

**JOINT REVIEW PANEL FOR THE ENBRIDGE  
NORTHERN GATEWAY PROJECT  
COMMISSION D'EXAMEN CONJOINT DU PROJET  
ENBRIDGE NORTHERN GATEWAY**



**Hearing Order OH-4-2011  
Ordonnance d'audience OH-4-2011**

**Northern Gateway Pipelines Inc.  
Enbridge Northern Gateway Project  
Application of 27 May 2010**

**Demande de Northern Gateway Pipelines Inc.  
du 27 mai 2010 relative au projet  
Enbridge Northern Gateway**

**VOLUME 166**

**Hearing held at  
Audience tenue à**

**Chances Prince Rupert  
240 West, 1<sup>st</sup> Avenue  
Prince Rupert, British Columbia**

**April 11, 2013  
Le 11 avril 2013**

**International Reporting Inc.  
Ottawa, Ontario  
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as represented by the Minister of the Environment  
and the National Energy Board

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participant à l'audience publique.

Imprimé au Canada

HEARING /AUDIENCE

OH-4-2011

IN THE MATTER OF an application filed by the Northern Gateway Pipelines Limited Partnership for a Certificate of Public Convenience and Necessity pursuant to section 52 of the *National Energy Board Act*, for authorization to construct and operate the Enbridge Northern Gateway Project.

**HEARING LOCATION/LIEU DE L'AUDIENCE**

Hearing held in Prince Rupert (British Columbia), Thursday, April 11, 2013  
Audience tenue à Prince Rupert (Colombie-Britannique), jeudi, le 11 avril 2013

**JOINT REVIEW PANEL/LA COMMISSION D'EXAMEN CONJOINT**

S. Leggett	Chairperson/Présidente
K. Bateman	Member/Membre
H. Matthews	Member/Membre

## APPEARANCES/COMPARUTIONS

(i)

### APPLICANT/DEMANDEUR

Northern Gateway Pipelines Inc.

- Mr. Richard A. Neufeld, Q.C.
- Mr. Ken MacDonald
- Mr. Bernie Roth
- Ms. Laura Estep
- Ms. Kathleen Shannon
- Mr. Dennis Langen
- Mr. Douglas Crowther

### INTERVENORS/INTERVENANTS

Alberta Federation of Labour

- Ms. Leanne Chahley

Alberta Lands Ltd.

- Mr. Darryl Carter

Alexander First Nation

- Ms. Caroline O'Driscoll

BC Nature and Nature Canada

- Mr. Chris Tollefson
- Mr. Anthony Ho
- Ms. Natasha Gooch

Doug Beckett

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- Ms. Elizabeth Graff
- Mr. Christopher R. Jones

Nathan Cullen

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- Mr. Chris Peter

Canadian Association of Petroleum Producers (CAPP)

- Mr. Keith Bergner
- Mr. Lewis L. Manning

Cenovus Energy Inc., Nexen Inc., Suncor Energy Marketing Inc.,  
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- Mr. Don Davies

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- Guujaaw

Daiya-Mattess Keyoh

- Mr. Kenny Sam
- Mr. Jim Munroe

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- Mr. Murray Minchin
- Ms. Cheryl Brown
- Mr. Kelly Marsh
- Mr. Manny Arruda
- Mr. Dave Shannon

Driftpile Cree Nation

- Mr. Aryn F. Lalji

Enoch Cree Nation, Ermineskin Cree Nation and Samson Cree Nation

- Mr. Allan Stonhouse
- Mr. Markel Chernenkoff
- Mr. G. Rangi Jeerakathil

ForestEthics Advocacy, Living Oceans Society  
and Raincoast Conservation Foundation - "The Coalition"

- Mr. Barry Robinson
- Mr. Tim Leadem, Q.C.
- Ms. Sasha Russell
- Ms. Karen Campbell

Fort St. James, District of

- Mr. Kevin Crook

Fort St. James Sustainability Group

- Mr. Lawrence Shute
- Ms. Brenda Gouglas
- Ms. Kandace Kerr

Friends of Morice-Bulkley

- Ms. Dawn Remington
- Mr. Richard Overstall

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- Mr. Michael Ross
- Ms. Krystle Tan

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**(Continued/Suite)**

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- Ms. Virginia Mathers
- Ms. Leslie Beckmann

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- Mr. Evan W. Dixon
- Mr. Ron Kruhlak

Government of Canada

- Mr. James Shaw
- Ms. Dayna Anderson
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Haisla Nation

- Ms. Jennifer Griffith
- Ms. Hana Boye
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- Mr. Allan Donovan
- Mr. Michael Gordon
- Ms. Gillian Bakker

Heiltsuk Tribal Council

- Ms. Carrie Humchitt
- Mr. Benjamin Ralston
- Ms. Lisa Fong

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Kitimat Valley Naturalists

- Mr. Walter Thorne
- Mr. Dennis Horwood
- Ms. April MacLeod
- Mr. Ken Maitland

MEG Energy Corp.

- Mr. Loyola Keough
- Mr. David A. McGillivray

Michel First Nation

- Acting Chief Gil Goerz
- Ms. Tracy Campbell

**APPEARANCES/COMPARUTIONS**  
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- Ms. Patricia Moss

Office of the Wet'suwet'en

- Mr. Mike Ridsdale

- Mr. David De Wit

- Chief Namoks (John Ridsdale)

Swan River First Nation

- Mr. Jay Nelson

- Ms. Dominique Nouvet

United Fishermen and Allied Workers' Union

- Ms. Joy Thorkelson

- Mr. Hugh Kerr

Terry Vulcano

Dr. Josette Wier

**National Energy Board/Office national de l'énergie**

- Mr. Andrew Hudson

- Ms. Carol Hales

- Ms. Rebecca Brown

- Mr. Asad Chaudhary

- Mr. Neil Patterson

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**Living Oceans/Raincoast Panel  
Examination by Mr. Leadem**

--- Upon commencing at 8:30 a.m./L'audience débute à 8h30

14203.           **THE CHAIRPERSON:** Good morning, everyone.

14204.           Do -- are there any preliminary matters to raise this morning?

--- (No response/Aucune réponse)

14205.           **THE CHAIRPERSON:** Seeing none, good morning, Mr. Leadem. I see that you have the Living Oceans Society and the Raincoast Conservation Foundation Panel already seated. Thank you very much.

14206.           **MR. LEADEM:** Yes. Thank you, Madam Chair. It's a pleasure to be back here.

14207.           When I woke this morning and I saw the fresh dusting of snow, I thought maybe I was in a time warp and I was -- the last time I was before you was back in December, and I was getting ready to cross-examine Mr. Green and -- and I don't think I'll have that chance again.

14208.           But to my right, I wanted to introduce Ms. Karen Wristen, who is the Executive Director of Living Oceans Society. And the panel I'll introduce to you, going from your left to right. Mr. Michael Jasny, Ms. Caroline Fox, Mr. Andrew Rosenberger, Ms. Misty MacDuffee, Dr. Paul Paquet, Ms. Katie Terhune and Mr. Brian Falconer. They're prepared to be sworn in.

14209.           **THE CHAIRPERSON:** Thank you, Mr. Leadem.

14210.           Ms. Niro, would you please proceed?

**MICHAEL JASNY: Affirmed**

**CAROLINE FOX: Sworn**

**ANDREW ROSENBERGER: Sworn**

**MISTY MacDUFFEE: Sworn**

**PAUL PAQUET: Sworn**

**KATIE TERHUNE: Sworn**

**BRIAN FALCONER: Sworn**

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**--- EXAMINATION BY/INTERROGATOIRE PAR MR. LEADEM:**

14211.           **MR. LEADEM:** Thank you, Madam Chair.
14212.           I'm going to begin with Dr. Paquet. Dr. Paquet was previously introduced to you in Prince George and at that time was accepted to give opinion evidence in the areas of wildlife biology and ecology.
14213.           Dr. Paquet, I'll refer you to Exhibits D170-2-06 through 08, inclusively, as well as D172-14, D172-16 through 19, inclusively, and D170-2-21 and 22, which together comprises Parts 2 through 7 of the written evidence of the Raincoast Conservation Foundation.
14214.           Were these documents prepared under your direction and control?
14215.           **DR. PAUL PAQUET:** Yes, they were.
14216.           **MR. LEADEM:** Is the information and the documents accurate, to the best of your knowledge and belief?
14217.           **DR. PAUL PAQUET:** Yes, it is.
14218.           **MR. LEADEM:** Were there any changes or errors that were noted in the -- in those documents?
14219.           **DR. PAUL PAQUET:** There are errors, and I have an errata sheet.
14220.           **MR. LEADEM:** Would you just simply run through the errata sheet and read those errors into the record then?
14221.           **DR. PAUL PAQUET:** Yes, I can do that.
14222.           This refers to Exhibit D170-2-06, "Marine Mammal Impacts", Part 2-1, and that's first on Adobe page 24, paragraph 41. And it's a correction in a paragraph. That paragraph begins:
- "Between 2004 and 2008, the Raincoast Conservation Foundation..."*
14223.           If you have located that. And further down, we refer to "St. Thomas

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University”. And the correction should be “St. Andrews University”.

14224. The next is, again, Exhibit D170-2-06, "Marine Mammal Impacts", Part 2-1, Adobe page 32. And it's a caption figure, and it requires a minor clarification, (a), that reads "comparison between density of all marine mammal species" should read (b) "comparison between density of cetaceans".

14225. The next is, again, Exhibit D170-2-07, "Marine Mammal Impacts", Part 2-2, Adobe page 1, paragraph 53, and it reads -- I need to correct this:

*"Although only five carcasses were ever found, these whales [were] almost certainly dead."*

14226. I think that's implied -- and should read:

*"Although only five carcasses were ever found, the other 10 whales are almost certainly dead." (As read)*

14227. If we have that.

14228. Again, Exhibit D170-2-16, for salmonids, Part 4, and that's Adobe page 17, paragraph 30. It reads:

*"The decision to exclude compounds..."*

14229. And then it should read -- what was our correction there? We -- yes, it's micrograms to kilograms. So that's the correction there, right before the Enbridge.

14230. Let me recorrect that. It should be changing grams to kilograms.

14231. **MR. LEADEM:** So it should read now “1 milligram per kilogram”?

14232. **DR. PAUL PAQUET:** That's correct. Yeah.

14233. Additional error is in Exhibit D170-2-08, Adobe page 8, paragraph 86, line 4. Citation 82 is incorrect citation, and the proper citation is as follows, and I'll read this in full, I think. It should be:

*"Monson, D.H., D.F. Do Duek, B.E. Bellachey and J.L. Bodkin.*

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*[And that's] 2011. [The title] 'Could Residual Oil from the Exxon Valdez Spill Create a Long-Term Population Sink for Sea Otters in Alaska?' [And that's] Ecological Applications [21] -- Volume 21 [and] pages 2917 through 2932." (As read)*

14234.           **MR. LEADEM:** And subject to those changes, do you accept and adopt the documents as corrected as your evidence in this proceeding?
14235.           **DR. PAUL PAQUET:** Yes, I do.
14236.           **MR. LEADEM:** I refer you to information responses that were filed on behalf of Raincoast Conservation Foundation, Exhibit D170-3-02. The specific responses were to Information Request Number 1.1 through 1.4 inclusively.
14237.           Is the information in those documents accurate to the best of your knowledge and belief?
14238.           **DR. PAUL PAQUET:** Yes, the information is correct.
14239.           **MR. LEADEM:** And were you responsible for preparing the responses?
14240.           **DR. PAUL PAQUET:** Yes, I was.
14241.           **MR. LEADEM:** And do you accept and adopt that information as your evidence in this proceeding?
14242.           **DR. PAUL PAQUET:** I do.
14243.           **MR. LEADEM:** Mr. Jasny, I'll turn next to you.
14244.           You have a Bachelor of Arts degree from Yale University?
14245.           **MR. MICHAEL JASNY:** Yes, I do.
14246.           **MR. LEADEM:** And a jurist doctorate degree from Harvard Law School?
14247.           **MR. MICHAEL JASNY:** Yes.

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14248.           **MR. LEADEM:** You're a graduate fellow at the University of California, Los Angeles?
14249.           **MR. MICHAEL JASNY:** Yes, I was.
14250.           **MR. LEADEM:** Since 1995, you have worked with the Natural Resources Defense Council in Los Angeles and Vancouver and are now a senior policy analyst and a director of that organization's marine mammal project?
14251.           **MR. MICHAEL JASNY:** That's correct.
14252.           **MR. LEADEM:** Throughout that time, you have engaged in policy development on the impact of underwater noise on marine mammals?
14253.           **MR. MICHAEL JASNY:** Yes, I have.
14254.           **THE CHAIRPERSON:** Mr. Leadem, I would just say that the CVs are on file, so there's no need to summarize the expertise of the evidence of the experts or of the witnesses that you are presenting. You can just ---
14255.           **MR. LEADEM:** Okay.
14256.           **.THE CHAIRPERSON:** --- refer to their CVs.
14257.           **MR. LEADEM:** Thank you.
14258.           **THE CHAIRPERSON:** Thank you.
14259.           **MR. LEADEM:** I refer you to Exhibit D170-2-13. Was this document prepared under your direction and control?
14260.           **MR. MICHAEL JASNY:** Could you clarify; is this the submission of NRDC?
14261.           **MR. LEADEM:** Yes, it's the Submission of the National Resources Defense Council to the Enbridge Northern Gateway Project Joint Review Panel Regarding Underwater Noise Impacts from Northern Gateway Tanker Traffic.
14262.           **MR. MICHAEL JASNY:** Then the answer is yes.

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14263.           **MR. LEADEM:** Is the information in the document accurate to the best of your knowledge and belief?
14264.           **MR. MICHAEL JASNY:** Yes, it is.
14265.           **MR. LEADEM:** And do you accept and adopt this evidence as your evidence in this proceeding?
14266.           **MR. MICHAEL JASNY:** I do.
14267.           **MR. LEADEM:** I refer you to Information Request D170-3-02, Information Response 1.5; did you prepare that?
14268.           **MR. MICHAEL JASNY:** Yes, I did.
14269.           **MR. LEADEM:** And do you adopt that as your evidence in this proceeding?
14270.           **MR. MICHAEL JASNY:** I do.
14271.           **MR. LEADEM:** And finally, Exhibit D66-22-10, your curriculum vitae.
14272.           You prepared this document, obviously?
14273.           **MR. MICHAEL JASNY:** Yes, I did.
14274.           **MR. LEADEM:** And do you accept and adopt this document as your evidence?
14275.           **MR. MICHAEL JASNY:** I do.
14276.           **MR. LEADEM:** Ms. Fox, I'll turn to you next.
14277.           I refer you to Exhibit D170-2-14. It's Part 3 of the Written Evidence of the Raincoast Conservation Foundation entitled "Marine Impacts - Marine Birds".
14278.           Did you prepare this document?

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14279.           **MS. CAROLINE FOX:** I did.
14280.           **MR. LEADEM:** Do you accept and adopt this document as your evidence in the proceeding?
14281.           **MS. CAROLINE FOX:** I do.
14282.           **MR. LEADEM:** With respect to document D170-02-06, 07 and 08, dealing with marine mammals, did you assist in the data collection and modelling format for that particular aspect of the evidence?
14283.           **MS. CAROLINE FOX:** I did.
14284.           **MR. LEADEM:** I refer you to Exhibit D170-2-18, Part 5 of the Written Evidence of Raincoast. It's entitled "Marine Impacts - Herring".
14285.           Did you prepare this document?
14286.           **MS. CAROLINE FOX:** I did.
14287.           **MR. LEADEM:** Do you accept and adopt this document as your evidence in this proceeding?
14288.           **MS. CAROLINE FOX:** I do.
14289.           **MR. LEADEM:** With respect to information responses, I refer you to D170-3-02, Information Responses to Requests 1.6, 1.16 and 1.17; did you prepare those responses?
14290.           **MS. CAROLINE FOX:** I did.
14291.           **MR. LEADEM:** And do you adopt those responses as your evidence in these proceedings?
14292.           **MS. CAROLINE FOX:** Yes, I do.
14293.           **MR. LEADEM:** And finally, Exhibit D66-22-4, your curriculum vitae; you prepared this?

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14294.           **MS. CAROLINE FOX:** I did.
14295.           **MR. LEADEM:** And is it accurate to the best of your knowledge and belief?
14296.           **MS. CAROLINE FOX:** It is, with the exception that I have three additional manuscripts and peer review.
14297.           **MR. LEADEM:** And what is that manuscript?
14298.           **MS. CAROLINE FOX:** There is one manuscript on marine birds and modelling, a second that relates to ---
14299.           **MR. LEADEM:** Could you just speak up a little bit?
14300.           **THE CHAIRPERSON:** I was going to say ---
14301.           **MR. LEADEM:** Maybe move the microphone closer.
14302.           **THE CHAIRPERSON:** --- Ms. Fox, would you perhaps pull your microphone a little closer?
14303.           **MS. CAROLINE FOX:** Yes, I can do that.
14304.           **THE CHAIRPERSON:** Thank you.
14305.           **MS. CAROLINE FOX:** A second that relates to salmon and its influence in the forest, and a third that relates to Pacific herring spawns and their influence in the intertidal.
14306.           **THE CHAIRPERSON:** And Ms. Fox, we're just going to have to ask you when you're speaking to speak a little more clearly so we can make sure that the transcript is able to capture your words.
14307.           **MS. CAROLINE FOX:** I'll try, thank you.
14308.           **THE CHAIRPERSON:** Thank you.
14309.           **MR. LEADEM:** Did we pick up on that, on her response?

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14310.           **THE CHAIRPERSON:** I think we're fine, but just going forward it'll make it much easier for ---
14311.           **MR. LEADEM:** Thank you.
14312.           **THE CHAIRPERSON:** --- the interpreters and the people doing the transcript if everybody can speak ---
14313.           **MR. LEADEM:** Thank you, Madam Chair.
14314.           **THE CHAIRPERSON:** --- clearly and slowly.
14315.           **MR. LEADEM:** And you accept and adopt your curriculum vitae with that addition as your evidence in this proceeding?
14316.           **MS. CAROLINE FOX:** Yes, I do.
14317.           **MR. LEADEM:** Mr. Rosenberger, I refer you to Exhibits D170-2-06 through 08, which are Part 2 of the Written Evidence of Raincoast Conservation Foundation entitled "Marine Impacts - Marine Mammals".
14318.           Did you assist in the preparation of these documents?
14319.           **MR. ANDREW ROSENBERGER:** Yes, I did, jointly with Dr. Paquet and Misty.
14320.           **MR. LEADEM:** Ms. MacDuffee?
14321.           **MR. ANDREW ROSENBERGER:** Ms. MacDuffee. Sorry.
14322.           **MR. LEADEM:** And do you accept and adopt these documents as your evidence in this proceeding?
14323.           **MR. ANDREW ROSENBERGER:** I do.
14324.           **MR. LEADEM:** I refer you to Exhibits D170-2-21 and D170-2-22, Part 7 of the Written Evidence of Raincoast Conservation Foundation entitled "Tanker Risks".
14325.           Were these documents prepared under your assistance and control?

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14326.           **MR. ANDREW ROSENBERGER:** Yes, they were prepared jointly with Dr. Paquet, Ms. MacDuffee, and Mr. Falconer.
14327.           **MR. LEADEM:** And do you accept and adopt the documents as your evidence in this proceeding?
14328.           **MR. ANDREW ROSENBERGER:** I do.
14329.           **MR. LEADEM:** And I refer you to your curriculum vitae, Exhibit D66-22-02.
14330.           Did you prepare this document?
14331.           **MR. ANDREW ROSENBERGER:** I did.
14332.           **MR. LEADEM:** And is it accurate to the best of your knowledge?
14333.           **MR. ANDREW ROSENBERGER:** It is.
14334.           **MR. LEADEM:** And do you accept and adopt this document as your evidence?
14335.           **MR. ANDREW ROSENBERGER:** I do.
14336.           **MR. LEADEM:** I neglected with Ms. Fox to go -- sorry, Mr. Rosenberger; I'm finished with you. Could we go back to Ms. Fox?
14337.           There was an information request that I need to make sure that we've tidied up here. The information request is Exhibit D170-3-02. It's Raincoast Conservation Foundation's response to Northern Gateway Information Request Number 1, Responses 1.6, 1.16 and 1.17.
14338.           Were you responsible for preparing those responses?
14339.           **MS. CAROLINE FOX:** I was, in collaboration with people on this panel.
14340.           **MR. LEADEM:** And do you adopt that evidence as your evidence in this proceeding?

