Page 24 of 95

Withheld pursuant to/removed as

s.13 ; s.14 ; s.16

RE: Question to recommend to the Press

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 3:11:08 PM PDT

I've got news, coming in a minute!

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 3:09 PM
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Subject: RE: Question to recommend to the Press

Hi Robert,
Thanks for the update. Am I likely to hear something today?
Gary

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Sent: May 28, 2021 12:59 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: RE: Question to recommend to the Press

Hi Gary, I'm still waiting to hear back on the proposed responses Gary, but it all reads fine to me.
I think the below is fine as well, though I'd include it as part of the email, and separate it from the official response you provided for attribution, so it's clear it's a suggestion to the reporter and not meant to be part of your response in their articles.
Be in touch as soon as I hear on the requests.

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 7:11 AM
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Subject: Question to recommend to the Press

Hi Robert,

In addition to the information that I would like to send to the press, I would also like to pass on the following recommendation:

I recommend contacting Dr. Miller or Dr. Di Cicco and asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

FW: Media inquiries - PRV study

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 3:17:29 PM PDT

Hi Gary, would the combination of the material you provided into a statement below from you be acceptable from your viewpoint? Please accept my apologies, but I cant, amidst the ongoings of a busy afternoon, recall the correct wording for the highlighted title.
Statement attributable to Dr. Gary Marty
As a Veterinary Fish Pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
There have been two studies done on the topic, one by myself in 2015 and one published recently.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.
2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

My 2015 study:

1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:
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4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

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4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

Best regards,
Gary
Mobile: 604-202-2147

RE: Media inquiries - PRV study

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 3:41:43 PM PDT

Great, thanks very much Gary, I had certified there too at one point. Appreciate it!

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 3:31 PM
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Subject: RE: Media inquiries - PRV study

Hi Robert,
The suggested correction below should work. I could add "with a Ph.D.", but that gets fairly long.
Gary

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Sent: May 28, 2021 3:17 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: FW: Media inquiries - PRV study

Hi Gary, would the combination of the material you provided into a statement below from you be acceptable from your viewpoint? Please accept my apologies, but I cant, amidst the ongoings of a busy afternoon, recall the correct wording for the highlighted title.
Statement attributable to Dr. Gary Marty
As a ~~Veterinary Fish~~ board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
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There have been two studies done on the topic, one by myself in 2015 and one published recently.

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2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

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4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

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1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.
2. None of the Pacific sequences were collected before 2000 and only six were collected before 2008
    a. sequences from the 1977 BC sample were not used
3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.

4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the “probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer.”

Best regards,
Gary
Mobile: 604-202-2147

RE: New PRV paper by Miller, Di Cicco et al

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Nelson Bennett <nbennett@biv.com>
Sent: May 28, 2021 4:27:13 PM PDT

Hi Nelson,
Here is some information that I put together about the new scientific paper from my perspective:
As a board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
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Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.

2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

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3. The PRV in the same 1977 paraffin block was independently sequenced by another researcher and made available in GenBank in 2020 (MT506522–MT506523).

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3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.

4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

If the study authors are interviewed, I recommend asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Nelson Bennett <nbennett@biv.com>
Sent: May 26, 2021 12:56 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: New PRV paper by Miller, Di Cicco et al

Thanks.
Nelson Bennett
Business in Vancouver
s.22

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 26, 2021 12:55 PM
To: Nelson Bennett <nbennett@biv.com>
Subject: RE: New PRV paper by Miller, Di Cicco et al

Hi Nelson,
Thanks for the enquiry. I am checking with my communications people for advice. They may also be contacted directly:
Boelens, Robert GCPE:EX Robert.Boelens@gov.bc.ca
Townsend, Dave H GCPE:EX Dave.H.Townsend@gov.bc.ca
Cotton, Brian GCPE:EX Brian.Cotton@gov.bc.ca
Robert is out of the office today, but for future reference he is often my primary contact.
Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Nelson Bennett <nbennett@biv.com>
Sent: May 26, 2021 11:14 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: New PRV paper by Miller, Di Cicco et al

Dr. Marty: I don't know if I'm even going to have time to cover this, but within seconds of UBC announcing publication of this new paper, I got a media interview pitch from Alexandra Morton's PR person, so you can bet some media will be picking up on it.
I'm hoping you can take a look and let me know what you think about the conclusions: i.e. Atlantic salmon aquaculture is responsible for PRV in BC.
Nelson Bennett
Business in Vancouver
s.22

RE: Media inquiries - PRV study

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 28, 2021 4:28:29 PM PDT

Hi Ruth,
Here is some information that I put together about the new scientific paper from my perspective:
As a board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the new paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
I am lead author on a scientific paper published in 2015 that addresses some of the same questions as the paper published this week.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.

2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

My 2015 study:

1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:
    a. 195 samples collected from 1974 – 1994

    b. 86 samples collected from 2000 – 2006

2. The earliest positive test result was from a wild-source steelhead trout sampled in 1977.

3. The PRV in the same 1977 paraffin block was independently sequenced by another researcher and made available in GenBank in 2020 (MT506522–MT506523).

4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

The current paper:

1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.

2. None of the Pacific sequences were collected before 2000 and only six were collected before 2008
    a. sequences from the 1977 BC sample were not used

3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.

4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

If the study authors are interviewed, I recommend asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 12:01 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: Media inquiries - PRV study

Thanks so much Gary.
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Wednesday, May 26, 2021 at 11:57 AM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
I am checking with my communication people now.
Gary

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 11:50 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Media inquiries - PRV study
Importance: High

Hi Gary,
We are receiving media inquiries today - one from Dirk Meissner of Canadian Press who would like industry comment on a new PRV study out today by UBC researchers.
Dirk told us the research was done in conjunction with the Salmon Health Initiative and DFO, using genetics to track PRV and mutations. Their conclusions are that there is strong evidence PRV came from Norway via Atlantic salmon farms when eggs and smolts were imported back in the day, and spread from salmon farms to wild salmon.
We mentioned your paper published in 2015 and have also provided Dirk with your phone number for possible comment. We are also working on further messaging.
The study has been published and can be found here:
https://advances.sciencemag.org/content/7/22/eabe2592?fbclid=IwAR1P6r5dwIxj46rxit_uNJFLjVRXR4E3np7f45vyxkT-0rQ_pTqdE8gkS-k

Not sure you can comment without approval, so hope you are OK with us passing along your contact information.
Thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

RE: Question on wild salmon study

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Rachel Sapin <rachel.sapin@intrafish.com>
Sent: May 28, 2021 4:30:30 PM PDT

Hi Rachel,
Here is some information that I put together about the new scientific paper from my perspective:
As a board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the new paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
I am lead author on a scientific paper published in 2015 that addresses some of the same questions as the paper published this week.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.

2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

My 2015 study:

1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:
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2. The earliest positive test result was from a wild-source steelhead trout sampled in 1977.

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4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

The current paper:

1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.

