

# Water Use in Oil and Gas Activities

Quarterly Updates on Short-Term Water Approvals and Use  
Q2 (April-June 2012) / Q3 (July-September 2012)



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### About Us

## BC Oil and Gas Commission

The BC Oil and Gas Commission (Commission) is the single-window regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

For general information about the Commission, please visit [www.bcogc.ca](http://www.bcogc.ca) or phone 250-794-5200.

### More Information

## Contact [www.bcogc.ca](http://www.bcogc.ca)

The short-term water approvals and usage data is updated quarterly with new information and statistics. A current copy is available on the Commission website at [www.bcogc.ca](http://www.bcogc.ca), along with:

- [Oil and Gas Activities Act and Water Act](#)
- [Short-term Use of Water Application Manual](#)
- [Data files of all Active Section 8 Approvals](#)
- [2011 Annual Water Report and Quarterly Updates \(Jan-Mar, Apr-Jun, Jul-Sep\)](#)
- [2012 Quarterly Updates](#)
- [Northeast Water Tool](#)

For specific questions or enquiries regarding this data, please contact:

Allan Chapman, MSc, PGeo.

Hydrologist

BC Oil and Gas Commission

[Allan.Chapman@bcogc.ca](mailto:Allan.Chapman@bcogc.ca).



## Quarterly Update on Short-Term Water Approvals and Use

Regulatory responsibility for short-term water use approvals is delegated to the BC Oil and Gas Commission (Commission) through the Oil and Gas Activities Act, as a specified enactment of the Water Act. Under Section 8, oil and gas operators apply to the Commission for approval to use or divert surface water from rivers, lakes or dugouts for an oil or gas activity for a maximum period of one year. The application specifies the total volume of water requested, the maximum withdrawal rate in cubic metres (m<sup>3</sup>) per day, and the specific geographic coordinates for all locations from where withdrawal is requested. Natural resource officers in the Commission's Permitting and Authorizations division receive, review and adjudicate the applications.

This update combines the second and third quarters for 2012, providing information on short-term water use approvals active during April-June and July-September. It details the Commission's responsibilities and authorities under Section 8 of the Water Act. It also includes available data on water licenses in northeast British Columbia, which are valid for periods greater than one year and under the permitting authority of the Ministry of Forests, Lands and Natural Resource Operations.

Included in the update is the cumulative volume of water that was approved for use, as well as the volume reported as actually used by the Section 8 approval holders for the April-June and July-September 2012 periods. Previous annual water reports and quarterly updates are available on the Commission's website at [www.bcogc.ca](http://www.bcogc.ca). New to this report is a summary of water source well production. The summary, in Appendix A, includes data from all reporting water source wells from January 2007 to August 2012.

## Water Used in Oil and Gas Activities

The Oil and Gas Activities Act provides authority to the Commission to issue short-term water use approvals under Section 8 of the Water Act in order 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. 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
- Hydrostatic testing of oil and gas pipelines
- Other purposes

### Commission Authority for Water

The Commission has natural resource specialists trained to review and adjudicate applications for water use associated with oil and gas activities. These specialists, including a professional hydrologist, have expertise in northeast B.C.'s water resources and oil and gas operations.

The Commission manages water approvals and use with specific focus on environmental values, and tools include:

- The development of a watershed base map for northeast B.C. (derived from the Ministry of Environment's "Freshwater Atlas" base map).
- The review of water use applications on a watershed basis with an understanding of cumulative effects management, which ensures withdrawals do not exceed environmental limits and environmental flows are maintained.
- The production of publicly available reports on all water approvals and use.
- The management of special or unique situations, and the ability to take action if necessary, such as suspending water use by industry during the 2010 and 2012 summer droughts in the Peace River area.
- The Northeast Water Tool, a complete hydrologic model for northeast B.C.
- Cooperation with water stewardship staff from FLNRO to ensure decisions are fully informed.

## Total Approvals and Reported Use

### April to June, 2012

During the April to June period of 2012, there were a total of 271 short-term water use approvals in place, held by 50 companies (Table 1). The number of approvals decreased slightly from the first quarter of 2012.

The total water volume associated with active approvals for the annual period beginning April 2012 was 27.3 million m<sup>3</sup>. For the three-month period of April to June, a total of 979,716 m<sup>3</sup> was reported as used by oil and gas operators. The cumulative total volume used in the first

six months of 2012 was 2,297,249 m<sup>3</sup>.

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 largest total approved volumes as a percentage of mean annual runoff between April and June were:

	Percentage
• East Kiskatinaw River	0.81
• Tsea River	0.64
• Kiwigana River	0.48
• West Kiskatinaw River	0.37
• Middle Petitot River	0.32
• Upper Petitot River	0.29
• Kyklo River	0.24

For all the remaining basins between April and June, the approved short-term water use corresponded to less than 0.20 per cent of mean annual runoff (Table 2).

Actual cumulative water use (as reported by the approval holders) in individual basins is a small fraction of the approved water use, and was less than 0.06 per cent of mean annual runoff in all river basins between January and June.

