

361 Kings Road East
North Vancouver BC, V7N 1H8
15 March 2010

The President and Council
The Natural Sciences and Engineering Research Council of Canada (NSERC)
350 Albert Street
Ottawa, ON K1A 1H5

To the President and Council,

RE: NSERC-Funded Sea Lice Research by the University of Alberta

As a member of the public, I am writing to express my concern and my opinions regarding NSERC-funded sea lice research by the Centre for Mathematical Biology (CMB) at the University of Alberta (UofA), and the reporting and publicity of the findings and funding sources.

In 2008, the University of Alberta awarded the Gold Medal of the Governor General of Canada to Dr. Martin Krkoek for this sea lice research.¹ To the best of my knowledge, Dr. Krkosek currently holds an NSERC post-doctoral fellowship with the University of Washington.^{2,3}

The paper, *Sea Lice Research: Science or Marketing?*, the attachments and the material at www.fair-questions.com present the information and analysis upon which my concerns and questions are based. As this research is a matter of public interest, this is an open letter.

1. Scientific Merit

Senior scientists and experts have noted peculiarities and serious flaws in this research: lack of adequate baseline data, selective use ("cherry-picking") of data, flawed assumptions, selective and inaccurate reporting, and unsubstantiated claims.^{4,5,6,7,8,9,10} These peculiarities appear to me to be serious deviations from the commonly accepted good practices of the scientific community.

According to Dr. Krkosek, more than 500 news stories have publicized this sea lice research.¹¹ In the wake of this extensive bad press, a "war on fish farmers" has been declared and more than 20,000 people have signed a petition to close salmon farms in British Columbia.^{12,13} If sound science shows that sea lice originating from salmon farms put wild salmon at risk of extinction, it goes without saying that salmon farms should be closed. However, for the reasons that I have outlined, I believe that this is not what the UofA's sea lice research actually shows.

In stark contrast to the CMB's claim that sea lice put wild salmon at risk of extinction in the Broughton Archipelago, 20 scientists have endorsed the view that wild salmon returns in the Broughton appear to be *increasing*.¹⁴

On the basis of the information and analysis that I have outlined, it appears to me that the CMB may have selectively and inaccurately reported some of its own research findings and funding sources, in a manner that falsely reflects both.

2. Marketing?

In my opinion based on the information that I have presented, the CMB and others may have manufactured the sea lice controversy as part of the "Context Setting" of a marketing campaign to shore up demand for "wild" fish - especially Alaskan fish - by swaying consumers and retailers away from the competition: farmed fish.¹⁵

According to my analysis, this marketing campaign has been heavily funded by the David and Lucile Packard Foundation, the Gordon and Betty Moore Foundation, the Pew Charitable Trusts and others. Since 2000, the David and Lucile Packard Foundation alone has granted more than \$75 million for projects to sway the seafood market, especially with regards to salmon.¹⁶ At the time that the CMB's sea lice research was published in the journal *SCIENCE*, the Editor-in-Chief of *SCIENCE* was Dr. Donald E. Kennedy, a trustee of the David and Lucile Packard Foundation since 2000.¹⁷

3. NSERC Funding

According to the CMB, 29 per cent of the sea lice research funding came from NSERC.¹⁸ If so, it appears to me that the CMB may have abused NSERC funds in order to further this American marketing campaign and give this sea lice research a false veneer of credibility. If this is true, I believe that this would constitute a breach of public trust in science and an abuse of NSERC funds derived from Canadian taxpayers.

4. Request

a) **Investigation**

In the attached paper and at www.fair-questions.com, I believe that there is more than enough information to warrant a proper investigation. As you'll see from the attached correspondence, upon the advice of Dr. Paul Pencharz, I contacted the University of Alberta about this in 2008 and again in 2009. In my experience, the University of Alberta has proven wholly unable or unwilling to investigate itself. As such, it seems appropriate to me that NSERC conducts an external investigation of the University of Alberta's NSERC-funded sea lice research and the reporting and publicity of the findings and funding sources.

b) **Clarification**

In the interest of fairness, I appeal to NSERC to publicly clarify that contrary to the University of Alberta's false claims, NSERC-funded research does NOT show that sea lice originating from salmon farms cause high levels of mortality among juvenile salmon in the wild and put their populations at risk of extinction in British Columbia.

I also believe that it is appropriate to ask that the University of Alberta acknowledges the origins of all of the research funding - including, if true, the funds from the Gordon and Betty Moore Foundation and from commercial fishing interests.

