

In the Matter Of:
The Chippewas of Saugeen First Nation et al v.
Attorney General of Canada et al

DAY 9/VOL 9
May 22, 2019



77 King Street West, Suite 2020
Toronto, ON M5K 1A2
1.888.525.6666 | 416.413.7755

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Court File No. 94-CQ-50872CM

ONTARIO
SUPERIOR COURT OF JUSTICE

B E T W E E N:

THE CHIPPEWAS OF SAUGEEN FIRST NATION, and THE
CHIPPEWAS OF NAWASH FIRST NATION
Plaintiffs

- and -

THE ATTORNEY GENERAL OF CANADA,
HER MAJESTY THE QUEEN IN RIGHT OF ONTARIO,
THE CORPORATION OF THE COUNTY OF GREY, THE
CORPORATION OF THE COUNTY OF BRUCE, THE CORPORATION
OF THE MUNICIPALITY OF NORTHERN BRUCE PENINSULA,
THE CORPORATION OF THE TOWN OF SOUTH BRUCE PENINSULA,
THE CORPORATION OF THE TOWN OF SAUGEEN SHORES, and
THE CORPORATION OF THE TOWNSHIP OF GEORGIAN BLUFFS
Defendants

Court File No. 03-CV-261134CM1

A N D B E T W E E N:

CHIPPEWAS OF NAWASH UNCEDED FIRST NATION and
SAUGEEN FIRST NATION
Plaintiffs

- and -

THE ATTORNEY GENERAL OF CANADA and HER MAJESTY THE
QUEEN IN RIGHT OF ONTARIO
Defendants

--- This is VOLUME 9/DAY 9 of the trial proceedings
in the above-noted matter, being held at the
Superior Court of Justice, 330 University Avenue,
Courtroom 5-1, Toronto, Ontario, on the 22nd day
of May, 2019.

B E F O R E:

The Honourable Justice Wendy M. Matheson

1 A P P E A R A N C E S :

2

3 H. W. Roger Townshend, Esq., for the Plaintiffs,
4 & Renée Pelletier, Esq., & The Chippewas of
5 & Cathy Guirguis, Esq., Saugeen First Nation,
6 & Benjamin Brookwell, Esq., and the Chippewas of
7 & Christopher Evans, Esq., Nawash First Nation.
8 & Krista Nerland, Esq.

9

10 Michael Beggs, Esq., for the Defendant,
11 & Michael McCulloch The Attorney General &
12 & Barry Ennis, Esq., of Canada.

13

14 David Feliciant, Esq., for the Defendant,
15 & Jennifer Lepad, Esq., Her Majesty the
16 Queen in Right of
17 & Julia McRandall, Esq., Ontario.
18 & Richard Ogden, Esq.,

19

20

21

22 REPORTED BY: Judith M. Caputo, RPR, CSR, CRR

23

24

25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

I N D E X

PAGE

WITNESS:

RANDALL KAHGEE; affirmed

Examination In-Chief by Ms. Pelletier.....	880
Cross-Examination by Mr. Ennis.....	918
Cross-Examination by Ms. Lapan.....	928
Re-Examination by Ms. Pelletier.....	949

FRANCINE McCARTHY; Sworn

Examination In-Chief by Mr. Brookwell.....	959
Cross-Examination by Mr. Beggs.....	1033

1 INDEX OF EXHIBITS

2

3 NO. DESCRIPTION PAGE NO.

4 3982: Annotated Map of Southern Ontario showing 892

5 First Nations in that area.

6 3983: Maawn-Ji-Giig-Do-Yaang (Gathering to Speak 894

7 As One) Declaration.

8 3984: Randall Kahgee Video (accessed from 943

9 YouTube).

10 3985: Curriculum Vitae of Dr. McCarthy. 957

11 3986: Final Report and Addendum of Dr. McCarthy. 958

12 3987: Article cited in Dr. McCarthy's report, by 986

13 Lewis, et al., 2014, entitled "Voyage of Discovery:

14 50 Years of Marine Research at Canada's Bedford

15 Institute of Oceanography".

16

17 LETTERED EXHIBITS:

18 Z: Map of Southern Ontario showing First Nations 888

19 in that area.

20 A-1: Maawn-Ji-Giig-Do-Yaang Declaration Shared 897

21 Territory.

22 A-2: Expert Tender Summary for Dr. Francine 963

23 McCarthy.

24 B-1: Video Clip from the Discovery Channel 1030

25 Episode (no audio).

10:06:39 1 -- Upon commencing at 10:08 a.m.

10:07:36 2

10:08:18 3 THE COURT: Good morning, Counsel.

10:08:44 4 MS. PELLETIER: Good morning, Your Honour.

10:08:46 5 THE COURT: There is always a glitch or

10:08:48 6 two when we start back, but I want to remind

10:08:51 7 everybody that I do prefer -- "prefer" is the wrong

10:08:54 8 word -- we'll be starting on time. All right, so

10:08:57 9 this is an exception this morning.

10:08:59 10 Please go ahead, Counsel.

10:09:01 11 MS. PELLETIER: Your Honour, I did want

10:09:02 12 to introduce you to Plaintiff's counsel, Krista

10:09:06 13 Nerland. I'll ask her to stand, who's just back

10:09:08 14 from parental leave, so she will be joining us for

10:09:11 15 the duration of the trial.

10:09:12 16 THE COURT: Welcome back, Counsel.

10:09:14 17 Please go ahead.

10:09:14 18 MS. PELLETIER: Thank you. The

10:09:16 19 Plaintiffs would like to call our next witness,

10:09:19 20 Mr. Randall Kahgee.

10:09:33 21 THE REGISTRAR: Good morning, sir.

10:09:34 22 Would you like to make an oath on the

10:09:37 23 Holy Book or make a solemn affirmation to tell the

10:09:39 24 truth?

10:09:44 25 THE WITNESS: Solemn affirmation.

1 THE REGISTRAR: Would you please state
2 and spell your first and last name for the record?

3 THE WITNESS: First name Randall,
4 R-A-N-D-A-L-L, last name, Kahgee, K-A-H-G-E-E.

5 RANDALL KAHGEE: AFFIRMED.

6 THE COURT: Just give me a moment,
7 counsel.

8 Please go ahead.

9 MS. PELLETIER: Thank you, Your Honour.

10 EXAMINATION IN-CHIEF BY MS. PELLETIER:

11 Q. Good morning, Mr. Kahgee.

12 A. Good morning.

13 Q. I'm going to begin by asking you
14 some questions to introduce you to the court. So
15 let's begin with you're a member of Saugeen First
16 Nation; is that correct?

17 A. Yes, that is correct.

18 Q. And you were born and raised at
19 the Saugeen Reserve?

20 A. Yes, that is correct.

21 Q. Where do you currently reside?

22 A. Port Elgin, Ontario.

23 Q. And how far is that from the
24 Saugeen Reserve?

25 A. Approximately ten minutes.

1 Q. And Mr. Kahgee, you are a lawyer?

2 A. That is correct.

3 Q. And what area of law do you
4 specialize in?

5 A. I specialize in Indigenous rights
6 law.

7 Q. And as a lawyer how much have you
8 worked on this action?

9 A. None.

10 Q. I'm going to ask you about your
11 experience as Chief of Saugeen First Nation. When
12 were you first elected as Chief of Saugeen?

13 A. I was first elected in June of
14 2006.

15 Q. And how long did you serve as
16 Chief?

17 A. Until June of 2014.

18 Q. And how long was each term in
19 office?

20 A. Two years in length.

21 Q. So you were elected four times
22 consecutively?

23 A. That's correct.

24 Q. And as Chief, were you a member of
25 Saugeen's Band Council?

10:13:07 1 A. Yes, I was.

10:13:08 2 Q. And could you please briefly
10:13:10 3 explain the Band Council's responsibilities?

10:13:13 4 A. So Chief in Council is comprised
10:13:15 5 of the Chief and nine councillors. The Council's
10:13:20 6 first -- primary responsibility is to look out for
10:13:22 7 the welfare of the community, in particular, ensure
10:13:25 8 the effective administration of programs and
10:13:28 9 services. Also to ensure that the rights and
10:13:31 10 interests of the community are safeguarded and
10:13:33 11 protected and make decisions accordingly.

10:13:37 12 Q. How does the Band Council pass
10:13:41 13 resolutions?

10:13:41 14 A. We pass Council resolutions which
10:13:44 15 is our formal way of making or rendering our
10:13:47 16 decision. Decisions are made by a quorum of
10:13:51 17 Council and the chair -- in this case you would
10:13:54 18 have to have the chair, which would be the Chief,
10:13:57 19 and five councillors present to constitute a
10:14:01 20 quorum.

10:14:02 21 Q. And each councillor has one vote;
10:14:06 22 is that correct?

10:14:07 23 A. That is correct.

10:14:07 24 Q. How many councillors were there on
10:14:10 25 Saugeen's Band Council when you were Chief?

10:14:12 1 A. Nine councillors.

10:14:13 2 Q. And could you please briefly
10:14:15 3 describe your responsibilities as Chief of Saugeen?

10:14:17 4 A. So as Chief of Saugeen, my
10:14:19 5 official role was as spokesperson for the Chief in
10:14:25 6 Council and for the community.

10:14:28 7 Also to coordinate and ensure effective
10:14:31 8 administration of programs and services and
10:14:32 9 coordinate with senior management and
10:14:35 10 administrators. Also, to work strategically with
10:14:40 11 our Council and our Joint Council to look at the
10:14:43 12 protection of our rights and interests throughout
10:14:45 13 our territory. And looking at improving the
10:14:47 14 overall quality of life for our people in our
10:14:51 15 community.

10:14:52 16 Q. What is the relationship between
10:14:55 17 SON and the two First Nations Band Councils?

10:14:59 18 A. So SON is comprised of two
10:15:02 19 communities, the Chippewas of Saugeen and Chippewas
10:15:04 20 of Nawash First Nation. We have a Joint Council
10:15:08 21 that meets monthly, although over the course of the
10:15:12 22 last, say, ten years those meetings become more
10:15:14 23 frequent as our -- as the issues that pile up on
10:15:18 24 our respective tables gets larger and larger at
10:15:24 25 times we have to meet more frequently, often two

10:15:26 1 times a month and Joint Council deals with a range
10:15:29 2 of issues, particularly those matters that impact
10:15:31 3 on the territory as a whole.

10:15:34 4 Q. And SON instructed legal counsel
10:15:38 5 for this action, correct?

10:15:39 6 A. That is correct.

10:15:40 7 Q. How does SON make decisions about
10:15:42 8 this action?

10:15:43 9 A. So the Joint Council makes
10:15:45 10 decisions by way of resolution. In order for
10:15:47 11 decisions to be made you have to have a quorum of
10:15:49 12 each Council to vote in favour of the resolution.

10:15:53 13 Q. Who may vote on resolutions?

10:15:55 14 A. The councillors may vote on
10:15:57 15 resolutions. The chiefs do not vote on
10:15:59 16 resolutions. Only when the Chief has to constitute
10:16:03 17 a quorum does the Chief get a vote.

10:16:05 18 Q. And what role in decision making
10:16:06 19 at the Joint Council did you play as Chief of
10:16:08 20 Saugeen?

10:16:09 21 A. So again, to work collaboratively
10:16:11 22 with the Joint Council to advance, protect the
10:16:14 23 rights and interests of the territory in the
10:16:18 24 communities. We often follow the strategic advice
10:16:22 25 that was given by Council to facilitate any

10:16:27 1 decisions that were made, typically in a matter
10:16:31 2 such as this or other matters that we were
10:16:34 3 addressing at the table.

10:16:35 4 Q. How do you keep your community
10:16:38 5 informed about the claim?

10:16:39 6 A. So in the past we would have
10:16:40 7 community meetings. We would also have written
10:16:42 8 materials that were circulated through both
10:16:46 9 communities. There is a regular claims update that
10:16:51 10 is presented to the communities, in written form.
10:16:53 11 So typically through that and as we progressed,
10:16:58 12 social media, as well.

10:17:00 13 Q. Thank you, Mr. Kahgee. I'm going
10:17:02 14 to ask you now about the territorial overlap
10:17:05 15 between SON and its neighbors to the south.

10:17:07 16 A. Okay.

10:17:07 17 Q. So SON filed its Aboriginal title
10:17:10 18 claim in 2003, yes?

10:17:11 19 A. That's correct.

10:17:12 20 Q. And when did SON learn that the
10:17:14 21 First Nations to its south had overlapping
10:17:17 22 territories?

10:17:17 23 A. To the best of my recollection,
10:17:21 24 that was brought to the Joint Council's attention
10:17:24 25 early in 2009 through our joint land claims

10:17:29 1 committee. My understanding at the time was that
10:17:31 2 there was concern that was expressed by the Crown,
10:17:34 3 specifically the overlap in relation to
10:17:36 4 exclusivity, and that's when we started talking
10:17:44 5 about how we were going to move forward to resolve
10:17:46 6 that.

10:17:46 7 Q. And what First Nations did the
10:17:48 8 Crown identify as having overlapping territories?

10:17:51 9 A. So to the south of Saugeen and
10:17:54 10 Nawash, you have the Chippewas of Kettle and Stony
10:17:59 11 Point, Aamjiwnaang First Nation and Walpole Island
10:18:01 12 First Nation.

10:18:02 13 Q. Thank you. I'm going to show you
10:18:05 14 a document, it is SC0143.

10:18:20 15 THE COURT: Can we pause this as the
10:18:23 16 first document. And perhaps someone towards the
10:18:24 17 back, could you raise your hand if the document
10:18:27 18 shows on that big screen. It doesn't. While we
10:18:30 19 proceed we'll work on that problem. We need that
10:18:33 20 to be working.

10:18:34 21 MS. PELLETIER: Is it showing up on the
10:18:36 22 smaller screens?

10:18:37 23 THE COURT: Yes, it is. This is our
10:18:39 24 chance to know that it's not showing, so you can
10:18:42 25 continue but we'll have to sort that out.

10:18:44 1 MS. PELLETIER: Thank you.

10:18:45 2 BY MS. PELLETIER:

10:18:45 3 Q. So this is a map with the title
10:18:47 4 "South Ontario", and it's a map that I shared with
10:18:50 5 my friends a couple of days ago.

10:18:52 6 Do you recognize it, Mr. Kahgee?

10:18:54 7 A. Yes, I do.

10:18:55 8 Q. And what does the map show?

10:18:56 9 A. This map represents or depicts the
10:19:01 10 First Nations in southern Ontario.

10:19:02 11 Q. And is it accurate, to the best of
10:19:04 12 your knowledge?

10:19:07 13 A. Yes, it is.

10:19:08 14 MS. PELLETIER: Your Honour, I'd ask
10:19:10 15 that this be marked as the next lettered exhibit.

10:19:13 16 THE COURT: Any objection? No.

10:19:14 17 Mr. Registrar, can we assign the letter
10:19:17 18 and we'll have to load the document later.

10:19:20 19 THE REGISTRAR: Letter exhibit Z.

10:19:24 20 THE COURT: "Z" as in "Zelda".

10:19:31 21 MS. McRANDALL: Your Honour, the
10:19:32 22 television in the back is functioning now.

10:19:35 23 THE COURT: Thank you very much.

10:19:36 24 Exhibit Z, Map of Southern Ontario
10:19:42 25 showing First Nations in that area.

10:19:42 1 Please go ahead.

10:19:40 2 EXHIBIT NO. Z: Map of Southern Ontario
10:19:42 3 showing First Nations in that area.

10:19:47 4 MS. PELLETIER: Your Honour, may I
10:19:48 5 approach the witness to give him the iPad and maybe
10:19:50 6 he can mark up the map.

10:19:51 7 THE COURT: Yes. That is not going to
10:19:52 8 show on these screens; is that correct?

10:19:56 9 MS. PELLETIER: I thought it would. I
10:19:57 10 understand it should.

10:19:59 11 THE COURT: We have a number of
10:20:01 12 first-day-back technology challenges. Why don't we
10:20:03 13 try and see what happens.

10:20:04 14 After the gentleman makes a mark I need
10:20:06 15 you to walk back and perhaps glance at a screen on
10:20:11 16 Canada's desk to make sure it's working before you
10:20:14 17 go on.

10:20:15 18 MS. PELLETIER: Sure.

10:20:16 19 THE COURT: All right.

10:20:49 20 BY MS. PELLETIER:

10:20:50 21 Q. Okay, Mr. Kahgee, if you can
10:20:55 22 circle the First Nations with overlapping
10:20:57 23 territories?

10:20:59 24 THE COURT: It is working on my screen,
10:21:01 25 counsel. I'm not sure I'm seeing a circle, but I'm

10:21:04 1 seeing some marks.

10:21:06 2 THE WITNESS: Yeah, I hit it with my
10:21:08 3 finger.

10:21:10 4 THE COURT: That's all right. There's
10:21:11 5 probably a solution to that, sir. Is there an undo
10:21:11 6 feature?

10:21:12 7 MS. PELLETIER: There is an undo.

10:21:14 8 THE COURT: Do you want to just come up
10:21:15 9 and show the witness how to start again?

10:21:21 10 I think I see on the top right there's
10:21:23 11 a back arrow, there.

10:21:34 12 MS. PELLETIER: Your Honour, I'm not
10:21:36 13 sure if there is a way to turn this screen on, the
10:21:40 14 monitor in front of my podium.

10:21:43 15 THE COURT: I don't know. One of your
10:21:45 16 co-counsel is getting up to look into it. So let's
10:21:49 17 start by seeing if we can get the witness -- we
10:21:52 18 lost our picture altogether at this point.

10:21:54 19 THE WITNESS: Okay. I miss the days of
10:22:16 20 pencils.

10:22:17 21 THE COURT: Yes, I do, too, sir. But
10:22:19 22 you need only know there are 4,000 exhibits already
10:22:22 23 in this trial to know why we don't have them all
10:22:28 24 printed out.

10:22:29 25 MR. EVANS: Your Honour, it doesn't

10:22:50 1 seem to be connecting. What we can do is we have a
10:22:53 2 paper version of the exhibit. Mr. Kahgee can work
10:22:55 3 on and then we'll scan it and hand it up
10:22:57 4 afterwards.

10:22:58 5 THE COURT: Thank you, work-arounds are
10:23:00 6 good. Maybe what we can do is put Exhibit Z back
10:23:04 7 up on the screen as well just so we can follow
10:23:07 8 along.

10:23:16 9 MS. PELLETIER: May I approach, Your
10:23:18 10 Honour?

10:23:18 11 THE COURT: Yes.

10:23:23 12 So the gentleman has been given an
10:23:25 13 eight by ten printout of that same map that we just
10:23:28 14 looked at and once you're finished, sir, we can
10:23:33 15 obviously share that printout with anyone who needs
10:23:36 16 to see it.

10:23:37 17 MS. PELLETIER: Sure.

10:23:37 18 THE COURT: All right. Just repeat
10:23:42 19 your question if you can, counsel, to get us back
10:23:45 20 on track.

10:23:45 21 BY MS. PELLETIER:

10:23:46 22 Q. Mr. Kahgee, if you can please
10:23:47 23 circle the First Nations with overlapping
10:23:49 24 territories.

10:23:55 25 Just for the record, Mr. Kahgee, can

10:23:57 1 you let us know which First Nations you have
10:24:00 2 circled?

10:24:00 3 A. So I've circled five, I've circled
10:24:02 4 Chippewa of Nawash --

10:24:04 5 THE COURT: Can you speak up, sir.
10:24:05 6 Maybe move your chair a little closer to the desk
10:24:09 7 will help. Also, when you're identifying them if
10:24:11 8 you can give the rough geography.

10:24:12 9 THE WITNESS: Yes.

10:24:13 10 THE COURT: Thank you.

10:24:14 11 THE WITNESS: Okay. I've circled the
10:24:16 12 Chippewas of Nawash Unceded First Nation which sits
10:24:19 13 on the Northeastern portion of the Peninsula. To
10:24:26 14 the south, I have the Saugeen First Nation.
10:24:28 15 Further south, roughly about 100 kilometres south
10:24:32 16 of Goderich, I have the Chippewas of Kettle and
10:24:37 17 Stoney Point. To the south of that I have
10:24:40 18 Aamjiwnaang First Nation and to the south of that I
10:24:43 19 have Walpole Island First Nation.

10:24:44 20 MS. PELLETIER: Thank you, Mr. Kahgee.
10:24:44 21 Your Honour, I'd ask that this be
10:24:46 22 marked as the next numbered exhibit with the title
10:24:51 23 of "Annotated Map of Southern Ontario".

10:24:53 24 THE COURT: Any objection? No.

10:24:58 25 Mr. Registrar, that will be...

10:24:58 1 THE REGISTRAR: Exhibit No. 3982.

10:25:00 2 MS. PELLETIER: Thank you.

10:25:01 3 EXHIBIT NO. 3982: Annotated Map of
10:25:01 4 Southern Ontario showing First Nations
10:25:02 5 in that area.

10:25:02 6 BY MS. PELLETIER:

10:25:02 7 Q. Mr. Kahgee, what was your
10:25:03 8 understanding of the positions the Crown took
10:25:06 9 regarding the overlap?

10:25:08 10 A. My understanding at the time was
10:25:10 11 that there was a concern about the overlaps as it
10:25:15 12 went to the issue of exclusivity.

10:25:18 13 My sense of it, or Council's sense of
10:25:23 14 it, was that it was something that could be
10:25:24 15 resolved amongst the other communities. And we
10:25:28 16 took the position that this overlap represented our
10:25:32 17 strength, certainly not a weakness and we certainly
10:25:36 18 did not want it to become a divisive or large
10:25:39 19 issue, but rather saw the overlap as a strength or
10:25:42 20 an opportunity to demonstrate our strength in
10:25:45 21 unity.

10:25:45 22 Q. And how did SON and these First
10:25:49 23 Nations deal with their respective concerns?

10:25:51 24 A. So SON had reached out to the
10:25:56 25 other communities, and we tried to coordinate some

10:26:02 1 meetings to sit down and have a conversation. I
10:26:05 2 recollect at least two meetings that were held in
10:26:09 3 my tenure as Chief, as well as at least two
10:26:15 4 independent and joint conversations with Chief
10:26:18 5 Joseph Gilbert from Walpole Island First Nation.
10:26:21 6 That conversation occurred between myself and Chief
10:26:26 7 Akiwenzie. And a conversation as well with Chief
10:26:30 8 Plain.

10:26:30 9 Q. I'd like to ask you a bit about
10:26:32 10 the agreement that was reached between SON and
10:26:34 11 these First Nations about the overlap. Firstly,
10:26:37 12 could you tell us the name of the agreement?

10:26:39 13 A. So, the name of the agreement in
10:26:43 14 Anishinaabemowin is Maawn-Ji-Giig-Do-Yaang which
10:26:48 15 roughly translates to "gathering to speak as one".

10:26:51 16 Q. If you can pull up a copy of that
10:26:54 17 declaration, it is document SC0147. It's titled
10:27:06 18 "Maawn-Ji-Giig-Do-Yaang (Gathering to Speak As One
10:27:08 19 Declaration)".

10:27:08 20 Do you recognize that, Mr. Kahgee?

10:27:10 21 A. Yes, I do.

10:27:10 22 Q. And how do you recognize it?

10:27:13 23 A. This is the declaration that my
10:27:15 24 community, Chippewas of Nawash, Walpole Island
10:27:21 25 First Nation, Aamjiwnaang First Nation and the

10:27:22 1 Chippewas of Kettles and Stoney Point, entered into
10:27:26 2 in February 18th, 2011.

10:27:27 3 Q. Is that your signature on the
10:27:29 4 document, Mr. Kahgee?

10:27:30 5 A. Yes, it is.

10:27:30 6 Q. And can I take it then that this
10:27:33 7 is an accurate copy of the Maawn-Ji-Giig-Do-Yaang
10:27:40 8 Declaration?

10:27:40 9 A. Yes, it is.

10:27:41 10 MS. PELLETIER: Your Honour, I ask that
10:27:42 11 this be marked as the next numbered exhibit.

10:27:45 12 THE COURT: No objection. Please go
10:27:46 13 ahead, Mr. Registrar.

10:27:47 14 THE REGISTRAR: Exhibit No. 3983.

10:27:47 15 EXHIBIT NO. 3983: Maawn-Ji-Giig-Do-Yaang
10:27:06 16 (Gathering to Speak As One) Declaration.

10:27:06 17 BY MS. PELLETIER:

10:27:55 18 Q. What are the parties to the
10:27:56 19 declaration, Mr. Kahgee?

10:27:59 20 A. I'm sorry?

10:27:59 21 Q. Who are the parties, the
10:28:01 22 signatories?

10:28:01 23 A. So the signatories to the
10:28:05 24 declaration representing the five communities that
10:28:08 25 I alluded to earlier. You have Chief Cloud, from

1 Chippewas of Kettle and Stony Point, Chief Plain
2 from Aamjiwnaang First Nation, myself representing
3 Saugeen, Chief Ralph Akiwenzie from the Chippewas
4 of Nawash Unceded First Nation, and Chief Joseph
5 Gilbert from Walpole Island First Nation.

6 Q. Could you please read the
7 description of the shared territory?

8 A. So, in particular, I'm referencing
9 the second paragraph of the declaration and it
10 reads:

11 "We acknowledge that the
12 Aboriginal title of strip of lakebed
13 of 22 miles wide centered on
14 Goderich and running from the shore
15 of Lake Huron to the international
16 boundary is shared among us."

17 Q. What does it mean that the overlap
18 territory is shared among the signatories?

19 A. So the significance of that, and I
20 will refer or reference the third paragraph, is
21 when we had our meetings both in Saugeen and
22 Walpole, we met over two days in Walpole and
23 formalized this declaration.

24 There was a discussion amongst
25 ourselves -- and I should add that we had a full

1 quorum of our all Councils there. The meeting we
2 had in Saugeen roughly mid to late 2010, we didn't
3 have a full quorum at the time. But for the
4 meeting in February, we had a full quorum of our
5 Councils present so we could render our decisions.

6 But the conversation really focused on
7 that particular portion of the territory, and the
8 historical context, as an area being something that
9 we typically would have shared and it would have
10 been a place where we would gather, where we would
11 rest, rested, and of course, you know, we took
12 those principles, those principles of sharing and
13 respect and we applied those to the water.

14 Obviously, we didn't congregate on the
15 water, but that spirit of sharing, recognizing the
16 purpose of that place, we transferred that to the
17 same understanding to the water. And so we
18 grounded this declaration in our core values as
19 Anishinaabek people and you see those referred to
20 in the third paragraph where it says.

21 "In accordance with the quorum
22 Anishinaabe values of kindness,
23 honesty, sharing and strength."
24 And really, that represents the
25 foundation and the strength of that declaration

10:30:50 1 because it comes from that good place. It comes
10:30:53 2 from that Anishinaabe Inaaknigewin, our way of
10:30:57 3 making those decisions our law.

10:30:59 4 Q. Thank you, Mr. Kahgee. I'm going
10:31:03 5 to ask you to show us the overlap area on a map.

10:31:08 6 So we are showing you a map entitled,
10:31:12 7 "Maawn-Ji-Giig-Do-Yaang Declaration Shared
10:31:16 8 Territory". Do you recognize it?

10:31:18 9 A. Yes, I do.

10:31:19 10 Q. What does this show?

10:31:20 11 A. This shows the territory of the
10:31:24 12 Saugeen Ojibwe nations but also shows the shared
10:31:29 13 overlap territory.

10:31:30 14 Q. The map is marked for illustrative
10:31:32 15 purposes and doesn't have a scale. Does it give a
10:31:35 16 reasonably accurate general picture of the shared
10:31:38 17 territory, in your view?

10:31:39 18 A. Yes, I believe it does.

10:31:41 19 MS. PELLETIER: Your Honour, I would
10:31:42 20 ask that this be marked as the next lettered
10:31:46 21 exhibit.

10:31:46 22 THE COURT: Mr. Registrar.

10:31:47 23 THE REGISTRAR: Lettered Exhibit A-1.

10:31:50 24 THE COURT: A-1, thank you.

10:31:51 25 EXHIBIT NO. A-1: Maawn-Ji-Giig-Do-Yaang

1 Declaration Shared Territory.

2 MS. PELLETIER: Thank you.

3 BY MS. PELLETIER:

4 Q. Mr. Kahgee, in the bottom left of
5 the map there's a pink area labelled "Shared
6 Territory". Is that the shared territory described
7 in the declaration?

8 A. Yes, it is.

9 Q. I'd like to ask you a bit about
10 how SON brought about the declaration.

11 Firstly, which party proposed making an
12 agreement on the overlap issue?

13 A. So, initially, as I alluded to
14 earlier, the matter was brought forward to Joint
15 Councils' attention by the joint lands committee.
16 The direction was given to reach out to the other
17 communities to start a conversation about that
18 particular issue. At the time, Walpole Island in
19 particular was also aware of the issue because they
20 were also pursuing a similar claim.

21 So, obviously you know, Chief Rob Evans
22 and I did have discussions with Chief Joseph
23 Gilbert about helping to try and facilitate a
24 meeting with the other communities. So we were
25 able to do that.

1 As I said, I recall at least two
2 meetings we had with those communities, one in
3 Saugeen, mid-to late 2010, and then of course in
4 February of 2011.

5 Q. And where was the meeting in 2011
6 held?

7 A. That was held in Walpole Island,
8 First Nation.

9 Q. Who represented the parties at
10 that meeting?

11 A. So, each community was represented
12 by their chiefs, and a full quorum of their
13 Councils. I recall that Saugeen had all nine
14 councillors present as did Nawash, and I believe
15 all the communities with the exception of perhaps
16 Chippewas of Kettle and Stony Point they didn't --
17 they did have a quorum present.

18 Q. What process did the First Nations
19 undertake to identify the overlap area?

20 A. So during those discussions we
21 talked -- we really centered our discussion around
22 our shared understanding of that place. And wanted
23 to ground our path forward in our own laws in our
24 own way and our own values. And so that's why you
25 see those values reflected, in those principles the

10:34:08 1 core values reflected in the declaration itself
10:34:12 2 because that became the foundation for our
10:34:14 3 declaration but also really guided us through our
10:34:16 4 discussions and of course those core values aren't
10:34:22 5 foreign concepts to us or the other communities.
10:34:26 6 Because as Anishinaabe people, those flow directly
10:34:30 7 from our Seven Grandfather Teaching and is very
10:34:33 8 much grounded in who we are as a people and we try
10:34:36 9 to aspire to live our lives and make our decisions
10:34:39 10 according to those teachings, and watch the path
10:34:43 11 and mno-maadziwin. And so we really grounded our
10:34:48 12 efforts in those core values.

10:34:50 13 Q. Is there anything more you'd like
10:34:52 14 to say about specifically the process undertaken to
10:34:54 15 identify the overlap area?

10:34:56 16 A. So there was a working group that
10:35:00 17 was formed amongst the five communities. We had
10:35:04 18 tasked them to go away and do some work to -- and
10:35:11 19 bring something back for us to consider, based on
10:35:13 20 those core values. And so when they came back,
10:35:18 21 that's what they presented to us, was this, this
10:35:23 22 concept of sharing and centering that declaration
10:35:27 23 around those core values.

10:35:28 24 So that became the essence of that
10:35:31 25 declaration and we formalized it as you see there.

10:35:34 1 It was later formalized by way of ceremony which
10:35:38 2 unfortunately I wasn't able to attend. But the
10:35:42 3 ceremony itself in many ways is more significant
10:35:45 4 than the words on the paper and the signatures.
10:35:47 5 Because that ceremony reflected our way of sharing
10:35:51 6 that understanding of that declaration. But also
10:35:57 7 coming together in unity and speaking as one voice.

10:36:04 8 As I said earlier, we saw this as a
10:36:06 9 really good opportunity to do that and do that
10:36:09 10 together.

10:36:09 11 Q. What were the First Nations
10:36:11 12 interests in the overlap area?

10:36:13 13 A. So there was no specific
10:36:19 14 discussions about necessarily uses. It was just
10:36:22 15 that shared understanding that I talked about
10:36:25 16 earlier. Obviously, you know, we're all fishing
10:36:30 17 communities, but there was no specific discussions
10:36:35 18 about specific uses of that territory. As I said,
10:36:39 19 it was grounded on those core values and
10:36:42 20 principles.

10:36:42 21 Q. And after the working group
10:36:43 22 identified the overlap area, how did the parties
10:36:46 23 discuss how to address the issue?

10:36:51 24 A. So after it was identified -- we
10:36:54 25 identified that and we knew how we were going to

1 ground it we formalized the declaration. As I said
2 earlier, we planned to have a --

3 THE COURT: Sir, I've asked you to go
4 close, but maybe just a little further back.

5 THE WITNESS: A little further back.
6 Find the sweet spot?

7 THE COURT: Yes. You're doing great.

8 THE WITNESS: Sorry. We wanted to
9 formalize that understanding by way of ceremony.
10 And that ceremony was held, I believe in 2017.
11 Unfortunately I could not attend.

12 BY MS. PELLETIER:

13 Q. What was the significance of the
14 ceremony?

15 A. I think the significance was
16 certainly we wanted to demonstrate and really use
17 that as an opportunity to share with our people,
18 that shared understanding as Anishinaabek, and how
19 we came together as one in unity. But we also
20 wanted to share that with the public as well, to
21 show that we were there, that we did have a
22 presence, historic and ongoing presence in that
23 space and I think demonstrating that through
24 ceremony, grounding that in our values, and our
25 understanding and in our law, I can't think of

10:38:08 1 nothing more appropriate than to do that.

10:38:10 2 Q. Where was the ceremony held?

10:38:12 3 A. The ceremony was held in Goderich.

10:38:15 4 Q. Thank you, Mr. Kahgee. I'm going
10:38:19 5 to ask you now about how the declaration gets into
10:38:22 6 SON's governance traditions. First I have some
10:38:25 7 questions about how you learned the oral history
10:38:27 8 you're going to share with us today.

10:38:29 9 How knowledgeable do you consider
10:38:31 10 yourself about your community's traditions relating
10:38:34 11 to the governance of lands and waters?

10:38:36 12 A. I have a -- I believe I have a
10:38:39 13 very good general and good working understanding of
10:38:42 14 that history and that knowledge.

10:38:44 15 Q. How much opportunity did you have
10:38:46 16 to learn about SON's history?

10:38:50 17 A. I've had numerous opportunities
10:38:53 18 over the years to learn most importantly from our
10:38:56 19 Elders. First, from my grandparents, from my
10:39:00 20 parents and then the Elders in the community. And
10:39:06 21 certainly in my legal career as helped as well.
10:39:09 22 But most of that learning and that understanding
10:39:11 23 has come from Elders and from my grandparents.

10:39:15 24 Q. How is oral history passed down in
10:39:18 25 your community?

10:39:19 1 A. So, oral history, it's interesting
10:39:23 2 because it's not something you just simply ask for.
10:39:28 3 There are protocols that have to be followed.

10:39:32 4 My experience is sometimes you will sit
10:39:35 5 with an Elder and they choose to share or they
10:39:37 6 don't share. But when you present yourself to an
10:39:42 7 Elder, and you're seeking that knowledge and that
10:39:45 8 understanding, you do it in a good way. So you
10:39:49 9 bring the asaamaa, the tobacco, and you ask that
10:39:55 10 permission first, to share that information and you
10:39:58 11 might specify why you're seeking that information.
10:40:03 12 How you might seek to protect that information and
10:40:06 13 the Elder will either accept that asaamaa or not,
10:40:13 14 or if they do they might set some conditions and
10:40:14 15 say, well, we are going to share some of it but not
10:40:16 16 all of it. Or they might have other conditions as
10:40:19 17 well. But it's nothing than just willingly given
10:40:22 18 unless they feel you're ready for it.

10:40:24 19 You know, I can relate to an experience
10:40:27 20 with my grandmother, she would tell me a story
10:40:29 21 about the water, and I'd go away and I thought to
10:40:33 22 myself, well, that doesn't make any sense. Because
10:40:36 23 she didn't tell me the whole story. Then I come
10:40:40 24 back a few years later she shared the rest then I
10:40:44 25 was, ah, now it makes sense. Sometimes they share

10:40:47 1 it with you in pieces and only when you're ready.

10:40:50 2 But there are protocols there. Because
10:40:52 3 that knowledge is important, that knowledge is
10:40:55 4 sacred, and you want to do everything to not only
10:40:58 5 respect the Elder but respect the sharing and
10:41:01 6 honour it.

10:41:03 7 Q. How do people maintain the
10:41:05 8 accuracy of oral history?

10:41:07 9 A. I think there is -- there is our
10:41:10 10 own way of verifying that amongst ourselves. I'll
10:41:15 11 give you an example.

10:41:17 12 When I was Chief, I had the
10:41:20 13 responsibility for the Elders portfolio, so that
10:41:24 14 meant making sure that Elder's concerns were being
10:41:27 15 brought forward and considered by the Council and
10:41:32 16 their voices were being heard.

10:41:34 17 Often those sessions, almost 99 percent
10:41:36 18 of the time, became sharing sessions which was
10:41:41 19 awesome for me, because I got to learn so much of
10:41:46 20 our history and was truly honoured in that sharing.

10:41:47 21 But I remember going specifically one
10:41:51 22 evening with a mission. We were dealing with a
10:41:53 23 particular issue on our territory and I was having
10:41:57 24 some concerns about that but I wanted some
10:42:01 25 verification about our place in the territory.

1 So I brought a map of our territory
2 with me, coincidentally, and it then just ended up
3 being a conversation. I just asked one question
4 and it turned into a conversation and what was
5 unique there were five, six Elders I recall present
6 that evening, and they all shared independent
7 stories of their recollection of their relationship
8 to the territory and their family's relationship.

9 They talked about hunting, fishing,
10 gathering medicines or having ceremony throughout
11 different parts of the territory. As they were
12 telling their stories I was just trying the best I
13 can, to plot their stories on the map.

14 And when we were finished, I had goose
15 bumps because through their sharing of the stories
16 they had almost identically identified the
17 boundaries of the territories. I said, do you
18 realize what just happened? In that moment it was
19 a little bit of magic but what occurred to me was
20 that was a perfect example of how we go through
21 that verification process through that sharing, and
22 sharing of those stories and sharing with one
23 another and having that independent verification.

24 I think technology doesn't like me.
25 (Technical difficulties).

10:44:44 1 THE COURT: We'll take a short break.

10:44:46 2 I'm not going to set the length of time. It will
10:44:50 3 be however long it takes to figure out what just
10:44:52 4 happened. There is construction going on on this
10:44:55 5 floor. I'm not sure if that's relevant or not.

10:44:59 6 MS. PELLETIER: Thank you, Your Honour.

10:47:08 7 -- RECESS TAKEN AT 10:47 A.M. --

10:47:09 8 -- UPON RESUMING AT 11:20 A.M. --

11:21:12 9 THE COURT: All right. Before we
11:21:13 10 begin. I'm just seeing, Madam Reporter, if this is
11:21:21 11 resuming and it is, okay.

11:21:23 12 So we've set up a work around which is
11:21:27 13 going to be able to facilitate us continuing.
11:21:30 14 Which means we're all going to speak more loudly
11:21:33 15 than usual? All right. We have a work around
11:21:38 16 which will allow us to proceed while we look at why
11:21:42 17 the microphones have mysteriously stopped working.

11:21:45 18 So I would ask for everyone's
11:21:48 19 accommodation, if you can't hear in the back,
11:21:50 20 there's closer seats that you can move forward to,
11:21:55 21 I can see from here.

11:21:56 22 And counsel, and sir, you, don't be
11:22:00 23 shy. Raise your voice. And we'll have the ability
11:22:07 24 to proceed. I have asked staff that if the
11:22:12 25 technology person needs to come quietly into the

1 courtroom without disturbing anyone that they can
2 do that. Counsel, if you feel there is a
3 disturbance that you wish to break for, just say
4 so.

5 MS. PELLETIER: Thank you, Your Honour.

6 THE COURT: So speak up and we'll see
7 how we can do while we try and sort out the
8 problem. Please go ahead.

9 MS. PELLETIER: Thank you.

10 BY MS. PELLETIER:

11 Q. Mr. Kahgee, who taught you the
12 knowledge you will share today?

13 A. So, um, as I was explaining
14 earlier, a lot of what I have learned over the
15 years has come through my time with the Elders.

16 Predominantly through my ten years as
17 Chief, part of that, as I said, through my
18 grandparents and my parents. And that's where the
19 bulk of that has come from.

20 Q. And how do you know that the
21 people who taught you were knowledgeable
22 themselves?

23 A. Well, typically, you know who the
24 Elders are in your community. And I should clarify
25 that. Elders aren't typically who hold themselves

1 out and say "I'm an Elder". It's something that's
2 garnered over time and the community gives that
3 respect, it's something that's earned. It's not
4 necessarily defined by age, but those who carry
5 that knowledge and that understanding and who
6 garner that respect in the community. So you know
7 who the Elders are.

8 As I said earlier, there are protocols
9 that you abide by and when you're seeking
10 information or you're wanting to have Elders share
11 that understanding, there's protocols you follow
12 and you do that out of respect for the Elder. But
13 also, out of respect for the knowledge that they're
14 going to share with you, because it's those pearls
15 of wisdom there are very, very important.

16 Q. Thank you, Mr. Kahgee. I'm now
17 going to ask you about what you've been taught
18 about how SON's ancestors governed their lands and
19 waters and how the declaration relates to these
20 traditions.

21 So, firstly, what have you been taught
22 about SON's responsibilities to its lands and
23 waters?

24 A. So the first place I start when I
25 think about our overall responsibility to the land

1 and the water is that first comes from the Creator.
2 I understand earlier in these hearings the creation
3 story was shared. And so that inherent
4 responsibility has been given to us by the Creator
5 to not only protect those lands and those waters,
6 but to safeguard those to ensure that our future
7 generations will have a relationship to those lands
8 and waters. Because who we are as Anishinaabe is
9 very much linked to that relationship: Our
10 language, our culture, our ceremonies, and indeed
11 our very identity.

12 So that responsibility flows from the
13 Creator. It also flows through our culture and our
14 ceremonies and our teachings. When you think of,
15 for example, our dodems, our clans, you have to
16 honour those teachings that come with your dodem
17 and live your life accordingly and also be guided
18 by the Seven Grandfather Teachings. That's what I
19 was taught is that inherent responsibility flows
20 from the Creator and we have to honour that and do
21 our part.

22 Q. How does SON's Joint Council carry
23 out these responsibilities?

24 A. I think the best way to articulate
25 that is we try and -- Joint Council historically

11:26:13 1 has tried to allow its decisions to be guided by
11:26:14 2 those principles and make decisions and good
11:26:17 3 decisions that are consistent with those core
11:26:19 4 values that you see.

11:26:20 5 For example, in the declaration and
11:26:23 6 remind ourselves that we do have a responsibility
11:26:27 7 to care for those lands and those waters, as it's
11:26:30 8 been bestowed upon us by the Creator.

11:26:34 9 Q. And what groups, other than SON,
11:26:37 10 have responsibilities to care for SON's territory?

11:26:39 11 A. That responsibility rests with us.

11:26:41 12 Q. And how does the declaration carry
11:26:45 13 out SON's responsibilities to its territory?