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14341.           **MS. CAROLINE FOX:** I do.
14342.           **MR. LEADEM:** Ms. MacDuffee, I turn to you next. I refer you to exhibits D170-2-06 through 08 inclusively, which are Part 2 of the written evidence of Raincoast Conservation Foundation entitled “Marine Impacts Marine Mammals”.
14343.           Did you assist in the preparation of these documents?
14344.           **MS. MISTY MacDUFFEE:** I did. I prepared them jointly with Dr. Paquet and Mr. Rosenberger.
14345.           **MR. LEADEM:** Do you accept and adopt these documents as your evidence in these proceedings?
14346.           **MS. MISTY MacDUFFEE:** I do.
14347.           **MR. LEADEM:** I refer you to Exhibits D170-2-16 and 17, which are Part 4 of the written evidence of Raincoast Conservation Foundation entitled “Maine Impacts Salmonids”.
14348.           Were these documents prepared under your direction and control?
14349.           **MS. MISTY MacDUFFEE:** They were, in collaboration with Dr. Paquet and Mr. Rosenberger.
14350.           **MR. LEADEM:** And do you accept and adopt these documents as your evidence in these proceedings, subject to the corrections that Dr. Paquet put into the record earlier?
14351.           **MS. MISTY MacDUFFEE:** I do.
14352.           **MR. LEADEM:** I refer you to Exhibits D170-2-21 and D170-2-22, which are Part 7 of the written evidence of Raincoast Conservation. This part is entitled “Tanker Risks”.
14353.           Did you assist in the preparation of those documents?
14354.           **MS. MISTY MacDUFFEE:** I did, again in collaboration with Dr.

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Paquet, Mr. Rosenberger and Mr. Falconer.

14355.           **MR. LEADEM:** And do you accept and adopt those documents as your evidence in the proceeding?
14356.           **MS. MISTY MacDUFFEE:** I do.
14357.           **MR. LEADEM:** Exhibit D170-2-11, which is an attachment to Part 2 of the written evidence of Raincoast Conservation. It's entitled "Predicative Marine Modeling for Queen Charlotte Basin, British Columbia".
14358.           Did you assist in the preparation of this document?
14359.           **MS. MISTY MacDUFFEE:** That document was prepared for the Raincoast Conservation Foundation by Dr. Patrick Halpin and Ben Best at Duke University's geospatial lab, and it was prepared for Raincoast to describe our survey methodology and results.
14360.           **MR. LEADEM:** Do you accept and adopt this document as your evidence in this proceeding?
14361.           **MS. MISTY MacDUFFEE:** I do.
14362.           **MR. LEADEM:** Next is Exhibit D170-2-12, which is an attachment to Part 2 of the written evidence of Raincoast. It's entitled "What's at Stake: The Cost of Oil on British Columbia's Priceless Coast".
14363.           Was this document prepared under your direction and control?
14364.           **MS. MISTY MacDUFFEE:** It was, in collaboration with my colleagues.
14365.           **MR. LEADEM:** And have you reviewed and are you fully familiar with the content of this document?
14366.           **MS. MISTY MacDUFFEE:** I am.
14367.           **MR. LEADEM:** Do you accept and adopt this document as your evidence in this proceeding?

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14368.           **MS. MISTY MacDUFFEE:** I do.
14369.           **MR. LEADEM:** With respect to information -- responses to information requests of Northern Gateway Number 1, I refer you to D170-3-02, information responses to Request Number 1.7 through 1.15 inclusively, Exhibit D170-3-10, Schedule H, and Exhibit D170-3-13, Schedule K.
14370.           Were these documents prepared under your direction and control?
14371.           **MS. MISTY MacDUFFEE:** They were, yes.
14372.           **MR. LEADEM:** And do you accept these documents as your evidence?
14373.           **MS. MISTY MacDUFFEE:** I do.
14374.           **MR. LEADEM:** Ms. Terhune, you are with Living Oceans Society.
14375.           **MS. KATIE TERHUNE:** That's correct. I used to be a full-time employment of Living Oceans and I'm currently working as a contractor for the organization.
14376.           **MR. LEADEM:** Okay. Keep your voice up and pull the microphone a bit closer to you so that we can make sure that we hear your evidence. Thank you.
14377.           I refer you to Exhibit D122-02. It's the written evidence of Living Oceans Society. And I refer you to Section 6.0 through 6.7 of that document.
14378.           Were those sections prepared under your direction and control?
14379.           **MS. KATIE TERHUNE:** Yes.
14380.           **MR. LEADEM:** Do you accept and adopt those sections as your evidence in this proceeding?
14381.           **MS. KATIE TERHUNE:** Yes.
14382.           **MR. LEADEM:** I refer you to Exhibit D122-7-11. It's a report entitled "Tanker Technology Limitations of Double Hulls".

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14383. Did you prepare this report?
14384. **MS. KATIE TERHUNE:** Yes.
14385. **MR. LEADEM:** Is it accurate, to the best of your knowledge and belief?
14386. **MS. KATIE TERHUNE:** Yes.
14387. **MR. LEADEM:** And do you accept and adopt this document as your evidence in the proceeding?
14388. **MS. KATIE TERHUNE:** I do.
14389. **MR. LEADEM:** Next is Exhibit D122-7-12. It's a map titled "Proposed Tanker Routes and Tidal Currents".
14390. Was this map prepared under your direction and control?
14391. **MS. KATIE TERHUNE:** Yes.
14392. **MR. LEADEM:** Do you accept and adopt this document as your evidence in this proceeding?
14393. **MS. KATIE TERHUNE:** Yes.
14394. **MR. LEADEM:** Exhibit D122-7-13. It's a report entitled "Preliminary Mechanical Response Gap Analysis for the Enbridge Northern Gateway Project".
14395. Was this report prepared under your direction and control?
14396. **MS. KATIE TERHUNE:** Yes.
14397. **MR. LEADEM:** And do you accept and adopt this document as your evidence in this proceeding?
14398. **MS. KATIE TERHUNE:** Yes.

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14399.           **MR. LEADEM:** Next is Exhibit D122-7-19. It's a report entitled "Financial Vulnerability Assessment: Who Would Pay for Oil Tanker Spills Associated with the Northern Gateway Pipeline".
14400.           Was this report prepared for Living Oceans Society at your request?
14401.           **MS. KATIE TERHUNE:** Yes.
14402.           **MR. LEADEM:** Have you reviewed the report and are you fully familiar with the contents of the report?
14403.           **MS. KATIE TERHUNE:** Yes.
14404.           **MR. LEADEM:** Is the information in this report accurate, to the best of your knowledge and belief?
14405.           **MS. KATIE TERHUNE:** Yes.
14406.           **MR. LEADEM:** Do you accept and adopt this document as your evidence?
14407.           **MS. KATIE TERHUNE:** Yes.
14408.           **MR. LEADEM:** Your written evidence also attaches Exhibit D122-7-14, which is the 2010 report of the Federal Commissioner of the Environment and Sustainable Development. You're obviously not the author of that report.
14409.           **MS. KATIE TERHUNE:** No, I'm not.
14410.           **MR. LEADEM:** What did you do, if anything, to the report, or what was the purpose for it?
14411.           **MS. KATIE TERHUNE:** I merely provided a summary of the main conclusions from that report that I feel are relevant for these Panel hearings.
14412.           **MR. LEADEM:** Your written evidence also attaches Exhibits D122-7-15 through D122-7-18 inclusively, which together are the 2009 status report of the Exxon Valdez Oil Spill Trustee Council. Is that right?
14413.           **MS. KATIE TERHUNE:** Yes.

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14414.           **MR. LEADEM:** And obviously, you're not the author of that report.
14415.           **MS. KATIE TERHUNE:** No, I'm not.
14416.           **MR. LEADEM:** And what is the purpose of including those reports in your evidence?
14417.           **MS. KATIE TERHUNE:** Again, I provided a summary of the main conclusions from the 2009 status report to highlight some of the ongoing concerns with the oil spill from the Exxon Valdez in Prince William Sound that are ongoing to this day.
14418.           **MR. LEADEM:** With respect to information responses, I refer you to Exhibit D122-17-02, Living Oceans Society response to Northern Gateway Information Request Number 1, responses numbers 1.5, 1.6 and 1.12.
14419.           Did you prepare those responses?
14420.           **MS. KATIE TERHUNE:** Yes.
14421.           **MR. LEADEM:** And do you adopt those responses as your evidence in these proceedings?
14422.           **MS. KATIE TERHUNE:** Yes.
14423.           **MR. LEADEM:** And finally, I refer you to Exhibit D66-22-8, which is your curriculum vitae. Did you prepare this?
14424.           **MS. KATIE TERHUNE:** Yes.
14425.           **MR. LEADEM:** And do you accept and adopt this document as your evidence in this proceeding?
14426.           **MS. KATIE TERHUNE:** I do.
14427.           **MR. LEADEM:** And I finally come to you, Mr. Falconer. I refer you to Exhibits D170-2-21, D170-2-22, which are Part 7 of the written evidence of the Raincoast Conservation Foundation. It's entitled "Tanker Risks".

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14428. Did you assist in the preparation of these documents?
14429. **MR. BRIAN FALCONER:** I did, in collaboration with Mr. Rosenberger, Ms. MacDuffee and Dr. Paquet.
14430. **MR. LEADEM:** Do you accept and adopt these documents as your evidence in this proceeding?
14431. **MR. BRIAN FALCONER:** Yes, I do.
14432. **MR. LEADEM:** I refer you to Exhibit D66-22-3, which is your curriculum vitae. Was this document prepared under your direction and control?
14433. **MR. BRIAN FALCONER:** Yes, it was.
14434. **MR. LEADEM:** Are you aware of any errors in this document?
14435. **MR. BRIAN FALCONER:** No.
14436. **MR. LEADEM:** And is it accurate, to the best of your knowledge and belief?
14437. **MR. BRIAN FALCONER:** Yes, it is.
14438. **MR. LEADEM:** And do you accept and adopt this document as your evidence in this proceeding?
14439. **MR. BRIAN FALCONER:** I do.
14440. **MR. LEADEM:** Now, with respect to qualifications as experts, Madam Chair, I did not lead them through their CVs. I intend to -- as I noted in the introduction, Dr. Paquet was -- already been accepted as an expert by this Panel. I intend to continue that -- his expertise through the questioning that follows. I don't know whether there's any issue with respect to that with my learned friends or not.
14441. **MS. ESTEP:** No issue with respect to Dr. Paquet.
14442. **MR. LEADEM:** With respect to the other witnesses, I intend to proffer Ms. MacDuffee as an expert in salmonid ecology and biology; Ms. Fox as

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- an expert in biology of marine birds and herring, and those are the two.
14443.           **THE CHAIRPERSON:** Those are the two experts ---
14444.           **MR. LEADEM:** Yes.
14445.           **THE CHAIRPERSON:** --- that you're bringing forward?
14446.           And I can confirm that we have not received any objections to qualifying any of the experts being seated on this panel. Are there any -- are there any comments at this point, Ms. Estep?
14447.           **MS. ESTEP:** No objection to those qualifications.
14448.           **THE CHAIRPERSON:** I just wanted to be clear, is Dr. Paquet being offered as an expert to speak on the same areas of expertise that he was qualified for ---
14449.           **MR. LEADEM:** Yes.
14450.           **THE CHAIRPERSON:** --- in Prince George?
14451.           **MR. LEADEM:** Wildlife biology.
14452.           **THE CHAIRPERSON:** I just want to be clear on that.
14453.           **MR. LEADEM:** I think he was qualified, if you just bear with me a moment, I'll refer back to the transcript.
14454.           He was accepted by you, Madam Chair, to give expert opinion evidence in the areas of wildlife biology and wildlife ecology.
14455.           **THE CHAIRPERSON:** And I just wanted to confirm that those were still the areas that you were offering him ---
14456.           **MR. LEADEM:** Yes.
14457.           **THE CHAIRPERSON:** --- to be referred to as an expert.

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14458.           **MR. LEADEM:** Yes.
14459.           **THE CHAIRPERSON:** Thank you.
14460.           And so the other two, just to be clear were Ms. Fox?
14461.           **MR. LEADEM:** Yes, Ms. Fox and Ms. MacDuffee.
14462.           **THE CHAIRPERSON:** And Ms. MacDuffee, thank you very much.
14463.           The Panel accepts Dr. Paquet to continue to provide opinion evidence in the areas that you've identified and that he was qualified for in Prince George. The Panel also accepts Ms. MacDuffee and Ms. Fox to give opinion evidence in the areas that you've identified.
14464.           **MR. LEADEM:** Thank you.
14465.           This panel is available now for questioning.
14466.           **THE CHAIRPERSON:** Thank you, Mr. Leadem.
14467.           Ms. Estep?
- EXAMINATION BY/INTERROGATOIRE PAR MS. ESTEP:**
14468.           **MS. ESTEP:** Thank you, Madam Chair, good morning.
14469.           Good morning, witnesses. My name is Laura Estep and I'm counsel for Northern Gateway and with me is Mr. Jeff Green; he'll be assisting me.
14470.           So most of my questions will be for the Raincoast witnesses and I'm simply going to refer to Raincoast Conservation Foundation as Raincoast throughout my questions.
14471.           Ms. MacDuffee, you're the -- you are a board member and Vice-Chair of Raincoast?
14472.           **THE CHAIRPERSON:** And -- and so you'll need -- everybody, you need to press the button on your mic before you speak and when the red light comes on, you're good to go. Thank you.

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14473.           **MS. MISTY MacDUFFEE:** Yes, that's correct.
14474.           **MS. ESTEP:** And you are authorized to speak on behalf of Raincoast in this proceeding on matters of policy?
14475.           **MS. MISTY MacDUFFEE:** Our Executive Director actually has the -- the authority to -- to do that.
14476.           **MS. ESTEP:** So your answer is no?
14477.           **MS. MISTY MacDUFFEE:** No, I don't have the authority to speak solely on behalf of the organization.
14478.           **MS. ESTEP:** Does anyone else on the panel have that authority?
14479.           **DR. PAUL PAQUET:** The answer would be no.
14480.           **MS. ESTEP:** Now, my colleague, Mr. Neufeld, questioned Dr. Darimont and Dr. Paquet on Part 1 of Raincoast's written evidence in Prince George. So I'd like to start with Part 2 of Raincoast's written evidence on marine mammals and specifically Exhibit D170-2-6.
14481.           **THE CHAIRPERSON:** Ms. Estep, if we could ask you to pull your mic a little closer too please.
14482.           **MS. ESTEP:** Closer.
14483.           **THE CHAIRPERSON:** Thank you.
14484.           **MS. ESTEP:** So Ms. MacDuffee, what portions of that evidence did you author? I know that you went through your direct evidence, but I just want to be clear on which portions were authored by who?
14485.           **MS. MISTY MacDUFFEE:** They were authored under the direction of Dr. Paquet in -- in terms of specific areas. I wouldn't say that I solely authored any one specific area.
14486.           **MS. ESTEP:** Okay, I'm just trying to get an understanding of how the document was prepared. So was it drafted by Dr. Paquet in the most part and

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- then other people had review over it or certain people drafted certain parts and it all came together at the end of the day? What was the process?
14487.           **MS. MISTY MacDUFFEE:** I would say the latter; certain people drafted certain parts. It all came together at the end of the day. It went through several iterations and reviews by the time it became a final document.
14488.           **MS. ESTEP:** Okay. And you said that you didn't author any particular portion. So you were responsible for reviewing the -- the completed document?
14489.           **MS. MISTY MacDUFFEE:** I would say Dr. Paquet had the authority to review the final document.
14490.           **MS. ESTEP:** Okay. So what portions did you author?
14491.           **MS. MISTY MacDUFFEE:** I would have to say it was a collaborative effort and I was a contributor.
14492.           **MS. ESTEP:** So -- but you had the pen and you were drafting portions of the document?
14493.           **MS. MISTY MacDUFFEE:** We would have to go over many iterations of the document to see, in track changes and reviewing and what was said and then what was corrected or rewritten or -- so I would have to say it was a collaboration.
14494.           **MS. ESTEP:** Okay, all I'm trying to confirm is that -- you know, you were an author and not just simply reviewing the document?
14495.           **MS. MISTY MacDUFFEE:** Yeah, I was a co-author.
14496.           **MS. ESTEP:** And were you directly involved in carrying out the marine mammal survey as described in the Raincoast written evidence?
14497.           **MS. MISTY MacDUFFEE:** I was a participant on those surveys.
14498.           **MS. ESTEP:** And you are a conservation biologist with a focus on fisheries, ecology in salmon ecosystems?

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14499.           **MS. MISTY MacDUFFEE:** Yes.
14500.           **MS. ESTEP:** And over the course of your career, would you say that your research has focused primarily on salmon?
14501.           **MS. MISTY MacDUFFEE:** I would.
14502.           **MS. ESTEP:** You've also done some research on grizzly bears?
14503.           **MS. MISTY MacDUFFEE:** Yes.
14504.           **MS. ESTEP:** So you're not a -- sorry?
14505.           **MS. MISTY MacDUFFEE:** Yes is the answer.
14506.           **MS. ESTEP:** You're not a marine biologist?
14507.           **MS. MISTY MacDUFFEE:** I'm not a marine biologist.
14508.           **MS. ESTEP:** And you don't have any previous research experience with marine mammals?
14509.           **MS. MISTY MacDUFFEE:** Not other than being an observer.
14510.           **MS. ESTEP:** On this -- on the marine mammal surveys that are described in the Raincoast written evidence, that's what you're referring to?
14511.           **MS. MISTY MacDUFFEE:** Yes.
14512.           **MS. ESTEP:** Mr. Rosenberger, you currently work on contract with Watershed Watch Salmon Society?
14513.           **MR. ANDREW ROSENBERGER:** I have worked for them in the past. Currently, I'm not on contract with them.
14514.           **MS. ESTEP:** Okay, where do you currently work then?
14515.           **MR. ANDREW ROSENBERGER:** I work at Raincoast.
14516.           **MS. ESTEP:** Okay. I understood from your CV that you'd worked

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- for Raincoast from 2010 to 2011.
14517.           **MR. ANDREW ROSENBERGER:** When the CV was prepared, that was correct. I'm still a full-time employee at Raincoast.
14518.           **MS. ESTEP:** Okay.
14519.           **MR. ANDREW ROSENBERGER:** Yeah.
14520.           **MS. ESTEP:** Thank you.
14521.           **MR. ANDREW ROSENBERGER:** No problem.
14522.           **MS. ESTEP:** And what portions of Raincoast's marine mammal evidence did you author?
14523.           **MR. ANDREW ROSENBERGER:** Well, like Ms. MacDuffee has said, it was ---
14524.           **THE CHAIRPERSON:** Excuse me, sorry, we've got a little bit of an echo or feedback. Ms. MacDuffee, could you please turn off your microphone?
14525.           Thank you very much.
14526.           When you're finished speaking, if everyone would turn off their microphones, it helps the sound system greatly. Thank you.
14527.           **MR. ANDREW ROSENBERGER:** As Ms. MacDuffee indicated, it was prepared collaboratively. I was definitely involved in producing the maps that are in -- in part of our risk assessment and I was involved in preparation of the conceptualization behind them.
14528.           **MS. ESTEP:** Okay. So do you consider yourself to be an author of that report?
14529.           **MR. ANDREW ROSENBERGER:** Yes.
14530.           **MS. ESTEP:** And were you directly involved in carrying out Raincoast's marine mammal surveys?

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14531.           **MR. ANDREW ROSENBERGER:** No, I was not.
14532.           **MS. ESTEP:** And like -- like Ms. MacDuffee, your research has primarily focused on salmon and other fish, has it not?
14533.           **MR. ANDREW ROSENBERGER:** With Raincoast, that's correct.
14534.           **MS. ESTEP:** And, Dr. Paquet, you're a senior scientist with Raincoast?
14535.           **DR. PAUL PAQUET:** Yes, that's correct.
14536.           **MS. ESTEP:** And again, what -- I understand that you were -- you had overview or review authority on the marine mammal evidence. Did you also author portions of that evidence?
14537.           **DR. PAUL PAQUET:** I did author portions and co-authored essentially and as Ms. MacDuffee described, it was a collaborative effort and I helped in the coordination and the integration as we normally would do in any co-authored manuscript.
14538.           **MS. ESTEP:** And were you involved in carrying out Raincoast marine mammal surveys?
14539.           **DR. PAUL PAQUET:** No, I was not. I was only involved in the analytical portion of it.
14540.           **MS. ESTEP:** And I see from your CV, sir, that you have done quite a bit of research on wolves. Over the course of your career has that been your primary focus?
14541.           **DR. PAUL PAQUET:** My primary focus has been on large mammals of all types and population biology and ecology.
14542.           My interest has been predatory large mammals like wolves, grizzly bears, et cetera.
14543.           **MS. ESTEP:** I think the Raincoast website describes you as a carnivore specialist; is that a fair description?