Sincerely,

Vivian Krause

Attachments:

1. Sea lice research: Science or Marketing? (22 pages).
 2. University of Alberta Express News: Salmon farms kill wild salmon. 3 October 2006.
<http://www.expressnews.ualberta.ca/article.cfm?id=7917>
 3. University of Alberta Press Release, 26 October 2006, Wild Salmon Mortality Caused By Fish Farms.
Up to 95 per cent of wild juvenile salmon killed by parasites from salmon farms.
http://www.math.ualberta.ca/~mlewis/SeaLice/SeaLiceSept-06/PNAS_Press_Release_website.pdf
 4. NSERC. Researchers Reveal the Infectious Impact of Salmon Farms on Wild Salmon. 7 April 2005.
 5. NSERC. Humans Making Wildlife Sick. 20 February 2006.
 6. A document of the University of Alberta, titled "GFC Academic Planning Committee. For the meeting of 11 October 2006. Outline of Issue. Agenda Title: Establishment of the University of Alberta Centre for Mathematical Biology in the Faculty of Sciences. (31 pages).
 7. E-mail with Dr. Paul Pencharz, 17 and 22 October 2007.
 8. Letter from the General Counsel of the University of Alberta, 30 April 2008.
 9. E-mail from the Gordon and Betty Moore Foundation, 12 June 2009.
 10. Letter to Dr. Dr. Indira Samarasekera, President, University of Alberta, 4 November 2009.
 11. Correspondence with Dr. David Johnson, University of Alberta, 4 December 2009 - 4 February 2010.
 12. Letter from the University of Alberta, 8 February 2010.
 13. Letter to the Editor-in-Chief of the journal *SCIENCE*, 12 December 2007.
 14. Letter to the Executive Publisher of the journal *SCIENCE*, 18 February 2010.
- c.c. Her Excellency, The Right Honourable Michaëlle Jean, Governor General of Canada
The Honourable Tony Clement, Minister for Industry, Government of Canada
The Honourable Gail Shea, Minister for Fisheries and Oceans, Government of Canada
The Honourable Steve Thomson, Minister for Agriculture and Lands. B.C.
Dr. Indira Samarasekera, President, University of Alberta
Dr. Mark Lewis, Professor, The University of Alberta
Dr. Martin Krkosek, NSERC Post Doctoral Fellow, The University of Washington
Ms. Alexandra Morton, Raincoast Research Society
Ms. Jennifer Ford, Ecology Action Center
Mr. John Duncan, Member of Parliament, North Island, B.C.
Dr. James Lunney, Member of Parliament, Nanaimo-Alberni
Mr. Richard Harry, Executive Director, Aboriginal Aquaculture Association
Mayor Bev Parnham, Mayor of Port Hardy
Mayor Charlie Cornfield, Mayor of Campbell River
Mayor Gerry Furney, Mayor of Port McNeill
Dr. Paul Pencharz, University of Toronto/University of Alberta

Ten Reasons Why Research from the University of Alberta Does NOT Show that Sea Lice Originating From Salmon Farms Cause High Levels of Mortality Among Juvenile Salmon in the Wild and Put Their Populations At Risk of Extinction