11:26:48 14 A. When I look at the declaration, I
11:26:53 15 see that as an extension of our responsibility and
11:26:58 16 honouring those core values and those core
11:27:02 17 principles, ensuring that we arrive at a good
11:27:06 18 understanding in our own way, as I said earlier our
11:27:10 19 own Anishinaabe Inaaknigewin, in our way, our law,
11:27:14 20 of understanding those things.

11:27:16 21 And as I alluded to, I think the real
11:27:19 22 strength and the foundation of that declaration is
11:27:23 23 really those core principles and those core values.
11:27:26 24 So that idea that we would arrive at a place and a
11:27:31 25 shared understanding with our brothers and sisters

11:27:34 1 in the south that that would be a place that we
11:27:36 2 would share together, consistent with those core
11:27:39 3 values, I believe those are the principles and that
11:27:42 4 understanding would resonate with all our people.

11:27:45 5 Q. What have you been taught about
11:27:47 6 protocols between SON and the Anishinaabe groups,
11:27:50 7 and other Anishinaabe groups, relating to
11:27:53 8 territorial governance?

11:28:01 9 A. So my understanding again is that
11:28:03 10 there are explicit protocols that exist. And
11:28:05 11 obviously we have a long-standing historical
11:28:09 12 alliance with those communities in the south. At
11:28:12 13 one time we were all part of the Three Fires
11:28:15 14 Confederacy which consisted of the Chippewa, the
11:28:22 15 Odawa and Potawatomi.

11:28:26 16 But the understanding that you can just
11:28:29 17 freely go into one's territory, without first
11:28:33 18 seeking that permission. And you would imagine
11:28:37 19 there would be protocols, there would have been
11:28:40 20 protocols that had to be followed. It might be
11:28:43 21 presenting yourself before the Council, stating
11:28:46 22 your purpose for being in their territory. How
11:28:49 23 long you were going to be in their territory. And
11:28:52 24 what it is you may be doing, whether it be to hunt,
11:28:55 25 or to fish, whatever the case might be and there

11:28:58 1 might be conditions put upon that before that
11:29:00 2 consent was given in order for you to be there.

11:29:03 3 And typically, there would be -- part
11:29:06 4 of those protocols would be the offering of perhaps
11:29:09 5 some asaamaa to do that in a good way, but also to
11:29:13 6 bring gifts.

11:29:14 7 So I was taught whenever you are going
11:29:18 8 to another's territory you bring gifts and you do
11:29:20 9 that as a show of respect but also to observe those
11:29:24 10 protocols.

11:29:24 11 Certainly if those protocols weren't
11:29:27 12 respected, then you could expect there would be
11:29:30 13 consequences for that. Obviously not all the time
11:29:33 14 would that represent conflict but that could be one
11:29:36 15 of the repercussions for not abiding by those
11:29:41 16 protocols.

11:29:41 17 Q. And what do these protocols look
11:29:43 18 like in the present day?

11:29:46 19 A. Obviously, we try and -- they look
11:29:49 20 a little bit differently. They're not as explicit
11:29:54 21 in a sense that, you know, you're going to have a
11:29:57 22 conflict, an armed conflict. But certainly you try
11:30:02 23 and honour the spirit and intent of those
11:30:06 24 protocols. And you do that in a good way so that,
11:30:10 25 as I said, if you're going to another community,

1 and you're there for a specific purpose, you
2 present yourself and you state your purpose and you
3 might bring gifts, you might bring asaamaa and
4 certainly you see that quite often amongst not only
5 Anishinaabek but other communities throughout
6 Ontario, where that shared understanding is there
7 as well to respect those protocols.

8 So those underpinnings and spirit of
9 the intended protocols still survive today.

10 Q. Asaamaa is tobacco, is that
11 correct?

12 A. That is correct.

13 Q. What protocols apply when
14 different groups have overlapping territories?

15 A. So, in this context, as I said
16 earlier, we really looked at this as an opportunity
17 to demonstrate our collective strength.

18 It certainly has been my experience
19 that overlaps, whether it be claims, or resource
20 issues, tend to be viewed as wedge or divisive
21 issues but in fact they represent a strength. And
22 certainly we viewed that in this context as well
23 that this was an opportunity to demonstrate our
24 collective understanding as Anishinaabe of how this
25 overlap would be addressed.

1 And so you see that reflected in the
2 declaration. I know it's only three paragraphs but
3 sometimes the beauty of these things is simplicity.
4 And I think -- I can think of nothing more powerful
5 than to invoke those core values and those
6 principles and ground that understanding in those
7 core values and principles.

8 Q. Thank you, Mr. Kahgee. I'll pull
9 up the declaration now, and I'd like to finally ask
10 you a bit about the significance of the declaration
11 in SON's perspective.

12 So from SON's perspective, what is the
13 significance of the declaration.

14 A. I think the significance of the
15 declaration is not only SON honouring those core
16 values and principles and doing its part to
17 safeguard the integrity of its territory, its land
18 and its waters, but again, to bring an
19 understanding and the importance of our world view
20 on these things. And how we are guided by these
21 core values and these core principles.

22 And seeing that reflected in a
23 declaration, that understanding, I think then
24 translate into something very powerful in the sense
25 that we've taken this overlap and we've made

1 something good from it. It's not a divisive issue,
2 it's not a wedge issue, and in fact it's something
3 very powerful because it invokes those core values
4 and core principles and very much grounded in our
5 understanding, our world view, and as I said,
6 Anishinaabe Inaaknigewin, our law. So I think that
7 is, to me, the overwhelming amount of significance
8 of that declaration.

9 Q. What does "gathering to speak as
10 one" mean?

11 A. So gathering to speak as one,
12 really is that representation of unity. Unity of
13 voice, and I think unity of purpose.

14 And you see that reflected in the
15 protocol in those two paragraphs that I read
16 earlier. One describing the overlap, and that
17 reference to that territory being shared among us.
18 And going on and going further and saying, this
19 area has historically been for the shared use and
20 benefit of our Anishinaabek ancestors and we
21 continue that sharing and respect for future
22 generations.

23 So not only were those core values and
24 principles that guided our ancestors in these types
25 of decisions but it's what guided us through this

11:34:27 1 decision and which will guide our future
11:34:29 2 generations to come.

11:34:30 3 Q. Now the declaration says:

11:34:32 4 "We will continue that sharing
11:34:33 5 and respect in accordance with the
11:34:36 6 core Anishinaabe values of kindness,
11:34:38 7 honesty, sharing and strength."

11:34:40 8 You've spoken a bit about the values
11:34:43 9 but could you say a little bit more about what that
11:34:45 10 paragraph means?

11:34:47 11 A. So I'm trying to figure out how to
11:35:03 12 expand upon that.

11:35:05 13 Again, I keep coming back to those core
11:35:18 14 values as being indicative of how we make decisions
11:35:23 15 and what guides our decisions. And really that
11:35:29 16 representing, for lack of a better description, our
11:35:32 17 truth.

11:35:33 18 So, you know, in circumstances like
11:35:37 19 these, you try and aspire to ground your
11:35:40 20 understanding in those things. And those were --
11:35:46 21 those values were integral to us, they were
11:35:49 22 integral to the communities that were signatories
11:35:51 23 to this and certainly what guided us, as I alluded
11:35:54 24 to earlier, through our discussions.

11:35:57 25 I'm not sure how much more I can expand

1 on that.

2 MS. PELLETIER: Thank you very much for
3 your time today, Mr. Kahgee. Those are my
4 questions.

5 THE WITNESS: Thank you.

6 THE COURT: Thank you.

7 Is counsel for Canada going to be
8 asking this gentleman questions?

9 MR. ENNIS: Yes, Your Honour, I'm
10 wondering we should take a break for the sake of
11 the court reporter or would you like me to proceed
12 now?

13 THE COURT: Madam court reporter, can
14 we proceed now?

15 Thank you. I would prefer to proceed
16 now.

17 If you can just come to the podium and
18 introduce yourself to the witness.

19 CROSS-EXAMINATION BY MR. ENNIS:

20 Q. Yes, good morning, Chief Kahgee.
21 My name is Barry Ennis, I am counsel for Canada,
22 how are you this morning?

23 A. Very well, thank you.

24 Q. I'd like to begin by asking you,
25 what is the current population of Saugeen First

1 Nation?

2 A. The current population of Saugeen
3 First Nation is roughly about 1,500 to 1,600
4 people.

5 Q. What is the current population of
6 Nawash First Nation?

7 A. Nawash, I believe is in -- they're
8 a little bit larger so I'm going to say
9 approximately 1,800 to 1,900. I stand to be
10 corrected on that from some of the leadership in
11 the courtroom today.

12 Q. Now, in terms of the waters, do
13 Anishinaabek women have a role as protectors of the
14 water?

15 A. Yes, they do.

16 Q. And what is the role of
17 Anishinaabek women in regards to the waters of Lake
18 Huron?

19 A. I believe that women, as you so
20 accurately described, are entrusted with the sole
21 responsibility of safeguarding and protecting the
22 water.

23 I believe that responsibility would
24 also extend to the waters of Lake Huron. I'll give
25 you an example.

1 Just this past year our women led a
2 water walk throughout the territory, to not just
3 create awareness about the territory, but to create
4 awareness about the water, in particular, Lake
5 Huron.

6 We did that in conjunction with a
7 number of nuclear issues we're addressing right now
8 in the territory. The women led that walk. That
9 walk took place over a period of, I believe two
10 months. I've seen one of the water walkers with us
11 today, and anyone who knows or understands the
12 significance of those walks and the ceremonies
13 behind that, understands that it's a tremendous
14 sacrifice of time, a dedication of mind, body and
15 spirit. And really a sacrifice of personal space.

16 And you do that to not only honour
17 creation, and the spirits, but honour the spirit of
18 that water because what we have been told is our
19 water is not well. And the women are stepping up
20 and they're making their voices heard, and ensuring
21 that everything needs to be done to protect and
22 safeguard the sanctity of that spirit is being
23 done.

24 Q. Thanks.

25 Chief Kahgee, were women consulted with

11:39:43 1 the making of the February 2011 declaration?

11:39:45 2 A. Yes, women were present at that
11:39:48 3 session, yes, and there were women there who spoke
11:39:51 4 to the water.

11:39:52 5 Q. So what role did they play in
11:39:55 6 formulating the terms of the declaration?

11:40:05 7 A. I believe there were -- I can't
11:40:07 8 remember specifically who, but I do believe there
11:40:08 9 were women who were part of the working group, who
11:40:12 10 brought that forward for our consideration.

11:40:15 11 When we formed -- when we tasked that
11:40:18 12 working group, we just didn't ask anyone. We
11:40:22 13 typically were looking towards people who carried
11:40:25 14 that understanding and knowledge of that history,
11:40:28 15 of that place, and they were tasked with that
11:40:31 16 responsibility. But there were women present.

11:40:35 17 Q. Thank you.

11:40:39 18 Now, how were the title boundaries of
11:40:46 19 the Saugeen Ojibwe Nation to the waters of Lake
11:40:49 20 Huron arrived at?

11:40:51 21 A. I honestly don't recollect. I'm
11:40:59 22 trying to -- you're talking about the whole
11:41:04 23 boundary, correct?

11:41:05 24 Q. Yes. In the claimed area, as
11:41:07 25 you'll see on Exhibit P, that's behind you, to the

1 Lake Huron and Georgian Bay portions of the claimed
2 area.

3 A. I honestly don't recollect.

4 Q. In the overlap area to the south,
5 just west of Goderich, that's identified in the
6 declaration that's shared with the other three
7 signatory First Nations, is it shared territory
8 exclusively, or do any of these First Nations have
9 a claim to exclusive title to that area?

10 A. To my understanding, the only
11 community at the time that was pursuing a similar
12 claim was Walpole Island First Nation. Again, I
13 stand to be corrected, I think they've kind of put
14 that on hold and are not pursuing it. And I don't
15 believe Kettle and Stony Point or Aamjiwnaang are
16 either.

17 Q. Do you know whether Walpole First
18 Nation claimed exclusive title to that overlap
19 area?

20 A. I'm not certain of that, no.

21 Q. And is title to the portion of
22 Lake Huron to the north of the overlapping area, in
23 the rest of the blue area in exhibit P, is it
24 exclusive to the Saugeen Ojibwe Nation?

25 A. So you're referencing the

1 territory north of --

2 Q. North of the overlap?

3 A. North of the overlap; yes,
4 correct.

5 Q. Now, in looking at the portion of
6 Lake Huron that's north of the Saugeen Peninsula,
7 that is the portion of the lake that's between
8 Tobermory and Manitoulin Island, is that area
9 exclusive to SON or is it shared with the First
10 Nations living on Manitoulin Island?

11 A. So the northern portion of the
12 Peninsula that you're referring to, my
13 understanding is that's being claimed as exclusive.
14 We haven't had much interaction with Manitoulin to
15 the north.

16 I believe at one time Wiikwemkoong was
17 possibly entertaining bringing forward a title
18 claim but I believe they abandoned that. I'm not
19 too certain about that. But I stand to be
20 corrected on that.

21 Q. So is there any agreement between
22 SON and any of the Manitoulin Island First Nations
23 as to that portion of northern Lake Huron in
24 between the northern tip of the peninsula and
25 Manitoulin Island?

11:44:03 1 A. Not currently.

11:44:06 2 Q. Are you expecting that there will
11:44:08 3 be an agreement formalized?

11:44:10 4 A. I would expect that if there was a
11:44:15 5 concern that was expressed about the potential for
11:44:18 6 overlap, then I'm certain that there would be some
11:44:21 7 outreach and there would certainly be some
11:44:24 8 dialogue. And how that would get resolved remains
11:44:27 9 to be seen but I would expect it would be addressed
11:44:30 10 in very much the same way.

11:44:33 11 Q. Thank you. And now in the
11:44:36 12 Georgian Bay area, on map P and the blue part of
11:44:43 13 that, to the east of the Saugeen Peninsula, is the
11:44:49 14 entire claimed area exclusive to SON or again is
11:44:55 15 there any overlapping claim with other First
11:44:57 16 Nations such as Beausoleil?

11:45:02 17 A. It's being claimed exclusively by
11:45:05 18 SON as I understand.

11:45:06 19 As to whether or not there's an overlap
11:45:09 20 with Beausoleil, specifically them bringing a
11:45:13 21 claim, I'm not aware of any.

11:45:15 22 Q. And again, do you have any
11:45:18 23 information as to whether you expect that there
11:45:21 24 would be an agreement with the First Nations in
11:45:27 25 Georgian Bay to the east of Saugeen with regard to

11:45:30 1 a potential overlap?

11:45:32 2 A. Yeah, I can only hypothesize that
11:45:34 3 there would be, if in fact there was a concern
11:45:37 4 expressed by Beausoleil about that, that I would
11:45:42 5 fully expect that there would be some outreach from
11:45:45 6 the communities who try and resolve that. But
11:45:49 7 certainly in my tenure as Chief there was nothing
11:45:53 8 brought forward.

11:45:53 9 Q. And you're not aware of a present
11:45:58 10 issue there?

11:45:59 11 A. I'm not aware, not currently, no.

11:46:02 12 Q. And now does SON have a claim to
11:46:07 13 shared Aboriginal title to any other portion of the
11:46:10 14 waters of the Great Lakes, outside of the claimed
11:46:13 15 area?

11:46:14 16 A. To my understanding, no, I don't
11:46:18 17 believe so.

11:46:19 18 Q. Okay. Thank you.

11:46:21 19 Now earlier this morning you gave an
11:46:23 20 example of oral history. And the example was of
11:46:29 21 the six Elders, who were telling you their family
11:46:33 22 stories while you had the map of the territories
11:46:37 23 and they were showing you where they hunted, where
11:46:43 24 they fished, where they gathered medicines, and
11:46:46 25 where they performed ceremonies. And you said in

11:46:49 1 the course of doing that, they essentially
11:46:51 2 confirmed the boundaries of the territories; is
11:46:53 3 that correct?

11:46:53 4 A. Yes.

11:46:54 5 Q. Now, are you referring to the
11:46:58 6 treaty, treaty seven --

11:47:05 7 Are you referring to the Treaty 72
11:47:10 8 territories that they confirm, that is the yellow
11:47:13 9 section of the Saugeen Peninsula on Exhibit P?

11:47:17 10 A. Actually, no. In our discussions
11:47:20 11 we were -- the stories they were sharing were
11:47:24 12 throughout the entire territory including the
11:47:26 13 territory represented through Treaty 45½.

11:47:29 14 Q. So that all the green portion?

11:47:31 15 A. Yes, that's correct.

11:47:32 16 Q. And what timeline are you
11:47:35 17 referencing for these stories, by the Elders? Did
11:47:38 18 they refer to these harvesting and ceremonial
11:47:44 19 activities in their lifetime or did they include a
11:47:51 20 prior time as well?

11:47:51 21 A. Some within their lifetime and
11:47:54 22 with their parents and their grandparents. So at
11:47:58 23 least three generations.

11:47:59 24 Q. Thank you. Just one moment,
11:48:02 25 please.

11:48:03 1 Now, with respect to the overlap
11:48:24 2 territory identified in the 2011 declaration, do
11:48:30 3 all five of the First Nations signatories have
11:48:34 4 equal rights to all of that overlap territory
11:48:39 5 identified in the declaration? Or do some have
11:48:43 6 rights only with respect to portions of that
11:48:47 7 overlap area; do you know?

11:48:48 8 A. So referring specifically to the
11:48:53 9 declaration, the understanding that would be a
11:48:56 10 shared use.

11:48:57 11 We didn't get into the specifics of the
11:49:01 12 parameters of that, but the understanding that it
11:49:04 13 would be a shared use, consistent with those core
11:49:10 14 values that are set out in the declaration.

11:49:11 15 Q. And again, that's as far as you
11:49:13 16 got in 2011?

11:49:15 17 A. Yeah, we didn't get into examples
11:49:17 18 of specific uses, or timeframes or anything of that --
11:49:24 19 anything with that level of specificity. But
11:49:27 20 grounded it specifically in those core values and
11:49:30 21 principles.

11:49:33 22 Q. One moment, sir.

11:49:34 23 Well, Chief Kahgee, those are my
11:49:38 24 questions. Thanks very much.

11:49:40 25 A. Thank you, counselor.

11:49:43 1 THE COURT: Sir, if you can wait. Is
11:49:45 2 counsel from Ontario asking this gentleman
11:49:47 3 questions?

11:49:48 4 MS. LEPAN: Yes, Your Honour, I will be
11:49:52 5 asking questions.

11:49:53 6 THE COURT: If you just want to
11:49:54 7 introduce yourself before you begin.

11:50:17 8 I sometimes mention when I'm sitting in
11:50:20 9 this courthouse, to the public, if you don't know
11:50:22 10 this, University Avenue is the location of most of
11:50:25 11 Toronto's major hospitals so it is quite
11:50:29 12 commonplace to hear sirens. But think of it as a
11:50:33 13 good thing those people who are ill are being taken
11:50:37 14 to those major hospitals right down the road, okay?
11:50:40 15 There's no other difficulty that causes that to
11:50:42 16 occur.

11:50:43 17 All right. Please go ahead, counsel.

11:50:46 18 CROSS-EXAMINATION BY MS. LEPAN:

11:50:47 19 Q. Thank you. Good morning,
11:50:48 20 Mr. Kahgee.

11:50:49 21 A. Good morning.

11:50:51 22 Q. Thank you for bearing with me
11:50:53 23 while we set everything up.

11:50:56 24 My name is Jennifer Lepan and I am
11:50:58 25 counsel for Ontario in this matter. I'm going to

1 be asking you a few questions.

2 If at any time you can't hear me let me
3 know I will speak up. Or if you don't understand
4 me I will repeat my question.

5 A. Okay, thank you.

6 Q. So today you spoke about the
7 Maawn-Ji-Giig-Do-Yaang declaration? Did I say that
8 correctly?

9 A. Maawn-Ji-Giig-Do-Yaang.

10 Q. I'll refer to it as the
11 declaration. And you testified that in addition to
12 the SON it was signed by the Chippewa, the Kettle
13 and Stony First Nations, the Aamjiwnaang First
14 Nation, and also the Walpole Island First Nation;
15 is that correct?

16 A. That is correct.

17 Q. Okay. And those three First
18 Nations, the Aamjiwnaang, the Walpole and the
19 Kettle and Stony First Nations, they're independent
20 separate from the SON; is that correct?

21 A. That is correct.

22 Q. And they're separate from each
23 other?

24 A. That is correct although I believe
25 all three communities are part of the Anishinaabe

1 nation.

2 Q. Okay. And are there other
3 agreements similar to the declaration with respect
4 to shared territories?

5 A. I'm not aware of any specifically
6 with those communities. Although, and this is
7 after my time, I do know that there has been some
8 discussions amongst the Council to perhaps form a
9 Grand Council. But I'm not certain as to where
10 those discussions have gone and I'm not privy to
11 those conversations.

12 Q. And has there been discussions
13 with the signatories to the declaration about how
14 the territory would be managed if SON was
15 successful in this action?

16 A. We haven't had, to my knowledge,
17 those specific discussions. Unfortunately I was
18 unable to attend the ceremony in 2017 so I'm not
19 certain as to whether or not a conversation might
20 have ensued from that.

21 What I can say is that when we did
22 complete the declaration, again, we had grounded
23 that in those core values and principles and we
24 felt it very important to honour those principles
25 through ceremony because that was the best way to

1 reflect our understanding, as I said, our
2 Anishinaabe Innaknigewin our law, our
3 understanding.

4 Q. So I want to turn now a bit.
5 Today you spoke about the protocols that are
6 followed when transmitting oral history.

7 Can you confirm that the protocols that
8 you have mentioned relate to the oral history of
9 the Saugeen First Nation as opposed to the Nawash
10 First Nation?

11 A. Well, certainly those were Saugeen
12 Elders that I was sitting with. That being said, I
13 don't think the process is all that much different
14 from our brothers and sisters. And Nawash,
15 certainly I've had an opportunity to sit with
16 Elders there as well, and they have shared and the
17 protocols are identical.

18 Q. Okay.

19 A. And how Elders treat you is very
20 much identical. They choose if and when they're
21 going to share something. So I never seem
22 facetious us in just asking. So, something has to
23 be earned.

24 Q. And what role does repetition play
25 to ensure that people remember the stories that

11:54:23 1 they are told accurately?

11:54:24 2 A. I think it plays a very prominent
11:54:29 3 role and, you know, we try and do -- I think one of
11:54:35 4 the critical things we try and do, and need to do
11:54:40 5 more of, is preserve our language.

11:54:43 6 But also, as part of that, is we have
11:54:47 7 our knowledge keepers. And we have to make sure
11:54:51 8 that that knowledge is shared and they do share
11:54:53 9 that. And we have to make sure that that knowledge
11:54:59 10 continues to pass on.

11:55:00 11 But I gave you an example earlier of
11:55:03 12 that time with the Elders and I might have
11:55:08 13 under-told it, but there's something very powerful
11:55:15 14 in the simplicity of sitting with Elders and having
11:55:20 15 them share their collective understanding of their
11:55:22 16 place in the territory; and the significance of
11:55:25 17 their relationship to those lands and those waters;
11:55:29 18 and have that understanding independently verified
11:55:32 19 by the Elders in separate stories.

11:55:35 20 And to me, that is a very powerful
11:55:39 21 example of that independent verification of how
11:55:44 22 knowledge is shared and how that knowledge is kind
11:55:47 23 of checked and balanced, so to speak, which I think
11:55:51 24 is what your question gets to. And I think that's
11:55:53 25 a perfect example of that.

1 Q. So given that there are protocols
2 for how oral history is transmitted, I take it that
3 not every statement that an Elder makes would be
4 considered oral history?

5 A. I think that's fair. But,
6 certainly we try and walk a good path and honour
7 those Seven Grandfather Teachings. It is a
8 universal concept in any culture that you always
9 respect your Elders.

10 So those that are Elders in the sense
11 that I'm talking about, are usually Elders who have
12 that recognition and that respect amongst the
13 community, for those purposes.

14 And it's not necessarily defined by
15 age, right? It's just understood that you have
16 that knowledge and you're respected for having that
17 knowledge in how you carry yourself. An Elder in a
18 truer sense never says, "I'm an Elder". It's just
19 something they've earned over time and they carry
20 that respect. They have a presence.

21 Not much different than when a judge
22 sits in a court, they demand that respect and they
23 have that presence. It's very similar with an
24 Elder. And that recognition and that respect is
25 given by our people to those Elders in the

11:57:21 1 community, because they've earned it over time.

11:57:23 2 Q. Okay. But it's fair to say that
11:57:25 3 not every statement that they make is oral history?

11:57:29 4 A. I think if an Elder who carries
11:57:31 5 that respect and that understanding and they share,
11:57:34 6 and they've chosen to share, within the parameter
11:57:38 7 of those protocols, then, yeah, you -- I would
11:57:41 8 consider that oral history.

11:57:43 9 Q. So long as it's within the
11:57:45 10 parameters of the protocols that you've spoken to?

11:57:47 11 A. And even if they choose to share.
11:57:49 12 Sometimes when you're sitting with an Elder, they
11:57:51 13 will just decide to share. And sometimes they
11:57:55 14 share small bits. I gave you an example of my
11:57:59 15 grandmother. She was trying to teach me about the
11:58:03 16 significance and importance of water and honouring
11:58:05 17 the spirit of water and how she, as a child, go and
11:58:09 18 take water from the stream and how she could taste
11:58:12 19 it, and have a different taste, she described it as
11:58:14 20 a sweet taste. And I'll give her a little credit,
11:58:17 21 she predicted that we would one day drink water
11:58:21 22 from bottles and she was right.

11:58:24 23 And but I remember talking about that
11:58:26 24 story of that stream and I felt like the story
11:58:29 25 wasn't done. And I remember going away, because I

11:58:32 1 was a small boy, I was probably about 11 at the
11:58:35 2 time, thinking to myself, oh, I feel really ripped
11:58:39 3 off, I didn't get the whole story, only to come
11:58:42 4 back later in life when I was about 20 and she told
11:58:44 5 the other part of the story and then it clicked.

11:58:47 6 So, you know, my experience and I'm
11:58:51 7 only speaking from my experience, is that Elders
11:58:54 8 will choose to share when they choose to share.
11:58:57 9 And in that moment, you do what you're supposed to
11:59:00 10 do, is you listen.

11:59:02 11 Q. Thank you.

11:59:04 12 You mentioned today the Three Fires
11:59:13 13 Confederacy and historically a member of the Three
11:59:15 14 Fires Confederacy, is it your understanding they
11:59:17 15 would still need to seek permission to hunt or fish
11:59:22 16 or use the territory of the other Three Fires
11:59:27 17 Confederacy members?

11:59:27 18 A. I'm not entirely sure in the
11:59:31 19 context of Three Fires Confederacy.

11:59:33 20 Q. That's fine.

11:59:41 21 A. Certainly there would be protocols
11:59:43 22 and as Anishinaabe we would recognize those
11:59:46 23 protocols. My understanding of the confederacy was
11:59:49 24 that it was an alliance that was meant to present
11:59:53 25 not only a position of strength but a unifying

11:59:59 1 effort to support one another, not only in war
12:00:01 2 times or in conflict but also in difficult times,
12:00:07 3 as one community or one group was struggling more
12:00:10 4 than the other. And so you reached out and you
12:00:14 5 offered those supports.

12:00:16 6 When treaty was being forced at
12:00:21 7 gunpoint in the U.S., Potawatomi sought refuge with
12:00:25 8 their brothers and sisters because they did not
12:00:28 9 want to take treaty in that way.

12:00:30 10 So, you know, it was a very powerful
12:00:33 11 and very strong alliance. I would fully expect
12:00:36 12 that the protocols within that confederacy, as
12:00:40 13 Anishinaabe people, would be as close as you can
12:00:46 14 get to universal, would be universal in that
12:00:49 15 understanding and that respect would be given.

12:00:51 16 But certainly through an alliance you
12:00:53 17 knew that if you were coming, then the expectation
12:00:56 18 would be that you would be given that respect and
12:00:59 19 afforded the opportunity to share. And that's
12:01:02 20 consistent with our values as Anishinaabe people.

12:01:06 21 Q. You say that you acted on Chief
12:01:10 22 between 2016 [sic] to 2014; did I get those dates
12:01:14 23 correct?

12:01:14 24 A. 2006 to 2014, yes.

12:01:16 25 Q. And while you were Chief, did you

1 represent the Saugeen nation at various
2 negotiations, for example, with the Province or the
3 Feds or other municipalities?

4 A. Yes, I did.

5 Q. And you represented them on a --
6 throughout your time, throughout 2006 to 2014 at
7 various negotiations?

8 A. When you say "represent" are you
9 referring to my capacity as Chief or lawyer.

10 Q. Either?

11 A. In my capacity as Chief, but we
12 had legal counsel there, yeah.

13 Q. Is it fair to say that you're an
14 experienced negotiator?

15 A. I would say so, yeah.

16 Q. And during those negotiations when
17 you were acting as Chief for the Saugeen First
18 Nation, you sought to protect their interests; is
19 that correct?

20 A. That is correct, yes.

21 Q. And you would agree that any
22 experienced negotiator would seek to protect the
23 interest of their clients?

24 A. I believe so, yes.

25 Q. Either before or after you were

1 Chief, were you also on Council at anytime?

2 A. No, I was not, no.

3 Q. And during your time as Chief you
4 were aware of the land claims that are the subject
5 of this litigation; is that right?

6 A. That is correct, yes.

7 Q. And while you were Chief, I know
8 you've stated that you didn't work on the land
9 claims in your capacity as a lawyer, but while you
10 were Chief, were you involved in the land claims at
11 all in your capacity as Chief?

12 A. Well, certainly I was -- it
13 depends what you mean by "involved". Certainly I
14 was apprised of all matters related to the title,
15 as you would expect I would be as Chief, when
16 direction or decisions were made and those
17 decisions had to be facilitated then, you know, I
18 would carry those out with my counterpart, Chief
19 Ralph Akiwenzie and after him Chief Scott Lee so,
20 yeah, we were involved.

21 Now, were we involved in the kind of --
22 I'll refer to as the nitty-gritty, getting in the
23 trenches and working with the working groups and
24 the committees, no. That's why we had the land
25 claims working group. They were responsible for

12:03:41 1 doing that work and anything that had to be brought
12:03:44 2 forward for feedback or direction came to Joint
12:03:47 3 Council and the chiefs.
12:03:48 4 Q. So the working group would present
12:03:52 5 to the chiefs some things that they had worked on --
12:03:55 6 A. To the Joint Council.
12:03:56 7 Q. To the Joint Council, thank you.
12:03:58 8 Are you familiar with Darlene Johnston?
12:04:02 9 A. Yes, I am.
12:04:02 10 Q. Are you aware that Darlene
12:04:05 11 Johnston has spent several years of doing research
12:04:07 12 into issues that are relevant to this case?
12:04:10 13 A. Yes, I am.
12:04:10 14 Q. Have you read any of her research
12:04:13 15 or any of the materials that she's prepared?
12:04:15 16 A. Not all of the materials, no.
12:04:19 17 Q. But some of them?
12:04:20 18 A. But some of them, yes.
12:04:21 19 Q. And during your time as Chief, was
12:04:24 20 any research regarding the land claims presented to
12:04:28 21 you perhaps from the working group on the land
12:04:30 22 claims?
12:04:34 23 A. I can certainly recall that at
12:04:36 24 different points research was discussed typically
12:04:40 25 in terms of the type of experts reports that had to

12:04:43 1 be garnered, but to say that it was one specific --
12:04:50 2 I can't think of one specific piece of research off
12:04:51 3 the top of my head.

12:04:52 4 Q. And would you have had a chance to
12:04:54 5 read any of those expert reports?

12:04:55 6 A. I didn't read all of them.
12:04:59 7 Certainly, when some of the reports were available,
12:05:03 8 I would skim them. Usually we received a briefing
12:05:06 9 on those through the working group.

12:05:11 10 Q. Okay. Mr. Kahgee, I'd like to
12:05:22 11 turn now and discuss Treaty 45½ and Treaty 72?

12:05:28 12 A. Sure.

12:05:29 13 Q. I understand you've given several
12:05:31 14 presentations in various schools about the history
12:05:32 15 of those Treaties and the circumstances in which
12:05:35 16 they were made; is that right?

12:05:36 17 A. Yes, I've had the opportunity to
12:05:38 18 speak in schools, yes.

12:05:39 19 Q. And have you also had the
12:05:41 20 opportunity to speak at local Saugeen First Nations
12:05:46 21 community events about those Treaties?

12:05:47 22 A. Yes, I have.

12:05:48 23 Q. Okay. And you've also had the
12:05:50 24 opportunity to speak about the history of these
12:05:52 25 Treaties at local community events outside of the

12:05:55 1 Saugeen First Nation community, so in the local
12:05:57 2 municipalities, for example, treaty recognition
12:06:00 3 week?

12:06:01 4 A. Yes, I've been asked a number of
12:06:03 5 times to speak at those events, yes.

12:06:05 6 Q. And is the source of your
12:06:08 7 knowledge or information about Treaty 45½ or Treaty
12:06:12 8 72, from your parents or your grandparents or some
12:06:15 9 of the Elders that you worked with while on the
12:06:18 10 Council?

12:06:18 11 A. Yes, that's a fair assessment,
12:06:21 12 yes, as well as my written understanding as well.
12:06:28 13 I've seen some of the written records.

12:06:30 14 Q. Okay. And I understand that you
12:06:35 15 made remarks at a special assembly on September
12:06:38 16 24th, 2011, in the Saugeen community. And a video
12:06:43 17 of those remarks was posted on YouTube to the
12:06:48 18 Saugeen Times page. I'm getting my friends to pull
12:06:50 19 this up now. If you can just bear with me, in case
12:06:53 20 we have some technical difficulties.

12:07:07 21 A. Okay. I didn't know there was a
12:06:47 22 YouTube video.

12:07:22 23 Q. So maybe we can just scroll up so
12:07:24 24 we can see the first screen of the video.

12:07:30 25 A. I'm definitely not Adam Levine.

1 THE COURT: No, it's the person that's
2 controlling the computer.

3 BY MS. LEPAN:

4 Q. There we go. Now I'm actually
5 going to --

6 A. The camera is not flattering.

7 Q. -- ask my colleague to just scroll
8 down again because there's a description that I'd
9 like to read. In the description there it says:

10 "Chief Randall Kahgee of
11 Saugeen Ojibway Nation gave an
12 update of land claim negotiations to
13 an assembly of the SON on September
14 24th, 2011.

15 "The assembly featured two guest
16 speakers, Alan Corbiere and Maurice
17 Switzer, who explained in detail the
18 meaning behind the wampum treaty
19 belt."

20 I've provided a copy of this video to
21 your counsel. Have you had a chance to review that
22 video?

23 A. Yes, I did.

24 Q. This is the video you reviewed,
25 this one here, if we scroll up.

12:08:31 1 A. That looks like me.

12:08:32 2 Q. And so it is you in the video as
12:08:35 3 you've just confirmed, and the video captures the
12:08:38 4 remarks that you made in or around September 24th,
12:08:41 5 2011; is that right?

12:08:42 6 A. That sounds correct, yes.

12:08:45 7 MS. LEPAN: Your Honour, I would ask
12:08:47 8 this be marked as the next exhibit, the document
12:08:50 9 number is SC0157.

12:08:53 10 THE COURT: Any objection? No?

12:08:56 11 Mr. Registrar.

12:08:57 12 THE REGISTRAR: Exhibit No. 3984.

12:08:57 13 EXHIBIT NO. 3984: Randall Kahgee Video
12:09:07 14 (accessed from YouTube).

12:09:07 15 BY MS. LEPAN:

12:09:07 16 Q. Mr. Kahgee, was the purpose of
12:09:09 17 this special assembly to provide information on the
12:09:11 18 history of your communities and provide an update
12:09:12 19 on the status of the land claims; am I
12:09:15 20 understanding correctly?

12:09:17 21 A. Partially. The overall theme of
12:09:20 22 that day was Treaties. More importantly, it was in
12:09:27 23 reference to the Treaty of Niagara, and
12:09:32 24 Mr. Corbiere gave a very powerful presentation on
12:09:35 25 that. And I was asked to come and bring greetings

1 on behalf of the Council to the gathering and
2 provide a short update on the claim.

3 Q. And?

4 A. Or claims, sorry.

5 Q. And your remarks were made in your
6 capacity as Chief?

7 A. That's correct.

8 Q. And you also made remarks about
9 Treaty 45½ and Treaty 72?

10 A. I believe I did, yes.

11 Q. And to the left of the screen
12 there, if it is a bit harder to see, we can skip
13 ahead perhaps to 0036. There's a clearer picture,
14 but to the left there, where the feathers; is that
15 the eagle feather staff?

16 Maybe we can go ahead to 0036 or 35.

17 A. Yeah, I believe that's an eagle
18 staff, yes.

19 Q. And my understanding of the eagle
20 staff is that it represents honour and truth and
21 your connection to the Creator and that when
22 speaking in the presence of it you speak solemnly
23 and honestly; is that understanding correct?

24 A. I believe that's probably correct.
25 And I think that's -- I'm trying to remember whose

1 eagle staff. It was a community member's eagle
2 staff that was present. I'm not certain that was a
3 Canadian eagle staff. But yes, you're correct.

4 Q. There were community members
5 present at that meeting?

6 A. Yes.

7 Q. And there were also Elders that
8 were present at that meeting, or traditional
9 knowledge holders?

10 A. I believe there were Elders
11 present, yes. I'm trying to recollect. There was
12 a number of people there, yes.

13 Q. And the community members were
14 looking to you, when you made your remarks to
15 provide them with an accurate -- to provide them
16 with accurate information regarding the land
17 claims, discuss the status of land claims, that's
18 correct?

19 A. Yes, well, to speak to -- to
20 provide an update on the claim, yes, that is
21 correct.

22 Q. So I want to ask you some
23 questions about the remarks that you made in the
24 video. So I'd like to play two clips from the
25 video first.

12:11:56 1 A. Certainly.

12:11:56 2 Q. I'm going to ask that we play from
12:11:59 3 2 minutes and 45 seconds to 3 minutes and 16 or
12:12:02 4 around there.

12:12:03 5 So we've set up the speakers.

12:12:05 6 If you can't hear anything let me know
12:12:18 7 and we'll readjust the speakers so you can hear,
12:12:23 8 okay?

12:12:23 9 -- REPORTER'S NOTE: Randall Kahgee
12:12:23 10 video excerpt was played for the Court and was
12:12:23 11 transcribed as follows:

12:12:25 12 "... these Treaties are not
12:12:26 13 relevant to the past. They are
12:12:28 14 living and breathing documents,
12:12:30 15 living breathing history that speak
12:12:31 16 to our place in this world and that
12:12:33 17 each understanding we have of that
12:12:36 18 relationship.

12:12:36 19 "And I tell them, I said, our
12:12:38 20 people, they weren't duped. In
12:12:40 21 fact, they were the most savvyest of
12:12:43 22 negotiators. Anything they wanted
12:12:44 23 they could get. They knew
12:12:45 24 exactly -- I like that analogy Alan
12:12:48 25 gave saying that these are about

12:12:50 1 negotiations, because our people
12:12:54 2 were savvy in our negotiations and
12:12:55 3 they knew what they wanted to
12:12:57 4 protect, and that was that
12:12:59 5 relationship ..."

12:12:59 6 -- REPORTER'S NOTE: Video was paused.

12:13:00 7 MS. LEPAN: Okay. If we can now play
12:13:01 8 the next clip which is from the 1039 to 1218.

12:13:01 9 -- REPORTER'S NOTE: Randall Kahgee
12:13:01 10 video excerpt was played for the Court and was
12:13:01 11 transcribed as follows:

12:13:22 12 "... which falls under Treaty
12:13:23 13 number 72, 1854. We talked about
12:13:27 14 when Alan was -- was talking about
12:13:28 15 the promises, one of the promises in
12:13:32 16 Treaty 45½ was, then we'd continue
12:13:35 17 to maintain that relationship for
12:13:37 18 our territory. Be able to do those
12:13:41 19 things that matter the most to us,
12:13:43 20 hunt, trap, fish, gather medicines,
12:13:46 21 have ceremony, and continue that
12:13:51 22 relationship.

12:13:52 23 "They promised they would protect
12:13:54 24 us, from the encroachment of others
12:13:57 25 on our lands, and they came to us

12:14:03 1 only 17 years later, 1851, to try to
12:14:08 2 say, we can't keep our promises, we
12:14:10 3 need to start talking about what
12:14:12 4 that means. You know, we got moved
12:14:16 5 a little bit further up. But our
12:14:19 6 people were savvy, as I said, savvy
12:14:21 7 negotiators. They said, 'wait a
12:14:23 8 minute, if we're going to do this
12:14:25 9 we're going to enter into another
12:14:27 10 discussion while we do this. You
12:14:28 11 couldn't keep our promises to us
12:14:31 12 from 1836 and that was only 18 years
12:14:34 13 ago, so we're going to add a few
12:14:38 14 conditions of our own.'

12:14:39 15 "And one of those conditions was
12:14:41 16 that any land that was sold, right,
12:14:44 17 the proceeds of those sales would go
12:14:47 18 into the Trust, for the Trust for
12:14:49 19 our use and the benefit of our
12:14:51 20 people. And that didn't happen.

12:14:56 21 I have another story about ..."

12:14:56 22 -- REPORTER'S NOTE: Video was paused.

12:15:02 23 BY MS. LEPAN:

12:15:02 24 Q. So, in the video that we've just
12:15:05 25 watched, you say that your ancestors who negotiated

1 Treaty 72 weren't duped; is that correct?

2 A. Those are my words, yes.

3 Q. And you also stated your ancestors
4 added conditions of their own to Treaty 72?

5 A. That's correct.

6 Q. And you stated that your ancestors
7 were the savviest of negotiators?

8 A. I said that, yes, correct.

9 Q. And at the time you made those
10 statements you believed them to be true?

11 A. Correct.

12 Q. So the savvy negotiators who
13 weren't duped. Your ancestors sought to protect
14 their interests when they entered into Treaty 72?

15 A. Yes.

16 MS. LEPAN: Thank you, Mr. Kahgee, I
17 have no further questions.

18 THE COURT: I don't believe there is
19 counsel present from the municipalities today. So
20 it remains to hear from counsel to the plaintiff,
21 if you wish to ask any questions in re-examination.

22 MS. PELLETIER: If I could have one
23 minute to confer with my colleagues.

24 THE COURT: Yes, please go ahead.

25 MS. PELLETIER: Thank you, Your Honour.

1 I have one question for redirect.

2 RE-EXAMINATION BY MS. PELLETIER:

3 Q. Mr. Kahgee, Ms. Lapan was just
4 asking you about your comments to the General
5 Assembly about your ancestors not having been
6 duped. Could you say a little bit about your views
7 on whether or not your ancestors had full
8 information at the time of the negotiating of
9 Treaty 72?

10 A. So I look at it in this context.
11 Yes, I do believe that our ancestors were fully
12 aware of what was important to them and what they
13 needed to protect it and they sought to protect
14 that the best they could. But did they really have
15 a choice when you think about Treaty 72.

16 The Crown told our people, told our
17 ancestors that they couldn't protect the peninsula,
18 and it turns out that wasn't true and that's the
19 whole purpose of why we're here today. So I do
20 believe our ancestors knew what they wanted to
21 protect. That is an inherent responsibility with
22 our people. It's intertwined with our Creation
23 Story.

