APPENDIX C

Part 4 Harvest of Fish and Wildlife Resources

1 INTRODUCTION

This appendix provides additional baseline information on the harvesting of fish and wildlife resources in the Peace Region (i.e., fishing, hunting, trapping and guide outfitting). For fishing, specific consideration is given to the fishing resource base, license sales, fishing activity, angler expenditures and the angling profile for the Peace Region. For hunting, specific consideration is given to hunting and season limits, license sales and hunting activity. For trapping, specific consideration is given to trapping activity and harvests. For guide outfitting, specific consideration is given to the guide outfitting industry and quotas and harvests for guide outfitters. The purpose of this appendix is to support Section 24 Harvest of Fish and Wildlife Resources of the Site C Clean Energy Project EIS.

2 FISHING

For this baseline, fishing is defined as an activity that users value and undertake as a recreation experience. Anglers may be participating in fishing only, or they may be fishing in conjunction with other outdoor recreation activities, such as camping and boating.

Anglers may be from the local area or visitors from outside the region. A distinction between resident anglers and non-residents anglers is made to identify the proportion of activity classified as tourism. Anyone who travels more than 80 km from home is considered a tourist, while a person travelling less is classified as a resident angler.

Any reference to the fishing “industry” is in accordance with the definition by BC Stats and the B.C. Ministry of Environment (BCMOE). These are establishments that sell directly to anglers, including angling guides and charters, resorts and fish camps, boat rentals and marinas, retail outlets such as tackle shops, transportation companies and the hospitality sector (e.g., hotels, campgrounds, restaurants). Establishments engaged in manufacturing and wholesaling that sell indirectly to anglers are not covered.

Typically, but not exclusively, packages that include angling guide services, air transportation and accommodations are purchased by tourists, although many tourists are self-sufficient and unlikely to hire a third party to package the fishing experience. Tourist anglers would be the primary client base of the guided fishing and lodge sector in the Peace region. Resident anglers would not be purchasing packages but would be buying major equipment such as boats. Both groups are assumed to purchase rod and gear, gasoline, rentals and miscellaneous services.

2.1 Fishing Resource Base

As indicated in Table 1, the fishing resource base in the Peace Region can be divided into three habitats: large lakes and reservoirs of greater than 400 hectares, small lakes, and river and streams. The large lakes are all located in the northern areas of the region in the Northern Rockies Regional District along with Dinosaur and Williston reservoirs. There are many small lakes in the sub-region, and they are predominantly in the Liard-Fort Nelson area. Northern pike, walleye, Dolly Varden and Arctic grayling are the main sport species. The stocked small lakes are usually replenished with rainbow trout. Major rivers include the Peace, Pine, Sukunka, Halfway, Beatton, Murray, Muskwa, Prophet,

Fort Nelson, Liard, Kechika, Turnagain and Sikanni Chief. Arctic grayling, Dolly Varden, mountain whitefish, rainbow trout, northern pike and inconnu generally occur throughout. Rainbow trout is limited to the Peace River, Dinosaur and Williston reservoirs and the Halfway River and its tributaries.

Table 1 Fisheries resource base in the Peace Region

Large Lakes and Reservoirs	Productive Small Lakes	Stocked Small Lakes	Mainstream River
5	50	16	1,935 km

NOTES:
The Peace region includes the Peace River Regional District and Northern Rockies Regional Municipality. Stocked means stocked within the last three years.

SOURCE:
Hammond (1980)

Popular fishing lakes in the North Peace include Charlie Lake, Inga Lake and Cecil Lake. There are also a number of popular fishing lakes in the South Peace including Sundance and Quality lakes. Moberly Lake, which formerly produced trophy-size lake trout, has been under a recovery management program since 2002, with a fishing ban instituted in 2005. Of the 55 lakes and streams in Northeast B.C. listed in BCMOE's Spring 2011 Stocking Summary, 13 of the 21 lakes and streams that are stocked are in the Peace River Regional District (RAA). They are Boot, Boulder, Chunamun, Heart, Inga, Iver, Moose, One Island, Pete, Quality, Stewart, Sundance and Wright lakes (BCMOE 2012a).

The Peace River and its tributaries support angling for a variety of sportfish including lake trout, northern pike, walleye, Arctic grayling, bull trout, rainbow trout and mountain whitefish, lake whitefish, kokanee, goldeye, and burbot (GSGislason 2009; LGL 2010). Tributaries within the LAA, or entering the LAA, that support angling include the Moberly, Halfway, Beatton, and Pine rivers and several smaller streams. The structure of fish communities in the Peace River undergoes a gradual shift from a cold, clear water sportfish community dominated by mountain whitefish in upstream areas (i.e., Arctic grayling, bull trout, kokanee, lake whitefish, lake trout, mountain whitefish, and rainbow trout) to a cool, turbid water fish community downstream of the Pine River confluence. The latter is more tolerant of elevated water temperatures and high sediment levels (i.e., burbot, goldeye, northern pike, yellow perch, and walleye). Species like kokanee, lake whitefish, and lake trout, although present in the Peace River, are more adapted to lake and reservoir conditions rather than riverine habitats.

The two existing reservoirs on the Peace River, the Williston and the Dinosaur, have good fishing opportunities. The fisheries in both reservoirs are managed through The Peace/Williston Fish & Wildlife Compensation Program. The program is a cooperative venture of BC Hydro, provincial fish and wildlife management agencies, First Nations, and surrounding community supported by funding from BC Hydro. The program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River. A creel survey was conducted in 2005 on Dinosaur Reservoir (Stiemer 2006). A typical angler on Dinosaur was a local or a B.C. resident, in a boat, with low to average angling skill and experience, and concerned more with overall experience (scenery, weather, socialization, etc.) than angling success. Anglers were often fishing as a secondary

activity to boating. The scenery and length of the reservoir made it ideal for boating and sightseeing. The existence of a municipal campground adjacent to the boat launch increased popularity on weekends with local families. Dinosaur Lake also attracts anglers who are generally stopping for one night on their way to or from Alaska.

The most recent creel report for Williston Reservoir was published in 1993 and based on data from a 1989 survey (Blackman and Newsholme 1993). The study identified a low number of anglers but noted that the large reservoir area and the nomadic nature of anglers made use estimates difficult. More recent recreation use monitoring program reports include information on boating access and use of the reservoir but do not document angler effort (Synergy Applied Ecology 2011). This program is a component of the Water Use Plan and supporting Water Licence Requirements for BC Hydro's Peace River generating facilities including Peace Canyon and G.M. Shrum.

2.2 Licence Sales

Licence sales for the Peace region and the province of B.C. are shown in Table 2. The number of licences sold in the Peace region was up 8% between 2000 and 2007, in contrast to the decline in provincial fishing licence sales of 6%. The low point in yearly sales for both the Peace region and the province was 2004. While licence sales are considered to be broadly indicative of regional fishing activity, they do not distinguish between resident and non-resident purchases, and do not indicate where the licensee actually fished. As with hunting licences, fishing licence sales indicate a general trend of sustained or increased interest in fishing in the Peace region compared to overall declines in the province.

Table 2 Fishing licence sales for the Peace Region and British Columbia, 2000-2009

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	% Change 2000-2007
Peace Region											
Licences sold	11,449	11,879	11,570	10,839	10,627	11,309	13,361	12,303	NA	NA	7%
Fee revenue	$175,412	$179,605	$175,923	$284,697	$284,670	$295,427	$357,341	$330,791	NA	NA	89%
British Columbia											
Licences sold - resident	278,646	285,517	275,554	276,206	248,052	251,993	260,135	261,505	246,388	287,561	-6%
Licences sold – non-resident	76,853	79,932	79,868	69,402	68,328	67,370	70,512	70,937	59,081	64,555	-8
Fee revenue ($'000)	$5,007	$5,069	$4,979	$7,796	$7,759	$7,601	$7,998	$7,883	NA	NA	57%

NOTES:
NA – data not available
% - percentage
SOURCES:
BCMOE (2009); BCMFLNRO, Environmental Assessment Coordinator (2011a, pers. comm.)