1. As it appears, sea lice levels at salmon farms were never measured. During part of the research there were apparently no fish at the farm under study.¹⁹
2. Sea lice are found on many species of *wild* fish. A technique to trace their origin doesn't exist.^{20,21} It follows that claims about "farm-origin" sea lice are unsubstantiated and false.
3. The lead researcher admitted in a public hearing of the government of British Columbia that the research findings are "all correlative."²² A correlation doesn't show causality.
4. Mortality in the wild was never measured. The actual research findings were computer-generated forecasts. In several instances, the wording used by University of Alberta scientists, Alexandra Morton and the David Suzuki Foundation implies that "real-life," observations were made when in fact, the actual research results were hypothetical, computer-generated predictions.^{23,24}
5. The "striking consistency" in patterns of sea lice that is reported by University of Alberta scientists - and is fundamental to their mathematical modeling - was not evident in extensive surveys conducted by Fisheries and Oceans Canada in the same areas and during the same time periods.²⁵
6. Early studies that found high juvenile salmon mortality due to sea lice were not controlled experiments and have not been replicated. Controlled studies by Dr. Simon Jones and his DFO colleagues have found surprisingly low levels of mortality among juvenile wild salmon - despite high levels of sea lice.
7. The University of Alberta's hypothetical forecasts of wild salmon mortality and extinction were based on highly selective data: data prior to 2000 and data for the largest pink watershed habitat of wild pink salmon in the Broughton Archipelago, was excluded. Twenty scientists from Canada, the U.S. and Europe have endorsed the view that when all relevant data is considered, wild pink salmon returns to the Broughton Archipelago appear to be *increasing*.²⁶
8. Studies from the 1960s - when there were no salmon farms - found that between 59 and 77 percent of juvenile salmon die within the first 40 days after entering the ocean from their natal streams.²⁷ If so, it is mathematically impossible that sea lice from salmon farms "commonly kill over 80 percent" of juvenile wild salmon - as University of Alberta scientists claim.
9. Extinction is the death of an entire species. Even if wild pink salmon were lost from some streams, the death of the entire species would not necessarily occur because in some areas of the Broughton, pink salmon from some streams can re-colonize other streams without loss of biodiversity. The alarming use of the term "extinction" is, therefore, unwarranted.²⁸
10. The University of Alberta's computer-generated extinction prediction is at odds with real life:
 - In 2000, after 13 years of salmon farming in the area, the return of wild pink salmon to the Broughton Archipelago was the highest on record, eight-fold higher than the historical average.²⁹
 - In 2004, the return to Glendale Creek, the largest wild pink salmon habitat in the Broughton, was one of the highest since the 1950s.
 - In 2009, wild pink salmon returns were high enough that commercial fishing was allowed - on the very same stocks that University of Alberta scientists, Alexandra Morton and the David Suzuki Foundation claim are at risk of extinction.³⁰

Reasons Why Bad Press About Sea Lice Appears to be Part of the "Context Setting" of a Marketing Strategy To Sway Consumers and Retailers Towards "Wild" Fish - Especially Alaskan Fish - and Away from the Competition: Farmed Fish

1. "Research Partnership" with SeaWeb

- o Sea lice research, funded and publicized by the David Suzuki Foundation and Alexandra Morton, was conducted by the Centre for Mathematical Biology (CMB) at the University of Alberta (UofA), in Edmonton. Alexandra Morton is a co-author on this sea lice research and an affiliated researcher of the University of Alberta.³¹
- o In 2006, the CMB reported to the administration of the UofA that it had a "research partnership" with SeaWeb, an American organization based in Maryland, U.S.A.³² SeaWeb also has offices in Paris and London.
- o Two of the co-authors of Krkosek et al. (2007) were Dr. Ransom Myers (deceased) and Jennifer S. Ford of Dalhousie University. The Myers Lab at Dalhousie is listed by SeaWeb as a "research partner."³³

2. The Packard Foundation's *Market Intervention Strategy to Conserve Marine Fisheries*

- o As part of its program for Conservation and Science, the Packard foundation has a sub-program for Marine Fisheries.³⁴ This program has a focus on "the U.S. arctic" which presumably is Alaska. The annual budget is \$14 million of which "about half" is for market intervention.
- o Since 1999, the Packard foundation's Marine Fisheries program includes a strategy called "*Market Intervention Tools to Conserve Marine Fisheries*." According to calculations based on U.S. tax returns and the foundation's on-line database, since 2000 the Packard foundation has granted about \$75 million for Market Intervention. Of that, about \$57 million was to support the Marine Stewardship Council (MSC) and promote MSC-certified "wild" fish - including Alaskan *ranch*ed salmon. About \$16 million was to "reform" aquaculture and demarket farmed salmon, and \$2 million was for related projects.³⁵
- o As of 2007, about 80 percent of MSC-certified "wild" fish was Alaskan (by volume) and about 60 per cent of MSC-certified products were Alaskan salmon.³⁶

3. Seafood Choices and the "Antifarming Campaign"

- o The Packard foundation's strategy, *Market Intervention Tools to Conserve Marine Fisheries*, includes "Seafood Choices" which has three components: 1) MSC Certification, 2) Large U.S. Buyers, and 3) Context Setting.³⁷
- o Since 2000 the Packard foundation has granted about \$9 million for Seafood Choices. Of that, about \$8.5 million was granted to SeaWeb. In addition, the Packard foundation granted about \$US 5.4 million for COMPASS, the SeaWeb program which publicized the University of Alberta's sea lice research (among other research).



Source: The David & Lucile Packard Foundation

- o At the same time that SeaWeb was paid to co-ordinate Seafood Choices, the Gordon and Betty Moore Foundation ("the Moore foundation") paid SeaWeb \$560,000 to co-ordinate an "antifarming campaign" involving "science messages" and "earned media."