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4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

If the study authors are interviewed, I recommend asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

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Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Rachel Sapin <rachel.sapin@intrafish.com>
Sent: May 27, 2021 3:59 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Question on wild salmon study

Hi Gary,
I was told by Tim Kennedy you would be a good person to get in touch with regarding a new study that came out regarding PRV-1 being transmitted between farmed salmon and wild salmon. I'm just curious how this compares with your paper that was published in 2015?
https://advances.sciencemag.org/content/7/22/eabe2592
Piscine reovirus in wild and farmed salmonids in British Columbia, Canada: 1974–2013 - Marty - 2015 - Journal of Fish Diseases - Wiley Online Library

Rachel Sapin
Reporter
IntraFish Media

3500 188th St. SW Ste 335

Lynnwood, WA 98037
Office: 206-490-3685
Cell: 617-894-6552
rachel.sapin@intrafish.com

Page 37 of 95 to/à Page 38 of 95

Withheld pursuant to/removed as

s.13 ; s.16

RE: Media inquiries - PRV study

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 28, 2021 4:38:59 PM PDT

Hi Ruth,
Public education is part of my ethical responsibility as a veterinarian. I am happy to review a draft document that will serve to education the public.
I have received a few media enquires about the paper, and the information that I have shared with you is intended as a reference for public release; so yes, I can be quoted.
The questions at the end are suggestions for the reporters. I did not intend to be quoted on those. However, I would like to read/hear the authors responses to those questions.
Best regards,
Gary

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 28, 2021 4:34 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: Media inquiries - PRV study

Thank you so much Gary, this is extremely helpful. I'm pulling together a detailed response on this paper for BCSFA, not sure it will be directed to public/media or the editor of the journal, but I want it to be thorough.
Can I share my draft with you for feedback when I'm complete? (Monday)
Can I quote you, or would you prefer I just assimilate the information into our response?
Thanks again,
Ruth
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Friday, May 28, 2021 at 4:28 PM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
Here is some information that I put together about the new scientific paper from my perspective:
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Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 12:01 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: Media inquiries - PRV study

Thanks so much Gary.
Ruth Salmon

Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Wednesday, May 26, 2021 at 11:57 AM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
I am checking with my communication people now.
Gary

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 11:50 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Media inquiries - PRV study
Importance: High

Hi Gary,
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Dirk told us the research was done in conjunction with the Salmon Health Initiative and DFO, using genetics to track PRV and mutations. Their conclusions are that there is strong evidence PRV came from Norway via Atlantic salmon farms when eggs and smolts were imported back in the day, and spread from salmon farms to wild salmon.
We mentioned your paper published in 2015 and have also provided Dirk with your phone number for possible comment. We are also working on further messaging.
The study has been published and can be found here:
https://advances.sciencemag.org/content/7/22/eabe2592?fbclid=IwAR1P6r5dwIxj46rxit_uNJFLjVRXR4E3np7f45vyxkT-0rQ_pTqdE8gkS-k
Not sure you can comment without approval, so hope you are OK with us passing along your contact information.
Thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

Re: Media inquiries - PRV study

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 4:42:35 PM PDT

Excellent, back to you on Monday with a first draft.
Ruth
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Friday, May 28, 2021 at 4:39 PM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
Public education is part of my ethical responsibility as a veterinarian. I am happy to review a draft document that will serve to education the public.
I have received a few media enquires about the paper, and the information that I have shared with you is intended as a reference for public release; so yes, I can be quoted.
The questions at the end are suggestions for the reporters. I did not intend to be quoted on those. However, I would like to read/hear the authors responses to those questions.
Best regards,
Gary

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 28, 2021 4:34 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: Media inquiries - PRV study

Thank you so much Gary, this is extremely helpful. I'm pulling together a detailed response on this paper for BCSFA, not sure it will be directed to public/media or the editor of the journal, but I want it to be thorough.
Can I share my draft with you for feedback when I'm complete? (Monday)
Can I quote you, or would you prefer I just assimilate the information into our response?
Thanks again,
Ruth
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Friday, May 28, 2021 at 4:28 PM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
Here is some information that I put together about the new scientific paper from my perspective:
As a board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon.
Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.

Even the thesis cited by the new paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions.
Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
I am lead author on a scientific paper published in 2015 that addresses some of the same questions as the paper published this week.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.

2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

My 2015 study:

1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:

    a. 195 samples collected from 1974 – 1994

    b. 86 samples collected from 2000 – 2006

2. The earliest positive test result was from a wild-source steelhead trout sampled in 1977.

3. The PRV in the same 1977 paraffin block was independently sequenced by another researcher and made available in GenBank in 2020 (MT506522–MT506523).

4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

The current paper:

1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.

2. None of the Pacific sequences were collected before 2000 and only six were collected before 2008

    a. sequences from the 1977 BC sample were not used

3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.

4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

If the study authors are interviewed, I recommend asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.

Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 12:01 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Re: Media inquiries - PRV study

Thanks so much Gary.
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Wednesday, May 26, 2021 at 11:57 AM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Media inquiries - PRV study

Hi Ruth,
I am checking with my communication people now.
Gary

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 26, 2021 11:50 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Media inquiries - PRV study
Importance: High

Hi Gary,
We are receiving media inquiries today - one from Dirk Meissner of Canadian Press who would like industry comment on a new PRV study out today by UBC researchers.
Dirk told us the research was done in conjunction with the Salmon Health Initiative and DFO, using genetics to track PRV and mutations. Their conclusions are that there is strong evidence PRV came from Norway via Atlantic salmon farms when eggs and smolts were imported back in the day, and spread from salmon farms to wild salmon.
We mentioned your paper published in 2015 and have also provided Dirk with your phone number for possible comment. We are also working on further messaging.
The study has been published and can be found here:
https://advances.sciencemag.org/content/7/22/eabe2592?fbclid=IwAR1P6r5dwlxj46rxit_uNJFLjVRXR4E3np7f45vyxkT-0rQ_pTqdE8gkS-k
Not sure you can comment without approval, so hope you are OK with us passing along your contact information.
Thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

Re: PRV study

From: SeaWestNews Editor <editor@seawestnews.com>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 28, 2021 6:10:38 PM PDT

Thank you sir

Sent from my iPhone

On May 28, 2021, at 4:30 PM, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca> wrote:

Hi Fabian,
Here is some information that I put together about the new scientific paper from my perspective:
As a board-certified veterinary pathologist, I disagree with the conclusion that "PRV is now an important infectious agent in critically endangered wild Pacific salmon populations."
Instead, PRV is a minor infectious agent that occurs in a small proportion of wild Pacific salmon. Controlled laboratory studies consistently show that BC PRV does not cause clinical disease in sockeye salmon or Chinook salmon.
Even the thesis cited by the new paper reports only mild PRV-associated microscopic lesions among six of nine wild Chinook salmon examined. The other three fish had no PRV-associated microscopic lesions. Mild microscopic lesions are not a threat to wild salmon populations. Instead, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.
I am lead author on a scientific paper published in 2015 that addresses some of the same questions as the paper published this week.

Study Similarities

1. The new paper and my 2015 paper both provide evidence to help us determine when PRV first infected salmonids in the northeastern Pacific.
2. Both research groups investigated the relation of PRV in BC salmonids in relation to the first importation of Atlantic salmon for aquaculture in 1985.

However, the researchers used different methods.

Study Differences

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1. Samples of British Columbia salmonids from archived paraffin blocks were tested by PCR for PRV:
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    b. 86 samples collected from 2000 – 2006
2. The earliest positive test result was from a wild-source steelhead trout sampled in 1977.
3. The PRV in the same 1977 paraffin block was independently sequenced by another researcher and made available in GenBank in 2020 (MT506522–MT506523).
4. Transmission from farm salmon to wild salmon was not a focus of this study, but prevalence of PRV was not different between fresh samples from wild coho salmon collected from Alaska and BC in 2013.

The current paper:

1. 392 PRV sequences from the Atlantic and Pacific were compared in an attempt to determine the origins of the Pacific sequences.
2. None of the Pacific sequences were collected before 2000 and only six were collected before 2008
    a. sequences from the 1977 BC sample were not used
3. Using a mathematical model, the time of separation of Atlantic and Pacific sequences was estimated as 1981 – 1997.
4. Transmission from farm salmon to wild salmon was a focus of this study, which found that the "probability of PRV infection for first–marine-year Chinook salmon increases closer to active salmon farms in the fall-winter period, but not in the spring-summer."

If the study authors are interviewed, I recommend asking the following questions:

1. Has anybody in your research group exposed Pacific salmon to eastern Pacific PRV under controlled laboratory conditions?

2. If so, did the exposed fish develop a PRV infection?

3. If so, was the PRV infection associated with statistically significant clinical disease or mortality?

Answers to these questions will help put the significance of the new study in perspective.

Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: SeaWestNews Editor <editor@seawestnews.com>
Sent: May 27, 2021 4:46 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: PRV study

Hi Dr Marty, are you able to shine some light on the new PRV study by UBC in relation to your findings on this subject matter..tmr morning will be great

Fabian Dawson
Editor
SeaWestNews.com
editor@seawestnews.com

Re: Additional information to provide interested media

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 29, 2021 11:01:49 AM PDT

Sounds good to me Gary, I'll share with aff executive and be in touch.

> On May 29, 2021, at 9:50 AM, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca> wrote:
>
> Hi Robert,
>
> As I thought some more about the published paper, I am not able to find that it contributes much new information to the discussion about farm salmon and wild salmon interactions. To that end, I would like to send the following information in response to media enquiries:
>
> The idea that salmon farms shed PRV into the environment is not new. DFO's 2019 CSAS report on PRV included, "It is therefore extremely likely, with high certainty, that PRV could be released from an Atlantic Salmon farm through infected fish."
>
> The idea that wild salmon will be infected with farm-source PRV is not new. DFO's 2019 CSAS report on PRV included, "…it would be very likely, with high uncertainty, that at least one Fraser River Sockeye Salmon would become infected."
>
> The idea that BC PRV came from Norway is not new. The first scientific paper to report PRV in BC (Kibenge et al. 2013) includes discussion about "the time when Canadian PRV isolates diverged from Norwegian PRV isolates…"
>
> **Sources:**
>
> Kibenge, M.J., Iwamoto, T., Wang, Y. et al. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. Virol J 10, 230 (2013). https://doi.org/10.1186/1743-422X-10-230
>
> Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz, I.J. and Parsons, G.J. 2019. Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/036. viii + 45 p.
>
> Best regards,
>
> Gary

Page 48 of 95 to/à Page 49 of 95

Withheld pursuant to/removed as

s.13 ; s.16

Question about DFO position on status of PRV in BC

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Gideon Mordecai <gmordecai@eoas.ubc.ca>
Sent: May 29, 2021 5:07:18 PM PDT

Dear Dr. Mordecai,
I read with interest the recent paper “Aquaculture mediates global transmission of a viral pathogen to wild salmon”. I also read a report about this paper in *The Tyee*, which includes the following:

> “The discovery differs markedly from the official position of Fisheries and Oceans Canada, says Mordecai. ‘They say it is a native Pacific strain, but that is not accurate. It’s the same strain as in Norway.’”

I realize that reporters do not always get information correct. However, if this quote is correct, would you be able to provide me with the source for this statement (i.e., the official position from DFO that PRV is native to BC)? I am not able to find such wording in either of these DFO documents:
https://www.dfo-mpo.gc.ca/science/aah-saa/species-especes/aq-health-sante/prv-rp-eng.html
https://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2019/2019_022-eng.html
Thank you very much.
Sincerely,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

RE: Additional information to provide interested media

From: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 31, 2021 8:37:27 AM PDT

Thanks Gary, no concerns here, thanks for sharing with us

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 29, 2021 9:51 AM
To: Boelens, Robert GCPE:EX <Robert.Boelens@gov.bc.ca>
Subject: Additional information to provide interested media

Hi Robert,

As I thought some more about the published paper, I am not able to find that it contributes much new information to the discussion about farm salmon and wild salmon interactions. To that end, I would like to send the following information in response to media enquiries:

The idea that salmon farms shed PRV into the environment is not new. DFO's 2019 CSAS report on PRV included, "It is therefore extremely likely, with high certainty, that PRV could be released from an Atlantic Salmon farm through infected fish."
The idea that wild salmon will be infected with farm-source PRV is not new. DFO's 2019 CSAS report on PRV included, "…it would be very likely, with high uncertainty, that at least one Fraser River Sockeye Salmon would become infected."
The idea that BC PRV came from Norway is not new. The first scientific paper to report PRV in BC (Kibenge et al. 2013) includes discussion about "the time when Canadian PRV isolates diverged from Norwegian PRV isolates…"

Sources:

Kibenge, M.J., Iwamoto, T., Wang, Y. et al. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. Virol J 10, 230 (2013). https://doi.org/10.1186/1743-422X-10-230
Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz, I.J. and Parsons, G.J. 2019. Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/036. viii + 45 p.

Best regards,
Gary

RE: Question on wild salmon study [additional information]

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: Rachel Sapin <rachel.sapin@intrafish.com>
Sent: May 31, 2021 9:18:28 AM PDT

Hi Rachel,
In addition to the information that I have already provided, I add the following:

1. The idea that salmon farms shed PRV into the environment is not new. DFO's 2019 CSAS report on PRV included, "It is therefore extremely likely, with high certainty, that PRV could be released from an Atlantic Salmon farm through infected fish."
2. The idea that wild salmon will be infected with farm-source PRV is not new. DFO's 2019 CSAS report on PRV included, "…it would be very likely, with high uncertainty, that at least one Fraser River Sockeye Salmon would become infected."
3. The idea that BC PRV came from Norway is not new. The first scientific paper to report PRV in BC (Kibenge et al. 2013) includes discussion about "the time when Canadian PRV isolates diverged from Norwegian PRV isolates…"

Sources:

Kibenge, M.J., Iwamoto, T., Wang, Y. et al. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. Virol J 10, 230 (2013). https://doi.org/10.1186/1743-422X-10-230

Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz, I.J. and Parsons, G.J. 2019. Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/036. viii + 45 p.

Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

Re: PRV study [additional information]

From: SeaWestNews Editor <editor@seawestnews.com>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 31, 2021 9:28:48 AM PDT

Thank you

Sent from my iPhone

On May 31, 2021, at 9:16 AM, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca> wrote:

Hi Fabian,
In addition to the information that I have already provided, I add the following:

1. The idea that salmon farms shed PRV into the environment is not new. DFO's 2019 CSAS report on PRV included, "It is therefore extremely likely, with high certainty, that PRV could be released from an Atlantic Salmon farm through infected fish."
2. The idea that wild salmon will be infected with farm-source PRV is not new. DFO's 2019 CSAS report on PRV included, "…it would be very likely, with high uncertainty, that at least one Fraser River Sockeye Salmon would become infected."
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Sources:

Kibenge, M.J., Iwamoto, T., Wang, Y. et al. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. Virol J 10, 230 (2013). https://doi.org/10.1186/1743-422X-10-230

Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz, I.J. and Parsons, G.J. 2019. Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/036. viii + 45 p.

Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

RE: Twitter fight with Morton

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
To: hughm@aquatactics.com
Sent: May 31, 2021 11:41:08 AM PDT
Attachments: image001.jpg

Hi Hugh,
I recommend asking Alexandra Morton how many of her ISAV-positive test results from BC salmon have been confirmed by an outside laboratory.
I recommend asking Alexandra Morton when she is going to respond to the Reader Comments about her correction: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0248912
Ms. Morton is correct in that Jim Winton's laboratory was not able to replicate the PRV-positive results from the 1977 sample. However, at the time when they attempted to replicate the result, the laboratory had no previous experience extracting nucleic acid from paraffin samples. Winton's lab was able to replicate PRV-positive results from other archived samples.
That said, the result from the 1977 sample has been replicated by a DFO laboratory: Siah et al. 2020 Virus Evolution, 2020, 6(2): veaa054) reported "…partial PRV-1 S1 and S3 sequences from a 1977 Steelhead Trout collected in BC (Marty et al. 2015) were made available in GenBank MT506522–MT506523) further supporting longer term presence of the virus in the northeast Pacific."
Best regards,
Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 31, 2021 11:26 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Twitter fight with Morton

Hey Gary,
So, I am getting in a twitter spar with s.22 .
She is claiming that Winton was sent samples of the 1977 Steelhead and didn't find PRV?? I am going to ask Jim about this. When I asked Morton about "chain of custody", she claimed it was handled by the Dept. of Justice. Know anything about that?
I am certainly not going to get into the weeds too much with her. You know how that goes.
On a flight right now to California to help a facility with Lactococcus garvieae. A bit of politics behind this one too!
Did you know that 23% of the OIE listed animal pathogens are fish???? A bit ridiculous.
Cheers,
Hugh
****