2.3 Fishing Activity

Fishing activity is determined by the availability of preferred species, productivity of the resource, the proximity and ease of access to that resource and the changing demographics and preferences of the angling community. Other attributes of the fishing experience are also important. Anglers fish for a variety of reasons. In B.C., the top three reasons were to relax, enjoy nature, and to get away. Family togetherness and fishing for a challenge were also highly rated. Less important to anglers were catching fish to eat, catching many fish or catching large fish (Go Fish BC 2012, pers. comm.).

Fishing levels are determined by participation rates, river access, resource productivity and management programs. The sport fishery serves mainly resident anglers, but non-residents also travel to the Peace on a regular basis, and some local resorts and campgrounds actively promote angling activities.

Historic estimates of fishing as a percentage of total outdoor recreation activity were as high as 16% (LGL 2010), and although these rates have leveled off somewhat, sport fishing remains one of the top-ten recreation activities in the RAA. In the 1996 B.C. Visitor Study of the Northeast region, 19% of all B.C. residents who visited the Peace region participated in fishing (Tourism BC 1998). In 2005, anglers visiting the Peace region from other parts of B.C. accounted for 20,530 angler days (GSGislason 2009). In the same year, anglers from within the Peace region accounted for 36,740 angler days.

At the provincial level, freshwater angling activity has been steadily declining over the last 25 years. The province supported 5.7 million angler-days in 1985, compared to 4.4 million in 2005 and 3.8 million in 2010. Demographic change, including an aging population and growing urban populations, may explain some of this decline. Competition from other outdoor activities has increased considerably, while increased costs, increased angling regulations and closures, and declining fish populations have affected angling behaviour (GSGislason 2003). A similar trend is seen across Canada, where the resident angler participation rate has been on the decline in most provinces and territories since 1985 (DFO 2007). Between 2005 and 2010, the numbers of active adult angler numbers have remained steady after years of low level declines (3.2 million in 2005 and 3.3 million in 2010) (DFO 2012).

In 2005, over 6,000 anglers fished in the Peace region of the province. Seventy-two percent were B.C. residents, 21% were other Canadians and 7% were non-Canadians. The total number of days fished was 69,350, or 11.3 days per angler (Table 3). Of the 152,000 fish caught, over 34,000 were kept, for a release rate of almost 80%. Total expenditures of $7.1M represented $1,156 per angler or almost $102 per angler-day (GSGislason 2009). Sport fishing activity seems to have remained steady in 2010. The Peace region represents close to one-fifth of the total land area of the province, but its share of total fishing activity is minor, 2% of anglers, just over 2% of fish caught and under 2% of expenditures.

Table 3 Peace Region sport fishing summary, 2005 and 2010

Summary Statistics	Peace Region		% of British Columbia Total	
	2005	2010	2005	2010
Active anglers	6,140	NA	2.3%	NA
Angler days	69,350	64,186	1.7%	1.7%
Fish kept	34,000	34,696	1.9%	1.5%
Fish released	118,000	126,990	1.9%	1.9%
Angler expenditures	$7.1M	NA	1.5%	NA

NOTES:
NA – data not available
SOURCES:
GSGislason 2009; Go Fish BC 2012, pers. comm.

The Peace region fishing activity trends between 1985 and 2005 indicate an overall decline in the number of anglers and fish caught. By 2000, fewer anglers were catching fewer fish, at a time when the regional population was growing steadily (Table 3). This might be evidence of a declining participation rate in the sport.

As indicated in Table 4, anglers living in the Peace region spent 83% of their angler days fishing in the Peace region. Over half of angler days in the Peace region were spent by Peace region residents. The Peace region recorded the lowest amount of angler days in the province, representing about 2% of angler days by B.C. residents and 2% of angler days by B.C. residents and visitors from outside the province and country.

Table 4 Regional pattern of B.C. freshwater angler days, 2005

Angler Residence	Angler Days by Fishing Region									
	VI	LM	TN	KO	CA	SK	OM	PE	OK	All
British Columbia	440,080	684,260	647,320	532,050	364,580	261,550	245,660	57,270	349,490	**3,582,260**
Vancouver Island (VI)	415,630	9,490	15,440	6,310	14,350	12,020	4,090	810	6,220	**484,360**
Lower Mainland (LM)	17,140	656,640	264,740	15,200	134,760	13,870	13,580	1,810	41,310	**1,159,050**
Thompson-Nicola (TN)	0	3,030	302,450	22,220	37,960	3,030	8,010	1,020	19,420	**397,140**
Kootenay (KO)	610	1,910	1,750	445,610	3,670	3,160	11,510	0	6,480	**474,700**
Cariboo (CA)	180	1,630	3,630	0	141,250	2,820	4,740	0	200	**154,450**
Skeena (SK)	0	0	510	1,830	1,940	171,800	7,040	100	710	**183,930**
Omineca (OM	3,770	3,600	2,850	1,020	14,880	41,770	186,090	16,690	760	**271,430**
Peace (PE)	0	210	2,600	710	90	200	3,560	36,740	0	**44,110**
Okanagan (OK)	2,750	7,750	53,350	39,150	15,680	12,880	7,040	100	274,390	**413,090**
Rest of Canada	8,330	7,470	18,430	85,320	16,640	34,140	19,930	11,210	6,560	**208,030**
Outside Canada	12,810	19,220	36,440	27,690	59,190	25,110	7,080	880	5,660	**194,080**
Total	**461,220**	**710,950**	**702,190**	**645,060**	**440,410**	**320,800**	**272,670**	**69,360**	**361,710**	**3,984,370**

SOURCE:
GSGislason (2009)

Table 5 indicates that visitors from the rest of B.C. and Canada account for a higher share of angler days in the Peace region than in most other regions. This may be due in part to the region's proximity to the Alberta border. This trend is unchanged in 2010 (Go Fish BC 2012, pers. comm.).

Table 5 Regional share of B.C. freshwater angler days, 2005

Angler Residence	Share of Regional Days									
	VI	LM	TN	KO	CA	SK	OM	PE	OK	All
Own B.C. Region	90%	92%	43%	69%	32%	53%	68%	53%	76%	**66%**
Rest of B.C.	5%	4%	49%	14%	51%	28%	22%	30%	21%	**24%**
Rest of Canada	2%	1%	3%	13%	4%	11%	7%	16%	2%	**5%**
Outside Canada	3%	3%	5%	4%	13%	8%	3%	1%	1%	**5%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

NOTES:
VI – Vancouver Island
LM – Lower Mainland
TN – Thompson-Nicola
KO – Kootenay
CA – Cariboo
SK – Skeena
OM – Omineca
PE – Peace
OK - Okanagan
SOURCE:
GSGislason (2009)

2.4 Angler Expenditures

Angler expenditures in the Peace region in 2005 were predominantly for camping and boating equipment (44%), travel and vehicles (27%) and accommodation and food (17%) (Table 6). The 2005 DFO survey of sport fishing in Canada estimated per angler expenditures by B.C. anglers at $672, a nominal decline of 4% from 2000, but a 15% decline in real terms based on the B.C. Consumer Price Index (DFO 2007). In 2010, B.C. anglers spent an average of $730 each (Go Fish BC 2012, pers. comm.).

Table 6 Peace Region sport fishing expenditures, 2005

Expenditure Item	Angler Expenditures by Category $000
Trip Expenditures	
Packages and guide services	100
Accommodation and food	1,190
Travel	960
Owned boat costs	400
Licence fees	160
Fishing supplies	280
Fishing services	40
Subtotal	***3,130***
Capital Expenditures	

Expenditure Item	Angler Expenditures by Category $000
Fishing equipment	200
Boating equipment (new)	120
Boating equipment (used)	1,770
Camping equipment	1,200
Vehicles	580
Land and buildings	0
Other	80
Subtotal	***3,950***
Total Trip & Capital Expenditures	**7,080**

SOURCE:
GSGislason (2009)

Both package and guide expenditures are made almost exclusively by non-Canadians, but the location of tourism operators receiving these expenditures in the Peace region is not known. In 2008 to 2009 there were 16 angling guides and 10 assistant angling guides licensed in the Peace region (GSGislason 2009). BC Stats monitors provincial fishing lodges as part of its room revenue tracking system, but there are too few lodges in the Northeast to warrant a listing of either room inventories or revenues. The Northern B.C. Tourism Association features two freshwater fishing lodges in the Northeast, one of which is located in the RAA (Torwood Lodge in Hudson's Hope) (2012). Sport Fishing B.C. does not list any Northeast lodges on its website. Similarly, information on angling guide activity is limited. In 2012, there were 3 individuals listed as freshwater angling guides for the Peace region in BCMOE's guide directory, out of a total number of 71 freshwater angling guides for the province (BCMOE 2012b). A discussion with a former fishing guide on the Peace indicated that very little guided angling was occurring on the Peace River due to low demand. This was attributed to the absence of the higher value species (i.e., salmon, sturgeon) and the high costs of operating jet boats (Hopkins 2011, pers. comm.). A guide outfitter, based in Hudson's Hope, offers guided fishing on the Peace River.