- o According to U.S. tax returns, the \$560,000 paid to SeaWeb was "To provide a high quality tool-kit and co-ordination infrastructure for use by ENGOs (environmental organizations) in their *campaigns to shift consumer and retailer demand away from farmed salmon*" (italics added).^{38,39}

SeaWeb		\$560,000	Apr. 2004
Wild Salmon, Consumers, and Conservation Project			
Term	Amount	Date Approved	
24 mo.	\$560,000	Apr. 2004	
Purpose			
This grant helps SeaWeb provide a toolkit and coordination for salmon aquaculture campaigns. Outcomes for this grant include identification of antifarming audience and issues, integration of aquaculture science messages into antifarming campaign, standardization of antifarming messaging tool-kit, creation of an earned-media campaign, and coordination of media for antifarming ENGOs.			
Grantee Websites			
SeaWeb ↗			

- o Seafood Choices and the "antifarming campaign" appear to be related. One is to sway market demand primarily towards Alaskan fish and the other is to demarket the competition. SeaWeb has been paid to co-ordinate both.

4. Sea Lice Research Funding

- o The Gordon and Betty Moore Foundation has confirmed by e-mail that it granted funds to the David Suzuki Foundation ("less than \$100,000") that were then re-granted to the CMB for sea lice research.⁴⁰ Thus, not only the Moore foundation funded SeaWeb's co-ordination of an "anti-farming campaign" involving "science messages" and "earned media," the Moore foundation also funded the University of Alberta's sea lice research itself. Funding from the Moore foundation was not reported in the University of Alberta's published papers nor in press releases.
- o It seems unlikely that the University of Alberta's sea lice research was partially funded by the same foundation that funded the co-ordination of the "antifarming campaign" involving "science messages" and "earned media" but that the sea lice research and its extensive media coverage was not part of that campaign.
- o The Moore foundation also granted \$710,262 to COMPASS. The paper, often cited by Alexandra Morton, titled *A Global Assessment of Salmon Aquaculture Impacts on Wild Salmonids*, is published in a journal created with \$US 9 million dollars from the Moore foundation. The editor of that paper was Dr. Callum Roberts, a member of the board of directors of SeaWeb.⁴¹

5. Media Coverage

- o The University of Alberta's sea lice research has garnered an unusual amount of highly negative media coverage. According to the lead researcher, Dr. Martin Krkosek, more than 500 news items have reported this sea lice research.⁴²
See: <http://www.math.ualberta.ca/~mkrkosek/media.htm>
- o SeaWeb reports that the international publicity of the sea lice research by the University of Alberta is one of SeaWeb's "top accomplishments" of COMPASS.⁴³ Sea lice are "one of the largest threats (to salmon) in the Northern Hemisphere," reports SeaWeb.⁴⁴ "Even a single louse can spell disaster," says SeaWeb.⁴⁵
- o The CMB reported to the UofA that in 2005 SeaWeb generated 148 news stories following the publication of Krkosek, Lewis and Volpe (2005).⁴⁶ Of that, about two thirds ran in the U.S.

- o The day *before* Krkosek et al. (2007) was published in *SCIENCE*, SeaWeb sent out an e-mail saying, "Good afternoon! As you may know, a group of researchers have a new paper coming out in *SCIENCE* tomorrow: Declining wild salmon populations in relation to parasites from farm salmon. We at COMPASS have been working with the authors on media outreach for their paper, and we hope it will get good coverage."⁴⁷ SeaWeb also wrote, "We also worked with the authors to assemble a website with photos, video, maps and a summary of the research." SeaWeb provided the following link: <http://www.math.ualberta.ca/~mlewis/SeaLice/protected/>.
- o In December 2007 alone, Google News listed about 250 news stories that negatively reported the University of Alberta's sea lice research published in *SCIENCE*.⁴⁸ More than two thirds of the stories actually ran the day *before* the paper was officially published. In the newswire issued by the American Association for the Advancement of *SCIENCE* (AAAS) which publishes the journal *SCIENCE*, the media contact is SeaWeb.⁴⁹

