APPENDIX D

Part 3 Recreational Angler Fish Consumption

1 INTRODUCTION

This Appendix summarizes the recreational fish consumption data collected for Section 33 Human Health Effects Assessment. Data were collected from secondary sources and supplemented with two surveys, a Fish Consumption Dock Survey at the public docks of Peace Island Park and Halfway River Boat Launch, and on-line Fish Consumption survey with the North Peace Rod and Gun Club. This appendix provides findings of the secondary source review and the two surveys. It also includes the objectives and methods for completing the surveys and copies of survey questions. This information contained in this appendix was used to inform the baseline on fish consumption for the Human Health Assessment.

2 EXISTING INFORMATION

Published information from a study on freshwater sports fishing in British Columbia indicates that in 2005 the total number of days fished in the Peace Region was 69,350 and total reported anglers were 6,140, indicating an average of 11.3 days fished per angler for this year (GSGislayson 2009). Of the 152,000 fish caught, over 34,000 were kept, for a release rate of almost 80% (Table 1). Based on this information, approximately one fish was kept for every two days spent fishing, indicating that on average, 5 fish per angler for this year were retained. In 2010, approximately one fish was kept for every 1.8 days spent fishing. These results indicate a relatively low fish retention and consumption rate.

Table 1 Peace Region sport fishing summary, 2005 and 2010

Summary Statistics	Peace Region	% of British Columbia Total
	2005	2005
Active anglers(no.)	6,140	2.3%
Angler days	69,350	1.7%
Average days fished per angler	11.3	NA
Total fish caught (no.)	151,920	N/A
-Total fish kept (no.)	33,760	1.9%
-Total fish released (no.)	118,160	1.9%

NOTES:
NA – data not available
SOURCES: adapted from GSGislayson (2009)

According to the same study, the number of fish kept by species in the Peace Region in 2005 is shown in Table 2. Of the approximately 34,000 fish kept in 2005, nearly half were trout.

Table 2 Peace Region Fish Kept by Species, 2005

Species	Number of Fish Kept, 2005	Percent of Fish Kept, 2005
trout	15,770	46.7%
walleye	8,610	25.5%
northern pike	5,240	15.5%
perch	2,610	7.7%
Arctic grayling	900	2.7%
whitefish	410	1.2%
Salmon (non-tidal)[a]	120	0.4%
other	100	0.3%
Total	33,760	100%

NOTE:
[a]Anadromous salmon are not known to be present in the Peace Region
SOURCE: GSGislayson (2009)

Data from the 2008-2009 Peace River Recreational Fishery Creel Survey (LGL 2010) were utilized to estimate retention of fish caught in the Peace River watershed by species. Artic grayling were the most commonly retained fish, followed by mountain whitefish, rainbow trout, walleye and northern pike (Table 3). To estimate the average number of fish kept per individual for this annual period, the total annual harvest (1,192 fish) was divided by the number of active anglers interviewed for this survey. The average number of fish retained during the 2008-2009 year was 5.52 fish per angler (Robichaud 2012).

Table 3 Annual retention of eight sport fish in the Peace River watershed, 2008-2009a

Total Fisherpersons Interviewed[b]	Arctic grayling	bull trout	burbot	goldeneye	mountain whitefish	northern pike	rainbow trout	walleye	Total
216	522 (179)	4 (3)	0	0	390 (255)	52 (27)	170 (63)	52 (56)	1,192 (324)

NOTES:
[a] Catches are rounded to the closest whole number. Standard errors in parentheses
[b] Only interviews conducted with individual anglers were considered, resulting in a sample size of 216 persons
SOURCE: Robichaud (2012)

Other studies indicated that the most common sport species consumed from the Peace River by local fishers and First Nations are lake trout and rainbow trout. Arctic grayling and mountain whitefish are consumed infrequently, while burbot are rarely encountered in the river (Pattenden 2010; 2011). Sport species such as walleye and goldeye, burbot and yellow perch are more common in the Peace River downstream of Site C (Pattenden 2011).

