P.O. Box 335 Hazelton, BC V0J 1Y0

March 11, 2016

Honourable Prime Minister Justin Trudeau via Fax: 613-941-6900

Honourable Catherine McKenna, Minister of Environment and Climate Change via email to ec.ministre-minister.ec@canada.ca

Honourable Hunter Tootoo, Minister of Fisheries, Oceans, and Canadian Coastguard via email to Min@dfo-mpo.gc.ca

Honourable Jim Carr, Minister of Natural Resources via email to Minister.Ministre@NRCan-RNCan.gc.ca

Honourable Jody Wilson-Raybould, Minister of Justice and Attorney General of Canada via email to mcu@justice.gc.ca

Honourable Doctor Carolyn Bennett via email to InfoPubs@aadnc-aandc.gc.ca;Carolyn.Bennett@parl.gc.ca

Canadian Environmental Assessment Agency via email to GNLPacificNorthwestLNG@ceaa-acee.gc.ca

Dear Honourable Ministers:

# **Environmental Assessment of the PNWLNG Project**

We write in response to the CEAA's draft environmental assessment report on the PNW LNG Terminal. By way of this letter we also provide preliminary comments on the report and draft conditions.

1, The Gitxsan claim a constitutionally entrenched right to be consulted and accommodated as it relates to the proposed LNG terminal in the Skeena River Estuary; Specifically, the Gitxsan have <u>established</u> fishing rights in the Skeena River watershed as described and confirmed in the Delgamuukw v. B.C. title case.

2, On July 9, 2015 we notified the Crown and CEAA by letter that the Gitxsan have not been consulted on the proposed LNG terminal in the Skeena River Estuary which, according to numerous scientific reports, will have very significant harmful impacts to the fisheries in the Skeena River watershed. The letter is attached as Appendix "A" to this submission.

3. On August 6, 2015 CEAA responded to the Gitxsan by letter stating, "Taking into consideration the spatial scope of the Project, and any mitigation required as enforceable conditions that would prevent upstream impacts, the Agency is of the view that your interests will not be impacted by the Project."

# **Duty to Consult**

4. It is our view that the proposed terminal and tanker traffic in the estuary will potentially harm and infringe our fishing rights and this satisfies the criteria for consultation as set out in various court decisions, including *Delgamuukw v. B.C.* and the *Haida* case, as well as in Canada's "Updated Guidelines for Federal Officials to Fulfill the Duty to Consult" dated March 2011 ("the Guidelines"). Also see Pacific Booker Minerals Inc. v. B.C. 2013 BCSC 2258 which references Gitxsan being added to a section 11 Order in recognition that Gitxsan fishing rights are impacted by upriver development.

5. Our fisheries are integral to our history, culture, and identity as a people; as such the duty to consult is clear and significant. The Gitxsan's Rights and Title as affirmed in *Delgamuukw* far exceeds the Guidelines' threshold which provides that consultation should proceed even if the strength of claim is unclear and if there is uncertainty or if there are legal and political reasons, these factors should be taken into account. In this regard, at the very least, there is a political and legal need sufficient to engage the honour of the Crown in so far as the PNW LNG Project will affect Skeena River salmon fishery, a migratory species, and is a cumulative impact of the PRGT LNG pipeline that is proposed to traverse Gitxsan territory. While legal need to consult can arise as a result of court action we would hope the federal government will honour its commitment to rebuild Crown - First Nations relations by consulting without requiring a Court Order to do so.

6. We reject the CEAA proposition that impacts will be restricted to a small geographic area; to specific water lots and shipping lanes. In fact the impacts will be on a much larger scale as reported in submissions to the CEAA, particularly with regard to the potential impact of the terminal operation on fisheries and fisheries habitat.

7. Further, it is our view CEAA is wrong at law in saying that, if it determines the effects of the terminal on the environment will be controlled, then there is no duty to consult.

Rather, the correct approach is to have the proposed controls and conditions form topics of consultation and accommodation with the Gitxsan.

8. Certainly we would want to discuss and be satisfied that existing mechanisms and proposed orders will ensure a sustainable fishery. For that reason we see consultation with the Ministers of the Environment and Fisheries and Oceans to be crucial as changes made to environmental legislation and regulation under the Harper regime are not designed to protect the environment or fisheries.

9. We are also concerned that cutbacks in the Department of Fisheries compromise that department's capacity to effectively carry out its mandate. The cutbacks, particularly in scientific staff, raises questions not only about the capacity of that department to adequately assess potential impacts in this process, but also to monitor and enforce Regulations and Orders. We are also mindful of the fact that recommendations made to Government in the Cohen Report, which cost over \$ 26 million to complete, remain unimplemented. Additionally, the reported failure and inability of the National Energy Board to adequately monitor conditions of projects within its jurisdiction highlights the very real possibility that federal departments will not adequately monitor the LNG terminal.

