Quarterly Report on

Short-Term Water Approvals and Use

January to March, 2011

BC Oil & Gas COMMISSION

About the BC Oil and Gas Commission

The BC Oil and Gas Commission is an independent, single-window regulatory agency with responsibilities for overseeing oil and gas operations in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected through the objectives of ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

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Introduction

The Oil and Gas Activities Act (OGAA) provides authority to the BC Oil and Gas Commission (Commission) to issue short-term water use approvals under Section 8 of the Water Act to manage short-term water use by the oil and gas industry. Approvals under Section 8 of the Water Act authorize the diversion and use of water for a term not exceeding 12 months. This report details the Commission's responsibilities and authorities under Section 8 of the Water Act, and does not include the diversion and use of water approved by other agencies for purposes other than oil and gas activities.

The oil and gas industry obtains short-term water use approvals for a number of activities, which include:

- Seismic or geophysical exploration.
- Drilling.
- Machine washing.
- Winter ice road freezing.
- Dust control.
- Water floods (to enhance oil recovery).
- Hydraulic fracturing (predominantly of unconventional gas wells, but also conventional gas wells and some oil wells).
- Hydrostatic testing of oil and gas pipelines.
- Other purposes.

This report presents information on short-term water use approvals active during the January to March 2011 period. Included in the report is the volume of water that was reported as used by the Section 8 approval holders during the period.

This is the first report of water use following changes to the Commission's water use reporting requirements that came into effect in March 2011 through Directive 2011-02. It will be followed by regular, quarterly reports on short-term water approvals and use.

Processes and Requirements

Oil and gas operators apply to the Commission for approval to use or divert water for an oil or gas activity. Natural resource officers in the Commission's Permitting and Authorizations division receive, review and adjudicate the applications. Prior to March 2011, applications typically were for a specified volume per day, but not for a total volume for the duration of the approval. Also, water that was diverted and used from natural surface water sources, such as from rivers and lakes, required an approval, but water that was obtained from dugouts or borrow pits did not require an approval. With regard to reporting, companies holding a Section 8 approval were required to maintain records of water withdrawals, but there was no formal water use reporting requirement in place.

Liard River

In March 2011, the Commission made a number of changes in its requirements related to short-term water use approvals:

- Water sourced from a dugout or a borrow pit (referred to as either a Water Source Dugout or a Water Storage Site) now requires an approval for short-term use under Section 8 of the Water Act.
- Schedule A approvals were eliminated and replaced with a Basin Section 8 approval (Schedule A approvals provided the approval holder the right to access small quantities of water per day from any of a number of rivers and lakes in northeast British Columbia, listed in a table referred to as the "Schedule A" list; a Basin Section 8 provides authority to access a maximum of 45 cubic metres (m^3) per day and 5,000 m^3/year from a river or lake in a specified river basin. Basin Section 8s are limited to only a few uses, such as geophysical exploration, where it is not possible to have a standard approval with distinct points of withdrawal specified.
- Holders of short-term water use approvals are now required to report to the Commission the actual water volumes withdrawn from the various surface sources. Companies are required to report on a quarterly basis the water volumes withdrawn each month for each approved point of withdrawal.
- Applications are now required to contain a total volume per year that is requested, in addition to the requested volume per day.

The data contained in this report reflects the January to March 2011 quarterly period, representing the first reporting requirement from industry. However, other changes to the Commission's short-term water use approval process (such as the requirement for approvals for water diverted and used from dugouts or borrow pits) did not come into effect until April, and so are not reflected in this report.

RESULTS

Total Approval and Reported Use

During the January to March period of 2011, there were a total of 161 short-term water use approvals in place, with 599 specified points of diversion, held by 45 companies (Table 1). The total water volume associated with these approvals was 78.4 million m^3. This water volume is approved for use for a 12-month period for the approvals that were active during January to March, 2011. As a comparison, the total volume of short-term water use approved during the April 2009 to March 2010 period, as reported in the Commission's 2010 Water Use Report, was also 78 million m^3.[1] Of this volume, a total of almost 89,000 m^3 was reported by the approval holders as being withdrawn during the January to March period.