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14544.           **DR. PAUL PAQUET:** That could be. I haven't looked at it but that's a possibility, it is certainly one of my specialties. The other is of course population biology and ecology.

14545.           **MS. ESTEP:** But you're not a marine biologist?

14546.           **DR. PAUL PAQUET:** No, I'm not a marine biologist.

14547.           **MS. ESTEP:** And prior to this assignment have you had any previous research or experience with marine mammals?

14548.           **DR. PAUL PAQUET:** Only analytically. And I might explain what I mean by that, in -- in the development of survey methods and the application of survey methods and -- and how those surveys are analyzed.

14549.           **MS. ESTEP:** Okay. A 2009 technical report called "Predictive Marine Mammal Modelling for Queen Charlotte Basin, British Columbia" by Benjamin Best and Patrick Halpin, is provided as Attachment C to Raincoast marine mammal evidence.

14550.           And for ease of reference I'm going to refer to that as the 2009 technical report.

14551.           **DR. PAUL PAQUET:** Sure.

14552.           **MS. ESTEP:** Now, that document -- I think we've covered this in the direct, but I just want to confirm that document was not authored by anyone on this panel; right?

14553.           **DR. PAUL PAQUET:** It was not authored directly, although I was involved in the writing of that document and the editing of it and the conceptualization of that document and the supervision of Benjamin Best at Duke University.

14554.           **MS. ESTEP:** You didn't get any credit for that, sir.

14555.           **DR. PAUL PAQUET:** No, I know I didn't.

--- (Laughter/Rires)

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14556.           **DR. PAUL PAQUET:** Can you please add my name? No, thank you.
14557.           **MS. ESTEP:** Okay, fair enough.
14558.           In your -- in the Raincoast evidence when you cite that document you say that the 2009 technical report has been published by Raincoast.
14559.           Now, does published mean that it was posted on your website or what exactly does published mean in that context?
14560.           **DR. PAUL PAQUET:** We're using that term loosely because we are a publisher at Raincoast but it's not a peer-reviewed published document. So it hasn't gone through another review process other than at university and at the graduate level.
14561.           **MS. ESTEP:** Yeah and in fact the forward in the document states that the document:
- “The documentation provided here represent[s] technical draft materials intended to be further refined for eventual peer-reviewed publication.”*
14562.           **DR. PAUL PAQUET:** And that's correct, and that's still in process right now.
14563.           **MS. ESTEP:** And were -- were Best and Halpin involved in Raincoast marine mammal surveys?
14564.           **DR. PAUL PAQUET:** Not directly, no. Benjamin Best did participate in -- as an observer in one portion. But ---
14565.           **MS. ESTEP:** But they were mostly doing the analytical work after the surveys had been carried out?
14566.           **DR. PAUL PAQUET:** That is correct, yes.
14567.           **MS. ESTEP:** And did Best and Halpin draft any of the written marine mammal evidence that Raincoast has filed with the JRP, specifically D170-2-6

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- through D170-2-8?
14568.           **DR. PAUL PAQUET:** No, they did not.
14569.           **MS. ESTEP:** Did you -- did you borrow certain portions of the text from the 2009 technical report and use it as your evidence?
14570.           **DR. PAUL PAQUET:** Yes, we likely did.
14571.           **MS. ESTEP:** Now Raincoast also filed another document called "What's At Stake", that's Exhibit D170-2-12, and that was prepared by Raincoast and published in 2010; is that right?
14572.           **DR. PAUL PAQUET:** Was that -- that was directed to me.
14573.           Yes that's correct.
14574.           And -- and just to return to your previous question about the other document, I should note that there are publications that preceded that document based on those same surveys that are peer reviewed and -- in -- in the literature. They're not by those authors though.
14575.           But -- based on Raincoast surveys and the analyses that we participated in, so -- and those will be authored primarily by Williams et al.
14576.           **MS. ESTEP:** Thank you. Yes.
14577.           So on the "What's At Stake" document that -- sorry, did I -- did you tell me that it was prepared by Raincoast and published in 2010?
14578.           **DR. PAUL PAQUET:** I think it was published in 2010. It was prepared by Raincoast, yes.
14579.           **MS. ESTEP:** Okay. I think the copyright on the document is 2010.
14580.           **DR. PAUL PAQUET:** Okay.
14581.           **MS. ESTEP:** Okay. And again by "published" does that mean it was posted on the Raincoast website?

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14582.           **DR. PAUL PAQUET:** It was posted and in -- in hardcopy and distributed and made available as a PDF. So there'll be an online publication that I -- again, it's a popular publication and not a peer-reviewed publication.
14583.           **MS. ESTEP:** Okay. And some of your written evidence also borrows from portions of that document; right?
14584.           **DR. PAUL PAQUET:** Yes that's correct.
14585.           **MS. ESTEP:** Now, Table 1 on page 27 of your evidence -- maybe we should just bring that up. So it's D170-2-6, please, Ms. Niro, page 27.
14586.           Okay so this table I just want to understand the source of that information. So this table came from the "What's At Stake" report; right?
14587.           **DR. PAUL PAQUET:** I think this table -- I -- I would have to check. I do think it came from "What's At Stake" but I think the "What's At Stake" report used the information from our analyses using distant sampling that -- part of which was carried out at Duke University by Halpin and Best.
14588.           **MS. ESTEP:** Okay. That's what I -- I had suspected.
14589.           So Table 1 was prepared using information from the 2009 technical report; is that correct?
14590.           **DR. PAUL PAQUET:** That's correct yes.
14591.           **MR. ESTEP:** So who prepared Table 1 originally?
14592.           **DR. PAUL PAQUET:** I -- yes, I think Ben Best and Patrick Halpin prepared that originally and then we used it.
14593.           **MS. ESTEP:** Okay. So it was Best and Halpin prepared it for "What's At Stake" first and then it was borrowed from "What's At Stake" and put into your evidence?
14594.           **DR. PAUL PAQUET:** No, the table was prepared before "What's At Stake" was prepared.
14595.           **MS. ESTEP:** Okay but ---

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14596.           **DR. PAUL PAQUET:** So -- so it was available to us and -- and that was work that was done for Raincoast and so then we used it in "What's At Stake", yeah.
14597.           **MS. ESTEP:** Okay.
14598.           **DR. PAUL PAQUET:** Does that help, is that clear enough?
14599.           **MS. ESTEP:** It does. Yeah, I'm following you.
14600.           **DR. PAUL PAQUET:** I believe that's the case and let -- give me just one second to check and make sure and confirm that.
14601.           **MS. ESTEP:** Sure.
14602.           **DR. PAUL PAQUET:** I -- I believe that it is in the technical report from -- we had other information that was not included in that technical report in the process of developing the original technical report and it could have come from there. But I think it's in the technical report.
14603.           **MS. ESTEP:** I looked in the technical report and it's not in there.
14604.           **DR. PAUL PAQUET:** It's not in there, okay.
14605.           **MS. ESTEP:** But I understand your process. I think you're saying that it was prepared --you know -- contemporaneously with the 2009 report and then it was put in "What's At Stake" and then it was put into your evidence?
14606.           **DR. PAUL PAQUET:** Yes. And it was not prepared by Halpin and Best for the "What's At Stake" report; it was prepared for Raincoast in the work that we were doing.
14607.           **MS. ESTEP:** Okay. And you've mentioned this -- this morning, Dr. Paquet, but you say that the "What's At Stake" document is a popular report, so what does that mean?
14608.           **DR. PAUL PAQUET:** It -- it's not intended for a scientific audience necessarily, although it does include science in the -- the report itself. But it's -- when we say that it's been popularized it's in part in how it's written, and so that

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- it's far more accessible, there's less scientific jargon for example that's used in it, but it's still substantive in its content and scientifically robust in that sense.
14609.           **MS. ESTEP:** Okay. So fair to say that the "What's At Stake" document and the 2009 technical report were intended for different audiences?
14610.           **DR. PAUL PAQUET:** That's correct, yes.
14611.           **MS. ESTEP:** And the "What's at Stake" document was written and prepared for the general public?
14612.           **DR. PAUL PAQUET:** That's correct, the public.
14613.           **MS. ESTEP:** And part of Raincoast's mission is what you call "informed advocacy"; right?
14614.           **DR. PAUL PAQUET:** That's correct, yes. I think others call it that as well but...
14615.           **MS. ESTEP:** So does publication of the "What's at Stake" document form part of that informed advocacy?
14616.           **DR. PAUL PAQUET:** That is part of informed advocacy, definitely.
14617.           **MS. ESTEP:** So would you consider that document to be a public relations tool?
14618.           **DR. PAUL PAQUET:** No, not as a public relations tool. It's an informative tool and educational tool but not a public relations tool.
14619.           **MS. ESTEP:** So -- but doesn't it assist Raincoast in carrying out its mission of informed advocacy?
14620.           **DR. PAUL PAQUET:** It does assist it but not in the sense of public relations. As I understand it, it -- again, I think any educational material that's produced by any organization, the intent isn't public relations. It's again, education and that was the purpose of that document.
14621.           **MS. ESTEP:** Okay. Now, the 2009 technical report used the data for marine coast, marine mammal surveys to develop marine mammal density models

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- and spatial decision support models; right?
14622.           **DR. PAUL PAQUET:** The -- could you rephrase that? I'm sorry I missed the beginning of that.
14623.           **MS. ESTEP:** Sure. So I'm in the 2009 technical report.
14624.           **DR. PAUL PAQUET:** Okay.
14625.           **MS. ESTEP:** And why don't we just pull that up? D170-2-11 and it's at page 2 -- Adobe page 2. So I'm just asking you to confirm -- I want to confirm what the purpose of this report was and I am saying to you that it was to develop marine mammal density models and spatial decision support models.
14626.           **DR. PAUL PAQUET:** Yes, that's part of it but that's -- it was more comprehensive in that it was -- again, it was an analytical document using the information that we'd gathered through transect surveys and the interest was in developing population estimates. Those are abundance estimates of marine mammals as well as their distribution and their densities combined. So all of those were objectives and that was the purpose of this document.
14627.           **MS. ESTEP:** Okay. The report does not specifically mention Northern -- the Northern Gateway Project or Northern Gateway; right?
14628.           **DR. PAUL PAQUET:** No it does not.
14629.           **MS. ESTEP:** However, the vessel routes that were analyzed roughly coincide with those proposed by Northern Gateway?
14630.           **DR. PAUL PAQUET:** In the latter part of the document there is an example of -- using least cost pathways methods of determining potential vessel routes and that was not done to address Enbridge at all. That was...
14631.           **MS. ESTEP:** It was purely ---
14632.           **DR. PAUL PAQUET:** It simply was an example of what can be done in anticipation that -- and knowing that there were proposals for developments on the coast of British Columbia and this was a method that we were just using as an example and a demonstration that could be applied.

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14633.           **MS. ESTEP:** Okay. Ms. Niro, could I just ask you to go to page 48 of that document please.
14634.           So Dr. Paquet, I'm looking at the diagram on the right-hand side. And so do I understand correctly that these reflect common shipping routes?
14635.           **DR. PAUL PAQUET:** No, not common shipping routes. The shipping route was -- I think to Kitimat was the choice there and what were the possible routes and what we considered to be -- based on this kind of analysis, what would be the least cost in the sense of risk and other aspects to the environment.
14636.           **MS. ESTEP:** Okay. But the -- what I'm trying to get at is that this report was not prepared specifically with the Northern Gateway Project in mind?
14637.           **DR. PAUL PAQUET:** It was not.
14638.           **MS. ESTEP:** Okay. So the least cost vessel routing and risk assessment that is presented in the report is a general framework?
14639.           **DR. PAUL PAQUET:** It's an example. It's a general framework and it's a demonstration as to what kind of analyses are available that could potentially be applied, if for example, if there was a proposal for tankers coming to Kitimat or elsewhere.
14640.           **MS. ESTEP:** Okay. And one least cost route that was proposed in the report was to use Grenville Channel to get to Kitimat?
14641.           **DR. PAUL PAQUET:** It's not a proposed -- let me explain what a least cost pathway is.
14642.           A least cost pathway is based, in this case, on -- we're going to have to go way back. It's -- do you know what a rasterized image is or a grid image? And it looks for the easiest routes that accumulate the least cost environmentally as a pathway.
14643.           So for example, if we wanted to go from Kitimat to Prince Rupert and we were looking for the best route that would create the fewest disturbances, potentially, in the environment, and that could include anything from cetaceans to pinnipeds to even terrestrial wildlife.

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14644. We would create a surface map which was done here and each -- that surface map is divided into grids and those are cells that often referred to and each of those cells has attributes attached to it that describe that cell. So you could include anything from water temperature to depth to presence or absence of particular marine species, various marine mammals for example.
14645. In this case, I -- we used density surface mapping and then the routine, which is part of a geographic information system -- you ask it to calculate the least cost pathway. So it will go from a cell to cell to cell and as it approaches and -- each cell, it will evaluate the cells next to it and the cell that it's currently in and look for the route that's both most efficient and least costly to -- in this example, the environment.
14646. So this -- these are square grids so every time that you're in a grid, you have eight potential options for movements.
14647. I'm hoping you're visualizing this, what I'm describing.
14648. **MS. ESTEP:** You might be getting a little ahead of where I want to be but I'll let you finish.
14649. **DR. PAUL PAQUET:** Okay, I will.
14650. So there are options for movements and they have eight options. You can move laterally. You can move up and down or you can move -- because there are four corners, at the four corners, which gives you eight options.
14651. And the computer and the modelling will accumulate and count the cost in each cell to determine the total cost for each route. And it will run various iterations in looking for the most efficient, and as we describe them, the least costly route and that's essentially what's done here.
14652. **MS. ESTEP:** Okay. Thank you for that.
14653. **DR. PAUL PAQUET:** And my apologies if ---
14654. **MS. ESTEP:** That's okay.
14655. **DR. PAUL PAQUET:** --- that's difficult to follow but that's

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- essentially what the process is.
14656. **MS. ESTEP:** Okay. So Ms. Niro, could we go to page 53 of the document please?
14657. So what I took from your answer, Dr. Paquet, is that I probably shouldn't have used the word "proposed" but I think maybe a better way to put it would be that the report discusses least cost routes. Would you agree with that or a least cost route?
14658. **DR. PAUL PAQUET:** It does and the report sets them out there, again, as an example of the kind of analytical processes that are available to make these kinds of determinations if the interest is what is the most efficient and least costly route to the environment.
14659. **MS. ESTEP:** Okay. And we're talking about the route shown in green on this figure; right?
14660. **DR. PAUL PAQUET:** That's correct. Yes.
14661. **MS. ESTEP:** Okay. And as acknowledged in the report, the least cost routing does not consider essential factors, such as channel depth, channel width, navigational hazards and percent calm weather?
14662. **DR. PAUL PAQUET:** That's correct. Yes.
14663. **MS. ESTEP:** And it was also acknowledged in the report that it's not clear whether Grenville Channel is deep and wide enough to support the kind of tanker traffic envisioned?
14664. **DR. PAUL PAQUET:** That's correct, that's what the report does say.
14665. **MS. ESTEP:** Okay. And I should just be clear that what I'm looking at here on the figure is that the least-cost route in this image shows the use of Grenville Channel?
14666. **DR. PAUL PAQUET:** That's correct.
14667. **MS. ESTEP:** Okay. Now, have you reviewed the transcript from March 22<sup>nd</sup>, 2013 when your counsel, Mr. Robinson, cross-examined the Northern

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Gateway shipping and navigation panel?

14668.           **DR. PAUL PAQUET:** I haven't reviewed that, but if you want to illuminate me, that would be great.
14669.           **MS. ESTEP:** Okay. Well, I was going to point out to you that in response to his questioning of Northern Gateway's witnesses, Northern Gateway committed to not using Grenville Channel for tankers, and that was because the channels are too narrow. So if you're not aware of that evidence, I was just -- I wanted to point that out to you.
14670.           **DR. PAUL PAQUET:** Yeah, I'm not aware of the evidence. And again, just to reiterate, you know, this was intended as an example. And one of -- it was a incomplete analysis, and that was the point that was made. And that's why my -- I know that you read those other comments that were included in that report.
14671.           **MS. ESTEP:** Thank you.
14672.           So just to finish this off, the model in this report as it stands in its current form would not be sufficient to draw project-based routing conclusions from in this case.
14673.           **DR. PAUL PAQUET:** Absolutely not. I would agree. And it was never intended for that.
14674.           **MS. ESTEP:** Okay. I'd like to talk to you a little bit about the marine mammal survey work that Raincoast has done.
14675.           And would you agree with me that there is relatively little data on marine mammal distribution and abundance in the waters of Canada's Pacific Coast?
14676.           **DR. PAUL PAQUET:** There were, but that's less the case now because of the work that we've done and the publications that have resulted from that work.
14677.           **MS. ESTEP:** Okay. But initially, when you were, back in 2004, thinking about doing this work, was that one of the motivators in why you did the survey work?

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14678.           **DR. PAUL PAQUET:** Yes, that was one of the motivators. There had not been systematic surveys of coastal British Columbia.
14679.           **MS. ESTEP:** And are you familiar, Dr. Paquet, with the area that Northern Gateway has defined as the Confined Channel Assessment Area?
14680.           **DR. PAUL PAQUET:** I am, yes.
14681.           **MS. ESTEP:** And can I just simply refer to that as the CCAA?
14682.           **DR. PAUL PAQUET:** Certainly.
14683.           **MS. ESTEP:** Thank you.
14684.           And there are relatively few publicly available studies or field data on marine mammals in the CCAA.
14685.           **DR. PAUL PAQUET:** That's correct, yes.
14686.           **MS. ESTEP:** Now, your surveys were done between 2004 and 2008?
14687.           **DR. PAUL PAQUET:** That's correct, too, yes.
14688.           **MS. ESTEP:** Ms. Niro, could I ask you to please pull up D170-2-6 at page 30? Thank you. Now, I'm focusing on the right-hand side, so that's Figure 5b.
14689.           And Dr. Paquet, this shows Raincoast's survey effort over those five seasons. Is that right?
14690.           **DR. PAUL PAQUET:** Yes, that's correct, I believe.
14691.           **MS. ESTEP:** And from this map, it looks like your survey area or study area primarily consisted of Dixon Entrance, Hecate Strait and Queen Charlotte Sound.
14692.           **DR. PAUL PAQUET:** That is correct. That's where the focus was.
14693.           **MS. ESTEP:** Did your study area include Principe Channel?

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14694.           **DR. PAUL PAQUET:** Just to add, and Queen Charlotte Strait as well, too.

14695.           **MS. ESTEP:** Okay.

14696.           **DR. PAUL PAQUET:** But the question; I'm sorry.

14697.           **MS. ESTEP:** Did your study area include Principe Channel?

--- (A short pause/Courte pause)

14698.           **DR. PAUL PAQUET:** Could I defer that to Ms. MacDuffee on there? We can confer on it and I can repeat it, but I think that she can answer that question for you.

14699.           **MS. ESTEP:** Sure.

14700.           **DR. PAUL PAQUET:** Yeah. It was really simply a matter of how the design took place.

14701.           **MS. ESTEP:** M'hm.

14702.           **MS. MISTY MacDUFFEE:** So we refer to our surveys as randomized systematic, which meant that every year we would allow the computer to determine the route that we would follow, so that we could -- it would select the inlets and the inside routes, and that is what it made it randomized and systematic. But we also undertook opportunistic off effort surveys when we were travelling that weren't part of the survey route.

14703.           **MS. ESTEP:** Okay. Ms. Niro, could I just ask you to zoom in on that figure on the right-hand side, and let's try and blow it up as much as -- a little bit more anyway, just so we can see the one on the right. Yeah. Okay.

14704.           So I understand what you just said, Ms. MacDuffee.

14705.           **MS. MISTY MacDUFFEE:** Thank you. So there isn't data from Principe Channel, correct.

14706.           **MS. ESTEP:** Okay. And what about Wright Sound?