### July to September, 2012

During July to September 2012, there were a total of 233 short-term water use approvals in place, held by 44 companies (Table 1). Of the 233 approvals, only 38 were issued in the third quarter. The total number of active approvals decreased from the first and second quarters

Table 1: Summary of Short-Term Water Use Approvals Active During 2012

	Q1 Total (Jan-Mar 2012)	Q2 Total (Apr-Jun 2012)	Q3 Total (Jul-Sept 2012)
Number of Active Approvals in each Quarter	285	271	233
Number of Approvals issued in each Quarter.	127	51	38
Number of Companies with Active Approvals	50	50	44
Total Volume Available for Use for the 12-month Period Beginning With Each Quarter (m <sup>3</sup> )	27,162,783	27,301,242	23,190,084
Total Volume Reported Used in Each Quarter (m <sup>3</sup> )	1,317,533	979,716	1,083,899
Cumulative Total Volume Reported Used in 2012 (m <sup>3</sup> )	1,317,533	2,297,249	3,399,169

of 2012. This reduction in active approvals reflects the drought conditions that affected water use. On Aug. 2, 2012, the Commission issued a directive for suspension of water withdrawals for short-term water use due to the onset of significant drought conditions. The suspension remained in place for the rest of August and all of September. Several larger rivers and lakes were exempted from the suspension as they were less affected by the drought.

The total water volume associated with active approvals for the annual period beginning July 2012 was 23.2 million m<sup>3</sup>. For the three-month period of July to September, a total of 1,083,899 m<sup>3</sup> was reported as used by oil and gas operators. The cumulative total volume used in the first nine months of 2012 was 3,399,169 m<sup>3</sup>.

The basins with the largest total approved volumes as a percentage of mean annual runoff between July and September were:

	Percentage
• East Kiskatinaw River	0.80
• Kiwigana River	0.34
• Middle Petitot River	0.33
• Upper Petitot River	0.29
• Kyklo River	0.24
• Blueberry River	0.19

For all the remaining basins between July and September, the approved short-term water use corresponded to less than 0.15 per cent of mean annual runoff (Table 3).

The highest actual cumulative water use (as reported by the approval holders) during the January to September period was in the Upper Petitot River, where use corresponded to 0.12 per cent of the mean annual runoff. For all other river basins during this period, actual use was less than 0.05 per cent of mean annual runoff.

Not all approval holders reported water use as required. Between April and June, 29 approvals (10.7 per cent of total) held by nine companies were not reported. Between July and September, one approval (0.4 per cent of the total) held by one company was not reported. As is standard procedure, these companies have been referred to the Commission's Compliance and Enforcement Branch for investigation and follow-up.

Table 2: Section 8 permits approved by the BC Oil and Gas Commission, along with water licensed by the Ministry of Forests, Lands and Natural Resource Operations.

Approved volumes for an annual period starting April 2012, actual withdrawals for January-June 2012, and percentage of average annual river discharge.

Major & Sub-Basin Name	Section 8 Water Use Approvals – BC Oil and Gas Commission					FLNRO Water Licenses			River Discharge and Runoff	
	Section 8 Approvals (Commission)	Total Volume Approved (m <sup>3</sup> )	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m <sup>3</sup> ) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m <sup>3</sup> )	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m <sup>3</sup> /s)	Mean Annual Runoff (m <sup>3</sup> )
<b>Beaton River</b>										
Upper Beaton River	12	341,290	0.088%	23,173	0.006%				12.2	386,248,504
Middle Beaton River	8	40,140	0.007%	2,030	0.000%				18.7	590,127,120
Milligan Creek	6	485,780	0.166%	264	0.000%				9.3	292,529,786
Blueberry River	15	639,884	0.190%	44,547	0.013%	15	175,436	0.052%	10.7	336,659,474
Doig	2	59,650	0.025%	1,409	0.001%	9	3,375,662	1.389%	7.7	243,054,492
Lower Beaton River	2	29,000	0.002%	0	0.000%	41	7,822,425	0.642%	38.6	1,218,123,360
Beaton Total	45	1,595,744	0.093%	71,423	0.004%	65	11,373,522	0.666%	54.1	1,708,660,566
<b>Halfway River</b>										
Upper Halfway River	3	196,000	0.017%	1,692	0.000%	6	133,304	0.012%	35.6	1,123,450,560
Chowade									10.3	325,043,280
Graham River	2	9,820	0.002%	208	0.000%	1	3,319	0.001%	18.3	576,557,352
Cameron River	15	876,123	0.171%	9,436	0.002%	3	7,467	0.001%	16.2	511,548,540
Lower Halfway River	9	363,209	0.018%	12,395	0.001%	10	1,036,050	0.051%	64.2	2,025,051,192
Halfway Total	29	1,445,152	0.062%	23,731	0.001%	20	1,180,139	0.051%	73.5	2,319,119,474
<b>Moberly River</b>										
Moberly River	1	200,000	0.055%	0	0.000%	10	85,954	0.024%	11.4	361,134,655
Moberly Total	1	200,000	0.055%	0	0.000%	10	85,954	0.024%	11.4	361,134,655
<b>Pine River</b>										
Burnt						2	34,784	0.007%	15.9	501,765,840



Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Sukunka						5	121,079	0.008%	45.4	1,432,715,040
Upper Pine						13	2,454,627	0.200%	38.9	1,227,590,640
Murray River	6	1,134,200	0.043%	1,690	0.000%	34	28,129,268	1.069%	83.4	2,631,903,840
Lower Pine River	9	308,400	0.005%	12,116	0.000%	28	5,576,477	0.093%	189	5,964,386,400
Pine Total	15	1,442,600	0.024%	13,806	0.000%	82	36,316,235	0.607%	189	5,980,515,840
Kiskatinaw River										
East Kiskatinaw River	2	777,300	0.810%	3,356	0.003%	5	2,871,174	2.993%	3.0	95,935,104
West Kiskatinaw River	2	331,540	0.366%	0	0.000%				2.9	90,570,312
Middle Kiskatinaw	1	81,000	0.032%	0	0.000%	11	3,719,705	1.455%	8.1	255,616,560
Lower Kiskatinaw River	5	344,240	0.109%	15,150	0.005%	20	1,644,961	0.521%	10.0	315,576,000
Kiskatinaw Total	10	1,534,080	0.468%	18,506	0.006%	36	8,235,840	2.512%	10.4	327,904,045
Peace River										
Peace Arm						9	3,710,644	0.009%	1280	40,393,728,000
Upper Peace River	2	86,000	0.000%	0	0.000%	33	1,677,242	0.004%	1430	45,127,368,000
Lynx Creek						5	259,970	0.324%	2.54	80,156,304
Farrell Creek	15	217,840	0.136%	3,075	0.002%	2	7,466	0.005%	5.09	160,628,184
Cache Creek	2	51,000	0.022%	0	0.000%	8	1,978,540	0.859%	7.3	230,370,480
Pouce Coupe River			0.000%	665	0.000%	61	3,104,923	1.567%	6.3	198,181,728
Lower Peace River	5	570,000	0.001%	0	0.000%	39	123,310,452	0.273%	1280	45,127,368,000
Peace Total	24	924,840	0.001%	3,740	0.000%	157	134,049,237	0.102%	4161.2	131,317,800,696
Smoky River										
Smoky River	7	262,053	0.011%	39,900	0.002%	2	528,441	0.022%	77.8	2,455,181,280
Smoky Total	7	262,053	0.011%	39,900	0.002%	2	528,441	0.022%	77.8	2,455,181,280
Fort Nelson River										
Fontas River	3	801,542	0.109%	16,662	0.002%				23.3	734,802,107
Kahntah River	1	450	0.000%	32	0.000%				17.3	544,750,613

Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Kiwigana River	12	1,879,198	0.482%	10,398	0.003%	2	419,609	0.108%	12.4	390,226,333
Klua River	4	266,400	0.068%	4,333	0.001%				12.4	391,372,372
Snake River	2	52,200	0.016%	0	0.000%				10.3	324,902,101
Upper Fort Nelson River	3	59,600	0.001%	1,286	0.000%				165	5,207,004,000
Middle Fort Nelson River	19	1,754,407	0.019%	894,124	0.009%	4	1,001,848	0.011%	300	9,467,280,000
Lower Fort Nelson River	2	287,539	0.003%	0	0.000%				340	10,729,584,000
Fort Nelson Total	46	5,101,336	0.046%	926,835	0.008%	6	1,421,457	0.013%	350	11,068,673,506
Muskwa River (sub-basin of Fort Nelson R.)										
Upper Muskwa River									44.5	1,404,313,200
Middle Muskwa River						1	830	0.000%	89	2,808,626,400
Lower Muskwa River	1	1,500	0.000%	1,080	0.000%	9	1,839,377	0.047%	124	3,913,142,400
Muskwa Total	1	1,500	0.000%	1,080	0.000%	10	1,840,207	0.027%	213	6,713,724,706
Prophet River (sub-basin of Fort Nelson R.)										
Upper Prophet River	1	9,355	0.001%	0	0.000%				42	1,325,419,200
Middle Prophet	1	116,100	0.005%	0	0.000%				70.1	2,212,187,760
Lower Prophet	4	154,450	0.006%	0	0.000%				86.2	2,720,265,120
Prophet Total	6	279,905	0.010%	0	0.000%	0	0	0.000%	86.2	2,720,265,120
Sikanni Chief River (sub-basin of Fort Nelson R.)										
Upper Sikanni Chief River	4	232,900	0.028%	30,974	0.004%	2	64,488	0.008%	26.1	823,653,360
Middle Sikanni Chief River	9	111,152	0.005%	4,968	0.000%	2	5,808	0.000%	76.7	2,420,467,920
Lower Sikanni Chief River	2	32,294	0.001%	5,538	0.000%				132	4,165,603,200
Sikanni Chief Total	15	376,346	0.009%	41,480	0.001%	4	70,295	0.002%	132	4,165,603,200
Liard River										
Capot-Blanc River	3	456,976	0.142%	854	0.000%				10.2	321,887,285
Dunedin River									49.6	1,565,181,051
Lower Toad River									71.2	2,246,511,740



Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Grayling River									18.5	583,947,351
Beaver River				1,536	0.000%			0.000%	16.6	525,243,649
Upper Liard River						3	58,906	0.002%	95.5	3,013,750,800
Middle Liard River									114	3,597,566,400
Lower Liard River	4	273,000	0.006%	7,829	0.000%				136	4,291,833,600
Liard Total	7	729,976	0.002%	10,219	0.000%	3	58,906	0.000%	1420	44,811,792,000
Petitot River										
Lower Petitot River	22	2,018,440	0.082%	629,701	0.025%	2	137,026	0.006%	78.3	2,470,960,080
Middle Petitot River	4	6,429,070	0.325%	4,045	0.000%	1	116,404	0.006%	62.7	1,978,661,520
Sahdoanah River	4	318,636	0.135%	20,775	0.009%	1	830	0.000%	7.5	236,366,424
Sahtaneh River	11	310,100	0.077%	9,944	0.002%	1	329,865	0.082%	12.8	402,990,552
Tsea River	5	2,166,509	0.640%	141,440	0.042%	2	2,783,632	0.823%	10.7	338,297,472
Upper Petitot River	4	1,481,000	0.290%	286,646	0.056%				16.2	511,233,120
Petitot Total	50	12,723,755	0.515%	1,092,551	0.044%	7	3,367,757	0.136%	78.3	2,470,960,080
Kotcho River										
Kyklo River	4	453,400	0.239%	1,358	0.001%	1	5,808	0.003%	6	189,345,600
Lower Kotcho River	1	147,000	0.042%	0	0.000%				11.07	349,342,632
Shekilie River									12.6	397,625,760
Upper Kotcho River	3	24,800	0.004%	4,681	0.001%				17.5	552,258,000
Kotcho Total	8	625,200	0.042%	6,039	0.000%	1	5,808	0.000%	47.2	1,489,518,720
Hay River										
Hay River	3	166,300	0.064%	47,591	0.018%				8.2	258,772,320
Hay Total	3	166,300	0.007%	47,591	0.002%	0	0	0.000%	73.5	2,319,119,474
Other	5	11,710		348						
Total	271	27,301,242		2,297,249		403	198,533,799			

Table 3: Section 8 permits approved by the BC Oil and Gas Commission, along with water licensed by the Ministry of Forests, Lands and Natural Resource Operations.

Approved volumes for an annual period starting July 2012, actual withdrawals for January-September 2012, and percentage of average annual river discharge.

Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m <sup>3</sup> )	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m <sup>3</sup> ) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m <sup>3</sup> )	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m <sup>3</sup> /s)	Mean Annual Runoff (m <sup>3</sup> )
<b>Beatton River</b>										
Upper Beatton River	13	332,790	0.086%	45,643	0.012%				12.2	386,248,504
Middle Beatton River	4	12,050	0.002%	745	0.000%				18.7	590,127,120
Milligan Creek	7	331,035	0.113%	1,315	0.000%				9.3	292,529,786
Blueberry River	15	627,814	0.186%	55,556	0.017%	15	175,436	0.052%	10.7	336,659,474
Doig	2	59,650	0.025%	358	0.000%	9	3,375,662	1.389%	7.7	243,054,492
Lower Beatton River	0	0	0.000%	0	0.000%	42	7,822,425	0.642%	38.6	1,218,123,360
Beatton Total	41	1,363,339	0.080%	103,617	0.006%	66	11,373,522	0.666%	54.1	1,708,660,566
<b>Halfway River</b>										
Upper Halfway River	4	211,000	0.019%	7,317	0.001%	6	133,304	0.012%	35.6	1,123,450,560
Chowade									10.3	325,043,280
Graham River	2	1,500	0.000%	605	0.000%	1	3,319	0.001%	18.3	576,557,352
Cameron River	14	622,795	0.122%	30,805	0.006%	3	7,467	0.001%	16.2	511,548,540
Lower Halfway River	10	399,605	0.020%	21,291	0.001%	10	1,036,050	0.051%	64.2	2,025,051,192
Halfway Total	30	1,234,900	0.053%	60,018	0.003%	20	1,180,139	0.051%	73.5	2,319,119,474
<b>Moberly River</b>										
Moberly River						10	87,614	0.024%	11.4	361,134,655
Moberly Total	0	0	0.000%	0	0.000%	10	87,614	0.024%	11.4	361,134,655
<b>Pine River</b>										
Burnt						2	34,784	0.007%	15.9	501,765,840

Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Sukunka						5	121,079	0.008%	45.4	1,432,715,040
Upper Pine						13	2,454,627	0.200%	38.9	1,227,590,640
Murray River	5	668,280	0.025%	7,406	0.000%	34	28,129,268	1.069%	83.4	2,631,903,840
Lower Pine River	9	440,340	0.007%	33,753	0.001%	28	5,576,477	0.093%	189	5,964,386,400
Pine Total	14	1,108,620	0.019%	41,159	0.001%	82	36,316,235	0.607%	189	5,980,515,840
Kiskatinaw River										
East Kiskatinaw River	2	763,300	0.796%	21,851	0.023%	4	2,871,174	2.993%	3.0	95,935,104
West Kiskatinaw River									2.9	90,570,312
Middle Kiskatinaw	2	109,536	0.043%		0.000%	11	3,719,705	1.455%	8.1	255,616,560
Lower Kiskatinaw River	4	215,059	0.068%	22,068	0.007%	20	1,644,961	0.521%	10.0	315,576,000
Kiskatinaw Total	8	1,087,895	0.332%	43,919	0.013%	35	8,235,840	2.512%	10.4	327,904,045
Peace River										
Peace Arm						9	3,742,180	0.009%	1280	40,393,728,000
Upper Peace River						34	2,654,858	0.006%	1430	45,127,368,000
Lynx Creek						4	259,970	0.324%	2.54	80,156,304
Farrell Creek	13	165,840	0.103%	5,193	0.003%	2	7,466	0.005%	5.09	160,628,184
Cache Creek	1	23,760	0.010%	0	0.000%	8	1,978,540	0.859%	7.3	230,370,480
Pouce Coupe River						61	3,104,923	1.567%	6.3	198,181,728
Lower Peace River	5	512,100	0.001%	0	0.000%	38	123,310,452	0.273%	1280	45,127,368,000
Peace Total	19	701,700	0.001%	5,193	0.000%	156	135,058,389	0.103%	4161.2	131,317,800,696
Smoky River										
Smoky River	6	305,053	0.012%	56,658	0.002%	3	528,441	0.022%	77.8	2,455,181,280
Smoky Total	6	305,053	0.012%	56,658	0.002%	3	528,441	0.022%	77.8	2,455,181,280
Fort Nelson River										
Fontas River	3	801,542	0.109%	4,384	0.001%				23.3	734,802,107
Kahntah River	1	450	0.000%	9,737	0.002%				17.3	544,750,613

Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Kiwigana River	8	1,327,600	0.340%	10,137	0.003%	2	419,609	0.108%	12.4	390,226,333
Klua River	4	110,820	0.028%	4,333	0.001%				12.4	391,372,372
Snake River	2	52,200	0.016%	476	0.000%				10.3	324,902,101
Upper Fort Nelson River	2	51,200	0.001%	2,602	0.000%				165	5,207,004,000
Middle Fort Nelson River	14	1,525,684	0.016%	1,490,024	0.016%	4	1,987,934	0.021%	300	9,467,280,000
Lower Fort Nelson River	2	287,539	0.003%	1,671	0.000%				340	10,729,584,000
Fort Nelson Total	36	4,157,035	0.038%	1,523,364	0.014%	6	2,407,543	0.022%	350	11,068,673,506
Muskwa River (sub-basin of Fort Nelson R.)										
Upper Muskwa River									44.5	1,404,313,200
Middle Muskwa River						1	830	0.000%	89	2,808,626,400
Lower Muskwa River				1,080		9	1,839,377	0.047%	124	3,913,142,400
Muskwa Total	0	0	0.000%	1,080	0.000%	10	1,840,207	0.027%	213	6,713,724,706
Prophet River (sub-basin of Fort Nelson R.)										
Upper Prophet River			0.000%	155	0.000%				42	1,325,419,200
Middle Prophet	1	103,150	0.005%	0	0.000%				70.1	2,212,187,760
Lower Prophet	4	149,000	0.005%	0	0.000%				86.2	2,720,265,120
Prophet Total	5	252,150	0.009%	155	0.000%	0	0	0.000%	86.2	2,720,265,120
Sikanni Chief River (sub-basin of Fort Nelson R.)										
Upper Sikanni Chief River	2	419,100	0.051%	31,565	0.004%	2	64,488	0.008%	26.1	823,653,360
Middle Sikanni Chief River	9	82,197	0.003%	4,677	0.000%	2	5,808	0.000%	76.7	2,420,467,920
Lower Sikanni Chief River	2	32,294	0.001%	994	0.000%				132	4,165,603,200
Sikanni Chief Total	13	533,591	0.013%	37,236	0.001%	4	70,295	0.002%	132	4,165,603,200
Liard River										
Capot-Blanc River	4	462,975	0.144%	0	0.000%				10.2	321,887,285
Dunedin River	1	5,000	0.000%	0	0.000%				49.6	1,565,181,051
Lower Toad River									71.2	2,246,511,740