2.5 Peace Region Angling Profile

Table 7 summarizes the 2005 freshwater angling profile of the Peace region and B.C.

Table 7 Freshwater angling profile of the Peace Region and B.C., 2005

Profile	Peace Region	B.C.	Peace Region % of Provincial Total
Activity			
Active anglers ('000)	6.1	270.8	2.3
Angler-days ('000)	69.4	3,984.4	1.7
Fishing packages purchased	30	9,230	0.3
Expenditures ($ millions)			
Packages and guides	0.1	17.0	0.6
Accommodation and food	1.2	74.9	1.6
Travel	1.0	59.6	1.7
Boat costs	0.4	19.8	2.0

Profile	Peace Region	B.C.	Peace Region % of Provincial Total
Licence fees	0.2	9.6	2.1
Supplies and services	0.3	23.8	1.3
Fishing equipment	0.2	18.4	1.1
Boats	1.9	77.8	2.4
Camping equipment	1.2	48.0	2.5
Special vehicles	0.6	55.4	1.1
Land and buildings	0	3.6	0
Other	0.1	5.8	1.7
Catch '000 Fish (kept or released)			
Rainbow trout	39.9	3,929.6	1.0
Cutthroat trout	0.8	913.6	0.1
Steelhead trout	0	135.4	0
Brook trout	3.1	148.8	2.1
Other trout	5.9	538.0	1.1
Kokanee	0	480.7	0
Salmon (non-tidal)	0.2	1,064.3	<0.1
Non-salmonids	102.0	982.1	10.4
Provincial Economic Impacts[a]			
Gross domestic product ($ millions)	3.0	210.4	1.4
Wages and benefits ($ millions)	1.7	120.2	1.4
Employment (person-years)	55	3,875	1.4
Taxes paid ($ millions)	1.8	125.1	1.4

NOTE:
[a]Impacts are total impacts (i.e., direct industry plus indirect supplier plus induced consumer spending).
% - percentage
SOURCE:
GSGislason (2009)

The growing population of the region and a consistent increase in the average number of days fished over the last 20 years would cause the regional demand for angling to increase, assuming that in-migrants and their families have similar participation rates to the existing population. Declining participation rates, the distance and associated cost to access the area by out-of-region anglers and the lack of high profile, destination fisheries are likely offsetting factors. An example of the latter is the absence of any classified waters in the Peace region. B.C. has a special classified waters system that regulates 42 highly productive trout streams. The Classified Waters Licensing System was created to preserve the unique fishing opportunities provided by these waters, which contribute to the province's reputation as a world-class fishing destination.

2.6 Site C Creel Survey Results

The LGL (2010) study identified a total of 49 recreation sites, 15 of which were noted as sites where fishing occurs (Table 8).

Table 8 Recreation sites where fishing occurs in the local assessment area

Site Name	River Stratum		
	Peace Canyon Dam to Hudson's Hope	Hudson's Hope to Site C Clean Energy Project	Site C Clean Energy Project to Alberta Border
Number of Fishing Participants (2008-09)	313	419	232
Recreation Sites and Locations			
Highway 29 Bridge	●	○	○
Alwin Holland Memorial Park	●	○	○
Hudson's Hope Boat Launch	○	●	○
Lynx Creek Boat Launch	○	●	○
Lynx Creek RV Park	○	●	○
The Gates Boat Launch	○	●	○
Unmaintained Campsite B	○	●	○
Farrell Creek	○	●	○
Peace Island Park	○	○	●
confluence of Beatton River	○	○	●
Blackfoot Park/"Clayhurst"	○	○	●
Shoreline Access D	○	○	●
Shoreline Access E	○	○	●
Pine River: East Pine	○	○	○
Pine River: Twidwell Bend	○	○	○

NOTES:
● – indicates presence of recreation site within river stratum.
○– indicates absence of recreation site within river stratum.
SOURCE:
LGL (2010)

Total angling effort estimated in the LGL (2010) study was 24,622 angler-hours (6,757 angler-days), of which 18,489 hours (5,070 angler-days) were in the Peace River mainstem, and 6,134 hours (1,687 angler-days) were in the Pine River watershed. Within the Peace River, 53% of the angling activity occurred in the river stratum from Hudson's Hope to the Site C Project site. About 20 years prior, a similar creel survey of the Peace River mainstem was conducted (which found similar levels of angler effort: a total of 17,430 angler hours between Peace Canyon Dam and Site C (DPA 1991; Table 9). The similarity of these effort estimates, despite a 20 year difference between the studies supports the conclusion that the overall demand for recreation and tourism is not increasing and may be decreasing, despite increases in the Peace River Regional District population (6% between 2001 and 2006 and 3% between 2006 and 2011; Statistics Canada 2007; 2012).

At the same time, the LGL study and DPA's results contrast strongly with those of another survey from the 1980s (Hammond 1986; Table 9). Hammond estimated total angling effort for a limited part of the LGL study area (from the Peace Canyon Dam to Farrell Creek) over a five-month period to be 16,898 angler-hours: a value similar to what was stated in the LGL study for the entire Peace River over the entire year (1986). Given that angler effort varied widely between 2008 and 2009, it is possible that some of the differences among studies resulted from year-to-year variability in angling effort

levels. LGL's confidence limits were large and Hammond's calculation methods are not described, thus the reasons for the differences between reports cannot be determined. Nevertheless, the disagreement between the Hammond (1986) and DPA (1991) results may call into question the validity of any comparisons of LGL (2010) angler effort estimates to those from the late 1980s.

The results of the LGL creel survey and other creel surveys do have inherent limitations associated with natural variability in the population (e.g., catch rates) and sampling error. With respect to natural variability, most catches are of zero fish and the larger the catch the rarer the event. Given the wide range of possible outcomes for a fishing event it is difficult to predict with confidence how many fish an angler is going to catch. This difficulty translates into wide confidence limits around any estimate of total catch.

In terms of sampling error, with any sampling program, the confidence in final estimates is greater when a larger proportion of the population has been sampled. In the LGL study, the number of interviews per month ranges from 13 to 86 or 0.8 to 5.3 interviews for each of the 16 sampling categories (i.e., day type, access method, and river stratum). With catch success expected to be variable, the confidence in estimates for a sample of less than 5 is low. To address this uncertainty, LGL pooled data among categories from 2008 and 2009. To simulate increased interviewing, all data was copied twice which reduced the standard error from 83% down to 51% (still a relatively large standard error). Furthermore, the accuracy of creel results is only as good as the data provided by anglers to the interviewers. Inspection of harvested fish was rarely permitted and without verification of catch, confidence in the accuracy of data provided by anglers is lowered. Limited sample sizes and wide confidence limits mean that creel results must be interpreted with caution.

Table 9 compares fishing levels on the Peace River from historical creel surveys to the most recent data available (i.e., LGL 2010). Whitefish and rainbow trout were the most commonly caught fish across all of the studies. Walleye or perch were more common downstream of the Site C dam site.

The 2008-2009 catch (fish harvested and released) estimates showed that Arctic grayling (2,446 fish) and mountain whitefish (2,443 fish) were the species that were caught in greatest numbers, the majority of which were caught in the Pine River (LGL 2010). The total catch of rainbow trout and bull trout, summed across all strata was estimated at 1,883 fish and 1,569 fish, respectively. Annual catch estimates for the Peace River mainstem indicated that rainbow trout was caught most frequently (1,786 fish), followed by bull trout (983 fish) and mountain whitefish (978 fish). For certain species (e.g., rainbow trout), the distribution of catch across river strata was strongly skewed with larger numbers of fish caught in areas upstream of the Project.