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14707.           **MS. MISTY MacDUFFEE:** There is data in Lower Wright Sound.
14708.           **MS. ESTEP:** It's just very hard to tell from the diagram, so that's why I'm asking the questions.
14709.           And what about Douglas Channel?
14710.           **MS. MISTY MacDUFFEE:** Lower parts of Douglas Channel and Gardner Canal.
14711.           **MS. ESTEP:** And what about Kitimat Arm?
14712.           **MS. MISTY MacDUFFEE:** Not in Kitimat Arm.
14713.           **MS. ESTEP:** Okay. So is it fair to say that Raincoast marine mammal surveys were not specific to the CCAA?
14714.           **MS. MISTY MacDUFFEE:** That's correct. And these were done before there was a CCAA, so there wasn't a proposal that we were trying to evaluate. It wasn't -- the purpose of undertaking these surveys was not specifically to -- for any proposal. It was to determine -- to get baseline information on distribution and abundance.
14715.           **MS. ESTEP:** Okay. And just to be clear, I'm not referring to the CCAA. Like that's just a label ---
14716.           **MS. MISTY MacDUFFEE:** Yeah.
14717.           **MS. ESTEP:** --- we've put on it ---
14718.           **MS. MISTY MacDUFFEE:** Right.
14719.           **MS. ESTEP:** --- to be clear what geographic area I'm talking about.  
Okay?
14720.           So your abundance estimates do not apply to these areas. Is that correct?
14721.           **DR. PAUL PAQUET:** Is the question do the abundance estimates

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- apply to the areas where they weren't surveyed, is that what you're asking, or to the CCAA?
14722.           **MS. ESTEP:** I'm trying to understand, for the areas that you don't have survey data, do the abundance estimates that you've developed in your modelling apply to those areas?
14723.           **DR. PAUL PAQUET:** They do not.
14724.           **MS. ESTEP:** Now, Ms. Niro, could we please go to page 31 in that document? Okay.
14725.           And again, I'm focusing on the figure on the right-hand side. This is Figure 6b, and I just want to let you have a look at that.
14726.           And if we could, then, Ms. Niro, just go to the figure on page 32, again on the right-hand side. So this is Figure 7b, and can you just blow that one up a little bit? Thank you.
14727.           Now -- okay. Now, these figures show your modelling results. Is that right?
14728.           **DR. PAUL PAQUET:** Yes, that's correct. These are -- I think this is a composite of some of the modelling results, yes.
14729.           **MS. ESTEP:** Thank you.
14730.           And I did just want to mention that these marine mammal maps were very useful, so I wanted to thank you for that evidence.
14731.           **DR. PAUL PAQUET:** You're very welcome.
14732.           **MS. ESTEP:** So we're -- I think you just mentioned this, but I just want to confirm. So these figures were produced by aggregating the individual density maps found in Appendix 4 of the 2009 technical report.
14733.           **DR. PAUL PAQUET:** That's correct.
14734.           **MS. ESTEP:** So those two figures -- and when I'm saying that, I'm referring to 6b and 7b in your report. They do not actually appear in the 2009

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- technical report.
14735.           **DR. PAUL PAQUET:** They do not. These are new figures that are derived from that report.
14736.           **MS. ESTEP:** So did Best and Halpin prepare those figures for you?
14737.           **DR. PAUL PAQUET:** Which figures are you referring to by "those figures"?
14738.           **MS. ESTEP:** Six (6)b and 7b.
14739.           **DR. PAUL PAQUET:** No, they did not. Those were prepared in-house.
14740.           **MS. ESTEP:** Now, in the 2009 technical report, the individual density maps in Appendix 4, they all included a numeric density scale on the maps; right?
14741.           **DR. PAUL PAQUET:** That's correct, yes.
14742.           **MS. ESTEP:** And the unit ---
14743.           **DR. PAUL PAQUET:** Sorry.
14744.           **MS. ESTEP:** That's okay.
14745.           The unit that they used was the number of individuals per square kilometre. Is that right?
14746.           **DR. PAUL PAQUET:** In their density maps in the original -- those were the extrapolated density maps that were extended to other areas, yes, and where they used covariates from the environment to do that.
14747.           **MS. ESTEP:** And the scale varied depending on the marine specie involved?
14748.           **DR. PAUL PAQUET:** That's correct. Initially it did.
14749.           **MS. ESTEP:** But in your maps you used just a generic scale of

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- lowest to highest regardless of the specie; right?
14750.           **DR. PAUL PAQUET:** In terms -- are you talking about the resolution of the map or the scale of the map?
14751.           **MS. ESTEP:** Well, I'm talking about this scale on the side of the map, the colours.
14752.           **DR. PAUL PAQUET:** That's a different ---
14753.           **MS. ESTEP:** Can you just scroll down a little bit, Ms. Niro? Thank you.
14754.           **DR. PAUL PAQUET:** Yes. We did use a different scaling. You're not talking about a geographic scaling you're talking about how we displayed the -- you're looking at the legend specifically, aren't you?
14755.           **MS. ESTEP:** That's right.
14756.           **DR. PAUL PAQUET:** Okay. Yes. No, we revised that. And I'll have Andy Rosenberg answer that for you.
14757.           **MS. ESTEP:** Okay.
14758.           **DR. PAUL PAQUET:** Specifically what we did and what the thinking was behind that.
14759.           **MR. ANDREW ROSENBERGER:** So basically this is actually the same figure, and it would be Figure 12 in the predicted marine mammal technical report. They do match. The difference being, as you've pointed out, that the legend is different. If you look at Figure 12, which is Adobe 51 of that exhibit ---
14760.           **MS. ESTEP:** Well, let's just bring that up so that we can all be on the same page.
14761.           **MR. ANDREW ROSENBERGER:** That's D170-2-11.
14762.           **MS. ESTEP:** Sorry, I thought that the maps, Figure 6b and 7b, were created from the maps in the appendix to this report?

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14763.           **MR. ANDREW ROSENBERGER:** These are results of the predicted modelling, the predicted densities. This is using the same data but in this case it's displayed differently.
14764.           And you're correct in saying that there is numbers on here. The way that they were displayed in the other maps, in 6b and 7b of our marine mammal report is that they were broken into 15 -- they're called -- natural breaks, and it's just a method of dealing with data essentially, but it's based on exactly the same data.
14765.           **MS. ESTEP:** Okay. So on this map the legend refers to cost and it has numeric units there. Is that another way of referring to density?
14766.           **MR. ANDREW ROSENBERGER:** The -- sorry, the units on this map?
14767.           **MS. ESTEP:** Yes.
14768.           **MR. ANDREW ROSENBERGER:** That is derived density, correct.
14769.           **MS. ESTEP:** Okay. So, for example -- this might help, if we could go to page 90.
14770.           **THE CHAIRPERSON:** Ms. Estep, I think that Dr. Paquet was wanting to say something ---
14771.           **MS. ESTEP:** Oh, sure.
14772.           **THE CHAIRPERSON:** --- as you were looking down there.
14773.           **MS. ESTEP:** Okay.
14774.           **DR. PAUL PAQUET:** I believe you're looking at one of the cost surfaces that was used by Halpin and Best, and that might be creating some of the confusion and that's why they're showing cost.
14775.           **MS. ESTEP:** Okay. But Dr. Rosenberger brought this map up so I'm trying to understand what happened here.
14776.           **MS. CAROLINE FOX:** Okay, I can understand where there's some

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- confusion. If you scroll down slightly you can see the figure title on this map. And so we're talking about these Z-scored densities, and all a Z-score means is that we have standardized for each species because some can be highly abundant, some can be quite rare in the environment and we wanted to weight those species equally.
14777.           So all that is is a conservation weighted map of all the marine mammals with a Z-score to make them relative counts.
14778.           **MS. ESTEP:** Okay. But -- okay, can we go to page 90 please in the same report?
14779.           So these -- and there's a series of these maps. This is Appendix 4 of the Best and Halpin report. My understanding was that you'd taken all of these maps and the appendix to create your Figure 6b and 7b; is that not correct?
14780.           **MS. CAROLINE FOX:** And this is 6b and 7b that ---
14781.           **MS. ESTEP:** In your evidence.
14782.           **MS. CAROLINE FOX:** Let me just have a look here.
14783.           The generation of those maps, it's derived from the same density layers, but we've done it slightly different, for example, that conservation weighting of Z-score mammals is different from the way we've generated those maps for our submission.
14784.           **MS. ESTEP:** And that's what I'm trying to understand.
14785.           **MS. CAROLINE FOX:** M'hm. How the different -- so for that figure we had that was Z-score conservation weighted, there's a thorough description of how we generated that derived surface.
14786.           And again, although it's based on the same original data, we have derived that slightly different from our submission. And that was done by Andy. So if you want to elaborate on the actual derivation for our submission it is slightly different from the way we did it for the Z-score mammals.
14787.           **MS. ESTEP:** Okay. Let me -- if you want to jump in that's fine, but let me ask this question. Did -- okay, the map that's shown on page 51 that we

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were looking at before, was that map an aggregation of all the maps in the appendix?

14788.           **MS. CAROLINE FOX:** And 51, you're again speaking about the conservation weighted Z-scores?

14789.           **MS. ESTEP:** So Ms. Niro's brought it up here.

14790.           **MS. CAROLINE FOX:** Actually, Dr. Paquet would like to clarify something.

14791.           **DR. PAUL PAQUET:** Let me just clarify that -- and then I'll allow Caroline to continue there. We did not import the maps directly from the 2009 document. We used the same data but we did not import their maps, if that's what you think we did.

14792.           **MS. ESTEP:** No, and I'm quite clear that you didn't import the maps. I'm trying to understand the aggregation work you did.

14793.           **DR. PAUL PAQUET:** Okay.

14794.           **MS. ESTEP:** So at a high level you aggregated the data from the 2009 report. Is that right?

14795.           **DR. PAUL PAQUET:** Yes, it is an aggregation, but I think the important point is we're using the same data and using quite -- but a different analysis of the same data and a different presentation of the same data, which Caroline just previously described.

14796.           And part of what we were doing in this case was normalizing the data. That's what she was commenting on when she referred to the Z-scores. That's to normalize the information for purposes of both presentation and assessment. And -- I'll Caroline continue on with what she was saying.

14797.           **MS. CAROLINE FOX:** Sorry, was there a question, or did you want me to elaborate further?

--- (A short pause/Courte pause)

14798.           **MS. ESTEP:** Okay, thanks for your patience.

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14799.           At one point in your response you had said “conservation weighted” and I wanted to confirm if that meant different species are treated differently based on conservation status?
14800.           **MS. CAROLINE FOX:** Yes, in that Ben Best predictive modelling document -- I’m sorry, I don’t have the evidence number -- the 2009 technical report, there is Figure 11 on Adobe page 49 that actually visually portrays that conservation weighting method.
14801.           So, for example, fin whales are weighted highest in terms of conservation and it runs down the list to harbour seals at the lowest conservation ranking. So that’s what we mean by conservation weighted.
14802.           **MS. ESTEP:** Okay. If we could go back to Figure 7b, so that’s page 32 of the evidence. Thank you.
14803.           So all I was trying to understand was how you've assigned highest to lowest in the various units used there. And I'm going to just suggest to you that that's a bit vague, highest to lowest; there's no meaning ascribed to that. Like there's no numeric number.
14804.           Can you speak to that?
14805.           **DR. PAUL PAQUET:** I'll speak to it very briefly here and then Andy can comment on how those were derived.
14806.           These are -- this is categorical, and it's not intended to reflect specific numbers, we didn't assign numbers to those.
14807.           **MS. ESTEP:** M’hm.
14808.           **DR. PAUL PAQUET:** And this is often the way that this kind of mapping or analysis is presented, is in categories. But those categories do reflect certain numbers that, as Andy mention previously, these were natural breaks in the data that were identified visually.
14809.           **MS. ESTEP:** Okay, that's helpful.
14810.           **DR. PAUL PAQUET:** If that helps.

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14811.           **MS. ESTEP:** It does, thank you.
14812.           **DR. PAUL PAQUET:** Yes.
14813.           **MS. ESTEP:** Ms. Niro, could you just move the -- over a little bit?  
Thank you. And just blow up the centre of the document a little bit just so that we  
can see the pixilation. Thank you.
14814.           Now, Dr. Paquet, are you familiar with Northern Gateway -- what  
Northern Gateway is calling the core humpback whale area?
14815.           **DR. PAUL PAQUET:** You know ---
14816.           **MS. ESTEP:** I can bring up another map, if that's helpful.
14817.           **DR. PAUL PAQUET:** Yes, if you could. I ---
14818.           **MS. ESTEP:** Yeah.
14819.           **DR. PAUL PAQUET:** I know that I've certainly looked at it.
14820.           **MS. ESTEP:** So it's B85-2, please.
14821.           I apologize I don't have the Adobe page number on this, but it's -- if  
you search for page 9-1, Madam Niro, and then it's just the previous page to that.
14822.           Great, thank you. Oh, scroll down. It's the map. So if you could just  
make it a little bit bigger. Thank you.
14823.           So Dr. Paquet, the core humpback whale area is the area shown with  
the cross-hatching on this map.
14824.           Could you just scroll up a little bit, Ms. Niro? No; the other way.  
Thanks. Okay.
14825.           So I'm just showing you this so you're familiar with it.
14826.           **DR. PAUL PAQUET:** Yes.

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14827.           **MS. ESTEP:** Okay. So now if we could go back to Figure 7b. And sorry for all the documents, but I want to make sure we're talking about the same area.
14828.           **DR. PAUL PAQUET:** What is the date on this document? Is this from the TDR?
14829.           **MS. ESTEP:** No, this is from the framework for marine mammal protection plan. It was filed in July 2012.
14830.           **DR. PAUL PAQUET:** In July 2012. Okay.
14831.           **MS. ESTEP:** It's also in other places in the evidence. That's just a useful reference.
14832.           **DR. PAUL PAQUET:** Okay. Thank you.
14833.           **MS. ESTEP:** Okay? So if we could go back to your evidence, D170-2-6, Figure 7b again. Thank you.
14834.           So I just wanted to ask you if you would agree that this figure confirms the selection of the core humpback whale area that Northern Gateway had identified?
- (A short pause/Courte pause)
14835.           **DR. PAUL PAQUET:** They're definitely not in agreement.
14836.           **MS. ESTEP:** Definitely not?
14837.           **DR. PAUL PAQUET:** Yes, definitely not.
14838.           And Brian, if you want to comment on that.
14839.           **MR. BRIAN FALCONER:** Yeah. If you're assessing that that is the only core area and the only area of concern for humpback whales ---
14840.           **MS. ESTEP:** No, no, no. I'm not suggesting that.
14841.           **MR. BRIAN FALCONER:** I've been involved in the marine

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- mammal surveys as the master of the vessel for virtually all of them, and it -- that includes the CCAA. But there are very definitely areas of concentrations of humpbacks that cross that straight line that's the border of the CCAA.
14842.           **MS. ESTEP:** Okay. I wasn't suggesting that.
14843.           The point of me taking you to the other map to show you where Northern Gateway had identified the core humpback whale area and then comparing to this map was just to ask you -- and Mr. Green will identify with the pointer where the core humpback whale area is on this map, in that area.
14844.           And I'm simply suggesting to you that your own data seems to confirm the selection of that area as an important area. I'm not saying to the exclusion of other areas. I'm just saying, don't they line up?
14845.           **MR. BRIAN FALCONER:** It certainly was an area where there were many encounters. It's not complete, by any means, but it's certainly an area where there were many encounters, and a very important area.
14846.           **MS. ESTEP:** Thank you.
14847.           **DR. PAUL PAQUET:** Yes. And the point is, there is agreement there.
14848.           **MS. ESTEP:** Thank you.
14849.           And would you also agree that based on your evidence and this figure, that Douglas Channel and Kitimat Arm, shown in dark blue, is identified as one of the lowest density areas for marine mammals?
14850.           **DR. PAUL PAQUET:** Yes, we'd agree with that.
14851.           **MS. ESTEP:** Thank you.
14852.           Madam Chair, I'm at a good point to have the break. I know it's five minutes early, but it's up to you.
14853.           **THE CHAIRPERSON:** Thank you very much for identifying, Ms. Estep. The morning has gone by very quickly.

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14854. Let's take our morning break and be back for 10 after 10, please.  
Thank you.

14855. **MS. ESTEP:** Thank you.

--- Upon recessing at 9:54 a.m./L'audience est suspendue à 9h54

--- Upon resuming at 10:11 a.m./ L'audience est reprise à 10h11

14856. **THE CHAIRPERSON:** If we could get everyone to take their seats,  
we'll be ready to get under way again. Thank you, everyone.

14857. Ms. Estep, please continue with your questions.

**KATIE TERHUNE: Resumed**

**MISTY MacDUFFEE: Resumed**

**ANDREW ROSENBERGER: Resumed**

**BRIAN FALCONER: Resumed**

**PAUL PAQUET: Resumed**

**MICHAEL JASNY: Resumed**

**CAROLINE FOX: Resumed**

--- **EXAMINATION BY/INTERROGATOIRE PAR MS. ESTEP:**  
(Continued/Suite)

14858. **MS. ESTEP:** Thank you, Madam Chair.

14859. So I'd like to continue talking about your marine mammal evidence  
and talk about your -- your criticisms of Stantec's work on the TDR, the marine  
mammal TDR.

14860. So fair to say that a portion or a large portion of your written evidence  
is devoted to critiquing the survey design for the marine mammal TDR, and we'll  
talk about that. But despite those criticisms, would you agree that Northern  
Gateway was the first project proponent to undertake marine mammal surveys in  
the CCAA?

14861. **DR. PAUL PAQUET:** The first project proponent?

14862. **MS. ESTEP:** Yes.

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14863.           **DR. PAUL PAQUET:** With that limited description, I would say yes.
14864.           **MS. ESTEP:** And I want to make sure I understand the main difference between what Raincoast did and what Northern Gateway did.
14865.           So in simple terms, my understanding is that the survey design is the pattern the survey boat makes in the water and Raincoast used parallel lines or zigzags across the Channel starting from a random point and Northern Gateway generally ran a straight line down the Channel. So at a high level, do I understand that correctly?
14866.           **DR. PAUL PAQUET:** No, you don't.
14867.           **MS. ESTEP:** Okay. And how would you ---
14868.           **DR. PAUL PAQUET:** The survey design includes more than just the transects themselves. The survey design is much broader, but if you want to focus on just specifically where the transects were, I can answer that. Is that your question?
14869.           **MS. ESTEP:** Okay. If we focus specifically on the survey transects, would my description be accurate at a high level?
14870.           **DR. PAUL PAQUET:** At a high level, yes. We used a different design of transects.
14871.           **MS. ESTEP:** And in your view, Stantec, Northern Gateway's consultant for the marine mammal TDR, should have done further marine mammal surveys using more quantitative methods.
14872.           **DR. PAUL PAQUET:** Well, that's correct. But part of returning to the transects that were chosen and their application, they were inappropriate for the questions being asked, and that was our concern.
14873.           **MS. ESTEP:** Okay. Ms. Niro, could I ask you to please display Exhibit D170-2-6 at page 14?
14874.           So paragraph 23. Now, here you quoted the four objectives for the marine mammal TDR as stated in that TDR. And the first objective of the marine mammal TDR was to determine:

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*“What marine mammal species are found in the study area?”*

14875. Right?
14876. **DR. PAUL PAQUET:** That’s correct, yes.
14877. **MS. ESTEP:** And you said that all four of those objectives as shown in the four bullet points were entirely appropriate?
14878. **DR. PAUL PAQUET:** Yes, these were appropriate objectives.
14879. **MS. ESTEP:** Now, one of the things that Stantec did to accomplish those objectives was to summarize existing literature?
14880. **DR. PAUL PAQUET:** That’s correct.
14881. **MS. ESTEP:** Stantec also summarized and mapped sightings from publicly available data?
14882. **DR. PAUL PAQUET:** That’s correct; they did.
14883. **MS. ESTEP:** Stantec provided descriptions of the most likely species to be seen in the vicinity of the CCAA, including information from DFO, recovery strategies and COSEWIC status assessments where available?
14884. **DR. PAUL PAQUET:** They did. And essentially, what they did was accumulate and assess anecdotal information.
14885. **MS. ESTEP:** Right. Stantec also conducted aerial and vessel-based field surveys to validate the list of expected species.
14886. **DR. PAUL PAQUET:** They did conduct both aerial and other surveys, but those surveys were reconnaissance. They were not validations or confirmations.
14887. **MS. ESTEP:** And one of the objectives of the field service -- field surveys was to determine minimum counts of animals in the study area.
14888. **DR. PAUL PAQUET:** That was one of the objectives, but minimum

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- counts could not be determined using the methods that were used.
14889.           **MS. ESTEP:** Well, I understand that's your view. And you were able to discern that objective from reading the first few pages of the TDR itself, weren't you?
14890.           **DR. PAUL PAQUET:** I'm sorry. I'm not sure I quite understand the question.
14891.           **MS. ESTEP:** I'm just asking you to confirm that you understood what the objectives of the field surveys were.
14892.           **DR. PAUL PAQUET:** Yes, we did. Yes.
14893.           **MS. ESTEP:** And in addition, in response to an IR, Northern Gateway explained that the surveys were designed to understand seasonal, cetacean and pinniped presence and were not developed to be overly quantitative in nature.
14894.           Were you aware of that response?
14895.           **DR. PAUL PAQUET:** Yes, I was -- we were.
14896.           **MS. ESTEP:** So you made the accusation in your evidence that the objectives of the TDR were highly misleading; right?
14897.           **DR. PAUL PAQUET:** We did, yes.
14898.           **MS. ESTEP:** You weren't intending to imply some ill intention on the part of Northern Gateway or its consultants in saying that.
14899.           **DR. PAUL PAQUET:** Absolutely not. It was not intended to do that.
14900.           **MS. ESTEP:** Wouldn't it have been more reasonable, and I suggest to you more impartial, just to say that you didn't agree with the field objectives or that you felt the field objectives should have been different?
14901.           **DR. PAUL PAQUET:** We certainly could have stated it that way.
14902.           **MS. ESTEP:** Ms. Niro, could you please turn to page 20 of that

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document, and specifically paragraph 35. Okay.