Section 8 Water Use Approvals – BC Oil and Gas Commission						FLNRO Water Licenses			River Discharge and Runoff	
Major & Sub-Basin Name	Section 8 Approvals (Commission)	Total Volume Approved (m³)	Total Volume Approved as % of Mean Annual Runoff	Total Volume Withdrawn (m³) (2012)	Total Volume Withdrawn as % of Mean Annual Runoff	# of Water Licenses (FLNRO)	Total Volume Licensed (m³)	Total Volume Licensed as % of Mean Annual Runoff	Mean Annual Discharge (m³/s)	Mean Annual Runoff (m³)
Grayling River									18.5	583,947,351
Beaver River				1,536	0.000%			0.000%	16.6	525,243,649
Upper Liard River						3	58,906	0.002%	95.5	3,013,750,800
Middle Liard River									114	3,597,566,400
Lower Liard River	4	278,500	0.006%	9,084	0.000%				136	4,291,833,600
Liard Total	9	746,475	0.002%	10,620	0.000%	3	58,906	0.000%	1420	44,811,792,000
Petitot River										
Lower Petitot River	17	2,226,340	0.090%	651,450	0.026%	1	137,026	0.006%	78.3	2,470,960,080
Middle Petitot River	5	6,444,070	0.326%	2,860	0.000%	1	116,404	0.006%	62.7	1,978,661,520
Sahdoanah River	4	312,136	0.132%	5,989	0.003%	1	830	0.000%	7.5	236,366,424
Sahtaneh River	9	250,500	0.062%	34,725	0.009%	1	329,865	0.082%	12.8	402,990,552
Tsea River	3	211,700	0.063%	146,713	0.043%	2	2,783,632	0.823%	10.7	338,297,472
Upper Petitot River	3	1,476,000	0.289%	613,744	0.12%				16.2	511,233,120
Petitot Total	41	10,920,746	0.442%	1,455,481	0.059%	6	3,367,757	0.136%	78.3	2,470,960,080
Kotcho River										
Kyklo River	4	452,000	0.239%	1,708	0.001%	1	5,808	0.003%	6	189,345,600
Lower Kotcho River	1	147,000	0.042%	1,314	0.000%				11.07	349,342,632
Shekilie River				3,334	0.001%				12.6	397,625,760
Upper Kotcho River	3	24,800	0.004%	4,681	0.001%				17.5	552,258,000
Kotcho Total	8	623,800	0.042%	11,037	0.001%	1	5,808	0.000%	47.2	1,489,518,720
Hay River										
Hay River	1	153,500	0.059%	49,270	0.019%				8.2	258,772,320
Hay Total	1	153,500	0.007%	49,270	0.002%	0	0	0.000%	73.5	2,319,119,474
Other	2	1,280		362						
Total	233	23,190,084		3,399,169		402	200,530,696			

## Water Source Well Production

This appendix details the water source well production for January 2007 through August 2012. It is the first of what is intended to be annual reports from the Commission on water source wells.

The Commission has authority through the Oil and Gas Activities Act for groundwater management, and the regulation of water source wells. Water source wells are defined in the Petroleum and Natural Gas Act as:

- “[A] hole in the ground drilled to obtain water for the purpose of injecting water into an underground formation in connection with the production of petroleum or natural gas.”

All water source wells require a well authorization from the Commission. A permit holder must measure and record the quantity and rate of water produced from the permit holder’s

water source well and compute the number of cubic metres it would occupy at standard conditions of 15C, and to report water production to the Commission monthly. Under Section 72 of the Drilling and Production Regulation:

- “A permit holder must not operate a water source well in a manner that injuriously affects the use of the water source for domestic or agricultural purposes.”
- “A well permit holder must report the quantity of water production from a water source well to the commission no later than 25 days after the end of the month in which the production occurred.”

Since 2007, 52 active water source wells have produced water. From January 2007 to August 2012, the total water production (as reported by approval holders) was 7,745,086 m<sup>3</sup> (Table 4).

In 2007, six wells produced a total amount of water of 136,055 m<sup>3</sup>. In subsequent years, the total number of active water source wells increased and the amount of water produced has generally risen. By 2011, 42 active water source wells produced a total amount of water of 3,831,203 m<sup>3</sup>.

In 2011, the water source well depths ranged from 46 to 900 metres (Table 5). The average depth was 219 metres. The majority of wells (74 per cent) were located near the surface at 20 metres to 200 metres depth, and were likely extracting fresh water. An intermediary depth of 201 metres to 500 metres was comprised of seven wells (17 per cent). These wells may be extracting a mix of fresh and brackish water. Four water source wells (nine per cent) extracted deep, saline water from depths greater than 500 metres. A map of the 2011 active water source wells is shown in Figure 1.