Hugh Mitchell, MS, DVM
AquaTactics Fish Health
12015 115th Ave NE, Suite 120
Kirkland, WA 98034
425-821-6821 (cell and office)
www.aquatactics.com

RE: Twitter fight with Morton

From:	hughm@aquatactics.com
To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 11:56:09 AM PDT
Attachments:	image001.jpg

Gary,
Thanks. This is such a waste of time, but s.22
s.22
What were the other archived samples that Winton could replicate.
At some point, getting too much into the weeds will not resonate with the public.
She doesn't work on fish diseases on a practical level and we do. We know what ones are important and what ones aren't (wild and farmed) and we actually have a Board to report to if we are acting unprofessional or incompetently.
Regards,
Hugh

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: Monday, May 31, 2021 11:41 AM
To: 'hughm@aquatactics.com' <hughm@aquatactics.com>
Subject: RE: Twitter fight with Morton
Hi Hugh,
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Best regards,
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AquaTactics Fish Health
12015 115th Ave NE, Suite 120
Kirkland, WA 98034
425-821-6821 (cell and office)
www.aquatactics.com

RE: Twitter fight with Morton

From:	hughm <hughm@aquatactics.com>
To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 12:49:02 PM PDT
Attachments:	signature_Drawing_1572033539835.png, signature_image001.jpg, 20210531_124733.jpg

This is all she posted in a Twitter retort. I assume you have seen it.
H

AquaTactics Fish Health

12015 115th Ave NE, Suite 120
Kirkland, WA 98934
425-821-6821 cell/text

AQUATACTICS AQUATACTICS AQUATACTICS

-------- Original message --------
From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>
Date: 5/31/21 12:07 PM (GMT-08:00)
To: '"hughm@aquatactics.com"' <hughm@aquatactics.com>
Subject: RE: Twitter fight with Morton

Hi Hugh,

I am not sure how much of the report from Winton's laboratory is public. I recommend asking Ms. Morton to send you the report. If you then send it to me, I can provide the summary that I provided to Maureen Purcell.

On a related note, the threat of PRV to wild Pacific salmon has been independently assessed. I recommend sending the following link to Ms. Morton:

https://www.dnr.wa.gov/sites/default/files/publications/PRV%20whitepaper%20revised%20Sept%202017.pdf?3c0h5&9laxp

In this link, the **Pacific Northwest Fish Health Protection Committee says,** regarding PRV, "…the virus poses a low risk to wild species of Pacific salmonids." [The PNWFPC is comprised of fish health professionals from the western United States. The author of the report, Dr. Ted Meyers, is the head Fish Pathologist for the Alaska Department of Fish and Game.]

Note that this was published in September 2017, 7 months after Di Cicco et al. (2017) published their diagnosis of HSMI in BC.

I think that public can have confidence in Ted Meyers and The Pacific Northwest Fish Health Protection Committee.

Best regards,

Gary

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 31, 2021 11:56 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: RE: Twitter fight with Morton

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Gary,

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s.22

What were the other archived samples that Winton could replicate.

At some point, getting too much into the weeds will not resonate with the public.

She doesn't work on fish diseases on a practical level and we do. We know what ones are important and what ones aren't (wild and farmed) and we actually have a Board to report to if we are acting unprofessional or incompetently.

Regards,

Hugh

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Subject: RE: Twitter fight with Morton

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Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 31, 2021 11:26 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Twitter fight with Morton

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Hugh Mitchell, MS, DVM

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Master Key for DFO/Marine Harvest VS Morton Litigation										
					Ct Values from Gary Marty study				Winton Values	
Sample No.	Curl Number	Slide No.	Pos./Neg		Gene1-L1	Gene2- L2	Species		Gene 1	Gene 2
H93-241-1	1	1	Positive		27.8	undet	Atlantic		37	38.5
94-329A-1	2	2	Negative				Kokanee			
H93-27-3	3	3	Positive		34.9	39.9	Atlantic			
H93-27-1	4	4	Positive		30.4	36.4	Atlantic			
94-329A-2	5	5	Negative				Kokanee			
H92-74-10	6	6	Positive		27.9	34.5	Chinook		34.3	34.6
94-329A-3	7	7	Negative				Kokanee			
93-346-1	8	8	Positive		31.9	undet	Atlantic			
94-329A-4	9	9	Negative				Kokanee			
7483-1	10	10	Negative				Atlantic			
7483-2	11	11	Negative				Atlantic			
7483-3	12	12	Negative				Atlantic			
7483-4	13	13	Negative				Atlantic			
93-346-2	14	14	Positive		33	undet	Atlantic			
93-368-1	15	15	Negative				Coho			
93-368-2	16	16	Negative				Coho			
93-347-1	17	17	Positive		34.6	undet	Atlantic			
93-347-2	18	18	Positive		31.2	undet	Atlantic		37.4	37.8
93-368-3	19	19	Negative				Coho			
94-328-40	20	20	Negative				ND			
92-103-1	21	21	Negative				Chinook			
H93-246-4	22	22	Positive		34.4	undet	Chinook			
92-103-4	23	23	Negative				Chinook			
H93-241-2	24	24	Positive		32.5	undet	Atlantic		33.8	34.9
94-357-8	25	25	Negative				ND			
93-246-20	26	26	Negative				Chinook			
868-B2	27	868-B	Negative				RBT			
868-D2	28	868-D	Negative				RBT			
868-G2	29	868-G	Negative				RBT			

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To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 1:06:52 PM PDT
Attachments:	image001.png, image002.jpg, signature_image001.jpg, signature_Drawing_1572033539835.png

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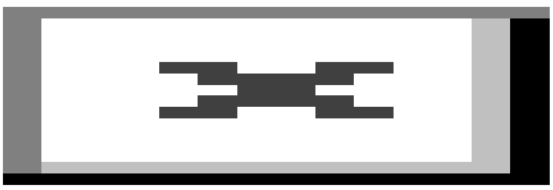

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To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 1:19:24 PM PDT
Attachments:	image003.png, signature_image001.jpg, image002.jpg, image004.jpg, image001.png, signature_Drawing_1572033539835.png

Hmmm. From a Twitter post I guess.
H

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-------- Original message --------
From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>
Date: 5/31/21 1:17 PM (GMT-08:00)
To: 'hughm' <hughm@aquatactics.com>
Subject: RE: Twitter fight with Morton

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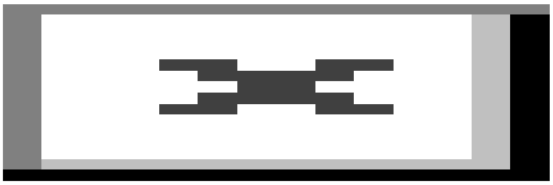

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To:	Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 1:23:03 PM PDT
Attachments:	signature_image001.jpg, image002.jpg, image003.png, image004.jpg, image001.png, signature_Drawing_1572033539835.png

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H

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-------- Original message --------
From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>
Date: 5/31/21 1:17 PM (GMT-08:00)
To: 'hughm' <hughm@aquatactics.com>
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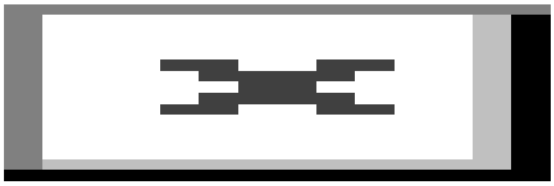

Re: FW: Your submission to BMC Biology - BMCB-D-21-00018R1 - Accepted

From: Zhang, Yangfan <s.22 >

To: Phillip Morrison <morrison@zoology.ubc.ca>, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>, Colin Brauner <brauner@ZOOLOGY.UBC.CA>, Farrell, Anthony <tony.farrell@ubc.ca>, Garver, Kyle <Kyle.Garver@dfo-mpo.gc.ca>, Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>

Sent: May 31, 2021 1:40:31 PM PDT

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Hi Mark,

I do not think I have the newest version of the paper in PDF. May you mind sending me the latest version?