3 SURVEY DATA COLLECTION

Information on fish retention by recreational anglers from the Peace River and its tributaries can assist in understanding fish consumption; however; this information is not well documented in secondary sources. A dock survey and an online survey were implemented to gather information on fish catch, retention and consumption from the Peace River and its tributaries.

3.1 Methods

3.1.1 Dock Survey

A dock survey of recreational users was conducted at Peace Island Park on September 1, 2012 and the Halfway River boat launch on September 3, 2012. A short questionnaire was designed to collect data on the species and quantity of fish consumed by the age of the consumer (Attachment 1). Recreational users were randomly approached by an interviewer to inquire if they were willing to complete the survey. One interviewer spent eight hours at each location collecting data..

3.1.2 On-line Survey with North Peace Rod and Gun Club

An online survey was conducted between October 24 and November 23, 2012. Golder contacted the three rod and gun clubs in the Project area to inquire if their membership would be interested in taking the survey. The survey was implemented with the North Peace Rod and Gun Club. A link to the web-based survey was posted on the North Peace Rod and Gun Club website. Survey questions asked whether specific species of fish were caught, retained, and eaten (Attachment 2).

4 RESULTS

4.1 Dock Survey

Twenty-three responses were received during the random dock survey conducted at Peace Island Park and the Halfway River Boat Launch. Results indicate that rainbow trout were kept by the most number of anglers (8 of 23 anglers interviewed) (Table 4). Ten of the 23 respondents indicated they released all of the fish they catch.

Table 4 Average number of meals of fish consumed per year by species

Species	Number of Anglers Keeping Fish	Average Number of Meals of Fish consumed Per Person Per Year	Locations of Fish Caught
bull trout	1	0.3	Peace River
lake trout	0	0	N/A
Artic grayling	2	0.67 [(a)]	Murray River
rainbow trout	8	2.4	Peace, Murray, Pine, Halfway Rivers
mountain whitefish	1	0.67	Lynx Creek
walleye	2	1	Charlie Lake
goldeye	0	0	N/A
burbot	0	0	N/A
pike	0	0	N/A

NOTES:
n=23 interviewees
[(a)] One respondent reported retaining one Artic grayling per week which, due to the small sample size, inflated the average fish consumption per year. The outlier was removed from the sample.
NA – not applicable
SOURCE: Golder Associates (2012)

4.2 Online Survey

The online survey response rate for the North Peace Rod and Gun Club was very low (n=3) and, as such, information on the number of fish caught and retained is not reported in Section 33 Human Health Assessment. However, of the responses received, respondents indicated that they did not retain more than one fish per month per species (bull trout, lake trout, Artic grayling, rainbow trout, mountain whitefish, burbot, and pike).

5 REFERENCES

5.1 Literature Cited

GSGislason & Associates Ltd. 2009. *Freshwater Sport Fishing in British Columbia: Sending Ripples through the Provincial Economy*. Prepared for: Freshwater Fisheries Society of BC. Victoria, BC.

LGL Limited. 2010. *Peace River Angling and Recreational-Use Creel Survey 2008-2009 Final Report*. Manuscript on File at BC Hydro.

Robichaud, David. 2012. *Effect of Age on Fish Retention in Peace River Recreational Fishery, 2008-2009.* LGL Consulting Ltd. Manuscript on file at Golder Associates Ltd.

Pattenden, R. 2010. *Site C fisheries studies Peace River fish inventory – 2009*. Report prepared for BC Hydro by Mainstream Aquatics. Edmonton, AB.

Pattenden, R. 2011. *Site C fisheries studies Peace River fish inventory – 2010*. Report prepared for BC Hydro, Vancouver BC by Mainstream Aquatics, Edmonton, AB

Golder Associates Ltd. 2012. *Dock Survey: Data collected for the Site C Clean Energy Project Environmental Impact Statement*. Data on file at Golder Associates Ltd. Burnaby, BC.