14903. Now, there you say that:

*“...the authors of the ESA note that the report does not deliver what it set out to do...”*

14904. And there's no reference for that statement, so where did the authors of the ESA say that?

14905. **DR. PAUL PAQUET:** I would have to go back to the ESA and -- and see if they stated that directly or if it was an implication or an inference that we made. I'm going to have to look it up.

14906. **MS. ESTEP:** I'm going to suggest to you that the authors of the ESA did not say that.

14907. **DR. PAUL PAQUET:** I believe -- and again, I don't have it in front of me and I haven't read it recently -- that they did imply that they weren't able to accomplish what they intended to do and that they had to make changes in their surveys in progress.

14908. **MS. ESTEP:** I'll leave it with you, perhaps as a subject to check, that that ---

14909. **DR. PAUL PAQUET:** All right.

14910. **MS. ESTEP:** --- is not stated anywhere in the ESA.

14911. **DR. PAUL PAQUET:** Well, I will check.

14912. **MS. ESTEP:** Thank you.

14913. I'd like to talk a little about validation of Raincoast data. So Raincoast used DFO's data to validate Raincoast's predictive modelling?

14914. **DR. PAUL PAQUET:** That's correct. And this is the predictive modelling that you're talking about that were in -- was in our submission.

14915. **MS. ESTEP:** Yes.

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14916.           **DR. PAUL PAQUET:** Yes.
14917.           **MS. ESTEP:** And in your view, the DFO data had some value?
14918.           **DR. PAUL PAQUET:** The DFO data does have some value, most certainly, although not all systematically collected.
14919.           **MS. ESTEP:** In your evidence, you said that:
- “Agreement between the DFO sightings and our model  
[meaning you] predictions is excellent.”*
14920.           **DR. PAUL PAQUET:** That’s correct, yes.
14921.           **MS. ESTEP:** In other words, the DFO data confirmed Raincoast’s hot spot identification.
14922.           **DR. PAUL PAQUET:** It did, yes.
14923.           **MS. ESTEP:** Does it work the other way around? Does Raincoast’s hot spot identification also confirm DFO’s data?
14924.           **DR. PAUL PAQUET:** It could be used to do that, but not typically, the difference being that one is a systematic collection of data and observations and a very, very rigorous analysis, but you typically go the other direction.
14925.           **MS. ESTEP:** But you wouldn’t rule it out.
14926.           **DR. PAUL PAQUET:** I would not rule that out, no.
14927.           **MS. ESTEP:** DFO didn’t do distance sampling, though, did they?
14928.           **DR. PAUL PAQUET:** They did not, no.
14929.           **MS. ESTEP:** And DFO’s data is siting data, not systematic survey data.
14930.           **DR. PAUL PAQUET:** They’re primarily siting data. There are some systematic surveys that are included in their data.

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14931.           **MS. ESTEP:** Okay. And DFO used similar survey design methodology that Northern Gateway used?
14932.           **DR. PAUL PAQUET:** Theirs is not really design methodology.
14933.           **MS. ESTEP:** Okay.
14934.           **DR. PAUL PAQUET:** But it could be similar. I would have to ---
14935.           **MS. ESTEP:** Similar survey design?
14936.           **DR. PAUL PAQUET:** There was not really a -- most of the DFO data with the exception of some marine mammals is not systematically designed. And there's not a design -- a lot of it is a collection of haphazard observation.
14937.           **MS. ESTEP:** Okay. In your view, is it different than the data that Northern Gateway collected, the survey data?
14938.           **DR. PAUL PAQUET:** It is different in kind, yes.
14939.           If you're looking for similarities I mean there are always similarities in observational data and -- and collections. It's just not identical.
14940.           **MS. ESTEP:** Okay. But the DFO data ---
14941.           **DR. PAUL PAQUET:** --- or comparable.
14942.           **MS. ESTEP:** Sorry.
14943.           **DR. PAUL PAQUET:** Sorry.
14944.           **MS. ESTEP:** The DFO data and the Northern Gateway data, as I understand it, is both citing data.
14945.           **DR. PAUL PAQUET:** That's correct, it's observational data.
14946.           **MS. ESTEP:** So could you have used Northern Gateway's data to validate your modelling?

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14947.           **DR. PAUL PAQUET:** We -- we likely could have attempted to use it but we were concerned that it was incomplete however, and likely wouldn't have used it.

14948.           The advantage to the DFO data that it had been collected over a very long period of time.

14949.           **MS. ESTEP:** What period of time is it?

14950.           **DR. PAUL PAQUET:** I can't remember the entire -- I would have to go back and look at their -- the data that they provided for us.

14951.           **MS. ESTEP:** Because certainly Northern Gateway's data was collected over a number of years as well.

14952.           **DR. PAUL PAQUET:** Not -- not I don't believe over the same amount of time or with the same amount of effort that the DFO data were collected.

14953.           And -- and I might ask Brian Falconer to -- to answer that since he's been involved with some of the collection of those data with DFO.

14954.           **MR. BRIAN FALCONER:** Yeah and some of that didn't come directly from DFO.

14955.           DFO's own data comes from a variety of sources, Cetacean Sightings Network, which goes back into the 1970s, and so there -- there have been reporting systems and collection of data since the 1970s in the DFO data.

14956.           **MS. ESTEP:** Okay. But you -- you didn't ask Northern Gateway to provide their data to validate your model did you?

14957.           **DR. PAUL PAQUET:** No we did not.

14958.           **MS. ESTEP:** Now, at paragraph 50 of your evidence you say that Northern Gateway:

*"...did not request Raincoast survey information for their 'assessment' of baseline conditions for marine mammals.*

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14959. Sorry that's page 29.
14960. **DR. PAUL PAQUET:** That's correct.
14961. **MS. ESTEP:** Okay.
14962. Now, you alluded to this before, Dr. Paquet, you said the -- so you're marine mammal survey design methodologies and preliminary findings were first published in 2007 in a paper by Williams and Thomas?
14963. **DR. PAUL PAQUET:** That's correct.
14964. **MS. ESTEP:** Was the survey work also published in a paper by Williams in 2006?
14965. **DR. PAUL PAQUET:** I believe that it -- part of it was, yes.
14966. **MS. ESTEP:** I'm just curious ---
14967. **DR. PAUL PAQUET:** It was preliminary, yes.
14968. **MS. ESTEP:** Okay.
14969. So I'm just curious why you didn't mention that in your evidence?
14970. **DR. PAUL PAQUET:** I can't remember if it was in our evidence or not.
14971. But it would -- it would ---
14972. **MS. ESTEP:** It's not.
14973. **DR. PAUL PAQUET:** It's not.
14974. No particular reason.
14975. **MS. ESTEP:** Okay. Both of those papers were part of the literature review that was done by Stantec in the marine mammal TDR?
14976. **DR. PAUL PAQUET:** That's correct.

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14977. **MS. ESTEP:** And at paragraph 44 of your evidence you state that:
- “The full results of [your] surveys are available online...”*
14978. And there’s a web link. This is at page 25. You see that?
14979. **DR. PAUL PAQUET:** I do see that, yes.
14980. **MS. ESTEP:** And that link is the main webpage for Raincoast; right?
14981. **DR. PAUL PAQUET:** I believe that’s the case, yes.
14982. **MS. ESTEP:** So by “full results” are you referring to the 2009 technical report which is published on that website?
14983. **DR. PAUL PAQUET:** That’s correct we are, yes.
14984. **MS. ESTEP:** So the raw data for your marine mammal surveys is not posted on the website?
14985. **DR. PAUL PAQUET:** I don’t believe the raw data are there, but they are available.
14986. **MS. ESTEP:** But it’s not available publicly is it?
14987. **DR. PAUL PAQUET:** On request.
14988. **MS. ESTEP:** So not publicly?
14989. No, right?
14990. **DR. PAUL PAQUET:** If that’s a no.
14991. **MS. ESTEP:** Now, Mr. Rob Williams was a previous scientific lead for Raincoast; right?
14992. **DR. PAUL PAQUET:** That’s correct, yes.
14993. **MS. ESTEP:** And he led your marine mammal survey work up until

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- his departure in 2007?
14994.           **DR. PAUL PAQUET:** That is correct, yes.
14995.           **MS. ESTEP:** He's the same Williams who authored the 2006 and 2007 papers with your survey results?
14996.           **DR. PAUL PAQUET:** That's correct.
14997.           **MS. ESTEP:** Were you aware that Northern Gateway environmental management team engaged him about obtaining Raincoast data?
14998.           **DR. PAUL PAQUET:** I wasn't aware. I had heard at one point that that was the case and I did check with Dr. Williams, and he said no that had not happened. So that's all I know.
14999.           **MS. ESTEP:** I understand that the data wasn't provided but were you aware that the discussion had occurred or that there had been discussion about that?
15000.           **DR. PAUL PAQUET:** I -- my -- I had heard that there had been a discussion but when I attempted to confirm that that discussion had taken place I was told that it had not.
15001.           **MS. ESTEP:** Is it your understanding that there was written correspondence to that effect?
15002.           **DR. PAUL PAQUET:** That is not my understanding, no.
15003.           **MS. ESTEP:** Is anyone else able to speak to that on the panel?
15004.           Is that a no?
15005.           **DR. PAUL PAQUET:** I think that is a no, yes.
15006.           **MS. ESTEP:** Okay. So were you aware, at all, that Northern Gateway had made a similar request for data sharing with North Coast Cetacean?
15007.           **DR. PAUL PAQUET:** I was not aware of that. And I'm -- and others -- others at Raincoast may have been aware of that, I certainly wasn't.

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15008.           **MS. ESTEP:** Okay. If your panel members have anything to add I would invite them to do so.
15009.           **DR. PAUL PAQUET:** Just in -- to answer just -- we were made aware of this apparently after -- after we submitted our response to Enbridge's submission.
15010.           **MS. ESTEP:** And were you similarly aware that Northern Gateway had made attempts to obtain the DFO data on their marine -- their marine mammal data?
15011.           **DR. PAUL PAQUET:** We were aware of that, yes.
15012.           **MS. ESTEP:** And are you also aware that Northern Gateway would like to work with all of these groups and some Aboriginal organizations to integrate marine mammal information?
15013.           **DR. PAUL PAQUET:** We are very aware of that, yes.
15014.           **MS. ESTEP:** There was a meeting in June of 2012 between representatives from Northern Gateway and representatives from Raincoast to discuss further collaboration efforts?
15015.           **DR. PAUL PAQUET:** That's correct, yes.
15016.           **MS. ESTEP:** And data sharing was one of the things that was discussed at that meeting?
15017.           **DR. PAUL PAQUET:** Yes, that's correct.
15018.           **MS. ESTEP:** And I take it there was general agreement to continue those discussions once the hearing is over?
15019.           **DR. PAUL PAQUET:** We did agree.
15020.           **MS. ESTEP:** And you're still willing to have those discussions?
15021.           **DR. PAUL PAQUET:** Absolutely.

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15022.           **MS. ESTEP:** Thank you, sir.
15023.           I'd like to talk to you a little about follow-up programs. Northern Gateway's marine mammal TDR states that:
- "...factors -- due to factors influencing the survey design..."*  
(As read)
15024.           Sorry, let me start that again:
- "...due to the factors influencing the survey methodology distance sampling techniques and predetermined transect techniques were not warranted."* (As read)
15025.           Do you recall that?
15026.           **DR. PAUL PAQUET:** Yes, I do recall that.
15027.           **MS. ESTEP:** And in your evidence you disagreed and say that distance sampling techniques were absolutely warranted; right?
15028.           **DR. PAUL PAQUET:** Yes, we did make that comment.
15029.           **MS. ESTEP:** And are you aware that Northern Gateway has filed a framework marine mammal protection plan with the Joint Review Panel?
15030.           **DR. PAUL PAQUET:** I was aware of this, yes.
15031.           **MS. ESTEP:** And have you had an opportunity to review that document?
15032.           **DR. PAUL PAQUET:** I have not reviewed that document. And I'm not -- but you could ask the rest of the panel to -- I think it's a no from the rest of the panel as well.
15033.           **MS. ESTEP:** Ms. -- we'll see where we can get to with this.
15034.           If -- Ms. Niro, could you please turn that up. It's B85-2, page 15, if we could go to that.

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15035.           And I'm looking at the first bullet under the heading "Marine Mammal Density Surveys", if you could please read that.

15036.           **DR. PAUL PAQUET:** The first bullet?

15037.           **MS. ESTEP:** Under "Marine Mammal Density Surveys".

15038.           **DR. PAUL PAQUET:** The first bullet is, "Northern Gateway is..."

15039.           **MS. ESTEP:** Oh, no, no, sorry, I just mean read it to yourself.

15040.           **DR. PAUL PAQUET:** Because you can read, too; right?

--- (Laughter/Rires)

15041.           **MS. ESTEP:** Yeah.

15042.           **DR. PAUL PAQUET:** All right.

15043.           **THE CHAIRPERSON:** And just for clarity for everyone, the Panel can also read.

15044.           **DR. PAUL PAQUET:** Good.

15045.           Yes.

15046.           **MS. ESTEP:** Thank you.

15047.           So based on that, would you acknowledge that Northern Gateway is committing to do marine mammal density surveys using the survey design and, in fact, the same software that Raincoast is advocating for?

15048.           **DR. PAUL PAQUET:** Based on this, I assume that that's what the commitment is. Unfortunately, it's after the fact.

15049.           **MS. ESTEP:** What do you mean by "after the fact"?

15050.           **DR. PAUL PAQUET:** Typically, for an environmental assessment you would commit to doing that type of rigorous survey and survey method before and as part of the submission for a proposal so that that information would

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be available for those -- for decision-making.

15051.           **MS. ESTEP:** I think that's a good point, Dr. Paquet. Like I feel like a lot of the ground where there's disagreement between -- you know, if you want to call it that, between Raincoast's evidence and Northern Gateway's evidence really does come down to an issue of timing. Not so much doing -- you know, you saying we should be doing one thing and Raincoast saying another, it's more just when is the work going to be done.

15052.           Would you agree with that?

15053.           **DR. PAUL PAQUET:** I think, in part, that's true, and when it's appropriate to do the work and the quality of the work.

15054.           **MS. ESTEP:** Okay. Now, related to what we have in the marine mammal protection plan, are you also aware that in the vicinity of the marine terminal, marine mammal surveys will be completed for a minimum of two to three years prior to the start of construction and for three years after the start of operation; were you aware of that?

15055.           **DR. PAUL PAQUET:** Is that part of this commitment that we're now looking ---

15056.           **MS. ESTEP:** It's not shown specifically on the document. I'm summarizing for you.

15057.           **DR. PAUL PAQUET:** No, I'm not. And I wasn't aware of that. And I can ask others if they were.

15058.           **MS. ESTEP:** Okay. So were you similarly unaware of the fact that the surveys for the remainder of the CCAA will be conducted for a minimum of three years prior to operations and continue for three years after the start of operations?

15059.           **DR. PAUL PAQUET:** I don't think any of us are aware of those commitments.

15060.           **MS. ESTEP:** Okay. Did you know that of any other project -- do you know of any other project Proponent in B.C. or Canada that has made that type of commitment?

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15061.           **DR. PAUL PAQUET:** I do know of Proponents of projects who have done that kind -- and made that kind of commitment prior to their submissions and proposals.
15062.           **MS. ESTEP:** In B.C. or Canada?
15063.           **DR. PAUL PAQUET:** In Canada, yeah. And ---
15064.           **MS. ESTEP:** Which projects are you referring to?
15065.           **DR. PAUL PAQUET:** There were a number of projects in the Bow River Valley that both Mr. Green and I were working on where those kinds of commitments took place before the projects were brought forward for review.
15066.           **MS. ESTEP:** But that's not for marine mammal densities?
15067.           **DR. PAUL PAQUET:** You were asking specifically for marine mammal densities?
15068.           **MS. ESTEP:** Yes.
15069.           **DR. PAUL PAQUET:** Oh, I'm sorry.
15070.           **MS. ESTEP:** No, fair enough.
15071.           **DR. PAUL PAQUET:** No, I ---
15072.           **MS. ESTEP:** I wasn't communicating clearly.
15073.           **DR. PAUL PAQUET:** --- misunderstood your question, then. Yes.
15074.           **MS. ESTEP:** So from -- let me just re-ask it so that the record is clear.
15075.           I was reading to you about the commitments that Northern Gateway has made about marine mammal surveys and talking about the timeframe when those are going to be conducted. And I asked you if you knew of any other project Proponent in B.C. or Canada that has made that type of commitment.

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15076.           **DR. PAUL PAQUET:** I'm not aware of other Proponents. That's a very specific question, so ---
15077.           **MS. ESTEP:** Yes. Thank you.
15078.           So in that context, would you agree that that commitment is unprecedented?
15079.           **DR. PAUL PAQUET:** I don't think I can answer that. I really don't know what has occurred previously.
15080.           **MS. ESTEP:** Okay. Has Raincoast done any of its own surveys since 2008?
15081.           **DR. PAUL PAQUET:** We haven't done additional surveys, no.
15082.           **MS. ESTEP:** In your view, is there a need for more survey work?
15083.           **DR. PAUL PAQUET:** Yes, and I think in our view there's a definite need. And even some of the information that we've already collected is probably old at this point.
15084.           And the need is to expand essentially what we did, both geographically and temporally, and continue that for a lengthy period of time because these surveys, I think, as you're probably well aware of now, need to be extended spatially throughout the region of interest.
15085.           And the temporal side is that they -- we need to do seasonal work to augment the work that's already been done.
15086.           And there are also substantial changes that are occurring within the same environment where we did our surveys, and so we expect to see change over time, in both the habitats that are of significance for a particular species, and even the presence of various species.
15087.           **MS. ESTEP:** Thank you.
15088.           And is Raincoast planning to do any additional survey work itself?
15089.           **DR. PAUL PAQUET:** Raincoast is definitely interested in doing

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- additional survey. The problem, of course, is always support and funding to do that. It's very expensive, and we're a very small organization.
15090.           **MS. ESTEP:** Northern Gateway has had preliminary discussions with Raincoast about working together on the marine mammal density surveys that Northern Gateway is going to undertake.
15091.           **DR. PAUL PAQUET:** We have, yes.
15092.           **MS. ESTEP:** And is that something that Raincoast will consider participating in?
15093.           **DR. PAUL PAQUET:** We definitely would consider participation.
15094.           **MS. ESTEP:** And this effort could also involve groups such as Northcoast Cetacean or universities?
15095.           **DR. PAUL PAQUET:** That's correct, yes.
15096.           **MS. ESTEP:** And possibly DFO?
15097.           **DR. PAUL PAQUET:** Yes.
15098.           **MS. ESTEP:** And the possibility of including other vessel operators in the region in those surveys has also been discussed?
15099.           **DR. PAUL PAQUET:** That was also discussed, yes.
15100.           **MS. ESTEP:** So I'd like to talk a little bit about vessel strikes. I'll just wait.
- (A short pause/Courte pause)
15101.           **MS. ESTEP:** Okay, I'd like to move on and talk about vessel strikes.
15102.           So were you aware that Northern Gateway has committed to undertake quantitative modelling of vessel marine mammal strike risk to better delineate high-risk areas for marine mammal strikes and seasonal changes in those areas?
15103.           **DR. PAUL PAQUET:** I was aware of that, and I think others here are

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aware of that as well.

15104.           **MS. ESTEP:** And that work could be conducted through a collaborative approach?
15105.           **DR. PAUL PAQUET:** Certainly all of the work could be conducted collaboratively.
15106.           **MS. ESTEP:** Now, I understand that that type of work was done by Williams and O'Hara in 2009 for Dixon and Trent, Hecate Strait and Queen Charlotte Sound. Are you familiar with that work?
15107.           **DR. PAUL PAQUET:** Yes, that's published work.
15108.           **MS. ESTEP:** And were you aware that Northern Gateway used that work in the application to identify areas of potential concern at the north entrance to the CCAA and the southern entrance to Caamano Sound?
15109.           **DR. PAUL PAQUET:** Yes, Raincoast was aware of this.
15110.           **MS. ESTEP:** And Northern Gateway felt that this information was too coarse and, as a result, a finer scale vessel strike analysis was required and this is the work that they are now proposing to do?
15111.           **DR. PAUL PAQUET:** I've understood that that's the case.
15112.           **MS. ESTEP:** Is that something that Raincoast will consider participating in?
15113.           **DR. PAUL PAQUET:** I think that Raincoast would consider participating and collaborating with others, for sure.
15114.           **MS. ESTEP:** And you've had some preliminary discussions with Northern Gateway on what that participation might look like?
15115.           **DR. PAUL PAQUET:** We've had some, yes.
15116.           **MS. ESTEP:** Okay.
15117.           I have some questions about sea otters when you're ready.