24 Our people will do whatever is
25 necessary to protect and safeguard that

12:18:43 1 relationship and they knew what they wanted to
12:18:45 2 protect. And, you know, I could talk for hours
12:18:49 3 because there's a lot of context to the Treaties
12:18:51 4 that have to be considered. And certainly I make
12:18:57 5 no apologies because we do take a very impoverished
12:19:02 6 view of the Treaties in this country and we tend to
12:19:06 7 reduce them to simple transactions and I think that
12:19:12 8 diminishes the role and responsibility my ancestors
12:19:14 9 had to safeguard.

12:19:15 10 If they were here today, I'd thank them
12:19:19 11 for their sacrifice. We do the best we can with
12:19:22 12 what we have. You look at that in the context of a
12:19:26 13 modern day treaty, they take multiple years and
12:19:30 14 many, many lawyers to negotiate. And you're all
12:19:34 15 trying to get to one thing, certainty. Certainty.

12:19:43 16 What certainty did my people have?
12:19:45 17 None. So there is context to that. And I really
12:19:51 18 do believe it's not like they had much of a choice
12:19:54 19 and I believe that's the whole basis of why we're
12:19:57 20 here today, so miigwetch.

12:20:02 21 MS. PELLETIER: Thank you, Mr. Kahgee.

12:20:04 22 THE COURT: Thank you, counsel.

12:20:07 23 Sir, that completes your evidence and
12:20:08 24 you can step down from the witness box.

12:20:12 25 THE WITNESS: Miigwetch.

12:20:13 1 THE COURT: Which of your is calling
12:20:14 2 Professor McCarthy?

12:20:16 3 MS. PELLETIER: Mr. Townshend is and
12:20:17 4 said he needs about 15 minutes to be here.

12:20:20 5 THE COURT: He's standing up in the
12:20:23 6 back of the courtroom.

12:20:23 7 MS. PELLETIER: I apologize, he is
12:20:25 8 here, Your Honour.

12:20:28 9 THE COURT: You can step down, sir.

12:20:28 10 (Randall Kahgee was excused from the
12:20:28 11 witness box.)

12:20:30 12 THE COURT: We had an unexpected long
12:20:32 13 break earlier today. I wasn't planning to stop
12:20:36 14 again, unless there's a need to.

12:20:39 15 Mr. Townshend, if you can come forward
12:20:42 16 and get himself organized. Is that Professor
12:21:01 17 McCarthy behind you?

12:21:02 18 Is it Professor McCarthy or
12:21:10 19 Dr. McCarthy.

12:21:11 20 PROFESSOR McCARTHY: Your choice.

12:21:14 21 THE COURT: My choice, all right.

12:21:14 22 Professor, if you can just come up to the other
12:21:16 23 side of the courtroom all the way to the front here
12:21:16 24 and we'll show you where to put your things.

12:24:23 25 Just while counsel are getting

1 organized, I'm going to put on the record that on
2 consent of the parties Professor McCarthy's report
3 is going to be marked as evidence in this trial and
4 I'm sure Mr. Townshend will ask that it be given a
5 number and we'll get to that in a moment.

6 And I also put on the record that no
7 party objects to this expert witness' expertise on
8 the basis that no one says that she's not qualified
9 to give the opinion evidence that's found in her
10 report.

11 Because of these two consent
12 agreements, Professor McCarthy's testimony does not
13 need to cover every detail in the soon to be marked
14 exhibit of her report, but is nonetheless, I think
15 Mr. Townshend, are you calling this witness?

16 MR. TOWNSHEND: Mr. Brookwell.

17 THE COURT: Mr. Brookwell will be
18 asking this expert some questions by way of, I
19 think, a high-level review of her opinions and then
20 we will have cross-examination after that.

21 So, Mr. Brookwell, just let us know
22 when you're ready and Mr. Registrar will take the
23 oath of this witness.

24 MR. TOWNSHEND: Your Honour, our
25 transcripts don't seem to be working.

12:25:49 1 THE COURT: Mine is working. Is anyone
12:25:53 2 else having a difficulty? We have that wonderful
12:25:55 3 note from the court reporter last week about how to
12:25:57 4 reset your iPad if you need to.

12:26:21 5 MR. BROOKWELL: My apologies, Your
12:26:23 6 Honour, it's going to be about two minutes for us
12:26:26 7 to set up our iPad.

12:26:29 8 THE COURT: Two minutes is no problem,
12:26:31 9 sir, go ahead.

12:27:41 10 Are people still having difficulty with
12:27:43 11 their iPads? No. Excellent news.

12:27:48 12 Mr. Brookwell, Mr. Registrar is now
12:27:51 13 going to proceed to take the oath of the witness.

12:27:55 14 THE REGISTRAR: Good afternoon. Would
12:27:56 15 you like to make an oath on the Holy Book or make a
12:28:00 16 solemn affirmation to tell the truth?

12:28:01 17 THE WITNESS: Holy Book will be fine.

12:28:07 18 THE REGISTRAR: Can you state and spell
12:28:08 19 your first and last name for the record.

12:28:10 20 THE WITNESS: Francine McCarthy,
12:28:11 21 F-R-A-N-C-I-N-E, M-C-C-A-R-T-H-Y.

12:28:16 22 THE REGISTRAR: Thank you.

12:28:17 23 FRANCINE MCCARTHY: SWORN.

12:28:36 24 THE COURT: Please go ahead,
12:28:37 25 Mr. Brookwell.

12:28:38 1 MR. BROOKWELL: I'm sorry, Your Honour,
12:28:40 2 I have to ask for your indulgence once again. We
12:28:43 3 are having a small technical issue.

12:28:45 4 THE COURT: Does your small technical
12:28:47 5 issue relate to what you're going to begin with,
12:28:51 6 sir?

12:28:51 7 MR. BROOKWELL: Yes, I'd like to be
12:28:53 8 able to provide Dr. McCarthy with a copy of her
12:28:55 9 report to interact with on the screen and we had
12:28:58 10 intended to do that through the iPad but we're
12:29:01 11 having --

12:29:02 12 THE COURT: Is that not pre-filed in
12:29:04 13 the database so we can just put it up on the
12:29:06 14 screen?

12:29:07 15 MR. BROOKWELL: It is, but this would
12:29:08 16 allow her to mark with a pen and help explain what
12:29:12 17 the diagrams mean by drawing on them.

12:29:15 18 THE COURT: Is that what you're going
12:29:16 19 to begin with, sir, or are you going to cover
12:29:19 20 anything else? And don't forget, I've reminded
12:29:22 21 counsel you have to tender each expert and that has
12:29:25 22 to be done.

12:29:25 23 MR. BROOKWELL: That's right. And I
12:29:26 24 will be going through the tender process.

12:29:26 25 THE COURT: You don't need it for that,

1 I don't think.

2 MR. BROOKWELL: So I can begin and I
3 hope, in the interim, my team can set up the iPad
4 with Dr. McCarthy's report.

5 THE COURT: In the meantime, do you
6 wish us to have the pre-filed document on the
7 screen? It needs to be marked.

8 MR. BROOKWELL: Yes, I think that's the
9 best way that we can start.

10 So the pre-filed document for
11 Dr. McCarthy's report is SC0156.

12 THE COURT: I believe there's also a
13 curriculum vitae in that image, I guess we'll be
14 able to see it. It's not up on my screen,
15 Mr. Registrar.

16 I see. Counsel, needs to pull it up.
17 All right. It should be straightforward to pull it
18 up from the database, sir.

19 MR. BROOKWELL: Yes, it should be, Your
20 Honour. If we can just have one more moment.

21 THE COURT: Well, we have some progress
22 here.

23 MR. BROOKWELL: Okay. So we've just
24 pulled up document SC0155 and that is
25 Dr. McCarthy's curriculum vitae.

12:31:21 1 THE COURT: And report.

12:31:22 2 MR. BROOKWELL: And report.

12:31:23 3 THE COURT: So I pulled it up myself,
12:31:25 4 and there is -- it's just the CV is at the
12:31:28 5 beginning of the document and it's directly
12:31:29 6 followed by the report.

12:31:33 7 MR. BROOKWELL: I think since you may
12:31:34 8 have pulled this up in advance, but since that time
12:31:35 9 we have separated it to two documents. I'm sorry
12:31:39 10 for the confusion.

12:31:40 11 THE COURT: No, there's no confusion.
12:31:42 12 Are you asking for the CV to be marked
12:31:44 13 as an exhibit?

12:31:45 14 MR. BROOKWELL: Yes, Your Honour.

12:31:46 15 THE COURT: All right. I assume
12:31:47 16 there's no objection, Mr. Registrar.

12:31:49 17 THE REGISTRAR: Exhibit number 3985.

12:31:52 18 THE COURT: And the report itself as
12:31:54 19 well, sir? What is the new number for that
12:31:57 20 document?

12:31:57 21 MR. BROOKWELL: The new number for the
12:31:58 22 report is SC0156.

12:32:01 23 EXHIBIT NO. 3985: Curriculum Vitae of
12:32:06 24 Dr. Francine McCarthy.

12:32:06 25 THE COURT: And that shall be the next

1 exhibit, Mr. Registrar.

2 THE REGISTRAR: 3986.

3 EXHIBIT NO. 3986: Final Report and
4 Addendum of Dr. Francine McCarthy.

5 MR. BROOKWELL: And before I continue
6 with the qualification process, Your Honour,
7 counsel for the parties have discussed, prior to my
8 coming up this afternoon, about evidence during the
9 voir dire and we have a proposal that, subject to
10 Your Honour's views, that the evidence in the voir
11 dire on qualifications for any of the experts to be
12 presented to the Court, could also be considered as
13 evidence in the action itself to avoid having to
14 reproduce the same evidence after the voir dire.

15 THE COURT: Well, sir, since there's no
16 objection to this individual's qualifications,
17 there is no necessity to have a voir dire at all.

18 I do expect, as it would be customary,
19 that you would wish to review some highlights of
20 your expert's background and experience. If any
21 counsel wishes to cross-examine before their
22 regular cross-examination on that experience, that
23 would surprise me. Because there's no objection.

24 I take it that defendants' counsel, to
25 the extent they wish to cross-examine the

12:33:23 1 qualifications, will do that as part of their main
12:33:26 2 cross-examination; is that correct? Canada,
12:33:30 3 Ontario? Yes, okay.

12:33:33 4 So all you need to do, sir, as after
12:33:36 5 you've highlighted whatever you choose in your
12:33:39 6 witness' background and experience is to tender her
12:33:43 7 for the area that you propose so that I can make a
12:33:45 8 ruling about that, okay?

12:33:47 9 MR. BROOKWELL: Thank you, Your Honour.
12:33:48 10 And I think it was unclear was that our discussion
12:33:51 11 had to do with proposal for all of the experts to
12:33:54 12 come?

12:33:55 13 THE COURT: If there is a voir dire and
12:33:57 14 I think there is at least one expert where there is
12:33:59 15 a potential issue, then it would probably be wise
12:34:02 16 to remind me of your agreement because that could
12:34:06 17 be quite a number of months from now.

12:34:07 18 MR. BROOKWELL: Okay, thank you, Your
12:34:09 19 Honour.

12:34:09 20 THE COURT: Please go ahead.

12:34:10 21 EXAMINATION IN-CHIEF BY MR. BROOKWELL:

12:34:12 22 Q. Good afternoon, Dr. McCarthy.

12:34:14 23 Thank you for bearing with us with the
12:34:15 24 technical challenges. We're going to do our best
12:34:18 25 to get the iPad up and running. But if that isn't

12:34:22 1 something that we can get going we can still
12:34:24 2 proceed with the screen and I'll bring you through
12:34:27 3 parts of your report and you can explain it to us
12:34:30 4 without having the ability to markup the screen but
12:34:33 5 I think we'll manage through and we'll hope that
12:34:36 6 the technology comes through for us in the end.

12:34:38 7 So, first I wanted to review your CV,
12:34:43 8 and just bring you to some of the highlights. And
12:34:47 9 maybe you can confirm for me and the Court that you
12:34:50 10 have a PhD in Earth Sciences; is that right?

12:34:55 11 A. Yes, I do.

12:34:56 12 Q. And You teach at Brock University;
12:34:59 13 how long have you been a professor there?

12:35:02 14 A. Since 1991.

12:35:03 15 Q. And in your CV it also indicates
12:35:06 16 you were the Chair of Earth Sciences?

12:35:08 17 A. For four years.

12:35:09 18 Q. How long were you the chair?

12:35:11 19 A. For four years.

12:35:12 20 Q. And you've also been the Director
12:35:14 21 of Graduate Programs in Earth Sciences?

12:35:17 22 A. I currently am.

12:35:19 23 Q. And when did you start as graduate
12:35:21 24 director?

12:35:21 25 A. Two years ago.

12:35:23 1 Q. And your CV lists a number of
12:35:27 2 publications, but in a manner of synthesizing it,
12:35:35 3 we see somewhere around 40 articles. Are they
12:35:38 4 mostly to do with the Great Lakes? Is that a fair
12:35:40 5 summary?

12:35:41 6 A. I'd say about a third of them
12:35:44 7 probably deal with the Great Lakes.

12:35:46 8 Q. Okay. And your CV also discusses
12:35:51 9 the International Association of Great Lakes
12:35:54 10 Research; could you explain to us what that is and
12:35:57 11 your role?

12:35:57 12 A. Yes. I am currently a board
12:36:01 13 member of IAGLR, the International Association for
12:36:06 14 Great Lakes Research. It's a binational
12:36:07 15 association between Canada and the United States,
12:36:10 16 it has equal numbers of board members from each
12:36:12 17 countries. And as of last year we also have an
12:36:16 18 international member and that actually including
12:36:20 19 Indigenous peoples. So someone whose nationality
12:36:24 20 is not Canadian or American.

12:36:27 21 The aims of IAGLR is to promote
12:36:30 22 interest in and understanding of the Great Lakes so
12:36:33 23 all aspects of the Great Lakes. So that includes
12:36:36 24 science as well as social science, political,
12:36:40 25 issues having to do with the Great Lakes, both from

12:36:43 1 a binational perspective, both from a political
12:36:46 2 economic, socioeconomic perspective, and scientific
12:36:51 3 perspective and it's the latter that I contribute
12:36:53 4 to myself.

12:36:54 5 Q. If I can have the document SC158
12:37:04 6 brought up on the screen. This is a summary of the
12:37:13 7 tender I wish to propose to the court for
12:37:16 8 Dr. McCarthy as an expert in this case to tender
12:37:18 9 her as a geologist qualified with expertise in the
12:37:21 10 geological history of the Great Lakes Basin from
12:37:24 11 the last Ice Age to the present, and capable of
12:37:28 12 giving opinion evidence about what can be
12:37:30 13 reconstructed from the geologic and fossil record
12:37:34 14 concerning historical lake levels, lake depth,
12:37:37 15 water flow, land forms, and changes to them,
12:37:41 16 climate, and plants and animals found in the Great
12:37:44 17 Lakes region.

12:37:46 18 THE COURT: Is there any objection to
12:37:47 19 the form of tender for this witness? No.

12:37:50 20 I'm satisfied that this witness is,
12:37:53 21 based on her qualifications, able to go ahead and
12:37:55 22 testify.

12:37:56 23 Sir, if you wish to proceed.

12:37:58 24 MR. BROOKWELL: Thank you, Your Honour.

12:37:59 25 THE COURT: Do you wish to have this

12:38:01 1 document marked as a lettered exhibit?

12:38:03 2 MR. BROOKWELL: I think it may be a
12:38:05 3 good idea just for reference purposes.

12:38:07 4 Mr. Registrar, if we can mark this
12:38:09 5 document as the next lettered exhibit.

12:38:11 6 THE REGISTRAR: Letter A-2.

12:38:14 7 THE COURT: A-2. Thank you

12:38:16 8 Mr. Registrar.

12:38:16 9 EXHIBIT NO. A-2: Expert Tender Summary
12:38:16 10 for Dr. Francine McCarthy.

12:38:18 11 THE COURT: Please go ahead.

12:38:19 12 BY MR. BROOKWELL:

12:38:19 13 Q. Now, Dr. McCarthy, we're going to
12:38:22 14 turn to your expert report on the screen. And
12:38:25 15 while that is being loaded up, I'd like to ask you
12:38:30 16 a few general questions about earth sciences. And
12:38:33 17 maybe you can just help us first understand what
12:38:35 18 earth science is?

12:38:36 19 A. So, strictly speaking, earth
12:38:40 20 science is geology, so most people would think of
12:38:45 21 geology as equivalent. Geology also has
12:38:49 22 connotations more with mining and hard rock, sort
12:38:52 23 of old style geology, whereas earth sciences itself
12:38:56 24 encompasses a larger breadth of material that would
12:38:59 25 include what people would think of as physical

12:39:02 1 geography, so land forms, lakes, oceans,
12:39:07 2 oceanography, limnology, so different fields that
12:39:10 3 look at the science of the earth, of science.

12:39:17 4 Q. A form of dating that is
12:39:19 5 throughout your report has to do with radiocarbon
12:39:22 6 dating. And I think it would be helpful if you
12:39:25 7 could explain to us what radiocarbon dating is and
12:39:28 8 how dating is used in earth sciences?

12:39:31 9 A. So it is the most well-known and
12:39:35 10 common type of radiometric age dating that's used
12:39:39 11 in rocks and various materials, archeological
12:39:43 12 materials as well, of relatively recent age. So
12:39:47 13 the last 75,000 years or so is the span of time for
12:39:51 14 which radiocarbon can be used. And radiocarbon is
12:39:56 15 carbon 14, which is the radioactive form of carbon.
12:40:00 16 And it forms naturally in the upper atmosphere.
12:40:03 17 And it is incorporated into all organic things,
12:40:08 18 carbon based life forms, according to or relative
12:40:11 19 to the amount that's in the atmosphere.

12:40:14 20 After death, the organism ceases to
12:40:19 21 metabolize and keep carbon in equilibrium with the
12:40:24 22 atmosphere and the radiocarbon starts to dissipate,
12:40:29 23 decay, so over time -- and there is a very fixed
12:40:34 24 rate of decay. It's called a half-life. So every
12:40:37 25 element that is a radioactive isotope has a very,

1 very strict half-life amount of time that half of
2 it disintegrates into something else. And for
3 radiocarbon that is 5,730 years. So that is the
4 reason why we can only go back to 75,000 years.

5 So that any carbon-based material that
6 metabolizes is really, really useful to use for
7 radiocarbon dating. It's very well accepted. The
8 thing about radiocarbon dating -- well, two things.
9 First of all, it is a statistical measure, so there
10 will always be plus or minus after the age. So
11 there is an error of estimate. That's just because
12 it counts the amount that is lost relative to the
13 amount that is left behind. So there is going to
14 be that little plus and minus so it will be given
15 to you upfront.

16 The other little caveat is that it's
17 only useful up until 1950 because the bomb spike
18 created far too much radiocarbon. So if we were to
19 radiocarbon date something deposited 20 years ago
20 it would date hundreds of years into the future.

21 But within the timeframe that we're
22 looking at it is the best form of dating. When we
23 -- currently, we tend to report radiocarbon dates
24 not as radiocarbon dates YBP plus or minus,
25 etcetera, etcetera, but as calibrated age or

12:42:10 1 calendar age. And that's the way most modern day,
12:42:13 2 I'd say in the last 20-year publications tend to
12:42:16 3 report data.

12:42:17 4 So it is important if we're mining data
12:42:21 5 back through the 1950s through 1990s, say, to make
12:42:26 6 sure that we recognize whether the reports, the
12:42:29 7 articles, are using radiocarbon ages or calibrated
12:42:36 8 ages. And the calibration is done to account for
12:42:38 9 the fact that not only the manmade bomb spike
12:42:43 10 messes up the amount of radiocarbon that is
12:42:46 11 generated in the upper atmosphere, but natural
12:42:48 12 cosmic radiation variations through time have done
12:42:50 13 so.

12:42:51 14 So there is a program right now in 2019
12:42:54 15 we're at the seventh iterations, so the seventh
12:42:57 16 tweak of a program called CALIB that is readily
12:43:03 17 available and that is what everyone uses to
12:43:05 18 calibrate their ages. So we take our radiocarbon
12:43:09 19 ages, run it through this program and it corrects
12:43:12 20 for variations through time and the amount of
12:43:15 21 radiocarbon that was produced so that when you have
12:43:17 22 a calibrated age, it's done all that magic, if you
12:43:20 23 will. And it gives you have the age in calendar
12:43:24 24 years, as opposed to in radiocarbon years which
12:43:28 25 doesn't correct for that.

12:43:29 1 So it is a more -- the calibrated ages
12:43:32 2 are more linear and they're easy for us to think of
12:43:36 3 in years ago without understanding the intricacies
12:43:41 4 of radiocarbon.

12:43:43 5 Q. Now, thank you for that overview
12:43:48 6 of dating. I think that's helpful for us as
12:43:51 7 throughout the report there are references to
12:43:53 8 dates. I'd like to turn now to your report and I
12:43:58 9 want to focus on the images and the figures that
12:44:03 10 you've included in your report. I don't think we
12:44:06 11 need to cover some of the content that is in there.
12:44:09 12 It's just to really look at some of the figures
12:44:13 13 today so you can help us understand what we are
12:44:16 14 looking at on the page when we see a graphic.

12:44:19 15 So the first one I would like to start
12:44:23 16 with is on the cover page of your report, and if
12:44:30 17 you can pull that up it should be on the screen in
12:44:32 18 front of you. For that figure, I'd like to just
12:44:36 19 first ask where this figure comes from?

12:44:38 20 A. It's from the website of the U.S.
12:44:46 21 Army Corps of Engineers.

12:44:46 22 Q. And it describes the Lake Huron
12:44:49 23 Basin but can you tell us what the Lake Huron
12:44:52 24 Drainage Basin -- sorry, the Great Lakes Drainage
12:44:55 25 Basin is?

12:44:56 1 A. Yes. It's outlined in green on
12:44:59 2 the diagram, and it represents the area around the
12:45:05 3 Great Lakes where a drop of water falling from the
12:45:09 4 cloud, what we call meteoric water, would land on
12:45:13 5 the ground and eventually make its way into the
12:45:16 6 Great Lakes or not. So within the green area, a
12:45:19 7 drop of rain or a snowflake that eventually melts,
12:45:23 8 that water would somehow or other, unless it
12:45:28 9 evaporates, would make its way into the Great Lakes
12:45:30 10 Basin, but if it falls in the area that's not
12:45:33 11 colored green or blue for water, I guess -- if it's
12:45:36 12 colored white then it would -- that water would
12:45:38 13 drain somewhere else. So the drainage basin is the
12:45:41 14 area in which a drop of water will drain into one
12:45:46 15 of the Great Lakes. Now, of course, all of the
12:45:48 16 Great Lakes drain to one another.

12:45:50 17 Q. I'd like to then look at the
12:45:55 18 figure that is on page 5. It's the first figure
12:45:57 19 inside of the report. And again, if you could
12:46:07 20 start by telling us where this figure comes from?

12:46:09 21 A. It's from a book called "The
12:46:10 22 Physiography of Ontario" by Chapman and Putnam.

12:46:16 23 Q. And what does it show us?

12:46:18 24 A. It's showing us the bedrock
12:46:21 25 geology. So if you remove all of the surface

12:46:24 1 sediments, till, you know, soil, this is what you
12:46:30 2 would see. The rocks are identified by the
12:46:33 3 different patterns and you can see the legend on
12:46:35 4 the right.

12:46:36 5 The top right of the diagram, four
12:46:40 6 little crosses, that's the Canadian Shield. The
12:46:42 7 Canadian Shield is very, very old rock. It's often
12:46:45 8 called the Precambrian shield, the very hard
12:46:49 9 crystalline rocks. But as soon as you get to
12:46:56 10 Southern Ontario there's that contact with the
12:46:58 11 little dashed mark, that I would draw if I could.
12:47:00 12 And you then get into much softer rock, so
12:47:05 13 sedimentary rocks that were deposited in ancient
12:47:09 14 oceans and they're much softer.

12:47:12 15 One of the key rock formations on this
12:47:17 16 diagram is the Lockport Annville formation which is
12:47:20 17 the top of the Niagara Escarpment. The Niagara
12:47:25 18 Escarpment is a -- "scarp" means a big cliff. So
12:47:27 19 it is a major land form feature that runs, well,
12:47:30 20 basically from Queenston all the way up through to
12:47:33 21 the tip of the Bruce Peninsula and on to Manitoulin
12:47:36 22 Island and actually it whips around through
12:47:40 23 Michigan as well, but we don't see that on the map.

12:47:42 24 That escarpment is outlined in black on
12:47:47 25 the line, so you can see it as the edge of the

1 Lockport formation which is a little hatch pattern.

12:47:52 2 Q. So am I right it's the dark black
12:47:55 3 line that's running up from Hamilton and going
12:48:01 4 direct west towards the Bruce Peninsula and
12:48:03 5 carrying on to Manitoulin Island?

12:48:05 6 A. And on to Manitoulin Island, that
12:48:08 7 is correct.

12:48:08 8 Q. I'd like to move on to another
12:48:12 9 figure that's in your report, it's Figure No. 2,
12:48:15 10 it's on page 6.

12:48:25 11 And once again, if you could start by
12:48:30 12 telling us where this figure comes from?

12:48:32 13 A. It is from one of my papers. It's
12:48:36 14 work that we published in 2015 as part of a book
12:48:41 15 that's entitled, just from memory, "Caribou Hunting
12:48:45 16 in the Upper Great Lakes Region" by some editors
12:48:49 17 from the University of Michigan.

12:48:54 18 Q. And what do the numbers that are
12:48:56 19 circled around Lake Huron and Georgian Bay
12:48:59 20 indicate?

12:49:00 21 A. So these were calculations that
12:49:03 22 were made from websites in the United States and in
12:49:09 23 Canada. So in the United States it's the United
12:49:12 24 States Geological Survey and in Canada it's the
12:49:17 25 Canadian Water Network that measures how much rain

12:49:19 1 is falling at different stations. It measures the
12:49:23 2 stream flow or how much water is flowing in each of
12:49:26 3 the streams.

12:49:26 4 This is an annual average that is shown
12:49:29 5 here for the present day. So we're looking at, if
12:49:33 6 you sum up all of those ovals, that's the amount of
12:49:37 7 water in cubic metres per second, that on average,
12:49:41 8 reaches Georgian Bay, Lake Huron, at the present
12:49:45 9 day.

12:49:46 10 And one of the reasons that we did
12:49:49 11 these calculations, that we went to these websites
12:49:53 12 to get these numbers, is to illustrate that by far
12:49:57 13 the vast majority of water that's coming into
12:50:01 14 Georgian Bay, Lake Huron, comes across the Soo
12:50:06 15 Locks, at Sault Ste. Marie at the top right of the
12:50:09 16 diagram. So 2,140 cubic metres per second makes
12:50:13 17 all of the other numbers added together look very
12:50:16 18 small.

12:50:17 19 So that the importance then is that the
12:50:22 20 drainage from Lake Superior into Lake Huron,
12:50:26 21 through the north channel is really important to
12:50:29 22 the water balance of Lake Huron, Georgian Bay.

12:50:33 23 Q. Now, you mentioned stream flow;
12:50:36 24 can you tell us what stream flow means?

12:50:38 25 A. So stream flow is also sometimes

12:50:41 1 called run off. So it is -- discharge is another
12:50:47 2 way that it's sometimes described. It means how
12:50:51 3 much water is flowing through a stream, at a
12:50:56 4 particular point over per unit time.

12:50:58 5 So in Canada we use cubic metres per
12:51:01 6 second. In the U.S. they use cubic feet per
12:51:06 7 second, and I just did the conversion to metric,
12:51:10 8 you know, across the Border.

12:51:13 9 Q. And there's a term that was in
12:51:17 10 your report, and I think it might be helpful if you
12:51:21 11 could explain to us, what is a "water budget"?

12:51:25 12 A. Right. The water budget is the
12:51:27 13 total amount of water in a system. So you can do a
12:51:31 14 water budget for a river, you can do it for a lake,
12:51:34 15 so it is the amount of water coming in, compared to
12:51:38 16 the amount of water leaving.

12:51:41 17 So the two main sources of water coming
12:51:44 18 in, are the water falling directly from the clouds
12:51:48 19 on to the lake. Either snow or rain, meteoric
12:51:53 20 water, and the stream flow that, you know, flows in
12:51:56 21 that drainage basin, that makes its way into the
12:51:59 22 streams that flows into the lake. So those are the
12:52:02 23 two major pluses on the budget.

12:52:06 24 The negatives the minuses are the
12:52:08 25 outlet. So in Lake Huron, the outlet is at Sarnia.

1 So at Sarnia, the water exits Lake Huron through
2 the St. Claire River, to Lake St. Claire, to the
3 Detroit river, ultimately, to Lake Eerie and on and
4 on to the Atlantic Ocean eventually.

5 Yes, oh, yes, correct. The other part
6 of the water budget is groundwater flow. And
7 unfortunately, groundwater flow, so the water that
8 seeps through the ground, like if you were to drill
9 a well to get water that's one -- that's the way we
10 tap into groundwater. The groundwater budget for
11 the Great Lakes basin is not very well known.

12 So, in this diagram, I dealt simply
13 with the very well-known surface stream flow
14 discharge, and I have data for precipitation. The
15 evaporation is the other major way that water
16 leaves.

17 So, yes, I'm sorry I interrupted myself
18 by mentioning the groundwater which is another
19 source that we don't know much about.

20 But other than the outflow at Sarnia,
21 the other major way that water leaves the Lake
22 Huron basin is through evaporation. So in a dry
23 year, or a series of dry years, water levels fall.
24 And in the 1990s, this is when I was brought in to
25 work with colleagues at the Geological Survey of

12:53:42 1 Canada because there had been a series of dry years
12:53:45 2 and water levels in Georgian Bay and Lake Huron,
12:53:48 3 had been declining steadily, so that led to people
12:53:52 4 wanting answers to what's going on?

12:53:56 5 And so the people from Halifax were
12:54:00 6 actually deployed to come to Georgian Bay, to study
12:54:02 7 this issue. And they enlisted my help because I
12:54:06 8 had done my masters thesis at the University of
12:54:10 9 Toronto on Great Lakes water levels in Lake
12:54:13 10 Ontario.

12:54:14 11 So, based on my expertise, they invited
12:54:17 12 me to help with that. So the evaporation is a very
12:54:24 13 big factor even in modern today. So the flipside
12:54:29 14 unfortunately for Lake Ontario today, we've had a
12:54:31 15 couple of wet years.

12:54:32 16 Q. I want to change now to another
12:54:35 17 figure in your report, page 7, Figure No. 3.

12:54:40 18 There's two images here, one on the
12:54:46 19 left and one on the right. Can you first let us
12:54:50 20 know where these images came from?

12:54:51 21 A. Yeah, the one on the left has the
12:54:53 22 copyright from Pearson, Prentice, Hall. So it's
12:54:57 23 from a textbook by Tarbuck, et al., it's entitled
12:55:02 24 "Earth" and it is the Canadian edition. And it
12:55:06 25 shows the pre-glacial drainage. So it shows the

1 way that rivers flowed on the continent before the
2 ice sheets reached the area.

3 The image on the right is a Google
4 Earth image that I tapped directly into Google
5 Earth into one of the layers that allows you to
6 see, to visualize the bedrock. So it is the
7 bedrock topography. That means that it's looking
8 at the height of bedrock, and it's a digital map.
9 So it's sort of big chunks, but the -- you can make
10 out Lake Ontario to the bottom right, and to the
11 top left you can see the little blob that is
12 Georgian Bay, except a separate blob of blue, that
13 is the main basin of Lake Huron.

14 And the green colour is the lowest
15 elevation that is still land, that is still
16 subaerial, exposed to the air, and the white is the
17 highest elevation.

18 So you can see on that Google Earth
19 image, the geologic evidence for the cartoon that
20 is drawn on the right. Because the cartoon
21 obviously, the earth history that we can
22 reconstruct, we tap into what the rock record is
23 telling us, what the sediment record is telling us.
24 And we have to understand that in order to make a
25 story.

12:56:36 1 So the diagram on the left is an
12:56:40 2 overview in a textbook of the way that the rivers
12:56:43 3 flowed before the ice sheets came. That's based on
12:56:46 4 a lot of basic geology, that you don't see in the
12:56:51 5 cartoon on the left. And I just wanted to
12:56:53 6 highlight on the right, the real evidence on which
12:56:58 7 one of the blue lines is drawn.

12:57:00 8 So the top right blue line from
12:57:04 9 Georgian Bay into Lake Ontario, that of course is
12:57:08 10 not a major river system today, but it is where the
12:57:13 11 Scarborough Bluffs are. The reason that the
12:57:16 12 Scarborough Bluffs are there is because that's a
12:57:19 13 deep pre-glacial river valley called the Laurentian
12:57:23 14 River Valley and along that trend line there is
12:57:26 15 also Lake Simcoe. So it's a low-lying area between
12:57:30 16 Georgian Bay and Lake Ontario. And it's because
12:57:32 17 that bedrock, that valley had been eroded by an
12:57:36 18 ancient river, is there, that those Scarborough
12:57:43 19 Bluffs are as thick as they are. There was a thick
12:57:46 20 accumulation of sediment in that bedrock valley.

12:57:50 21 Q. And you mentioned the ice age and
12:57:53 22 the ice sheets. I'd like to then take you to
12:57:57 23 Figure No. 4 on page 8.

12:58:01 24 THE COURT: Just when you're completed
12:58:02 25 that figure, sir, we're at an appropriate time to

1 take the lunch break.

2 MR. BROOKWELL: Yes, that would be an
3 ideal time. Thank you, Your Honour.

4 BY MR. BROOKWELL:

5 Q. Can you tell us where this comes
6 from?

7 A. Yes. This is a figure that I
8 routinely use in my lectures and it's available
9 online in Google image. Several different versions
10 of this figure are readily available and what it's
11 showing is the thickness of ice that covered North
12 America at different times.

13 So they're 1000-year what we call time
14 slices, so it's like time-lapse photography every
15 thousand years. So the farthest extent is shown in
16 the dark blue. So you can see that the Laurentide
17 Ice Sheet which covered the eastern part of North
18 America to the Rockies, the furthest extent south
19 was actually St. Louis, Missouri, where the
20 Missouri and Mississippi rivers meet so it is a
21 low-lying area.

22 You can see that there was ice out on
23 the Continental Shelf off of Nova Scotia. Sable
24 Island is in fact land expression of where that
25 farthest extent was.

1 And every thousand years you can see
2 the retreat of the ice sheet as it melted back, and
3 one of the things that I wanted to highlight with
4 this image is the fact that it's not just one big
5 blob, that as it retreated you can see that there
6 are several different extends like fingers, we call
7 that lobate, different lobes of ice and you can, if
8 you picture where the Great Lakes are, you can
9 actually fairly easily make out where Lake
10 Michigan, Lake Huron, and Lake Eerie are with the
11 sort of light blue colour.

12 So that these ice lobes, because the
13 basins were deep areas, the lobes would kind of --
14 sometimes ice lobes would advance and retreat
15 relatively quickly. Sometimes out of phase,
16 sometimes even if other parts of the ice sheets are
17 retreating, certain lobes would surge forward.

18 So the history, reconstructing the
19 glacial history is relatively complex. I teach a
20 whole course on this. I'm not going to try to
21 teach the courtroom this today. But I was trying
22 to illustrate that with this image and to show that
23 the Great Lakes Basins are actually occupied by
24 different ice lobes at different times.

25 Q. And before we go for our break,

01:00:42 1 maybe could you describe, based on the colours, the
01:00:47 2 time period when the Lake Huron Basin would have
01:00:51 3 started to become free of ice?

01:00:55 4 A. Right. So there is a colour
01:00:59 5 that's sort of purply, pinky on my screen, sort of
01:01:05 6 purply, pinky blue. That is the time that there
01:01:10 7 was a stagnation of ice at the northern part of
01:01:15 8 Lake Huron and the shade of lighter blue
01:01:18 9 underneath, shows a time, a thousand years earlier,
01:01:21 10 when it was a bit further south.

01:01:24 11 So those two shades of blue, the pinky
01:01:27 12 blue and the light blue are showing the exposure
01:01:30 13 through time of the basin of Lake Huron, from the
01:01:37 14 -- sort of appearing -- as the ice sheet retreated,
01:01:42 15 the basin was exposed. I guess exposed is the
01:01:46 16 better way to put it.

01:01:48 17 Q. And in years, can you give us the
01:01:50 18 range in years?

01:01:50 19 A. So that's between -- yes, so
01:01:53 20 14,000 is the light blue and the pinky pale blue is
01:01:59 21 13,000 years ago so 14,000 to 13,000 years ago is
01:02:02 22 when you see the ice beginning to retreat from the
01:02:06 23 margin.

01:02:10 24 MR. BROOKWELL: Thank you,
01:02:11 25 Dr. McCarthy.

01:02:12 1 This would be an appropriate time for a
01:02:16 2 break Your Honour.

01:02:16 3 THE COURT: Let's take the lunch break
01:02:18 4 at this time. Adjourned until 2:15.

02:09:41 5 -- RECESS TAKEN AT 1:02 P.M. --

02:16:39 6 -- UPON RESUMING AT 2:15 P.M. --

02:16:39 7 THE COURT: Mr. Brookwell, please go
02:16:41 8 ahead.

02:16:42 9 MR. BROOKWELL: Thank you, Your Honour.

02:16:43 10 BY MR. BROOKWELL:

02:16:45 11 Q. We're going to return to
02:16:46 12 Dr. McCarthy's report. Over the break we were able
02:16:50 13 to resolve the iPad issues. So she is going to be
02:16:55 14 able to annotate on to the report to help us with
02:16:59 15 some of her descriptions so you'll see that come up
02:17:01 16 on your screen.

02:17:04 17 So, Dr. McCarthy, continuing from where
02:17:06 18 we left off, we were talking about the ice age and
02:17:11 19 ice sheets. So I want to bring you to page 9 on
02:17:15 20 your report and to look at Figure No. 5.

02:17:25 21 A. Okay.

02:17:26 22 Q. And the figure at the top of the
02:17:29 23 page, can you tell us first where that comes from?

02:17:33 24 A. Yes, that's from a textbook on
02:17:38 25 "Earth History" by Wicander, et al., and it's an

02:17:42 1 image that's available online and I frequently use
02:17:45 2 it in my classes.

02:17:47 3 Q. And what does this figure show us
02:17:51 4 about the ice sheet?

02:17:52 5 A. So it's showing us the moment in
02:17:55 6 time, so 11,500 years ago when ice had retreated
02:18:00 7 from much of the Great Lakes Basin but still
02:18:03 8 blocking the -- obviously the western part of Lake
02:18:07 9 Superior, and the very northern most part of the
02:18:12 10 Georgian Bay/Lake Huron basin. And that very
02:18:16 11 north, Northeastern part of the basin, would have
02:18:19 12 been the lowest outlet for water to exit. But ice
02:18:24 13 was still blocking that lowest outlet at that time.

02:18:27 14 So that, at that time, there was a very
02:18:31 15 high level lake in the Lake Huron Basin as well as
02:18:36 16 in the Michigan Basin. So it was one large
02:18:39 17 contiguous lake that filled and over filled those
02:18:43 18 basins and that is called Lake Algonquin and it's
02:18:47 19 referred to as Glacial Lake Algonquin because it is
02:18:51 20 ice dammed so that there is still -- there were a
02:18:53 21 lot of icebergs plopping, caving into it and so on.

02:18:59 22 Q. And, at this point in time, can
02:19:02 23 you identify where the Bruce Peninsula would have
02:19:05 24 been?

02:19:06 25 A. Yes. So the Bruce Peninsula would

02:19:10 1 have been underwater in this region here.

02:19:18 2 So it would have been under something
02:19:20 3 like tens of metres of water at that time.

02:19:25 4 Q. I want to turn to some of the
02:19:31 5 figures below for you to explain to us -- this is
02:19:33 6 Figure 6 on the same page. And there is two sets
02:19:37 7 of figures there, so can you begin by telling us
02:19:41 8 where each set came from?

02:19:42 9 A. So each is from a textbook, the
02:19:46 10 figures that I routinely use in my teachings. So
02:19:49 11 the Canadian edition of Tarbuck and Luctin's
02:19:52 12 "Earth". The left, appears in the Prentice figure
02:19:55 13 and to the right the Bruce coal figure is from the
02:19:58 14 Earth History textbook by Wicander and colleagues.

02:20:02 15 The figure on the left is what we call
02:20:05 16 a block diagram that illustrates the effects of
02:20:08 17 glacial ice, the weight of the ice on the crust,
02:20:12 18 causing the crust to subside so that the crust is
02:20:16 19 pressed down and material, plastic material deeper
02:20:20 20 down in the crust actually squeezes out to the
02:20:23 21 edges, well beyond the diagram.

02:20:26 22 When the ice melts, so the weight is
02:20:29 23 removed, the crust then rebounds. So the crust
02:20:33 24 gradually, the plastic material that had been
02:20:37 25 squeezed out, gradually backfills so that the crust

02:20:41 1 rebounds and that's referred to as isostatic
02:20:45 2 depression and isostatic rebound.

02:20:48 3 And the figure on the right is
02:20:50 4 illustrating in plan view, eastern North America,
02:20:56 5 eastern Canada and it shows the amount in metres,
02:21:00 6 that the land rebounded in eastern Canada. And it
02:21:05 7 shows three distinct areas where the most rebound
02:21:08 8 occurred. In other words, it shows where the ice
02:21:11 9 was deepest, and it shows a decreasing amount of
02:21:15 10 rebound toward the Great Lakes, and you can infer
02:21:20 11 that the greatest depression of the Great Lakes
02:21:23 12 Basin, by looking at the diagram, was to the
02:21:27 13 northeast and the least was in the southwest.

02:21:31 14 So, in other words, the least depressed
02:21:35 15 would have been Lake Michigan and Lake Eerie and
02:21:37 16 the greatest depression was in the northern part of
02:21:42 17 the Lake Huron Basin. And therefore, the greatest
02:21:44 18 uplift since deglaciation happened in that
02:21:49 19 Northeastern part of the Great Lakes basin.

02:21:51 20 Q. Would you be able to highlight for
02:21:53 21 us on that figure on the right, where -- the
02:21:56 22 highest point and lowest point?

02:21:59 23 A. Yeah, so the highest, the greatest
02:22:02 24 depression, would have been here in the northeast.
02:22:04 25 And the least, if we track this around, the very

02:22:09 1 least would have been in the southwest.

02:22:12 2 Q. And on the figure to the left, you
02:22:15 3 were discussing crustal subsidence and crustal
02:22:20 4 rebound.

02:22:22 5 Can you just briefly review with us the
02:22:25 6 image of those two issues?

02:22:27 7 A. Sure. Yes, so the subsidence, it
02:22:32 8 was due to the weight of the ice, so that the
02:22:35 9 plastic material had been squeezed out and it
02:22:38 10 gradually -- once the weight of the ice was
02:22:41 11 removed, gradually fills back in, causing the crust
02:22:44 12 to bounce back, to rebound. And that is gradual.
02:22:50 13 It happens most quickly shortly after the ice, the
02:22:54 14 weight of the ice is removed but continues through
02:22:57 15 to today.