Total harvest (retained fish) was dominated by Arctic grayling (284 fish), rainbow trout (224 fish) and mountain whitefish (182 fish) (LGL 2010). Retention rates were highest for lake trout and northern pike, with 27% and 14% of catch retained, respectively. Despite being a catch and release fishery, bull trout were retained 5% of the time.

Table 9 Peace River fishing survey results

Year	Area	Season	Angler hours	Angler days	Hours per Angler days	Effort per River km	Total Catch	Catch per Hour	Catch by Species	Reference
1985	Peace Canyon Dam to Farrell Creek (14 km)	June 1985 to October 1985	16,898	NA	NA	1,207 hrs/km	7,667	0.45/hr	RB: 4,469 (58%) **WF: 2,890 (38%)** GR: 164 (2%) BT: 144 (2%)	Hammond 1986
1989/90	Peace Canyon Dam to Farrell Creek (14 km)	May 1989 to April 1990	9,970	4,420	2.26	712 hrs/km 315 days/km	5,073	0.51/hr 1.15/day	RB: 2,005 (40%) **WF: 2,400 (47%** GR: 389 (8%) BT: 149 (3%) KO: 101 (2%) NP: 29 (0.6%)	DPA 1991
1989/90	Peace Canyon Dam to Site C (83 km)	May 1989 to April 1990	17,430	7,550	2.31	210 hrs/km 91 days/km	9,432	0.54/hr 1.25/day	RB: 2,445 (26%) **WF: 4,747 (50%)** GR: 1,399 (15%) BT: 304 (3%) KO: 129 (1%) NP: 359 (4%) WP: 49 (1%)	DPA 1991
2008/09	Peace Canyon Dam to Hudson's Hope (7km)	April 2008 to March 2009	3,032	833	3.64[a]	433 hrs/km 119 days/km	864	0.28/hr 1.04/day	**RB: 602 (70%)** WF: 71 (8%) GR: 18 (2%) BT: 143 (17%) NP: 8 (1%) WP: 9 (1%) GE: 13 (2%)	LGL 2010

Year	Area	Season	Angler hours	Angler days	Hours per Angler days	Effort per River km	Total Catch	Catch per Hour	Catch by Species	Reference
2008/09	Peace Canyon Dam to Site C (83 km)	April 2008 to March 2009	12,875	3,537	3.64[a]	155 hrs/km 43 days/km	3,418	0.27/hr 0.97/day	**RB: 1,692 (50%)** WF: 515 (15%) GR: 300 (9%) BT: 635 (19%) NP: 102 (3%) WP: 70 (2%) GE: 104 (3%)	LGL 2010
2008/09	Site C to Alberta Border (49 km)	April 2008 to March 2008	5,613	1,542	3.64[a]	114 hrs/km 31 days/km	1,439	0.26/hr 0.94/day	RB: 70 (5%) WF: 120 (8%) GR: 94 (7%) BT: 259 (18%) NP: 236 (16%) **WP: 550 (38%)** GE: 110 (8%)	LGL 2010

NOTES:
aPooled study average (not corrected for river stratum).
% – percentage
hr – hour
hrs – hours
km – kilometre
NA – data not available
BT – bull trout
GE – goldeye
GR – Arctic grayling
KO – kokanee
NP – northern pike
RB – rainbow trout
WF – whitefish
WP – walleye/pickerel
SOURCES:
DPA (1991); Hammond (1986); LGL (2010)

3 HUNTING

3.1 Hunting and Season Limits

The provincial government manages game species and maintains hunting opportunities through a variety of management tools, including hunting seasons, licensing, regulations of various types and permits designed to retain the sustainability and health of the resource. As shown in Table 10, for most species, the hunting season runs from late August to late November, with the greatest overlap in the late October and early November periods. Bag limits are one for all ungulates and cougar, two for black bear, and three for wolf. There is no bag limit for coyote. Bag limits for birds range from nine for Sharp-tailed Grouse to 30 for Spruce and Ruffed Grouse.

Table 10 Local assessment area species bag limits and seasons, 2012-2014

Species	Class	Management Unit	Season	Bag Limit
Mule deer	3 point bucks	7-31 to 7-35	Nov 1 – Nov 30	1
	antlerless	7-20 Zone A	Nov 15 – Nov 30	1
	either sex	7-32 to 7-35	Sept 1 – Sept 30 (bow only season)	1
White-tailed deer	bucks	7-31 to 7-35	Sept 10 – Nov 30	1
			Sept 1 – Sept 9 (bow only/youth only season[a])	1
	antlerless	7-20 Zone A	Oct 10 – Oct 31	1
	either sex	7-20 Zone A	Nov 1 – Nov 30 (youth only season)	1
Moose	bulls	7-31 to 7-35	Aug 15 – Aug 31	1
	spike-fork bulls, tripalm bulls, 10 point bulls	7-31	Sept 1 – Oct 31	1
		7-32 to 7-35	Sept 1 – Sept 30, Oct 16 – Oct 31, Oct 1 – Oct 15 (bow only season)	1
Elk	6 point bulls	7-31	Sept 1 – Oct 31	1
	3 point bulls	7-20 Zone A		
	antlerless	7-20 Zone A	Sept 15 – Oct 31	1
Black bear	N/A	7-31 to 7-35	Aug 15 – Nov 15, Apr 1 – June 15	2, 2
Cougar	N/A	7-31 to 7-35	Sept 10 – Mar 31	1
Wolf	N/A	7-31 to 7-35	Aug 1 – Mar 31, Apr 1 – June 15[b]	3, 3
Coyote	N/A	7-31 to 7-35	Sept 1 – Mar 31[b]	None
Wolverine	N/A	7-31 to 7-35	Oct 15 – Jan 15	1
Lynx	N/A	7-31 to 7-35	Nov 15 – Feb 15	1
Snowshoe hare	N/A	7-31 to 7-35	Aug 1 – Apr 30	10 (daily)
Dusky (blue) Grouse	N/A	7-31	Sept 1 – Nov 15	10 (30)[c]
Spruce and Ruffed Grouse	N/A	7-31 to 7-35	Sept 1 – Nov 15	10 (30)
Sharp-tailed Grouse	N/A	7-32 to 7-35	Sept 1 – Nov 15	3 (9)
Ptarmigan	N/A	7-31	Aug 15 – Feb 28	10 (30)

Species	Class	Management Unit	Season	Bag Limit
Raven	N/A	7-32 to 7-35[d]	No closed season	5
Coots, Common Snipe	N/A	7-31 to 7-35	Sept 3 – Nov 30	10 (20)
Ducks	N/A	7-31 to 7-35	Sept 3 – Nov 30	8 (16)
Geese: Snow, White-fronted, Ross's, Canada & Cackling	N/A	7-31 to 7-35	Sept 3 – Nov 30	5 (10)

NOTES:
MU 7-20 Zone A fully encompasses MUs 7-32, 7-33, and 7-34, as well as portions of 7-35
[a] Restricted to hunters under the age of 18
[b] No closed season below 1100 m elevation
[c] Daily limit (total limit)
[d] Restricted to private land (with permission of the landowner)
N/A – not applicable
SOURCE: BCMOE (2012c)

Limited Entry Hunting (LEH) is another management tool which allocates hunting opportunities by lottery. The purpose of LEH is to achieve wildlife management objectives without resorting to such measures as shortening seasons or closing areas. LEH seasons are introduced where necessary to limit the number of hunters, the number of animals that may be taken or the harvest to a certain class of animal. Elk (antlerless or unrestricted) and moose (calf only) LEH draws are available in the RAA and LAA. The elk LEH season is open from December 1 to February 28. The moose LEH season is August 15 to August 30 and October 16 to October 31. Although general open seasons may coincide for all species, the class of animal available will often be different. Table 11 and Table 12 show elk and moose LEH harvest statistics for the most recent years available in the LAA.