6. The Packard Foundation's Major Buyer Initiative

- o Since 2002, the David and Lucile Packard Foundation has granted about \$US 12.7 million to get large U.S. retailers ("major buyers") to preferentially source and sell "sustainable seafood," especially MSC-certified "wild" fish. The Packard Foundation says that its "major buyer" strategy starts by defining "a consistent and feasible seafood purchasing policy that can be used to coordinate and align the Foundation's support for market interventions."⁵⁰ "Promoting and facilitating the implementation of this **"coordinated 'Ask'"** is the centre-point around which the foundation supports the work of its grantees," states the Packard foundation.⁵¹
- o The University of Alberta's sea lice research has been publicized in press releases from SeaWeb and Environmental Defense. Both promote Alaskan salmon and provide recipe cards for Alaskan salmon.^{52,53,54,55,56,57,58,59,60,61,62,63} SeaWeb calls wild salmon "the white truffle of seafood."⁶⁴ Since 2000, the Packard foundation has granted about \$US 20.7 million to SeaWeb and about \$US19.9 million to Environmental Defense.
- o The Farmed and Dangerous campaign and the Pure Salmon campaign appear to be what the David and Lucile Packard Foundation describes as 'grantee work to influence non-responsive buyers' and "pressure recalcitrant firms." The Packard foundation has granted at least \$US 2.7 million for these campaigns - including at least \$346,500 to initiate the Coastal Alliance for Aquaculture Reform (CAAR) in 2002.^{65,66} The University of Alberta's sea lice research findings are central to these campaigns and form the basis of the tag-line, "Ingredients for Extinction," of the Smarten Up Safeway campaign.
- o According to U.S. tax returns, Living Oceans Society, a member of the CAAR was paid \$453,400 "to educate major buyers of farmed salmon."^{67,68} CAAR implements two campaigns: Farmed and Dangerous and Smarten Up Safeway. CAAR has a program called "Supermarket Solutions" and reports that the CEO of Safeway has been sent more than 30,000 faxes telling Safeway to stop selling farmed salmon.^{69,70}
- o CAAR runs a program called "Wild Salmon Supporters" that promotes high-end restaurants which sell "wild" salmon" in New York, Las Vegas, Miami Beach and elsewhere.^{71,72}
- o Over roughly the same period that the Packard foundation funded campaigns that demarket farmed salmon (largely on the basis of the University of Alberta's sea lice research), the Packard foundation also funded the World Wildlife Fund (WWF) to get Wal-Mart to preferentially sell MSC-certified fish. In 2006, at the behest of Packard-funded organizations, Wal-Mart announced that it would source from MSC-certified fisheries of which Alaska accounted for 95 percent of the volume.⁷³

Questions About The University of Alberta's Sea Lice Research Funding

1. MITACS

- o According to a document (attached) submitted by the Centre for Mathematical Biology (CMB) to the administration of the University of Alberta, the CMB received \$467,000 from Mathematics of Information Technology and Complex Systems (MITACS). Where did the \$467,000 originate?
- o Between 6 December 2007 and 13 December 2007, two different versions of the curriculum vitae for Dr. Mark Lewis were publicly available at the web-site of the University of Alberta. The version posted as of 12 December 2007 included the words, "Award sub-amount to Lewis (including industrial matching): approximately \$80,000 per annum" but the version posted on 13 December 2007 did not. On 12 December 2007, the author sent an open letter to the Editor-In-Chief of *SCIENCE*. Dr. Lewis was copied on that letter. Two days later, on 14 December 2007, a sea lice research paper was published in *SCIENCE*. Did Dr. Lewis receive \$80,000 per annum from MITACS? If so, where did those funds originate and was Dr. Mark Lewis's CV re-written to omit mention of \$80,000? If so, why?

2. Tides Canada Foundation

- o The sea lice paper published in *SCIENCE* lists Tides Canada Foundation as a source of funds. Where did those funds originate? Did those funds originate from the Packard foundation or the Moore foundation? Since 2000, the David and Lucile Packard Foundation has granted at least \$US 14.1 million to Tides Canada Foundation and the Gordon and Betty Moore Foundation has granted at least \$9.7 million to Tides Canada. Both the Packard foundation and the Moore foundation have also directly funded the environmental organizations that have supported the sea lice research through MITACS. At the time that sea lice research was published in the journal *SCIENCE*, the Editor-in-Chief was a trustee of the David and Lucile Packard Foundation.
- o In a sea lice research paper (Krkosek et al. 2006), Alexandra Morton acknowledges funding from "Tides Canada." Where did those funds originate? Did Alexandra Morton's non-profit organization (Raincoast Research Society) receive funds directly or indirectly from the Packard Foundation? If so, the University of Alberta's sea lice research has been partially funded by the foundation of which the Editor-in-Chief of *SCIENCE* is a trustee.⁷⁴ As of 15 February 2010, Alexandra Morton admits on-line that only 2 percent of her organization's funding is from tax-receipted donations, and that funds from both Tides Canada Foundation, and Living Oceans Society, are from U.S. sources.⁷⁵ Which source(s)?