10. There is clearly a need for affected First Nations to be fully engaged throughout the life of the project, should it proceed. The Gitxsan rights will potentially be infringed we therefore expect to be fully engaged throughout the process through consultation and accommodation.

## Failure to Consult:

11. On January 4, 2016 CEAA, by email, invited the Gitxsan to submit a request for funding to participate in the environmental review of the PNW LNG terminal. Funding in the amount of \$ 3,800.00 was offered with an application to be submitted no later than January 13, 2016. In response to that offer the Gitxsan informed the CEAA Crown Consultation Coordinator that the offer of \$3,800.00 in no way enabled us to participate in the process in a meaningful way as we required the advice of specialists to understand the highly technical reports. Further as we must engage in excess of 62 hereditary chiefs as well as four band councils who represent in excess of 7000 Gitxsan the offer of \$3,800.00 was completely inadequate.

12. In its draft Environmental Assessment Report dated February 10, 2016 the CEAA stated at page 21 that the Gitxsan were offered funds to review and comment on the Report. The Agency went on to state that a total of \$367,854 was made available to First Nations in the Skeena watershed. In fact Gitxsan did not receive any funds and it is our view that the last minute offer of \$3,800.00 was an attempt to whitewash the failure to consult Gitxsan.

13. While we have engaged in the process to the extent of participating in the call for public comments we stress that this does not represent consultation as our rights are constitutionally entrenched and are thus separate and distinct from the general public and other stakeholders.

## The Draft Report:

14. We understand that the draft environmental report concludes there will be only moderate long term impacts on fisheries. We reject that conclusion on the basis that over 100 scientists have joined forces to express grave concern that the environmental assessment of the terminal is incomplete and not based on sound scientific data. We attach their March 6, 2016 letter to Minister McKenna as Appendix 'B' to this submission and hereby support and adopt it.

15. In our submission we are acting on the basis of our experience with declining and closed fisheries in the Skeena watershed due to environmental conditions which include warm temperatures and low flows causing poor migrating and spawning conditions in the river and streams. A large portion of Gitxsan continue to rely on the fisheries for food and livelihood. When fisheries are closed, Gitxsan experience not only financial hardship but also social damage and uncertainty due to a loss of connection to cultural practices. Band administrations must step in to provide the necessary social safety net thereby encountering increased needs for assistance and support despite programs and services already being under resourced.

16. We are aware that the LNG industry will be a significant contributor to green house gases over the projected 40 year lifespan of the PNW LNG project. We are therefore potentially faced with even more frequent and severe conditions brought about by warmer temperatures in our rivers and streams and extreme weather events. We believe there is legitimate cause for concern that our children and grandchildren will be deprived of their right to fish. The draft report does not adequately consider these long term impacts. Moreover, when a project has the potential to infringe or possibly extinguish First Nations rights, then the assessment should necessarily consider and assess potential damages that would be payable to First Nations by the proponent and the Crown; that is, form part of the cost benefit analysis.

17. The Draft Report also includes draft conditions which CEAA considers will adequately mitigate harmful impacts of the LNG terminal. We are not able to comment on the conditions as we do not have the necessary technical and financial resources. Generally we state that the draft Order is in error as it fails to take into account the constitutionally entrenched right of the Gitxsan to be consulted. Additionally the views expressed by the scientists lead us to conclude that the conditions proposed are not adequate.

18. We note that the majority of conditions relate to requirements during the construction phase, with emphasis only on monitoring during operation of the facility. We believe that conditions for any major project, particularly one proposed for an environmentally sensitive area should as is the case for the PNW LNG project, must necessarily be backed by an environmental trust fund funded by the proponent and government royalties. This

fund would be used for either remediation or alternately, payment of damages to First Nations.

In conclusion, we hereby again formally request that the federal government reject the draft environmental assessment report, and engage in the Gitxsan in consultation and accommodation on the PNW LNG.