Not all approval holders reported water use as required. Data was not reported for 38 approvals (23.6 per cent of total), held by 16 companies (35.5 per cent of companies), and representing 19.8 million m^3 of approved water use (25.0 per cent of total volume approved). The Commission is following up on the 16 companies that did not report on their active short-term water use approvals.

In most cases, the total volume calculated for these approvals is the product of the requested volume per day for 365 days per year, for each point of diversion. This results in large total volumes for some approvals. As an example, one approval was issued for 8.7 million m^3 (500 m^3/day for 48 points of withdrawal, for 365 days per year). The five largest approvals have a total combined authorized volume of 26 million m^3, while the 10 largest approvals have a total combined volume of 39 million m^3 (Figure 1). These large volumes are primarily an artifact of the pre-March 2011 approval process, and the method by which the total volume was calculated. The actual water requirement of the approval holder is substantially smaller than the volume approved in this way. This situation has been addressed with the changes in requirements that were implemented in March, and it is anticipated that the total volume per approval will be smaller in future reports.

Commission Water Management Basins, Mean Annual Discharge

In 2011 the Commission developed map coverage of river basins in northeast British Columbia, referred to as the OGC Water Management Basins (Appendix A). This coverage was created from the Ministry of Environment's Freshwater Atlas mapping. Table 2 (Appendix B) summarizes the short-term water use within the OGC Water Management Basins. The 161 short-term water use approvals and the associated 599 points of withdrawal are listed within the specific river basin in which they occur.

For each basin, the mean annual discharge (cubic metres per second – m^3/s) and mean annual runoff (cubic metres per year – m^3/year) are listed. These values are calculated using two approaches:

1. Where there is a Water Survey of Canada stream flow gauge in the basin, the mean annual discharge is calculated from the historic gauge record, and is converted into a discharge per square kilometer of drainage basin (m^3/s/km^2). This value is then used to produce estimates of mean annual discharge for ungauged sub-basins by multiplying it by the drainage basin area of ungauged sub-basins. Table 3 (Appendix C) contains a listing of the Water Survey of Canada stream flow gauges used in this report.
2. There is a general lack of Water Survey of Canada stream flow data for the Horn, Liard and Cordova basins in northeast British Columbia from which discharge estimates can be made. However, the Commission completed a preliminary hydrological modelling study in the Horn and Liard basins in March 2011, which has been used to provide preliminary estimates of mean annual discharge and runoff for some basins.

The Commission recognizes the importance of having enhanced stream flow estimates for river basins in which oil and gas activity occurs, and has started a project in partnership with Geoscience BC to complete overview hydrologic modelling for all of northeast British Columbia, and to produce a Geographic Information System-based hydrology decision-support tool. This project is expected to be completed by the end of 2011, and when it is done it will provide improved estimates of monthly, seasonal and annual runoff. This information will then assist the Commission with regard to Section 8 short-term water use approvals.

The hydrology information is used to provide context for the

1 Oil and Gas Water Use in British Columbia, August, 2010. BC Oil and Gas Commission, Victoria, BC

	Total	Reported to Commission	% of Total	Not Reported to Commission	% of Total
Number of Approvals	159	121	75%	38	24%
Number of Points of Withdrawal	599	492	82%	105	18%
Number of Companies	44	28	62%	16	36%
Total Volume Approved (m^3)	78,350,264	58,531,519	75%	19,818,745	25%
Total Volume Reported Used (m^3)	n/a	88,956	n/a	n/a	n/a

Table 1 – Summary of Short-Term Water Use Approvals Active During January to March, 2011