3. Finest At Sea Ocean Products

- o The CMB reports that six per cent of the sea lice research funds originated from the Canadian Sablefish Association (4 per cent) and Finest At Sea Ocean Products (2 per cent).⁷⁶ What are the amounts of funds provided and where did the CSA funding originate?

4. The David Suzuki Foundation

- o The Moore foundation has acknowledged that it granted funds to the DSF ("less than \$100,000) which were then re-granted for the University of Alberta's sea lice research.⁷⁷ Did funds from the David Suzuki Foundation originate only with the Moore foundation or from other sources as well? What is the amount of those funds?

Please see:

- o Info from the University of Alberta: <http://www.math.ualberta.ca/~mkrkosek/SeaLiceFunding.pdf>
- o Info from Alexandra Morton: http://www.raincoastresearch.org/pdf/RRS_Funders.pdf

Sources:

- ¹ http://archive.gg.ca/honours/search-recherche/index_e.asp?results=1&Firstname=Martin&Middlename=&Lastname=Krkosek&City=&Province=AB&TypeID=acmed&Institution=University+of+Alberta&Honours=Gold&AwardStart=&AwardEnd=&npp=25
- ² <http://www.math.ualberta.ca/~mkrkosek/>
- ³ http://www.nserc-crsng.gc.ca/Media-Media/Event-Evenement_eng.asp?ID=13
- ⁴ Butterworth, K.G., F. Cubitt, B. Finstad and R.S. McKinley. Sea Lice: The Science Behind the Hype. Fraser Institute Digital Publication. November 2006. http://www.fraserinstitute.org/commerce.web/publication_details.aspx?pubID=3168
- ⁵ http://www.al.gov.bc.ca/ahc/fish_health/Sealice/AAVBC_sealice_comments.pdf
- ⁶ McVicar. 2005. Scientific critique of the publication by Krkosek et al. (2005) Transmission dynamics of parasitic sea lice from farm to wild salmon. Proceedings of the Royal Society. Italics added. http://www.aquaculture.ca/media/PressReleases/CAIA_PressReleases88.html
- ⁷ Brooks, K. 2005. The effects of water temperature, salinity, and currents on the survival and distribution of the infective copepodid stage of sea lice (*Lepeophtheirus Salmonis*) Originating on Atlantic Salmon Farms in the Broughton Archipelago of British Columbia. Reviews in Fisheries Science 13:177-204. <http://www.ingentaconnect.com/content/tandf/brfs/2005/00000013/00000003/art00003>
- ⁸ Brooks, K. 2006. A critical review of Krkosek et al. (In press). Epizootics of wild fish induced by farm fish. http://www.salmonfarmers.org/pdfs/critical_review_of_Krkosek.pdf
- ⁹ Brooks, K. and S. Jones. 2008. Perspectives on Pink Salmon and Sea Lice: Scientific Evidence Fails to Support the Extinction Hypothesis. Reviews in Fisheries Science, 16(4) 403-12. <http://www.informaworld.com/smpp/1593114469-62796375/content~content=a792379117~tab=send>
- ¹⁰ Riddell, B.E., R.J. Beamish, L.J. Richards, J.R. Candy. 2006. Comment on "Declining Wild Salmon Populations in Relation to Parasites from Farm Salmon." Science 19 December 2008: Vol. 322. no. 5909, p. 1790. <http://www.sciencemag.org/cgi/content/abstract/sci;322/5909/1790b>
- ¹¹ http://www.math.ualberta.ca/~mkrkosek/Krkosek_CV.pdf
- ¹² <http://www.canada.com/vancouver/news/editorial/story.html?id=9f75125f-c5f7-42c2-91b8-db42f2f8ea27>
- ¹³ <http://alexandramorton.typepad.com/>
- ¹⁴ Brooks, K. and S. Jones. 2008. Perspectives on Pink Salmon and Sea Lice: Scientific Evidence Fails to Support the Extinction Hypothesis. Reviews in Fisheries Science, 16(4) 403-12. <http://www.informaworld.com/smpp/1593114469-62796375/content~content=a792379117~tab=send>
- ¹⁵ <http://fairquestions.typepad.com/fishfarmfuss/2010/01/are-campaigns-context-setting.html>
- ¹⁶ <http://fairquestions.typepad.com/fishfarmfuss/2010/02/75-million-packard.html>
- ¹⁷ <http://www.packard.org/itemList.aspx?RootCatID=2&CategoryID=205>
- ¹⁸ <http://www.math.ualberta.ca/~mkrkosek/SeaLiceFunding.pdf>
- ¹⁹ Brooks, K. 2006. A critical review of Krkosek et al. (In press). Epizootics of wild fish induced by farm fish. http://www.salmonfarmers.org/pdfs/critical_review_of_Krkosek.pdf
- ²⁰ Fisheries and Oceans Canada. 2006 State-of-Knowledge Presentation for the Special Committee on Sustainable Aquaculture of the Legislature of British Columbia. 30 November 2006. http://www.pac.dfo-mpo.gc.ca/sci/aquaculture/sok/document_e.pdf Page 25.
- ²¹ http://www.al.gov.bc.ca/ahc/fish_health/Sealice/AAVBC_sealice_comments.pdf
- ²² <http://www.leg.bc.ca/cmt/38thparl/session%2D2/aquaculture/hansard/W61205a.htm> Issue 32, Page 1032.
- ²³ University of Alberta Express News: Salmon farms kill wild salmon. 3 October 2006. <http://www.expressnews.ualberta.ca/article.cfm?id=7917>
- ²⁴ University of Alberta Press Release, 26 October 2006, Wild Salmon Mortality Caused By Fish Farms. *Up to 95 per cent of wild juvenile salmon killed by parasites from salmon farms.*
- ²⁵ Fisheries and Oceans Canada. 2006 State-of-Knowledge Presentation for the Special Committee on Sustainable Aquaculture of the Legislature of British Columbia. 30 November 2006. http://www.pac.dfo-mpo.gc.ca/sci/aquaculture/sok/document_e.pdf A printed copy is available.
- ²⁶ Brooks, K. and S. Jones. 2008. Perspectives on Pink Salmon and Sea Lice: Scientific Evidence Fails to Support the Extinction Hypothesis. Reviews in Fisheries Science, 16(4) 403-12. <http://www.informaworld.com/smpp/1593114469-62796375/content~content=a792379117~tab=send>
- ²⁷ Parker, R.R. 1968. Marine mortality schedules of pink salmon of the Bella Coola river, central British Columbia. J. Fish. Res. Bd. Canada, 25(4) 757-794.
- ²⁸ Riddell, B.E., R.J. Beamish, L.J. Richards, J.R. Candy. 2006. Comment on "Declining Wild Salmon Populations in Relation to Parasites from Farm Salmon." Science 19 December 2008: Vol. 322. no. 5909, p. 1790. <http://www.sciencemag.org/cgi/content/abstract/sci;322/5909/1790b>
- ²⁹ http://www-comm.pac.dfo-mpo.gc.ca/pages/release/p-releas/2002/nr070_e.htm A printed copy is available.
- ³⁰ Fisheries and Oceans Canada (DFO), Pacific Region. Fishery Notice. 28 August 2009. http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/fns/index.cfm?pg=view_notice&lang=en&DOC_ID=119653&ID=all
- ³¹ http://www.math.ualberta.ca/~mlewis/research1/LRG_research/sls.html
- ³² <http://www.uofaweb.ualberta.ca/secretariat/pdfs/Item4-SCCentreforMathBioIProposalMEETING.pdf>