Yours truly,

Gitxsan Simogyet:

<original signed by>

Simogyet Guuhadakw
Norman Stephens

Simogyet Luutkudziwuus Charlie Wright Simogyet Baskyelaxha / Niist Bill Blackwater Senior

Gitxsan Elected Councils:

<original signed by>

<original signed by>

Chief Marjorie McRae Gitanmaax Indian Band

Chief Bob Barnes Kispiox Indian Band

## July 9, 2015

Mr. Michael Culbert, President Pacific North West LNG Limited Partnership Oceanic Plaza, Suite 1900 – 1066 West Hastings St. Vancouver, BC V6E 3X1

via email: info@pacificnorthwestIng.com

Pacific Northwest LNG Project Canadian Environmental Assessment Agency 410-701 Georgia Street West Vancouver, BC V7Y 1C6

via email: GNLPacificNorthwestLNG@ceaaacee.gc.ca

Aboriginal Affairs and Northern Development Canada Honorable Bernard Valcourt 10 Wellington, North Tower Ottawa, Ontario

Province of British Columbia Minister of Aboriginal Relations & Reconciliation Honorable John Rustad P.O. Box 9100 STN PROV GOVTK1A 0H4 Victoria, B.C. V8W 9B1

via fax : 819-953-3017

via email: abr.minister@gov.bc.ca

**Dears Sirs and Honourable Ministers:** 

We write to give notice to the proponent of the Prince Rupert LNG Terminal ("the Project"), to the Canadian Environmental Assessment Agency ("CEAA"), as well as to the Crown, that we have not been consulted on the Project, and we are deeply concerned that the proposed development will significantly impact our traditional fisheries.

We are aware that over 300 million salmon from the Skeena River watershed, including fish runs that Gitxsan people have relied on for thousands of years, traverse through the Flora Banks/ Lelu Island area where the proponent proposes to construct the LNG terminal. We are also aware that various scientific studies, including by Department of Fisheries and Oceans, identify the Flora Banks area as being critical salmon habitat which needs to be protected. We question how an LNG terminal can be constructed and operated without harming the estuary, particularly fragile eel grass beds which are critical for the survival of Skeena River salmon.

To date neither the proponent, nor the CEAA consider inland First Nations, including the Gitxsan, to have a potential or established rights which may be adversely impacted by the proposed LNG terminal in the Skeena river estuary. As B.C. and Canada are fully aware, the Gitxsan have a strong prima facie case to title and rights which have been recognized in various court cases including <u>Delgamuukw v. B.C.</u>, [1997] 3 SCR 1010, 1997 Gitxsan fishing rights were specifically discussed by McEachern C. J. of the B.C. Supreme Court in his decision reported at 79 DLR (4th) 185; [1991] 3 WWR 97; as follows:

- Each Gitxsan house owns territory and fishing sites which have been used since time immemorial. (p.85)
- Early historical records indicate fishing was the mainstay of the traditional economy (p 22)

- Although reserves in the territory included most occupied villages, they were very small because it was thought secure access to strategic fishing sites was more important than acreage. (para 27)
- Gitxsan men and women have been employed in the coastal commercial fishing industry since the 1870's.( p. 68 and 144)
- Fishing remains an important part of the economy (p. 143-144)

It is our view that the foregoing confirm that the Gitxsan have established fishing rights in the Skeena River watershed. In so far as the fisheries have, and continue to be integral to our culture and to our economies, and there is potential of significant, if not irreversible impacts caused by the proposed Project, the consultation must be in depth to reflect our strength of claim.

As a first step we require information on the Proponent's plans and also require resources to enable our meaningful participation. We are prepared to immediately convene a meeting of potentially impacted Gibssan to discuss our fisheries and to hear further from the Crown and Proponent. Considering the past failure to consult, we consider it reasonable that the CEAA delay any decision on the Project until such time as appropriate consultation has taken place with our Simogyet and communities.

Also take notice that in so far as the proposed PR LNG Pipeline is to be constructed specifically to deliver gas to the Prince Rupert Terminal and we have not been consulted on the potential impact on our fisheries therefore we remain opposed to that development. We consider any development of the terminal and its related infrastructure to constitute an unjustifiable infringement of our aboriginal fishing rights.

As stated above we are prepared to meet to discuss the LNG terminal and its infrastructure. We look forward to an early response.

## Gitxsan Simogyet:

<original signed by>

Bill Blackwater Baskyalaxha / Niist Geraldine McDougall Spookw Charlie Wright Luutkudziiwus Norman Moore Moolxhan/Noola

Gitxsan Communites;

<original signed by>

Chief Marjorie McRae Gitanmaax Indian Band Chief Bob Barnes Kispiox Indian Band

cc: Lax Kw'alaams First Nation Wet'suwet'en Hereditary Chiefs Gitanyow First Nation Lake Babine First Nation

Hon. R. Coleman, Minister of Energy

#### To: Honourable Catherine McKenna, Minister of Environment and Climate Change

#### From: Scientists

cc: Honourable Prime Minister Justin Trudeau
Honourable Hunter Tootoo, Minister of Fisheries, Oceans, and Canadian Coastguard
Honourable Jim Carr, Minister of Natural Resources
Honourable Jody Wilson-Raybould, Minister of Justice and Attorney General of Canada
Canadian Environmental Assessment Agency

Date: March 9, 2016

## Re: Scientific flaws in assessment of environmental risks from the proposed Pacific NorthWest Liquified Natural Gas facility at Lelu Island, Skeena River estuary

We, the undersigned scientists, conclude that the Canadian Environmental Assessment Agency's (CEAA) draft report of the environmental risks of the Pacific NorthWest Liquid Natural Gas (PNW LNG) project, proposed for the Skeena River estuary at Lelu Island, is scientifically flawed and represents an insufficient base for decision-making. We urge you to reject the CEAA draft report.