There are several no-hunting and restricted hunting zones in the LAA, including within 100 m of the Peace River for game birds, around Charlie Lake, west of Farrell Creek (firearms using shot only in specified area of MU 7-35), and on the Upper Halfway River (caribou closed area in MU 7-57). Almost all of the LAA, except a small zone along the Upper Halfway River, has been designated for an Agricultural Zone Hunt in 2008/2009 for elk, white-tailed deer and mule deer. This hunt was established following a structured decision-making process in the region led by the BCMOE and including various stakeholders, including local hunting clubs, guide outfitters and ranchers.

Table 11 Elk limited entry hunting harvest statistics in the local assessment area

Year	Management Unit	Animal Class	Permits Available	First Choice Applicants	Hunting Survey Respondents	Estimated Hunters	Success Rate [%]	Estimated Kills	Estimated Days Hunting	Days per Kill
Elk										
2008	7-20 Zone A	antlerless	1,240	4,056	561	552.6	48.8	269.7	2,542	9.4
		any sex/age	800	3,144	354	404.5	45.2	182.9	1,848	10.1
2009		antlerless	1,240	4,500	609	635.3	44.2	281.0	3,026	10.8
		any sex/age	800	3,450	433	423.2	48.5	205.1	1,850	9.0
2010		antlerless	1,240	5,966	531	464.7	48.2	224.2	2,162	9.6
		any sex/age	800	3,946	332	343.1	46.6	160.0	1,468	9.2
% change antlerless			0.0	47.0	-5.3	-15.9	-1.2	-16.9	-14.9	2.1
% change any sex/age			0.0	25.5	-6.2	-15.2	3.1	-12.5	-20.6	-8.9
Total antlerless			**3,720**	**14,522**	**1,701**	**1,652.6**	**46.9**	**775.0**	**7,730**	**10.0**
Total any sex/age			**2,400**	**10,540**	**1,119**	**1,170.8**	**46.8**	**548**	**5,166**	**9.4**

NOTES:
% - percent

SOURCE:
BCMFLNRO, Environmental Assessment Coordinator (2012, pers. comm.)

Table 12 Moose limited entry hunting harvest statistics in the local assessment area

Year	Management Unit	Animal Class	Permits Available	First Choice Applicants	Respondents	Estimated Hunters	Success Rate [%]	Estimated Kills	Estimated Days Hunting	Days per Kill
Moose										
2000	7-32, 7-33, and 7-34	calf only	137	161	90	76.1	15.1	11.5	289	25.1
2001			165	141	92	84.2	15.0	12.6	318	25.2
2002			165	179	99	78.7	38.2	30.1	317	10.5
2003			165	162	102	86.0	29.9	25.7	377	14.7
2004			165	137	85	76.5	30.1	23.0	400	17.4
2005			180	105	68	68.5	47.0	32.2	463	14.4
2006			240	135	71	94.6	45.2	42.8	457	10.7
2007			240	142	74	85.0	22.2	18.9	444	23.5
2008			240	130	62	74.4	17.7	13.2	510	38.6
2009			240	142	80	86.4	29.7	25.7	483	18.8
2010			240	163	73	70.0	32.9	23.0	626	27.2
% change			75.2	1.2	-18.9	-8.0	117.9	100.0	116.6	8.4
Total			**2,177**	**1,597**	**896**	**880.4**	**29.4**	**258.7**	**4,684**	**18.1**

NOTES:
% - percent
SOURCE:
BCMFLNRO, Environmental Assessment Coordinator (2012 pers. comm.)

The inception of the hunt, along with more liberalized regulations such as a longer season and increased bag limits, has increased hunting opportunities in the RAA over the last three years (BCMOE, Wildlife Biologist 2009b pers. comm.).

Hunters who participated in the focus group interviews in 2011 expressed concern that the hunting seasons and limits for ungulates do not consider that harsh winters in recent years have reduced deer and moose numbers in the region considerably. Members of the rod and gun clubs will often participate in meetings with the BCMOE to discuss these issues and provide input into revised regulations. The elk LEH has not been in place long enough to determine a longer term trend but estimated harvests, along with other hunting activity indicators, did decline between 2008 and 2010. The moose calf LEH data indicate that in the eleven years the hunt has been available, interested hunters are steadily spending more days hunting and have been more successful. The most recent numbers of kills have declined since mid-2000 but are higher overall than in the early 2000. Days per kill were also lower and success rates were higher in mid-2000.

3.2 Hunting Licence Sales

Hunting licence sales for the Peace Region and the province of B.C. are shown in Table 13. The number of licences sold in the RAA was up 2% between 2000 and 2007, compared to the decline in provincial hunting licence sales of 6%. The low point in yearly sales for the RAA was 2003 and 2004 for the province. While licence sales are believed broadly indicative of hunting activity, they do not indicate where the licensee actually hunted. The fact that hunting licence sales are generally on the increase in the Peace Region when they are declining in the rest of the province indicates a higher interest in hunting in the RAA.

3.3 Hunting Activity

Harvest data by species, for the management units in the RAA and LAA, and for the 11-year period ending in 2010 are shown in Table 14.

Hunting activity data for the management units in the RAA and LAA for the 10-year period between 1996 and 2005 is shown in Table 15.

The demand for B.C. resident hunting in the RAA is primarily a function of local population size and the propensity of use by hunters from B.C. who are not resident in the RAA. In turn, participation rates are influenced by costs, demographic variables (e.g., age, gender, ethnicity) and convenience (in terms of regulatory and licensing requirements).

Table 13 Hunting licence sales in the Peace Region and British Columbia, 2000-2009

Region	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	% Change 2000-2007
Peace Region[a]											
Licences Sold	8,524	7,697	7,995	7,955	7,685	8,198	8,543	8,659	NA	NA	2%
Fee Revenue	$219,577	$199,630	$205,583	$264,096	$249,945	$263,042	$280,029	$272,519	NA	NA	24%
British Columbia											
Licences Sold – resident[a]	93,740	86,580	85,714	81,736	84,003	85,633	87,170	87,722	90,867	92,235	-6%
licences sold – non-resident[b]	5,887	5,612	5,752	5,785	5,931	6,387	6,244	5,891	5,620	5,112	<1%
fee revenue [$000][a]	$2,165	$1,996	$2,022	$2,659	$2,797	$2,784	$2,862	$2,844	NA	NA	31%

NOTE:
NA – data not available
SOURCES:
[a]BCMOE (2009); [b]BCMFLNRO, Environmental Assessment Coordinator (2011a, pers. comm.)

Table 14 Big game species harvested in management units in the RAA and LAA, 1999-2010

Species	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	% Change
Local Assessment Area												
Black bear	63	129	79	101	55	68	75	58	102	63	83	**32%**
Caribou	—	—	—	—	—	—	—	—	—	—	—	**N/A**
Cougar	—	—	—	—	—	—	—	—	—	—	0	**N/A**
Elk	99	122	172	170	246	243	376	387	375	746	652	**559%**
Goat	—	—	—	—	—	—	—	—	—	—	—	**N/A**
Grizzly	—	1	—	—	—	—	—	—	3	1	0	**N/A**
Moose	452	570	782	885	1,009	542	897	936	310	267	552	**22%**
Mule deer	634	935	782	773	773	715	893	1,234	1,254	1,108	635	**<1%**
Sheep	—	—	—	—	1	—	—	—	—	—	—	**N/A**
White-tailed deer	258	406	110	300	318	277	423	342	438	524	731	**183%**
Wolf	23	57	—	29	27	17	16	10	40	23	48	**109%**
Total	**1,529**	**2,220**	**1,925**	**2,258**	**2,429**	**1,862**	**2,680**	**2,967**	**2,522**	**2,732**	**2,701**	**77%**
Regional Assessment Area												
Black bear	331	356	256	249	269	189	274	246	269	210	202	**-39%**
Caribou	46	40	44	30	24	16	30	32	14	18	—	**-61%**
Cougar	—	—	—	—	—	1	—	—	—	1	0	**N/A**
Elk	270	422	535	478	585	513	823	1,004	929	1,534	1,493	**453%**
Goat	96	85	64	63	65	53	71	62	53	60	6	**-93%**
Grizzly	37	28	13	38	36	37	44	26	54	48	10	**-74%**
Moose	1,536	1,480	1,959	2,177	2,300	1,327	2,182	2,201	1,278	1,236	1,229	**-20%**
Mule deer	1,931	1,127	970	889	952	871	1,079	1,553	1,658	1,426	809	**-58%**
Sheep	62	52	47	43	34	23	34	34	28	36	3	**-95%**
White-tailed deer	425	677	203	486	529	572	784	698	871	1,076	1,415	**233%**
Wolf	75	228	65	104	124	67	128	91	206	217	240	**220%**
Total	**4,809**	**4,495**	**4,156**	**4,557**	**4,918**	**3,669**	**5,449**	**5,947**	**5,360**	**5,862**	**5,407**	**12%**

NOTES:

N/A – not applicable

— not collected

SOURCES:

LAA Harvests 1999-2005 – BCMOE (2008); LAA Harvests 2006-2008 and RAA Harvest 1999-2008 – BCMFLNRO, Environmental Assessment Coordinator (2011c, pers. comm.); BCMFLNRO, Environmental Assessment Coordinator (2012, pers. comm.)