Removed in the spring of 2008. A printed copy is available.

³³ <http://seafoodchoices.com/resources/links.php>

³⁴ <http://www.packard.org/categoryDetails.aspx?RootCatID=3&CategoryID=66>

³⁵ Krause, V. How much has the David and Lucille Packard Foundation granted to sway the seafood market? Posted at 12 December 2009. <http://fairquestions.typepad.com/fishfarmfuss/2009/12/million-dollar-marketing.html>

³⁶ Krause, V.M. What percentage of MSC-certified fish is Alaskan? <http://fairquestions.typepad.com/fishfarmfuss/2010/01/msc-is-alaskan.html>

³⁷ The David and Lucille Packard Foundation. Strategy for Market-Intervention Tools to Conserve Marine Fisheries. Page 8. http://www.packard.org/assets/files/conservation%20and%20science/marine_fisheries_strategy_041007_Web_site.pdf

³⁸ The 2004 tax return filed with the U.S. Internal Revenue Service by the Gordon and Betty Moore Foundation. Page 8 of Statement 16A. A printed copy is available.

³⁹ <http://moore.org/files/2005-grants-paid.pdf> Page 11.

⁴⁰ E-mail from the Gordon and Betty Moore Foundation, 12 June 2009. A copy is attached.

⁴¹ <http://moore.org/files/2006-grants-paid.pdf> Page 14.

⁴² http://www.math.ualberta.ca/~mkrkosek/Krkosek_CV.pdf Page 2.