Given that the PNW LNG project is proposed for the Flora Bank area of the Skeena River estuary, an area with economically- and culturally-important fishes, such as salmon, eulachon, and herring, we primarily focus our analyses on risks posed to these species. We have identified five primary scientific flaws in the CEAA draft report:

- 1. Misrepresentation of the importance of the project area to fish populations, especially salmon. The CEAA draft report has not accurately characterized the importance of the project area, the Flora Bank region, for fish. The draft CEAA report<sup>1</sup> states that the "...marine habitats around Lelu Island are representative of marine ecosystems throughout the north coast of B.C.". In contrast, five decades of science has repeatedly documented that this habitat is NOT representative of other areas along the north coast or in the greater Skeena River estuary, but rather that it is exceptional nursery habitat for salmon<sup>2-6</sup> that support commercial, recreational, and First Nation fisheries from throughout the Skeena River watershed and beyond<sup>7</sup>. A worse location is unlikely to be found for PNW LNG with regards to potential risks to fish and fisheries. Proponents of previous industrial projects and decision makers have historically avoided development in the Flora Bank region because of its known enormous value to fish. Thus, the draft CEAA report has failed to adequately characterize the potential risks of the project to fish and fisheries.
- 2. Assuming lack of information equates to lack of risks. CEAA's draft report concluded that the project is not likely to cause adverse effects on fish in the estuarine environment, even when their only evidence for some species was an absence of information. For example, eulachon, a fish of paramount importance to First Nations and a Species of Special Concern<sup>8</sup>, likely use the Skeena River estuary and project area during their larval, juvenile, and adult life-stages. There has been no systematic study of eulachon in the project area. Yet CEAA concluded that the project posed minimal risks to this fish. It is scientifically indefensible to conclude that a species will not be negatively impacted when it is unknown how it relies on habitat that would be destroyed. Indeed, there are many aspects of this ecosystem and the proposed PNW LNG project for which there is little scientific understanding<sup>9</sup>. Lack of knowledge does not mean lack of risks.
- 3. Disregard for science that was not funded by the proponent. CEAA's draft report is not a balanced consideration of the best-available science. On the contrary, CEAA relied upon conclusions presented in proponent-funded studies which have not been subjected to independent peer-review and disregarded a large and growing body of relevant independent scientific research, much of it peer-reviewed and published. For example, CEAA marginalized a published peer-reviewed study<sup>10</sup> that revealed risks of widespread erosion of Flora Bank, a unique marine coastal landform and eelgrass habitat, due to disruption of water

Page 1 of 9

currents by the proposed trestle and suspension bridge. Instead, CEAA adopted the conclusions of a proponent-funded model that claimed "*no harmful effects*" of the PNW LNG project, even though external and professional analyses identified several critical errors in their methods<sup>11</sup>. Similarly, CEAA did not adequately consider decades of scientific research on salmon in the Skeena River estuary<sup>2-7</sup>, and instead relied on proponent-funded studies that were substantially more limited in scope and duration and that reached different conclusions compared to the larger body of available science. In these and similar cases, the CEAA draft assessment of the PNW LNG project presents an unbalanced assessment of the project's environmental risks through the disregard of the larger body of independent science.