ATTACHMENT 1
Dock Survey

Site C Clean Energy Project

Recreational Fish Consumption Survey

On behalf of BC Hydro, Golder Associates Ltd. is completing a Human Health Assessment, as a component of the Environmental Assessment for the proposed Site C Clean Energy Project.

The objectives of the Human Health Assessment are to assess potential project effects on human health, and if potential effects are identified, identify potential mitigation measures to address effects.

For the Health Assessment, we are currently gathering information on the amount and type of fish caught and consumed from the Peace River and its tributaries and would like to ask you a few general questions in this regard.

All information we obtain from you today will remain confidential and anonymous.

What is your gender? ☐ Male ☐ Female

What is your age? ☐ Under 14 ☐ 15 to 20 ☐ 21 to 40 ☐ 41 to 60 ☐ over 60

Considering only fish caught on the Peace River and its tributaries, to the best of your knowledge, please fill out the table below:

Species	Total Family Consumption Frequency (# of meals)		Average number of portion consumed by each person per meal (approximate size - palm, hand)						Average weight of fish caught (if known)	Location of Fish Caught (name of river/lake)
	per week	per year	1 -4 yrs	4-11 yrs	12-18 yrs	Adult male	Adult female	Pregnant or breastfeeding female		
Bull Trout										
Lake Trout										
Arctic Grayling:										
Rainbow Trout										
Mountain Whitefish										
Walleye										
Goldeye										
Burbot										
Pike										
Other _____ _____										

Do you eat any other part of the fish such as roe or liver? If so, how much and from what species?

_____

_____

ATTACHMENT 2
Online Fish Consumption Survey

Fish Consumption Survey

On behalf of BC Hydro, Golder Associates Ltd. is completing a Human Health Assessment, as a component of the Environmental Assessment for the proposed Site C Clean Energy Project.
The objectives of the Human Health Assessment are to assess potential project effects on human health, and if potential effects are identified, identify potential mitigation measures to address effects.
For this health assessment, we are currently gathering information on the amount and type of fish caught and consumed from the Peace River and its tributaries and would like to ask you a few general questions in this regard.

All information we obtain from you today will remain confidential and anonymous.

1. Do you retain and eat fish caught in the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

2. Do you catch, retain and eat Bull Trout from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

3. Approximately how many Bull Trout caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

Fish Consumption Survey

4. Do you catch, retain and eat Lake Trout from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

5. Approximately how many Lake Trout caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

6. Do you catch, retain and eat Arctic Grayling from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

7. Approximately how many Arctic Grayling caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

Fish Consumption Survey

8. Do you catch, retain and eat Rainbow Trout from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

9. Approximately how many Rainbow Trout caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

10. Do you catch, retain and eat Mountain Whitefish from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

11. Approximately how many Mountain Whitefish caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

Fish Consumption Survey

12. Do you catch, retain and eat Walleye from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

13. Approximately how many Walleye caught in the Peace River and/or its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

14. Do you catch, retain and eat Goldeye from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

15. Approximately how many Goldeye caught in the Peace River and its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

Fish Consumption Survey

16. Do you catch, retain and eat Burbot from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

17. Approximately how many Burbot caught in the Peace River and its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

18. Do you catch, retain and eat Pike from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

Fish Consumption Survey

19. Approximately how many Pike caught in the Peace River and its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

20. Do you catch, retain and eat any other fish from the Peace River and/or its tributaries?

- ◯ Yes
- ◯ No

Yes (please specify)

21. Approximately how many of the specified other fish caught in the Peace River and its tributaries do you retain and eat?

- ◯ one per year
- ◯ 2-6 per year
- ◯ 7-11 per year
- ◯ one per month (12 per year)
- ◯ two to three per month
- ◯ one per week
- ◯ more than one per week

Thank you very much for your time.