

Industry, power, farms, people all drive demand for water in northeastern B.C.

BY DERRICK PENNER, VANCOUVER SUN SEPTEMBER 18, 2015



Ray Wagner, a BC Hydro manager, during tour of the facilities at the W.A.C. Bennett dam.

Photograph by: Derrick Penner

HUDSON'S HOPE —Two water pipelines, each with the capacity to carry 10 million litres a day, cross ranchers Christoph and Erika Weder's fields and pastures northwest of town.

That water could have been useful to their operation a year ago during the worst drought northeastern B.C. has experienced in decades, but they couldn't touch it, because the lines belong to energy companies licensed to use water from the Williston Lake for hydraulic fracturing of natural gas wells.

"To me, it's ironic that we're expanding water (infrastructure) to extract a non-renewable resource, yet we could use that water to create a renewable resource," Christoph Weder said.

It is an example of the competing interests for water in a region of major rivers and lakes and increasing concerns about scarcity in a time of climate change.

The Weders' ranch lies between Williston Lake, BC Hydro's biggest reservoir, and the Peace River, both of which are symbolic of water abundance in the North.

Fed by long-winter snows that gather along the province's spine of high mountain ranges, rivers such as the Peace and Skeena are the region's main arteries that sustain watersheds stretching east into Alberta, Slave Lake and the Mackenzie River, and west to the coast.

Along with providing habitat for fish and wildlife, those main rivers are key water sources that help sustain human populations and major industry.

There are growing tensions over how the water available in smaller tributaries will be able to meet all the demands, and the accumulating effect of industry on their watersheds' ability to continue recharging the streams.

Concerns are greatest in the northeast, where vast areas of wilderness have already been cut by resource roads for logging, mining and natural gas development. Demands for a strategic environmental review of the cumulative impacts of industry is a common demand among the Treaty 8 First Nations in the region.

Residents are staring down a potentially massive ramp-up of drilling and gas production using the controversial, and thirsty, technique of hydraulic fracturing — if the provincial government's ambitions to build a liquefied natural gas export industry come to pass.

"At this point, communities are reasonably secure," in their water supplies, said Reg Whiten, an independent consultant in watershed management.

However, the prospect of LNG development threatens to increase industry's demand for fresh water, even as companies look for ways to reduce their water use — and it is happening at the same time climate models are forecasting a shift in the seasonality of water flows.

Northerners can expect the weather to get wetter, with warmer winters meaning more precipitation falling as rain, and higher-than-usual winter river flows. The corollary, however, is that with lower snowpacks, rivers will run lower in summers that are expected to be drier, leaving streams more vulnerable to drought conditions.

Whiten said B.C. is beginning to ask the right questions with the advent of the province's new Water Sustainability Act, due to come into force in 2016.

This spring, the province launched a major planning effort under the name of the Northeast Water Strategy to study water sources and engage communities more comprehensively about their needs.

The provincially supported Geoscience B.C. agency and Peace River Regional District are conducting surveys to more closely map underground aquifers in the region using high-tech aerial LIDAR (light-detection-and-ranging) sensors.

Aquifers are well understood in some areas but not others, Whiten said. The mapping is important work, as industry and communities look to aquifers to supply more of their water as surface flows become more seasonably uncertain.

“We’re getting to answering the questions,” Whiten said, “But I don’t believe we’re there yet to make new, big commitments (to industry) for long-term water use.”

Water everywhere

In reports and fact sheets, the province estimates snow and rain produce about 120 billion cubic metres of surface run-off annually in the top eastern corner of the province. That’s 120 trillion litres.

“Generally, there’s lots of water in the northeast,” said Allan Chapman, hydrologist and regional manager for the B.C. Oil & Gas Commission.

“We have some major rivers — the Peace and the Liard. A lot of water flows through the rivers and lakes in (the region).”

And British Columbians wring a lot out of that water.

BC Hydro generates about one third of the province’s electricity from the water held back by the W.A.C. Bennett and Peace Canyon dams before passing it downstream.