- 4. Inadequate consideration of multiple project impacts and their cumulative effects. The CEAA draft report did not adequately consider the multiple potential impacts of the project and their cumulative effects and thereby provided an unbalanced assessment of risks. The PNW LNG project presents many different potential risks to the Skeena River estuary and its fish, including, but not limited to, destruction of shoreline habitat, acid rain, accidental spills of fuel and other contaminants, dispersal of contaminated sediments, chronic and acute sound, seafloor destruction by dredging the gas pipeline into the ocean floor, and the erosion and food-web disruption from the trestle structure. Fisheries and Oceans Canada (DFO) and Natural Resources Canada provided detailed reviews<sup>12</sup> on only one risk pathway habitat erosion while no such detailed reviews were conducted on other potential impacts or their cumulative effects.
- 5. Unsubstantiated reliance on mitigation. CEAA's draft report concluded that the project posed moderate risks to marine fish but that these risks could be mitigated. However, the proponent has not fully developed their mitigation plans and the plans that they have outlined are scientifically dubious. For example, the draft assessment states that destroyed salmon habitat will be mitigated; the "proponent identified 90 000 m<sup>2</sup> of lower productivity habitats within five potential offsetting sites that could be modified to increase the productivity of fisheries", when in fact, the proponent did not present data on productivity of Skeena Estuary habitats for fish at any point in the CEAA process. Without understanding relationships between fish and habitat, the proposed mitigation could actually cause additional damage to fishes of the Skeena River estuary. Independent scientific analyses indicate that mitigation frequently fails to recover original levels of ecosystem function<sup>13</sup>.

For these stated reasons the CEAA draft report represents a flawed assessment of the environmental risks of the PNW LNG proposal. While we are not decision-makers, we can assess when decisions would be made based on false premises. This is one of those instances. We urge you to reject this draft report.

The CEAA draft report for the Pacific Northwest LNG project is a symbol of what is wrong with environmental decision-making in Canada. An obvious risk of a flawed assessment is that it will arrive at an incorrect conclusion. Indeed, scientific research from other estuaries has found industrial development, such as that proposed by the PNW LNG project, is associated with lasting damage to salmon populations<sup>14,15</sup>.

While our assessment finds that the CEAA draft report is scientifically flawed, the greater body of science also demonstrates that protection of the Lelu Island/Flora Bank area would benefit the second-largest salmon-producing watershed in Canada. Protection of the Flora Bank area would demonstrate the Liberal Government's commitment to protection of marine ecosystems, rights of indigenous people, and scientific integrity.

Sincerely,

Signed,

Jonathan W. Moore, Ph.D., Liber Ero Chair of Coastal Science and Management, Associate Professor, Simon Fraser University.

Marvin Rosenau, Ph.D., Professor, British Columbia Institute of Technology.

Charmaine Carr-Harris, M.Sc., Biologist, Skeena Fisheries Commission.

Matthew R. Sloat, Ph.D., Director of Science, Wild Salmon Center, and Adjunct Professor, Oregon State University.

Michael H.H. Price, M.Sc., Salmon Ecologist, SkeenaWild Conservation Trust.

Allen Gottesfeld, Ph.D., P. Geo., Head Scientist, Skeena Fisheries Commission.

#### Co-signed,

Otto E. Langer, M.Sc., R.P.Bio., Fisheries Biologist, Former Chief of Habitat Assessment, Department of Fisheries and Oceans Canada.

Patrick McLaren, Ph.D., P.Geo., President, SedTrend Analysis Limited.

John G. Stockner, Ph.D., Emeritus Senior Scientist DFO, West Vancouver Laboratory, Adjuct Professor, University of British Columbia.

Barb Faggetter, Ph.D., R.P.Bio., Independent Oceanographer.

David.W. Schindler, Ph.D., Killam Memorial Professor of Ecology Emeritus, University of Alberta.

Charles Simenstad, Ph.D., Professor, University of Washington.

Janvier Doire, M.Sc., R.P.Bio., Biologist, Skeena Fisheries Commission.

Randall M. Peterman, Ph.D., Professor Emeritus and Former Canada Research Chair in Fisheries Risk Assessment and Management, Simon Fraser University.

R. S. Hooton, M.Sc., Former Senior Fisheries Management Authority for British Columbia Ministry of Environment, Skeena Region.

David Bustard, M.Sc., R.P.Bio., Fish Habitat Biologist, Skeena Region.

Alexander I. Vedenev, Ph.D., Head of Ocean Noise Laboratory, Russian Academy of Science.

Kyla Warren, M.Sc. R.P.Bio., Biologist, Skeena Fisheries Commission.

Mark C. Cleveland, B.Sc., R.P.Bio., Head Biologist, Gitanyow Fisheries Authority.

John D. Reynolds, Ph.D., Tom Buell BC Leadership Chair in Salmon Conservation, Professor, Simon Fraser University.

Page 3 of 9

Daniel Schindler, Ph.D., Harriet Bullitt Endowed Chair in Conservation, Professor, University of Washington.

Jim Pojar, Ph.D., R.P.Bio., Senior Ecologist (ESA), Skeena Region.

Rosamund Pojar, M.Sc., Botanist, Skeena Region.

Kai M.A. Chan, Ph.D., Canada Research Chair in Biodiversity and Ecosystem Services, Associate Professor, University of British Columbia.

Richard D. Routledge, Ph.D., Professor, Simon Fraser University.

