Quarterly Report on

Short-Term Water Approvals and Use

April to June 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; it does not include the diversion and use of water approved by other agencies (such as the Ministry of Forests, Lands and Natural Resource Operations, which has responsibility for water licensing) or 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 April to June 2011 period. Included in the report is the cumulative volume of water that was reported as used by the Section 8 approval holders during 2011 (January to June). This is the second report of water use following changes to the Commission's water use reporting requirements that came into effect in March 2011. It will be followed by regular, quarterly reports on short-term water approvals and use. The first report, for the period of January to March 2011, is available on the Commission website.

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.

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 B.C., listed in a table referred to as the Schedule A list; a Basin Section 8 provided 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 April to June 2011 quarterly period, representing the second reporting requirement from industry. In addition, cumulative water use for January to June 2011 is presented. 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) came into effect in April, and so are reflected in this report.

Liard River

Public Reporting of Short-term Water Use Approvals

Data on active short-term water use approvals is now being reported on the Commission's website here. The file is updated every night, and contains a complete listing of all the active short-term water use approvals issued by the Commission. For each approval, the following information is presented:

- ogc_file_number
- application_received_date
- application_approval_date
- effective_date
- termination_date
- client_name
- wmb_name (watershed name)
- utm_zone
- utm_northing
- utm_easting
- source_name
- source_type
- approved_volume_per_day
- approved_total_volume
- approval_status

RESULTS

Total Approval and Reported Use

During the April to June period of 2011, there were a total of 229 short-term water use approvals in place, with 553 specified points of diversion, held by 46 companies (Table 1). The total water volume associated with these approvals was 69.2 million m^3. This water volume is approved for use for a 12-month period for the approvals that were active during April to June 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 water use report from August 2010, was 78 million m^3.[1] In addition, the total volume of active approvals during April to June 2011 is almost 12 per cent less than the active approved during the first quarter of 2011. This reduction results largely from the Commission now requiring companies to apply for a total volume of water, rather than just a volume per day. We anticipate that the total water volume approved statistic will continue to drop until all the pre-2011 approvals have expired.

Of the total volume approved for withdrawal, a total of almost 1.4 million m^3 was reported by the approval holders as being withdrawn. This is a cumulative total for 2011, representing withdrawals during the six-month period of January to June.

The quarterly water use report for the January to March 2011 period noted that not all approval holders reported water use as required. For that period, data was not reported for 38 approvals held by 16 companies. The files for the 16 companies that did not report on their active short-term water use approvals were referred to the Commission's Compliance and Enforcement Branch for investigation and follow-up. Following investigation, tickets and fines were levied to the non-compliant companies based on the Violation Ticket Administration and Fines Regulation of the Offence Act. For the April to June 2011 period, compliance significantly improved, with four companies not reporting on eight approvals (3.5 per cent of total). These have been referred to the Commission's Compliance and Enforcement Branch for investigation and follow-up.

Commission Water Management Basins, Mean Annual Discharge

In 2011 the Commission developed map coverage of river basins in northeast B.C., 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 229 short-term water use approvals and the associated 553 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 (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 kilometre 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 B.C. 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 occur, and has started a project in partnership with Geoscience BC to complete overview hydrologic modelling for all of northeast B.C., 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 completed 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 short-term water approvals and use. In Table 2, the total volume

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

Table 1 – Summary of Short Term Water use Approvals active during 2011

	Q1 Total Jan-Mar 2011	Q2 Total Apr-Jun 2011	Q3 Total Jul-Sep 2011	Q4 Total Oct-Dec 2011
Number of Approvals	161	229	-	-
Number of Points of Withdrawal	599	553	-	-
Number of Companies	45	46	-	-
Total Volume Approved (m3)[1]	78,350,264	69,243,134	-	-
Total Volume Reported Used (m3)[2]	88,956	1,393,879	-	-

Notes:

1. The number of approvals, number of points of withdrawal, number of companies and total volume approved are for a 12-month period beginning with each quarter.

2. The total volume reported is cumulative for calendar year 2011.

3. For Q1, 38 approvals (24 per cent of total) representing 19,818,000 m^3 of approved volume (25 per cent of total) were not reported.

4. For Q2, eight approvals (3.5 per cent of total) representing 1,170,000 m^3 of approved volume (1.6 per cent of total) were not reported.