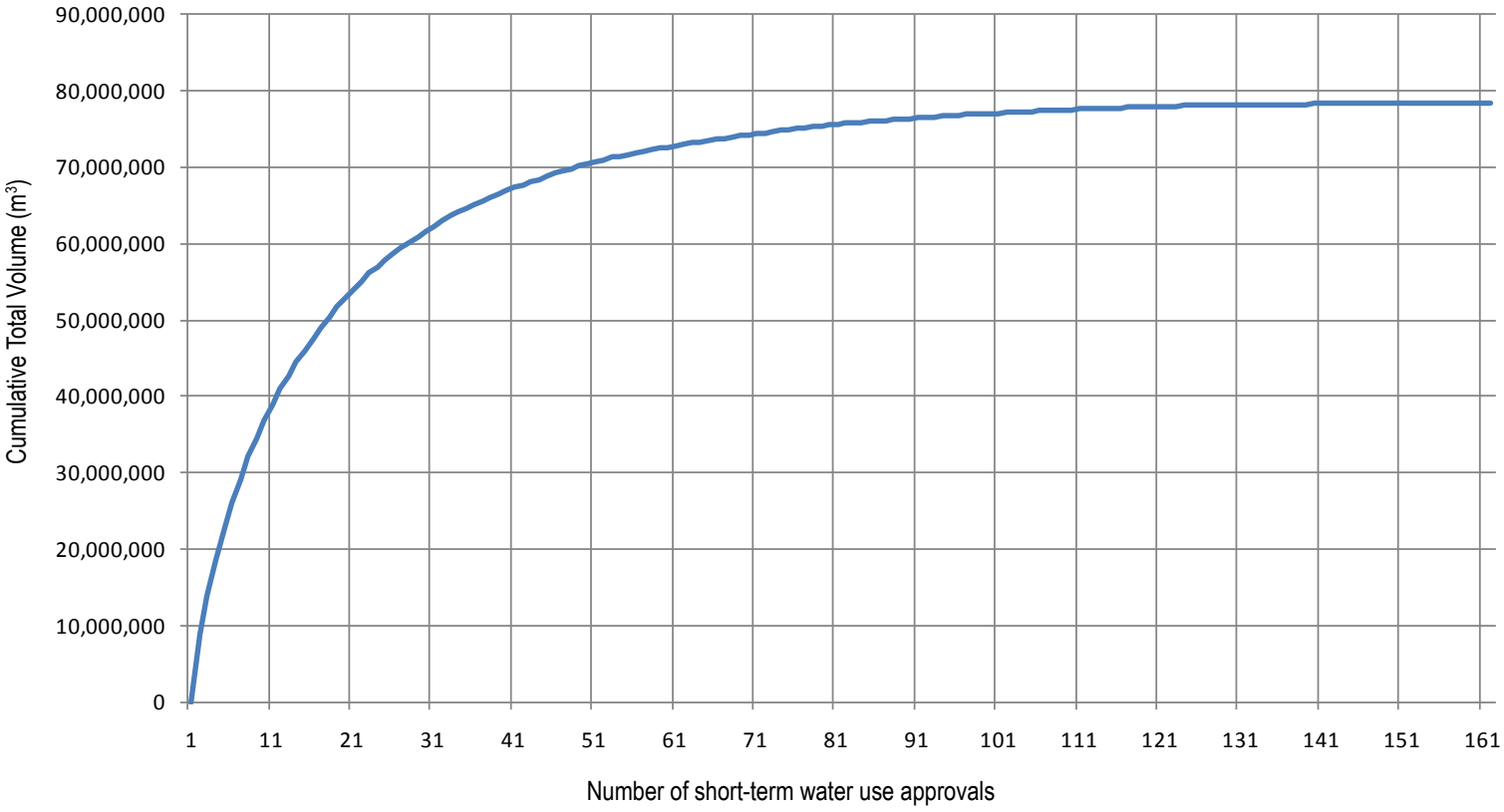

Figure 1 – Cumulative volume of short-term water use approvals, Jan-Mar, 2011

Horn River Basin

short-term water approvals and use. In Table 2, the total volume approved and used in each river basin is presented as a percentage of mean annual runoff.

Approvals and Use in Relation to Basin Runoff

In most river basins in northeast British Columbia, the total approved short-term water use is a small fraction of the mean annual runoff. The basins with the 10 largest total approved volumes as a percentage of mean annual runoff are:

- Tsea River – 2.0 per cent
- Upper Petitot River – 1.5 per cent
- Sahdoanah River – 1.1 per cent
- Lynx Creek – 0.87 per cent
- Shekilie River – 0.67 per cent
- Kiwigana River – 0.59 per cent
- Moberly River – 0.55 per cent
- Farrell Creek – 0.54 per cent
- Lower Petitot River – 0.35 per cent
- Fontas River – 0.23 per cent

For all the remaining basins, the approved short-term water use corresponds to less than 0.20 per cent of mean annual runoff.