Figure 1: Active Water Source Wells in 2011

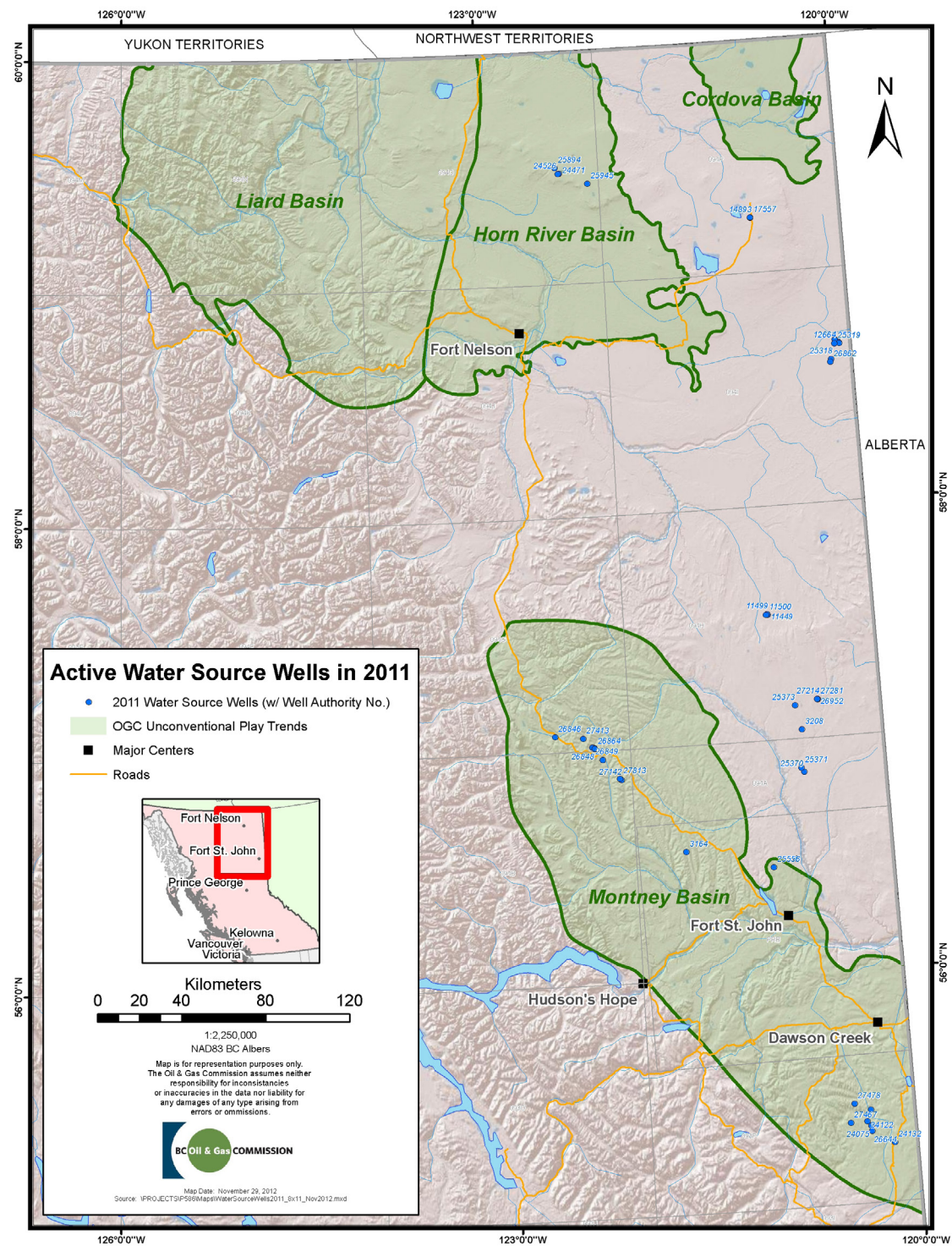


Table 4: Reported Water Source Well Withdrawals from January 2007 to August 2012.

							Water Withdrawal					
Major Basin	Sub-Basin	Well Number	Company	Depth of Well (m)	Easting	Northing	2007	2008	2009	2010	2011	2012 (to Aug)
Beatton River												
	Upper Beatton River	26846	Progress Energy Ltd	80	525002	6325277					10,414	1,594
	Upper Beatton River	26848	Progress Energy Ltd	46	543348	6319308					3,139	576
	Upper Beatton River	26849	Progress Energy Ltd	105	542509	6319625					12,149	288
	Upper Beatton River	26864	Progress Energy Ltd	98	543626	6318982					16,552	520
	Upper Beatton River	27413	Progress Energy Ltd	49	538320	6323888					5,345	3
	Milligan Creek	25370	Canadian Natural Resources Ltd	91	643081	6303882				4,018	20,735	13,514
	Milligan Creek	25371	Canadian Natural Resources Ltd	152	641831	6305985				3,491	22,805	18,424
	Milligan Creek	25373	Canadian Natural Resources Ltd	165	640056	6335748				5,265	38,105	25,996
	Milligan Creek	26952	Dejour Energy Ltd	305	650759	6338188					13,350	8,830
	Milligan Creek	27214	Dejour Energy Ltd	305	650809	6338207					24,641	18,938
	Milligan Creek	27281	Dejour Energy Ltd	316	650723	6338251					16,272	15,646
	Milligan Creek	3208	Pengrowth Energy Corporation	63	642800	6324185					2,670	27,216
	Lower Beatton River	11402	Pengrowth Energy Corporation	161	637528	6261537	8,020	6,039	1,692	465		
	Lower Beatton River	14167	Pengrowth Energy Corporation	219	620522	6272195	56,367	21,791	1,912			
	Lower Beatton River	16332	Pengrowth Energy Corporation	140	637357	6262984	62,749	44,759	43,373	45,699	31,796	27,130
	Lower Beatton River	25556	Pengrowth Energy Corporation	135	626822	6259069			4,709	13,427	12,340	11,250
Beatton Total							127,136	72,589	51,686	72,365	230,314	169,924
Fort Nelson River												
	Kiwigana River	24471	Encana Corporation	875	538087	6593258				369,514	948,396	
	Kiwigana River	24526	Encana Corporation	874	537473	6593054				477,563	926,736	
	Kiwigana River	25894	Encana Corporation	900	536064	6595865				11,247	190,028	
	Middle Fort Nelson River	3910	Suncor Energy Inc	2,061	528351	6512210		291,959				
Fort Nelson Total							0	291,959	0	858,324	2,065,159	0
Halfway River												
	Cameron River	26240	Progress Energy Ltd	124	547270	6313457					3,506	
	Cameron River	27142	Progress Energy Ltd	49	555758	6303639					10,594	8,097
	Cameron River	27813	Progress Energy Ltd	500	555087	6304225					3,025	14,010
Halfway Total							0	0	0	0	17,125	22,107