Horn River Basin

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 B.C., 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:

- Upper Petitot River – 1.7 per cent
- Tsea 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 – 0.57 per cent
- Moberly River – 0.55 per cent
- Farrell Creek – 0.54 per cent
- Lower Petitit River – 0.42 per cent
- Lower Kotchko River – 0.27 per cent

For all the remaining basins, the approved short-term water use corresponds to less than 0.25 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, except for the Tsea River, where actual use was 0.21 per cent of mean annual runoff (Note: the Tsea River is part of the Petitot River watershed, and is located in the Horn River Basin gas play area).

SUMMARY

The Commission has authority under the Oil and Gas Activities Act 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 for the April to June 2011 period, and a summary of reported usage for the January to June period.

During this period, there were a total of 229 short-term water use approvals in place, with 553 specified points of diversion, held by 46 companies. The total water volume associated with these approvals was 69.2 million m^3, a reduction of 12 per cent from the previous quarter. A total of almost 1.4 million m^3 was reported by the approval holders as actually being withdrawn during the January to June period.

Not all approval holders reported water use as required. Data were not reported for eight approvals (3.5 per cent of total), held by four companies. These files have been referred to the Commission's Compliance and Enforcement Branch for investigation and follow-up.

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 0.25 per cent of mean annual runoff. Three basins in the Horn River Basin have approved water use of one to two per cent (Upper Petitot River, Tsea 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. The Tsea River (in the Horn River Basin gas play) was the highest and had a reported use representing 0.21 per cent of mean annual runoff.

Total approved use is high relative to actual use for a number of reasons, a 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 the July to September 2011 period.