The media person at the Faculty of Land and Food system will need to write up a pitch to the UBC media release.

I can for sure circulate the media release around all authors once it is ready.

Cheers,
Yangfan
On May 25, 2021, 9:45 AM -0700, Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>, wrote:

> WARNING: Harvard cannot validate this message was sent from an authorized system. Please be careful when opening attachments, clicking links, or following instructions. For more information, visit the HUIT IT Portal and search for SPF.
>
> - -
> - -
> [CAUTION: Non-UBC Email]
>
> Hello everyone, just wanted to let you know that following a minor revision our manuscript has been accepted for publication in BMC Biology as indicated below. I will address the minor formatting requirements and let you know when the article is published. Thank you all again for your contributions.
>
> Best,
>
> Mark
>
> -----Original Message-----
> From: s.22
> <s.22 > On Behalf Of BioMed Central Editorial Office
> Sent: Tuesday, May 25, 2021 5:36 AM
> To: Polinski, Mark <Mark.Polinski@dfo-mpo.gc.ca>
> Subject: Your submission to BMC Biology - BMCB-D-21-00018R1 - [EMID:c8286cdff7136c86]
>
> BMCB-D-21-00018R1
> The vertebrate (salmon) innate antiviral defense demonstrates high energetic efficiency during rhabdovirus and reovirus infection Mark Polinski; Yangfan Zhang; Phillip R Morrison; Gary D Marty; Colin J Brauner; Anthony P Farrell; Kyle A Garver
>
> Dear Dr. Polinski,

Your revised manuscript has now been seen again by reviewer #1, and I am pleased to let you know that we are happy to offer publication in BMC Biology, subject to some further minor revisions to comply with the journal style.

Guidance on our formatting and style requirements can be found in the Instructions for Authors at https://bmcbiol.biomedcentral.com/submission-guidelines/preparing-your-manuscript.

The following points related to journal policy and style need your attention:

1. We require confirmation of authorship from all co-authors, and have not yet received a response from Anthony P Farrell. I have resent him the verification email containing the confirmation link. May I kindly ask that you follow up on this or provide us with alternative email addresses, if necessary? Co-authors should contact us directly to confirm co-authorship if they have any problems.
2. Please make the following change to your section headings: change 'Materials and Methods' to 'Methods'
3. Please make the following change to your declaration headings: change 'ethics approval' to 'Ethics Approval and Consent to Participate'.
4. Each figure, table, supplementary figure and supplementary table should be mentioned in the main manuscript. It seems that Fig S5 is currently not cited.
5. For supplementary figures or tables within an additional file please cite both the file and the figure in the main text eg, Additional file 2: Fig. S1. The additional files should be numbered according to the order of their citation, which may mean that the one with all the supplementary figures should be renamed Additional file 1, and the one with the supporting data Additional file 2.
6. Please remove any duplicate figures from your manuscript and file inventory. The main figure legends should be included at the end of the main manuscript.
7. A more informative description of the contents of the additional file containing the supplementary figures and tables should be given in the main manuscript. Please list the title for each supplementary figure and table.
8. BMC requires that all publicly available datasets be fully referenced in the reference list with an accession number or unique identifier such as a digital object identifier (DOI). For previously published datasets, we ask authors to cite both the related research articles and the datasets themselves • An author list and title for the dataset should be included in the data citation if recorded at the repository. The name of the data-hosting repository, URL to the dataset and year the data were made available are required for all data citations. For DOI-based (e.g. figshare or Dryad) repositories the DOI URL should be used. For repositories using accessions (e.g. SRA or GEO) an identifiers.org URL should be used where available.
• Please refer to the following examples of data citation for guidance:
-Zhang, Q-L., Chen, J-Y., Lin, L-B., Wang, F., Guo, J., Deng, X-Y. Characterization of ladybird Henosepilachna vigintioctopunctata transcriptomes across various life stages. figshare https://doi.org/10.6084/m9.figshare.c.4064768.v3 (2018).
-Barbosa, P., Usie, A. and Ramos, A. M. Quercus suber isolate HL8, whole genome shotgun sequencing project. GenBank https://identifiers.org/ncbi/insdc:PKMF00000000 (2018).
9. Please ensure the references are in Vancouver style and in line with the examples given in our guidelines above. Journal titles should be abbreviated as in the National Library of Medicine https://www.ncbi.nlm.nih.gov/nlmcatalog/journals

If any of the authors wishes to display their twitter handle in the published paper, please provide them next to the authors' names in the Authors' Information section of the manuscript.

We shall hope to see your revised manuscript by 08 Jun 2021 . If you think it is likely to take longer to prepare, please give us some estimate of when we can expect it, to avoid inappropriate reminders.

You should upload your cover letter and revised manuscript through https://www.editorialmanager.com/bmcb/.

At this stage, authors are welcome to send us an image highlighting their research for display on our web page and social media. Images should be high resolution, free from copyright, in a TIFF, JPEG or PDF format, and they should not be overlaid with graphics or drawings. Please note that we cannot guarantee the display of images, as the editors will make the final selection. Please send your images to our editorial inbox at bmcbiologyeditorial@biomedcentral.com.

Please don't hesitate to get in touch if you have any questions.

Kind regards,

Penelope Austin, PhD
Senior Editor, BMC Biology
https://bmcbiol.biomedcentral.com/

Reviewer #1: Thank you for your thorough responses to my initial review. I have no further comments or concerns - great work!

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Declarations
-

Ethics approval and consent to participate
-

Consent to publish
-

Availability of data and materials
-

Competing interests
-

Funding
-

Authors' Contributions
-

Acknowledgements

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http://www.biomedcentral.com/submissions/editorial-policies#availability+of+data+and+materials

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Please note that incomplete forms will be rejected.
Your request will be taken into consideration by the editor, and you will be advised whether any changes will be permitted.
Please be aware that we may investigate, or ask your institute to investigate, any unauthorized attempts to change authorship or discrepancies in authorship between the submitted and revised versions of your manuscript.

Our flexible approach during the COVID-19 pandemic

If you need more time at any stage of the peer-review process, please do let us know. While our systems will continue to remind you of the original timelines, we aim to be as flexible as possible during the current pandemic.

This letter contains confidential information, is for your own use, and should not be forwarded to third parties.

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_____
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https://www.editorialmanager.com/bmcb/login.asp?a=r). Please contact the publication office if you have any questions.

Draft Statement for Review

From:	Ruth Salmon <ruth@bcsalmonfarmers.ca>
To:	Gary Marty <Gary.Marty@gov.bc.ca>, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent:	May 31, 2021 1:43:11 PM PDT
Attachments:	BCSFA Draft Statement re Science AdvancesSSHI, May 31.docx

Hi Gary,
Could you review the draft statement please? In particular, please see the yellow highlighted section where I've mentioned your name.
Any comments or suggested edits you might have are most welcome.
Many thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

BCSFA Draft Statement re: Science Advances Paper & SSHI
May 31, 2021

On May 25, a study entitled *Aquaculture mediates global transmission of a viral pathogen to wild salmon* was published in the journal, *Science Advances*. This study was part of the Strategic Salmon Health Initiative (SSHI) – and highlights yet again the long standing concerns of the BC salmon farming industry regarding the bias and credibility of research supported by the SSHI.

The SSHI was established 8 years ago to investigate potential relationships between variability in the survival of juvenile salmon during early ocean migration and the microbes they carry. As presented on the Fisheries and Oceans Canada website, the initiative was to consist of four phases. The first two phases of this initiative were to focus on the identification of microbes currently carried by BC's wild and farmed salmon – while the latter phases were to investigate the potential effects of identified microbes on the wild and farmed fish. However, the final two phases were never completed.