Actual water use (as reported by the approval holders) in individual basins is a small fraction of the approved water use, and was less than 0.002 per cent of mean annual runoff in individual river basins. As noted above, though, data for almost 25 per cent of the active water use approvals were not reported, and it is possible that the actual water use will be higher.

SUMMARY

The Commission has authority under OGAA for short-term water use approvals through Section 8 of the Water Act. Changes in the Commission's water use approvals processes were introduced in March 2011. Included in the changes is the new requirement for the quarterly reporting of actual water withdrawals from all approved points of withdrawal.

This report presents a summary of short-term water approvals and use for the January to March 2011 period.

During this period, there were a total of 161 short-term water use approvals in place, with 599 specified points of diversion, held by 45 companies. The total water volume associated with these approvals was 78.4 million m^3. Of this, a total of almost 89,000 m^3 was reported by the approval holders as actually being withdrawn during the January to March period. This total volume of water reported may under-represent actual volumes used due to some data not reported.

Not all approval holders reported water use as required. Data was not reported for 38 approvals (23.6 per cent of total), held by 16 companies (35.5 per cent of companies). These files are being followed up on by the Commission.

Table 2 of this report presents the short-term water use and approval information in relation to mean annual runoff from the river basins in which the approvals are located. In most cases, the total approved use was less than 0.2 per cent of mean annual runoff. Three basins in the Horn River Basin have approved water use of one to two per cent (Tsea River, Upper Petitot River and Sahdoanah River). All the rest were less than one per cent of annual runoff. In all cases, the actual reported use was a very small fraction of the total approved use.

Total approved use is high relative to actual use for a number of reasons, the major reason being an artifact of the Commission's approval process where a "total volume" approved was not required. This practice was changed in March 2011, and the Commission now requires companies to apply for a total volume for the duration of the approval. Total volumes approved for short-term water approvals are anticipated to decline in future reports as a result of this new practice.

The Commission anticipates releasing quarterly reports on water approvals and use. The next report will be for April-July, 2011.