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15118.           Okay. So you talk about sea otters in your evidence. Has Northern Gateway done any of its own surveying for sea otters?
15119.           **DR. PAUL PAQUET:** Northern Gateway or Raincoast?
15120.           **MS. ESTEP:** Sorry, Raincoast. Let's start with Raincoast.
15121.           **DR. PAUL PAQUET:** Well, the sea otters were included in the survey work that we did and there's been some observational work too but that would -- was mostly opportunistic.
15122.           **MS. ESTEP:** M'hm. And just to be clear, your evidence had referred to two personal communications about sea otters but I didn't see where any abundance or density information had been provided.
15123.           **DR. PAUL PAQUET:** There are some species of marine mammals that were included in the surveys where we lacked sufficient data to produce density and abundance estimates. So the samples were too small.
15124.           **MS. ESTEP:** So they're ---
15125.           **DR. PAUL PAQUET:** So that's the reason and I think if you look back through the 2009 technical report, you'll see other species as well that we just could not develop density maps and cost surfaces for in abundance.
15126.           **MS. ESTEP:** And Northern Gateway did its own dedicated sea otter survey?
15127.           **DR. PAUL PAQUET:** That's correct, yes.
15128.           **MS. ESTEP:** And in that survey, no sea otters were found within the CCAA but some were found outside of the CCAA; is that your understanding?
15129.           **DR. PAUL PAQUET:** That was the report, yes.
15130.           **MS. ESTEP:** Now, Northern Gateway's marine mammal TDR stated that sea otter ranges are believed to be expanding northward from Vancouver Island but the northern most extent of the range was currently unknown.

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15131. Do you agree with that statement, that the northern most extent of the range is presently unknown?

15132. **DR. PAUL PAQUET:** I'll defer to Brian on this if that's okay.

15133. **MR. BRIAN FALCONER:** I think that if you're looking at an absolute range, there are certainly sightings. And I think some of the sightings were noted in -- I've been involved in many of the research projects on our vessel and we continue to report sea otter sightings and those basically have been, without question, increasing sightings moving northward

15134. There -- if you have rafts of sea otters in a particular location, I guess that's pretty much extent of the range of sea otters. So if you look at those sightings you can see that at least these are the furthest north sightings that we have and I guess that would then indicate probably the range.

15135. **MS. ESTEP:** Okay. And your evidence referred to two personal communications; is that right?

15136. **DR. PAUL PAQUET:** That's correct, yes.

15137. **MS. ESTEP:** Now, Northern Gateway has acknowledged that sea otters might inhabit coastal areas in the CCAA during the life of the project?

15138. **DR. PAUL PAQUET:** That's correct.

15139. **MS. ESTEP:** And in your evidence, you stated that:

*"In the marine transportation ESA, Enbridge did not assess future project impacts on sea otters." (As read)*

15140. That's what you said?

15141. **DR. PAUL PAQUET:** Yes, that's our interpretation. I don't think we thought the acknowledgement was an assessment.

15142. **MS. ESTEP:** M'hm. And you also say that that failure to assess project impacts on sea otters, as you put it, was a serious shortfall.

15143. **DR. PAUL PAQUET:** We felt it was a serious shortfall, particularly

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- because the expectation was that otters would be in the area ---
15144.           **MS. ESTEP:** M'hm. So in saying ---
15145.           **DR. PAUL PAQUET:** --- in the future.
15146.           **MS. ESTEP:** Okay.
15147.           **DR. PAUL PAQUET:** Yeah.
15148.           **MS. ESTEP:** In saying that, that it was a serious shortfall and that we didn't assess it, are you talking about project impacts from routine operations or project impacts from spills?
15149.           **DR. PAUL PAQUET:** Both.
15150.           **MS. ESTEP:** Okay. In the case of routine operations, it's my understanding that there is no obvious effects pathway between transiting vessels and sea otters and that collisions between vessels and sea otters are not well documented; do you agree with that?
15151.           **DR. PAUL PAQUET:** I don't think that we were focusing on collisions. I would agree with what you said but I don't think we were concerned particularly about collisions.
15152.           **MS. ESTEP:** So what did you have in mind in terms of a routine effect?
15153.           **DR. PAUL PAQUET:** Their displacement. A combination of noise, presence ---
15154.           **MS. ESTEP:** Okay but ---
15155.           **DR. PAUL PAQUET:** --- alienation that occurs just as a consequence of increased activities.
15156.           **MS. ESTEP:** M'hm. But Raincoast hasn't provided any evidence on effects pathways between tankers and sea otters?
15157.           **DR. PAUL PAQUET:** We didn't provide evidence, no.

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15158.           **MS. ESTEP:** Now, with respect to spills, Northern Gateway has acknowledged that oil spills are considered the greatest threat for sea otters. Were you aware of that?
15159.           **DR. PAUL PAQUET:** Yes.
15160.           **MS. ESTEP:** But were you also aware that Northern Gateway considered sea otter habitat to be sensitive habitat for the purpose of spill analysis?
15161.           **DR. PAUL PAQUET:** I don't remember and can I ask the rest of the panel?
15162.           Yes, I think part of the panel is aware but I don't remember it specifically on that question.
15163.           **MS. ESTEP:** Okay. And did you also know that the ecological risk assessment application or the ecological risk assessment included sea otters as one of the receptors for marine -- for the marine environment in Wright Sound?
15164.           **DR. PAUL PAQUET:** Yes, I was aware of that.
15165.           **MS. ESTEP:** And specifically, that sea otters were considered as a special case in that assessment because they could recolonize the area at some time in the future?
15166.           **DR. PAUL PAQUET:** Yes, that was stated several times.
15167.           **MS. ESTEP:** And again, Northern Gateway is going to include updated sea otters distribution information as part of oil spill response planning and areas identified as sensitive sea otter habitat will be taken into account during planning of oil spill response activities?
15168.           **DR. PAUL PAQUET:** If I understood, is that ongoing or is that something that's occurring now or is that some future decision?
15169.           **MS. ESTEP:** That is a commitment that Northern Gateway had made.

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15170.           **DR. PAUL PAQUET:** That's a commitment. And is it also a question?
15171.           **MS. ESTEP:** I'm just asking if you're aware of all that because when you made those assertions in your evidence it seemed like you weren't.
15172.           **DR. PAUL PAQUET:** I think that that commitment was not known at the time, no. I wasn't aware of that current commitment.
15173.           **MS. ESTEP:** Okay. So I'd like to talk to you about your risk analysis that you've put in your evidence. So this is starting at paragraph 62 of D170-2-6, at page 36. Dash 2-7 please, Adobe page 3.
15174.           So starting at paragraph 62 of that evidence, you provided what you described as a rigorous assessment of risk that consists of three paragraphs and five figures. So who authored that particular evidence?
15175.           **DR. PAUL PAQUET:** Several of us authored that, and again, we worked collaboratively on that working with Andrew Rosenberger and myself and Misty MacDuffee as well.
15176.           **MS. ESTEP:** Okay. And maybe you can each speak to this but what experience or previous expertise do you have in risk assessment?
15177.           **DR. PAUL PAQUET:** Would you like each of us to speak with that?
15178.           **MS. ESTEP:** Sure.
15179.           **DR. PAUL PAQUET:** Okay. I've done previous risk assessments for terrestrial mammals, as well as I've done emergency response risk assessment for fire, and this is another hat which is a bit different from this but it's still risk assessment.
15180.           The others can speak for themselves on this.
15181.           **MS. MISTY MacDUFFEE:** I'm familiar with the literature on risk assessment.
15182.           **MR. ANDREW ROSENBERGER:** I, as well am familiar with the literature.

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15183.           **MS. ESTEP:** And did you have any assistance from anyone else in preparing this portion of your evidence?
15184.           **DR. PAUL PAQUET:** No, I don't believe that we did. We may have consulted with others but I don't remember.
15185.           **MS. ESTEP:** Now, in Part 2, 3 and 4 of your evidence you selected marine mammals, marine birds and salmonids for this risk assessment approach, but you could have chosen other wildlife groups; is that correct?
15186.           **DR. PAUL PAQUET:** We certainly could have. As well as we could have chosen economic factors, we could have chosen social factors, a variety of things that could have been included in a risk assessment and particularly a comprehensive one.
15187.           **MS. ESTEP:** M'hm. So the decision to select only those three groups was a decision made by Raincoast?
15188.           **DR. PAUL PAQUET:** That was our own decision and it was limited to the data that we had available.
15189.           **MS. ESTEP:** So those selections involve some judgment on your part?
15190.           **DR. PAUL PAQUET:** Only judgment in the sense of what was available to us and the short time that we had to prepare it.
15191.           **MS. ESTEP:** Okay. Ms. Niro, could I ask you to please turn up Exhibit B23-34, at page 134? Maybe you can just squeeze it down a little bit so we can see the whole page. It might make it a little small but -- thank you, that's perfect.
15192.           So this is Table 8-2 of the marine shipping QRA which was prepared by DNV. And can you please confirm that you used the 10 DNV segments that are shown on the top row of that table, the types of incidents shown on the left-hand side and the total probabilities for each segment shown on the bottom row of the table in your risk assessment work?
15193.           **DR. PAUL PAQUET:** Yes, I'll let Andy speak to that, but we did

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- use this information.
15194.           **MR. ANDREW ROSENBERGER:** That's correct.
15195.           **MS. ESTEP:** So you used the information from this table in your risk analysis to convert the total probabilities for all types of incidents to a return period in years?
15196.           **MR. ANDREW ROSENBERGER:** That's correct.
15197.           **MS. ESTEP:** And the probabilities calculated by DNV are for specific segments of the shipping route as illustrated in their report; correct?
15198.           **DR. PAUL PAQUET:** That's correct.
15199.           **MS. ESTEP:** And the probabilities reflect differences in visibility, meteorological and ocean conditions, proximity to navigational aids or amounts of vessel traffic for each of those segments; right?
15200.           **DR. PAUL PAQUET:** That's correct, yes.
15201.           **MS. ESTEP:** And the conditions used to calculate the probabilities are specific to each segment. Is that right?
15202.           **DR. PAUL PAQUET:** That's our understanding, yes.
15203.           **MS. ESTEP:** Ms. Niro, could we please go to D170-2-7, at page 5?
15204.           So this is Figure 8 of your evidence. Now, the polygons shown on Figure 8 -- and maybe I'll just stop there. When you speak about polygons you're talking about the coloured areas shown on the map; right?
15205.           **MR. ANDREW ROSENBERGER:** Yeah, correct.
15206.           **MS. ESTEP:** So the polygons shown on Figure 8 are not from the DNV report, those were developed by Raincoast?
15207.           **MR. ANDREW ROSENBERGER:** That's correct.
15208.           **MS. ESTEP:** Now, Figure 8 is intended to show possible return

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periods for a spill and not a spill trajectory or spill extent; right?

15209.           **DR. PAUL PAQUET:** Yeah, that's correct.

15210.           **MR. ANDREW ROSENBERGER:** That's correct.

15211.           **MS. ESTEP:** So I'd like to better understand how you developed the specific shapes of the polygons shown in this figure. So at paragraph 62 of your evidence you stated that:

*"In ArcGIS, the segment probability was extended outwards from the intersection point between segments using a geo-referenced shipping line to create polygons assigned the probability value..."*

15212.           And quite frankly I didn't totally follow that. So can we just go through it?

15213.           **MR. ANDREW ROSENBERGER:** For sure. Absolutely.

15214.           **MS. ESTEP:** Okay. So for example, why are some of the boundaries perpendicular to the route? And I'm talking about the boundaries of the polygons. Why are some of them perpendicular to the route?

15215.           **MR. ANDREW ROSENBERGER:** So essentially the intersection points between each segment, which aren't actually indicated on this map but you can broadly tell where they are by where the colours intersect, where there was two segments abutting each other than it's very easy to draw a perpendicular.

15216.           But where there's three segments abutting each other, so in the case of Segment 7, 9 and 8, to draw a simple perpendicular from one of those segments would not be truly representative, in that if you look at -- so if you're looking at Segment 8 and Segment 9, the orange and the yellow, Segment 7 is also abutting at the intersection point. And so to draw a perpendicular between just 7 and 8 would not necessarily reflect the contribution of Segment 9 to those polygons.

15217.           **MS. ESTEP:** So are you simply dividing the angle between the two lines equally?

15218.           **MR. ANDREW ROSENBERGER:** Yeah, that's pretty much

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- correct, yes.
15219.           **MS. ESTEP:** So does the placement of the boundaries involve some judgment on your part?
15220.           **MR. ANDREW ROSENBERGER:** In this case yes, because they were done by eye, yes.
15221.           **MS. ESTEP:** And in terms of the colour gradient -- Ms. Niro, if you could just scroll up a little bit. Thank you.
15222.           In terms of the colour gradient shown for the spill return periods, I notice that there is about 4,000 years between the top two levels -- just scroll up a little bit more -- and about 600 years between the bottom two levels.
15223.           So they're not relative steps between those colour assignments; is that correct?
15224.           **MR. ANDREW ROSENBERGER:** Yes, it's just based on a categorical colour ramp in our GIS.
15225.           **MS. ESTEP:** Okay. And I take it that you could have chosen any colour scheme. Is that correct, it didn't have to be red to yellow?
15226.           **MR. ANDREW ROSENBERGER:** That's correct.
15227.           **MS. ESTEP:** It could have been green to blue like your other maps?
15228.           **MR. ANDREW ROSENBERGER:** M'hm.
15229.           **MS. ESTEP:** But red in this case indicates the highest risk; is that right?
15230.           **MR. ANDREW ROSENBERGER:** That's correct. In this case it actually is not risk in this case it's actually probability and it indicates the lowest return period.
15231.           **MS. ESTEP:** Okay. So would you agree with me that the colours are deliberately emotive?

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15232.           **DR. PAUL PAQUET:** Yes, they're intended to be. Red is usually what you -- you know -- typically would use in this type of mapping to indicate an area of high probability, or if it was to be at-risk map that red would again typically be used.
15233.           There is one other consideration we have though that you should also understand, is that 10 percent of the male population is red/green colour blind and so there's certain maps that aren't seen by males and so we do take that into account.
15234.           **MS. ESTEP:** Okay. Now, the lowest return period on the map is 1,027 years; right?
15235.           **DR. PAUL PAQUET:** That's correct, yes.
15236.           **MS. ESTEP:** Now, isn't that still a pretty long time? Like by my math that's at least 30 human generations; right?
15237.           **MR. ANDREW ROSENBERGER:** That is a long time, yes. A thousand (1,000) years is a long time.
15238.           **MS. ESTEP:** Would you agree it's about 30 human generations?
15239.           **MR. ANDREW ROSENBERGER:** I haven't done the math, but sure.
15240.           **MS. ESTEP:** But you're a biologist ---
15241.           **MR. ANDREW ROSENBERGER:** Approximately, true, yeah.
15242.           **DR. PAUL PAQUET:** I might comment on that. However, as we noted in our submission, is that we used this information but we didn't accept it as being necessarily valid.
15243.           **MS. ESTEP:** No, I understand that caveat.
15244.           **DR. PAUL PAQUET:** There's all sorts of statistical problems associated with these return periods, and so -- and we can discuss those, if you like, as well.

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15245.           **MS. ESTEP:** Yeah, I'm just focusing on your map and what you've  
---
15246.           **DR. PAUL PAQUET:** Yes.
15247.           **MS. ESTEP:** --- put up as the return period.
15248.           Now, have you assumed that the probability of a spill or the return  
period is the same across the entire area covered by each polygon?
15249.           **MR. ANDREW ROSENBERGER:** For the purposes of our  
analysis, yes, that is correct. The geospatial extent of each of these polygons --  
the geographic extent of them is assigned all the same probability. As you can see  
from each colour, each colour is the same across the board.
15250.           **MS. ESTEP:** It's uniform?
15251.           **MR. ANDREW ROSENBERGER:** Correct.
15252.           **MS. ESTEP:** And do you have any independent authority to support  
your choice to apply a uniform return period across the entire area that you chose  
to use for the polygon?
15253.           **DR. PAUL PAQUET:** No.
15254.           **MR. ANDREW ROSENBERGER:** No.
15255.           **MS. ESTEP:** But for areas that are further away from each route  
segment, wouldn't the return periods change, given the factors such as visibility,  
meteorological and ocean conditions, proximity to navigational aids or amounts  
of vessel traffic that are different?
15256.           **MR. ANDREW ROSENBERGER:** That's quite possible. But in  
this case this is only using the probabilities that were presented in that table that  
you showed, 8.2. So if the ship was somewhere else, not on those lines, then  
there may be different considerations.
15257.           **MS. ESTEP:** Okay, let's have a look at Polygon 9 for example. Now  
-- so DNV assessed risk along their segments, which is in the open water area of  
Hecate Strait. Wouldn't you agree that the risk of grounding, for example, would

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- be higher for a vessel travelling closer to Haida Gwaii as opposed to further offshore?
15258.           **MR. BRIAN FALCONER:** I could speak to that. I've spent quite a few hours, and days, and weeks, and months in Hecate Strait. Some of the shallowest parts are in the northern part between Prince Rupert and Sandspit and some of the deepest parts are adjacent to and the Moresby Trough adjacent to Haida Gwaii. So the answer to that would be no.
15259.           There is a relatively narrow channel in the northern part of Hecate Strait which is deep enough for supertankers.
15260.           **MS. ESTEP:** Would you agree that, in general, and just generally speaking, that the safest part for tanker travel is going to be in the middle of these routes rather than closer to the land on either side?
15261.           **MR. ANDREW ROSENBERGER:** I wouldn't necessarily agree, but I'm not, as we've established, an expert on shipping.
15262.           **MS. ESTEP:** M'hm. Well, what do you think?
15263.           **MR. BRIAN FALCONER:** No, as I mentioned, it's not necessarily the case. There are very deep waters very adjacent to Haida Gwaii and very shallow waters in the middle of Hecate Strait, shallow enough to ground a supertanker.
15264.           **MS. ESTEP:** Okay. But you'll agree that there's variation along that?
15265.           **MR. BRIAN FALCONER:** Certainly. And I think Mr. Rosenberger can speak to the fact that this was never intended to be at that level of variation. But I just wanted to correct the record that certainly it's not necessarily how far away you are from land, how shallow things get. I've spent 30 years -- 35 years trying to avoid the shallow spots.
15266.           **MS. ESTEP:** Sure. And I'm not trying to oversimplify I'm just trying to understand the evidence.
15267.           So in some cases the coloured areas are in areas where Northern Gateway is not expecting vessels to be calling on the -- that are calling on the

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Kitimat Terminal to be using. Would you agree with that?