Evelyn Pinkerton, Ph.D., School of Resource and Environmental Management, Professor, Simon Fraser University.

Julian D. Olden, Ph.D., Associate Professor, University of Washington.

Hadi Dowlatabadi, Ph.D., Canada Research Chair in Applied Mathematics and Integrated Assessment of Global Change, Professor, University of British Columbia.

Phil LePage, M.Sc., R.P.F., Research Silviculturist, Skeena Region.

Karen Price, Ph.D., Consulting Ecologist, Skeena Region.

Michael Nelligan, B.Sc., R.P.Bio., Biologist and College Instructor, Northwest Community College.

Mary E. Power, Ph.D., Professor, University of California, Berkeley.

Chris T. Darimont, Ph.D., Associate Professor, University of Victoria.

Karen Kubiski, M.Sc., P.Ag., Dragonfly Ecological Services.

Dana Lepofsky, Ph.D., Professor, Simon Fraser University.

Dawn Remington, M.Sc., R.P.Bio., Aquatic Ecologist.

Peter B. Moyle, Ph.D., Professor, University of California.

John Volpe, Ph.D., Associate Professor, University of Victoria.

Nicholas Dulvy, Ph.D., Canada Research Chair in Marine Biodiversity and Conservation, Professor, Simon Fraser University.

Len Vanderstar, B.Sc., R.P.Bio., Consulting Ecologist, Skeena Region.

Ken Lertzman, Ph.D., Professor, Simon Fraser University.

Sarah P. Otto, Ph.D., Professor and Director, Biodiversity Research Centre, University of British Columbia.

Michael Doebeli, Ph.D., Professor, University of British Columbia.

Charles J. Krebs, Ph.D., Professor, University of British Columbia.

Alexandra Morton, B.Sc., Biologist, Pacific Coast Wild Salmon Society.

Jack A. Stanford, Ph.D., Professor of Ecology, University of Montana.

Isabelle M. Côté, Ph.D., Professor, Simon Fraser University.

Martin Krkosek, Ph.D., Assistant Professor, University of Toronto.

Gordon F. Hartman, Ph.D., Fisheries Scientist.

Kevin Koch, B.Sc., R.P.Bio. Fish and Wildlife Biologist, Gitanyow Fisheries Authority.

Daniel L. Bottom, M.Sc., Estuarine Ecologist.

Amanda Vincent, Ph.D., Professor, University of British Columbia.

Aerin Jacob, Ph.D., Postdoctoral Fellow, University of Victoria.

Mark Novak, Ph.D., Assistant Professor, Oregon State University.

Jon Armstrong, Ph.D., Assistant Professor, Oregon State University.

Susan Johnson, Ph.D., Fisheries Biologist.

Suzanne Bayley, Ph.D., Emeritus Professor, University of Alberta.

Karen Diemert, B.Sc., R.P.Bio., Ecosystem Biologist, Skeena Region.

Lynn Westcott, M.Sc., R.P.Bio., Independent Biologist, Skeena Region.

Tania Millen, B.Sc., Environmental Scientist, Skeena Region.

P. Sean McDonald, Ph.D., Research Scientist, University of Washington.

Peter Westley, Ph.D., Assistant Professor of Fisheries, University of Alaska Fairbanks.

Anne Beaudreau, Ph.D., Assistant Professor of Fisheries, University of Alaska Fairbanks.

Douglas A. Holdway, Ph.D., Canada Research Chair in Aquatic Toxicology, Professor, University of Ontario Institute of Technology.

Briony E.H. Penn, Ph.D., Adjunct Professor, University of Victoria.

Natalie Ban, Ph.D., Assistant Professor, School of Environmental Studies, University of Victoria.

Nick Gayeski, Ph.D., Aquatic Ecologist, Wild Fish Conservancy.

Jennifer Harding, Ph.D., Aquatic Ecologist.

Jack E. Williams, Ph.D., Senior Scientist, Trout Unlimited.

Travis G. Gerwing, Ph.D., Postdoctoral Fellow, University of Victoria.

Michelle C. Nelson, Ph.D., Fisheries Ecologist.

Brendan Connors, Ph.D., Senior Systems Ecologist, ESSA Technologies Ltd., Adjunct Professor, Simon Fraser University.

Lawrence Dill, Ph.D., Professor Emeritus, Simon Fraser University.

Bill McMillan, Fisheries Biologist, Wild Fish Conservancy.

Amy Haak, Ph.D., Conservation Biologist, Trout Unlimited.

Leslie M. Johnson, Ph.D., Professor, Athabasca University.

John E. McCosker, Ph.D., Chair of Aquatic Biology, Emeritus, California Academy of Sciences.