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APPENDIX A

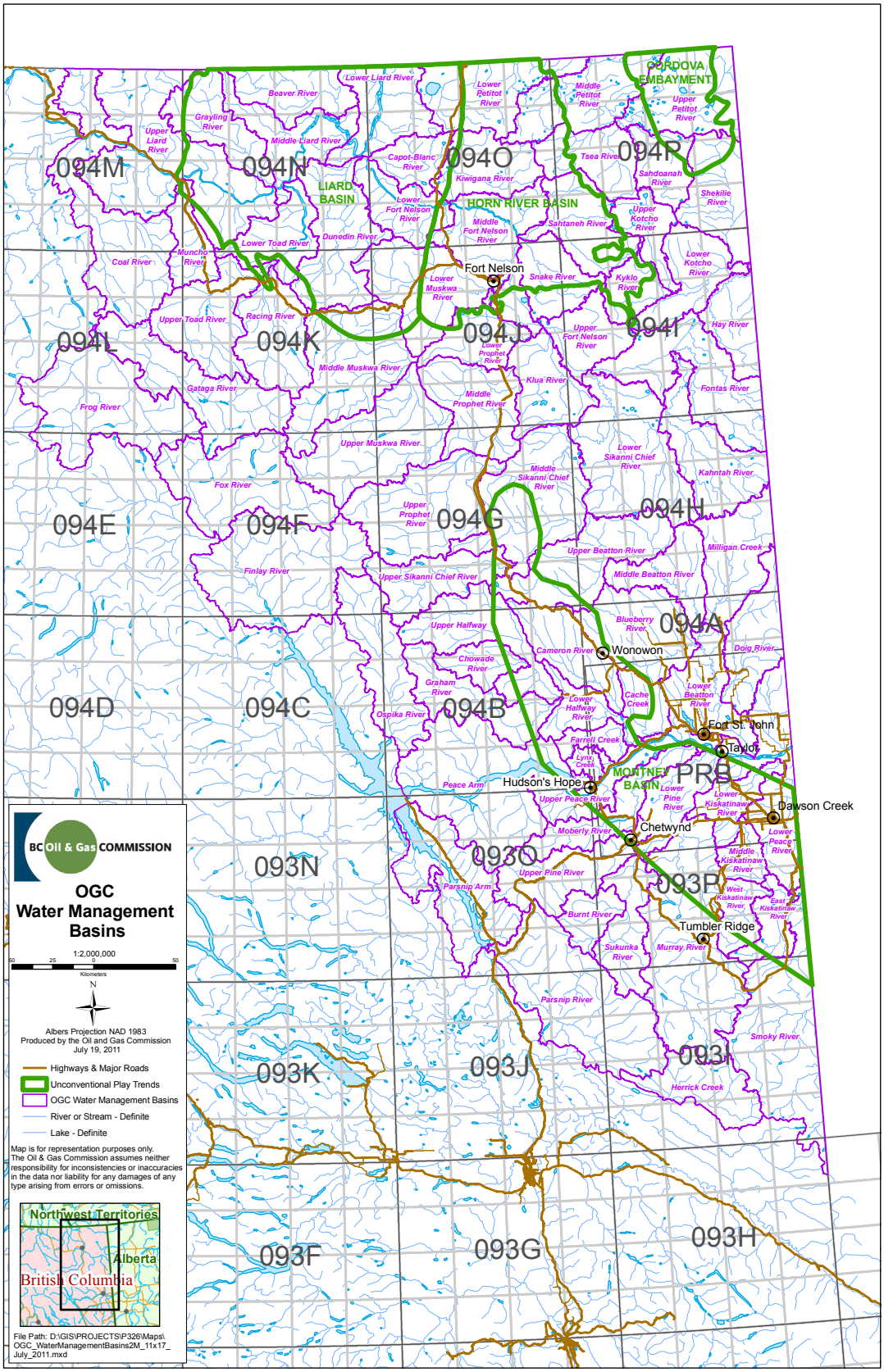

Figure 2 – Commission Water Management Basins

APPENDIX B

Table 2 – Current Section 8 (short-term water use) approved by the Commission.
(Approved volumes, actual withdrawals for the Jan-Mar 2011 period, and annual discharge)

Major Basin Name	Sub-Basin Name	Number of Section 8 Approvals	Number of Points of Diversion	Total Volume Approved (m^3)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m^3)	Total Volume Withdrawn as % of Mean Annual Runoff	Mean Annual Discharge (m^3/s)	Mean Annual Runoff (m^3)
Beatton	Upper Beatton River	7	9	226,070	0.059%	2,538	0.001%	12.2	386,248,504
	Middle Beatton River	0	6	589,680	0.100%	0		18.7	590,127,120
	Milligan Creek	5	17	237,220	0.081%	0		9.3	292,529,786
	Blueberry River	1	2	196,560	0.058%	0		10.7	336,659,474
	Doig	0	0	0	0.000%	0		7.7	243,054,492
	Lower Beatton River	1	1	182,000	0.015%	0		38.6	1,218,123,360
Beatton Total		14	35	1,431,530	0.084%	2,538	0.000%	54.1	1,708,660,566
Fort Nelson	Fontas River	2	25	1,697,988	0.231%	0		23.3	734,802,107
	Kahntah River		4	283,720	0.052%	0		17.3	544,750,613
	Kiwigana River	14	25	2,305,450	0.591%	0		12.4	390,226,333
	Klua River		5	248,248	0.063%	0		12.4	391,372,372
	Upper Prophet River	0	0	0	0.000%	0		24.9	786,946,888
	Middle Prophet River		2	364,000	0.028%	0		41.7	1,315,951,920
	Lower Prophet River	3	3	11,250	0.001%	2,538	0.000%	51.2	1,615,749,120
	Snake River		5	413,140	0.127%	0		10.3	324,902,101
	Upper Fort Nelson River		11	908,908	0.017%	0		165	5,207,004,000
	Middle Fort Nelson River	23	36	6,907,790	0.073%	32,732	0.000%	300	9,467,280,000
	Lower Fort Nelson River	3	8	1,839,400	0.017%	0		340	10,729,584,000
Fort Nelson Total		45	124	14,979,894	0.135%	35,270	0.000%	350	11,068,673,506
Halfway	Upper Halfway River	4	9	1,762,100	0.157%	24,236	0.002%	35.6	1,123,450,560
	Chowade	0	0	0	0.000%	0		10.3	325,043,280
	Graham River	1	3	1,288,800	0.224%	0		18.3	576,557,352
	Cameron River	1	1	1,500	0.000%	0		16.2	511,548,540
	Lower Halfway River	4	5	1,003,000	0.050%	0		64.2	2,025,051,192
Halfway Total		10	18	4,055,400	0.175%	24,236	0.001%	73.5	2,319,119,474
Hay	Hay River		32	1,402,084	0.539%	576		8.2	260,100,000