15268.           **MR. ANDREW ROSENBERGER:** I would agree with the expecting, yes.
15269.           **MS. ESTEP:** So for example, I'm thinking of areas down here shown on the map near Port Hardy or areas north -- quite a bit north of Prince Rupert, for example.
15270.           **MR. ANDREW ROSENBERGER:** Our understanding is that would be correct.
15271.           **MS. ESTEP:** Okay. So based on this figure you've assessed risk in areas where vessels associated with the project will not be travelling?
15272.           **MR. ANDREW ROSENBERGER:** Given that narrow definition correct, yes.
15273.           **MS. ESTEP:** Ms. Niro, could we please go to D170-2-7, at page 6? It's just the next page over in that same document -- sorry.
15274.           **DR. PAUL PAQUET:** Just to add a clarification here and possibly a better understanding of the spatial extent of the coloured zones. Those are really zones of influence. And so what we're looking at is the potential and the relative probabilities of an event occurring within each of those zones, and then they're extended out as areas of potential influence.
15275.           **MS. ESTEP:** Okay. So let's look at Figure 9b on the right-hand side. And if you could just blow that up a little bit, Ms. Niro. Thank you.
15276.           Now, as I understand it, this figure was prepared by multiplying the combined density for four species of whales by the recovery periods shown in Figure 8; is that right?
15277.           **MR. ANDREW ROSENBERGER:** I believe we actually used the probability from the table not the return period.
15278.           **DR. PAUL PAQUET:** Exactly.
15279.           **MR. ANDREW ROSENBERGER:** But because it's an inverse

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- relationship it's essentially the same number but we used the probabilities not the return period.
15280.           **MS. ESTEP:** Okay. But what you've shown on Figure 8 is return period?
15281.           **MR. ANDREW ROSENBERGER:** That's correct.
15282.           **MS. ESTEP:** So if we could just talk about that.
15283.           **MR. ANDREW ROSENBERGER:** We can, but that's not how this map was generated.
15284.           **MS. ESTEP:** Okay. Fair enough.
15285.           Now, what unit is shown in Figure 9b in the legend there? Again you've got highest to lowest. Is there a number or a unit that's assigned to that or how is that broken down?
15286.           **MR. ANDREW ROSENBERGER:** Essentially, again this is a categorical classification. So it's density times probability. In this figure there are no units.
15287.           **MS. ESTEP:** Could you just make the figure a little bit bigger, Ms. Niro? Thank you.
15288.           So is the reason that the area in southern Principe Channel and Nepean Sound is ranked red is that there are higher whale densities there and the incident probability is higher? So I'm looking at this are right here -- oh, here -- sorry.
15289.           **MR. ANDREW ROSENBERGER:** That would be correct, yes.
15290.           **MS. ESTEP:** And as we've discussed, that is the same area that Northern Gateway has identified as the core humpback whale area; agreed?
15291.           **DR. PAUL PAQUET:** That's correct.
15292.           **MS. ESTEP:** Now, if we look at the area south of that area in Figure 9b we see a number of orangey/red pixels that also suggest increased risk to marine mammals from oil spills. Mr. Green will point that out. Do you see that?

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15293.           **MR. ANDREW ROSENBERGER:** I do see it.
15294.           **MS. ESTEP:** So the southern boundary of that same coloured area in Figure 9b corresponds with the southern boundary of your Polygon 7 on Figure 8?
15295.           **MR. ANDREW ROSENBERGER:** That would be correct, yeah.
15296.           **MS. ESTEP:** Okay. Now, on Figure 9a, which is just the one to the left, Ms. Niro, if you could just scroll over? Thank you.
15297.           Now, the whale density is moderate, yellow, or lower in that same area. Is that right?
15298.           **MR. ANDREW ROSENBERGER:** The yellow would be medium density, lower than red, yes.
15299.           **MS. ESTEP:** Okay. So the orange in Figure 9b reflects your ranking of the polygon in Figure 8?
15300.           **MR. ANDREW ROSENBERGER:** The -- are you referring to the specific colour or -- it's a calculation based on density times probability. And then the map on the right, Figure B, is categorized based on that calculation.
15301.           **MS. ESTEP:** And it reflects the polygon ranking that you provided in Figure 8.
15302.           **MR. ANDREW ROSENBERGER:** Correct. Essentially, what happens is each grid square, it was assigned the same risk, as we've discussed -- the same probability, sorry.
15303.           **MS. ESTEP:** M'hm.
15304.           **MR. ANDREW ROSENBERGER:** And so the grid square, you can see the pixilation so each of those as a grid square, is also assigned a density, and so the grid square is multiply the density times the probability. And so in essence, all of the grid squares from the left-hand map, the density, were multiplied by the corresponding grid square from the risk map.
15305.           **MS. ESTEP:** Okay. Thank you.

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15306. Now, if we could just go to Figure 10b, which is on the -- page 7, Ms. Niro. And again, it's the one on the right-hand side. Perfect.
15307. So if the boundary of Polygon 7, or any of the other polygons shown in Figure 8, changed, then the colour coding on Figures 9b and 10b indicating the relative risk areas would also change.
15308. **MR. ANDREW ROSENBERGER:** Yes, that's correct.
15309. **MS. ESTEP:** Now, if the return periods shown on your Figure 8 changed, then the risk to the marine mammals in Figure 9b and 10b would also change; right?
15310. **MR. ANDREW ROSENBERGER:** Yes.
15311. **MS. ESTEP:** So did your risk analysis include Douglas Channel and Kitimat Arm? It's hard to tell from the figure.
15312. **MR. ANDREW ROSENBERGER:** It did.
15313. **MS. ESTEP:** So would you agree with me that it seems like those areas are some of the lowest-risk areas shown on the map?
15314. **MR. ANDREW ROSENBERGER:** Yes.
15315. **MS. ESTEP:** Now, Ms. Niro, could I please ask you to turn up the DNV report? Keep these figures handy. But it's B23-34 at page 35.
15316. Okay. Now, this is to give you the big picture view, so just have a look at that map. Have you reviewed this map before?
15317. **MR. ANDREW ROSENBERGER:** I've seen it, yeah.
15318. **MS. ESTEP:** Okay. Now, if we could just flip to the next page, page 36 in the same document.
15319. So this is now a zoomed-in version of that previous map, and I'd like you to focus on the intersection point between segments 6, 7 and 8 and 9 -- 7, 8 and 9. Okay?

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15320.           **MR. ANDREW ROSENBERGER:** M'hm.
15321.           **MS. ESTEP:** Now, you'll agree that this point is west of the south end of Caamano Sound and Rennison Island? Do you see that?
15322.           **MR. ANDREW ROSENBERGER:** Correct, yeah.
15323.           **MS. ESTEP:** And it's directly ---
15324.           **MR. ANDREW ROSENBERGER:** It's west of it, yes.
15325.           **MS. ESTEP:** Okay. And directly south of the southwest end of Banks Island.
15326.           **MR. ANDREW ROSENBERGER:** Correct.
15327.           **MS. ESTEP:** Okay. And now let's compare that to your Figure 8 in D170-2-7 at page 5.
15328.           So Ms. Niro, if I could ask you to pull that back up, page 5.
15329.           So let's look again at the intersection point between segments 7, 8 and 9. And do you agree that that intersection is straight south of the southwest tip of Banks Island and is a line almost west of Bella Bella?
15330.           **MR. ANDREW ROSENBERGER:** Correct.
15331.           **MS. ESTEP:** So your Polygon 7 is shown extending substantially further south from what DNV showed to a point that is about 60 to 65 nautical miles further south than the point in the DNV figures.
15332.           **MR. ANDREW ROSENBERGER:** That's correct. And as referenced in our evidence, we used a different map than you have showed us, and it is was georeferenced from Enbridge's evidence. And I'm just -- I can look up what -- where the actual exhibit that that's from.
15333.           **MS. ESTEP:** Well, we can have a look at that, but let's just finish this line of questioning.

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15334.           So based on what was shown in the DNV figures, your red Polygon 7 should not have extended down to Bella Bella. Rather, it should have ended just west of Caamano Sound; right?
15335.           **MR. ANDREW ROSENBERGER:** If I had used that map, then the polygon would have been drawn differently, yes.
15336.           **MS. ESTEP:** Okay. And Polygon 8 would have extended up further north on the coast of Haida Gwaii; right?
15337.           **MR. ANDREW ROSENBERGER:** Correct, yeah, probably.
15338.           **MS. ESTEP:** And in turn, this would change the ratings on your Figures 9b and 10b for marine mammals.
15339.           **MR. ANDREW ROSENBERGER:** That's correct. It would change the categorical -- it would change the calculation because the probability for each grid square would have changed; correct.
15340.           **MS. ESTEP:** Okay. Now, was this same return period map and approach used to develop the risk analyses for marine birds and salmonids?
15341.           **MR. ANDREW ROSENBERGER:** I believe all of them used the same grid squares map, yes.
15342.           **MS. ESTEP:** Thank you.
15343.           Okay, I was going to leave that now.
15344.           Okay, I'd like to turn to you, Ms. Terhune. Am I pronouncing that correctly?
15345.           **MS. KATIE TERHUNE:** It's very close.
15346.           **MS. ESTEP:** Okay.
15347.           **MS. KATIE TERHUNE:** Terhune.
15348.           **MS. ESTEP:** Terhune, okay.

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15349. Now, I understand that you are the energy campaign manager for Living Oceans Society?
15350. **MS. KATIE TERHUNE:** I was at the time of submitting written evidence. At this time, because I am going to graduate school full-time, I'm working under contract for Living Oceans.
15351. **MS. ESTEP:** Okay. So what is your position currently?
15352. **MS. KATIE TERHUNE:** I'm just a contractor.
15353. **MS. ESTEP:** So not currently the energy campaign manager?
15354. **MS. KATIE TERHUNE:** I'm not currently ---
15355. **MS. ESTEP:** Okay.
15356. **MS. KATIE TERHUNE:** --- the energy campaign manager ---
15357. **MS. ESTEP:** Thank you.
15358. **MS. KATIE TERHUNE:** --- for Living Oceans.
15359. **MS. ESTEP:** And I apologize. I was confused by the fact that your CV was filed with the Forest Ethics evidence, so I didn't have that when I was preparing this. But what did you do prior to working at Living Oceans?
15360. **MS. KATIE TERHUNE:** My prior experience is actually field experience, geological as well as habitat and conservation.
15361. **MS. ESTEP:** Okay. I understand that your position with Living Oceans has changed, but how long did you hold the position of energy campaign manager?
15362. **MS. KATIE TERHUNE:** I was with Living Oceans for nearly three years. I started as an intern for my first five months there, and I believe I was the energy campaign manager for about two years and three months, that general range.
15363. **MS. ESTEP:** Okay. And your written evidence stated that you were

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- accountable for the development and implementation of the Living Oceans Energy Campaign. So what does that refer to?
15364.           **MS. KATIE TERHUNE:** It just refers to my role at Living Oceans. In the manager position, I worked with our Executive Director at the time to develop the direction that the energy campaign within the organization went.
15365.           **MS. ESTEP:** But what is the energy campaign? What is that?
15366.           **MS. KATIE TERHUNE:** At the time that I was working there, it was focused quite a lot on Northern Gateway and the issue of introducing oil tankers to B.C.'s coast, as well as working on ocean acidification issues which is essentially the equivalent of climate change of the oceans.
15367.           **MS. ESTEP:** Okay. Did the campaign include attempting to stop new energy infrastructure, including pipelines?
15368.           **MS. KATIE TERHUNE:** The campaign focused on oil tanker traffic, so we do have the position that we would not like to see oil tankers introduced to British Columbia's inner coast, yes.
15369.           **MS. ESTEP:** And I understand that you have a Bachelor of Science Degree in geography?
15370.           **MS. KATIE TERHUNE:** That's correct.
15371.           **MS. ESTEP:** And when did you obtain that degree?
15372.           **MS. KATIE TERHUNE:** I graduated from the University of Victoria in June of 2006.
15373.           **MS. ESTEP:** And you do not have a degree in naval architecture?
15374.           **MS. KATIE TERHUNE:** No.
15375.           **MS. ESTEP:** Marine or maritime engineering?
15376.           **MS. KATIE TERHUNE:** No.
15377.           **MS. ESTEP:** Mechanical engineering?

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15378.           **MS. KATIE TERHUNE:** No, although I wish I did.
15379.           **MS. ESTEP:** Or any other type of engineering?
15380.           **MS. KATIE TERHUNE:** No, I am not an engineer.
15381.           **MS. ESTEP:** Now, Living Oceans filed a report that you adopted in your direct evidence, “The Tanker Technology Limitations of Double Hulls”. The acknowledgements in that report say that the report was made possible through the generous support of the Tar Sands Campaign Fund of Tides Foundation. By “made possible”, do you mean that the report would not have been prepared without that funding?
15382.           **MS. KATIE TERHUNE:** That’s correct.
15383.           **MS. ESTEP:** And that report was prepared for a broad public audience?
15384.           **MS. KATIE TERHUNE:** That’s correct.
15385.           **MS. ESTEP:** Would you describe it as a popular report?
15386.           **MS. KATIE TERHUNE:** If I was to adopt Paul’s definition of popular report, in that it’s meant to provide information to stimulate rational dialogue among the public audience to provide educated materials, then yes, I would agree with that.
15387.           **MS. ESTEP:** That report is posted on the Living Oceans website?
15388.           **MS. KATIE TERHUNE:** Yep.
15389.           **MS. ESTEP:** Along with a press release?
15390.           **MS. KATIE TERHUNE:** That’s correct.
15391.           **MS. ESTEP:** And an easy-to-digest backgrounder with key points about double-hulled tankers?
15392.           **MS. KATIE TERHUNE:** Yes.

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15393.           **MS. ESTEP:** And is that also part of Living Oceans energy campaign?
15394.           **MS. KATIE TERHUNE:** Yes.
15395.           **MS. ESTEP:** But other parties to this proceeding have relied on their report in their own evidence. Were you aware of that?
15396.           **MS. KATIE TERHUNE:** I am aware that a couple of other parties have adopted the evidence. It was not my decision for them to do that; that was something they undertook themselves.
15397.           **MS. ESTEP:** Okay, thank you.
15398.           Mr. Jasny, I have a few questions for you.
15399.           **MR. MICHAEL JASNY:** Please go ahead.
15400.           **MS. ESTEP:** So your submission is Exhibit D170-2-13, and I was trying to keep up with the direct evidence this morning, but just to confirm, that is your -- your evidence in this proceeding?
15401.           **MR. MICHAEL JASNY:** Yes, that's -- that's correct, and I don't have the docket number printed on my copy, but if you're referring to the document with the title "Submission of the Natural Resources Defense Council to the Joint Review Panel", then yes.
15402.           **MS. ESTEP:** Yes, and just so that, for your reference, that's Exhibit D170-2-13.
15403.           **MR. MICHAEL JASNY:** Thank you.
15404.           **MS. ESTEP:** And you're a senior policy analyst with the NRDC?
15405.           **MR. MICHAEL JASNY:** Yes, that's right.
15406.           **MS. ESTEP:** And where is your head office?
15407.           **MR. MICHAEL JASNY:** We're headquartered in New York City,

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New York.

15408.           **MS. ESTEP:** And I understand that you are a lawyer by training?
15409.           **MR. MICHAEL JASNY:** Yes, although I'm a policy analyst by practice.
15410.           **MS. ESTEP:** And in the past you've practised human rights law?
15411.           **MR. MICHAEL JASNY:** No, I -- that was something I -- I studied in law school and did a -- a fellowship for -- after I think my first year of law school.
15412.           **MS. ESTEP:** Okay. And how many courses have you taken in physics?
15413.           **MR. MICHAEL JASNY:** You mean at the college level?
15414.           **MS. ESTEP:** Or at any level?
15415.           **MR. MICHAEL JASNY:** One or two I think, in -- in high school.
15416.           **MS. ESTEP:** Okay, and what about acoustics?
15417.           **MR. MICHAEL JASNY:** None except -- except through -- through physics courses.
15418.           **MS. ESTEP:** Okay. Turning to your evidence then, your submission only cites Volume 1 and Volume 8B of Northern Gateway's application. Were those the only portions of Northern Gateway's evidence that you reviewed in preparing your written submission?
15419.           **MR. MICHAEL JASNY:** That -- those are the -- the portions that I focused on. It's likely that I consulted other portions as well to get a general scope of the project, but may not have cited those in the submission itself.
15420.           **MS. ESTEP:** Okay. At the time you prepared your submission, did you know that Northern Gateway had also filed two separate marine acoustics technical data reports and a number of IR responses on acoustics?

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15421.           **MR. MICHAEL JASNY:** No, I had not -- I have not reviewed them.
15422.           **MS. ESTEP:** Okay. Now, the NRDC is not an intervenor in its own right in this proceeding. Mr. Jasny, are you here today representing Raincoast or representing the NRDC?
15423.           **MR. MICHAEL JASNY:** I mean, I'm not entirely aware of how the -- of how the panel functions and what representation means. I know I'm speaking on behalf of NRDC, but the relationship between Raincoast, I can't speak to.
15424.           **MS. ESTEP:** Okay. So did you or someone else at the NRDC approach Raincoast and ask them if you could attach your submission to their evidence?
15425.           **MR. MICHAEL JASNY:** I -- I'm not entirely sure how that -- how the conversation began. I know that at least one other staff person at NRDC has -- has worked with Raincoast before. I know I got in contact with Paul during the comment process.
15426.           **MS. ESTEP:** But from -- from your comments, I don't -- I don't take it that the NRDC is a consultant to Raincoast.
15427.           **MR. MICHAEL JASNY:** No, we're not a consultant to Raincoast or at least -- I should say we're not a consultant to Raincoast with respect to my submission. I -- I don't know of any other -- if there's other -- another relationship between NRDC and Raincoast.
15428.           **MS. ESTEP:** Let me put it this way; Raincoast did not retain you to prepare the submission and file it on their behalf?
15429.           **MR. MICHAEL JASNY:** No.
15430.           **MS. ESTEP:** Thank you.
15431.           Now, on page 1 of your submission -- let's just bring that up if we could please. Madam Niro, 170-2-13.
15432.           Okay, so on page 1 you stated that:

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*“NRDC has helped lead the environmental community in advancing policy on the impacts of underwater noise on marine wildlife.”*

15433.           So what does advancing policy mean in the context of your participation in this Joint Review Panel proceeding?
15434.           **MR. MICHAEL JASNY:** About 20 years ago the -- the issue of ocean noise was not really on the landscape as a -- as a policy matter. There had been some science conducted along the west coast in the Arctic, but -- but very little policy.
15435.           Since then, NRDC has been engaged in a -- in a multi-sector basis to achieve regulatory compliance, particularly in the United States, but more broadly as well for major noise sources, and to -- to improve decision-making and alternatives analysis in mitigation.
15436.           The noise sources that we have been focused on have been oil and gas exploration, military activities, shipping and, to a lesser extent, pile driving. Our interest in -- in shipping is what has motivated my participation here.
15437.           **MS. ESTEP:** Now, on -- on this page -- Madam Niro, if you could just scroll up, last paragraph, thank you -- you state that:
- “...underwater noise generated by the project poses a significant risk to BC coastal wildlife...”*
15438.           Now, when you use that term “significant” in that context, you weren’t suggesting that you’ve performed an environmental assessment are you?
15439.           **MR. MICHAEL JASNY:** No, we have not performed an environmental assessment. I think that is a -- a qualitative statement.
15440.           **MS. ESTEP:** So what you’ve done here is presented a critique of what Northern Gateway has done; is that right?
15441.           **MR. MICHAEL JASNY:** Yes, that was the intent of the submission.
15442.           **MS. ESTEP:** And so when you say significant, that’s your own view?

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15443.           **MR. MICHAEL JASNY:** Yes, it's -- it's my view of the potential risk given the -- given the species present, given the -- the nature of the habitat, given the -- the noise that would be -- the acoustic output of the ships that would be used and putting those in the context of -- of existing literature.

15444.           **MS. ESTEP:** Now, on page 2, last paragraph, you state there that:

*“Should the [Northern or should the] Gateway project go forward as proposed, tankers would run the hazardous northern or southern route...”*

15445.           And that quote continues on from there. And your citation for that statement is Volume 1 of Northern Gateway's application.

15446.           Now, I suggest to you that nowhere in the application does Northern Gateway state that the northern or southern routes are hazardous. Again I take it that's your own view?

15447.           **MR. MICHAEL JASNY:** Yes, the use of the word “hazardous” is my own view.

15448.           The citation to the Enbridge Northern Gateway application was to the -- the number of -- the number of transits.

15449.           **MS. ESTEP:** Okay. And sir, have you ever been to Douglas Channel?

15450.           **MR. MICHAEL JASNY:** No, I have not.

15451.           **MS. ESTEP:** So are you aware that all of the proposed routes have been and are currently being used by freighters?

15452.           **MR. MICHAEL JASNY:** Yes, I am aware of that.

15453.           **MS. ESTEP:** And cargo ships?

15454.           **MR. MICHAEL JASNY:** Yes.

15455.           **MS. ESTEP:** And cruise liners?

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15456.           **MR. MICHAEL JASNY:** I -- I know that -- that cruise liners do operate in those areas. All the proposed routes I guess I can't speak to.
15457.           **MS. ESTEP:** Okay. And even tankers, such as those calling on the former Methanex terminal?
15458.           **MR. MICHAEL JASNY:** Smaller tankers, yes.
15459.           **MS. ESTEP:** And the same routes are being proposed to be used by LNG tankers?
15460.           **MR. MICHAEL JASNY:** Yes, I'm aware of -- of that proposal.
15461.           **MS. ESTEP:** Do you know how wide the narrowest point in the proposed route is?
15462.           **MR. MICHAEL JASNY:** I don't.
15463.           **MS. ESTEP:** Would you be surprised to hear that it's 1.4 kilometres?
15464.           **MR. MICHAEL JASNY:** No, that -- that wouldn't surprise me. I -- I understand that the route traverses narrow channels.
15465.           **MS. ESTEP:** Well, would you agree that 1.4 kilometres is the equivalent of 14 football fields placed end-to-end?
15466.           **MR. MICHAEL JASNY:** I suppose it depends on whether you're talking about American or Canadian football.
15467.           **MS. ESTEP:** Canadian.
- (Laughter/Rires)
15468.           **MR. MICHAEL JASNY:** Okay. I will concede that point.
15469.           **MS. ESTEP:** Okay. And you're here to speak about marine acoustics not marine -- marine navigation; right?
15470.           **MR. MICHAEL JASNY:** No. If -- if you're -- by marine navigation you mean navigational safety, no.