02:22:58 16 So, in other words, the fastest rate of
02:23:01 17 rebound was after deglaciation but even today, if
02:23:05 18 you use very high tech measurements like we can
02:23:07 19 with GPS, satellite imagery, we can still picture,
02:23:11 20 we can still image, measure the greater rebound in,
02:23:15 21 say, North Bay relative to, say, St. Catharines.

02:23:19 22 Q. And briefly, for the image on the
02:23:23 23 right, what do the numbers along the red lines
02:23:27 24 indicate?

02:23:27 25 A. So these are lines of equal

02:23:30 1 depression. And the numbers are in metres. So the
02:23:34 2 amount that the land was depressed and has
02:23:37 3 subsequently rebounded.

02:23:38 4 So they illustrate that there were
02:23:41 5 several domes of ice so that the Laurentide ice
02:23:44 6 sheet wasn't one blob, but it was at least three
02:23:48 7 different sectors of ice accumulation in the Fox
02:23:53 8 Basin, the west of Hudson Bay and the east of James
02:23:57 9 Bay.

02:23:58 10 Q. And you said numbers and metres.
02:24:01 11 Metres with respect to what?

02:24:03 12 A. Metres with respect to what it had
02:24:08 13 been depressed. So the amount that it bounced back
02:24:11 14 relative to immediately after deglaciation.

02:24:14 15 Q. I'd like to turn to an article
02:24:19 16 that you cited in your report. It's by Lewis, et
02:24:23 17 al., 2014, in "Voyage of Discovery: 50 Years of
02:24:28 18 Marine Research at Canada's Bedford Institute of
02:24:35 19 Oceanography". And it can be found in the database
02:24:37 20 at SC0152. I'm going to switch over to the screen
02:24:43 21 now.

02:25:16 22 If you'll just bear with us for a
02:25:18 23 moment. So you'll see the article up on the
02:25:30 24 screen. Are you familiar with this article?

02:25:31 25 A. Yes, I am.

02:25:32 1 Q. And is this one of the articles
02:25:35 2 that you referenced in your report?

02:25:38 3 A. Yes, it is, several of the figures
02:25:40 4 that I reproduced in my report were taken from
02:25:43 5 this.

02:25:45 6 MR. BROOKWELL: Your Honour, I propose
02:25:46 7 that we make this the next numbered exhibit.

02:25:51 8 THE COURT: Any objection? No.

02:25:53 9 Mr. Registrar?

02:25:53 10 THE REGISTRAR: Exhibit No. 3987.

02:25:57 11 EXHIBIT NO. 3987: Article cited in

02:24:21 12 Dr. McCarthy's report, by Lewis,

02:24:23 13 et al., 2014, entitled "Voyage of

02:24:27 14 Discovery: 50 Years of Marine Research

02:24:29 15 at Canada's Bedford Institute of

02:24:35 16 Oceanography".

02:25:58 17 BY MR. BROOKWELL:

02:25:59 18 Q. I want to direct your attention,
02:26:01 19 Dr. McCarthy, to page 2 on the PDF which has a
02:26:04 20 number of figures on it.

02:26:07 21 And at the middle of the page on the
02:26:19 22 left side is Figure C and I'm going to ask that we
02:26:25 23 can blow that up in our second document which is
02:26:30 24 SC0153.

02:26:43 25 MR. BROOKWELL: Your Honour, I propose

02:26:44 1 we make this the next exhibit.

02:26:46 2 THE COURT: No objection.

02:26:47 3 Mr. Registrar.

02:26:49 4 THE REGISTRAR: Exhibit No. 3987 (later
02:26:54 5 corrected).

02:26:54 6 THE COURT: Thank you.

02:26:55 7 BY MR. BROOKWELL:

02:26:55 8 Q. Now, Dr. McCarthy, can you explain
02:26:58 9 to us what this diagram is depicting?

02:27:02 10 A. This is a diagram illustrating
02:27:06 11 features called "popups". So you can see that the
02:27:11 12 layers are sedimentary layers, what we call strata,
02:27:14 13 and they've been buckled so there is a force, some
02:27:19 14 kind of tectonic force that has caused the crust
02:27:23 15 where the layers are initially flat, to become
02:27:26 16 buckled.

02:27:27 17 But rather than a nice smooth fold, it
02:27:30 18 actually fractured, and so what we have then is a
02:27:36 19 linear feature, called a "popup", that's got walls
02:27:41 20 on either side. And this particular feature, it's
02:27:44 21 described in the article, is about 1.7 kilometers
02:27:50 22 long and the walls on either side, the walls of the
02:27:53 23 rocks, limestone rocks, would have been about
02:27:56 24 4 metres high.

02:27:58 25 So it would be a long sort of

02:28:00 1 tunnel-like feature that would extend 1 to
02:28:04 2 2 kilometers. And these are fairly common in the
02:28:07 3 area of the drainage basin of Lake Huron. And you
02:28:12 4 can see that they are common above ground, but you
02:28:17 5 can also see to the left, this is an underwater
02:28:19 6 image that is imaging the edge that you would think
02:28:23 7 the arrow is pointing to the edge of the scar, so
02:28:26 8 it's actually pointing to the edge of what we call
02:28:29 9 a limb or an arm of that popup structure.

02:28:34 10 MR. BROOKWELL: Your Honour, I'd just
02:28:35 11 like to pause a moment. As I understand, I think
02:28:38 12 we have two exhibits numbered 3987. I just want to
02:28:42 13 verify if that is the case.

02:28:44 14 THE COURT: Well, we shouldn't.
02:28:46 15 Perhaps, Mr. Registrar, should it be 3987-A, can we
02:28:52 16 do that? Keep it with its original.

02:28:55 17 THE REGISTRAR: So the last exhibit is
02:28:57 18 going to be 3988.

02:29:00 19 THE COURT: All right. Thank you.

02:29:01 20 EXHIBIT NO. 3988: Figure C, Photo from
02:29:01 21 a Submersible with Interpretive
02:29:07 22 Drawing.

02:29:07 23 BY MR. BROOKWELL:

02:29:08 24 Q. So, Dr. McCarthy, just returning
02:29:10 25 to the image you were describing, on the left-hand

02:29:13 1 side there is a colour image and can you again just
02:29:17 2 indicate where that image is in terms of above or
02:29:23 3 below water?

02:29:24 4 A. Yes. So it's an underwater image
02:29:26 5 that would have been taken probably using a remote
02:29:28 6 operated vehicle by the geological survey. I would
02:29:34 7 have to look at the caption to be absolutely sure.

02:29:36 8 But it is clearly an underwater image
02:29:38 9 that is showing, you can see the arrow is pointing
02:29:41 10 to the diagram to the right. And it is showing
02:29:44 11 that sedimentary scarp that is sticking out of the
02:29:50 12 water.

02:29:51 13 Q. Staying on the topic of popups, I
02:29:54 14 would like to return to your report. And if you
02:29:57 15 could move to page 10 and look at Figure No. 7.

02:30:02 16 A. Right.

02:30:03 17 Q. And first, identify for us where
02:30:08 18 this image comes from?

02:30:09 19 A. This is from a journal article,
02:30:12 20 published by Wallach, et al., in 1998. And it
02:30:18 21 depicts the area just to the north of Lake Simcoe
02:30:23 22 along the Trent-Severn River and it shows the
02:30:29 23 location in little triangles, little purple
02:30:33 24 triangles, or blue, light blue triangles, these
02:30:37 25 various popup structures in that area.

02:30:39 1 So along the boundary, between two
02:30:45 2 different types of rocks that you can see indicated
02:30:48 3 here, the boundary between the Precambrian rocks of
02:30:53 4 the Canadian Shield that I described before lunch,
02:30:59 5 the very, very hard crystalline rocks and the much
02:31:01 6 softer layered sedimentary rocks of Paleozoic age
02:31:05 7 that are below it.

02:31:06 8 And because these two rock types have
02:31:08 9 very different properties, one is very hard and
02:31:11 10 brittle, the other one is softer and less brittle,
02:31:14 11 the way that they responded to the removal of the
02:31:19 12 weight of the ice, the uplift, the isostatic
02:31:22 13 rebound that I described earlier, that this is now
02:31:26 14 what is widely accepted to have caused these popup
02:31:31 15 structures was that what we call neo-tectonic
02:31:34 16 activity associated with the rebound of the crust
02:31:36 17 and the fact that those rock types, two bedrock
02:31:39 18 types have very different characteristics.

02:31:42 19 Q. So I'm hoping you can help us
02:31:46 20 understand where these popups may be found. So if
02:31:52 21 you could turn back to Figure No. 1 in your report,
02:31:56 22 on page 5.

02:32:06 23 A. All right.

02:32:06 24 Q. If you could illustrate on this
02:32:08 25 diagram where you would expect to find popups along

02:32:13 1 the different lines of rock?

02:32:15 2 A. Right. So the contact between the
02:32:18 3 Canadian shield and the softer sedimentary rocks
02:32:25 4 runs very clearly through here where you can see
02:32:27 5 the legend, but it also continues up through
02:32:31 6 roughly the centre of Georgian Bay and passes
02:32:33 7 between Manitoulin Island and this area in the
02:32:39 8 northeast of Georgian Bay.

02:32:41 9 So you can find -- and the previous
02:32:44 10 figure we were talking about illustrated the area
02:32:47 11 around Lake Simcoe, so that you can find them lined
02:32:50 12 up mostly on the sedimentary rocks but sometimes
02:32:57 13 can be found just on the Canadian shield as well
02:33:00 14 and we have underwater examples as well.

02:33:02 15 So we don't have as many underwater
02:33:05 16 examples because it's just harder to see them. You
02:33:08 17 have to have an ROV to go and take pictures of
02:33:11 18 them. But they're certainly found underwater as
02:33:16 19 well as above ground today.

02:33:17 20 Q. For the section that you've drawn
02:33:21 21 near Georgian Bay, when would a popup in that area
02:33:28 22 have last been visible to the naked eye, so without
02:33:32 23 an ROV, without technology?

02:33:34 24 A. So there was a 2 to 3,000-year
02:33:38 25 interval of time when a large part of Georgian Bay

02:33:41 1 was not covered with water, because there was a
02:33:45 2 very long period of evaporative conditions and
02:33:49 3 negative water budget, I explained that earlier, so
02:33:52 4 that there was more evaporation than there was
02:33:55 5 precipitation.

02:33:56 6 So between around 11,500 and
02:34:03 7 8,000 years ago, there were -- most of that
02:34:06 8 interval of time, there would have been much lower
02:34:09 9 water levels in both Georgian Bay and Lake Huron,
02:34:12 10 the main basin of Lake Huron. So certainly, at
02:34:16 11 some of those times -- much of that time there
02:34:20 12 would have been the possibility to have these
02:34:23 13 visible above ground, not underwater.

02:34:31 14 Q. So that period of time, 11,000 to
02:34:34 15 8,000 years ago, what kind of vegetation would have
02:34:36 16 prevailed in the area?

02:34:38 17 A. So, at that time, it was during
02:34:45 18 the transition from the boreal forest to the modern
02:34:48 19 forest that we see today. And it was represented
02:34:52 20 -- I look at pollen as part of my research.

02:34:56 21 So the pollen evidence tells us that
02:34:59 22 from that interval of 11,000 to 8,000, that we have
02:35:04 23 what is called the pine zone. So that there would
02:35:07 24 have been a very, very strong dominance of pine in
02:35:11 25 the forest. And at that time, with the -- the

02:35:17 1 forest that would have existed, would have been
02:35:24 2 fairly open, but with very tall trees. So that
02:35:29 3 these would -- these are conifer trees, needle leaf
02:35:34 4 trees, so they certainly would have been a thick
02:35:37 5 enough forest to form a solid canopy.

02:35:41 6 Q. What kind of trees would be
02:35:43 7 growing on the type of rock you've described as a
02:35:46 8 popup?

02:35:47 9 A. So the thing about the calcereous
02:35:50 10 rocks in this area, they're -- in addition to pine,
02:35:56 11 there's also a fair amount of cedar that actually
02:35:59 12 grows right into the cracks in the rocks. And so
02:36:03 13 this, as I said, it was the transition between the
02:36:08 14 boreal forest and the deciduous forest that we see
02:36:12 15 there today, the mixed deciduous forest.

02:36:15 16 So in addition to the pine there would
02:36:17 17 have been trees like cedar, tamarack, hemlock, in
02:36:21 18 addition to some broad leafed trees like oak and so
02:36:27 19 on.

02:36:27 20 But it is the -- because cedar, white
02:36:32 21 cedar is very, very good at wrapping its roots
02:36:38 22 around those rocks, bare rocks, it doesn't need
02:36:45 23 much soil to live on. And it likes to have the
02:36:46 24 slightly basic, the non-acidic characteristics of
02:36:48 25 the soil as well. Cedar is very common, it's very

02:36:53 1 common on the escarpment now. So one can infer
02:36:57 2 that, at that time, there would have been cedar
02:37:00 3 sticking out of the rocks of the escarpment, much
02:37:04 4 like they do today.

02:37:06 5 Q. A few moments ago you were talking
02:37:09 6 about water level changes. I'd like to explore
02:37:12 7 that a little further.

02:37:14 8 Can you turn to page 11 of your report,
02:37:18 9 and look at Figure No. 8.

02:37:34 10 A. Right.

02:37:35 11 Q. And first can you tell us where
02:37:38 12 this figure comes from?

02:37:39 13 A. Yes. These figures are from
02:37:42 14 publications by Jim Teller who is a Professor
02:37:47 15 Emeritus now at the University of Manitoba now. He
02:37:51 16 is the world expert on Lake Agassiz, and Lake
02:37:58 17 Agassiz is what is depicted in this diagram. One
02:38:01 18 is from his 1988 paper -- the one on the left is
02:38:04 19 from the 1988 paper and the one on the right is
02:38:08 20 2005 publication in a journal.

02:38:10 21 Q. Can you tell us about the
02:38:13 22 interaction between the lakes identified there,
02:38:16 23 Lake Agassiz, Lake Algonquin in terms of change of
02:38:21 24 water level.

02:38:23 25 A. Yes. So at the time that the ice

02:38:27 1 sheet was retreating, we have water, during the
02:38:33 2 warm season, even though we're still in a
02:38:35 3 relatively cold period of time, from the spring to
02:38:39 4 the fall, there was an awful lot of melt water just
02:38:43 5 streaming out from the front of the ice sheet, what
02:38:46 6 we call the pro-glacial area. Because the crust
02:38:49 7 had been depressed by the weight of the ice sheets
02:38:52 8 for so long, much of that water just piled up
02:38:56 9 against the edge of the ice sheet.

02:38:58 10 So that's why we call the large number
02:38:59 11 of lakes that are all illustrated along what was
02:39:02 12 the former ice sheet. So in this diagram, for
02:39:07 13 instance, this would have been ice, still. And
02:39:10 14 then we have these pro-glacial lakes.

02:39:15 15 At times, water from one pro-glacial
02:39:19 16 lake could enter another and at other times not.
02:39:22 17 So depending on -- I talked earlier about the
02:39:27 18 lobate nature of the ice front that's not just
02:39:29 19 smooth. So if there were blockage by say an ice
02:39:33 20 sheet or sediment, some kind of damming, there
02:39:37 21 would not be confluence, or there would not be
02:39:40 22 water flowing from say Lake Agassiz into lake
02:39:45 23 Algonquin.

02:39:46 24 But if that barrier were to be removed
02:39:48 25 then there would be water from Lake Agassiz. And

02:39:53 1 Lake Agassiz, the single biggest repository of
02:39:55 2 freshwater from the ice sheet. In fact more
02:39:58 3 freshwater than in all of the world today was found
02:40:01 4 on the ice front, making up what is Lake Agassiz.

02:40:06 5 So there wasn't a single deep basin for
02:40:09 6 this water. It covered large amounts of Manitoba
02:40:15 7 as well as, as you see, Minnesota, western Ontario
02:40:18 8 and North Dakota.

02:40:19 9 So it was a very, very large relatively
02:40:23 10 shallow lake, except where there were deeper basins
02:40:27 11 like Lake Winnipeg, Winnipegosis, Lake of the
02:40:31 12 Woods, which are still lakes today. But at that
02:40:33 13 time it was a huge amount of melt water.

02:40:35 14 And it is a complex history in the Lake
02:40:39 15 Huron basin, depending on whether melt water from
02:40:44 16 Lake Agassiz was making it in to the Huron Basin or
02:40:48 17 not. Because that amount -- if you think back to
02:40:51 18 the water budget, story of earlier, if you are
02:40:55 19 capturing water from Lake Agassiz, into the lake
02:40:59 20 Algonquin, in Lake Huron Basin, then obviously you
02:41:03 21 have a great source of water, a plus on your
02:41:06 22 budget. And if you don't, and we know that it was
02:41:09 23 an arid time because of the pollen, so if you don't
02:41:12 24 have water from Lake Agassiz, then you're in a
02:41:16 25 negative water budget situation. And then you can

02:41:19 1 have water levels start to decline.

02:41:23 2 And the figure on the right, is a more
02:41:26 3 complex, slightly layered figure, in 2005. And it
02:41:31 4 is showing a number of different outlets that Lake
02:41:38 5 Agassiz occupied in its several thousand year
02:41:41 6 history. And the different outlets were occupied
02:41:45 7 because if you think back to the story about
02:41:47 8 isostatic rebound, water will always flow out the
02:41:52 9 lowest outlet.

02:41:53 10 And if you're changing the orientation,
02:41:55 11 the elevation of the land, one outlet that used to
02:42:00 12 be the lowest may become not as low as another, so
02:42:03 13 that you have outlets switching that way. And
02:42:06 14 also, the lobate edges of the margin, edges of the
02:42:11 15 ice sheet or the margin of the ice sheet might
02:42:14 16 occasionally block certain outlets.

02:42:16 17 So all that to say that it is a very
02:42:18 18 complex and evolving history of the ice sheet and
02:42:26 19 where the water from the ice sheet is going. And
02:42:29 20 Lake Algonquin sometimes receiving water from Lake
02:42:34 21 Agassiz, sometimes not. Very, very complex,
02:42:38 22 leading to a number of high level stands and low
02:42:44 23 level stands, fluctuating back and forth in that
02:42:48 24 interval between 11,500 and 8,000 years ago.

02:42:52 25 So this is a story, a lake level story

02:42:58 1 that has been pieced together using various lines
02:43:01 2 of evidence by many different scientists looking at
02:43:05 3 different types of evidence. So over the last
02:43:09 4 25 years, we've come to the current understanding
02:43:13 5 of the complexity. It was known to be complex 50,
02:43:19 6 60 years ago. But the story that we now know is
02:43:23 7 fairly solid and well accepted.

02:43:25 8 Q. So on the subject of changing
02:43:33 9 water levels, I want to ask you some questions
02:43:36 10 about particular features in the environment.

02:43:41 11 So could you turn to Figure 14, which
02:43:44 12 is on page 16 of your report. So Figure 14 on the
02:44:01 13 left side, there is a bar chart. Could you tell us
02:44:07 14 where that comes from?

02:44:08 15 A. Yes, it's reproduced from one of
02:44:11 16 my papers, published in a special volume about Lake
02:44:15 17 Huron in 2012.

02:44:18 18 It was modified from a previous
02:44:20 19 illustration in a paper by Dr. C.F.M. Lewis,
02:44:26 20 published in 2007.

02:44:28 21 So these -- I was working very closely
02:44:31 22 together with scientists from the Geological Survey
02:44:35 23 of Canada, and they were my co-authors on these
02:44:38 24 papers. So as we were tweaking the story we would
02:44:41 25 make slight modifications to the figures, so this

02:44:45 1 figure, as it is depicted, is taken from my
02:44:48 2 article.

02:44:48 3 Q. And what do the dark lines
02:44:52 4 indicate on this, the sort of up and down lines on
02:44:57 5 the chart indicate?

02:44:58 6 A. So that's what I was referring to
02:45:00 7 with the very complex water level history of Lake
02:45:06 8 Huron. The black line is, to the best of our
02:45:09 9 knowledge, the elevation of water in the Lake Huron
02:45:12 10 Basin from the time of the highest Lake Algonquin
02:45:19 11 level. That's the time the ice sheet was damming
02:45:22 12 the lowest outlet.

02:45:24 13 And the lowest outlet, when the crust
02:45:27 14 was depressed to the northeast, was here, through
02:45:29 15 the French River and out through North Bay, and the
02:45:35 16 Mattawa River and Ottawa River, eventually to the
02:45:39 17 St. Lawrence and the North Atlantic Ocean.

02:45:42 18 So the highest elevation was during
02:45:44 19 this ice damming. And the dam, the ice dam as it
02:45:50 20 retreated, opened up that outlet, so that the water
02:45:56 21 level in the Lake Huron basin, fell to the lowest
02:46:04 22 level that it ever was, and that was controlled by
02:46:09 23 the elevation of the sill or the bedrock base of --
02:46:16 24 if you think of it.

02:46:17 25 The simplest way to think of it is the

02:46:19 1 French River where the water was existing, that
02:46:22 2 sill at North Bay, the bottom of the channel, that
02:46:27 3 is -- that controlled how much water was in Lake
02:46:30 4 Huron.

02:46:30 5 So, as isostatic rebound caused North
02:46:34 6 Bay to uplift relative to, say, Sarnia, the channel
02:46:40 7 was uplifting, so the amount of water being held
02:46:43 8 back in Lake Huron, Georgian Bay, was rising.

02:46:47 9 So that's why the overall simple
02:46:52 10 pattern of lake level rise is this exponentially
02:46:57 11 decreasing rate of rise, okay? So if nothing else
02:47:01 12 was going on, we would see the North Bay outlet
02:47:06 13 rising and the amount of water in Lake Huron rising
02:47:10 14 with it.

02:47:11 15 But that's not all that was going on.
02:47:13 16 We have two other factors at play. One is a very
02:47:17 17 dry climate, dry and evaporative. So the dry and
02:47:23 18 evaporative climate was keeping the water level
02:47:29 19 down, except for these short intervals of time,
02:47:35 20 when water from Lake Superior flushed into Lake
02:47:43 21 Huron when Lake Superior received water from Lake
02:47:47 22 Agassiz.

02:47:47 23 So when Lake Agassiz water flooded into
02:47:51 24 Lake Superior, it flooded over -- well, through the
02:47:54 25 St. Mary's River at Sault Ste. Marie -- drew it in

02:47:58 1 the wrong place -- over here, into the north
02:48:01 2 channel, and it would very, very quickly cause lake
02:48:07 3 levels to rise.

02:48:10 4 But the latest thoughts for the last
02:48:14 5 decade or so, are that these Mattawa highstands, as
02:48:19 6 they are called, these Mattawa lakes were
02:48:22 7 short-lived because the water would then flush its
02:48:25 8 way through, Superior, Huron and then out to the
02:48:29 9 North Atlantic so that the fact that the climate
02:48:33 10 was overall quite dry, fairly quickly, caused lake
02:48:37 11 levels to fall again.

02:48:38 12 So that the story of the lake levels
02:48:43 13 then is controlled by the isostatic rebound of the
02:48:47 14 sill at North Bay, the dry evaporative climate,
02:48:53 15 except for these pulses of capture of drainage from
02:48:57 16 Lake Superior. And most of those are thought to be
02:49:00 17 due to capture into Lake Superior from Lake
02:49:05 18 Agassiz.

02:49:05 19 Q. The diagram at the right has two
02:49:07 20 lakes named there, Lake Stanley and Lake Hough.
02:49:12 21 Can you tell us what those two lake outlines mean?

02:49:16 22 A. Yes, so geologists dating back to
02:49:20 23 the 1950s, have been giving lake names to lake
02:49:27 24 level stands that persisted for long periods of
02:49:30 25 time.

1 So ancient lakes that of course no
2 longer exist, these low-level lakes that occupied
3 the deepest parts of the basin of Georgian Bay and
4 the basin of the main basin of Lake Huron. And in
5 the main basin of Lake Huron, they're actually
6 separate sub-basins that are called the Manitoulin
7 and Goderich basins. And in Georgian Bay there's
8 just the one.

9 So Lake Stanley is the name given to
10 the lowstand, low-level lake in the Huron Basin.
11 And Lake Hough is the name given to the low-level
12 lake in the Georgian Bay Basin.

13 So you'll notice that these low-level
14 lakes were isolated from each other. And in fact,
15 in the Lake Stanley, there were isolated
16 sub-basins, but we're not going to talk about that
17 now.

18 But Lake Hough and Lake Stanley were
19 isolated from each other and there was a separated
20 lake called Lake Chippewa in the Michigan Basin.
21 These were low-level lakes. There were three
22 different phases of these lakes. They were
23 interrupted by the Mattawa highstands. So there is
24 the early Hough, middle Hough and late Hough.
25 Similarly, early, middle, late Stanley.

02:50:56 1 The most intense of these lowstands was
02:51:02 2 the Late Lake Hough, Late Lake Stanley lowstand.
02:51:06 3 And that's illustrated in the image on the left
02:51:08 4 with the stipple. And the really important aspect
02:51:14 5 to take note of is that the level, the lake level,
02:51:19 6 you'll recall that the black line shows you the
02:51:22 7 level of water in the basin.

02:51:25 8 The lake level was far below metres,
02:51:30 9 tens of metres below that North Bay sill. So the
02:51:36 10 bedrock, bottom of the channel of the outlet. That
02:51:39 11 means that Late Lake Hough and Late Lake Stanley,
02:51:44 12 were what we call closed basin lakes. They were
02:51:49 13 lakes without an outlet. And a lake without an
02:51:52 14 outlet, a closed basin lake is very, very sensitive
02:51:56 15 to the water budget. Slight changes in water
02:52:00 16 budget will cause a closed basin level to rise or
02:52:06 17 fall, whereas an open lake, because it's got an
02:52:10 18 outlet stream, it's less sensitive to fluctuations.
02:52:15 19 So that the closed basin nature of Late Lake Hough
02:52:19 20 and Late Lake Stanley is a significant feature of
02:52:23 21 this figure.

02:52:24 22 And the other thing I want to draw your
02:52:26 23 attention to is that the black line, because it's
02:52:28 24 from my paper that was looking at Georgian Bay and
02:52:32 25 Lake Hough, so the black line refers to Lake Hough,

02:52:36 1 but there's a little dash line above it, the Late
02:52:40 2 Lake Stanley level was a little bit shallower -- a
02:52:44 3 little bit less depressed.

02:52:47 4 So Late Lake Stanley was at a slightly
02:52:50 5 higher elevation than Late Lake Hough. So Late
02:52:54 6 Lake Hough was more depressed, the lake level was
02:52:58 7 more depressed, it was a more evaporative
02:53:02 8 situation. And that is something that -- yeah, I
02:53:06 9 think we need to take note of for a further diagram
02:53:10 10 that I'll discuss later.

02:53:11 11 Q. I'd like to take you to a
02:53:14 12 different page now to page 17, if you look at
02:53:17 13 Figure 15.

02:53:23 14 A. Yes.

02:53:23 15 Q. And can you tell us where these
02:53:26 16 two diagrams come from?

02:53:28 17 A. So these two diagrams were from a
02:53:32 18 presentation that my colleague, Steve Blasco, who
02:53:35 19 was then with the Geological Survey of Canada, gave
02:53:39 20 at Brock University.

02:53:43 21 They are also found in another
02:53:46 22 publication that I can provide, that I've actually
02:53:52 23 cited in my paper, in my report, Blasco, 2001, the
02:53:57 24 chapter on Fathom Five National Park.

02:54:01 25 Q. And the left-hand side appears to

02:54:10 1 have what look like notches to me, but that may be
02:54:12 2 the wrong description.

02:54:13 3 Can you explain to us what that figure
02:54:17 4 is showing?

02:54:18 5 A. Yeah. So that's a very modern
02:54:22 6 technology that is looking at the high resolution
02:54:25 7 bathymetry. So it's multi-beam technology that is
02:54:28 8 reconstructing bathymetry or the depth of lake --
02:54:39 9 Georgian Bay, I should say.

02:54:39 10 And this edge is the edge of Flowerpot
02:54:44 11 Island, a very frequently visited spot, so I will
02:54:47 12 locate that for you here. So this is Flowerpot
02:54:50 13 Island.

02:54:51 14 The red line that you see here is the
02:54:54 15 edge of the Niagara escarpment. Of course, the
02:54:57 16 escarpment between essentially Manitoulin Island
02:55:01 17 and the tip of the Bruce Peninsula is underwater
02:55:06 18 currently.

02:55:06 19 So the edge of Flowerpot Island is what
02:55:10 20 is being imaged here. And you can see this notch,
02:55:14 21 it's a wave cut notch. It is 35 metres below
02:55:19 22 modern lake level. And that is clearly expressed
02:55:22 23 all around the area, so that it represents a
02:55:28 24 prolonged period of lowstand of lower lake level,
02:55:33 25 causing erosion along the -- a beach, if you will,

02:55:38 1 at that level.

02:55:40 2 Q. If we can turn to the next page
02:55:43 3 and look at Figure 16?

02:55:55 4 A. So that's the beach that I was
02:55:57 5 referring to above. And it also -- this is also
02:56:00 6 from a presentation given by Steve Blasco also
02:56:04 7 available in that publication.

02:56:06 8 And so the bottom diagram, you can see
02:56:10 9 the illustration of Flowerpot Island, and you can
02:56:14 10 also see the -- above, an image, an image of the
02:56:33 11 beach ridges that were found at that depth, below,
02:56:37 12 well below modern lake level.

02:56:39 13 And this, what we're seeing here are
02:56:42 14 the -- what we call pro-grading or advancing ridges
02:56:47 15 of sandy sediment through time as they build out --
02:56:53 16 if you've ever been to Cape Cod, for instance,
02:56:55 17 you'll see these kinds of land forms, where the
02:56:58 18 sand builds out and this down here is very, very
02:57:03 19 deep water.

02:57:03 20 So what we have is the very, very deep
02:57:11 21 water just off Flowerpot Island, there was a sandy
02:57:15 22 beach built out into that very deep water, during
02:57:19 23 that lowstand interval, during Late Lake Hough,
02:57:25 24 which was around 8,200 years ago. Between 8,500
02:57:33 25 and 8,000 years ago'ish.

02:57:36 1 Q. And the diagram below, the beach
02:57:38 2 ridges has some channels marked. Can you tell us
02:57:41 3 about the significance of those channels?

02:57:43 4 A. Yes. So at the time that the lake
02:57:48 5 level was so much lower, you can see what, based on
02:57:55 6 modern bathymetry, 30 metres below modern lake
02:58:01 7 level is where the escarpment is currently. That
02:58:05 8 would have been exposed, that would have been dry
02:58:07 9 land at this time, between 8,500 and 8,000 years
02:58:11 10 ago.

02:58:13 11 And because, you'll recall, Lake
02:58:16 12 Stanley in the Huron Basin was at a slightly higher
02:58:21 13 elevation than Lake Hough, any water that was
02:58:24 14 available to overflow, would have flowed from Lake
02:58:29 15 Stanley into Lake Hough and it would have
02:58:31 16 overflowed over a largely exposed limestone area,
02:58:35 17 except in the deepest parts of that limestone
02:58:39 18 terrain, where you would have had rivers,
02:58:42 19 periodically, at least flowing, and flowing over
02:58:47 20 the escarpment into Late Lake Hough, producing
02:58:53 21 water falls or rapids, depending on how steep the
02:58:58 22 decline is.

02:59:00 23 Q. Can you show us on the diagram
02:59:02 24 where these water falls or rapids would have been?

02:59:05 25 A. So the deepest parts of the

02:59:10 1 bathymetry of Georgian Bay are shown here, in the
02:59:17 2 darker blue. And so that these rivers would have
02:59:20 3 flown along here, at what is now Fitzwilliam Island
02:59:26 4 Channel, Lucas Island Channel, Middle Island and
02:59:30 5 Dunks Point where a single stream would have
02:59:32 6 bifurcated around an island.

02:59:35 7 And there would have been a fall of
02:59:38 8 water from a higher elevation over the escarpment
02:59:41 9 into a lower body of water, standing body of water,
02:59:47 10 Lake Hough.

02:59:48 11 And based on the bathymetry, the shape
02:59:52 12 of Fitzwilliam channel it would have had a steeper
02:59:56 13 waterfall whereas the others would have been more
03:00:00 14 like thundering rapids.

03:00:11 15 Q. I'd like you now to go to page 19
03:00:14 16 to look at Figure 17. And if you can begin by
03:00:28 17 telling us where this image comes from.

03:00:30 18 A. So, this image is one of my
03:00:35 19 publications together with one of my PhD students.
03:00:39 20 And it's showing us the sediment cores that were
03:00:44 21 collected from that Flowerpot Beach, where the
03:00:50 22 pro-grading sediment ridges were found. So the
03:00:54 23 ship, I think it was the LIMNOS, went and they
03:01:02 24 collected three sediment cores. So you can
03:01:02 25 actually see the images, the visual images of those

03:01:08 1 sediment cores, and we did various kinds of
03:01:09 2 analyses on these.

03:01:12 3 From the pollen we were able to
03:01:14 4 reconstruct the climate. From the sediments
03:01:18 5 themselves, we were able to reconstruct the water
03:01:21 6 level history. And one aspect of the sediments
03:01:23 7 themselves that I illustrate here, because we did
03:01:26 8 some measurements of the sediment grain size, you
03:01:31 9 can see relatively coarse sediments, these reddish
03:01:35 10 sandy sediment at the top, very, very fine grain
03:01:39 11 sediment or muds. And then very coarse sediments
03:01:44 12 so you can actually see the cobbles of the white
03:01:50 13 limestone at the very base.

03:01:51 14 So we have coarse, coarse, and fine.
03:01:57 15 And to a geologist, first year, or maybe a second
03:02:00 16 year student, you would ask them to interpret that
03:02:03 17 profile, those data, in terms of lake level. And
03:02:08 18 this is shallow, deep, shallow.

03:02:10 19 So we have evidence in the cores taken
03:02:15 20 at Flowerpot Beach of the relatively shallow waters
03:02:20 21 at the time that those beach ridges pro-graded. A
03:02:25 22 preexisting very deep lake, at that very spot,
03:02:32 23 after a shallow interval.

03:02:35 24 And what we call the contacts between
03:02:40 25 these are relatively sharp, so that certainly the

03:02:45 1 -- you had evidence for those rapid changes in lake
03:02:51 2 level that I talked about on the diagram that, you
03:02:54 3 know, where we had the lake level changes.

03:02:57 4 Q. Okay. Let's talk about the lake
03:03:01 5 level changes again.

03:03:02 6 Can you go to page 22 and we'll look at
03:03:06 7 Figure 19. To begin tell us where this figure
03:03:19 8 comes from?

03:03:19 9 A. This is from a journal article
03:03:21 10 published by my colleagues, Loope and his
03:03:29 11 colleagues. And the journal article was looking at
03:03:32 12 the very end of the existence of Glacial Lake
03:03:38 13 Minong, and Glacial Lake Minong was the glacial
03:03:44 14 lake in the Superior Basin. So it's looking at,
03:03:45 15 basically, the depth of Lake Minong, the end of
03:03:50 16 Lake Minong and their data suggest that the
03:03:55 17 barrier, the preexisting barrier that had existed
03:03:59 18 between basically it was Sault Ste. Marie, Ontario
03:04:03 19 and Sault Ste. Marie, Michigan, at the mouth of the
03:04:06 20 St. Mary's River, was breached, was destroyed by a
03:04:12 21 sudden influx of water presumably from Lake
03:04:16 22 Agassiz, 9,100 years ago.

03:04:19 23 So 9,100 years ago, there had been,
03:04:23 24 their data suggests, a sediment dam, sediment
03:04:27 25 barrier, sediment dam, holding water back into Lake

03:04:32 1 Superior that was suddenly destroyed. And that
03:04:35 2 would mean that the water would very rapidly enter
03:04:39 3 the north channel of Lake Huron, and so that the
03:04:44 4 area -- so if you think back to the lake level
03:04:47 5 diagram, the north channel would have been largely
03:04:50 6 empty, largely dry, and suddenly there would have
03:04:54 7 been a huge influx of water from Lake Superior,
03:04:59 8 flooding the north channel and leaving all those
03:05:01 9 islands that are there, much like they are today.

03:05:04 10 And that is the very last time that
03:05:08 11 there was a Mattawa highstand. There is the very
03:05:12 12 last of the Mattawa highstands in Lake Huron, has
03:05:16 13 now been attributed to the breach of this -- they
03:05:20 14 call it the Nadoway-Gros Cap Barrier. So it's
03:05:24 15 between Nadoway, Michigan and Gros Cap, Ontario.

03:05:35 16 Q. And you just described this as a
03:05:36 17 "sudden event" but that may be relative to geology,
03:05:40 18 versus laymen.

03:05:41 19 How quickly did this breach occur?

03:05:45 20 A. Days, hours maybe even. Sediment
03:05:53 21 dam breaks, and there are sad reports in the news
03:05:57 22 when mine tailings, for instance, breach and people
03:06:00 23 die. They are sudden floods, they're not sudden in
03:06:03 24 geologic time; they're sudden, they're hours, days.

03:06:07 25 Q. And what you're describing is a

03:06:09 1 large lake breaking through. What would that have
03:06:14 2 looked like?

03:06:15 3 A. It would have been like if someone
03:06:18 4 had taken dynamite to the dam and burst it, you
03:06:22 5 know, like during a war where you deliberately
03:06:28 6 burst a dam. So a dam would have burst and water
03:06:33 7 would have flushed into a large area, a large
03:06:37 8 basin, so it would have been a flood.

03:06:39 9 Q. And what would have happened to
03:06:41 10 any vegetation that would have been there at the
03:06:43 11 time?

03:06:43 12 A. It would have been drowned
03:06:45 13 instantly. So, yeah, so those trees that I
03:06:48 14 mentioned were growing along where the popups were,
03:06:53 15 those would have been drowned instantly.

03:07:01 16 Q. Could we turn to page 12 of your
03:07:03 17 report and we'll have a look at Figure 9.

03:07:16 18 Can you tell us first where this figure
03:07:22 19 comes from?

03:07:22 20 A. This is from a frequently cited
03:07:25 21 paper by Overpeck and colleagues and published in
03:07:30 22 1992. And it depicts what we call time slices. It
03:07:37 23 depicts reconstructions of the vegetation, based on
03:07:42 24 pollen records. So it's at 3,000-year intervals.

03:07:47 25 Q. And when you were describing that

03:07:51 1 breach of the earth and dam what vegetation would
03:07:59 2 have been prevalent at that time?

03:08:01 3 A. So the earth and dam would have
03:08:03 4 been present -- this would be the relevant little
03:08:10 5 depicts, little cartoon. So we would have looking
03:08:14 6 in this area. And it is essentially where we have
03:08:19 7 sort of a transition between the boreal forest and
03:08:23 8 the mixed forest. So it's at a time when you would
03:08:28 9 have still had probably still primarily conifers,
03:08:31 10 needle leaf trees, evergreen trees growing in the
03:08:33 11 area, but beginning to see some warmer trees, like
03:08:41 12 oak, for instance.

03:08:42 13 Q. If you could turn now to page 14
03:08:47 14 of your report and look at Figure 11.

03:09:04 15 A. All right.

03:09:04 16 Q. Now can you tell us where this
03:09:06 17 figure comes from and what it's depicting?

03:09:08 18 A. It's a figure from one of my
03:09:10 19 papers, published with my -- what was my masters
03:09:14 20 supervisor, Jack MacAndrews. He had previously in
03:09:19 21 1994 published a very widely cited paper that looks
03:09:23 22 at the response of pollen in sediments, in other
03:09:30 23 words, vegetation, all over Ontario.

03:09:33 24 So that these pollen zones changed
03:09:37 25 through times, reflecting the change in climate

03:09:41 1 after deglaciation. So lakes -- after the ice
03:09:45 2 sheets retreated, lakes started to form, in the
03:09:50 3 landscape, and they started to accumulate sediment.

03:09:53 4 Some of those sediments are little
03:09:55 5 pollen grains. The pollen grains are in the air,
03:09:59 6 that's why they sell you allergy medication. So
03:10:01 7 pollen falls into lakes and accumulate and we, my
03:10:05 8 students and I, can study the sediment to identify
03:10:08 9 them.

03:10:08 10 We are able to reconstruct what the
03:10:12 11 vegetation was like through time, based on the
03:10:15 12 pollen assemblages that we see. And we can tell
03:10:20 13 you what the vegetation was like and because we can
03:10:24 14 tell you what the vegetation was like, we can tell
03:10:26 15 you what the climate is like.

03:10:28 16 There are fancy computer techniques
03:10:31 17 called "transfer functions". So there are
03:10:32 18 equations, statistical equations, that allow us to
03:10:37 19 give you numerical values for, you know, annual
03:10:41 20 precipitation, summer temperature, winter
03:10:45 21 temperature, and so on.

03:10:49 22 But this diagram tells us that the
03:10:51 23 climate changed from immediately after
03:10:55 24 deglaciation, from a tundra, through that pine zone
03:10:58 25 that I referred to earlier, at the time of the peak

03:11:02 1 aridity. And then we have the transition to the
03:11:06 2 relatively warm, wet forest that we would have
03:11:10 3 today, if we hadn't cut down so many trees.

03:11:13 4 So all other things being equal we
03:11:16 5 would still have what we call the birch, maple,
03:11:20 6 hemlock, beach forest in the area. Instead we have
03:11:24 7 a lot of rag weed and grass because we've put a lot
03:11:29 8 of farmland and so on. So that is what this
03:11:32 9 diagram is meant to reconstruct, the vegetation of
03:11:35 10 the area as well as the climate.

03:11:37 11 And Axe Lake is in Huntsville, so it's
03:11:42 12 just to the east of Georgian Bay in Muskoka. And
03:11:45 13 the reason that we published an image diagram from
03:11:51 14 a small lake, like Axe Lake, as opposed to Georgian
03:11:58 15 Bay itself, is that small lakes are more reliable
03:12:03 16 captures, more reliable receptors of the pollen
03:12:10 17 that's thrown up by the plants, that the wind picks
03:12:13 18 up from the plants.

03:12:14 19 Whereas large lakes like Georgian Bay
03:12:16 20 are almost more like oceans in terms of their
03:12:20 21 physical processes so that they are a little bit
03:12:24 22 less reliable for these really fancy statistical
03:12:28 23 techniques, these transfer functions.

03:12:30 24 So the transfer functions that we ran,
03:12:33 25 the numbers that we calculated for the climate,

03:12:41 1 say, for instance 8,000 years ago, were based on
03:12:44 2 these small lake diagrams because they are more
03:12:47 3 reliable. And so the area that we focused on was
03:12:53 4 pollen Zone 2 which is the pine zone, and the very
03:12:56 5 rapid transition to the maple, beach, hemlock,
03:13:02 6 etcetera, forest that we see thereafter, which is
03:13:07 7 moist and warm, as opposed to dry.

03:13:15 8 And this is what allowed the low-level
03:13:20 9 Late Lake Hough and Late Lake Stanley to fill up.
03:13:24 10 Because the water budget went from being very
03:13:27 11 negative to very positive, very quickly. And we
03:13:31 12 see that not just in Axe Lake, we see it in lakes
03:13:35 13 all over Ontario.

03:13:37 14 In fact, all over this mid-latitude
03:13:40 15 eastern North America, we see the same shift from
03:13:43 16 dry, what we call early Holocene up to about
03:13:49 17 8,200 years ago, to wet after that, what we call
03:13:52 18 middle Holocene.