As a result of the researchers' inability to complete their stated task, their publications have largely focused on viral discovery; they have failed to publish any scientific studies that investigate whether the viruses they discovered are actually threatening wild or farmed stocks. Therefore, rather than contributing to a greater understanding of the factors actually impacting the health of BC's wild salmon populations, the SSHI research team leading this 10-million-dollar program (64% of which came from the federal government) has simply succeeded in generating alarm and uncertainty.

As in their previous publications, the authors of the *Science Advances* study express a clear bias against salmon farming – and rely heavily on speculation to draw conclusions. This bias and speculation is clearly evident in the following claims made by the authors:

1. ***The development of Atlantic salmon aquaculture facilitated the spread of Piscine orthoreovirus-1 (PRV-1) from Europe to the North and South East Pacific***

   This claim is based upon the authors' determination that PRV-1a in the NE Pacific diverged from PRV-1a in the Atlantic Ocean between 1981 – 1997. The authors emphasize that this timing is consistent with the timing of Atlantic salmon egg imports from Europe for salmon farms in the NE Pacific.

   In their determination of the timing of PRV-1 introduction, the authors dismiss the fact that a wild-source steelhead trout sampled in 1977 tested positive for PRV by PCR analysis. The authors defend their dismissal of the 1977 positive test by stating that it has not been verified by genetic sequencing. However, in May 2020, researchers at Fisheries and Oceans Canada confirmed the positive PRV test in the 1977 sample through sequencing (GenBank). Given that one of the lead authors of the *Science Advances* study also works at Fisheries and Oceans Canada, it is surprising that this researcher was not aware that the positive test had in fact been verified.

   With this verification, it is very clear that PRV was in BC waters prior to the introduction of Atlantic salmon farming. As such, we recommend that the authors submit a correction to *Science Advances* that would be appended to the online version of the study. This correction should consider the

impact of the confirmed presence of PRV in the 1977 sample on their estimates of the arrival of PRV in the NE Pacific.

2. ***Evidence strongly supports Atlantic salmon aquaculture as a source of infection in wild Pacific salmon.***

To indirectly assess transmission from farmed to wild salmon, the authors state that they investigated the probability of PRV infection for wild Chinook salmon in relation to distance from active aquaculture facilities – and found that PRV-1 infection was closely tied to farm proximity. However, by their own admission, the authors did not take account of other factors that might influence PRV-1 prevalence (e.g. different environmental conditions or differences in host condition between regions). Without accounting for the significance of these factors, how could the authors arrive at their conclusion?

The authors strive to provide support for their conclusion by citing three studies which they say also implicate PRV-1 transmission from farmed Atlantic salmon to wild salmon. However, one of the three cited studies has since been corrected – and these corrections make its original conclusions invalid. Another of the studies considered farm-to-farm transmission (i.e. not farmed-to-wild transmission), while the third was unable to establish a clear line of transmission from farmed to wild salmon. In an effort to bolster their own questionable conclusion, the authors of the *Science Advances* study thus appear to have adopted rather lax citation standards.

Furthermore, any study considering the transmission dynamics between farmed and wild salmon should recognize that all young farmed Atlantic salmon entering the marine environment have been verified PRV-free. In other words, farmed Atlantic salmon do not introduce PRV to the marine environment. Rather, they acquire it during their ocean residency.

Even when the young Atlantic salmon acquire PRV, it is unlikely that they become a significant source of infection in wild Pacific salmon. The potential for farmed-to-wild transmission is limited by the brief period that migrating salmon spend in proximity to a farm. For example, Reshisky et al., 2021, found that sockeye salmon migrating through the main migration routes of the Discovery Islands only remain within ~200-800 metres of a farm for approximately 4-11 minutes. This limited contact between farmed and wild salmon may be one of the factors contributing to the finding of Marty et al., 2015; this study found the prevalence of PRV was not different between fresh samples from wild Coho salmon collected from Alaska (where there are no salmon farms) and BC.

3. ***PRV-1 is now an important infectious agent in critically endangered wild Pacific salmon populations, fueled by aquacultural transmission.***

In making the above statement, the authors of the *Science Advances* study fail to recognize that BC farmed salmon are healthy. Evidence presented from fish farm data (through DFO reporting) indicates that "mortality events" are overwhelmingly due to environmental and mechanical (handling) incidents (nearly 100% in 2019), rather than disease; and about 80% of "fish health events" (where disease is known to be a factor) were due to the prevalence of three diseases historically common and managed in populations of BC farm-raised salmon.

Given that there have been no major die-offs, or significantly high numbers of uncontrollable fish health events on farms, it does not stand to reason that BC farmed salmon are spreading highly infectious and harmful diseases to wild populations. In perhaps a clear example of the impact of social distancing, crowded populations, such as those in a farm setting, would be the first to display problems due to a contagion event.

The authors also fail to acknowledge that pathogen detection does not equate to disease. Pathogen detection alone is insufficient to allow inferences of the overall health status of wild fish populations and requires the context of host susceptibility, virulence of pathogen strains, and environmental conditions (Jia et al., 2019). Therefore, it is inaccurate to assume that the detection of pathogens or their DNA in proximity to a salmon farm is an indicator they are causing disease issues for wild salmon swimming near a farm. This has been a common assumption of SSHI work – yet further research has never been conducted to verify assumptions that pathogen presence is causing disease.

There is, however, a weight of evidence that indicates that the PRV isolate found in BC *does not* cause disease in wild or farmed salmon in the Pacific (Garver et al., 2016; Polinski et al., 2019; Zhang et al., 2019). Moreover, Heart and Skeletal Muscle Inflammation (HSMI) (associated with PRV elsewhere) has not been diagnosed by licenced veterinarians caring for fish in British Columbia.

Importantly, Wessel et al., 2020, conducted a lab study to compare the onset of PRV infection between different isolates – and confirmed that high virulent (Norwegian) PRV isolates induced cardiac lesions consistent with HSMI. However, the low virulent isolates (three historical Norwegian isolates and one Canadian (BC) isolate) induced only mild cardiac lesions. According Dr. Gary Marty, BC Provincial Fish Pathologist, such mild microscopic lesions would not be a threat to wild salmon populations. Rather, mild lesions are part of the normal inflammatory response to infectious agents that wild fish encounter during their migrations.

Summary To Be Completed:

During this critical time of economic recovery, coastal communities should be able to rely on DFO to provide responsible and judicious oversight to ensure that public funds are being used to support important and credible science directly linked to regulation and management of their aquatic resources…..

Re: Draft Statement for Review

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: May 31, 2021 2:40:11 PM PDT

Thanks for your quick response Gary, much appreciated.
Ruth Salmon
Mobile: 604-202-2147

From: Gary Marty <Gary.Marty@gov.bc.ca>
Date: Monday, May 31, 2021 at 2:22 PM
To: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Subject: RE: Draft Statement for Review

Hi Ruth,
Thank you for the opportunity to review this document. I always try to accommodate requests for review of documents that discuss fish health issues, regardless of the source of the request.
I have made some comments directly on the manuscript using Track Changes (attached).
Regarding the spread of PRV, I suspect that nature of the spread is similar for sea lice and PRV: both tend to move from populations with high abundance to populations with low abundance. When farm salmon are stocked into the ocean PRV-free, they probably get PRV from fish in their environment. When wild salmon are resident near PRV-infected salmon farms (e.g., some Chinook salmon), they are more likely to get PRV from salmon farms than are fish whose migrations have them close to salmon farms for only a few minutes during their migration (e.g., sockeye salmon). This hypothesis might explain findings in my 2015 paper in the Journal of Fish Diseases: the lack of PRV in 1986 BC Atlantic salmon but then the presence of PRV in the 1987 BC Atlantic salmon, despite the 1986 samples being better preserved than the 1987 samples (i.e., if the 1986 fish were PRV free, then they got PRV from wild fish after they were reared in marine waters for a year).
In addition to the information that I have already provided, I add the following:

1. The idea that salmon farms shed PRV into the environment is not new. DFO's 2019 CSAS report on PRV included, "It is therefore extremely likely, with high certainty, that PRV could be released from an Atlantic Salmon farm through infected fish."
2. The idea that wild salmon will be infected with farm-source PRV is not new. DFO's 2019 CSAS report on PRV included, "…it would be very likely, with high uncertainty, that at least one Fraser River Sockeye Salmon would become infected."
3. The idea that BC PRV came from Norway is not new. The first scientific paper to report PRV in BC (Kibenge et al. 2013) includes discussion about "the time when Canadian PRV isolates diverged from Norwegian PRV isolates…"

Sources:

Kibenge, M.J., Iwamoto, T., Wang, Y. et al. Whole-genome analysis of piscine reovirus (PRV) shows PRV represents a new genus in family Reoviridae and its genome segment S1 sequences group it into two separate sub-genotypes. Virol J 10, 230 (2013). https://doi.org/10.1186/1743-422X-10-230
Mimeault, C., Polinski, M., Garver, K.A., Jones, S.R.M., Johnson, S., Boily, F., Malcolm, G., Holt, K., Burgetz, I.J. and Parsons, G.J. 2019. Assessment of the risk to Fraser River Sockeye Salmon due to piscine orthoreovirus (PRV) transfer from Atlantic Salmon farms in the Discovery Islands area, British Columbia. DFO Can. Sci. Advis. Sec. Res. Doc. 2019/036. viii + 45 p.

Let me know if I can answer any other questions.
Best regards,
Gary

Gary D. Marty, Fish Pathologist

Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: Ruth Salmon <ruth@bcsalmonfarmers.ca>
Sent: May 31, 2021 1:43 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Draft Statement for Review

Hi Gary,
Could you review the draft statement please? In particular, please see the yellow highlighted section where I've mentioned your name.
Any comments or suggested edits you might have are most welcome.
Many thanks,
Ruth
Ruth Salmon
Mobile: 604-202-2147

RE: Twitter fight with Morton

From: hughm <hughm@aquatactics.com>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: June 1, 2021 9:33:11 AM PDT
Attachments: image001.png, signature_image001.jpg, image002.jpg, signature_Drawing_1572033539835.png

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

So, what is the explanation? Just too difficult to get out of paraffin?
H

AquaTactics Fish Health

12015 115th Ave NE, Suite 120
Kirkland, WA 98934
425-821-6821 cell/text

AQUATACTICS AQUATACTICS AQUATACTICS

-------- Original message --------
From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>
Date: 6/1/21 8:13 AM (GMT-08:00)
To: 'hughm' <hughm@aquatactics.com>
Subject: RE: Twitter fight with Morton

Hi Hugh,

In the region of this image within the red text box, both laboratories agree that the samples were PRV-negative. The positive test result that we repeated twice and was sequenced in Stewart Johnson's laboratory is from block 868-H.

Best regards,

Gary

From: hughm <hughm@aquatactics.com>
Sent: May 31, 2021 12:49 PM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: RE: Twitter fight with Morton

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

This is all she posted in a Twitter retort. I assume you have seen it.

H

AquaTactics Fish Health

12015 115th Ave NE, Suite 120

Kirkland, WA 98934

425-821-6821 cell/text

-------- Original message --------

From: "Marty, Gary D AFF:EX" <Gary.Marty@gov.bc.ca>

Date: 5/31/21 12:07 PM (GMT-08:00)

To: "'hughm@aquatactics.com'" <hughm@aquatactics.com>

Subject: RE: Twitter fight with Morton

Hi Hugh,

I am not sure how much of the report from Winton's laboratory is public. I recommend asking Ms. Morton to send you the report. If you then send it to me, I can provide the summary that I provided to Maureen Purcell.

On a related note, the threat of PRV to wild Pacific salmon has been independently assessed. I recommend sending the following link to Ms. Morton:

https://www.dnr.wa.gov/sites/default/files/publications/PRV%20whitepaper%20revised%20Sept%202017.pdf?3c0h5&9laxp

In this link, the **Pacific Northwest Fish Health Protection Committee says,** regarding PRV, "…the virus poses a low risk to wild species of Pacific salmonids." [The PNWFPC is comprised of fish health professionals from the western United States. The author of the report, Dr. Ted Meyers, is the head Fish Pathologist for the Alaska Department of Fish and Game.]

Note that this was published in September 2017, 7 months after Di Cicco et al. (2017) published their diagnosis of HSMI in BC.

I think that public can have confidence in Ted Meyers and The Pacific Northwest Fish Health Protection Committee.

Best regards,

Gary

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 31, 2021 11:56 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: RE: Twitter fight with Morton

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Gary,

Thanks. This is such a waste of time, but s.22
s.22

What were the other archived samples that Winton could replicate.

At some point, getting too much into the weeds will not resonate with the public.

She doesn't work on fish diseases on a practical level and we do. We know what ones are important and what ones aren't (wild and farmed) and we actually have a Board to report to if we are acting unprofessional or incompetently.

Regards,

Hugh

From: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: Monday, May 31, 2021 11:41 AM
To: 'hughm@aquatactics.com' <hughm@aquatactics.com>
Subject: RE: Twitter fight with Morton

Hi Hugh,

I recommend asking Alexandra Morton how many of her ISAV-positive test results from BC salmon have been confirmed by an outside laboratory.

I recommend asking Alexandra Morton when she is going to respond to the Reader Comments about her correction:

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0248912

Ms. Morton is correct in that Jim Winton's laboratory was not able to replicate the PRV-positive results from the 1977 sample. However, at the time when they attempted to replicate the result, the laboratory had no previous experience extracting nucleic acid from paraffin samples. Winton's lab was able to replicate PRV-positive results from other archived samples.

That said, the result from the 1977 sample has been replicated by a DFO laboratory: Siah et al. 2020 Virus Evolution, 2020, 6(2): veaa054) reported "…partial PRV-1 S1 and S3 sequences from a 1977 Steelhead Trout collected in BC (Marty et al. 2015) were made available in GenBank MT506522–MT506523) further supporting longer term presence of the virus in the northeast Pacific."

Best regards,

Gary

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.

Fish Pathologist
Animal Health Centre
Ministry of Agriculture, Food, and Fisheries
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
778-666-0578

From: hughm@aquatactics.com <hughm@aquatactics.com>
Sent: May 31, 2021 11:26 AM
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Subject: Twitter fight with Morton

[EXTERNAL] This email came from an external source. Only open attachments or links that you are expecting from a known sender.

Hey Gary,

So, I am getting in a twitter spar with s.22 .

She is claiming that Winton was sent samples of the 1977 Steelhead and didn't find PRV?? I am going to ask Jim about this. When I asked Morton about "chain of custody", she claimed it was handled by the Dept. of Justice. Know anything about that?

I am certainly not going to get into the weeds too much with her. You know how that goes.

On a flight right now to California to help a facility with Lactococcus garvieae. A bit of politics behind this one too!

Did you know that 23% of the OIE listed animal pathogens are fish???? A bit ridiculous.