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15471.           **MS. ESTEP:** You're not here to speak to that? Sorry, I was getting confused ---

15472.           **MR. MICHAEL JASNY:** Well I guess could you clarify what you mean by marine navigation.

15473.           **MS. ESTEP:** Well, I'm taking this back to your comment about the hazard -- the routes being hazardous, and I'm just confirming that you're not really here to speak to that, you're here to speak about marine acoustics?

15474.           **MR. MICHAEL JASNY:** That's right. Although, I mean if -- obviously marine acoustics poses hazards in themselves.

15475.           **MS. ESTEP:** Okay. Now, were you aware that in July of 2012, Northern Gateway filed its framework marine mammal protection plan?

15476.           **MR. MICHAEL JASNY:** No, I was not.

15477.           **MS. ESTEP:** So you haven't reviewed that document?

15478.           **MR. MICHAEL JASNY:** I haven't reviewed that document. I have reviewed the -- the mitigation set forth in the original application.

15479.           **MS. ESTEP:** M'hm.

15480.           Ms. Niro, could you please turn up B85-2, at page 18?

15481.           And under the heading "Vessel Speed Restrictions",

15482.           **MR. MICHAEL JASNY:** M'hm.

15483.           **MS. ESTEP:** I'll just give you a moment to review that.

15484.           **MR. MICHAEL JASNY:** Yes, I believe that's consistent with what was set forth in the application.

15485.           **MS. ESTEP:** Okay. And it says that:

*"Vessel-based underwater sound typically increases with*

*speed...*”

15486. And you agree with that; right?

15487. **MR. MICHAEL JASNY:** Yes I do.

15488. **MS. ESTEP:** Now, the plan also states that:

*“...the maximum speed restriction for all Project-related tankers of 10 to 12 knots within the CCAA and 8 to 10 knots within the core humpback whale area during the 1 of May to the 1 of November, unless otherwise required for safe navigation, will help limit underwater noise.”*

15489. Were you aware of that?

15490. **MR. MICHAEL JASNY:** Yes, and I ---

15491. **MS. ESTEP:** It’s in the plan?

15492. **MR. MICHAEL JASNY:** I -- I would agree that that would have some -- some mitigation effect. But the operative word is -- is limit.

15493. **MS. ESTEP:** Okay. And measures for propeller maintenance are also described there to minimize underwater noise?

15494. **MR. MICHAEL JASNY:** Yes, I’ve seen that as well.

15495. **MS. ESTEP:** And in your evidence you describe those mitigation measures as indispensable elements; right?

15496. **MR. MICHAEL JASNY:** Yes, maintenance is -- is indispensable in order to -- to reduce cavitation.

15497. **MS. ESTEP:** And the speed restrictions as well; right?

15498. **MR. MICHAEL JASNY:** Yes, though it -- it’s worth noting that the speed restrictions here would not -- would not eliminate cavitation. That is to say it would not reduce speeds below the inception of cavitation which is the largest contributor to ocean noise from large vessels.

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15499.           **MS. ESTEP:** Do you know of any other Proponent that has committed to such measures in B.C. or elsewhere in Canada?
15500.           **MR. MICHAEL JASNY:** Well, B.C. and Canada I -- I can't speak to. I can if you wish to speak to the United States.
15501.           **MS. ESTEP:** No, that's fine.
15502.           Turning to page 3 then, you make the statement that:
- "In general, large tankers produce more underwater noise than any other class of commercial vessel..."*
15503.           **MR. MICHAEL JASNY:** That's correct.
15504.           **MS. ESTEP:** And as authority for that proposition your footnote 7 cites the National Resource Council (2003) Ocean Noise and Marine Mammals?
15505.           **MR. MICHAEL JASNY:** Yes.
15506.           **MS. ESTEP:** And that reference is to an entire book, is it not?
15507.           **MR. MICHAEL JASNY:** Yes, it's to a report from the National Research Council.
15508.           **MS. ESTEP:** But it's essentially a textbook isn't it?
15509.           **MR. MICHAEL JASNY:** Well, I mean not a textbook used for -- for academic purposes. It's -- it's a report from a committee of experts that reviewed the state of the science back in 2003 which was -- given that -- again this -- this issue didn't really emerge significantly until the mid-nineties, is a -- a significant time ago.
15510.           **MS. ESTEP:** Okay. And you provided no pinpoint page reference for that citation?
15511.           **MR. MICHAEL JASNY:** No, I did not.
15512.           **MS. ESTEP:** Would that type of vague referencing pass muster with

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- a peer-reviewed academic journal?
15513.           **MR. MICHAEL JASNY:** Actually, I mean from what I've seen of peer-reviewed academic journals in the sciences there aren't that kind of -- you don't see that kind insight; you see references to -- to articles.
15514.           **MS. ESTEP:** Okay. Well, I discovered that the entire book is available online. And I searched it for that statement and I could not find it. So will you agree with me that that certainly is not a direct quote?
15515.           **MR. MICHAEL JASNY:** I didn't use direct quotation marks, however, if you want to turn to the excerpt that you provided you could see this point represented in graphical form.
15516.           **MS. ESTEP:** Okay. Well let's do that. I provided an aid to question to your counsel and I think Ms. Niro has that as well. So if we could please go to page 5 of that document.
15517.           So was this figure the sort -- the source for the statement that large tankers produce more underwater noise than any other class of commercial vessel?
15518.           **MR. MICHAEL JASNY:** Yes, and I mean this is -- this is also represented in tabular form as well.
15519.           **MS. ESTEP:** Okay. But doesn't that figure show that supertankers are actually the loudest?
15520.           **MR. MICHAEL JASNY:** Yes, that's -- that's true.
15521.           **MS. ESTEP:** So your statement is not correct based on the figure; right?
15522.           **MR. MICHAEL JASNY:** There is a -- a very narrow division between the point where the VLCC vessel lanes end and the point where supertankers begin. It's on the order of feet.
15523.           **MS. ESTEP:** Okay.
15524.           **MR. MICHAEL JASNY:** So am -- would I -- do I take issue in the

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- fact that the NRC -- that large tankers within the context of the NRC refers to the yellow line rather than the red line, no I wouldn't, but I would note that the VLCCs used by -- or proposed in the application come extremely close to the cut off point for supertanker size.
15525.           **MS. ESTEP:** Okay. But it's your evidence and it's your source, and I have to go through the entire book to figure out what you were pointing to, and that's not what's shown in the figure; right?
15526.           **MR. MICHAEL JASNY:** It is a fair point.
15527.           **MS. ESTEP:** Okay. Now, more importantly, the modelling used to make this figure used the speed set out in Table 2. -- 2-3, and that's further down in the document; is that right?
15528.           **MR. MICHAEL JASNY:** That's correct.
15529.           **MS. ESTEP:** Now, Table 2-3 shows the speeds for supertankers were 7.7 to 11.3 metres per second; right?
15530.           **MR. MICHAEL JASNY:** Yes.
15531.           **MS. ESTEP:** And would you agree that that converts to 15 to 22 knots?
15532.           **MR. MICHAEL JASNY:** Roughly, yes.
15533.           **MS. ESTEP:** And the speed used for large tankers was 7.7 to 9.3 metres per second?
15534.           **MR. MICHAEL JASNY:** Yes.
15535.           **MS. ESTEP:** And again, that converts to 15 to 18 knots?
15536.           **MR. MICHAEL JASNY:** Yes, roughly.
15537.           **MS. ESTEP:** So based on the speed restrictions that Northern Gateway will implement, the project's tankers will be equivalent to merchant or fishing vessels, as shown in this table; right?

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15538.           **MR. MICHAEL JASNY:** No, that's not -- that doesn't necessarily follow. Vessel length is not the only factor in determining acoustic output from a vessel.
15539.           **MS. ESTEP:** I'm not talking about vessel length, I'm focusing on ---
15540.           **MR. MICHAEL JASNY:** Oh, sorry ---
15541.           **MS. ESTEP:** --- speed.
15542.           **MR. MICHAEL JASNY:** --- and speed. Yes, speed and vessel length are -- both of them are not the only factors in determining ---
15543.           **MS. ESTEP:** Okay, well, ---
15544.           **MR. MICHAEL JASNY:** --- the acoustic output of a vessel.
15545.           **MS. ESTEP:** --- we can talk about other factors, but I'm focusing specifically on the information in the table and I'm suggesting to you that Northern Gateway's speed limitations will be in the range of what's shown for merchant and fishing vessels on that table. Do you agree with that?
15546.           **MR. MICHAEL JASNY:** I agree with that. I don't agree with the proposition that that would mean that the acoustic output is the same as from a merchant to fishing boat.
15547.           **MS. ESTEP:** M'hm. And I wasn't asking you that.
15548.           **MR. MICHAEL JASNY:** I just wanted to clarify the point.
15549.           **MS. ESTEP:** Fair enough.
15550.           For acoustic emissions, the size of the vessel matters less than the speed that they are going. Would you agree with that, particularly, as the vessels get bigger?
15551.           **MR. MICHAEL JASNY:** Yeah, I -- I mean, speed is the factor that is -- that tends to be most strongly correlated with acoustic output when you're considering a wide class of vessels together.

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15552.           **MS. ESTEP:** Okay. And do you agree that acoustic emissions for Northern Gateway project-related tankers travelling in the CCAA will be less than what a normal supertanker, as modelled in Figure 3 -- or Figure 2-2 would be? I can ---

15553.           **MR. MICHAEL JASNY:** I would say, yeah, I -- I would say in one sense yes, in one sense no. And all things being equal, the -- if you have two ships operating in the same environment and they're the same class of vessel, so you're looking at VLCCs or other tankers as proposed, and one is travelling slower than another one, then it is quite likely that the ship that is travelling slower would have a lower acoustic output.

15554.           However, when you're considering biological facts you have to look not only at the acoustic output of the source, you have to look at the acoustic output at the receiver, which is to the say the animal. And there the operation of a vessel within the confined channels in which -- the constricted channels through which the proposed traffic would be moving and the complex bathymetry, can in fact increase the received level at the animal significantly.

--- (A short pause/Courte pause)

15555.           **MS. ESTEP:** Okay.

15556.           **MR. MICHAEL JASNY:** Could I modify an earlier response?

15557.           **MS. ESTEP:** Sure.

15558.           **MR. MICHAEL JASNY:** And maybe this is something I'm going to have to look at. It's just on the difference between large tankers and supertankers.

15559.           **MS. ESTEP:** M'hm.

15560.           **MR. MICHAEL JASNY:** It may be that for the Aframax and Suezmax, they certainly fall into the large tanker class, but the VLCCs that are used are significantly bigger. They really do fall right on the margins between large tanker and supertanker, and actually as the lengths I see as defined here, I believe they fall -- they may indeed fall into the supertanker category, being 245 metres in length. I would have to check that.

15561.           **MS. ESTEP:** M'hm.

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15562.           **MR. MICHAEL JASNY:** So in fact, I guess my original statement, on review, was correct, that supertankers or the large ships essentially used in the application, the VLCCs, are the class of vessels that produce, according to the NRC 2003 report, the greatest acoustic output of any commercial class of vessel.

15563.           **MS. ESTEP:** Just a minute please.

15564.           **MR. MICHAEL JASNY:** M'hm.

--- (A short pause/Courte pause)

15565.           **MS. ESTEP:** So if we compare the sound from a freighter travelling in the CCAA at 14 to 16 knots to a Suezmax or a VLCC tanker travelling at 8 to 12 knots in the CCAA, would you agree that reduced speeds will provide a benefit?

15566.           **MR. MICHAEL JASNY:** I think there's no argument that reduced speeds will provide a benefit.

15567.           **MS. ESTEP:** Okay. I'd like to turn to page 8 of your evidence. There you have a series of five points. I take it those -- or the fifth is on the next page, but we can just focus on these ones.

15568.           I take it that you're putting these forward as recommendations for the project? Is that -- how were these supposed to be taken?

15569.           **MR. MICHAEL JASNY:** Well, in general, the submission I made was aimed at critiquing the application and the application's analysis of marine mammal impacts from underwater noise. I intended these to be additional mitigation that ought to have been considered.

15570.           **MS. ESTEP:** Okay. So let's look at the first one, number 1 on that page. So did you know that Northern Gateway has committed to AIS being one method that it would use to determine compliance with its terminal regulations?

15571.           **MR. MICHAEL JASNY:** No, I assume this was in the 2012 release?

15572.           **MS. ESTEP:** Well, this is developed through the course of the evidence.

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15573.           **MR. MICHAEL JASNY:** Right. I was responding to the mitigation measures as set forth in the application.
15574.           **MS. ESTEP:** Okay. And the record has evolved since that point in time so I'm pointing out to you that Northern Gateway has made a commitment to AIS being one method that it would use during compliance with its terminal regulations.
15575.           So does that address that recommendation in part or in whole?
15576.           **MR. MICHAEL JASNY:** It may very well. I would have to look at the specifics but yes, it would certainly indicate that that has been considered.
15577.           **MS. ESTEP:** Okay. And if we look at item number 2 then, this is about fixed hydrophones. And I wanted to clarify first, when you say the "coastal area", do you mean there the CCAA or what do you mean exactly?
15578.           **MR. MICHAEL JASNY:** Yeah, it's predominantly the CCAA but I would say anywhere in which there is a transit near the coast.
15579.           **MS. ESTEP:** And did you know that Northern Gateway has committed -- has now committed to at least a four-year passive acoustic monitoring study two years prior to operation and two years after the start of operation, with an option for additional years, if required?
15580.           **MR. MICHAEL JASNY:** No, that is also something that was added.
15581.           I would guess I would ask you to clarify what the purpose of that monitoring study is.
15582.           **MS. ESTEP:** Okay, I'm advised that that was a commitment that was made right in Volume 8B of the application.
15583.           **MR. MICHAEL JASNY:** Then the distinction may be in the final clause of the point number 2. The idea is to establish a fixed hydrophone network or a number of fixed hydrophones which would aid in the dynamic mitigation of both vessel noise and ship strikes.
15584.           And there's a distinction between a passive network that's established

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- to monitor for noise in an area, detect marine mammal vocalizations for purposes of determining a presence or density, and the use of a fixed hydrophone system or network to help in mitigation.
15585.           The latter is very different, mechanically and logistically, it requires real-time monitoring and potentially different locations and densities of placement.
15586.           So I -- that's -- I guess my question would be -- this is why I've asked for clarification whether what Enbridge has proposed is a passive monitoring regime to aid in the dynamic mitigation of both vessel noise and ship strikes. And if the latter, I would ask why it's only limited to two years following the beginning of operations?
15587.           **MS. ESTEP:** Well, certainly the commitment has been to the passive acoustic monitoring but as the evidence has developed through the cross-examination of Northern Gateway's witnesses, Northern Gateway has indicated that if the passive acoustic monitoring is shown to be an effective way of using real-time detection that is something that could be reviewed further.
15588.           **MR. MICHAEL JASNY:** So just to clarify, Enbridge then has not made the commitment to establish such a system but only to review the benefit of installing one at a later date; is that correct?
15589.           **MS. ESTEP:** Well, the commitment has been -- the commitment has been to do the passive acoustic monitoring, but the methods have not been pinned down yet. So that's still under review.
15590.           **MR. MICHAEL JASNY:** Okay.
15591.           **MS. ESTEP:** So I'm just asking you if that begins to address the recommendation that you've made in number 2?
15592.           **MR. MICHAEL JASNY:** It sets a process for considering what I've -- what is proposed in point 2 but does not actually commit to doing what's set forth in part 2.
15593.           **MS. ESTEP:** Okay. And Northern Gateway has said that it will research the potential of real-time remote humpback whale detection techniques such as acoustic monitoring or land based radar. Are you aware of that?

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15594.           **MR. MICHAEL JASNY:** Generally, yes. Well, I wasn't aware of the land-based radar side.
15595.           **MS. ESTEP:** Okay. In your view, would collaboration with other parties on such a program be useful and something that you would encourage?
15596.           **MR. MICHAEL JASNY:** Yes.
15597.           **MS. ESTEP:** Okay, let's just look at your third item then.
15598.           **DR. PAUL PAQUET:** Could I get a clarification just on your question, if that's permitted -- previously?
15599.           I think there is some confusion between the phrasing and the difference between consideration and commitment. And I know in the application it was -- consideration is what was used and I think subsequent to that, has it become a commitment in the 2012 document?
15600.           **MS. ESTEP:** Northern Gateway is committed to the use of passive acoustic monitoring in some form.
15601.           **DR. PAUL PAQUET:** Okay. That's fine.
15602.           **MS. ESTEP:** Does that help?
15603.           **DR. PAUL PAQUET:** Yes it does. It's a commitment, it's not a consideration.
15604.           **MS. ESTEP:** Right.
15605.           **DR. PAUL PAQUET:** But with a qualification of some form?
15606.           **MS. ESTEP:** Yeah.
15607.           **DR. PAUL PAQUET:** Okay. Thank you.
15608.           **MS. ESTEP:** Okay, so let's look at number 3.
15609.           **MR. MICHAEL JASNY:** M'hm. Yes, please go ahead.

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15610.           **MS. ESTEP:** Okay. So we've talked in a couple of different occasions through the course of my questioning about those -- about the speed restrictions that Northern Gateway has committed to implement.
15611.           And I was going to -- and you know, specifically, the speed restrictions within the core humpback whale area of 8 to 10 knots during May 1<sup>st</sup> to November 1<sup>st</sup>.
15612.           **MR. MICHAEL JASNY:** M'hm.
15613.           **MS. ESTEP:** Now, wouldn't you agree that Northern Gateway has actually exceeded your recommendation in the most important area and time of year?
15614.           **MR. MICHAEL JASNY:** You mean the -- because -- can you repeat again the humpback whale cautionary area speed restriction?
15615.           **MS. ESTEP:** Sure. It's 8 to 10 knots.
15616.           **MR. MICHAEL JASNY:** I think in that sense, there -- I'm not sure I'd say exceed because of the range of speeds indicated, but certainly for that area, at that time, you would be observing the recommendation.
15617.           **MS. ESTEP:** Thank you.
15618.           Witnesses, you've been very responsive. I thank you for your answers and that completes my questioning for this panel.
15619.           **THE CHAIRPERSON:** Thank you, Ms. Estep.
15620.           Witnesses, the Panel has no questions of you.
15621.           Mr. Leadem, do you have any re-direct?
15622.           **MR. LEADEM:** I have one follow-up question if I may.

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**--- RE-EXAMINATION BY/RÉ-INTERROGATOIRE PAR MR. LEADEM:**

15623.           **MR. LEADEM:** Ms. Estep asked about you about the Douglas Channel and the Kitimat Arm in terms of risk. Did Raincoast perform any transects of marine mammals located within that area?
15624.           **DR. PAUL PAQUET:** Limited surveys in Douglas but not Kitimat Arm.
15625.           **MR. LEADEM:** That's the only question I had.
15626.           Thank you.
15627.           **THE CHAIRPERSON:** Thank you, Mr. Leadem.
15628.           Ms. Niro, could we get an AQ number please?
15629.           **THE REGULATORY OFFICER:** That will be AQ86.

**--- AID TO CROSS-EXAMINATION NO./AIDE AU CONTRE-INTERROGATOIRE No. AQ86-A:**

*Northern Gateway – Excerpts from a Report entitled “Ocean Noise and Marine Mammals” of the National Research Council of the National Academies*

15630.           **THE CHAIRPERSON:** Thank you, Ms. Niro.
15631.           Witnesses, the Panel thanks you for your presence today and for the evidence that you've been provided. And the magic words seem to be you are dismissed or released from this panel and everybody seems to smile over at that side of the table when those words are spoken. So thank you again.

--- (Witnesses are excused/Les témoins sont libérés)

15632.           **THE CHAIRPERSON:** So this concludes the questioning of the intervenor panels. We will begin at 8 o'clock on the 22<sup>nd</sup> of April with the Government of Canada panels.
15633.           For scheduling purposes, the Panel requests that parties file any

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updates to their time estimates for questioning the Government of Canada panels, that are listed now in filing A47445, by no later than 4 o'clock Pacific Standard Time on Tuesday, the 16<sup>th</sup> of April.

15634. So with that, thank you very much everyone, and we will sit again on the 22<sup>nd</sup> of April. And safe travels to everybody in the room. Good bye.

--- Upon adjourning at 12:01 p.m./L'audience est ajournée à 12h01