03:13:54 19 Q. I'd like to take you now to
03:13:57 20 Figure 13 which is on page 16.

03:13:59 21 So here, on the right-hand side there
03:14:08 22 is a photograph. Can you tell us where that
03:14:11 23 photograph comes from and what it's depicting?

03:14:14 24 A. So this is the bottom of Georgian
03:14:17 25 Bay. And it is a diver who is in the process of

03:14:22 1 collecting a sample of wood from that in-situ tree
03:14:29 2 stump. So the tree stump that you see there, and
03:14:32 3 you can see the roots actually grew into that
03:14:35 4 sediment and the diver is sampling that.

03:14:38 5 So it is one of several, 8, 10, I can't
03:14:44 6 remember the number. But 10 or so tree stumps that
03:14:48 7 have been identified and sampled from the bottom of
03:14:52 8 Georgian Bay and radiocarbon dated.

03:14:55 9 And the radiocarbon dates on those tree
03:14:58 10 stumps, not surprisingly, come back to the ages
03:15:04 11 when the lake level was low, because the tree
03:15:10 12 stumps that are now in many metres up to, you know,
03:15:15 13 30 or 40 metres of water, in Georgian Bay, were
03:15:19 14 obviously not growing underwater. They were
03:15:22 15 growing above ground, when the water level was
03:15:26 16 lower.

03:15:26 17 So this is from an older diagram, but
03:15:29 18 it shows the existence of the lowstands, the early,
03:15:35 19 middle, late. I think this is -- yes, this is in
03:15:39 20 the main basin of Lake Huron, so these are Stanley
03:15:43 21 lowstands punctuated by the Mattawa highstands.

03:15:48 22 So the times when the radiocarbon dates
03:15:51 23 of these various tree stumps, and they're mostly
03:15:55 24 stumps of cedar, as well as hemlock, tamarack,
03:16:02 25 they're mostly conifers, because conifers have more

03:16:07 1 resins that make them more resistant. That's why
03:16:10 2 in the old days, we used to have cedar decks,
03:16:13 3 because cedar is relatively resistant to decay.
03:16:14 4 Whereas, if you made your deck out of oak, it would
03:16:18 5 decay very quickly.

03:16:20 6 So the stumps are primarily cedar, but
03:16:23 7 also some of these other conifer species. And the
03:16:26 8 key thing is that they're in-situ, they haven't
03:16:28 9 been washed in. You can see that, like I mentioned
03:16:31 10 earlier, cedars are particularly good at growing
03:16:33 11 out of bare ground along the escarpment. They were
03:16:38 12 doing that between 11,000 and 8,000 years ago when
03:16:42 13 the lake level was low enough to do that, to allow
03:16:46 14 that.

03:16:47 15 Q. And how far below the water is
03:16:53 16 that tree stump?

03:16:55 17 A. That's 35 metres, water depth. So
03:16:58 18 that's about the same depth as the Flowerpot Beach.

03:17:02 19 Q. And similar to what you were just
03:17:06 20 actually flagging, and maybe we can return to the
03:17:09 21 time, when is the last time that these trees would
03:17:13 22 have been visible to the naked eye without diving
03:17:16 23 equipment and going down to look at it?

03:17:18 24 A. So the last time would have been
03:17:21 25 during Late Lake Stanley. Or in Georgian Bay, of

1 course Late Lake Hough and it also would have been
2 visible during the middle and early stands. They
3 would not have been visible, for instance, when the
4 Nadoway-Gros Cap barrier was breached. Nor would
5 they have been visible during the other times when
6 it is believed that water flushed into Lake Huron
7 via Lake Superior from, ultimately, Lake Agassiz.

8 Q. To switch away from plant life for
9 now, I'd like you to turn to page 13. If you can
10 look at Figure 10 and perhaps you can first help us
11 with orientation in time. When was the Pleistocene
12 epoch?

13 A. So the boundary between the
14 Pleistocene epoch and Holocene epoch is 11,700
15 years ago. So the Pleistocene epoch ended 11,700
16 years ago when the Pleistocene started (verbatim).

17 So we're looking at the quote that we
18 have here from MacDonald and Bryson, is saying
19 basically that between around 14,000-ish and
20 10,000-ish years ago, in other words at the end of
21 the Pleistocene epoch into the early Holocene,
22 there were giant beavers commonly living in the
23 Great Lakes region.

24 So there are several skeletons of giant
25 beaver that have been found. I hasten to tell you

03:19:14 1 that, because when I was a masters student I worked
03:19:19 2 at the Royal Ontario Museum. The mounts that you
03:19:21 3 see in museums they don't come like that out of the
03:19:26 4 ground. They just don't come like wash up out of
03:19:26 5 the ground. They're disarticulated bones and teeth
03:19:29 6 and so on. So that they are mounted in a museum as
03:19:32 7 you see here but the bones, teeth particularly of
03:19:40 8 giant beaver are relatively common in this area,
03:19:42 9 particularly further south in the United States,
03:19:45 10 but they were also recently common in Ontario.

03:19:49 11 Q. Can I take you now to page 15 and
03:19:59 12 take a look at Figure 12. And can you tell me
03:20:05 13 where this figure comes from?

03:20:07 14 A. This is from one of my
03:20:09 15 publications. That was another publication in that
03:20:13 16 same special volume on Great Lakes water level
03:20:18 17 history.

03:20:20 18 Q. And what does the chart show us?

03:20:23 19 A. So, on the very left, if you
03:20:27 20 picture in a different configuration that lake
03:20:31 21 level history that I talked about earlier, so that
03:20:35 22 we have the very high lake levels during the time
03:20:40 23 of Lake Algonquin when the ice stem was present,
03:20:44 24 declining to the lowest lowstand, very shortly
03:20:47 25 after the North Bay outlet was exposed, the North

03:20:51 1 Bay outlet controls the elevation of the water in
03:21:02 2 the Lake Huron/Georgian Bay basin, for much of the
03:21:05 3 time, except when we have these sudden Mattawa
03:21:11 4 highstands.

03:21:12 5 And, of course, when we had, during the
03:21:17 6 Late Lake Hough-Stanley phase, in this case I'm
03:21:20 7 focusing on Lake Hough in this diagram, so Georgian
03:21:23 8 Bay, very, very evaporative conditions that
03:21:26 9 produced closed basin status, made it a lake
03:21:30 10 without an outlet, and therefore, allowed the lake
03:21:35 11 to very, very quickly fall in elevation.

03:21:40 12 That fall in elevation caused the lake
03:21:42 13 waters to actually change in characteristics,
03:21:45 14 because just as if you boil soup on the stove for
03:21:52 15 too long it becomes overly salty. You are
03:21:55 16 concentrating everything that is in a large body of
03:21:58 17 water into a smaller volume. And it's when I had a
03:22:03 18 masters student do a project in the late 1990s, he
03:22:10 19 recognized that there were lots and lots of small
03:22:15 20 microfossils that, in my experience, because I had
03:22:20 21 done my PhD in Dalhousie University in the
03:22:24 22 Eastcoast, that we would find this particular
03:22:27 23 assemblage characteristically in near-shore marine
03:22:33 24 basins.

03:22:34 25 So marine basins. So marine basins

03:22:37 1 that had some saltwater coming in but very near
03:22:41 2 shore so that there was also freshwater coming in.
03:22:44 3 We call slightly salty water, we call that
03:22:49 4 brackish. So anyway, so long story short. These
03:22:52 5 small microfossils, these testate amoeba that were
03:22:58 6 present in the sediments, suggested to me that
03:23:02 7 there was slightly salty or brackish water at the
03:23:05 8 time.

03:23:06 9 And that is consistent with the pollen
03:23:08 10 data during that pine zone, because pine is a tree
03:23:15 11 that tolerates very dry conditions. That's why it
03:23:21 12 tends to be found growing on sand. Yeah, it is
03:23:27 13 tolerant of very dry conditions and when we ran
03:23:29 14 those transfer functions, we found that all of the
03:23:33 15 lakes in the Great Lakes region, measured, based on
03:23:38 16 their pollen record, recorded for us, that
03:23:42 17 conditions were very, very dry and very, very
03:23:45 18 evaporative.

03:23:46 19 So putting together the evidence of all
03:23:49 20 the physical evidence that we have, that the water
03:23:53 21 level during the Late Lake Hough and Stanley phase
03:23:57 22 was much lower than the lowest outlet, so it was a
03:24:00 23 closed basin condition. The water was slightly
03:24:04 24 salty or what we call brackish and that makes sense
03:24:09 25 because of the highly evaporative climate. For a

03:24:14 1 long time, my colleague, Mike Lewis at the
03:24:17 2 Geological Survey, who has spent almost his whole
03:24:21 3 career working on the Great Lakes, kept looking for
03:24:25 4 using various geophysical techniques, a lower
03:24:29 5 outlet that the water might have left through to
03:24:33 6 make that lowstand. But eventually, the evidence
03:24:36 7 that we have the slightly brackish conditions from
03:24:40 8 my microfossils or my student's microfossils,
03:24:47 9 finally got them to recognize that there was in
03:24:49 10 fact closed basin conditions in both Lake Hough and
03:24:53 11 Lake Stanley or the very, very low level lakes in
03:24:56 12 the Georgian Bay and main basin, Lake Huron.

03:25:00 13 So that's what this diagram is showing.
03:25:03 14 So that 2012 publication, Mike Lewis from the
03:25:07 15 Geological Survey was the editor of that special
03:25:11 16 volume. And he brought together people, authors,
03:25:13 17 to write from their various perspectives, various
03:25:17 18 lines of evidence, about lake level changes, in the
03:25:21 19 Great Lakes and, yeah, this paper was one that we
03:25:25 20 published there. And this, this illustration is
03:25:29 21 the punch line of that paper.

03:25:34 22 MR. BROOKWELL: Your Honour, I'm
03:25:35 23 conscious of the time approaching the afternoon
03:25:38 24 break. But to give you have a sense of where we're
03:25:41 25 at there's one more figure that I would be looking

03:25:43 1 at with Dr. McCarthy and then two short video clips
03:25:48 2 to review. I expect it would take more than five
03:25:52 3 minutes to do. But I would let you know where we
03:25:55 4 are in the examination for timing purposes.

03:25:58 5 THE COURT: What is the time
03:26:00 6 altogether.

03:26:01 7 MR. BROOKWELL: I think time altogether
03:26:02 8 would be 15 minutes.

03:26:04 9 THE COURT: We'll do the five minutes
03:26:06 10 to the break and then we'll take a break.

03:26:08 11 Please go ahead.

03:26:10 12 BY MR. BROOKWELL:

03:26:11 13 Q. Dr. McCarthy, could you turn to
03:26:13 14 Figure 18 which is on page 20.

03:26:20 15 A. Yes.

03:26:21 16 Q. Can you tell us at the top where
03:26:24 17 that figure comes from?

03:26:25 18 A. Yes. That is a figure from one of
03:26:30 19 the papers, one of the two papers that I published
03:26:32 20 in the special volume edited by Dr. Mike Lewis, and
03:26:37 21 it is superimposing our evidence of the very low
03:26:45 22 lake levels in the Georgian Bay and Lake Huron main
03:26:50 23 basins, the Lake Hough and Lake Stanley, during
03:26:54 24 that late phase when there was close basin status,
03:26:59 25 when there was no outlet for the water.

03:27:02 1 And what I did to write this paper, is
03:27:07 2 you look -- you'll recognize, perhaps, in the
03:27:14 3 little ovals that are present on the diagram, we
03:27:18 4 looked at some of those earlier in my testimony.
03:27:23 5 In the same paper, I had illustrated the modern
03:27:27 6 discharge or stream flow into Georgian Bay and Lake
03:27:35 7 Huron. In this case, in the same paper, I'm
03:27:37 8 contrasting what water was coming into Georgian
03:27:41 9 Bay, 8,000, 8,200 years ago, during that very arid
03:27:46 10 lowstand Late Lake Hough.

03:27:50 11 So, if you remember, there was a huge
03:27:53 12 amount of water coming in from Lake Superior, there
03:27:57 13 is currently that much water, 2,140 cubic metres
03:28:04 14 per second; there was none of that 8,200 years ago.
03:28:07 15 There was no connection with the main basin of Lake
03:28:11 16 Huron, Late Lake Stanley, so Lake Hough was on its
03:28:19 17 own.

03:28:19 18 And because the isostatic rebound had
03:28:23 19 still depressed the northeast relative to the
03:28:26 20 southwest, there was no water coming -- there would
03:28:30 21 have been no water coming in from the French River
03:28:33 22 or the Spanish River or any of the rivers entering
03:28:35 23 the north channel because water was actually
03:28:38 24 leaving from that area.

03:28:39 25 So if there had been any outlet at all,

03:28:42 1 it would have been here but, again, the water level
03:28:48 2 was so low that it was below the level of that
03:28:52 3 lowest outlet.

03:28:52 4 So the punch line of this figure, to
03:28:55 5 take us to break, is that there was very little
03:28:57 6 water coming into Lake Hough.

03:29:00 7 And those numbers in the ovals are
03:29:03 8 corrected relative to the modern inflow from those
03:29:08 9 rivers, like the Nottawasaga River, etcetera, by
03:29:14 10 the percentage that the pollen data tell us that
03:29:17 11 the climate was dryer.

03:29:19 12 So by combining the annual
03:29:21 13 precipitation data, the summer temperature data, we
03:29:28 14 calculated, back of the envelope calculation, how
03:29:32 15 much stream flow, on average, how much discharge
03:29:35 16 was coming into Late Lake Hough, all that to say
03:29:39 17 that we produced a hydrologic model to see, could
03:29:45 18 we actually -- the fancy word is drawdown. Could
03:29:50 19 we actually quickly lower the water level below the
03:29:54 20 outlet, using these numbers that are based on data,
03:29:58 21 pollen data and so on, and it turned out that
03:30:01 22 within a few centuries, we could close Lake Hough.

03:30:08 23 And the easy way to make that happen,
03:30:11 24 the quickest thing that you can do is to shut off
03:30:15 25 that 2,140 cubic metres per second which, you know,

03:30:21 1 we know happened. But because it is the single
03:30:25 2 biggest source of water into this basin, during an
03:30:28 3 arid interval, if you're not getting that water
03:30:30 4 from Lake Superior, which occasionally we did
03:30:34 5 during Mattawa highstands, but if you're not
03:30:37 6 getting it then the climatic conditions during that
03:30:41 7 Late Lake Hough/Lake Stanley lowstand, about
03:30:45 8 8,200 years ago, were sufficiently dry and
03:30:49 9 evaporative too quickly, within the interval of
03:30:51 10 time we have available to us from the geologic
03:30:54 11 evidence, make the water very -- the water level
03:30:59 12 very, very low.

03:31:00 13 And therefore, make the remaining water
03:31:02 14 in Late Lake Hough, slightly salty. Because
03:31:06 15 remember, that all around the Great Lakes basins,
03:31:10 16 there are bedrocks that were deposited in an
03:31:14 17 ancient ocean. And there is, if you look back on
03:31:17 18 the very first diagram of the bedrock, Figure 1
03:31:22 19 there is a formation called the salina formation,
03:31:27 20 saline, salty, it's rock salt, it's solid rock
03:31:31 21 salt. So groundwater flowing through that contains
03:31:33 22 ions that at the bottom of lakes can get in there
03:31:37 23 and make the water slightly salty.

03:31:40 24 So you reduce the volume of the lake,
03:31:42 25 you add groundwater with sufficient dissolved ions,

03:31:46 1 then the lower diagram on that page, the little
03:31:49 2 cartoons of those testate amoeba, the assemblage of
03:31:55 3 those little aquatic microfossils had the
03:32:00 4 conditions that were very similar to near shore
03:32:04 5 marine environment today.

03:32:07 6 Q. Dr. McCarthy, if I can ask you one
03:32:10 7 question before the break, you've spoken about
03:32:14 8 brackish and slightly salty water. Could you give
03:32:16 9 us an everyday analogue of what you mean by
03:32:20 10 slightly salty or brackish water?

03:32:23 11 A. So brackish has formally quite a
03:32:25 12 wide range of definition. It's less salty than sea
03:32:31 13 water which is three and a half percent salinity.
03:32:34 14 So if you were to cut your lip, the blood would
03:32:40 15 taste salty, so that combined with the saliva in
03:32:43 16 your mouth, that would be less salty than your
03:32:45 17 blood which is like sea water so that would give
03:32:48 18 you an idea.

03:32:49 19 Or tears, you know, if you tasted a
03:32:56 20 tear, the tear combined with the saliva in your
03:33:00 21 mouth, would taste brackish. That's the closest I
03:33:03 22 can come to something you can relate to.

03:33:05 23 MR. BROOKWELL: Thank you,
03:33:07 24 Dr. McCarthy.

03:33:07 25 Your Honour, and I propose that we can

03:33:08 1 go into the break.

03:33:10 2 THE COURT: Yes. I want you to ensure,
03:33:12 3 sir, before 15 minutes from now you have your video
03:33:15 4 clips working so that we don't have a delay when we
03:33:19 5 return.

03:33:19 6 MR. BROOKWELL: I will, Your Honour.

03:33:21 7 THE COURT: All right.

03:33:21 8 -- RECESS TAKEN AT 3:32 P.M. --

03:33:21 9 -- UPON RESUMING AT 3:50 P.M. --

03:51:01 10 THE COURT: Please go ahead.

03:51:04 11 MR. BROOKWELL: Your Honour, I'd like
03:51:05 12 to turn to a document in the database -- sorry, a
03:51:09 13 video. It's SC0141.

03:51:13 14 And this is a Discovery Channel episode
03:51:17 15 that aired October 7th, 2002, and we've excerpted
03:51:23 16 two short clips to show Dr. McCarthy related to
03:51:29 17 geological imaging.

03:51:31 18 But first, I'd like to propose that the
03:51:35 19 Discovery Channel episode be a lettered exhibit for
03:51:38 20 reference purposes before playing the video for
03:51:42 21 Dr. McCarthy.

03:51:44 22 THE COURT: Any objection? No.

03:51:46 23 THE REGISTRAR: Lettered Exhibit B-1.

03:51:49 24 THE COURT: B-1?

03:51:52 25 THE REGISTRAR: B-1, Your Honour.

EXHIBIT NO. B-1: Video Clip from the
Discovery Channel Episode (no audio).

BY MR. BROOKWELL:

Q. Okay. Dr. McCarthy, the first
clip I'm going to show you is taken from work done
by doctor -- sorry, by Mr. Steven Blasco; and are
you aware of Mr. Blasco's work?

A. Yes.

Q. I think it's already up on your
screen. We're going to go ahead and start it in a
moment. There's no sound with it. So what I would
ask is while we are viewing the video, if you could
explain what it is that we are seeing.

I'm going to go ahead and start the
clip.

-- REPORTER'S NOTE: Discovery Channel
Video excerpt is being played for the court (no
audio).

THE WITNESS: So this is the multi-beam
imagery and it's reconstructing the bathymetry, or
the water depth. And you can see the multiple
beams so there are many, many beams which are sent
out. One signal is received and it's translated
into these images, that show the elevation.

So these linear images that you see

03:53:01 1 here are deep grooves that were gouged out by the
03:53:05 2 force of melt water, by the force of water, I
03:53:09 3 should say, in water falls and so on.

03:53:14 4 This you can see descending from the
03:53:15 5 height of the escarpment very, very sharply down to
03:53:20 6 the deep basin of Georgian Bay, what would have
03:53:23 7 been of course Lake Hough during the lowstand, the
03:53:28 8 dry interval.

03:53:29 9 You can see a plunge pool that was
03:53:32 10 actually carved out of bedrock. So Niagara Falls,
03:53:36 11 for instance, has a very deep plunge pool. So as
03:53:39 12 the water plunges down into the underlying surface,
03:53:42 13 the underlying rock it actually erodes the
03:53:47 14 material, the sediment I should say.

03:53:47 15 -- REPORTER'S NOTE: Discovery Channel
03:53:47 16 Video excerpt was paused.

03:53:48 17 THE WITNESS: So that's what we saw.
03:53:50 18 There was a reconstruction of the bottom of
03:53:53 19 Georgian Bay, with the colours illustrating from
03:53:56 20 the blue, the deepest, to the yellow and orange,
03:53:59 21 the very shallowest parts of Georgian Bay and
03:54:04 22 looking at the various features that were carved by
03:54:10 23 the water.

03:54:11 24 BY MR. BROOKWELL:

03:54:11 25 Q. I'm going to queue up on a second

1 clip from the same Discovery Channel episode.

2 Again, there isn't sound with it. So I'll ask you
3 to describe for us what it is that we're seeing.

4 And I'll just start.

5 -- REPORTER'S NOTE: Discovery Channel
6 Video excerpt is being played for the court (no
7 audio).

8 THE WITNESS: Yes, so this is imagery,
9 actually with a remotely operated vehicle. So it
10 is visual imagery of the bottom of the lake, so
11 that you can see large slabs of limestone, that
12 were actually broken up. You can see that there's
13 not much soft sediment on Georgian Bay, but that
14 you have these cobbles that are at the surface.
15 And I don't remember what Steve was talking about
16 there, that's Steve Blasco.

17 -- REPORTER'S NOTE: Video excerpt was
18 paused.

19 MR. BROOKWELL: We can skip over this
20 section, okay.

21 -- REPORTER'S NOTE: Discovery Channel
22 Video excerpt is being played for the court (no
23 audio).

24 THE WITNESS: So you can see some
25 little pocks, pock marks. And here you see the

03:55:09 1 divers who are looking for various features. The
03:55:11 2 divers originally were interested in archeological
03:55:15 3 artifacts, but when they started fighting these
03:55:18 4 submerged but when they started finding, you know,
03:55:19 5 the submerged forest of tree stumps that became an
03:55:23 6 area of on active investigation so that they're
03:55:25 7 actually taking -- they're documenting the samples
03:55:27 8 that they're taking, the orientation of the
03:55:30 9 samples, the fact they're from in-situ tree stumps.

03:55:33 10 And those were the samples that were
03:55:36 11 then radiocarbon dated to establish the ages of the
03:55:39 12 time, at least at that elevation, that would have
03:55:42 13 been exposed to the air, so that those trees could
03:55:45 14 have grown.

03:55:45 15 -- REPORTER'S NOTE: Discovery Channel
03:55:45 16 Video excerpt was paused.

03:55:46 17 BY MR. BROOKWELL:

03:55:46 18 Q. And the image of the tree stump,
03:55:52 19 is that consistent with the image that we saw in
03:55:54 20 your report? Are they the same types of tree
03:55:59 21 stumps we're looking at?

03:55:59 22 A. Yes, the same type of tree stumps.
03:56:01 23 I'm not sure that it is the same tree stump. I'm
03:56:04 24 not sure. But it would be part of the collection
03:56:07 25 of in-situ tree stumps whose roots have actually

03:56:11 1 grown in to the limestone of what is now the
03:56:13 2 escarpment, those rocks that date back to those
03:56:16 3 various lowstands in Georgian Bay.

03:56:22 4 MR. BROOKWELL: Your Honour, if I may
03:56:23 5 have a brief moment to confer with my colleagues.

03:56:29 6 Thank you, Dr. McCarthy, those are my
03:56:32 7 questions.

03:56:32 8 THE WITNESS: Thank you.

03:56:32 9 THE COURT: Does Canada have any
03:56:35 10 questions for this witness?

03:56:37 11 MR. BEGGS: Yes. Thank you, Your
03:56:38 12 Honour.

03:56:38 13 THE COURT: Please go ahead, sir.

03:56:41 14 CROSS-EXAMINATION BY MR. BEGGS:

03:56:43 15 Q. Hello, Professor McCarthy. I'm
03:56:45 16 Michael Beggs. I'm counsel for Attorney General
03:56:48 17 Canada.

03:56:48 18 A. How do you do?

03:56:49 19 Q. Before I get into the substance of
03:56:54 20 your testimony, I wanted to check a few things on
03:56:58 21 terminology. I may have missed it early on, and I
03:57:03 22 think I understand from context, but when you refer
03:57:07 23 to highstands and lowstands, what is it that you're
03:57:12 24 referring to?

03:57:12 25 A. So prolonged intervals of high

1 water level in the basin, would be a highstand.

2 And a prolonged interval of low water levels in

3 that same basin would be the lowstand. So the

4 high-stand lakes in the Lake Huron basin, were lake

5 Algonquin, the high-stand lake. And the low-stand

6 lake in Georgian Bay, was Hough and in the main

7 basin, Stanley.

8 So the level today is what we call Lake

9 Huron. Higher than that would be a high-stand

10 lake, like Algonquin. Low-stand lakes are

11 substantially lower, so those are Hough and

12 Stanley. And the highstand were also the Mattawa,

13 or the short Mattawa highstands.

14 Q. Right, okay, thank you.

15 A. Yeah.

16 Q. I also wanted to ask about the
17 dating terminology. I know you explained in the
18 beginning the difference between the radiocarbon
19 and the calibrated dating.

20 You refer, I guess people don't -- or
21 perhaps scientist don't use BCE or AD these days?

22 A. No, archeologists you BCE,
23 geologists never have. And so when we read
24 archeological papers, then we translate for
25 ourselves into what we're more used to, radiocarbon

03:58:37 1 or calibrated. And my archeology colleagues do the
03:58:42 2 opposite. So it's what you're more -- like
03:58:44 3 Americans have to translate celsius and we
03:58:50 4 translate Fahrenheit.

03:58:51 5 Q. So in your report, when you refer
03:58:53 6 to I think just years ago, that would be just --
03:58:58 7 that would be literal?

03:58:59 8 A. Those would be calibrated. So if
03:59:04 9 -- I would actually write CAL, that's to make it
03:59:09 10 explicit that those are calibrated ages. Usually I
03:59:12 11 would do that on a figure, on a diagram or on a
03:59:15 12 table. But if I just say years ago, that is
03:59:18 13 calibrated. If I am referring to the radiocarbon
03:59:21 14 ages, usually from older literature to make things
03:59:25 15 simpler to not have to redraft the diagram, I would
03:59:28 16 make sure that it would say, C14 or, you know,
03:59:33 17 KABP without the calibrated.

03:59:35 18 But I would not -- that is a challenge,
03:59:37 19 actually, to look at material that's written over
03:59:39 20 the span of 35 years to make sure that you're
03:59:42 21 comparing apples with apples and not, oh my
03:59:46 22 goodness, those were radiocarbon years and not
03:59:50 23 calibrated years.

03:59:51 24 So in several of my diagrams from my
03:59:53 25 papers, for instance, that I talk about today,

03:59:55 1 there were actually two time scales, the calibrated
03:59:59 2 and radiocarbon, to help people do the math.

04:00:06 3 Q. Actually, I did have a question
04:00:08 4 and it's not to be tricky or anything. I just
04:00:10 5 wanted to make sure I'm understanding things.

04:00:12 6 Could my colleague pull up Professor
04:00:15 7 McCarthy's report?

04:00:17 8 I don't know that you'll need to see
04:00:20 9 it. But in one of your early figures, Figure 5...

04:00:27 10 A. Could I have a copy of my report?
04:00:32 11 I don't have it with me.

04:00:34 12 Q. While my colleague is doing that,
04:00:52 13 roughly the idea is Figure 5 depicts Lake Algonquin
04:00:56 14 and it says 11,500 years ago?

04:00:59 15 A. From the old textbook, yes.

04:01:01 16 Q. I was wondering because another
04:01:03 17 time in your testimony you referred to the "dry
04:01:07 18 periods" as being from 8,000, to 11,500. But
04:01:13 19 11,500 is not in the dry period, is it? Or is it?

04:01:17 20 A. It would have been -- the dry
04:01:24 21 period actually existed until 8,200 years ago. So
04:01:31 22 the climate was dry throughout. The driest
04:01:36 23 interval was between 8,500, and 8,000 years ago.
04:01:41 24 But the climate, even when there was still ice in
04:01:46 25 this area, the climate was dry. The climate did

1 not become moist until 8,200 years ago.

2 The very low-level -- those cartoons
3 with the depictions of the lowstands, highstands
4 from the various books, some of them are older
5 books and they're radiocarbon ages and some of them
6 are from newer books and they have been translated
7 into calibrated ages.

8 And that is -- the difficulty is, do we
9 re-draft everything to make it consistent or do you
10 just grab things quickly and then cite the source.
11 Because you can go back and look at the source and
12 say, oh, yeah, those were radiocarbon years or
13 those were calibrated years.

14 Q. Okay. So were you able to tell us
15 when the first humans appeared in the Great Lakes
16 area? Are you familiar?

17 A. I don't have any personal
18 experience with anthropological evidence,
19 archeological evidence, I am a geologist. I have
20 worked with archeologists who are colleagues. I
21 know that there is a tremendous controversy between
22 the people who think that it is well before 11,000,
23 12,000 years ago and those who think that it dates
24 back to that last ice withdrawal. There are people
25 who claim, I think as early as 35,000 years ago.

04:03:22 1 But that I have no personal expert knowledge of.

04:03:26 2 It's just hearsay.

04:03:28 3 Q. I wouldn't want you to go beyond
04:03:30 4 your expertise --

04:03:31 5 A. Right.

04:03:31 6 Q. -- and I appreciate that.

04:03:33 7 I think in your report you do refer to
04:03:35 8 caribou and hunting blinds which I presume hunting
04:03:39 9 blinds would have had humans involved?

04:03:41 10 A. Yes. So certainly by then, which
04:03:44 11 is 8,200 years ago, so the colleagues that I've
04:03:48 12 worked with from the University of Michigan, there
04:03:52 13 is evidence of caribou and there is evidence that
04:03:57 14 they built hunting blinds across what was then a
04:04:04 15 ridge that connected Alpena, Michigan to Amberley,
04:04:09 16 Ontario -- of course those cities weren't there --
04:04:12 17 but during the lowstands.

04:04:15 18 So when Lake Stanley was so low that
04:04:17 19 there were actually two separate basins, the
04:04:19 20 Manitoulin and the Goderich basin, there is a high
04:04:24 21 ridge in there that's called the Alpena-Amberley
04:04:27 22 Ridge. And on that ridge, so underwater, they have
04:04:29 23 found both caribou bone, and what they interpret to
04:04:33 24 be hunting blinds, suggesting to them, the
04:04:36 25 archeologists, that the caribou who were migrating

04:04:40 1 across this very narrow isthmus, if you will,
04:04:45 2 probably twice a year, fall, spring, were being
04:04:49 3 picked off like fish in a barrel, by the
04:04:58 4 Paleo-Indians at the time.

04:04:59 5 So when I participated in the workshop
04:05:02 6 and wrote a paper for their special volume, I
04:05:06 7 presented the geologic evidence, the lake level
04:05:09 8 evidence, and I interpreted my geological data in
04:05:16 9 light of their question which was: "If there were
04:05:24 10 Paleo-Indians killing caribou 8,200 years ago, did
04:05:31 11 I have anything to contribute to that? Could I
04:05:33 12 make a case?"

04:05:35 13 And the one thing I did hypothesize for
04:05:39 14 them, that could plausibly -- I haven't done the
04:05:44 15 work to test this, but plausibly have supported
04:05:49 16 their contention is that that very small Goderich
04:05:54 17 Basin to the south of the Alpena-Amberley Ridge
04:05:58 18 would almost definitely have been more than
04:06:02 19 brackish. It would have been actually quite salty
04:06:05 20 because it's a smaller basin and the salina
04:06:10 21 formation, the bedrock formation that is the rock
04:06:13 22 salt, is very close to there. And there are
04:06:17 23 actually active seeps of brine, of hypersaline,
04:06:23 24 more saline than seawater that is actually bubbling
04:06:27 25 up the bottom of Lake Huron, the main basin of Lake

04:06:29 1 Huron today.

04:06:30 2 So when I wrote my paper, I did not
04:06:36 3 hypothesize about there being Paleo-Indians there
04:06:41 4 hunting there or not. But if they were my answer
04:06:44 5 to them as a participant in their workshop and a
04:06:47 6 co-author in their book, is that having salty water
04:06:51 7 would be useful for preserving the vast amounts of
04:06:54 8 caribou that you're hunting like fish in a barrel.
04:06:57 9 Because what's the point of killing all the caribou
04:07:00 10 if you're going to let it rot.

04:07:02 11 Q. Okay. And while we're on the
04:07:08 12 topic of salinity and brackishness, but turning
04:07:11 13 back to Lake Hough. Now, if I understood your
04:07:16 14 evidence, you first noted that there was the right
04:07:20 15 geological conditions for there to be a closed
04:07:23 16 basin, and your colleague, Mr. Lewis, didn't find
04:07:28 17 any exit points, I suppose?

04:07:31 18 A. Correct, yeah.

04:07:32 19 Q. And then based on your analysis of
04:07:38 20 microfossils and pollen data you found traces or
04:07:44 21 evidence of salinity?

04:07:47 22 A. So in the sediments from Georgian
04:07:52 23 Bay that were deposited during that pine zone,
04:07:57 24 during that interval that records dry environments,
04:08:04 25 there were microfossils of small organisms that

04:08:09 1 live in the bottom of the lake called testate
04:08:12 2 amoeba. And in sediments from the Late Lake Hough
04:08:17 3 phase, so in that interval between 8,500 and
04:08:21 4 8,000 years ago, the assemblage was similar to what
04:08:26 5 typically we found in Bedford Basin, which is
04:08:31 6 between Halifax and Dartmouth. I had looked at
04:08:39 7 sediments from that brackish water environment from
04:08:42 8 the mouth of the Atlantic but with lots of
04:08:44 9 freshwater coming in.

04:08:45 10 There was actually a time in the middle
04:08:47 11 of the Holocene, so about 6,000 years ago, when it
04:08:51 12 was actually a freshwater lake. And in that
04:08:54 13 interval of time when you have brackish conditions
04:08:57 14 from marine to freshwater, that interval, there
04:09:01 15 were similar kinds of microfossils, so similar
04:09:06 16 assemblages, similar species living together in
04:09:11 17 Georgian Bay as there were in the Eastcoast.

04:09:14 18 And initially, I couldn't understand
04:09:16 19 how sea water could have gotten all the way into
04:09:20 20 Georgian Bay. I mean, you know, it's like he's
04:09:22 21 coming up with these assemblages and I'm looking at
04:09:25 22 them and I'm saying: That's really weird. Did the
04:09:28 23 water come from Hudson bay? And then I thought
04:09:30 24 about it and I compared it with the evidence for
04:09:33 25 the very low lake levels. And Great Salt Lake is a

04:09:37 1 good example of one of these closed basin lakes.

04:09:41 2 It's very salty because it evaporated over
04:09:45 3 thousands of years from a big freshwater lake
04:09:47 4 during when the ice sheets first melted, and now it
04:09:51 5 is a shriveled remnant that's very salty, of what
04:09:55 6 it was before.

04:09:55 7 So I inferred, I threw out this
04:10:00 8 possibility to my colleagues that it was a similar
04:10:04 9 situation of the aridity that I could see with my
04:10:07 10 pollen diagrams with the transfer functions that
04:10:09 11 say, yes, it was hot and evaporative; and the
04:10:16 12 combination of the microfossils that would have
04:10:19 13 been experiencing slightly salty water and I
04:10:24 14 floated that as an explanation.

04:10:24 15 And that explanation of the closed
04:10:28 16 basin status in Lake Huron, Georgian Bay, is very
04:10:36 17 well accepted today. It became accepted over the
04:10:38 18 last 15 years. And I think I can say it is
04:10:42 19 universally accepted.

04:10:48 20 Q. That was my next question, if it
04:10:52 21 was accepted by consensus, okay, that's great.

04:10:55 22 Are you able to tell us, and probably
04:10:58 23 you did already, but I didn't absorb it, but when
04:11:03 24 the beginning and end of the brackish period -- or
04:11:06 25 perhaps the Lake Hough period would have been?

04:11:10 1 When would there have been a body of water like
04:11:13 2 Lake Hough which was noticeably brackish?

04:11:17 3 A. Would it be possible to go to one
04:11:21 4 of my figures in order to show that?

04:11:24 5 Q. Sure.

04:11:25 6 A. I'll tell you when to stop. It's
04:11:28 7 the big summary one. That one.

04:11:28 8 -- REPORTER'S NOTE: Witness referring
04:11:39 9 to Figure 12.

04:11:41 10 A. So if you look on the left to the
04:11:44 11 Late Lake Hough, when there was a lake level below
04:11:50 12 the North Bay outlet, so there was a close basin
04:11:55 13 lake. And if you notice that there is -- there are
04:11:59 14 two time scales. There is a radiocarbon age to the
04:12:02 15 left and to the right there is the calibrated age.
04:12:06 16 So I'm going to speak in calibrated age, just to
04:12:10 17 make things simpler and more modern.

04:12:12 18 Q. Great.

04:12:13 19 A. So that, on the very right-hand
04:12:17 20 diagram, the testate amoeba or Thecaomoebian
04:12:21 21 assemblage that was present between say 9,500 and
04:12:28 22 8,200 years ago, that *Centropyxis aculeata* and
04:12:33 23 *Centropyxis constricta* fauna, that's the fauna,
04:12:36 24 that's the assemblage that is characteristic of
04:12:39 25 brackish water.

04:12:40 1 It can mean other things, too, but in
04:12:42 2 this context, paired together with the pine
04:12:45 3 dominated, very strongly pine dominated pollen
04:12:51 4 assemblage, and with the evidence of the closed
04:12:55 5 basin condition, this indicated to us that the
04:12:57 6 prolonged interval of evaporative conditions led to
04:13:03 7 this.

04:13:03 8 And one of the things that you might
04:13:07 9 notice, if you draw the line across from the
04:13:13 10 *Centropyxis aculeata* fauna, we have evidence that
04:13:16 11 probably even during the middle Lake Hough phase
04:13:22 12 that probably that line should go below the
04:13:27 13 controlling sill. But we didn't have enough
04:13:30 14 evidence. We didn't have enough samples to go that
04:13:33 15 far.

04:13:34 16 But for the Late Lake Hough phase, we
04:13:38 17 have lots and lots of sites in Georgian Bay that
04:13:41 18 tell us the same story so we are confident about
04:13:43 19 the conditions in Late Lake Hough.

04:13:46 20 Q. Great. Now, the land ridges that
04:14:09 21 you've described, essentially, from the various
04:14:15 22 maps, you have several, I think?

04:14:17 23 A. Uhm-hmm.

04:14:17 24 Q. You've included in your report, it
04:14:20 25 appears that essentially there's no -- there's no

04:14:24 1 Manitoulin island, there's no Peninsula. It's a
04:14:28 2 body of land surrounding Lake Stanley, and
04:14:32 3 separating from the cuff, is that essentially
04:14:37 4 correct?

04:14:37 5 A. Yes, yes.

04:14:38 6 Q. And how wide would the distance
04:14:41 7 between Lake Hough and Lake Stanley be? I guess it
04:14:45 8 would depend on water levels at certain times?

04:14:48 9 A. Yes, it certainly got farther and
04:14:50 10 farther apart as the lakes decreased in elevation.

04:14:53 11 Oh, I don't know, tens of kilometers.

04:14:57 12 Q. Okay. And when the video you were
04:15:09 13 shown earlier -- you described an area that
04:15:17 14 reflected a waterfall, I believe?

04:15:20 15 A. Uhm-hmm. Yeah.

04:15:20 16 Q. Earlier in your testimony, you had
04:15:25 17 described the Fitzwilliam Channel as a likely spot
04:15:29 18 for the waterfall; is that the waterfall that we
04:15:31 19 were looking at?

04:15:32 20 A. Yes, that's the one that we saw.

04:15:34 21 Q. You mentioned a plunge pool?

04:15:35 22 A. Yes.

04:15:36 23 Q. How significant was that plunge
04:15:38 24 pool? Did it give an indication of the force of
04:15:42 25 the waterfall?

04:15:42 1 A. It's very visible. If you think
04:15:46 2 back to the video, the very, very darkest colour
04:15:51 3 which indicated the very, very deepest water, is
04:15:58 4 eroded away, it's not -- it's like a pock in the
04:16:05 5 geology.

04:16:05 6 So definitely there would have been a
04:16:09 7 prolonged -- I don't know how long -- prolonged
04:16:12 8 interval of lots of water plunging down, that's
04:16:16 9 what plunge pool is, plunging down and just eroding
04:16:19 10 it over time.

04:16:20 11 So I'm not an expert on waterfalls, so
04:16:25 12 I don't know how long that would have to take and
04:16:27 13 how much water. A lot of water over a significant
04:16:33 14 amount of time is the best I can do.

04:16:35 15 Q. During the time period there would
04:16:40 16 have been a waterfall -- I don't think I can fairly
04:16:48 17 ask you that question, okay.

04:16:49 18 If I could perhaps jump to your
04:16:56 19 evidence about the Nadoway Barrier?

04:17:01 20 A. Uhm-hmm.

04:17:01 21 Q. As I understand it, this is a
04:17:12 22 barrier that existed between Nadoway Point and Gros
04:17:15 23 Cap Point, or Gros Cap?

04:17:15 24 A. Gros Cap, yeah.

04:17:18 25 Q. Sorry, Gros Cap, and that would

04:17:22 1 have been roughly 9 kilometres, would it, do you
04:17:24 2 think?

04:17:24 3 A. Because that's not my work, if we
04:17:26 4 can go to that, I think it's Figure 16. I'm not
04:17:34 5 good at numbers and distances unless I've done the
04:17:36 6 work myself.

04:17:40 7 No, it's -- not that figure. 17,
04:17:42 8 maybe? 18? I think it's my last figure. Yes,
04:18:00 9 that's the one.

04:18:07 10 So there seems to be a scale on that
04:18:09 11 bottom map if we can -- yeah, so 13 kilometres wide
04:18:15 12 at the top, yeah.

04:18:20 13 Q. Okay. And this barrier would have
04:18:26 14 been earth and rocks, would it?

04:18:28 15 A. Yes, it says "Quaternary
04:18:32 16 sediments" on the left-hand side so that means
04:18:35 17 usually till so, yeah, mixed mud and rocks, small
04:18:43 18 rocks.

04:18:45 19 Q. As I understood, it was because --
04:18:48 20 or you believed it was because a rapid flow of
04:18:52 21 water from Lake Agassiz hit --

04:18:55 22 A. That is what was postulated by
04:18:58 23 Loope and his co-authors that it was the sudden
04:19:01 24 influx of a large amount of water from Lake
04:19:05 25 Agassiz, into Lake Superior, pounding, just

04:19:11 1 abutting against this dam and breaching it.

04:19:15 2 Q. And this, I guess this location
04:19:17 3 would be upstream from Sault Ste. Marie?

04:19:21 4 A. Yeah. If you look at the bottom
04:19:25 5 left of the diagram, it shows you the location.

04:19:29 6 So it's at the mouth of the St. Mary's
04:19:33 7 River, so the very southeastern end of Lake
04:19:42 8 Superior, or it ends at the St. Mary's River, that
04:19:42 9 barrier was right across the mouth of the river.
04:19:45 10 And Sault Ste. Marie, Michigan and Ontario are just
04:19:52 11 to the right there.

04:19:55 12 Q. Okay. And now you mentioned today
04:20:03 13 that the flood caused by the breaching of the
04:20:08 14 barrier could have flooded in days or hours.

04:20:17 15 Is there a consensus that this was a
04:20:20 16 very rapid -- scientific consensus that this was a
04:20:24 17 very rapid event?