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APPENDIX A

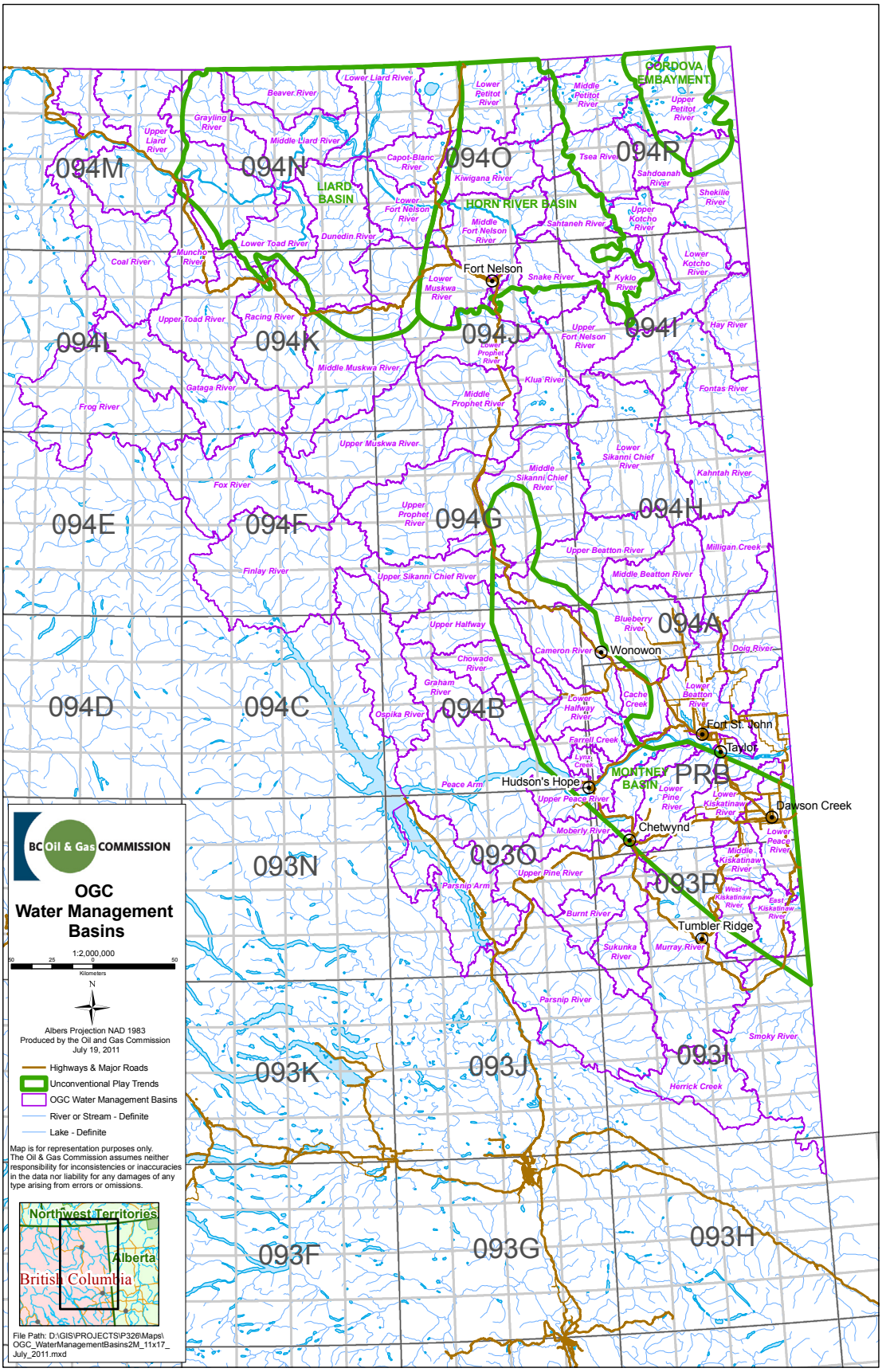

Figure 1 – Commission Water Management Basins

APPENDIX B

Table 2 – Current Section 8 (short-term water use) approved by the Commission.
(Approved volumes (Apr-Jun 2011), actual withdrawals (Jan-Jun 2011) 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	8	189,670	0.049%	1,329	0.000%	12.2	386,248,504
	Middle Beatton River	1	6	589,680	0.100%	280	0.000%	18.7	590,127,120
	Milligan Creek	5	17	237,220	0.081%	0	0.000%	9.3	292,529,786
	Blueberry River	1	2	196,560	0.058%	0	0.000%	10.7	336,659,474
	Doig	0	0	0	0	0	0.000%	7.7	243,054,492
	Lower Beatton River	1	1	182,000	0.015%	0	0.000%	38.6	1,218,123,360
Beatton Total		15	34	1,395,130	0.082%	1,609	0.000%	54.1	1,708,660,566
Fort Nelson	Fontas River	2	17	733,388	0.100%	0	0	23.3	734,802,107
	Kahntah River	1	2	18,000	0.003%	0	0	17.3	544,750,613
	Kiwigana River	15	22	2,210,650	0.567%	0	0	12.4	390,226,333
	Klua River	1	5	248,248	0.063%	0	0	12.4	391,372,372
	Upper Prophet River	0	0	0	0	0	0	24.9	786,946,888
	Middle Prophet River	0	0	0	0	0	0	41.7	1,315,951,920
	Lower Prophet River	0	0	0	0	0	0	51.2	1,615,749,120
	Snake River	1	5	413,140	0.127%	0	0	10.3	324,902,101
	Upper Fort Nelson River	1	11	908,908	0.017%	0	0	165	5,207,004,000
	Middle Fort Nelson River	29	37	4,796,390	0.051%	493,470	0.005%	300	9,467,280,000
	Lower Fort Nelson River	3	6	1,037,150	0.010%		0	340	10,729,584,000
Fort Nelson Total		53	105	10,365,874	0.094%	493,470	0.004%	350	11,068,673,506
Halfway	Upper Halfway River	5	6	1,359,500	0.121%	32,708	0.003%	35.6	1,123,450,560
	Chowade	0	0	0	0	0	0	10.3	325,043,280
	Graham River	1	2	852,000	0.148%	0	0	18.3	576,557,352
	Cameron River	1	1	1,500	0.000%	0	0	16.2	511,548,540
	Lower Halfway River	5	5	1,003,000	0.050%	270	0.000%	64.2	2,025,051,192
Halfway Total		12	14	3,216,000	0.139%	32,978	0.001%	73.5	2,319,119,474
Hay	Hay River	2	17	382,884	0.147%	0		8.2	260,100,000