Hay Total			32	1,402,084		576			
Kiskatinaw	East Kiskatinaw River	1	7	49,000	0.051%	0		3.0	95,935,104
	West Kiskatinaw River		3	21,000	0.023%	0		2.9	90,570,312
	Middle Kiskatinaw		0	0	0.000%			8.1	255,616,560
	Lower Kiskatinaw River	1	1	364,000	0.115%	0		10.0	315,576,000
Kiskatinaw Total		2	11	434,000	0.132%	0	0.000%	10.4	327,904,045
Kotchko	Kyklo River		10	483,820	0.256%	0		6	189,345,600
	Lower Kotcho River	1	26	1,227,372	0.351%	2,734	0.001%	11.07	349,342,632
	Shekilie River		19	2,657,200	0.668%	0		12.6	397,625,760
	Upper Kotcho River	1	2	99,008	0.018%	0		17.5	552,258,000
Kotchko Total		2	57	4,467,400	0.300%	2,734		47.2	1,489,518,720
Liard	Capot-Blanc River	6	16	750,100	0.233%	0		10.2	321,887,285
	Dunedin River	0	0	0	0.000%			49.6	1,565,181,051
	Lower Toad River	0	0	0	0.000%			71.2	2,246,511,740
	Grayling River	0	0	0	0.000%			18.5	583,947,351
	Beaver River	0	0	0	0.000%			16.6	525,243,649
	Upper Liard River	0	0	0	0.000%			95.5	3,013,750,800
	Middle Liard River	0	0	0	0.000%			114	3,597,566,400
	Lower Liard River	4	6	279,100	0.007%	0		136	4,291,833,600
Liard Total		10	22	1,029,200	0.002%	0		1420	44,811,792,000
Moberly	Moberly River	7	7	1,981,935		0			
Moberly Total		7	7	1,981,935	0.549%	0	0.000%	11.4	361,134,655
Muskwa	Upper Muskwa River	0	0	0	0.000%			44.5	1,404,313,200
	Middle Muskwa River	0	0	0	0.000%			89	2,808,626,400
	Lower Muskwa River	1	1	4,500	0.000%	4,005	0.000%	124	3,913,142,400
Muskwa Total		1	1	4,500	0.000%	4,005	0.000%	213	6,713,724,706
Peace	Cache Creek	1	1	16,380	0.007%	not reported		7.3	230,370,480
	Farrell Creek	1	2	873,600	0.544%	0		5.09	160,628,184
	Lower Peace River	4	9	3,704,400	0.009%	0		1280	40,393,728,000
	Lynx Creek	1	1	696,000	0.868%	not reported		2.54	80,156,304
	Peace Arm	1	2	4,128,000	0.010%	0		1280	40,393,728,000
	Upper Peace River	5	7	3,603,600	0.008%	0		1430	45,127,368,000
Peace Total		13	22	13,021,980					