Table 15 Hunting activity in management units in the local assessment areas, 1996-2008

Hunting Activity	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	% Change
Resident Hunters														
Number of hunters	5,797	5,907	7,089	6,514	6,411	5,329	6,204	5,991	4,905	6,454	6,766	7,301	7,704	**33%**
Hunter days	34,357	34,332	41,409	42,028	41,393	36,704	37,322	32,899	27,611	38,627	37,552	48,011	49,215	**43%**
Harvest	1,574	1,849	2,216	1,504	2,172	1,882	2,227	2,398	1,825	2,632	2,924	2,492	2,691	**71%**
Expenditure [$ millions]	$1.6	$1.6	$1.9	$2.0	$2.0	$1.9	$2.0	$1.7	$1.5	$2.2	NA	NA	NA	**38%**
Consumer surplus [$ millions]	$1.6	$1.7	$2.0	$2.1	$2.1	$1.9	$2.0	$1.8	$1.6	$2.2	NA	NA	NA	**37%**
Non-Resident Hunters														
Number of hunters	97	80	77	72	114	167	107	115	103	147	110	95	109	**12%**
Hunter days	686	492	452	435	785	1,234	796	710	525	809	567	395	124	**-82%**
Harvest	48	36	38	25	48	43	31	31	37	48	43	30	41	**-15%**
Expenditure [$ millions]	$0.2	$0.2	$0.2	$0.2	$0.3	$0.5	$0.3	$0.3	$0.2	$0.4	NA	NA	NA	**43%**
Consumer surplus [$ millions]	$0.04	$0.03	$0.03	$0.03	$0.05	$0.1	$0.06	$0.05	$0.04	$0.07	NA	NA	NA	**52%**

NOTES:

NA – data not available

Due to rounding, percentage changes may not equal the percentage change of the dollar values presented in the table.

SOURCE:

BCMOE (2008)

With Northeast B.C. representing close to one quarter of the province's land area, large tracts of wilderness support a diverse range of big game. In the Peace River valley, wildlife is abundant and hunting areas on Crown and private land readily accessible. While the Project footprint represents only 0.5% of the LAA area of approximately two million hectares, interviews have suggested that resident hunters placed a higher value on hunting on and along the Peace River compared to most other areas of the LAA (Koslowski 2008, pers. comm.; Hudson's Hope Rod and Gun Club, Members 2011, pers. comm.; North Peace Rod and Gun Club, Members 2011, pers. comm.). This is because some aspects of the Peace River experience such as hunting on the islands is relatively rare in the regional context.

Trends in regional hunting demand appear to be diverging from provincial trends, at least in the short and medium terms. There has been a province-wide decline in hunting licences issued and hunting activity over the last 30 years, but this trend is not evident in the Peace River region, where the number of resident hunters grew by 11% during the 10-year period ending in 2005. A greater number of hunters from southern B.C. may also be coming to the region as hunting areas shrink due to the encroachment of urban development and the expansion of protected areas. Population growth during this same period was in the range of 18%, which would imply a declining participation rate, everything else being the same, though not as much of a decline as seen in the province as a whole. However, with the creation of the Agriculture Zone Hunt, local hunting opportunities have increased in the last three to four years, and the number of hunters has apparently increased. This trend is not captured in Table 15 (BCMOE, Wildlife Biologist 2009b pers. comm.).

The recreational aspect of hunting remains an important lifestyle element for hunters, in addition to contributing to the local economy. The total number of members in the four nearby rod and gun clubs is estimated to be more than 1,000, and about 80% of members are active hunters from year to year.

The North Peace Rod and Gun Club, based in Fort St. John, has a current membership of over 600 (youth, adults and families), while the Hudson's Hope Rod and Gun Club has about 50 single and family memberships. The Peace River is valued by members of local rod and gun clubs for its hunting areas, notably the islands and the north shore slopes with a south-facing aspect where wildlife is more abundant, and (in the case of the islands) where less hunter effort is needed. The lower river bottom is winter range for major species, namely elk, deer and moose. Much of the hunting on the north shore is on private land. The south shore and north-facing aspects are not used as much and receive an estimated 20% of total hunter effort on the river, compared to 80% for the islands and north shore (Holland 2009, pers. comm.). Hunters use river boats along the Peace, Pine and Halfway rivers and some members belong to the Peace Country River Rats. Most group members hunt north of the river and as far north as the Muskwa-Kechika area (North Peace Rod and Gun Club, Members 2011, pers. comm.). Hunters from Hudson's Hope frequent the Bear Flat area, the Gates and up the Halfway River. Farrell Creek also provides access for hunting (Hudson's Hope Rod and Gun Club, Members 2011, pers. comm.).

Accessibility is a factor in the distribution of hunting pressure on the river. The islands and the south shore are accessed by river boats launched from Peace Island Park, Halfway River and Lynx Creek. It is also possible to put a boat in at Farrell Creek, but it is not a recognized launch. Approximately half of the hunters launching from Peace

Island Park would be heading west to river islands upstream from the Site C dam site, while the other half would be going down stream. Hunters launching at the Halfway River would be heading both upstream and downstream on the Peace, while some would also be going up the Halfway itself (Holland 2009, pers. comm.).

Road access to the south shore is possible in places, mainly via Jackfish Lake Road, but for Fort St. John hunters the travel times are close to three hours. Access to the north shore between Bear Flat and Hudson's Hope via Highway 29 is convenient and low-cost.

While hunters interviewed generally agreed that the Peace region offers numerous hunting opportunities, they indicated that hunting pressure is increasing with the population. Hunters were concerned about the effects of recent harsh winters on the ungulate populations and some participants wondered if hunting seasons could be shortened.

Hunters from Chetwynd use the river corridor, though less frequently than hunters from Hudson's Hope and Fort St. John. The Chetwynd and District Rod and Gun Club have 153 memberships. Members are more likely to hunt in the Del Rio and Stewart Lake area than the Peace River corridor because they are much closer and opportunities remain good (Eastman 2009, pers. comm.). The Del Rio is a very heavily used hunting area as oil and gas activity has provided access (Chetwynd and District Rod and Gun Club, Members 2011, pers. comm.).

Roughly half of the 1,200 members of the Dawson Creek Sportsman's Club regularly use the Peace River and its major tributaries for hunting due to its proximity to the community and ease of access via the Peace Island Park boat launch (Mathias 2009, pers. comm.; Mayor 2011, pers. comm.). Areas north of Chetwynd, Stewart Lake and especially the Del Rio area are also heavily used by members of the Dawson Creek club.

Private land or agricultural land hunting occurs on Bear Flat and up the Halfway River. During April to May 2011, BC Hydro mailed questionnaires to property owners that own or lease land within areas potentially affected by the Project. Thirty-seven property owners responded to the questionnaire. Nine of those owners (24%), indicated that they allow hunting on their property. Seven of these nine owners indicated that they allowed hunting for deer, six allowed hunting for elk, three allowed hunting for moose, three allowed hunting for black bear, and one owner allowed hunting for Nabor's buffalo on their property. Therefore, while hunting does occur on potentially affected private land, it is not as common or likely as hunting on public lands in the LAA.