⁴³ <http://seaweb.org/aboutus/accomplishments.php>

⁴⁴ <http://seaweb.org/secure/newsletter-ocean-update.php?year=2003#30>

⁴⁵ http://www.seafoodchoices.org/smartchoices/species_salmonpink.php No longer on-line. A printed copy is available.

⁴⁶ <http://www.uofaweb.ualberta.ca/secretariat/pdfs/Item4-SCCentreforMathBiolProposalMEETING.pdf> Accessed between 28 October 2007 and 12 February 2008. Removed at some point during March or April 2008. A printed copy is available. Page 28.

⁴⁷ E-mail sent by Brittany Grayson, 13 December 2007. A printed copy is available.

⁴⁸ A printed copy of this information is available.

⁴⁹ http://www.eurekalert.org/pub_releases/2007-12/s-ffd120707.php

⁵⁰ http://www.packard.org/assets/files/conservation%20and%20science/marine_fisheries_strategy_041007_Web_site.pdf Page 8.

⁵¹ http://www.packard.org/assets/files/conservation%20and%20science/marine_fisheries_strategy_041007_Web_site.pdf Page 8.

⁵² http://www.motherjones.com/blue_marble_blog/archives/2007/12/6597_farmed_salmon_o.html

⁵³ <http://www.loe.org/shows/shows.htm?programID=00-P13-00047#feature8>

⁵⁴ http://www.SeaWeb.org/documents/PR_2004.3.9.pdf

⁵⁵ <http://www.edf.org/pressrelease.cfm?ContentID=3480>

⁵⁶ <http://www.oceansalive.org/mediacenter.cfm?subnav=release&ContentID=3480>

⁵⁷ <http://www.edf.org/article.cfm?ContentID=5098>

⁵⁸ <http://www.oceansalive.org/eat.cfm?contentID=4021>

⁵⁹ <http://www.oceansalive.org/explore.cfm?subnav=article&contentID=5323>

⁶⁰ <http://www.edf.org/page.cfm?tagID=15802> A printed copy is available of Environmental Defense's advisory that the maximum number of meals of farmed salmon is half a meal per month and for young children, zero meals. To the best of the author's knowledge, Environmental Defense changed this advisory to one meal per month for adults and older children, and half a meal for younger children, in 2008. To the best of the author's knowledge, Environmental Defense did not publicize this change in its advisory.

⁶¹ http://www.kidsafeseafood.org/bestchoices_otherkindsoffish.php

⁶² http://www.kidsafeseafood.org/recipe_alaskansalmon.php

⁶³ <http://www.edf.org/page.cfm?tagID=17138>

⁶⁴ http://www.seaweb.org/documents/PR_2002.4.12.pdf

⁶⁵ The David and Lucille Packard Foundation. Strategy for Market-Intervention Tools to Conserve Marine Fisheries. http://www.packard.org/assets/files/conservation%20and%20science/marine_fisheries_strategy_041007_Web_site.pdf Page 8.

⁶⁶ The David and Lucille Packard Foundation. Aquaculture Strategy Executive Summary. Marine Fisheries Sub-program. June 2007. Page 4. <http://www.packard.org/genericDetails.aspx?RootCatID=3&CategoryID=131&ItemID=3619&isFromModule=1>

⁶⁷ The 2003 tax return (990-PF) of the Gordon and Betty Moore Foundation. Statement 17A. Undated. This document was previously available on-line at <http://moore.org/financials.aspx> A printed copy is available.

⁶⁸ The 2004 tax return (990-PF) of the Gordon and Betty Moore Foundation. Statement 16A. Undated. This document was available on-line at <http://moore.org/financials.aspx> A printed copy is available.

⁶⁹ http://www.democracyinaction.org/dia/organizations/farmed/campaign.jsp?campaign_KEY=1406&t=safeway.dwt

⁷⁰ <http://farmedanddangerous.org/page/marketdemand>

⁷¹ http://www.farmedanddangerous.org/page/supermarket_solutions

⁷² <http://salmonsupporters.com/>

⁷³ <http://www.oecd.org/dataoecd/25/5/38464846.pdf>

⁷⁴ <http://www.packard.org/itemList.aspx?RootCatID=2&CategoryID=205>

⁷⁵ http://www.raincoastresearch.org/pdf/RRS_Funders.pdf

⁷⁶ <http://www.math.ualberta.ca/~mkrkosek/SeaLiceFunding.pdf>

⁷⁷ E-mail from the Gordon and Betty Moore Foundation, 12 June 2009. A copy is attached.