04:20:26 18 A. As far as I know, the breach
04:20:31 19 9,100 years ago, if you think back to the way that
04:20:36 20 those Mattawa highstands are drawn on the diagrams,
04:20:40 21 they go up, they go down, they go up, they go down,
04:20:46 22 so that the wave, the consensus around these
04:20:49 23 intervals -- and the reason I bring up the Mattawa
04:20:53 24 highstands is that the last of the Mattawa
04:20:55 25 highstands has been attributed to this breach so

04:21:00 1 that they happened very quickly and then they flood
04:21:03 2 through the next basin and they subside as quickly.
04:21:06 3 So the speed at which this would
04:21:14 4 happen, a rush of water from Lake Agassiz through
04:21:21 5 Lake Superior potentially breaching the Nadoway
04:21:24 6 barrier into Lake Huron in the north channel,
04:21:27 7 there's no reason to believe that that would take --
04:21:30 8 that would be gradual, it would be instantaneously.
04:21:32 9 I mean, the consensus, because if you
04:21:35 10 think of the way the diagrams are drawn,
04:21:37 11 particularly there's never been any doubt about
04:21:40 12 that very last one, up and down. So geologically
04:21:46 13 instantaneously, yes. Based on our experience with
04:21:53 14 breached dams and flooding in the modern, there is
04:21:55 15 no reason to believe that it would have not been
04:21:59 16 days. That it would have been longer than that.
04:22:02 17 There's no reason to believe that it trickled,
04:22:04 18 trickled, trickled. A dam burst is a dam burst.
04:22:09 19 Q. Okay. And that was approximately
04:22:21 20 9,100 years ago?
04:22:22 21 A. 9,100 years ago, yeah.
04:22:24 22 Q. Okay. If I could ask you a bit
04:22:33 23 about some of the popups that you've referred to?
04:22:41 24 A. Yeah.
04:22:41 25 Q. You mentioned that there were

04:22:49 1 numerous popups in Georgian Bay, I believe?

04:22:56 2 A. So there are lots of popups known
04:23:00 3 at the boundary between the Canadian Shield and the
04:23:04 4 Paleozoic bedrock, along the Severn River, the
04:23:09 5 Trent-Severn system along that region. And there
04:23:14 6 are some known from underwater because there was an
04:23:16 7 image that I showed of one, and they follow that
04:23:23 8 trend between those two bedrocks because of the
04:23:26 9 differential response to the post-glacial rebound.

04:23:32 10 So there's no reason to believe that
04:23:34 11 there wouldn't been more under water, it's just
04:23:36 12 that you need a remotely operated vehicle to see.

04:23:39 13 Q. That's what I was wondering. Have
04:23:39 14 they explored with vehicles to see or perhaps --

04:23:43 15 A. They explored in the area Fathom
04:23:47 16 Five National Park because they had funding from
04:23:48 17 the park. I mean they've -- the sub-marine -- the
04:23:52 18 subaqueous features are a big draw there. Because
04:23:59 19 it's the only marine park that we have in Canada, I
04:24:02 20 believe. So people come to dive. So they had a
04:24:06 21 lot of money, which is what you need in order to
04:24:08 22 deploy an ROV. But to deploy an ROV along Georgian
04:24:14 23 Bay, nobody has spent that money.

04:24:16 24 Q. It would be considerably deeper
04:24:18 25 there, too, as well?

04:24:19 1 A. And it would be, yeah, yeah.

04:24:26 2 Q. The one you referred to in Fathom
04:24:27 3 Five?

04:24:27 4 A. Right.

04:24:28 5 Q. That's one we saw in the video as
04:24:30 6 part of -- we didn't see it in the video but there
04:24:30 7 was a picture?

04:24:30 8 A. Yeah, there was an image that was
04:24:32 9 shown.

04:24:33 10 Q. Yes, that one. So am I correct
04:24:46 11 that -- is that popup 35 metres below the water; is
04:24:54 12 that right.

04:24:54 13 A. So from the chapter, the Marine
04:24:56 14 Geoheritage: 50th Anniversary of the Bedford
04:25:00 15 Institute of Oceanography. So it's 1.7 metres
04:25:08 16 long, 4-metre high walls and yes, 35 metres of
04:25:12 17 water, I think. I'd have to look it up to be sure.
04:25:16 18 It's not my work; it's the work of Mike Lewis.

04:25:19 19 Q. I don't know what the transcript
04:25:21 20 said. I heard 1.7 metres, did you mean
04:25:26 21 1.7 kilometres?

04:25:26 22 A. I'm sorry, 1.7 kilometres,
04:25:28 23 4 metres high. Yes, sorry.

04:25:32 24 Q. Does it run roughly north-south?

04:25:36 25 A. It runs north-west, south-east,

04:25:39 1 yeah.

04:25:39 2 Q. Okay. And it's about, so -- and
04:25:43 3 it is starts 10 kilometres from where Tobermory is
04:25:49 4 today?

04:25:49 5 A. I'd have to look that up, I'm
04:25:52 6 sorry.

04:25:52 7 Q. That's fine. You don't have the
04:25:53 8 distance from Manitoulin?

04:25:56 9 A. I don't.

04:26:29 10 Q. Okay. Is there a point in perhaps
04:26:33 11 Northern Ontario where the water starts running
04:26:35 12 away from the Great Lakes?

04:26:37 13 A. Yeah. So as soon as you're
04:26:40 14 outside the Great Lakes Basin, the water doesn't go
04:26:44 15 into the Great Lakes, it goes the other way.

04:26:46 16 So in Northern Ontario, most of the
04:26:49 17 water flows north to James Bay and Hudson bay. In
04:26:53 18 fact, in Canada most of the water flows north,
04:26:56 19 that's one of our water issues.

04:26:58 20 Q. Okay. And whereabouts would that
04:27:06 21 be? I presume that would be on the Canadian Shield
04:27:10 22 that this change takes place?

04:27:12 23 A. Yeah, look at the very front page
04:27:14 24 of my -- yeah, exactly. So as soon as you are
04:27:18 25 north of that green, it's flowing toward Hudson Bay

04:27:22 1 and James Bay.

04:27:23 2 Q. Okay. And --

04:27:29 3 A. Which is Canadian Shield, yes.

04:27:31 4 Until you get closer to Hudson Bay, James Bay, in
04:27:34 5 which case there are more sedimentary rocks up in
04:27:38 6 that area.

04:27:48 7 Q. I want to ask you about the
04:27:57 8 reference in your report to -- I'll skip the Latin
04:28:00 9 name. But the giant beavers?

04:28:03 10 A. The giant beaver, yes.

04:28:05 11 Q. And these -- I guess these giant
04:28:15 12 beavers grew to about the size of a bear; is that
04:28:20 13 right?

04:28:20 14 A. That is correct.

04:28:21 15 Q. But they didn't build dams, if I
04:28:24 16 understand?

04:28:24 17 A. Apparently they were not true
04:28:26 18 beavers and apparently, I'm not a vertebra
04:28:30 19 paleontologist, but apparently their incisors would
04:28:33 20 not have been good for building dams. They would
04:28:38 21 not have been suited the way a true beaver's teeth
04:28:41 22 are to cutting trees and therefore ultimately to
04:28:44 23 building dams. So it's believed that the giant
04:28:48 24 beaver did not build dams.

04:28:50 25 Q. And I think you referred to the

04:28:53 1 work of MacDonald and Bryson?

04:28:58 2 A. Correct.

04:28:58 3 Q. And that work said that it was
04:29:02 4 toward the end of the Pleistocene which you said
04:29:06 5 was 11,700 years ago?

04:29:08 6 A. Yes, that's right.

04:29:08 7 Q. Then you gave range of about
04:29:11 8 between 14,000 to 10,000?

04:29:15 9 A. There are records known in the
04:29:17 10 early Holocene as well, yeah.

04:29:25 11 The quote from Mike MacDonald and
04:29:29 12 Bryson had to do with the change in the climatic
04:29:32 13 conditions and therefore, the vegetation at the end
04:29:35 14 of the Pleistocene. It did not mean that giant
04:29:41 15 beavers ceased to exist then. It just meant that
04:29:44 16 the change in climate that makes the difference
04:29:48 17 between the Pleistocene and the Holocene, that's
04:29:51 18 why the boundary is there, is because of the change
04:29:53 19 in climate.

04:29:55 20 That climatic and vegetational
04:29:57 21 transition eventually made it such that the giant
04:30:00 22 beaver did not have the kind of vegetation it
04:30:02 23 needed to survive. Because their teeth show that
04:30:06 24 they were vegetarian, they were herbivores, but it
04:30:10 25 also shows that they would not have been very good

1 at cutting down trees.

2 THE COURT: Mr. Beggs, about how much
3 longer do you expect to be?

4 MR. BEGGS: Actually, probably about
5 10 minutes.

6 THE COURT: Unless there's some
7 objection, I would just proceed for another
8 10 minutes then. Please go ahead.

9 MR. BEGGS: Thank you.

10 BY MR. BEGGS:

11 Q. And while you mention it, the
12 Holocene that's what we're currently in right now,
13 is it?

14 A. Yes, it is.

15 Q. You mentioned that skeletons or
16 teeth particularly have been found commonly in the
17 Great Lakes Region?

18 A. Relatively commonly, yes.

19 Q. So that region would go as far as
20 Indiana and Illinois?

21 A. Correct, but they're actually more
22 common in Indiana and Ohio than they are in Canada.
23 But they are present in Ontario, as well.

24 Q. Am I correct that there were --
25 there's only two artifacts of giant beavers found

04:31:19 1 in Ontario?

04:31:20 2 A. It is possible, because I'm not a
04:31:22 3 vertebrate paleontologist, but they are much more
04:31:26 4 common, as you say, Indiana Ohio, etcetera,
04:31:29 5 Wisconsin, than they are in Ontario. If you say
04:31:32 6 there are two, then there are two.

04:31:34 7 Q. Well, I'm not testifying.

04:31:36 8 A. No, if the data say that then I'm
04:31:41 9 not a vertebrate paleontologist, but I'm not sure.

04:31:58 10 MR. BEGGS: If I can just take a
04:31:59 11 moment, Your Honour.

04:32:12 12 Professor McCarthy, those are my
04:32:14 13 questions. Thank you very much.

04:32:15 14 THE COURT: Now if you can stay there
04:32:17 15 for a moment.

04:32:17 16 Which counsel is asking this witness
04:32:19 17 questions for Ontario.

04:32:22 18 MS. McRANDALL: Julia McRandall, Your
04:32:25 19 Honour.

04:32:25 20 THE COURT: I assume you'll be longer
04:32:28 21 than five minutes.

04:32:28 22 MS. McRANDALL: I am, Your Honour.

04:32:30 23 THE COURT: We're going to resume
04:32:32 24 tomorrow at 10 o'clock.

04:32:34 25 You're under cross-examination and that

04:32:37 1 means you cannot discuss your trial evidence with
04:32:40 2 anybody.

04:32:41 3 THE WITNESS: Okay.

04:32:42 4 THE COURT: I'm sure you have other
04:32:44 5 things to do.

04:32:44 6 The other thing I like to mention for
04:32:47 7 learned persons such as yourself, is that includes
04:32:50 8 doing research on issues that may have come up
04:32:52 9 today to satisfy your curiosity; which is a
04:32:57 10 temptation that I'd like you to avoid.

04:32:59 11 THE WITNESS: I will.

04:32:59 12 THE COURT: So if you could please be
04:33:01 13 here obviously before 10 o'clock tomorrow morning.
04:33:04 14 And if you do have any questions, and you don't
04:33:07 15 know if you're allowed to do something, you should
04:33:09 16 just ask Mr. Brookwell and he'll give you guidance
04:33:13 17 as to your witness obligations. All right?

04:33:15 18 THE WITNESS: Yes.

04:33:16 19 THE COURT: We'll adjourn until
04:33:17 20 tomorrow morning then.

04:33:18 21
04:33:19 22 -- Court adjourned at 4:33 p.m.
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

REPORTER'S CERTIFICATE

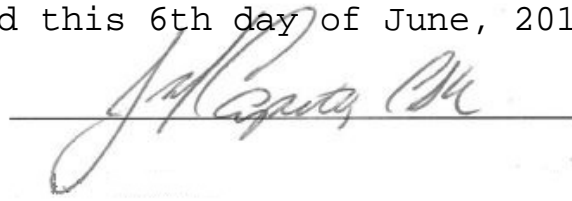
I, JUDITH M. CAPUTO, RPR, CSR, CRR,
Certified Shorthand Reporter, certify;

That the foregoing proceedings were
taken before me at the time and place therein set
forth;

That the testimony of the witness
and all objections made at the time of the
examination were recorded stenographically by me
and were thereafter transcribed at my direction;

That the foregoing is a true and
correct transcript of my shorthand notes so taken.

Dated this 6th day of June, 2019.



NEESON COURT REPORTING INC.

PER: JUDITH M. CAPUTO, RPR, CSR, CRR

0	12,000 1038:23	2	3	5
0036 944:13,16	1218 947:8	2 946:3 970:9 986:19 988:2 991:24 1016:4	3 946:3 974:17	5 968:18 980:20 990:22 1037:9, 13
1	13 1016:20 1019:9 1048:11	2,140 971:16 1025:13 1026:25	3,000-year 991:24 1012:24	5,730 965:3
1 988:1 990:21 1027:18	13,000 979:21	20 935:4 965:19 1024:14	30 1007:6 1017:13	50 985:17 986:14 998:5
1,500 919:3	14 964:15 998:11,12 1013:13	20-year 966:2	35 944:16 1005:21 1018:17 1036:20 1052:11,16	50th 1052:14
1,600 919:3	14,000 979:20, 21 1055:8	2001 1004:23	35,000 1038:25	6
1,800 919:9	14,000-ish 1019:19	2002 1029:15	3982 892:1,3	6 970:10 982:6
1,900 919:9	15 952:4 1004:13 1020:11 1024:8 1029:3 1043:18	2003 885:18	3983 894:14,15	6,000 1042:11
1.7 987:21 1052:15,20,21, 22	16 946:3 998:12 1006:3 1016:20 1048:4	2005 994:20 997:3	3984 943:12,13	60 998:6
10 989:15 1017:5,6 1019:10 1053:3 1056:5,8 1057:24 1058:13	17 948:1 1004:12 1008:16 1048:7	2006 881:14 936:24 937:6	3985 957:17,23	7
10,000 1055:8	18 948:12 1024:14 1048:8	2007 998:20	3986 958:2,3	7 974:17 989:15
10,000-ish 1019:20	1836 948:12	2009 885:25	3987 986:10,11 987:4 988:12	72 926:7 940:11 941:8 944:9 947:13 949:1,4, 14 950:9,15
100 891:15	1851 948:1	2010 896:2 899:3	3987-A 988:15	75,000 964:13 965:4
1000-year 977:13	1854 947:13	2011 894:2 899:4,5 921:1 927:2,16 941:16 942:14 943:5	3988 988:18,20	7th 1029:15
1039 947:8	18th 894:2	2012 998:17 1023:14	3:32 1029:8	8
10:08 879:1	19 1008:15 1010:7	2014 881:17 936:22,24 937:6 985:17 986:13	3:50 1029:9	8 976:23 994:9 1017:5
10:47 907:7	1950 965:17	2015 970:14	4 976:23 987:24 1052:23	8,000 992:7,15, 22 997:24 1006:25 1007:9 1016:1 1018:12 1025:9 1037:18, 23 1042:4
11 935:1 994:8 1013:14	1950s 966:5 1001:23	2016 936:22	4,000 889:22	8,200 1006:24 1016:17 1025:9, 14 1027:8 1037:21 1038:1 1039:11 1040:10 1044:22
11,000 992:14, 22 1018:12 1038:22	1988 994:18,19	2017 902:10 930:18	4-metre 1052:16	8,500 1006:24 1007:9 1037:23
11,500 981:6 992:6 997:24 1037:14,18,19	1990s 966:5 973:24 1021:18	2019 966:14	40 961:3 1017:13	
11,700 1019:14,15 1055:5	1991 960:14	22 895:13 1010:6	45 946:3	
11:20 907:8	1992 1012:22	24th 941:16 942:14 943:4	45½ 926:13 940:11 941:7 944:9 947:16	
12 1012:16 1020:12 1044:9	1994 1013:21	25 998:4	4:33 1058:22	
	1998 989:20	2:15 980:4,6		
	1:02 980:5			

1042:3	accessed 943:14	16,18	990:6 1044:14, 15,16	allowed 1016:8 1021:10 1058:15
9	accommodati on 907:19	address 901:23	ages 966:7,8, 18,19 967:1 1017:10 1033:11 1036:10,14 1038:5,7	alluded 894:25 898:13 911:21 917:23
9 980:19 1012:17 1048:1	accordance 896:21 917:5	addressed 914:25 924:9	ago'ish 1006:25	Alpena 1039:15
9,100 1010:22, 23 1049:19 1050:20,21	account 966:8	addressing 885:3 920:7	agree 937:21	Alpena- amberley 1039:21 1040:17
9,500 1044:21	accumulate 1014:3,7	adjourn 1058:19	agreement 893:10,12,13 898:12 923:21 924:3,24 959:16	altogether 889:18 1024:6,7
99 905:17	accumulation 976:20 985:7	adjourned 980:4 1058:22	agreements 930:3 953:12	Amberley 1039:15
A	accuracy 905:8	administratio n 882:8 883:8	ahead 879:10, 17 880:8 888:1 894:13 908:8 928:17 944:13, 16 949:24 954:9,24 959:20 962:21 963:11 980:8 1024:11 1029:10 1030:10,14 1034:13 1056:8	America 977:12,18 983:4 1016:15
A-1 897:23,24, 25	accurate 887:11 894:7 897:16 945:15, 16	administrator s 883:10	aims 961:21	American 961:20
A-2 963:6,7,9	accurately 919:20 932:1	advance 884:22 957:8 978:14	air 975:16 1014:5 1033:13	Americans 1036:3
a.m. 879:1 907:7,8	acknowledge 895:11	advancing 1006:14	aired 1029:15	amoeba 1022:5 1028:2 1042:2 1044:20
Aamjiwnaang 886:11 891:18 893:25 895:2 922:15 929:13, 18	acted 936:21	advice 884:24	Akiwenzie 893:7 895:3 938:19	amount 916:7 964:19 965:1, 12,13 966:10,20 971:6 972:13, 15,16 983:5,9 985:2,13 993:11 996:13,17 1000:7,13 1025:12 1047:14 1048:24
abandoned 923:18	acting 937:17	affirmation 879:23,25 954:16	Algonquin 981:18,19 994:23 995:23 996:20 997:20 999:10 1020:23 1035:5,10 1037:13	amounts 996:6 1041:7
abide 909:9	action 881:8 884:5,8 930:15 958:13	AFFIRMED 880:5	Alan 942:16 946:24 947:14	analogue 1028:9
abiding 913:15	active 1033:6 1040:23	afforded 936:19	allergy 1014:6	analogy 946:24
ability 907:23 960:4	activities 926:19	afternoon 954:14 958:8 959:22 1023:23	alliance 912:12 935:24 936:11,16	analyses 1009:2
Aboriginal 885:17 895:12 925:13	activity 990:16	Agassiz 994:16,17,23 995:22,25 996:1,4,16,19, 24 997:5,21 1000:22,23 1001:18 1010:22 1019:7 1048:21,25 1050:4	analysis 1041:19	
absolutely 989:7	aculeata 1044:22 1045:10	AD 1035:21		
absorb 1043:23	AD 1035:21	Adam 941:25		
abutting 1049:1	add 895:25 948:13 1027:25	add 895:25 948:13 1027:25		
accept 904:13	added 949:4 971:17	added 949:4 971:17		
accepted 965:7 990:14 998:7 1043:17, 19,21	Addendum 958:4	age 909:4 933:15 962:11 964:10,12 965:10,25 966:1,22,23 976:21 980:18		
	addition 929:11 993:10,			

ancestors 909:18 916:20, 24 948:25 949:3,6,13 950:5,7,11,17, 20 951:8	apparently 1054:17,18,19	991:7,10,21 992:16 993:10 995:6 1005:23 1007:16 1011:4 1012:7 1013:6, 11 1015:6,10 1016:3 1020:8 1025:24 1033:6 1037:25 1038:16 1046:13 1051:15 1054:6	1042:4 1044:21, 24 1045:4	awareness 920:3,4
ancient 969:13 976:18 1002:1 1027:17	appeared 1038:15	areas 978:13 983:7	assemblages 1014:12 1042:16,21	awesome 905:19
animals 962:16	appearing 979:14	arid 996:23 1025:9 1027:3	assembly 941:15 942:13, 15 943:17 950:5	awful 995:4
Anishinaabe 896:22 897:2 900:6 910:8 911:19 912:6,7 914:24 916:6 917:6 929:25 931:2 935:22 936:13,20	appears 982:12 1004:25 1045:25	aridity 1015:1 1043:9	assessment 941:11	Axe 1015:11,14 1016:12
Anishinaabek 896:19 902:18 914:5 916:20 919:13,17	apples 1036:21	arm 988:9	assign 887:17	B
Anishinaabe mowin 893:14	applied 896:13	armed 913:22	association 961:9,13,15	B-1 1029:23,24, 25 1030:1
Anniversary 1052:14	apply 914:13	Army 967:21	assume 957:15 1057:20	back 879:6,13, 16 886:17 887:22 888:15 889:11 890:6,19 900:19,20 902:4,5 904:24 907:19 917:13 935:4 952:6 965:4 966:5 978:2 984:11,12 985:13 990:21 996:17 997:7,23 1000:8 1001:22 1010:25 1011:4 1017:10 1026:14 1027:17 1034:2 1038:11,24 1041:13 1047:2 1049:19
annotate 980:14	apprised 938:14	arrive 911:17, 24	Atlantic 973:4 999:17 1001:9 1042:8	backfills 982:25
Annotated 891:23 892:3	approach 888:5 890:9	arrived 921:20	atmosphere 964:16,19,22 966:11	background 958:20 959:6
annual 971:4 1014:19 1026:12	approaching 1023:23	arrow 889:11 988:7 989:9	attend 901:2 902:11 930:18	balance 971:22
Annville 969:16	approximatel y 880:25 919:9 1050:19	article 985:15, 23,24 986:11 987:21 989:19 999:2 1010:9,11	attention 885:24 898:15 986:18 1003:23	balanced 932:23
another's 913:8	aquatic 1028:3	articles 961:3 966:7 986:1	Attorney 1034:16	Band 881:25 882:3,12,25 883:17
answers 974:4	archeological 964:11 1033:2 1035:24 1038:19	articulate 910:24	attributed 1011:13 1049:25	bar 998:13
anthropologi cal 1038:18	archeologists 1035:22 1038:20 1039:25	artifacts 1033:3 1056:25	audio 1030:2, 18 1032:7,23	bare 993:22 1018:11
anytime 938:1	archeology 1036:1	asaamaa 904:9,13 913:5 914:3,10	authors 1023:16	barrel 1040:3 1041:8
apologies 951:5 954:5	area 881:3 887:25 888:3 892:5 896:8 897:5 898:5 899:19 900:15 901:12,22 916:19 921:24 922:2,4,9,19,22, 23 923:8 924:12,14 925:15 927:7 959:7 968:2,6, 10,14 975:2 976:15 977:21 988:3 989:21,25	aspect 1003:4 1009:6	Avenue 928:10	
apologize 952:7		aspects 961:23	average 971:4,7 1026:15	
		aspire 900:9 917:19	avoid 958:13 1058:10	
		assemblage 1021:23 1028:2	aware 898:19 924:21 925:9,11 930:5 938:4 939:10 950:12 1030:7	

barrier 995:24 1010:17,25 1011:14 1019:4 1047:19,22 1048:13 1049:9, 14 1050:6	1050:2 1053:14	beams 1030:22	believed 949:10 1019:6 1048:20 1054:23	blockage 995:19
Barry 918:21	basins 978:13, 23 981:18 996:10 1002:7 1021:24,25 1024:23 1027:15 1039:19	bear 941:19 985:22 1054:12	belt 942:19	blocking 981:8,13
base 999:23 1009:13	basis 951:19 953:8	bearing 928:22 959:23	benefit 916:20 948:19	blood 1028:14, 17
based 900:19 962:21 964:18 974:11 976:3 979:1 1007:5 1008:11 1012:23 1014:11 1016:1 1022:15 1026:20 1041:19 1050:13	bathymetry 1005:7,8 1007:6 1008:1,11 1030:20	Beausoleil 924:16,20 925:4	bestowed 911:8	blow 986:23
basic 976:4 993:24	bay 922:1 924:12,25 970:19 971:8, 14,22 974:2,6 975:12 976:9,16 984:21 985:8,9 991:6,8,21,25 992:9 999:15 1000:2,6,8,12 1001:14 1002:3, 7,12 1003:9,24 1005:9 1008:1 1015:12,15,19 1016:25 1017:8, 13 1018:25 1020:25 1021:1, 2,8 1023:12 1024:22 1025:6, 9 1031:6,19,21 1032:13 1034:3 1035:6 1041:23 1042:17,20,23 1043:16 1044:12 1045:17 1051:1, 23 1053:17,25 1054:1,4	beaver 1019:25 1020:8 1054:10,24 1055:22	bifurcated 1008:6	blue 922:23 924:12 968:11 975:12 976:7,8 977:16 978:11 979:6,8,11,12, 20 989:24 1008:2 1031:20
basically 969:20 1010:15, 18 1019:19	Bedford 985:18 986:15 1042:5 1052:14	beaver's 1054:21	big 886:18 969:18 974:13 975:9 978:4 1043:3 1044:7 1051:18	Bluffs 976:11, 12,19
basin 962:10 967:23,24,25 968:10,13 972:21 973:11, 22 975:13 979:2,13,15 981:7,10,11,15, 16 983:12,17,19 985:8 988:3 992:10 996:5, 15,16,20 999:10,21 1002:3,4,5,10, 12,20 1003:7, 12,14,16,19 1007:12 1010:14 1012:8 1017:20 1021:2, 9 1022:23 1023:10,12 1024:24 1025:15 1027:2 1031:6 1035:1, 3,4,7 1039:20 1040:17,20,25 1041:16 1042:5 1043:1,16 1044:12 1045:5	bedrock 968:24 975:6,7, 8 976:17,20 990:17 999:23 1003:10 1027:18 1031:10 1040:21 1051:4	beavers 1019:22 1054:9, 12,18 1055:15 1056:25	biggest 996:1 1027:2	board 961:12, 16
Bay/lake 981:10	bedrocks 1027:16 1051:8	Bedford 985:18 986:15 1042:5 1052:14	binational 961:14 962:1	body 920:14 1008:9 1021:16 1044:1 1046:2
BCE 1035:21, 22	Beggs 1034:11,14,16 1056:2,4,9,10 1057:10	bedrock 968:24 975:6,7, 8 976:17,20 990:17 999:23 1003:10 1027:18 1031:10 1040:21 1051:4	birch 1015:5	boil 1021:14
beach 1005:25 1006:4,11,22 1007:1 1008:21 1009:20,21 1015:6 1016:5 1018:18	begin 880:13, 15 907:10 918:24 928:7 955:5,19 956:2 982:7 1008:16 1010:7	beginning 957:5 979:22 1013:11 1035:18 1043:24	bit 893:9 898:9 906:19 913:20 915:10 917:8,9 919:8 931:4 944:12 948:5 950:6 979:10 1004:2,3 1015:21 1050:22	bomb 965:17 966:9
	begin 880:13, 15 907:10 918:24 928:7 955:5,19 956:2 982:7 1008:16 1010:7	behalf 944:1	black 969:24 970:2 999:8 1003:6,23,25	bone 1039:23
	beginning 957:5 979:22 1013:11 1035:18 1043:24		Blasco 1004:18,23 1006:6 1030:6 1032:16	bones 1020:5, 7
			Blasco's 1030:7	book 879:23 954:15,17 968:21 970:14 1041:6
			blinds 1039:8, 9,14,24	books 1038:4, 5,6
			blob 975:11,12 978:5 985:6	Border 972:8
			block 982:16 997:16	boreal 992:18 993:14 1013:7
			blockage 995:19	born 880:18
			blocking 981:8,13	bottles 934:22
			blood 1028:14, 17	bottom 898:4 975:10 1000:2 1003:10 1006:8 1016:24 1017:7 1027:22 1031:18 1032:10 1040:25 1042:1 1048:11 1049:4
			blow 986:23	
			blue 922:23 924:12 968:11 975:12 976:7,8 977:16 978:11 979:6,8,11,12, 20 989:24 1008:2 1031:20	
			big 886:18 969:18 974:13 975:9 978:4 1043:3 1044:7 1051:18	
			biggest 996:1 1027:2	
			binational 961:14 962:1	
			birch 1015:5	
			bit 893:9 898:9 906:19 913:20 915:10 917:8,9 919:8 931:4 944:12 948:5 950:6 979:10 1004:2,3 1015:21 1050:22	
			black 969:24 970:2 999:8 1003:6,23,25	
			Blasco 1004:18,23 1006:6 1030:6 1032:16	
			Blasco's 1030:7	
			blinds 1039:8, 9,14,24	
			blob 975:11,12 978:5 985:6	
			block 982:16 997:16	

case 882:17 912:25 939:12 941:19 962:8 988:13 1021:6 1025:7 1040:12 1054:5	947:21	999:5 1020:18	cited 985:16 986:11 1004:23 1012:20 1013:21	close 902:4 936:13 1024:24 1026:22 1040:22 1044:12
Catharines 984:21	certainty 951:15,16	check 1034:20	cities 1039:16	closed 1003:12,14,16, 19 1021:9 1022:23 1023:10 1041:15 1043:1, 15 1045:4
caused 987:14 990:14 1000:5 1001:10 1021:12 1049:13	chair 882:17,18 891:6 960:16,18	checked 932:23	claim 885:5,18 898:20 922:9,12 923:18 924:15, 21 925:12 942:12 944:2 945:20 1038:25	closely 998:21
causing 982:18 984:11 1005:25	challenge 1036:18	Chief 881:11, 12,16,24 882:4, 5,18,25 883:3,4, 5 884:16,17,19 893:3,4,6,7 894:25 895:1,3, 4 898:21,22 905:12 908:17 918:20 920:25 925:7 927:23 936:21,25 937:9,11,17 938:1,3,7,10,11, 15,18,19 939:19 942:10 944:6	claimed 921:24 922:1,18 923:13 924:14, 17 925:14	closer 891:6 907:20 1054:4
caveat 965:16	change 974:16 994:23 1013:25 1021:13 1053:22 1055:12,16,18	chiefs 884:15 899:12 939:3,5	claims 885:9, 25 914:19 938:4,9,10,25 939:20,22 943:19 944:4 945:17	closest 1028:21
caving 981:21	changed 1013:24 1014:23	child 934:17	Claire 973:2	cloud 894:25 968:4
ceased 1055:15	changing 997:10 998:8	Chippewa 891:4 912:14 929:12 1002:20	clans 910:15	clouds 972:18
cedar 993:11, 17,20,21,25 994:2 1017:24 1018:2,3,6	channel 971:21 1000:2,6 1001:2 1003:10 1008:4,12 1011:3,5,8 1025:23 1029:14,19 1030:2,16 1031:15 1032:1, 5,21 1033:15 1046:17 1050:6	Chippewas 883:19 886:10 891:12,16 893:24 894:1 895:1,3 899:16	clarify 908:24	co-author 1041:6
cedars 1018:10	channels 1007:2,3	choose 904:5 931:20 934:11 935:8 959:5	classes 981:2	co-authors 998:23 1048:23
celsius 1036:3	Chapman 968:22	chosen 934:6	clearer 944:13	co-counsel 889:16
centered 895:13 899:21	chapter 1004:24 1052:13	chunks 975:9	clicked 935:5	coal 982:13
centering 900:22	characteristic 1044:24	circle 888:22, 25 890:23	clients 937:23	coarse 1009:9, 11,14
centre 991:6	characteristic 1021:23	circled 891:2, 3,11 970:19	cliff 969:18	cobbles 1009:12 1032:14
Centropyxis 1044:22,23 1045:10	characteristic 1021:23	circulated 885:8	climate 962:16 1000:17,18 1001:9,14 1009:4 1013:25 1014:15,23 1015:10,25 1022:25 1026:11 1037:22,24,25 1055:16,19	Cod 1006:16
centuries 1026:22	characteristic 990:18 993:24 1021:13	circumstance 917:18 940:15	climatic 1027:6 1055:12, 20	coincidentall y 906:2
ceremonial 926:18	chart 998:13	cite 1038:10	clip 947:8 1030:1,5,15 1032:1	cold 995:3
ceremonies 910:10,14 920:12 925:25			clips 945:24 1024:1 1029:4, 16	collaborative y 884:21
ceremony 901:1,3,5 902:9, 10,14,24 903:2, 3 906:10 930:18,25				colleague 942:7 1004:18 1023:1 1037:6, 12 1041:16
				colleagues 949:23 973:25 982:14 1010:10, 11 1012:21

1034:5 1036:1 1038:20 1039:11 1043:8 collected 1008:21,24 collecting 1017:1 collection 1033:24 collective 914:17,24 932:15 colored 968:11,12 colour 975:14 978:11 979:4 989:1 1047:2 colours 979:1 1031:19 combination 1043:12 combined 1028:15,20 combining 1026:12 commencing 879:1 comments 950:4 committee 886:1 898:15 committees 938:24 common 964:10 988:2,4 993:25 994:1 1020:8,10 1056:22 1057:4 commonly 1019:22 1056:16,18 commonplace 928:12 communities 883:19 884:24 885:9,10	892:15,25 894:24 898:17, 24 899:2,15 900:5,17 901:17 912:12 914:5 917:22 925:6 929:25 930:6 943:18 community 882:7,10 883:6, 15 885:4,7 893:24 899:11 903:20,25 908:24 909:2,6 913:25 922:11 933:13 934:1 936:3 940:21,25 941:1,16 945:1, 4,13 community's 903:10 compared 972:15 1042:24 comparing 1036:21 complete 930:22 completed 976:24 completes 951:23 complex 978:19 996:14 997:3,18,21 998:5 999:7 complexity 998:5 comprised 882:4 compromise d 883:18 computer 942:2 1014:16 concentrating 1021:16 concept 900:22 933:8	concepts 900:5 concern 886:2 892:11 924:5 925:3 concerns 892:23 905:14, 24 condition 1022:23 1045:5 conditions 904:14,16 913:1 948:14,15 949:4 992:2 1021:8 1022:11,13,17 1023:7,10 1027:6 1028:4 1041:15 1042:13 1045:6, 19 1055:13 confederacy 912:14 935:13, 14,17,19,23 936:12 confer 949:23 1034:5 confident 1045:18 configuration 1020:20 confirm 926:8 931:7 960:9 confirmed 926:2 943:3 conflict 913:14,22 936:2 confluence 995:21 confusion 957:10,11 congregate 896:14 conifer 993:3 1018:7 conifers 1013:9 1017:25	conjunction 920:6 connected 1039:15 connecting 890:1 connection 944:21 1025:15 connotations 963:22 conscious 1023:23 consecutive y 881:22 consensus 1043:21 1049:15,16,22 1050:9 consent 913:2 953:2,11 consequence s 913:13 considerably 1051:24 consideration n 921:10 considered 905:15 933:4 951:4 958:12 consisted 912:14 consistent 911:3 912:2 927:13 936:20 1022:9 1033:19 1038:9 constitute 882:19 884:16 constricta 1044:23 construction 907:4 consulted 920:25 contact 969:10 991:2	contacts 1009:24 content 967:11 contention 1040:16 context 896:8 914:15,22 935:19 950:10 951:3,12,17 1034:22 1045:2 contiguous 981:17 continent 975:1 Continental 977:23 continue 886:25 916:21 917:4 947:16,21 958:5 continues 932:10 984:14 991:5 continuing 907:13 980:17 contrasting 1025:8 contribute 962:3 1040:11 controlled 999:22 1000:3 1001:13 controlling 942:2 1045:13 controls 1021:1 controversy 1038:21 conversation 893:1,6,7 896:6 898:17 906:3,4 930:19 conversation s 893:4 930:11 conversion
--	--	---	---	---

<p>972:7</p> <p>coordinate 883:7,9 892:25</p> <p>copy 893:16 894:7 942:20 955:8 1037:10</p> <p>copyright 974:22</p> <p>Corbiere 942:16 943:24</p> <p>core 896:18 900:1,4,12,20, 23 901:19 911:3,16,23 912:2 915:5,7, 15,21 916:3,4, 23 917:6,13 927:13,20 930:23</p> <p>cores 1008:20, 24 1009:1,19</p> <p>Corps 967:21</p> <p>correct 880:16,17,20 881:2,23 882:22,23 884:5,6 885:19 888:8 914:11,12 921:23 923:4 926:3,15 929:15,16,20, 21,24 936:23 937:19,20 938:6 943:6 944:7,23, 24 945:3,18,21 949:1,5,8,11 959:2 966:25 970:7 973:5 1041:18 1046:4 1052:10 1054:14 1055:2 1056:21,24</p> <p>corrected 919:10 922:13 923:20 987:5 1026:8</p> <p>correctly 929:8 943:20</p> <p>corrects 966:19</p>	<p>cosmic 966:12</p> <p>Council 881:25 882:4, 12,14,17,25 883:6,11,20 884:1,9,12,19, 22,25 905:15 910:22,25 912:21 930:8,9 938:1 939:3,6,7 941:10 944:1</p> <p>Council's 882:3,5 885:24 892:13</p> <p>councillor 882:21</p> <p>councillors 882:5,19,24 883:1 884:14 899:14</p> <p>Councils 883:17 896:1,5 899:13</p> <p>Councils' 898:15</p> <p>counsel 879:3,10,12,16 880:7 884:4 888:25 890:19 907:22 908:2 918:7,21 928:2, 17,25 937:12 942:21 949:19, 20 951:22 952:25 955:21 956:16 958:7, 21,24 1034:16 1057:16</p> <p>counselor 927:25</p> <p>counterpart 938:18</p> <p>countries 961:17</p> <p>country 951:6</p> <p>counts 965:12</p> <p>couple 887:5 974:15</p>	<p>court 879:3,5, 16 880:6,14 886:15,23 887:16,20,23 888:7,11,19,24 889:4,8,15,21 890:5,11,18 891:5,10,24 894:12 897:22, 24 902:3,7 907:1,9 908:6 918:6,11,13 928:1,6 933:22 942:1 943:10 946:10 947:10 949:18,24 951:22 952:1,5, 9,12,21 953:17 954:1,3,8,24 955:4,12,18,25 956:5,12,21 957:1,3,11,15, 18,25 958:12,15 959:13,20 960:9 962:7,18,25 963:7,11 976:24 980:3,7 986:8 987:2,6 988:14, 19 1024:5,9 1029:2,7,10,22, 24 1030:17 1032:6,22 1034:9,13 1056:2,6 1057:14,20,23 1058:4,12,19,22</p> <p>courthouse 928:9</p> <p>courtroom 908:1 919:11 952:6,23 978:21</p> <p>cover 953:13 955:19 967:11, 16</p> <p>covered 977:11,17 992:1 996:6</p> <p>cracks 993:12</p> <p>creases 964:20</p> <p>create 920:3</p>	<p>created 965:18</p> <p>creation 910:2 920:17 950:22</p> <p>Creator 910:1, 4,13,20 911:8 944:21</p> <p>credit 934:20</p> <p>critical 932:4</p> <p>cross- examination 918:19 928:18 953:20 958:22 959:2 1034:14 1057:25</p> <p>cross- examine 958:21,25</p> <p>crosses 969:6</p> <p>Crown 886:2,8 892:8 950:16</p> <p>crust 982:17, 18,20,23,25 984:11 987:14 990:16 995:6 999:13</p> <p>crustal 984:3</p> <p>crystalline 969:9 990:5</p> <p>cubic 971:7,16 972:5,6 1025:13 1026:25</p> <p>cuff 1046:3</p> <p>culture 910:10,13 933:8</p> <p>curiosity 1058:9</p> <p>current 918:25 919:2,5 998:4</p> <p>curriculum 956:13,25 957:23</p> <p>customary 958:18</p> <p>cut 1005:21 1015:3 1028:14</p>	<p>cutting 1054:22 1056:1</p> <p>CV 957:4,12 960:7,15 961:1, 8</p> <hr/> <p style="text-align: center;">D</p> <hr/> <p>Dakota 996:8</p> <p>Dalhousie 1021:21</p> <p>dam 999:19 1010:24,25 1011:21 1012:4, 6 1013:1,3 1049:1 1050:18</p> <p>dammed 981:20</p> <p>damming 995:20 999:11, 19</p> <p>dams 1050:14 1054:15,20,23, 24</p> <p>dark 970:2 977:16 999:3</p> <p>darker 1008:2</p> <p>darkest 1047:2</p> <p>Darlene 939:8, 10</p> <p>Dartmouth 1042:6</p> <p>dash 1004:1</p> <p>dashed 969:11</p> <p>data 966:3,4 973:14 1009:17 1010:16,24 1022:10 1026:10,13,20, 21 1040:8 1041:20 1057:8</p> <p>database 955:13 956:18 985:19 1029:12</p> <p>date 965:19,20 1034:2</p>
---	--	---	--	---

dated 1017:8 1033:11	declaration 893:17,19,23 894:8,16,19,24 895:9,23 896:18,25 897:7 898:1,7,10 900:1,3,22,25 901:6 902:1 903:5 909:19 911:5,12,14,22 915:2,9,10,13, 15,23 916:8 917:3 921:1,6 922:6 927:2,5,9, 14 929:7,11 930:3,13,22	deliberately 1012:5	1030:21	924:8
dates 936:22 965:23,24 967:8 1017:9,22 1038:23	decline 997:1 1007:22	demand 933:22	descending 1031:4	die 1011:23
dating 964:4,6, 7,8,10 965:7,8, 22 967:6 1001:22 1035:17,19	declining 974:3 1020:24	demonstrate 892:20 902:16 914:17,23	describe 883:3 979:1 1032:3	difference 1035:18 1055:16
day 913:18 934:21 943:22 951:13 966:1 971:5,9	decreased 1046:10	demonstratin g 902:23	describes 967:22	differential 1051:9
days 887:5 889:19 895:22 1011:20,24 1018:2 1035:21 1049:14 1050:16	decreasing 983:9 1000:11	depend 1046:8	describing 916:16 988:25 1011:25 1012:25	differently 913:20
deal 892:23 961:7	dedication 920:14	depending 995:17 996:15 1007:21	description 895:7 917:16 942:8,9 1005:2	difficult 936:2
dealing 905:22	deep 976:13 978:13 996:5 1006:19,20,22 1009:18,22 1031:1,6,11	depends 938:13	descriptions 980:15	difficulties 906:25 941:20
deals 884:1	deeper 982:19 996:10 1051:24	depicted 994:17 999:1	desk 888:16 891:6	difficulty 928:15 954:2,10 1038:8
dealt 973:12	deepest 983:9 1002:3 1007:17, 25 1031:20 1047:3	depicting 987:9 1013:17 1016:23	destroyed 1010:20 1011:1	digital 975:8
death 964:20	defendants' 958:24	depictions 1038:3	detail 942:17 953:13	diminishes 951:8
decade 1001:5	defined 909:4 933:14	depicts 887:9 989:21 1012:22, 23 1013:5 1037:13	Detroit 973:3	dire 958:9,11, 14,17 959:13
decay 964:23, 24 1018:3,5	definition 1028:12	deploy 1051:22	diagram 968:2 969:5,16 971:16 973:12 976:1 982:16,21 983:12 987:9,10 989:10 990:25 994:17 995:12 1001:19 1004:9 1006:8 1007:1, 23 1010:2 1011:5 1014:22 1015:9,13 1017:17 1021:7 1023:13 1025:3 1027:18 1028:1 1036:11,15 1044:20 1049:5	direct 970:4 986:18
decide 934:13	deglaciation 983:18 984:17 985:14 1014:1, 24	deployed 974:6	dialogs 955:17 1004:16, 17 1016:2 1036:24 1043:10 1049:20 1050:10	direction 898:16 938:16 939:2
deciduous 993:14,15	delay 1029:4	deposited 965:19 969:13 1027:16 1041:23	dialogue	directly 900:6 957:5 972:18 975:4
decision 882:16 884:18 917:1		depressed 983:14 985:2,13 995:7 999:14 1004:3,6,7 1025:19		director 960:20,24
decisions 882:11,16 884:7,10,11 885:1 896:5 897:3 900:9 911:1,2,3 916:25 917:14, 15 938:16,17		depression 983:2,11,16,24 985:1		disarticulated 1020:5
deck 1018:4		depth 962:14 1005:8 1006:11 1010:15 1018:17,18		discharge 972:1 973:14 1025:6 1026:15
decks 1018:2				Discovery 985:17 986:14 1029:14,19 1030:2,16 1031:15 1032:1, 5,21 1033:15
				discuss 901:23 940:11 945:17 1004:10 1058:1