Petitot	Lower Petitot River	19	36	8,647,545	0.350%	5,868	0.000%	78.3	2,470,960,080
	Middle Petitot River	10	45	1,735,500	0.088%	1,975	0.000%	62.7	1,978,661,520
	Sahdoanah River	1	32	2,660,628	1.126%	0		7.5	236,366,424
	Sahtaneh River	1	2	158,228	0.039%	0		12.8	402,990,552
	Tsea River	3	45	6,615,250	1.955%	1,125	0.000%	10.7	338,297,472
	Upper Petitot River	5	71	7,838,000	1.533%	2,988	0.001%	16.2	511,233,120
Petitot Total		39	231	27,655,151	0.412%	11,956	0.000%	78.3	6,713,724,706
Pine River	Burnt	0	0	0				15.9	501,765,840
	Sukunka	0	0	0				45.4	1,432,715,040
	Upper Pine	0	0	0				38.9	1,227,590,640
	Murray River	1	9	1,512,000	0.057%	0	0.000%	83.4	2,631,903,840
	Lower Pine River	3	4	2,918,800	0.049%	0	0.000%	189	5,964,386,400
Pine Total		4	13	4,430,800	0.074%	0	0.000%	189	5,980,515,840
Prophet	Upper Prophet River	1	1	68,250	0.005%	not reported		42	1,325,419,200
	Middle Prophet	0	0	0	0.000%			70.1	2,212,187,760
	Lower Prophet	0	0	0	0.000%			86.2	2,720,265,120
Prophet Total		1	1	68,250	0.003%	not reported		86.2	2,720,265,120
	Upper Sikanni Chief River	1	3	742,000	0.090%	6,341	0.001%	26.1	823,653,360
	Middle Sikanni Chief River	4	5	309,400	0.013%	0		76.7	2,420,467,920
	Lower Sikanni Chief River	1	1	700	0.000%	0		132	4,165,603,200
Sikanni Chief Total		6	9	1,052,100	0.025%	6,341	0.000%	132	4,165,603,200
Smoky	Smoky River	7	16	2,336,040		1,300			
Smoky Total		7	16	2,336,040		1,300			
Grand Total		161	599	78,350,264		88,956			

Note 1: The water reporting for the Jan-Mar, 2011 period was incomplete, and the "Total Volume Withdrawn" column may not be complete for all basins.

Note 2: Refer to report for information on how Mean Annual Discharge and Mean Annual Runoff were calculated.

APPENDIX C

Table 3 – Water Survey of Canada Hydrometric Stations utilized in the “mean annual discharge” calculations.

Gauge No.	Gauge Name	Basin Area (km^2)	Mean Annual Discharge (m^3/s)	Mean Annual Runoff (mm)
07FA003	Halfway River above Graham River	3,780	35.6	421
07FA005	Graham River above Colt Creek	2,200	24.4	496
07FA006	Halfway River near Farrell Creek	9,330	73.5	352
07FB001	Pine River at East Pine	12,100	190	702
07FB002	Murray River near the Mouth	5,550	83.4	672
07FB003	Sukunka River near the Mouth	2,590	54.8	946
07FB004	Dickebusch Creek near the Mouth	82	0.592	323
07FB008	Moberly River near Fort St. John	1,520	11.4	336
07FC001	Beatton River near Fort St. John	15,600	54.1	155
07FC003	Blueberry River below Aitken Creek	1,770	5.35	135
07FD001	Kiskatinaw River near Farmington	3,640	10.4	128
10BE004	Toad River above Nonda Creek	2,570	43.4	755
10BE011	Grayling River near the Mouth	1,780	16.5	414
10BE101	Toad River near the Mouth	6,900	103	667
10CA001	Fontas River near the Mouth	7,400	31.3	189
10CB001	Sikanni Chief River near Fort Nelson	2,160	25.9	535
10CC001	Fort Nelson River at Fort Nelson	43,500	351	361
10CC002	Fort Nelson River above Muskwa River	22,800	138	271
10CD001	Muskwa River near Fort Nelson	20,300	212	467
10CD003	Raspberry Creek near the Mouth	273	1.19	195
10CD004	Bougie Creek at km 368	332	2.67	360
10CD005	Adsett Creek at km 386	109	0.861	353
10CD006	Prophet River above Cheves Creek	7,320	74.6	456