3.4 Trapping

Registered trapping activity is administered by the BCMOE. The registered trapline system is the primary system for setting harvest guidelines and managing furbearing animals. In 1926, the province was divided into registered traplines, giving the trapline owner the exclusive right to trap furbearing animals inside the trapline area. Traplines typically cover a large land area. The Fish and Wildlife Branch of the BCMOE in Fort St. John manages approximately 250 traplines including those in the LAA. There are a total of 16 traplines in the LAA.

The trapping season is based on a variety of criteria including pelt primeness, relative vulnerability of age and sex classes to harvesting, abundance, and capture technology.

In the Peace region, trapping activity is concentrated between October and late February for most species. The trapping of beaver may occur up to early May in some years.

Key habitat for trapping includes mature or old growth forest for marten and wetlands and riparian areas for beaver and muskrat. Willow swamps were identified as key habitat for coyote, wolf, lynx, and marten. Trapping occurs along the breaks and lower benches north of the river. One trapper noted that the distribution of animals throughout a trapline is affected by plant growth and weather so trapping areas are modified to suit expected locations of animals (Trapper Interviews 2012, pers. comm.).

In the LAA, traps are set on the flats along the Peace River, and some trappers may set traps in the river, but the location and number of traps is not documented. Existing roads, trails, and cutlines are used throughout traplines. Many use a variety of access methods including going on foot or snowshoe, riding horses, skidoos and all-terrain vehicles and trucks depending on the level of access and the desire to create or maintain new access to areas within the trapline. Boats are also used on the Peace River to reach trapping areas along the Peace and Moberly rivers. Local roads such as the Medicine Woman Road, Jackfish Lake Road, and the Del Rio Road are used by trappers south of the river. Trappers access the Project activity zone regularly during the trapping season and noted the importance of these trails or roads for their traplines. Trappers described or mapped trapping locations, access and cabins within and in the vicinity of the Project activity zone during interviews with BC Hydro.Trappers also listed which species they trap within the proposed Project area (Figure 1). Marten, beaver and fisher were the most commonly trapped species in the Project activity zone.

Aboriginal people are involved in the use of half of the affected traplines, either as the registered owners or through agreements with the registered trapline owner.

Table 16 Trapping harvests in the local assessment area, 2001-2008

Species Harvested	Total Harvest	Average Annual Harvest
Beaver	255	32
Black bear	2	<1
Coyote	90	11
Fisher	37	5
Fox	12	2
Lynx	31	4
Marten	1,684	211
Mink	25	3
Muskrat	73	9
Otter	1	<1
Squirrel	4,072	509
Weasel	334	42
Wolf	7	1
Wolverine	5	1
Total	**6,628**	**829**

NOTES:
Totals may not add up due to rounding.
SOURCE:
BCMFLNRO, Environmental Assessment Coordinator (2011b, pers. comm.)

Table 16 summarizes the harvest from the traplines overlapping the LAA for eight years from 2001-2008. Marten accounts for a large proportion of the animals trapped and an associated a large proportion of the total revenue from trapping. Collectively marten, lynx, beaver, and fisher made up an average of 60% of the annual trapping revenue between 2005 and 2008 (Table 17). Trapping is typically pursued as a lifestyle activity, and less often as a primary income source.

Table 17 Trapping values for traplines in the local assessment area, 2005-2008

Animals Harvested	Average Annual Harvest	Average Price per Animal ($)	Price Range ($)	Average Annual Revenue ($)	Average Royalty per Animal ($)	Average Annual Royalty per Animal ($)
Beaver	47	26.68	22.47 – 28.27	1,253.96	0.77	36.19
Coyote	29	33.30	24.47 – 42.16	965.70	1.13	32.77
Fisher	13	87.10	70.68 – 94.33	1,132.30	1.99	25.87
Fox	3	25.87	21.33 – 31.66	77.61	0.85	2.55
Lynx	26	170.79	138.41 – 203.28	4,440.54	5.14	133.64
Marten	459	71.01	57.88 – 80.31	32,593.59	1.88	862.92
Mink	9	17.98	14.96 – 21.33	161.82	0.56	5.04
Muskrat	8	3.99	2.62 – 6.73	31.92	0.10	0.80
Otter	2	71.56	39.70 – 152.78	143.12	3.94	7.88
Squirrel	323	1.38	1.22 – 1.46	445.74	0.04	12.92
Weasel	79	7.50	5.31 – 9.30	592.50	0.19	15.01
Wolf	2	98.60	75.39 – 129.57	197.20	2.60	5.2
Wolverine	1	230.61	169.04 – 297.48	230.61	6.00	6.0
Total (all animals)	**1,001**	**65.11**	**2.62 – 297.48**	**65,175.11**	**1.94**	**1,941.94**

SOURCE:
BCMFLNRO, Environmental Assessment Coordinator (2011b, pers. comm.)

The trapping of furbearing animals pre-dates European settlement in the region and has been practiced continuously up to the present. However, the economic value of the activity has diminished greatly, and it is considered mainly a subsistence and lifestyle activity.

The value of harvests, while cyclic, has generally been trending up. Variation between years in the LAA is driven by the harvest and prices paid for marten, which between 2001and 2008 has accounted for 78% of the total pelt revenue.

Traplines are a form of non-exclusive use tenure on Crown land and may be sold by the registered holder. The price of a trapline depends on its particular circumstances (e.g., abundance of valuable furbearers) and improvements (e.g., a cabin). Recent prices for an average trapline is in the order of $15,000- $25,000 (BCMOE, Wildlife Biologist 2009c pers. comm.). The price of some traplines south of the LAA have sold for higher prices, but the primary purpose for these areas may be for recreational purpose, since a trapline license allows one to construct a cabin on Crown land. In these cases owners may only

register the minimum harvest required to maintain active status, as opposed to actively trapping for fur.

A trapline does not preclude other uses on the land. For instance, timber harvesting commonly occurs in trapline areas. In the case of oil and gas activities, the industry has established a referral and compensation policy to address those cases where traps need to be moved. Although there is no provincial policy requirement for this arrangement, the BCMOE and the Ministry of Energy, Mines, and Petroleum Resources have developed a framework in cooperation with industry.

3.5 Guide Outfitting

The guide outfitter industry in B.C. contributes to economic activity in all regions of the province, including the northeast, and plays an important role in attracting tourists to B.C. In 2002, 223 guide outfitters offered hunts in B.C., guiding 5,144 clients and generating $64.4M in total revenues. Over 2,000 jobs were generated. When all spinoff and secondary impacts are counted, the sector was responsible for $135M in spending, $79M in provincial GDP, 1,631 person-years of employment and more than $22M in government revenues (Pacific Analytics 2003).

In 2012, there were 48 guide outfitters with active tenures in Region 7 (Northeast B.C.) (GOABC 2012a; GOABC 2012b). There are four guide outfitters with hunting territories overlapping the LAA. There are four guide outfitters with hunting territories overlapping the LAA. One guide outfitter identified up to three cabins within the LAA that may be affected by inundation (Guide Outfitter Interviews 2012, pers. comm.). Two cabins located near the Peace River downstream of the Site C dam site are not within the inundation area. One guide outfitter has licence of occupation for a hunting camp within the footprint of the Site C dam site.

One outfitter indicated that 40-50% of his hunts occur adjacent to the Peace River in November, and during the spring and fall bear hunts (Guide Outfitter Interviews 2012, pers. comm.). He offers charter fishing, boat operation, camping and day use on islands on the Peace River. Another outfitter indicated that the Peace River valley is a good area for hunting as far up as Maurice Creek across from Hudson's Hope and that he provides hunts on horseback in areas with limited access between Hudson's Hope and Taylor (Guide Outfitter Interviews 2012, pers. comm.). Another outfitter's spring bear hunt occurs in the area of Bullhead and Portage Mountain (Guide Outfitter Interviews 2012, pers. comm.).

Outfitters commented that traffic detours or access restrictions that result from construction or industrial activities in the region adversely affect guided outfitting hunting experience for clientele and in turn can affect outfitters' operations and/or revenue (Guide Outfitter Interviews 2012, pers. comm.). In general, the outfitters are concerned with increased competition for resources (e.g., through increased access in the LAA and RAA) and diminished wilderness experience (e.g., due to visible industrial activities or the need for or exposure to motorized access) (Guide Outfitter Interviews 2012, pers. comm.). Some outfitters indicate that oil and gas industry and forestry have already disturbed their guiding areas to the point where few untouched hunting areas remain (Guide Outfitter Interviews 2012, pers. comm.).