Cheers,

Hugh

****

Hugh Mitchell, MS, DVM

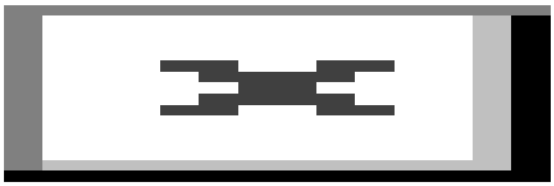
AquaTactics Fish Health

12015 115th Ave NE, Suite 120

Kirkland, WA 98034

425-821-6821 (cell and office)

www.aquatactics.com



Page 90 of 95 to/à Page 91 of 95

Withheld pursuant to/removed as

s.13 ; s.16

Re: PRV study [correction suggestion]

From: SeaWestNews Editor <editor@seawestnews.com>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: June 1, 2021 1:52:28 PM PDT

Thank u will fix. Just on the road

Sent from my iPhone

> On Jun 1, 2021, at 1:02 PM, Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca> wrote:
>
> Hi Fabian,
> I see that the SeaWestNews article has been published about on the recent UBC study (https://advances.sciencemag.org/content/7/22/eabe2592.abstract). The SeaWestNews article contains information that is not correct:
>
> 1. "Last April, they quietly corrected their study which suggested wild stocks exposed to marine aquaculture sites have much higher rates of viral infection."
>   a. The study referred to here (https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188793) was authored by Rick Routledge, Alexandra Morton, and Fred Kibenge. None of these authors were involved in the recent UBC study.
> 2. "The same group published a paper in 2011 titled “Lethal Atlantic virus found in Pacific salmon”. That paper was also proven to be false leading to the laboratory that did the screening work to lose its international accreditation."
>   a. The “same group” part of this sentence is not correct. A different group made this announcement. I believe that this statement is referring to a 2011-10-17 press release from SFU (no longer available online without a password). Rick Routledge was the SFU contact; Alexandra Morton is listed as a contact; Fred Kibenge's laboratory produced the results that formed the basis of the press release. The information in this press release was not published in a scientific journal until 2016 (https://virologyj.biomedcentral.com/articles/10.1186/s12985-015-0459-1). None of these authors were involved in the recent UBC study.
>
> Best regards,
> Gary
> ---
> Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.
> Fish Pathologist
> Animal Health Centre
> Ministry of Agriculture, Food, and Fisheries
> 1767 Angus Campbell Rd.
> Abbotsford, BC, V3G 2M3
> 778-666-0578

RE: May I receive a copy of the article

From: Rachel Sapin <rachel.sapin@intrafish.com>
To: Marty, Gary D AFF:EX <Gary.Marty@gov.bc.ca>
Sent: June 2, 2021 7:55:56 AM PDT

Hi Gary,
Yes, here it is. Thanks again for getting back to me.

Virus found in British Columbia wild salmon can be traced back to Norwegian farms, new study finds

The new study also implicated salmon farms for higher rates of the virus in wild fish.

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10 May 2021 12:54 GMT
28 May 2021 0:39 GMT *UPDATED 28 May 2021 6:09 GMT*
By **Rachel Sapin**

A virus found in farmed salmon is more transmissible to wild salmon in British Columbia than previously thought, and its origin can be traced back to Europe, indicating it may have been brought to the province with the arrival of salmon farming in the 1980s, according to new a new study published Thursday.

Researchers from the University of British Columbia and the Strategic Salmon Health Initiative -- a partnership between Fisheries and Oceans Canada (DFO), Genome BC and the Pacific Salmon Foundation -- traced samples of the piscine orthoreovirus-1 (PRV) found in wild Chinook salmon to Atlantic salmon farms in Norway.

Sequencing of 86 PRV genomes helped researchers track the history of PRV emergence in British Columbia, who estimate the lineage of PRV in the Northeast Pacific diverged from PRV in the Atlantic Ocean approximately 30 years ago.

The findings, published in the peer-reviewed journal *Science Advances*, suggest the introduction of PRV to British Columbia is a relatively recent phenomenon, coinciding with the growth of salmon aquaculture in the province in the 1980s, according to the researchers.

The samples which covered a 10-year time span, were collected from 6,791 Chinook (also known as king), 2,165 coho and 4,140 sockeye.

Lead author Gideon Mordecai, a viral ecologist and Liber Ero fellow with University of British Columbia (UBC) Science and researcher with UBC Medicine, said the study helps clarify several unknowns about the disease, which is found at nearly every salmon farming site in the province.

“There is much confusion about where PRV is originally from, whether it is transmitted between farmed and wild salmon, and how different lineages of the virus cause different severities of disease,” Mordecai said.

In addition, the increase in infection rates in wild salmon over time indicates salmon farms serve as both a source of PRV and as an amplifier of the disease as it passes back and forth between the two species, according to the study.

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Closer to salmon farms, higher the transmission

Researchers also found evidence PRV was transmitted at higher rates to wild salmon than was previously known. Samples showed wild Chinook are more likely to be infected with PRV the closer they are to salmon farms.

Overall, PRV-1 prevalence was higher on the west coast of British Columbia's Vancouver Island, where local populations of Chinook and coho coexist in sheltered inlets with farmed salmon for up to their first year at sea, according to the study.

In contrast, salmon moving through the southern portion of the Salish Sea on the east coast of Vancouver Island, where salmon farms are less prevalent, showed lower incidence. Study authors suggested the lower rates could be because of the lack of salmon farms in the area.

'A precautionary approach'

Study authors recommended DFO take a more "precautionary approach" to BC salmon farming, given the implications of the findings, and invest in enhanced monitoring for diseases.

"The rise of aquaculture has caused an ecological shift that favors the emergence and spread of marine infectious disease," the study said.

Alexandra Coutts, a spokesperson for the DFO, told **IntraFish** the government agency "supports new research to help identify and understand potential risks associated with various strains of PRV."

"The [study] provides valuable information on the origin, evolution and potential transmission dynamics of PRV-1a," she said.

The department will be considering these findings alongside additional studies on PRV in British Columbia’s coastal waters.

"As new peer-reviewed information becomes available, the Department will continue to review and incorporate the information as part of its risk-based, science-informed adaptive management process," she said.

Salmon farmers unconvinced

Shawn Hall, a spokesperson for the BC Salmon Farmers Association (BCSFA), which represents farming, feed and services companies, told **IntraFish** the association and its members are still reviewing the study.

He pointed, however to different academic research from 2014 that showed through archived salmon tissue samples from 1977, there is evidence that PRV existed in BC waters before the establishment of salmon farms.

"There is also evidence that the strain of PRV found in BC waters is genetically different than those found in Europe," he said.

"The BC strain has been found to be asymptomatic – in that it does not cause disease in wild or farmed salmon - while the European strain has been found to be symptomatic."

BCSFA members -- which include Norwegian salmon farming giants Mowi, Cermaq, Grieg Seafood and Canada's Creative Salmon -- do not import anything in from Europe for their operations.

"Our fish are raised in hatcheries on Vancouver Island, from broodstock born and raised on Vancouver Island. Before our fish are transferred to our ocean sites, they go through several health checks and are vaccinated against several known diseases," he added.

Bad timing for BC farmed salmon

The new findings come at a particularly heated period in the British Columbia salmon farming sector.

Netpen salmon farming is already being phased out in British Columbia's Discovery Islands, a move that has won praise from opponents, including environmental groups and several First Nations, and consternation from members of the BC industry.

The forced closures of the BC sites have been costly as well. Mowi, the world's largest salmon farmer, has been forced to cull millions of fish, and said the move may force it to close a British Columbia salmon processing facility.

The company said in its fourth quarter report it expects an overall annual loss in harvest volume of between 10,000 to 12,000 metric tons starting in 2022, and layoffs of up to 200 employees.

Mowi's Dean Dobrinsky told **IntraFish** a 30 percent reduction in production "will result in, at minimum, significant loss in production days and lost employment."

Mowi, Mitsubishi-owned Cermaq Group and Grieg Seafood filed a judicial review of decisions made by Fisheries Minister Bernadette Jordan to phase out the Discovery Islands farms. The companies are asking the court to find the fisheries minister's plan unreasonable and to allow for further negotiation.(Copyright)

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Sent: Tuesday, June 1, 2021 8:27 AM
To: Rachel Sapin
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I see that an article related to the information that I provided was published on May 28. I am not an Intrafish subscriber. Would you be able to send me a copy of the article?
Thanks.
Best regards,
Gary

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