discussed 939:24 958:7	1029:12	1022:11,13,17 1027:8 1031:8 1037:17,19,20, 22,25 1041:24	1048:14	elected 881:12,13,21
discusses 961:8	documenting 1033:7	documents 946:14 957:9	easily 978:9	element 964:25
discussing 984:3	dodem 910:16	dodems 910:15	east 924:13,25 985:8 1015:12	elevation 975:15,17 997:11 999:9, 18,23 1004:5 1007:13 1008:8 1021:1,11,12 1030:24 1033:12 1046:10
discussion 895:24 899:21 948:10 959:10	domes 985:5	dominance 992:24	Eastcoast 1021:22 1042:17	Elgin 880:22
discussions 898:22 899:20 900:4 901:14,17 917:24 926:10 930:8,10,12,17	dominated 1045:3	duration 879:15	eastern 977:17 983:4,5, 6 1016:15	Emeritus 994:15
disintegrates 965:2	doubt 1050:11	dynamite 1012:4	easy 967:2 1026:23	empty 1011:6
dissipate 964:22	drain 968:13, 14,16	<hr/> E <hr/>	economic 962:2	encompasse s 963:24
dissolved 1027:25	drainage 967:24 968:13 971:20 972:21 974:25 988:3 1001:15	eagle 944:15, 17,19 945:1,3	edge 969:25 988:6,7,8 995:9 1005:10,15,19	encroachment t 947:24
distance 1046:6 1053:8	draw 969:11 1003:22 1045:9 1051:18	earlier 894:25 898:14 901:8,16 902:2 908:14 909:8 910:2 911:18 914:16 916:16 917:24 925:19 932:11 952:13 979:9 990:13 992:3 995:17 996:18 1014:25 1018:10 1020:21 1025:4 1046:13,16	edges 982:21 997:14	end 960:6 1010:12,15 1019:20 1043:24 1049:7 1055:4,13
distances 1048:5	drawdown 1026:18	early 885:25 1002:24,25 1016:16 1017:18 1019:2, 21 1034:21 1037:9 1038:25 1055:10	edited 1024:20	ended 906:2 1019:15
distinct 983:7	drawing 955:17 988:22	earned 909:3 931:23 933:19 934:1	edition 974:24 982:11	ends 1049:8
disturbance 908:3	drawn 975:20 976:7 991:20 1049:20 1050:10	earth 960:10, 16,21 963:16, 18,19,23 964:3, 8 974:24 975:4, 5,18,21 980:25 982:12,14 1013:1,3	editor 1023:15	Engineers 967:21
disturbing 908:1	drew 1000:25		editors 970:16	enlisted 974:7
dive 1051:20	driest 1037:22		Eerie 973:3 978:10 983:15	Ennis 918:9, 19,21
diver 1016:25 1017:4	drill 973:8		effective 882:8 883:7	ensued 930:20
divers 1033:1, 2	drink 934:21		effects 982:16	ensure 882:7,9 883:7 910:6 931:25 1029:2
diving 1018:22	drop 968:3,7, 14		effort 936:1	ensuring 911:17 920:20
divisive 892:18 914:20 916:1	drowned 1012:12,15		efforts 900:12	enter 948:9 995:16 1011:2
doctor 1030:6	dry 973:22,23 974:1 1000:17 1001:10,14 1007:8 1011:6 1016:7,16		Elder 904:5,7, 13 905:5 909:1, 12 933:3,17,18, 24 934:4,12	entered 894:1 949:14
document 886:14,16,17 887:18 893:17 894:4 943:8 956:6,10,24 957:5,20 962:5 963:1,5 986:23			Elder's 905:14	entering 1025:22
			Elders 903:19, 20,23 905:13 906:5 908:15, 24,25 909:7,10 925:21 926:17 931:12,16,19 932:12,14,19 933:9,10,11,25 935:7 941:9 945:7,10	

entertaining 923:17	1007:7,20 1008:8 1018:11 1031:5 1034:2	everyday 1028:9	exhibit 887:15, 19,24 888:2 890:2,6 891:22 892:1,3 894:11, 14,15 897:21, 23,25 921:25 922:23 926:9 943:8,12,13 953:14 957:13, 17,23 958:1,3 963:1,5,9 986:7, 10,11 987:1,4 988:17,20 1029:19,23 1030:1	experienced 937:14,22
entire 924:14 926:12	essence 900:24	everyone's 907:18	exhibits 889:22 988:12	experiencing 1043:13
entitled 897:6 970:15 974:23 986:13	essentially 926:1 1005:16 1013:6 1045:21, 25 1046:3	evidence 951:23 953:3,9 958:8,10,13,14 962:12 975:19 976:6 992:21 998:2,3 1009:19 1010:1 1022:19, 20 1023:6,18 1024:21 1027:11 1038:18,19 1039:13 1040:7, 8 1041:14,21 1042:24 1045:4, 10,14 1047:19 1058:1	exist 912:10 1002:2 1055:15	expert 940:5 953:7,18 955:21 959:14 962:8 963:9,14 994:16 1039:1 1047:11
entrusted 919:20	establish 1033:11	evolving 997:18	existed 993:1 1010:17 1037:21 1047:22	expert's 958:20
envelope 1026:14	estimate 965:11	examination 880:10 959:21 1024:4	existence 1010:12 1017:18	expertise 953:7 962:9 974:11 1039:4
environment 998:10 1028:5 1042:7	et al 974:23 980:25 986:13 989:20	examples 927:17 991:14, 16	existing 1000:1	experts 939:25 958:11 959:11
environment s 1041:24	etcetera 965:25 1016:6 1026:9 1057:4	Excellent 954:11	exit 981:12 1041:17	explain 882:3 955:16 960:3 961:10 964:7 972:11 982:5 987:8 1005:3 1030:13
episode 1029:14,19 1030:2 1032:1	Evans 889:25 898:21	exception 879:9 899:15	exits 973:1	explained 942:17 992:3 1035:17
epoch 1019:12,14,15, 21	evaporated 1043:2	excerpt 946:10 947:10 1030:17 1031:16 1032:6, 17,22 1033:16	expand 917:12,25	explaining 908:13
equal 927:4 961:16 984:25 1015:4	evaporates 968:9	excerpted 1029:15	expect 913:12 924:4,9,23 925:5 936:11 938:15 958:18 990:25 1024:2 1056:3	explanation 1043:14,15
equations 1014:18	evaporation 973:15,22 974:12 992:4	exclusive 922:9,18,24 923:9,13 924:14	expectation 936:17	explicit 912:10 913:20 1036:10
equilibrium 964:21	evaporative 992:2 1000:17, 18 1001:14 1004:7 1021:8 1022:18,25 1027:9 1043:11 1045:6	exclusively 922:8 924:17	expecting 924:2	explore 994:6
equipment 1018:23	event 1011:17 1049:17	exclusivity 886:4 892:12	experience 881:11 904:4,19 914:18 935:6,7 958:20,22 959:6 1021:20 1038:18 1050:13	explored 1051:14,15
equivalent 963:21	events 940:21, 25 941:5	excused 952:10		exponentially 1000:10
eroded 976:17 1047:4	eventually 968:5,7 973:4 999:16 1023:6 1055:21			exposed 975:16 979:15 1007:8,16 1020:25 1033:13
erodes 1031:13	evergreen 1013:10			exposure 979:12
eroding 1047:9				expressed 886:2 924:5 925:4 1005:22
erosion 1005:25				
error 965:11				
escarpment 969:17,18,24 994:1,3 1005:15,16				

expression 977:24	1021:11,12 1040:2	feedback 939:2	finally 915:9 1023:9	1011:8 1050:14
extend 919:24 988:1	falling 968:3 971:1 972:18	feel 904:18 908:2 935:2	find 902:6 990:25 991:9,11 1021:22 1041:16	floods 1011:23
extends 978:6	falls 947:12 968:10 1007:21, 24 1014:7 1031:3,10	feet 972:6	finding 1033:4	floor 907:5
extension 911:15	familiar 939:8 985:24 1038:16	fell 999:21	fine 935:20 954:17 1009:10, 14 1053:7	flow 900:6 962:15 971:2, 23,24,25 972:20 973:6,7,13 997:8 1025:6 1026:15 1048:20
extent 958:25 977:15,18,25	family 925:21	felt 930:24 934:24	finger 889:3	flowed 975:1 976:3 1007:14
eye 991:22 1018:22	family's 906:8	fields 964:2	fingers 978:6	Flowerpot 1005:10,12,19 1006:9,21 1008:21 1009:20 1018:18
F	fancy 1014:16 1015:22 1026:18	fighting 1033:3	finished 890:14 906:14	flowing 971:2 972:3 995:22 1007:19 1027:21 1053:25
F-R-A-N-C-I- N-E 954:21	farmland 1015:8	figure 907:3 917:11 967:18, 19 968:18,20 970:9,12 974:17 976:23,25 977:7,10 980:20,22 981:3 982:6,12,13,15 983:3,21 984:2 986:22 988:20 989:15 990:21 991:10 994:9,12 997:2,3 998:11, 12 999:1 1003:21 1004:13 1005:3 1006:3 1008:16 1010:7 1012:17, 18 1013:14,17, 18 1016:20 1019:10 1020:12,13 1023:25 1024:14,17,18 1026:4 1027:18 1036:11 1037:9, 13 1044:9 1048:4,7,8	Fires 912:13 935:12,14,16,19	first-day- back 888:12
facetious 931:22	farther 1046:9, 10	fish 912:25 935:15 947:20 1040:3 1041:8	firstly 893:11 898:11 909:21	flush 1001:7
facilitate 884:25 898:23 907:13	farthest 977:15,25	fished 925:24	fish 912:25 935:15 947:20 1040:3 1041:8	flows 910:12, 13,19 972:20,22 1053:17,18
facilitated 938:17	fastest 984:16	fishing 901:16 906:9	fish 912:25 935:15 947:20 1040:3 1041:8	fluctuating 997:23
fact 914:21 916:2 925:3 946:21 966:9 977:24 978:4 990:17 996:2 1001:9 1002:14 1016:14 1023:10 1033:9 1053:18	Fathom 1004:24 1051:15 1052:2	Fitzwilliam 1008:3,12 1046:17	fixed 964:23	fluctuations 1003:18
factor 974:13	fauna 1044:23 1045:10	flagging 1018:20	flagging 1018:20	flush 1001:7
factors 1000:16	favour 884:12	flat 987:15	flat 987:15	flushed 1000:20 1012:7 1019:6
Fahrenheit 1036:4	feather 944:15	flattering 942:6	flattering 942:6	focus 967:9
fair 933:5 934:2 937:13 941:11 961:4 993:11	feathers 944:14	figures 967:9, 12 982:5,7,10 986:3,20 994:13 998:25 1037:9 1044:4	figures 967:9, 12 982:5,7,10 986:3,20 994:13 998:25 1037:9 1044:4	focused 896:6 1016:3
fairly 978:9 988:2 993:2 998:7 1001:10 1047:16	feature 889:6 969:19 987:19, 20 988:1 1003:20	filed 885:17	filed 885:17	focusing 1021:7
fall 973:23 995:4 1001:11 1003:17 1008:7	featured 942:15	fill 1016:9	filled 981:17	fold 987:17
	features 987:11 998:10 1031:22 1033:1 1051:18	fills 984:11	fills 984:11	follow 884:24 890:7 909:11 1051:7
	February 894:2 896:4 899:4 921:1	Final 958:3	flood 1012:8 1049:13 1050:1	force 987:13, 14 1031:2 1046:24
	Feds 937:3		flooded 1000:23,24 1049:14	
			flooding	

forced 936:6	1008:22	funding	962:10 970:24	give 880:6
foreign 900:5	1019:25	1051:16	973:25 989:6	888:5 891:8
forest 992:18, 19,25 993:1,5, 14,15 1013:7,8 1015:2,6 1016:6 1033:5	1022:12,14 1039:23 1041:20 1042:5 1056:16,25	furthest 977:18	998:22 1004:19 1023:2,15 1029:17 1040:8 1041:15	897:15 905:11 919:24 934:20 953:9 979:17 1014:19 1023:24 1028:8, 17 1046:24 1058:16
forget 955:20	foundation 896:25 900:2 911:22	future 910:6 916:21 917:1 965:20	geologically 1050:12	giving 962:12 1001:23
form 885:10 930:8 962:19 964:4,15 965:22 969:19 993:5 1014:2	Fox 985:7	<hr/> G <hr/>	geologist 962:9 1009:15 1038:19	glacial 978:19 981:19 982:17 1010:12,13
formal 882:15	fractured 987:18	garner 909:6	geologists 1001:22 1035:23	glance 888:15
formalize 902:9	Francine 954:20,23 957:24 958:4 963:10	garnered 909:2 940:1	geology 963:20,21,23 968:25 976:4 1011:17 1047:5	glitch 879:5
formalized 895:23 900:25 901:1 902:1 924:3	free 979:3	gather 896:10 947:20	geophysical 1023:4	Goderich 891:16 895:14 903:3 922:5 1002:7 1039:20 1040:16
formally 1028:11	freely 912:17	gathered 925:24	Georgian 922:1 924:12,25 970:19 971:8, 14,22 974:2,6 975:12 976:9,16 981:10 991:6,8, 21,25 992:9 1000:8 1002:3, 7,12 1003:24 1005:9 1008:1 1015:12,14,19 1016:24 1017:8, 13 1018:25 1021:7 1023:12 1024:22 1025:6, 8 1031:6,19,21 1032:13 1034:3 1035:6 1041:22 1042:17,20 1043:16 1045:17 1051:1, 22	good 879:3,4, 21 880:11,12 890:6 897:1 901:9 903:13 904:8 911:2,17 913:5,24 916:1 918:20 928:13, 19,21 933:6 954:14 959:22 963:3 993:21 1018:10 1043:1 1048:5 1054:20 1055:25
formation 969:16 970:1 1027:19 1040:21	French 999:15 1000:1 1025:21	gathering 893:15,18 894:16 906:10 916:9,11 944:1		goodness 1036:22
formations 969:15	frequent 883:23	gave 925:19 932:11 934:14 942:11 943:24 946:25 1004:19 1055:7		Google 975:3, 4,18 977:9
formed 900:17 921:11	frequently 883:25 981:1 1005:11 1012:20	general 897:16 903:13 950:4 963:16 1034:16		goose 906:14
forms 962:15 964:1,16,18 1006:17	freshwater 996:2,3 1022:2 1042:9,12,14 1043:3	generated 966:11		gouged 1031:1
formulating 921:6	friends 887:5 941:18	generations 910:7 916:22 917:2 926:23		governance 903:6,11 912:8
forward 886:5 898:14 899:23 905:15 907:20 921:10 923:17 925:8 939:2 952:15 978:17	front 889:14 952:23 967:18 995:5,18 996:4 1053:23	gentleman 888:14 890:12 918:8 928:2		governed 909:18
fossil 962:13	full 895:25 896:3,4 899:12 950:7	geography 891:8 964:1	giant 1019:22, 24 1020:8 1054:9,10,11,23 1055:14,21 1056:25	GPS 984:19
found 953:9 962:16 985:19 990:20 991:13, 18 996:3 1004:21 1006:11	fully 925:5 936:11 950:11	Geoheritage 1052:14	gifts 913:6,8 914:3	grab 1038:10
	functioning 887:22	geologic 962:13 975:19 1011:24 1027:10 1040:7	Gilbert 893:5 895:5 898:23	
	functions 1014:17 1015:23,24 1022:14 1043:10	geological		

gradual 984:12 1050:8	grew 1017:3 1054:12	guide 917:1	hearings 910:2	highstands 1001:5 1002:23 1011:12 1017:21 1021:4 1027:5 1034:23 1035:13 1038:3 1049:20,24,25
gradually 982:24,25 984:10,11	grooves 1031:1	guided 900:3 910:17 911:1 915:20 916:24, 25 917:23	hearsay 1039:2	historic 902:22
graduate 960:21,23	Gros 1011:15 1047:22,23,24, 25	guides 917:15	height 975:8 1031:5	historical 896:8 912:11 962:14
grain 1009:8, 10	ground 899:23 902:1 915:6 917:19 968:5 973:8 988:4 991:19 992:13 1017:15 1018:11 1020:4, 5	gunpoint 936:7	held 893:2 899:6,7 902:10 903:2,3 1000:7	historically 910:25 916:19 935:13
grains 1014:5	grounded 896:18 900:8,11 901:19 916:4 927:20 930:22	H	helped 903:21	history 903:7, 14,16,24 904:1 905:8,20 921:14 925:20 931:6,8 933:2,4 934:3,8 940:14,24 943:18 946:15 962:10 975:21 978:18,19 980:25 982:14 996:14 997:6,18 999:7 1009:6 1020:17,21
Grand 930:9	grounding 902:24	half 965:1 1028:13	helpful 964:6 967:6 972:10	hit 889:2 1048:21
Grandfather 900:7 910:18 933:7	groundwater 973:6,7,10,18 1027:21,25	half-life 964:24 965:1	helping 898:23	hold 908:25 922:14
grandmother 904:20 934:15	group 900:16 901:21 921:9,12 936:3 938:25 939:4,21 940:9	Halifax 974:5 1042:6	hemlock 993:17 1015:6 1016:5 1017:24	holders 945:9
grandparents 903:19,23 908:18 926:22 941:8	growing 993:7 1012:14 1013:10 1017:14,15 1018:10 1022:12	Hall 974:22	herbivores 1055:24	holding 1010:25
graphic 967:14	grown 1033:14 1034:1	Hamilton 970:3	high 981:15 984:18 987:24 997:22 1005:6 1020:22 1034:25 1039:20 1052:16,23	Holocene 1016:16,18 1019:14,21 1042:11 1055:10,17 1056:12
grass 1015:7	grows 993:12	hand 886:17 890:3	high-level 953:19	Holy 879:23 954:15,17
great 902:7 925:14 961:4,7, 9,14,22,23,25 962:10,16 967:24 968:3,6, 9,15,16 970:16 973:11 974:9 978:8,23 981:7 983:10,11,19 996:21 1019:23 1020:16 1022:15 1023:3, 19 1027:15 1038:15 1042:25 1043:21 1044:18 1045:20 1053:12,14,15 1056:17	guess 956:13 968:11 979:15 1035:20 1046:7 1049:2 1054:11	happen 948:20 1026:23 1050:4	high-stand 1035:4,5,9	honestly 921:21 922:3 944:23
greater 984:20	guest 942:15	happened 906:18 907:4 983:18 1012:9 1027:1 1050:1	higher 1004:5 1007:12 1008:8 1035:9	honesty 896:23 917:7
greatest 983:11,16,17,23	guidance 1058:16	hard 963:22 969:8 990:5,9	highest 975:17 983:22, 23 999:10,18	honour 879:4,
green 926:14 968:1,6,11 975:14 1053:25		harder 944:12 991:16	highlight 976:6 978:3 983:20	
		harvesting 926:18	highlighted 959:5	
		hasten 1019:25	highlights 958:19 960:8	
		hatch 970:1	highly 1022:25	
		he'll 1058:16	highstand 1011:11 1035:1, 12	
		head 940:3		
		hear 907:19 928:12 929:2 946:6,7 949:20		
		heard 905:16 920:20 1052:20		

11 880:9 887:14,21 888:4 889:12,25 890:10 891:21 894:10 897:19 905:6 907:6 908:5 910:16,20 913:23 918:9 920:16,17 928:4 930:24 933:6 943:7 944:20 949:25 952:8 953:24 954:6 955:1 956:20 957:14 958:6 959:9,19 962:24 977:3 980:2,9 986:6,25 988:10 1023:22 1028:25 1029:6, 11,25 1034:4,12 1057:11,19,22	1043:25 1044:2, 11 1045:11,16, 19 1046:7 Hough- stanley 1021:6 Hough/lake 1027:7 hours 951:2 1011:20,24 1049:14 Hudson 985:8 1042:23 1053:17,25 1054:4 huge 996:13 1011:7 1025:11 humans 1038:15 1039:9 hundreds 965:20 hunt 912:24 935:15 947:20 hunted 925:23 hunting 906:9 970:15 1039:8, 14,24 1041:4,8 Huntsville 1015:11 Huron 895:15 919:18,24 920:5 921:20 922:1,22 923:6,23 967:22,23 970:19 971:8, 14,20,22 972:25 973:1,22 974:2 975:13 978:10 979:2,8,13 981:10,15 983:17 988:3 992:9,10 996:15,16,20 998:17 999:8,9, 21 1000:4,8,13, 21 1001:8 1002:4,5,10 1007:12 1011:3, 12 1017:20 1019:6 1023:12 1024:22 1025:7,	16 1035:4,9 1040:25 1041:1 1043:16 1050:6 Huron/ georgian 1021:2 hydrologic 1026:17 hypersaline 1040:23 hypothesize 925:2 1040:13 1041:3 <hr/> I <hr/> IAGLR 961:13, 21 ice 962:11 975:2 976:3,21, 22 977:11,17,22 978:2,7,12,14, 16,24 979:3,7, 14,22 980:18,19 981:4,6,12,20 982:17,22 983:8 984:8,10,13,14 985:5,7 990:12 994:25 995:5,7, 9,12,13,18,19 996:2,4 997:15, 18,19 999:11,19 1014:1 1020:23 1037:24 1038:24 1043:4 icebergs 981:21 idea 911:24 963:3 1028:18 1037:13 ideal 977:3 identical 931:17,20 identically 906:16 identified 901:22,24,25 906:16 922:5 927:2,5 969:2	994:22 1017:7 identify 886:8 899:19 900:15 981:23 989:17 1014:8 identifying 891:7 identity 910:11 ill 928:13 Illinois 1056:20 illustrate 971:12 978:22 985:4 990:24 1009:7 illustrated 991:10 995:11 1003:3 1025:5 illustrates 982:16 illustrating 983:4 987:10 1031:19 illustration 998:19 1006:9 1023:20 illustrative 897:14 image 956:13 975:3,4,19 977:9 978:4,22 981:1 984:6,20, 22 988:6,25 989:1,2,4,8,18 1003:3 1006:10 1008:17,18 1015:13 1033:18,19 1051:7 1052:8 imaged 1005:20 imagery 984:19 1030:20 1032:8,10 images 967:9 974:18,20 1008:25	1030:24,25 imagine 912:18 imaging 988:6 1029:17 immediately 985:14 1014:23 impact 884:2 importance 915:19 934:16 971:19 important 905:3 909:15 930:24 950:12 966:4 971:21 1003:4 importantly 903:18 943:22 impoverished 951:5 improving 883:13 IN-CHIEF 880:10 959:21 in-situ 1017:1 1018:8 1033:9, 25 Inaaknigewin 897:2 911:19 916:6 incisors 1054:19 include 926:19 963:25 included 967:10 1045:24 includes 961:23 1058:7 including 926:12 961:18 incorporated 964:17 independent 893:4 906:6,23 929:19 932:21
--	---	---	--	--

independentl y 932:18	Institute 985:18 986:15 1052:15	1037:23 1041:24 1042:3, 13,14 1045:6 1047:8	1025:18	June 881:13,17
Indiana 1056:20,22 1057:4	instructed 884:4	intervals 1000:19 1012:24 1034:25 1049:23	isotope 964:25	<hr/> K <hr/>
indication 1046:24	integral 917:21,22	intricacies 967:3	issue 892:12, 19 898:12,18,19 901:23 905:23 916:1,2 925:10 955:3,5 959:15 974:7	K-A-H-G-E-E 880:4
indicative 917:14	integrity 915:17	introduce 879:12 880:14 918:18 928:7	issues 883:23 884:2 914:20,21 920:7 939:12 961:25 980:13 984:6 1053:19 1058:8	KABP 1036:17
Indigenous 881:5 961:19	intended 914:9 955:10	investigation 1033:6	isthmus 1040:1	Kahgee 879:20 880:4,5, 11 881:1 885:13 887:6 888:21 890:2,22,25 891:20 892:7 893:20 894:4,19 897:4 898:4 903:4 908:11 909:16 915:8 918:3,20 920:25 927:23 928:20 940:10 942:10 943:13,16 946:9 947:9 949:16 950:3 951:21 952:10
individual's 958:16	intense 1003:1	invited 974:11	iterations 966:15	<hr/> J <hr/>
indulgence 955:2	intent 913:23	invoke 915:5	invokes 916:3	Jack 1013:20
infer 983:10 994:1	interact 955:9	involved 938:10,13,20,21 1039:9	invokes 916:3	James 985:8 1053:17 1054:1, 4
inferred 1043:7	interaction 923:14 994:22	ions 1027:22, 25	invokes 916:3	Jennifer 928:24
inflow 1026:8	interest 937:23 961:22	ipad 888:5 954:4,7 955:10 956:3 959:25 980:13	invokes 916:3	Jim 994:14
influx 1010:21 1011:7 1048:24	interested 1033:2	ipads 954:11	invokes 916:3	Johnston 939:8,11
information 904:10,11,12 909:10 924:23 941:7 943:17 945:16 950:8	interesting 904:1	island 886:11 891:19 893:5,24 895:5 898:18 899:7 922:12 923:8,10,22,25 929:14 969:22 970:5,6 977:24 991:7 1005:11, 13,16,19 1006:9,21 1008:3,4,6 1046:1	invokes 916:3	joining 879:14
informed 885:5	interests 882:10 883:12 884:23 901:12 937:18 949:14	islands 1011:9	invokes 916:3	joint 883:11,20 884:1,9,19,22 885:24,25 893:4 898:14,15 910:22,25 939:2,6,7
inherent 910:3,19 950:21	interim 956:3	isolated 1002:14,15,19	invokes 916:3	Joseph 893:5 895:4 898:22
initially 898:13 987:15 1042:18	international 895:15 961:9, 13,18	isolated 1002:14,15,19	invokes 916:3	journal 989:19 994:20 1010:9, 11
Innaknigewin 931:2	interpret 1009:16 1039:23	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	judge 933:21
inside 968:19	interpreted 1040:8	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	Julia 1057:18
instance 995:13 1006:16 1011:22 1013:12 1016:1 1019:3 1031:11 1036:25	Interpretive 988:21	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	jump 1047:18
instantaneou sly 1050:8,13	interrupted 973:17 1002:23	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	
instantly 1012:13,15	intertwined 950:22	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	key 969:15 1018:8
	interval 991:25 992:8,22 997:24 1006:23 1009:23 1027:3, 9 1031:8 1035:2	isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	keeping 1000:18
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	Kettle 886:10 891:16 895:1 899:16 922:15 929:12,19
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	Kettles 894:1
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	key 969:15 1018:8
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	killing 1040:10 1041:9
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	kilometers 987:21 988:2 1046:11
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	kilometres 891:15 1048:1, 11 1052:21,22 1053:3
		isostatic 983:1,2 990:12 997:8 1000:5 1001:13	invokes 916:3	kind 922:13 932:22 938:21 978:13 987:14 992:15 993:6 995:20 1055:22

997:22,23,25 999:7,11,21,22 1000:10,18 1001:24 1003:5, 7,8,16 1004:2,6 1005:22,24 1006:1,12 1007:5,7 1009:6,17 1010:2,3,5 1011:4 1017:11, 15 1018:13 1020:16,21 1022:21 1023:11,18 1026:1,2,19 1027:11 1035:1, 8 1040:7 1044:11	LIMNOS 1008:23 linear 967:2 987:19 1030:25 lined 991:11 lines 976:7 984:23,25 991:1 998:1 999:3,4 1023:18 linked 910:9 lip 1028:14 listen 935:10 lists 961:1 literal 1036:7 literature 1036:14 litigation 938:5 live 900:9 910:17 993:23 1042:1 lives 900:9 living 923:10 946:14,15 1019:22 1042:16 load 887:18 loaded 963:15 lobate 978:7 995:18 997:14 lobes 978:7,12, 13,14,17,24 local 940:20,25 941:1 locate 1005:12 location 928:10 989:23 1049:2,5 Lockport 969:16 970:1 Locks 971:15 long 881:15,18 907:3 912:23 934:9 952:12	960:13,18 987:22,25 992:2 995:8 1001:24 1021:15 1022:4 1023:1 1047:7, 12 1052:16 long-standing 912:11 longer 1002:2 1050:16 1056:3 1057:20 looked 890:14 914:16 1012:2 1025:4 1042:6 Loope 1010:10 1048:23 lost 889:18 965:12 lot 908:14 951:3 976:4 981:21 995:4 1015:7 1047:13 1051:21 lots 1021:19 1042:8 1045:17 1047:8 1051:2 loudly 907:14 Louis 977:19 low 997:12,22 1017:11 1018:13 1023:11 1024:21 1026:2 1027:12 1035:2 1039:18 1042:25 low-level 1002:2,10,11, 13,21 1016:8 1038:2 low-lying 976:15 977:21 low-stand 1035:5,10 lower 992:8 1005:24 1007:5 1008:9 1017:16 1022:22 1023:4	1026:19 1028:1 1035:11 lowest 975:14 981:12,13 983:22 997:9,12 999:12,13,21 1020:24 1022:22 1026:3 lowstand 1002:10 1003:2 1005:24 1006:23 1020:24 1023:6 1025:10 1027:7 1031:7 1035:3 lowstands 1003:1 1017:18, 21 1034:3,23 1038:3 1039:17 Lucas 1008:4 Luctin's 982:11 lunch 977:1 980:3 990:4	1021:9 1055:21 magic 906:19 966:22 main 959:1 972:17 975:13 992:10 1002:4,5 1017:20 1023:12 1024:22 1025:15 1035:6 1040:25 maintain 905:7 947:17 major 928:11, 14 969:19 972:23 973:15, 21 976:10 majority 971:13 make 879:22, 23 882:11 884:7 888:16 900:9 904:22 911:2 917:14 932:7,9 934:3 951:4 954:15 959:7 966:5 968:5,9 975:9,24 978:9 986:7 987:1 998:25 1018:1 1023:6 1026:23 1027:11,13,23 1036:9,14,16,20 1037:5 1038:9 1040:12 1044:17 makes 884:9 888:14 904:25 933:3 971:16 972:21 1022:24 1055:16 making 882:15 884:18 897:3 898:11 905:14 920:20 921:1 996:4,16 manage 960:5 managed 930:14 management
M				
M-C-C-A-R-T-H-Y 954:21				
Maawn-jigig-do-yaang 893:14, 18 894:7,15 897:7,25 929:7, 9				
Macandrews 1013:20				
Macdonald 1019:18 1055:1, 11				
Madam 907:10 918:13				
made 882:16 884:11 885:1 915:25 938:16 940:16 941:15 943:4 944:5,8 945:14,23 949:9 970:22 1018:4				

883:9 Manitoba 994:15 996:6 Manitoulin 923:8,10,14,22, 25 969:21 970:5,6 991:7 1002:6 1005:16 1039:20 1046:1 1053:8 manmade 966:9 manner 961:2 map 887:3,4,8, 9,24 888:2,6 890:13 891:23 892:3 897:5,6, 14 898:5 906:1, 13 924:12 925:22 969:23 975:8 1048:11 maple 1015:5 1016:5 maps 1045:22 margin 979:23 997:14,15 Marie 971:15 1000:25 1010:18,19 1049:3,10 marine 985:18 986:14 1021:23, 25 1028:5 1042:14 1051:19 1052:13 mark 888:6,14 955:16 963:4 969:11 marked 887:15 891:22 894:11 897:14, 20 943:8 953:3, 13 956:7 957:12 963:1 1007:2 marks 889:1 1032:25 markup 960:4	Mary's 1000:25 1010:20 1049:6, 8 masters 974:8 1013:19 1020:1 1021:18 material 963:24 965:5 982:19,24 984:9 1031:14 1036:19 materials 885:8 939:15,16 964:11,12 math 1037:2 Mattawa 999:16 1001:5,6 1002:23 1011:11,12 1017:21 1021:3 1027:5 1035:12, 13 1049:20,23, 24 matter 885:1 898:14 928:25 947:19 matters 884:2 885:2 938:14 Maurice 942:16 Mccarthy 952:2,17,18,19, 20 954:20,23 955:8 957:24 958:4 959:22 962:8 963:10,13 979:25 980:17 986:19 987:8 988:24 1024:1, 13 1028:6,24 1029:16,21 1030:4 1034:6, 15 1057:12 Mccarthy's 953:2,12 956:4, 11,25 980:12 986:12 1037:7 Mcrandall 887:21 1057:18,	22 meaning 942:18 means 907:14 917:10 948:4 969:18 971:24 972:2 975:7 1003:11 1048:16 1058:1 meant 905:14 935:24 1015:9 1055:15 meantime 956:5 measure 965:9 984:20 measured 1022:15 measurement s 984:18 1009:8 measures 970:25 971:1 media 885:12 medication 1014:6 medicines 906:10 925:24 947:20 meet 883:25 977:20 meeting 896:1,4 898:24 899:5,10 945:5, 8 meetings 883:22 885:7 893:1,2 895:21 899:2 meets 883:21 melt 995:4 996:13,15 1031:2 melted 978:2 1043:4 melts 968:7 982:22	member 880:15 881:24 935:13 961:13, 18 member's 945:1 members 935:17 945:4,13 961:16 memory 970:15 mention 928:8 1056:11 1058:6 mentioned 931:8 935:12 971:23 976:21 1012:14 1018:9 1046:21 1049:12 1050:25 1056:15 mentioning 973:18 messes 966:10 met 895:22 metabolize 964:21 metabolizes 965:6 meteoric 968:4 972:19 metres 971:7, 16 972:5 982:3 983:5 985:1,10, 11,12 987:24 1003:8,9 1005:21 1007:6 1017:12,13 1018:17 1025:13 1026:25 1052:11,15,16, 20,23 metric 972:7 Michael 1034:16	Michigan 969:23 970:17 978:10 981:16 983:15 1002:20 1010:19 1011:15 1039:12,15 1049:10 microfossils 1021:20 1022:5 1023:8 1028:3 1041:20,25 1042:15 1043:12 microphones 907:17 mid 896:2 mid-latitude 1016:14 mid-to 899:3 middle 986:21 1002:24,25 1008:4 1016:18 1017:19 1019:2 1042:10 1045:11 migrating 1039:25 miigwetch 951:20,25 Mike 1023:1,14 1024:20 1052:18 1055:11 miles 895:13 mind 920:14 mine 954:1 1011:22 mining 963:22 966:4 Minnesota 996:7 Minong 1010:13,15,16 minus 965:10, 14,24
---	--	---	--	---

minuses 972:24	money 1051:21,23	N	Nawash 883:20 886:10 891:4,12 893:24 895:4 899:14 919:6,7 931:9, 14	news 954:11 1011:21
minute 948:8 949:23	monitor 889:14	Nadoway 1011:15 1047:19,22 1050:5	near-shore 1021:23	Niagara 943:23 969:17 1005:15 1031:10
minutes 880:25 946:3 952:4 954:6,8 1024:3,8,9 1029:3 1056:5,8 1057:21	month 884:1	Nadoway- gros 1011:14 1019:4	necessarily 901:14 909:4 933:14	nice 987:17
missed 1034:21	monthly 883:21	months 920:10 959:17	necessity 958:17	nitty-gritty 938:22
mission 905:22	morning 879:3,4,9,21 880:11,12 918:20,22 925:19 928:19, 21 1058:13,20	naked 991:22 1018:22	needed 950:13 1055:23	non-acidic 993:24
Mississippi 977:20	mounted 1020:6	named 1001:20	needle 993:3 1013:10	nonetheless 953:14
Missouri 977:19,20	mounds 1020:2	names 1001:23	negative 992:3 996:25 1016:11	north 922:22 923:1,2,3,6,15 971:21 977:11, 17 981:11 983:4 984:21 989:21 996:8 999:15,17 1000:2,5,12 1001:1,9,14 1003:9 1011:3, 5,8 1016:15 1020:25 1025:23 1044:12 1050:6 1053:17,18,25
mixed 993:15 1013:8 1048:17	mouth 1010:19 1028:16,21 1042:8 1049:6,9	narrow 1040:1	negatives 972:24	north-south 1052:24
mno- maadziwin 900:11	move 886:5 891:6 907:20 970:8 989:15	nation 880:16 881:11 883:20 886:11,12 891:12,14,18,19 893:5,25 895:2, 4,5 899:8 919:1, 3,6 921:19 922:12,18,24 929:14 930:1 931:9,10 937:1, 18 941:1 942:11	negotiate 951:14	north-west 1052:25
model 1026:17	moved 948:4	National 1004:24 1051:16	negotiated 948:25	northeast 983:13,24 991:8 999:14 1025:19
modern 951:13 966:1 974:13 992:18 1005:5,22 1006:12 1007:6 1025:5 1026:8 1044:17 1050:14	mud 1048:17	nationality 961:19	negotiating 950:8	Northeastern 891:13 981:11 983:19
modifications 998:25	muds 1009:11	nations 883:17 885:21 886:7 887:10,25 888:3,22 890:23 891:1 892:4,23 893:11 897:12 899:18 901:11 922:7,8 923:10, 22 924:16,24 927:3 929:13, 18,19 940:20	negotiations 937:2,7,16 942:12 947:1,2	northern 923:11,23,24 979:7 981:9 983:16 1053:11, 16
modified 998:18	multi-beam 1005:7 1030:19	negotiator 937:14,22	negotiators 946:22 948:7 949:7,12	notch 1005:20, 21
moist 1016:7 1038:1	multiple 951:13 1030:21	negotiating 950:8	neighbors 885:15	notches 1005:1
moment 880:6 906:18 926:24 927:22 935:9 953:5 956:20 981:5 985:23 988:11 1030:11 1034:5 1057:11, 15	municipalitie s 937:3 941:2 949:19	negotiated 948:25	neo-tectonic 990:15	note 946:9 947:6,9 948:22 954:3 1003:5
moments 994:5	museum 1020:2,6	natural 966:11	Nerland 879:13	
	museums 1020:3	naturally 964:16	Network 970:25	
	Muskoka 1015:12	nature 995:18 1003:19	newer 1038:6	
	mysteriously 907:17			