Eric Higgs, Ph.D., Professor, University of Victoria.

Paul C. Paquet, Ph.D., Senior Scientist, Raincoast Conservation Foundation, Adjunct Professor, University of Victoria.

Aaron C. Hill, M.Sc., Executive Director, Watershed Watch Salmon Society.

Heather Tallis, Ph.D., Chief Scientist, The Nature Conservancy, Adjunct Professor, University of California, Santa Cruz.

Richard A. Cunjak, Ph.D., Professor, University of New Brunswick.

Jeremy Kerr, Ph.D., University Research Chair in Macroecology and Conservation, Professor, University of Ottawa

Eduardo Martins, Ph.D., Liber Ero Postdoctoral Fellow, University of Waterloo.

Wyatt F. Cross, Ph.D., Associate Professor, Montana State University.

Hugh MacIsaac, Ph.D., Canada Research Chair Great Lakes Institute for Environmental Research, Professor, University of Windsor.

John McMillan, M.Sc., Steelhead Science Director, Trout Unlimited.

Emma J. Rosi-Marshall, Ph.D., Senior Scientist, Cary Institute of Ecosystem Studies.

Megan V. McPhee, Ph.D., Assistant Professor, University of Alaska Fairbanks.

Stan L. Proboszcz, M.Sc., Science Advisor, Watershed Watch Salmon Society.

Brian Cumming, Ph.D., Professor, Queen's University.

James A. Estes, Ph.D., Professor, University of California.

Andrew Whiteley, Ph.D., Assistant Professor, University of Montana.

Eric P. Palkovacs, Ph.D., Assistant Professor, University of California-Santa Cruz.

Michael Healey, Ph.D., Professor Emeritus, University of British Columbia.

Craig Orr, Ph.D., Conservation Advisor, Former Executive Director, Watershed Watch Salmon Society.

Andrew Hendry, Ph.D., Professor, McGill University.

Colden V. Baxter, Ph.D., Associate Professor, Idaho State University.

F. Richard Hauer, Ph.D., Professor and Director, Center for Integrated Research on the Environment, University of Montana.

Davide Latremouille, M.Sc., Fisheries Habitat Biologist, Skeena Fisheries Commission.

Emily Bernhardt, Ph.D., Professor, Duke University.

James K. Rowe, Ph.D., Assistant Professor, University of Victoria.

Eric M. Anderson, Ph.D., Faculty, British Columbia Institute of Technology.

Gail McCabe, Ph.D., University of Toronto.

Justin D. Yeakel, Ph.D., Assistant Professor, University of California.

Barrie Gilbert, Ph.D., Wildlife Ecologist, Former Professor, Utah State University.

Taal Levi, Ph.D., Assistant Professor, Oregon State University.

Nikolaus Gantner, Ph.D., Adjunct Professor, University of Northern British Columbia.

Claudia R. Copley, M.Sc., Biologist, Royal British Columbia Museum.

Jeff Stuart, Ph.D., Biological Sciences, Brock University.

Rachel Malison, Ph.D., Marie Curie Fellow and Research Ecologist, The Norwegian Institute for Nature Research.

Alejandro Frid, Ph.D., Science Coordinator/Ecologist, Central Coast Indigenous Resource Alliance.

Abby Lippman, Ph.D., Professor Emerita, McGill University.

Steven J. Cooke, Ph.D., Canada Research Chair in Fish Ecology and Conservation, Carlton University.

Faisal Moola, Ph.D., Adjunct Professor, Faculty of Environmental Studies, York University.

Richard Bailey, Ph.D., Microbial Geneticist (Retired).

M. Jake Vander Zanden, Ph.D., Professor, University of Wisconsin-Madison.

Alexander Shubin, M.Sc. Fisheries Biologist, Sakhalin Research Institute of Fisheries and Oceanography.

Ian C. Colquhoun, Ph.D., Associate Professor, Western University.

David Lesbarrères, Ph.D., Associate Professor, Laurentian University.

Alicia Fernando, B.Sc., Biologist, Gitksan Watershed Authorities.

Tessa Francis, Ph.D., Research Scientist, University of Washington.

Donna Macintyre, B.Sc., Fisheries Director, Lake Babine Nation.

Ian A. Fleming, Ph.D., Professor, Memorial University of Newfoundland.

Brett Favaro, Ph.D., Liber Ero conservation fellow, Memorial University of Newfoundland.

Patricia Gallaugher, Ph.D., Adjunct Professor, Simon Fraser University.

Victor Afanasiev, Ph.D., Russian Academy of Sciences.