Table 18 shows outfitter quotas and harvests in the LAA.

Table 18 Business profile of guide outfitters in the local assessment area

Guide Outfitter Tenure #	Location	Management Unit	Hunts Offered
700551	Hudson's Hope	7-35, 7-43	BB, CO, DE, EL, GB, LY, MO, WO, FW, PS, TR, WV, XC
701241	Charlie Lake	7-31, 7-35, 7-36	BB, DE, GB, MO, WOF, SS
701222	Chetwynd	7-31	BB, CO, DE, EL, GB, GO, LY, MO, WOF, WOV, PS, WV
701245	Chetwynd	7-21, 7-22, 7-32	BB, CO, DE, EL, GB, GO, LY, MO, WOF, TR, PS, WV

NOTES:
BB-black bear, CO-cougar, DE-deer, EL-elk, GB-grizzly bear, GO-goat, LY-lynx, MO-moose, SS-stone sheep, WOF-wolf, WOV-wolverine, FW-fresh water angling, PS-photo safaris, TR-trail rides, WV-wildlife viewing, XC-cross country skiing

SOURCE:
GOABC (2012c)

These outfitters offer a variety of species and hunts, but moose and deer account for the bulk of hunter effort, harvest and expenditures (Table 19). For outfitters in the LAA, about half of their clients are American, with the remainder coming from Europe, New Zealand, Australia and other parts of Canada outside of B.C. At least one of the outfitters has been affected by the downturn in the US economy, experiencing almost a 50% drop in clientele over the last five years (Guide Outfitter Interviews 2012, pers. comm.). Province-wide, the geographic origin of guide outfitters' clients is 85% American, 4% German, 6% other European and 5% other nationalities (Pacific Analytics 2003). This profile is believed to be representative of guide outfitters in the LAA. Elk, deer, moose and bear hunts are the most popular in the region. In terms of Aboriginal employment, three elders from the West Moberly First Nation work for Tracks B.C./High Prairie Outfitters as guides (Guide Outfitter Interviews 2012, pers. comm.)

Table 19 Quotas (2007-2011) and harvests (2006-2010) for guide outfitters in the local assessment area

Tenure #	700551		701241		701222		701245	
Species	**Quota**	**Harvest**	**Quota**	**Harvest**	**Quota**	**Harvest**	**Quota**	**Harvest**
Black bear	N/A	36	N/A	15	N/A	39	N/A	12
Cougar	0	0	N/A	1	0	0	0	0
Elk (antlerless)	15	44[b]	6	10[b]	0	3[b]	37	43[b]
Any elk	8[a]		4[a]		0[a]		24[a]	
Grizzly bear	5	2[a]	5	0	15	2	11	7
Lynx	0	0	0	0	N/A	1	0	0
Moose (bull)	N/A	14	N/A	3	N/A	22	N/A	17
Mountain goat	0	0	0	0	5	1	12	7
Mule deer	N/A	38	N/A	18	N/A	2	N/A	8
Stone sheep	4	1	0	0	0	0	0	0

Tenure #	700551		701241		701222		701245	
Species	**Quota**	**Harvest**	**Quota**	**Harvest**	**Quota**	**Harvest**	**Quota**	**Harvest**
Whitetail deer	N/A	31	N/A	27	N/A	18	N/A	80
Wolf	N/A	0	N/A	0	N/A	2	N/A	2
Total	**32**	**165**	**15**	**71**	**20**	**90**	**84**	**176**

NOTES:
[a]2008-2011
[b]including bulls not on quota
N/A – not applicable
SOURCE:
BCMFLNRO, Environmental Assessment Coordinator (2011b pers. comm.)

In 2002, Region 7 guide outfitters generated $23M in spending (36% of the provincial total), $14.6M in provincial GDP and over 300 person-years of employment (Pacific Analytics 2003).

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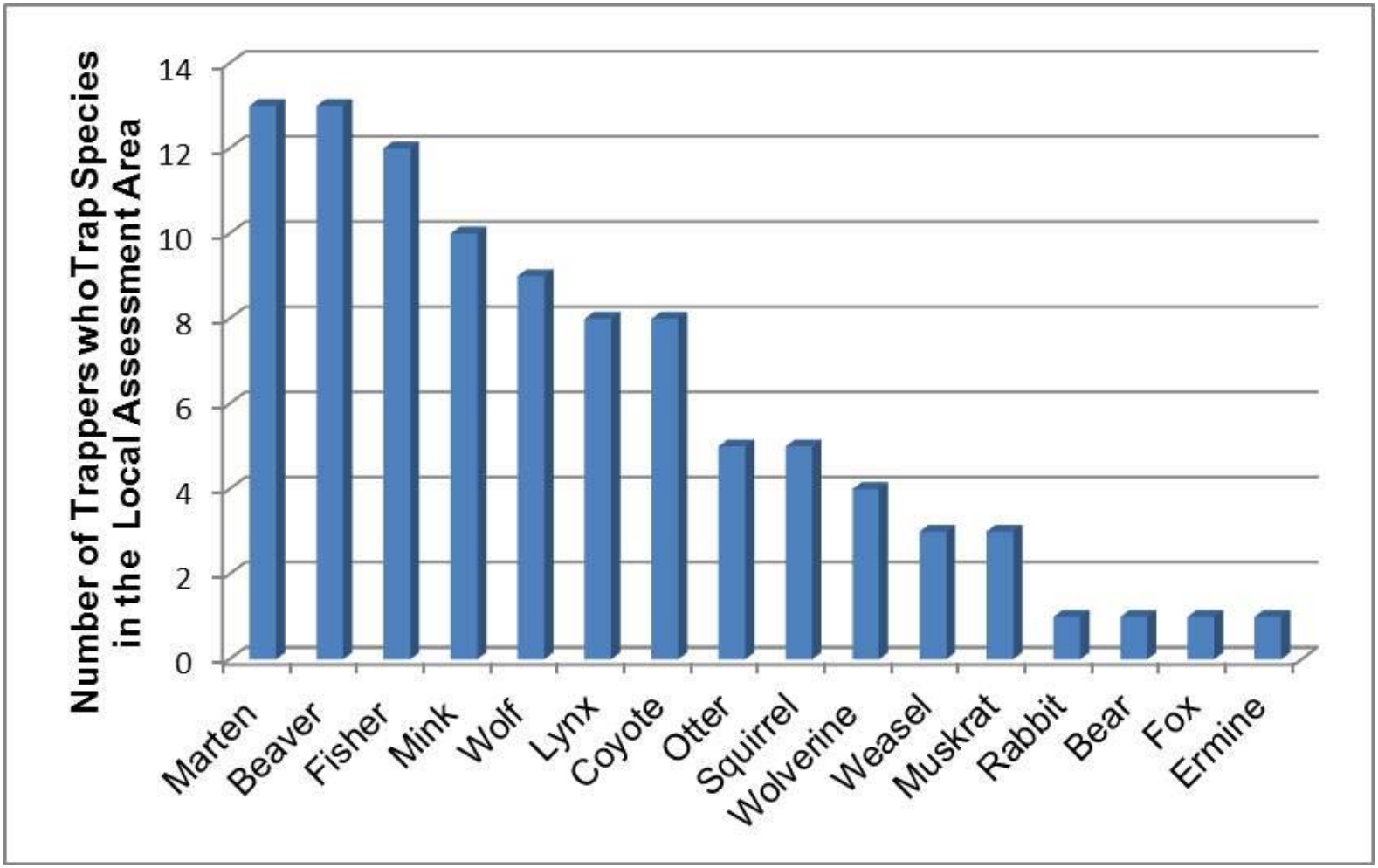
Figure



NOTES:
SOURCE: TRAPPER INTERVIEWS (2012, PERS. COMM.)

BC hydro

SITE C CLEAN ENERGY PROJECT

Figure 1 Species trapped in the local assessment area

Construction of the Site C Clean Energy Project is subject to required regulatory approvals including environmental certification