1025:1,5,7 1040:6 1041:2	party 898:11 953:7	people 883:14 896:19 900:6,8 902:17 905:7 908:21 912:4 919:4 921:13 928:13 931:25 933:25 936:13, 20 945:12 946:20 947:1 948:6,20 950:16,22,24 951:16 954:10 963:20,25 974:3,5 1011:22 1023:16 1035:20 1037:2 1038:22,24 1051:20	persons 1058:7	pink 898:5
papers 970:13 998:16,24 1013:19 1024:19 1035:24 1036:25	pass 882:12,14 932:10	percent 905:17 1028:13	perspective 915:11,12 962:1,2,3	pinky 979:5,6, 11,20
paragraph 895:9,20 896:20 917:10	passed 903:24	percentage 1026:10	perspectives 1023:17	place 896:10, 16 897:1 899:22 905:25 909:24 911:24 912:1 920:9 921:15 932:16 946:16 1001:1 1053:22
paragraphs 915:2 916:15	passes 991:6	perfect 906:20 932:25	phase 978:15 1021:6 1022:21 1024:24 1042:3 1045:11,16	Plain 893:8 895:1
parameter 934:6	past 885:6 920:1 946:13	performed 925:25	phases 1002:22	plaintiff 949:20
parameters 927:12 934:10	path 899:23 900:10 933:6	period 920:9 979:2 992:2,14 995:3 1005:24 1037:19,21 1043:24,25 1047:15	Phd 960:10 1008:19 1021:21	Plaintiff's 879:12
parental 879:14	pattern 970:1 1000:10	periodically 1007:19	Photo 988:20	Plaintiffs 879:19
parents 903:20 908:18 926:22 941:8	patterns 969:3	periods 1001:24 1037:18	photograph 1016:22,23	plan 983:4
park 1004:24 1051:16,17,19	pause 886:15 988:11	permission 904:10 912:18 935:15	photography 977:14	planned 902:2
part 908:17 910:21 912:13 913:3 915:16 921:9 924:12 929:25 932:6 935:5 959:1 970:14 973:5 977:17 979:7 981:8,9,11 983:16,19 991:25 992:20 1033:24 1052:6	paused 947:6 948:22 1031:16 1032:18 1033:16	persisted 1001:24	physical 963:25 1015:21 1022:20	planning 952:13
Partially 943:21	PDF 986:19	permitted 925:25	Physiograph y 968:22	plant 1019:8
participant 1041:5	peak 1014:25	periods 1001:24 1037:18	picked 1040:3	plants 962:16 1015:17,18
participated 1040:5	pearls 909:14	permitted 925:25	picks 1015:17	plastic 982:19, 24 984:9
parties 894:18, 21 899:9 901:22 953:2 958:7	Pearson 974:22	permitted 925:25	picture 889:18 897:16 944:13 978:8 984:19 1020:20 1052:7	plausibly 1040:14,15
parts 906:11 960:3 978:16 1002:3 1007:17, 25 1031:21	PELLETIER 879:4,11,18 880:9,10 886:21 887:1,2,14 888:4,9,18,20 889:7,12 890:9, 17,21 891:20 892:2,6 894:10, 17 897:19 898:2,3 902:12 907:6 908:5,9, 10 918:2 949:22,25 950:2 951:21 952:3,7	permitted 925:25	pictures 991:17	play 884:19 921:5 931:24 945:24 946:2 947:7 1000:16
	pen 955:16	permitted 925:25	piece 940:2	played 946:10 947:10 1030:17 1032:6,22
	pencils 889:20	permitted 925:25	pieced 998:1	playing 1029:20
	peninsula 891:13 923:6, 12,24 924:13 926:9 950:17 969:21 970:4 981:23,25 1005:17 1046:1	permitted 925:25	pieces 905:1	plays 932:2
		person 907:25 942:1	pile 883:23	Pleistocene 1019:11,14,15, 16,21 1055:4, 14,17
		personal 920:15 1038:17 1039:1	piled 995:8	plopping 981:21
			pine 992:23,24 993:10,16 1014:24 1016:4 1022:10 1041:23 1045:2, 3	

plot 906:13	popups 987:11 989:13 990:20,25 1012:14 1050:23 1051:1, 2	pre-glacial 974:25 976:13	preserve 932:5	962:23 1056:7
plunge 1031:9, 11 1046:21,23 1047:9	Port 880:22	Precambrian 969:8 990:3	preserving 1041:7	proceeds 948:17
plunges 1031:12	portfolio 905:13	precipitation 973:14 992:5 1014:20 1026:13	pressed 982:19	process 899:18 900:14 906:21 931:13 955:24 958:6 1016:25
plunging 1047:8,9	portion 891:13 896:7 922:21 923:5,7,11,23 925:13 926:14	predicted 934:21	presume 1039:8 1053:21	processes 1015:21
pluses 972:23	positions 922:1 927:6	Predominantl y 908:16	prevailed 992:16	produced 966:21 1021:9 1026:17
pock 1032:25 1047:4	position 892:16 935:25	preexisting 1009:22 1010:17	prevalent 1013:2	producing 1007:20
pocks 1032:25	positions 892:8	prefer 879:7 918:15	previous 991:9 998:18	professor 952:2,16,18,20, 22 953:2,12 960:13 994:14 1034:15 1037:6 1057:12
podium 889:14 918:17	positive 1016:11	Prentice 974:22 982:12	previously 1013:20	profile 1009:17
point 886:11 889:18 891:17 894:1 895:1 899:16 922:15 972:4 981:22 983:22 1008:5 1041:9 1047:22, 23 1053:10	possibility 992:12 1043:8	prepared 939:15	primarily 1013:9 1018:6	program 966:14,16,19
pointing 988:7,8 989:9	possibly 923:17	presence 902:22 933:20, 23 944:22	primary 882:6	programs 882:8 883:8 960:21
points 939:24 1041:17	post-glacial 1051:9	present 882:19 896:5 899:14,17 904:6 906:5 913:18 914:2 921:2,16 925:9 935:24 939:4 945:2,5,8, 11 949:19 962:11 971:5,8 1013:4 1020:23 1022:6 1025:3 1044:21 1056:23	principles 896:12 899:25 901:20 911:2, 17,23 912:3 915:6,7,16,21 916:4,24 927:21 930:23,24	progress 956:21
political 961:24 962:1	posted 941:17	presentation 943:24 1004:18 1006:6	printed 889:24	progressed 885:11
pollen 992:20, 21 996:23 1009:3 1012:24 1013:22,24 1014:5,7,12 1015:16 1016:4 1022:9,16 1026:10,21 1041:20 1043:10 1045:3	postulated 1048:22	presentation s 940:14	printout 890:13,15	project 1021:18
pool 1031:9,11 1046:21,24 1047:9	Potawatomi 912:15 936:7	presented 885:10 900:21 939:20 958:12 1040:7	prior 926:20 958:7	prolonged 1005:24 1034:25 1035:2 1045:6 1047:7
population 918:25 919:2,5	potential 924:5 925:1 959:15	presenting 912:21	privy 930:10	prominent 932:2
popup 987:19 988:9 989:25 990:14 991:21 993:8 1052:11	potentially 1050:5		pro-glacial 995:6,14,15	promised 947:23
	pounding 1048:25		pro-graded 1009:21	promises 947:15 948:2,11
	powerful 915:4,24 916:3 932:13,20 936:10 943:24		pro-grading 1006:14 1008:22	promote 961:21
	pre-filed 955:12 956:6,10		problem 886:19 908:8 954:8	properties 990:9
			proceed 886:19 907:16, 24 918:11,14,15 954:13 960:2	

proposal 958:9 959:11	publications 961:2 966:2 994:14 1008:19 1020:15	<hr/> Q <hr/>	quote 1019:17 1055:11	1008:14
propose 959:7 962:7 986:6,25 1028:25 1029:18	published 970:14 989:20 998:16,20 1010:10 1012:21 1013:19,21 1015:13 1023:20 1024:19	qualification 958:6	<hr/> R <hr/>	rate 964:24 984:16 1000:11
proposed 898:11	pull 893:16 915:8 941:18 956:16,17 967:17 1037:6	qualifications 958:11,16 959:1 962:21	R-A-N-D-A-L- L 880:4	re-draft 1038:9
protect 884:22 904:12 910:5 920:21 937:18, 22 947:4,23 949:13 950:13, 17,21,25 951:2	pulled 956:24 957:3,8	qualified 953:8 962:9	radiation 966:12	re- examination 949:21 950:2
protected 882:11	punch 1023:21 1026:4	quality 883:14	radioactive 964:15,25	reach 898:16
protecting 919:21	punctuated 1017:21	Quaternary 1048:15	radiocarbon 964:5,7,14,22 965:3,7,8,18,19, 23,24 966:7,10, 18,21,24 967:4 1017:8,9,22 1033:11 1035:18,25 1036:13,22 1037:2 1038:5, 12 1044:14	reached 892:24 893:10 936:4 975:2
protection 883:12	purple 989:23	Queenston 969:20	radiometric 964:10	reaches 971:8
protectors 919:13	purply 979:5,6	question 890:19 906:3 929:4 932:24 950:1 1028:7 1037:3 1040:9 1043:20 1047:17	rag 1015:7	read 895:6 916:15 939:14 940:5,6 942:9 1035:23
protocol 916:15	purpose 896:16 912:22 914:1,2 916:13 943:16 950:19	questions 880:14 903:7 918:4,8 927:24 928:3,5 929:1 945:23 949:17, 21 953:18 963:16 998:9 1034:7,10 1057:13,17 1058:14	rain 968:7 970:25 972:19	readily 966:16 977:10
protocols 904:3 905:2 909:8,11 912:6, 10,19,20 913:4, 10,11,16,17,24 914:7,9,13 931:5,7,17 933:1 934:7,10 935:21,23 936:12	purposes 897:15 933:13 963:3 1024:4 1029:20	queue 1031:25	raise 886:17 907:23	readjust 946:7
provide 943:17,18 944:2 945:15,20 955:8 1004:22	pursuing 898:20 922:11, 14	quickest 1026:24	raised 880:18	reads 895:10
provided 942:20	put 890:6 913:1 922:13 952:24 953:1,6 955:13 979:16 1015:7	quickly 978:15 984:13 1001:2, 10 1011:19 1016:11 1018:5 1021:11 1026:19 1027:9 1038:10 1050:1, 2	Ralph 895:3 938:19	ready 904:18 905:1 953:22
Province 937:2	Putnam 968:22	quietly 907:25	ran 1015:24 1022:13	real 911:21 976:6
public 902:20 928:9	putting 1022:19	quorum 882:16,20 884:11,17 896:1,3,4,21 899:12,17	randall 879:20 880:3,5 942:10 943:13 946:9 947:9 952:10	realize 906:18
publication 994:20 1004:22 1006:7 1020:15 1023:14			range 884:1 979:18 1028:12 1055:7	reason 965:4 976:11 1015:13 1049:23 1050:7, 15,17 1051:10
			rapid 1010:1 1016:5 1048:20 1049:16,17	reasons 971:10
			rapidly 1011:2	rebound 983:2,7,10 984:4,12,17,20 990:13,16 997:8 1000:5 1001:13 1025:18 1051:9
			rapids 1007:21,24	rebounded 983:6 985:3
				rebounds 982:23 983:1
				recall 899:1,13 906:5 939:23 1003:6 1007:11
				received

940:8 1000:21 1030:23	recorded 1022:16	reflecting 1013:25	1016:3	964:5 965:23
receiving 997:20	records 941:13 1012:24 1041:24 1055:9	refuge 936:7	remaining 1027:13	966:3 967:7,8, 10,16 968:19 970:9 972:10
recent 964:12	red 984:23 1005:14	regard 924:25	remains 924:8 949:20	974:17 980:12, 14,20 985:16 986:2,4,12 989:14 990:21 994:8 998:12 1004:23 1012:17 1013:14 1033:20 1036:5 1037:7,10 1039:7 1045:24 1054:8
recently 1020:10	reddish 1009:9	region 962:17 970:16 982:1 1019:23 1022:15 1051:5 1056:17,19	remarks 941:15,17 943:4 944:5,8 945:14, 23	
receptors 1015:16	redirect 950:1	Registrar 879:21 880:1 887:17,19 891:25 892:1 894:13,14 897:22,23 943:11,12 953:22 954:12, 14,18,22 956:15 957:16,17 958:1,2 963:4,6, 8 986:9,10 987:3,4 988:15, 17 1029:23,25	remember 905:21 921:8 931:25 934:23, 25 944:25 1017:6 1025:11 1027:15 1032:15	reporter 907:10 918:11, 13 954:3
RECESS 907:7 980:5 1029:8	redraft 1036:15	regular 885:9 958:22	remind 879:6 911:6 959:16	REPORTER'S 946:9 947:6,9 948:22 1030:16 1031:15 1032:5, 17,21 1033:15 1044:8
recognition 933:12,24 941:2	reduce 951:7 1027:24	relate 904:19 931:8 955:5 1028:22	reminded 955:20	reports 939:25 940:5,7 966:6 1011:21
recognize 887:6 893:20,22 897:8 935:22 966:6 1023:9 1025:2	refer 895:20 926:18 929:10 938:22 1034:22 1035:20 1036:5 1039:7	related 938:14 1029:16	remnant 1043:5	repository 996:1
recognized 1021:19	reference 895:20 916:17 943:23 963:3 1029:20 1054:8	relates 909:19	remote 989:5	represent 913:14 914:21 937:1,8
recognizing 896:15	referenced 986:2	relating 903:10 912:7	remotely 1032:9 1051:12	representatio n 916:12
recollect 893:2 921:21 922:3 945:11	references 967:7	relation 886:3	removal 990:11	represented 892:16 899:9,11 926:13 937:5 992:19
recollection 885:23 906:7	referencing 895:8 922:25 926:17	relationship 883:16 906:7,8 910:7,9 932:17 946:18 947:5, 17,22 951:1	remove 968:25	representing 894:24 895:2 917:16
reconstruct 975:22 1009:4,5 1014:10 1015:9	referred 896:19 981:19 983:1 1014:25 1037:17 1050:23 1052:2 1054:25	relative 964:18 965:12 984:21 985:14 1000:6 1011:17 1025:19 1026:8	removed 982:23 984:11, 14 995:24	represents 887:9 896:24 944:20 968:2 1005:23
reconstructe d 962:13	referring 923:12 926:5,7 927:8 937:9 999:6 1006:5 1034:24 1036:13 1044:8	reliable 1015:15,16,22	render 896:5	reproduce 958:14
reconstructin g 978:18 1005:8 1030:20	refers 1003:25		rendering 882:15	reproduced 986:4 998:15
reconstructio n 1031:18	reflect 931:1		repeat 890:18 929:4	
reconstructio ns 1012:23	reflected 899:25 900:1 901:5 915:1,22 916:14 1046:14		repercussion s 913:15	
record 880:2 890:25 953:1,6 954:19 962:13 975:22,23 1022:16			repetition 931:24	
			report 953:2, 10,14 955:9 956:4,11 957:1, 2,6,18,22 958:3 960:3 963:14	

research 939:11,14,20,24 940:2 961:10,14 985:18 986:14 992:20 1058:8	911:10,13	1044:19	rot 1041:10	salinity 1028:13 1041:12,21
Reserve 880:19,24	responsibility 882:6 905:13 909:25 910:4, 12,19 911:6,11, 15 919:21,23 921:16 950:21 951:8	rights 881:5 882:9 883:12 884:23 927:4,6	rough 891:8	saliva 1028:15, 20
reset 954:4	responsible 938:25	ripped 935:2	roughly 891:15 893:15 896:2 919:3 991:6 1037:13 1048:1 1052:24	salt 1027:20,21 1040:22 1042:25
reside 880:21	rest 896:11 904:24 922:23	rise 1000:10,11 1001:3 1003:16	routinely 977:8 982:10	saltwater 1022:1
resins 1018:1	rested 896:11	rising 1000:8, 13	ROV 991:17,23 1051:22	salty 1021:15 1022:3,7,24 1027:14,20,23 1028:8,10,12, 15,16 1040:19 1041:6 1043:2, 5,13
resistant 1018:1,3	rests 911:11	river 972:14 973:2,3 976:10, 13,14,18 989:22 999:15,16 1000:1,25 1010:20 1025:21,22 1026:9 1049:7, 8,9 1051:4	Royal 1020:2	sample 1017:1
resolution 884:10,12 1005:6	resume 1057:23	rivers 975:1 976:2 977:20 1007:18 1008:2 1025:22 1026:9	ruling 959:8	sampled 1017:7
resolutions 882:13,14 884:13,15,16	resuming 907:8,11 980:6 1029:9	road 928:14	run 966:19 972:1 1052:24	samples 1033:7,9,10 1045:14
resolve 886:5 925:6 980:13	retreat 978:2, 14 979:22	Rob 898:21	running 895:14 959:25 970:3 1053:11	sampling 1017:4
resolved 892:15 924:8	retreated 978:5 979:14 981:6 999:20 1014:2	rock 963:22 969:7,12,15 975:22 990:8,17 991:1 993:7 1027:20 1031:13 1040:21	runs 969:19 991:4 1052:25	sanctity 920:22
resonate 912:4	retreating 978:17 995:1	Rockies 977:18	rush 1050:4	sand 1006:18 1022:12
resource 914:19	return 980:11 989:14 1018:20 1029:5	rocks 964:11 969:2,9,13 987:23 990:2,3, 5,6 991:3,12 993:10,12,22 994:3 1034:2 1048:14,17,18 1054:5	S	sandy 1006:15,21 1009:10
respect 896:13 905:5 909:3,6,12,13 913:9 914:7 916:21 917:5 927:1,6 930:3 933:9,12,20,22, 24 934:5 936:15,18 985:11,12	returning 988:24	role 883:5 884:18 919:13, 16 921:5 931:24 932:3 951:8 961:11	Sable 977:23	sanctity 920:22
respected 913:12 933:16	review 942:21 953:19 958:19 960:7 984:5 1024:2	roots 993:21 1017:3 1033:25	sacred 905:4	sand 1006:18 1022:12
respective 883:24 892:23	reviewed 942:24		sacrifice 920:14,15 951:11	Sarnia 972:25 973:1,20 1000:6
responded 990:11	ridge 1039:15, 21,22 1040:17		sad 1011:21	satellite 984:19
response 1013:22 1051:9	ridges 1006:11,14 1007:2 1008:22 1009:21 1045:20		safeguard 910:6 915:17 920:22 950:25 951:9	satisfied 962:20
responsibiliti es 882:3 883:3 909:22 910:23	right-hand 1016:21		safeguarded 882:10	satisfy 1058:9
			safeguarding 919:21	Saugeen 880:15,19,24 881:11,12 883:3,4,19 884:20 886:9 891:14 895:3,21 896:2 897:12 899:3,13 918:25 919:2 921:19
			sake 918:10	
			sales 948:17	
			salina 1027:19 1040:20	
			saline 1027:20 1040:24	

922:24 923:6 924:13,25 926:9 931:9,11 937:1, 17 940:20 941:1,16,18 942:11	science 961:24 963:18, 20 964:3	1031:14 1032:13	set 904:14 907:2,12 927:14 928:23 946:5 954:7 956:3 982:8	sharply 1031:5
Saugeen's 881:25 882:25	sciences 960:10,16,21 963:16,23 964:8	sedimentary 969:13 987:12 989:11 990:6 991:3,12 1054:5	sets 982:6	sheet 977:17 978:2 979:14 981:4 985:6 995:1,5,9,12,20 996:2 997:15, 18,19 999:11
Sault 971:15 1000:25 1010:18,19 1049:3,10	scientific 962:2 1049:16	sediments 969:1 1009:4,6, 9,11 1013:22 1014:4 1022:6 1041:22 1042:2, 7 1048:16	seventh 966:15	sheets 975:2 976:3,22 978:16 980:19 995:7 1014:2 1043:4
savviest 946:21 949:7	scientist 1035:21	seek 904:12 935:15 937:22	Severn 1051:4	Shelf 977:23
savvy 947:2 948:6 949:12	scientists 998:2,22	seeking 904:7, 11 909:9 912:18	shade 979:8	shield 969:6,7, 8 990:4 991:3, 13 1051:3 1053:21 1054:3
SC0141 1029:13	Scotia 977:23	seep 904:12 935:15 937:22	shades 979:11	shift 1016:15
SC0143 886:14	Scott 938:19	seeps 973:8 1040:23	shallow 996:10 1009:18, 20,23	ship 1008:23
SC0147 893:17	screen 886:18 888:15,24 889:13 890:7 941:24 944:11 955:9,14 956:7, 14 960:2,4 962:6 963:14 967:17 979:5 980:16 985:20, 24 1030:10	sell 1014:6	shallower 1004:2	shore 895:14 1022:2 1028:4
SC0152 985:20	screens 886:22 888:8	senior 883:9	shallowest 1031:21	short 907:1 944:2 1000:19 1022:4 1024:1 1029:16 1035:13
SC0153 986:24	scroll 941:23 942:7,25	sense 892:13 904:22,25 913:21 915:24 933:10,18 1022:24 1023:24	share 890:15 902:17,20 903:8 904:5,6,10,15, 25 908:12 909:10,14 912:2 931:21 932:8,15 934:5,6,11,13, 14 935:8 936:19	short-lived 1001:7
SC0155 956:24	sea 1028:12,17 1042:19	sensitive 1003:14,18	shared 887:4 895:7,16,18 896:9 897:7,12, 16 898:1,5,6 899:22 901:15 902:18 904:24 906:6 910:3 911:25 914:6 916:17,19 922:6,7 923:9 925:13 927:10, 13 930:4 931:16 932:8,22	shortly 984:13 1020:24
SC0156 956:11 957:22	season 995:2	separate 929:20,22 932:19 975:12 1002:6 1039:19	shape 1008:11	show 886:13 887:8 888:8 889:9 897:5,10 902:21 913:9 952:24 968:23 978:22 981:3 1007:23 1020:18 1029:16 1030:5, 24 1044:4 1055:23
SC0157 943:9	seats 907:20	separated 957:9 1002:19	share 890:15 902:17,20 903:8 904:5,6,10,15, 25 908:12 909:10,14 912:2 931:21 932:8,15 934:5,6,11,13, 14 935:8 936:19	showed 1051:7
SC158 962:5	seawater 1040:24	separating 1046:3	sharper 1009:25	showing 886:21,24 887:25 888:3 892:4 897:6 925:23 968:24 977:11 979:12
scale 897:15 1048:10	seconds 946:3	September 941:15 942:13 943:4	sharing 896:12,15,23 900:22 901:5 905:5,18,20 906:15,21,22 916:21 917:4,7 926:11	
scales 1037:1 1044:14	section 926:9 991:20 1032:20	series 973:23 974:1		
scan 890:3	sectors 985:7	serve 881:15		
scar 988:7	sediment 975:23 976:20 995:20 1006:15 1008:20,22,24 1009:1,8,10,11 1010:24,25 1011:20 1014:3, 8 1017:4	services 882:9 883:8		
Scarborough 976:11,12,18		session 921:3		
scarp 969:18 989:11		sessions 905:17,18		
schools 940:14,18				

981:5 989:9,10 997:4 1005:4 1008:20 1023:13	sill 999:23 1000:2 1001:14 1003:9 1045:13	situation 996:25 1004:8 1043:9	soil 969:1 993:23,25	891:14,15,17,18 912:1,12 922:4 977:18 979:10 1020:9 1040:17
shown 971:4 977:15 1008:1 1046:13 1052:9	Simcoe 976:15 989:21 991:11	size 1009:8 1054:12	sold 948:16	south-east 1052:25
shows 886:18 897:11,12 974:25 979:9 983:5,7,8,9 989:22 1003:6 1017:18 1049:5 1055:25	similar 898:20 922:11 930:3 933:23 1018:19 1028:4 1042:4, 15,16 1043:8	skeletons 1019:24 1056:15	sole 919:20	southeastern 1049:7
shriveled 1043:5	Similarly 1002:25	skim 940:8	solemn 879:23,25 954:16	southern 887:10,24 888:2 891:23 892:4 969:10
shut 1026:24	simple 951:7 1000:9	skip 944:12 1032:19 1054:8	solid 993:5 998:7 1027:20	southwest 983:13 984:1 1025:20
shy 907:23	simpler 1036:15 1044:17	slabs 1032:11	solution 889:5	space 902:23 920:15
sic 936:22	simplest 999:25	slices 977:14 1012:22	SON 883:17,18 884:4,7 885:15, 17,20 892:22,24 893:10 898:10 911:9 912:6 915:15 923:9,22 924:14,18 925:12 929:12, 20 930:14 942:13	span 964:13 1036:20
side 952:23 986:22 987:20, 22 989:1 998:13 1004:25 1016:21 1048:16	simplicity 915:3 932:14	slight 998:25 1003:15	SON's 903:6, 16 909:18,22 910:22 911:10, 13 915:11,12	Spanish 1025:22
signal 1030:23	simply 904:2 973:12	slightly 993:24 997:3 1004:4 1007:12 1022:3, 7,23 1023:7 1027:14,23 1028:8,10 1043:13	small 934:14 935:1 955:3,4 971:18 1015:14, 15 1016:2 1021:19 1022:5 1040:16 1041:25 1048:17	speak 891:5 893:15,18 894:16 907:14 908:6 916:9,11 929:3 932:23 940:18,20,24 941:5 944:22 945:19 946:15 1044:16
signatories 894:22,23 895:18 917:22 927:3 930:13	single 996:1,5 1008:5 1027:1	smaller 886:22 1021:17 1040:20	Soo 971:14	speakers 942:16 946:5,7
signatory 922:7	sir 879:21 889:5,21 890:14 891:5 902:3 907:22 927:22 928:1 951:23 952:9 954:9 955:6,19 956:18 957:19 958:15 959:4 962:23 976:25 1029:3 1034:13	smooth 987:17 995:19	sort 886:25 908:7 963:22 975:9 978:11 979:5,14 987:25 999:4 1013:7	speaking 901:7 935:7 944:22 963:19
signature 894:3	sirens 928:12	snow 972:19	sought 936:7 937:18 949:13 950:13	special 941:15 943:17 998:16 1020:16 1023:15 1024:20 1040:6
signatures 901:4	sisters 911:25 931:14 936:8	snowflake 968:7	sound 1030:11 1032:2	specialize 881:4,5
signed 929:12	sit 893:1 904:4 931:15	social 885:12 961:24	sounds 943:6	species 1018:7 1042:16
significance 895:19 902:13, 15 915:10,13,14 916:7 920:12 932:16 934:16 1007:3	sites 1045:17	socioeconom ic 962:2	soup 1021:14	specific 901:13,17,18 914:1 927:18 930:17 940:1,2
significant 901:3 1003:20 1046:23 1047:13	sits 891:12 933:22	soft 1032:13	source 941:6 973:19 996:21 1027:2 1038:10, 11	
	sitting 928:8 931:12 932:14 934:12	softer 969:12, 14 990:6,10 991:3	sources 972:17	
			south 885:15, 21 886:9 887:4	

specifically 886:3 900:14 905:21 921:8 924:20 927:8,20 930:5	979:7	1020:9	12,13,15,22 925:22 926:11, 17 931:25 932:19	struggling 936:3
specificity 927:19	stand 879:13 919:9 922:13 923:19	stating 912:21		student 1009:16 1020:1 1021:18
specifics 927:11	standing 952:5 1008:9	stations 971:1	story 904:20, 23 910:3 934:24 935:3,5 948:21 950:23 975:25 996:18 997:7,25 998:6,24 1001:12 1022:4 1045:18	student's 1023:8
speed 1050:3	stands 997:22, 23 1001:24 1019:2	statistical 965:9 1014:18 1015:22		students 1008:19 1014:8
spell 880:2 954:18	Stanley 1001:20 1002:9, 15,18,25 1003:2,11,20 1004:2,4 1007:12,15 1016:9 1017:20 1018:25 1022:21 1023:11 1024:23 1025:16 1027:7 1035:7,12 1039:18 1046:2, 7	status 943:19 945:17 1021:9 1024:24 1043:16	stove 1021:14	study 974:6 1014:8
spent 939:11 1023:2 1051:23	start 879:6 889:9,17 898:17 909:24 948:3 956:9 960:23 967:15 968:20 970:11 997:1 1030:10,14 1032:4	stay 1057:14	straightforwa rd 956:17	stump 1017:2 1018:16 1033:18,23
spike 965:17 966:9	started 886:4 979:3 1014:2,3 1019:16 1033:3, 4	Staying 989:13	strata 987:12	stumps 1017:6,10,12, 23,24 1018:6 1033:5,9,21,22, 25
spirit 896:15 913:23 914:8 920:15,17,22 934:17	starting 879:8	Ste 971:15 1000:25 1010:18,19 1049:3,10	strategic 884:24	style 963:23
spirits 920:17	starts 964:22 1053:3,11	steadily 974:3	strategically 883:10	sub-basins 1002:6,16
spoke 921:3 929:6 931:5	state 880:1 914:2 954:18	steep 1007:21	stream 934:18, 24 971:2,23,24, 25 972:3,20 973:13 1003:18 1008:5 1025:6 1026:15	sub-marine 1051:17
spoken 917:8 934:10 1028:7	statement 933:3 934:3	steeper 1008:12	streaming 995:5	subaerial 975:16
spokesperso n 883:5	statements 949:10	stem 1020:23	streams 971:3 972:22	subaqueous 1051:18
spot 902:6 1005:11 1009:22 1046:17	stated 938:8 949:3,6	step 951:24 952:9	strength 892:17,19,20 896:23,25 911:22 914:17, 21 917:7 935:25	subject 938:4 958:9 998:8
spring 995:3 1040:2	state 880:1 914:2 954:18	stepping 920:19	strict 965:1	submerged 1033:4,5
squeezed 982:25 984:9	stated 938:8 949:3,6	Steve 1004:18 1006:6 1032:15, 16	strictly 963:19	Submersible 988:21
squeezes 982:20	statement 933:3 934:3	Steven 1030:6	strip 895:12	subsequently 985:3
St 973:2 977:19 984:21 999:17 1000:25 1010:20 1049:6, 8	statement 933:3 934:3	sticking 989:11 994:3	strong 936:11 992:24	subside 982:18 1050:2
staff 907:24 944:15,18,20 945:1,2,3	statement 933:3 934:3	stipple 1003:4	strongly 1045:3	subsidence 984:3,7
stagnation	States 961:15 970:22,23,24	Stoney 891:17 894:1	structure 988:9	substance 1034:19
		Stony 886:10 895:1 899:16 922:15 929:13, 19	structures 989:25 990:15	substantially 1035:11
		stop 952:13 1044:6		successful 930:15
		stopped 907:17		
		stories 906:7,		

sudden 1010:21 1011:17,23,24 1021:3 1048:23	supposed 935:9	talk 951:2 1002:16 1010:4 1036:25	955:3,4 959:24	terms 919:12 921:6 939:25 989:2 994:23 1009:17 1015:20
suddenly 1011:1,6	surface 968:25 973:13 1031:12 1032:14	talked 899:21 901:15 906:9 947:13 995:17 1010:2 1020:21	techniques 1014:16 1015:23 1023:4	terrain 1007:18
sufficient 1027:25	surge 978:17	talking 886:4 921:22 933:11 934:23 947:14 948:3 980:18 991:10 994:5 1032:15	technology 888:12 906:24 907:25 960:6 991:23 1005:6,7	territorial 885:14 912:8
sufficiently 1027:8	surprise 958:23	tall 993:2	tectonic 987:14	territories 885:22 886:8 888:23 890:24 906:17 914:14 925:22 926:2,8 930:4
suggest 1010:16	surprisingly 1017:10	tamarack 993:17 1017:24	teeth 1020:5,7 1054:21 1055:23 1056:16	territory 883:13 884:3,23 895:7,18 896:7 897:8,11,13,17 898:1,6 901:18 905:23,25 906:1,8,11 911:10,13 912:17,22,23 913:8 915:17 916:17 920:2,3, 8 922:7 923:1 926:12,13 927:2,4 930:14 932:16 935:16 947:18
suggested 1022:6	surrounding 1046:2	tap 973:10 975:22	television 887:22	Teller 994:14
suggesting 1039:24	survey 970:24 973:25 989:6 998:22 1004:19 1023:2,15	tapped 975:4	telling 906:12 925:21 968:20 970:12 975:23 982:7 1008:17	telling 906:12 925:21 968:20 970:12 975:23 982:7 1008:17
suggests 1010:24	survive 914:9 1055:23	tasked 900:18 921:11,15	tells 992:21 1014:22	temperature 1014:20,21 1026:13
suited 1054:21	sweet 902:6 934:20	taste 934:18, 19,20 1028:15, 21	temptation 1058:10	ten 880:25 883:22 890:13 908:16
sum 971:6	switch 985:20 1019:8	tasted 1028:19	test 1040:15	testate 1022:5 1028:2 1042:1 1044:20
summary 961:5 962:6 963:9 1044:7	switching 997:13	taught 908:11, 21 909:17,21 910:19 912:5 913:7	testified 929:11	testify 962:22
summer 1014:20 1026:13	Switzer 942:17	teach 934:15 960:12 978:19, 21	testifying 1057:7	testimony 953:12 1025:4 1034:20 1037:17 1046:16
superimposi ng 1024:21	SWORN 954:23	Teaching 900:7	tens 982:3 1003:9 1046:11	tenure 893:3 925:7
Superior 971:20 981:9 1000:20,21,24 1001:8,16,17 1010:14 1011:1, 7 1019:7 1025:12 1027:4 1048:25 1049:8 1050:5	synthesizing 961:2	teachings 900:10 910:14, 16,18 933:7 982:10	term 881:18 972:9	terminology 1034:21 1035:17
supervisor 1013:20	system 972:13 976:10 1051:5	team 956:3	term 881:18 972:9	textbook 974:23 976:2 980:24 982:9,14 1037:15
support 936:1	<hr/> T <hr/>	tear 1028:20		
supported 1040:15	table 885:3 1036:12	tears 1028:19		
supports 936:5	tables 883:24	tech 984:18		
suppose 1041:17	tailings 1011:22	technical 906:25 941:20		
	takes 907:3 1053:22			
	taking 1033:7, 8			

Thecaomoebi	912:13 913:13	1017:22 1019:5	1024:16	transmitted
an 1044:20	918:3 920:14	1046:8	1048:12	933:2
theme 943:21	922:11 923:16	timing 1024:4	topic 989:13	transmitting
thesis 974:8	926:20 929:2	tip 923:24	1041:12	931:6
thick 976:19	930:7 932:12	969:21 1005:17	topography	trap 947:20
993:4	933:19 934:1	title 885:17	975:7	treat 931:19
thickness	935:2 937:6	887:3 891:22	Toronto 974:9	Treaties
977:11	938:3 939:19	895:12 921:18	Toronto's	940:15,21,25
thing 928:13	949:9 950:8	922:9,18,21	928:11	943:22 946:12
951:15 965:8	957:8 964:13,23	923:17 925:13	total 972:13	951:3,6
993:9 1003:22	965:1 966:12,20	938:14	Townshend	treaty 926:6,7,
1018:8 1026:24	972:4 976:25	titled 893:17	952:3,15 953:4,	13 936:6,9
1040:13 1058:6	977:3,13 979:2,	tobacco 904:9	15,16,24	940:11 941:2,7
things 911:20	6,9,13 980:1,4	914:10	traces 1041:20	942:18 943:23
915:3,20 917:20	981:6,13,14,22	Tobermory	track 890:20	944:9 947:12,16
932:4 939:5	982:3 991:25	923:8 1053:3	983:25	949:1,4,14
947:19 952:24	992:8,11,14,17,	today 903:8	traditional	950:9,15 951:13
964:17 965:8	25 994:2,25	908:12 914:9	945:8	tree 1017:1,2,6,
978:3 1015:4	995:3 996:13,23	918:3 919:11	traditions	9,11,23 1018:16
1034:20	999:10,11	920:11 929:6	903:6,10 909:20	1022:10 1033:5,
1036:14 1037:5	1000:19	931:5 935:12	transactions	9,18,20,22,23,
1038:10	1001:25	949:19 950:19	951:7	25
1044:17 1045:1,	1006:15 1007:4,	951:10,20	transcribed	trees 993:2,3,4,
8 1058:5	9 1009:21	952:13 967:13	946:11 947:11	6,17,18 1012:13
thinking 935:2	1011:10,24	974:13,14	transcript	1013:10,11
thought 888:9	1012:11,22	976:10 978:21	1052:19	1015:3 1018:21
904:21 1001:16	1013:2,8	984:15,17	transcripts	1033:13
1042:23	1014:11,25	991:19 992:19	953:25	1054:22 1056:1
thoughts	1018:21,24	993:15 994:4	transfer	tremendous
1001:4	1019:11	996:3,12 1011:9	1014:17	920:13 1038:21
thousand	1020:22 1021:3	1015:3 1028:5	1015:23,24	trenches
977:15 978:1	1022:8 1023:1,	1035:8 1036:25	1022:14	938:23
979:9 997:5	23 1024:5,7	1041:1 1043:17	1043:10	trend 976:14
thousands	1027:10	1049:12 1053:4	transferred	1051:8
1043:3	1033:12 1037:1,	1058:9	896:16	Trent-severn
threw 1043:7	17 1040:4	told 920:18	transition	989:22 1051:5
thrown	1042:10,13	932:1 935:4	992:18 993:13	trial 879:15
1015:17	1044:14	950:16	1013:7 1015:1	889:23 953:3
thundering	1047:10,14,15	tolerant	1016:5 1055:21	1058:1
1008:14	time-lapse	1022:13	translate	triangles
till 969:1	977:14	tolerates	915:24 1035:24	989:23,24
1048:17	timeframe	1022:11	1036:3,4	trickled
time 879:8	965:21	tomorrow	translated	1050:17,18
886:1 892:10	timeframes	1057:24	1030:23 1038:6	tricky 1037:4
896:3 898:18	927:18	1058:13,20	translates	true 949:10
905:18 907:2	timeline	top 889:10	893:15	950:18 1054:17,
908:15 909:2	926:16	940:3 969:5,17		21
	times 881:21	971:15 975:11		
	883:25 884:1	976:8 980:22		
	936:2 941:5,18	1009:10		
	977:12 978:24			
	992:11 995:15,			
	16 1013:25			

truer 933:18	ultimately 973:3 1019:7 1054:22	understood 933:15 1041:13 1048:19	upstream 1049:3	version 890:2
Trust 948:18	unable 930:18	undertake 899:19	usual 907:15	versions 977:9
truth 879:24 917:17 944:20 954:16	Unceded 891:12 895:4	undertaken 900:14	<hr/> V <hr/>	versus 1011:18
tundra 1014:24	unclear 959:10	underwater 982:1 988:5 989:4,8 991:14, 15,18 992:13 1005:17 1017:14 1039:22 1051:6	valley 976:13, 14,17,20	vertebra 1054:18
tunnel-like 988:1	under-told 932:13	undo 889:5,7	values 896:18, 22 899:24,25 900:1,4,12,20, 23 901:19 902:24 911:4, 16,23 912:3 915:5,7,16,21 916:3,23 917:6, 8,14,21 927:14, 20 930:23 936:20 1014:19	vertebrate 1057:3,9
turn 889:13 931:4 940:11 963:14 967:8 982:4 985:15 990:21 994:8 998:11 1006:2 1012:16 1013:13 1019:9 1024:13 1029:12	underlying 1031:12,13	unexpected 952:12	variations 966:12,20	video 941:16, 22,24 942:20, 22,24 943:2,3, 13 945:24,25 946:10 947:6,10 948:22,24 1024:1 1029:3, 13,20 1030:1, 12,17 1031:16 1032:6,17,22 1033:16 1046:12 1047:2 1052:5,6
turned 906:4 1026:21	underneath 979:9	unifying 935:25	vast 971:13	view 897:17 915:19 916:5 951:6 983:4
turning 1041:12	underpinning s 914:8	unique 906:5	vasts 1041:7	viewed 914:20,22
turns 950:18	understand 888:10 910:2 924:18 929:3 940:13 941:14 963:17 967:13 975:24 988:11 990:20 1034:22 1042:18 1047:21 1054:16	unit 972:4	vegetarian 1055:24	viewing 1030:12
tweak 966:16	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	United 961:15 970:22,23 1020:9	vegetation 992:15 1012:10, 23 1013:1,23 1014:11,13,14 1015:9 1055:13, 22	views 950:6 958:10
tweaking 998:24	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	unity 892:21 901:7 902:19 916:12,13	vegetational 1055:20	visible 991:22 992:13 1018:22 1019:2,3,5 1047:1
type 939:25 964:10 993:7 1033:22	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	universal 933:8 936:14	vehicle 989:6 1032:9 1051:12	visited 1005:11
types 916:24 990:2,8,17,18 998:3 1033:20	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	universally 1043:19	vehicles 1051:14	visual 1008:25 1032:10
typically 885:1,11 896:9 908:23,25 913:3 921:13 939:24 1042:5	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	University 928:10 960:12 970:17 974:8 994:15 1004:20 1021:21 1039:12	verbatim 1019:16	visualize 975:6
<hr/> U <hr/>	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	update 885:9 942:12 943:18 944:2 945:20	verification 905:25 906:21, 23 932:21	vital 956:13,25 957:23
U.S. 936:7 967:20 972:6	understandin g 886:1 892:8, 10 896:17 899:22 901:6,15 902:9,18,25 903:13,22 904:8 909:5,11 911:18,20,25 912:4,9,16 914:6,24 915:6, 19,23 916:5 917:20 921:14 922:10 923:13 925:16 927:9,12 931:1,3 932:15, 18 934:5 935:14,23 936:15 941:12 943:20 944:19, 23 946:17 961:22 967:3 998:4 1037:5	upfront 965:15	verified 932:18	voice 901:7 907:23 916:13
Uhm-hmm 1045:23 1046:15 1047:20	understands 920:11,13	uplift 983:18 990:12 1000:6	verify 988:13	voices 905:16 920:20
		uplifting 1000:7	verifying 905:10	
		upper 964:16 966:11 970:16		

voir 958:9,10, 14,17 959:13	warm 995:2 1015:2 1016:7	1035:1,2 1041:6 1042:7,19,23 1043:13 1044:1, 25 1046:8 1047:3,8,13 1048:21,24 1050:4 1051:11 1052:11,17 1053:11,14,17, 18,19	western 981:8 996:7	918:10 1037:16 1051:13
volume 998:16 1020:16 1021:17 1023:16 1024:20 1027:24 1040:6	warmer 1013:11		wet 974:15 1015:2 1016:17	wood 1017:1
vote 882:21 884:12,13,14, 15,17	wash 1020:4		whereabouts 1053:20	Woods 996:12
Voyage 985:17 986:13	washed 1018:9		whips 969:22	word 879:8 1026:18
<hr/> W <hr/>	watch 900:10		white 968:12 975:16 993:20 1009:12	words 901:4 949:2 983:8,14 984:16 1013:23 1019:20
	watched 948:25	waterfall 1008:13 1046:14,18,25 1047:16	Wicander 980:25 982:14	work 883:10 884:21 886:19 890:2 900:18 907:12,15 938:8 939:1 970:14 973:25 1030:5,7 1040:15 1048:3, 6 1052:18 1055:1,3
	water 896:13, 15,17 904:21 910:1 919:14,22 920:2,4,10,18, 19 921:4 934:16,17,18,21 962:15 968:3,4, 8,11,12,14 970:25 971:2,7, 13,22 972:3,11, 12,13,14,15,16, 17,18,20 973:1, 6,7,9,15,21,23 974:2,9 981:12 982:3 989:3,12 992:1,3,9 994:6, 24 995:1,4,8,15, 22,25 996:6,13, 15,18,19,21,24, 25 997:1,8,19, 20 998:9 999:7, 9,20 1000:1,3,7, 13,18,20,21,23 1001:7 1003:7, 15 1006:19,21, 22 1007:13,21, 24 1008:8,9 1009:5 1010:21, 25 1011:2,7 1012:6 1016:10 1017:13,15 1018:15,17 1019:6 1020:16 1021:1,17 1022:3,7,20,23 1023:5 1024:25 1025:8,12,13, 20,21,23 1026:1,6,19 1027:2,3,11,13, 23 1028:8,10, 13,17 1030:21 1031:2,3,12,23	waterfalls 1047:11	wide 895:13 1028:12 1046:6 1048:11	work- arounds 890:5
	wait 928:1 948:7	waters 903:11 909:19,23 910:5,8 911:7 915:18 919:12, 17,24 921:19 925:14 932:17 1009:20 1021:13	widely 990:14 1013:21	worked 881:8 939:5 941:9 1020:1 1038:20 1039:12
	walk 888:15 920:2,8,9 933:6	wave 1005:21 1049:22	Wiikwemkoo ng 923:16	working 886:20 888:16, 24 900:16 901:21 903:13 907:17 921:9,12 938:23,25 939:4,21 940:9 953:25 954:1 998:21 1023:3 1029:4
	walkers 920:10	ways 901:3	willingly 904:17	workshop 1040:5 1041:5
	walks 920:12	weakness 892:17	wind 1015:17	world 915:19 916:5 946:16 994:16 996:3
	Wallach 989:20	website 967:20	Winnipeg 996:11	wrapping 993:21
	walls 987:19, 22 1052:16	websites 970:22 971:11	Winnipegosis 996:11	write 1023:17 1025:1 1036:9
	Walpole 886:11 891:19 893:5,24 895:5, 22 898:18 899:7 922:12,17 929:14,18	wedge 914:20 916:2	winter 1014:20	written 885:7, 10 941:12,13 1036:19
	wampum 942:18	weed 1015:7	Wisconsin 1057:5	wrong 879:7 1001:1 1005:2
	wanted 899:22 902:8,16,20 905:24 946:22 947:3 950:20 951:1 960:7 976:5 978:3 1034:20 1035:16 1037:5	week 941:3 954:3	wisdom 909:15	
	wanting 909:10 974:4	weight 982:17, 22 984:8,10,14 990:12 995:7	wish 959:15	
	war 936:1 1012:5	weird 1042:22	wishes 958:21	
		welfare 882:7	withdrawal 1038:24	
		well-known 964:9 973:13	witness' 953:7 959:6	
		west 922:5 970:4 985:8	women 919:13,17,19 920:1,8,19,25 921:2,3,9,16	
			wonderful 954:2	
			wondering	

wrote 1040:6
1041:2

Y

YBP 965:24

year 920:1
961:17 973:23
997:5 1009:15,
16 1040:2

years 881:20
883:22 903:18
904:24 908:15,
16 939:11
948:1,12 951:13
960:17,19,25
964:13 965:3,4,
19,20 966:24
967:3 973:23
974:1,15 977:15
978:1 979:9,17,
18,21 981:6
985:17 986:14
992:7,15 997:24
998:4,6
1006:24,25
1007:9 1010:22,
23 1016:1,17
1018:12
1019:15,16,20
1025:9,14
1027:8 1036:6,
12,20,22,23
1037:14,21,23
1038:1,12,13,
23,25 1039:11
1040:10 1042:4,
11 1043:3,18
1044:22
1049:19
1050:20,21
1055:5

yellow 926:8
1031:20

Youtube
941:17,22
943:14

Z

Zelda 887:20

zone 992:23
1014:24 1016:4
1022:10
1041:23

zones 1013:24