S. Misty MacDuffee, B.Sc., Conservation Biologist, Raincoast Conservation Foundation.

Anne Salomon, Ph.D., Associate Professor, Simon Fraser University.

Arne Mooers, Ph.D., Professor, Simon Fraser University.

Walter Duffy, Ph.D., Adjunct Professor, Humboldt State University.

Walter Joseph, Fisheries Manager, Office of the Wet'suwet'en, Wet'suwet'en Nation.

John L. Largier, Ph.D., Professor, University of California Davis.

Lynne M. Quarmby, Ph.D., Professor, Simon Fraser University.

Wendy J. Palen, Ph.D., Associate Professor, Simon Fraser University.

### Citations

<sup>1</sup> Canadian Environmental Assessment Agency (CEAA). 2016. Pacific Northwest LNG draft environmental assessment report. Available: <u>http://www.ceaa.gc.ca/050/document-eng.cfm?document=104785</u>.

<sup>2</sup> Manzer, J.I. 1956. Distribution and movement of young Pacific salmon during early ocean residence. Fisheries Research Board Progress Report #106, 24-28.

<sup>3</sup> Higgins, R.J., and Shouwenburg, W.J. 1973. A biological assessment of fish utilization of the Skeena River estuary, with special reference to port development in Prince Rupert. Northern Operations Branch, Fisheries and Marine Service, Department of the Environment. Technical Report 1973-1.

<sup>4</sup> Hoos, L.M. 1976. The Skeena River estuary status of environmental knowledge to 1975. Report of the Estuary Working Group, Department of the Environment, Regional Board (Pacific Region). Special Estuary Series No. 3.

<sup>5</sup> Carr-Harris, C., Gottesfeld, A.S., and Moore, J.W. 2015. Juvenile salmon usage of the Skeena River estuary. PIOS one 10: e0118988.

<sup>6</sup> Moore, J.W., Carr-Harris, C., and Gordon, J. 2015. Salmon science as related to proposed development in the Skeena River estuary. Report to Lax Kw'alaams Band Council.

<sup>7</sup> Moore, J.W., Carr-Harris, C., Gottesfeld, A.S., MacIntyre, D., Radies, D., Barnes, C., Joseph, W., Williams, G., Gordon, J., and Shepert, B. 2015. Selling First Nations down the river. Science 349: 596.

<sup>8</sup> Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2016. Eulachon (*Thaleichthys pacificus*) Nass/Skeena River population. Available:

http://www.cosewic.gc.ca/eng/sct1/searchdetail e.cfm?id=1162&StartRow=161&boxStatus=All&boxTaxonomic= All&location=1&change=All&board=All&commonName=&scienceName=&returnFlag=0&Page=17.

<sup>9</sup> Pickard, D., Porter, M., Olson, E., Connors, B., Kellock, K., Jones, E., and Connors, K. 2015. Skeena River estuary assessment: technical report. Available: <u>http://skeenasalmonprogram.ca/library/lib\_433/.</u>

<sup>10</sup> McLaren, P., 2015. The environmental implications of sediment transport in the waters of Prince Rupert, British Columbia, Canada: a comparison between the kinematic and dynamic approaches. Journal of Coastal Research. *In-Press*. Available: <u>http://www.jcronline.org/doi/pdf/10.2112/JCOASTRES-D-15-00134.1</u>

<sup>11</sup> McLaren, P., 2015. An assessment of the "Supplemental Report for 3D Modelling Update" prepared by Hatch for PNWLNG, November 2015.

<sup>12</sup> Canadian Environmental Assessment Agency (CEAA). 2016. From Fisheries and Ocean Canada and Natural Resources Canada to the Canadian Environmental Assessment Agency re: request for advice and comments on Pacific Northwest LNG Ltd.'s November 10, 2015 submission. Available: http://www.ceaa.gc.ca/050/document-eng.cfm?document=104462.

<sup>13</sup> Rey Benayas, J.M., Newton, A.C., Diaz, A. and Bullock, J.M. 2009. Enhancement of biodiversity and ecosystem services by ecological restoration: a meta-analysis. Science 325: 1121-1124.

<sup>14</sup> Magnusson, A. and Hilborn, R. 2003. Estuarine influence on survival rates of coho (*Oncorhynchus kisutch*) and chinook salmon (*Oncorhynchus tshawytscha*) released from hatcheries on the U.S. Pacific coast. Estuaries 26: 1094-1103.

<sup>15</sup> Meador, J.P. 2014. Do chemically contaminated river estuaries in Puget Sound (Washington, USA) affect the survival rate of hatchery-reared Chinook salmon? Canadian Journal of Fisheries and Aquatic Sciences 71: 162-180.