Hay Total		2	17	382,884		0			
Kiskatinaw	East Kiskatinaw River	2	6	156,000	0.163%			3.0	95,935,104
	West Kiskatinaw River	1	2	14,000	0.015%			2.9	90,570,312
	Middle Kiskatinaw		0					8.1	255,616,560
	Lower Kiskatinaw River	1	1	364,000	0.115%	6,406	0.002%	10.0	315,576,000
Kiskatinaw Total		4	9	534,000	0.163%	6,406	0.002%	10.4	327,904,045
Kotchko	Kyklo River	3	7	283,620	0.150%			6	189,345,600
	Lower Kotcho River	3	22	943,452	0.270%			11.07	349,342,632
	Shekilie River	3	19	2,657,200	0.668%	532	0.000%	12.6	397,625,760
	Upper Kotcho River	2	2	99,008	0.018%			17.5	552,258,000
Kotchko Total		11	50	3,983,280	0.267%	532	0.000%	47.2	1,489,518,720
Liard	Capot-Blanc River	6	16	750,100	0.233%			10.2	321,887,285
	Dunedin River							49.6	1,565,181,051
	Lower Toad River							71.2	2,246,511,740
	Grayling River							18.5	583,947,351
	Beaver River							16.6	525,243,649
	Upper Liard River							95.5	3,013,750,800
	Middle Liard River							114	3,597,566,400
	Lower Liard River	6	6	279,100	0.007%			136	4,291,833,600
Liard Total		12	22	1,029,200	0.002%	0		1420	44,811,792,000
Moberly	Moberly River	7	7	1,981,935		4,080			
Moberly Total		7	7	1,981,935	0.549%	4,080	0.001%	11.4	361,134,655
Muskwa	Upper Muskwa River			0	0.000%			44.5	1,404,313,200
	Middle Muskwa River			0	0.000%			89	2,808,626,400
	Lower Muskwa River	1	1	4,500	0.000%		0.000%	124	3,913,142,400
Muskwa Total		1	1	4,500	0.000%	0	0.000%	213	6,713,724,706
Peace	Cache Creek	1	1	16,380	0.007%			7.3	230,370,480
	Farrell Creek	1	2	873,600	0.544%			5.09	160,628,184
	Lower Peace River	5	7	3,690,400	0.009%	26,695	0.000%	1280	40,393,728,000
	Lynx Creek	1	1	696,000	0.868%			2.54	80,156,304
	Peace Arm	1	1	2,064,000	0.005%			1280	40,393,728,000
	Upper Peace River	6	6	3,057,600	0.007%	25,715	0.000%	1430	45,127,368,000
Peace Total		15	18	10,397,980		52,410			

Petitot	Lower Petitot River	25	39	10,239,145	0.414%	22,228	0.001%	78.3	2,470,960,080
	Middle Petitot River	13	45	1,735,500	0.088%	9,856	0.000%	62.7	1,978,661,520
	Sahdoanah River	7	32	2,660,628	1.126%			7.5	236,366,424
	Sahtaneh River	2	2	158,228	0.039%			12.8	402,990,552
	Tsea River	7	41	4,984,300	1.473%	706,334	0.209%	10.7	338,297,472
	Upper Petitot River	18	80	8,578,350	1.678%	11,182	0.002%	16.2	511,233,120
Petitot Total		72	239	28,356,151	0.422%	749,600	0.011%	78.3	6,713,724,706
Pine River	Burnt							15.9	501,765,840
	Sukunka							45.4	1,432,715,040
	Upper Pine							38.9	1,227,590,640
	Murray River	3	7	1,555,000	0.059%	29,418	0.001%	83.4	2,631,903,840
	Lower Pine River	3	4	2,918,800	0.049%			189	5,964,386,400
Pine Total		6	11	4,473,800	0.075%	29,418	0.000%	189	5,980,515,840
Prophet	Upper Prophet River				0.000%			42	1,325,419,200
	Middle Prophet	1	2	364,000	0.016%	2,451	0.000%	70.1	2,212,187,760
	Lower Prophet	3	3	11,250	0.000%	338	0.000%	86.2	2,720,265,120
Prophet Total		4	5	375,250	0.014%	2,789	0.000%	86.2	2,720,265,120
	Upper Sikanni Chief River	3	3	375,000	0.046%	6,341	0.001%	26.1	823,653,360
	Middle Sikanni Chief River	3	4	241,150	0.010%	2,776	0.000%	76.7	2,420,467,920
	Lower Sikanni Chief River	1	1	700	0.000%			132	4,165,603,200
Sikanni Chief Total		7	8	616,850	0.015%	9,117	0.000%	132	4,165,603,200
Smoky	Smoky River	8	13	2,161,600		3,800			
Smoky Total		8	13	2,161,600		3,800			
Grand Total		229	553	69,274,434		1,386,209			

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	Bluebery 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