							Water Withdrawal					
Major Basin	Sub-Basin	Well Number	Company	Depth of Well (m)	Easting	Northing	2007	2008	2009	2010	2011	2012 (to Aug)
Hay River												
	Hay River	12649	Harvest Operations Corp	179	667427	6507719		72,568	25,432	71,975	95,233	20,889
	Hay River	12650	Harvest Operations Corp	116	666470	6508531		160,670	44,223	134,092	225,609	162,794
	Hay River	12662	Harvest Operations Corp	190	667619	6507551		75,820	26,630	77,680	137,156	83,613
	Hay River	12663	Harvest Operations Corp	263	666017	6508914				77,833	160,830	86,911
	Hay River	12664	Harvest Operations Corp	178	668111	6507133			14,062	67,781	35,825	468
	Hay River	25318	Harvest Operations Corp	55	663881	6499732			7,616	151,350	87,507	90,392
	Hay River	25319	Harvest Operations Corp	103	665729	6507088				156,981	161,076	134,258
	Hay River	26862	Harvest Operations Corp	75	663547	6498337					21,631	
	Hay Total						0	309,058	117,963	737,692	924,867	579,325
Kiskatinaw River												
	East Kiskatinaw River	24074	Apache	150	668224	6142167		7,757	13,551	7,365	6,736	
	East Kiskatinaw River	24075	Apache	92	668085	6134640	6,284	16,693	24,451	22,978	4,399	
	East Kiskatinaw River	26644	Apache	151	668461	6132056					40,448	
	East Kiskatinaw River	24281	Avenex Energy Corp	49	669860	6133508		4,000	1,000			
	East Kiskatinaw River	25483	Avenex Energy Corp	122	673659	6116076			3,360	3,440		
	West Kiskatinaw River	24072	Apache	115	668571	6135631	2,815	18,264	9,296	1,964		
	West Kiskatinaw River	24122	Apache	150	666265	6136739		46,970	39,442	36,005	3,422	
	West Kiskatinaw River	27467	Apache	151	658415	6136298					1,174	
	Middle Kiskatinaw	27478	Apache	150	660470	6145384					1,060	
	Lower Kiskatinaw River	7779	Shell Canada Ltd	1,473	637696	6198391						26,442
	Lower Kiskatinaw River	27864	Tourmaline Oil Corp	1,135	662420	6202034						310
	Kiskatinaw Total						9,099	93,685	91,099	71,751	57,239	26,752
Peace River												
	Cache Creek	3164	Harvest Operations Corp	66	585296	6268197				13,562	2,315	6,025
	Peace Total						0	0	0	13,562	2,315	6,025
Petitot River												
	Sahdoanah River	14893	Ish Energy Ltd	232	628010	6568548				6,510	12,832	20,163
	Sahdoanah River	17557	Ish Energy Ltd	255	627989	6568704				9,968	80,079	18,524
	Tsea River	25945	Nexen Inc	749	551298	6587792				76,484	360,452	
	Petitot Total						0	0	0	92,961	453,363	38,687

							Water Withdrawal					
Major Basin	Sub-Basin	Well Number	Company	Depth of Well (m)	Easting	Northing	2007	2008	2009	2010	2011	2012 (to Aug)
Pine River												
	Lower Pine River	22061	Canadian Natural Resources Ltd	1,280	628735	6216860	5	30	1			1,591
	<b>Pine Total</b>						<b>5</b>	<b>30</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1,591</b>
Sikanni Chief River												
	Lower Sikanni Chief River	11449	Canadian Natural Resources Ltd	92	628676	6379191					64,858	6,482
	Lower Sikanni Chief River	11499	Canadian Natural Resources Ltd	96	628415	6379606					4,241	16,426
	Lower Sikanni Chief River	11500	Canadian Natural Resources Ltd	183	628004	6379264					2,594	24,558
	Lower Sikanni Chief River	14995	Canadian Natural Resources Ltd	104	628436	6380161						11,041
	<b>Sikanni Chief Total</b>						<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>71,692</b>	<b>58,507</b>
Smoky River												
	Smoky River	24132	Apache	150	679098	6126289					9,130	
	<b>Smoky Total</b>						<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,130</b>	<b>0</b>
<b>Total</b>							<b>136,240</b>	<b>767,321</b>	<b>260,749</b>	<b>1,846,655</b>	<b>3,831,203</b>	<b>902,918</b>
<b>Total Number of Active Water Source Wells</b>							<b>6</b>	<b>13</b>	<b>16</b>	<b>25</b>	<b>42</b>	<b>33</b>

Table 5: Comparison of water source well withdrawal and depth for 2011

Depth of Water Source Well	1,000-10,000 m³	10,000-100,000 m³	100,000-1,000,000 m³	Total
40-200 metres	13	15	3	31
201-500 metres	1	5	1	7
>500 metres	0	0	4	4
<b>Total</b>	<b>14</b>	<b>20</b>	<b>8</b>	<b>42</b>