The water sustains a population of some 72,000 in some of B.C.’s fastest-growing communities such as Fort St. John and Dawson Creek, and supports a heavily resource-oriented economy with agriculture, forestry, mining and natural gas production.

The province only allows a fraction of available surface water to be used (some 68 billion litres) for all of those purposes, but the energy sector is allocated the biggest share of it — just under one third.

Companies typically only use between 10 and 20 per cent of their allocations for purposes that include dust control and freezing in winter roads.

The hydraulic fracturing of natural gas wells is by far the biggest use, taking up 8.3 billion litres of water in 2014.

That’s enough to fill 3,300 swimming pools.

Depending on where they are, geoscientist David Hughes estimated it takes between nine million and 96 million litres of water injected under high pressure, in a mix with sand and chemicals, to fracture shale formations and release the gas.

Companies also obtain water under short-term permits, referred to as Section 8 approvals, which has proved contentious to conservation groups. These permits have a shorter approval process, about six weeks compared with about six months for the regulatory review to obtain a water license.

In 2014, the Sierra Club of B.C. and Wilderness Committee sued the province, challenging the legality of awarding short-term permits back-to-back, which environmental lawyer Karen Campbell argued effectively gave companies long-term water rights without undergoing closer scrutiny.

“The more that we learned about this in putting the case together, the more we realized that there is

a lot of water being drawn down in the northeast and it's being drawn down on a piecemeal basis without a lot of tracking," said Campbell, a staff lawyer with the group Ecojustice.

Campbell not only lost the lawsuit but said the province included amendments that specifically made that practice legal when it re-wrote the B.C. Water Act.

"It was a frustrating experience," she said.

However, Chapman, of the Oil & Gas Commission, said companies tend to seek short-term water permits when they are in the exploration phase, then apply for water licences when fields are in full production. And regardless of what permits companies have, Chapman said the commission monitors stream flows closely and doesn't hesitate to turn off the taps for industry when flows become too low, doing so in 2010, 2012 and 2014 during summer droughts.

"Water management is a big item to the commission," Chapman said. "It's a critical (resource) that's highly valued by us, by the public and First Nations."

Data and answers

Rivers in the Peace Region are divided between those fed by high-mountain snows, such as the Peace and Liard, and those that are tied more to the vagaries of seasonal precipitation, such as the Kiskatinaw, a tributary of the Peace that begins 170 kilometres southwest of Dawson Creek.

In an era of climate change, watershed consultant Whiten said some of the effort being put into studying the region's water needs to go into understanding the protection needs of the watersheds of such seasonal rivers.

The Oil & Gas Commission has increased the amount of information that it collects and reports publicly via its website. "We did a big hydrological monitoring project that started in 2011 shortly after I got to the commission," Chapman said.

That led to the creation of what the commission calls its Northeast Water Tool (or Newt), an online database of all the streamflow data that it collects.

Chapman said that has given the commission a good handle on conditions, but Whiten believes more work needs to be done upstream in the watersheds being measured, and authorities need to get a better handle on how surface streams interact with underground aquifers.

"The big challenge is having enough monitoring of those upper portions (of watersheds), which really isn't there," Whiten said.

The Peace River Regional District is also looking to help provide some of those answers with a major effort to map the region's aquifers, which is being conducted by Geoscience B.C.

"We know far less than we should (about the region's water)," said Fort St. John Mayor Lori Ackerman, who is also chairwoman of the Peace River Regional District. "That's why it's important to

do this study with Geoscience B.C., to make sure we have the baseline data, to make sure we know where the aquifers are, where they flow and with that information, perhaps manage further to ensure that competition for water doesn't impact one segment of the community adversely."

Water concerns are coming up within the region, however.

In Hudson's Hope, about 90 kilometres west of Fort St. John, residents in the rural area of the community not hooked up to the town's water system suffered a spate of well failures four years ago, said Mayor Gwen Johansson.

About seven properties suddenly had lots of sand coming up with their water, she said, at the same time as gas drilling was going on in the area.

She hopes the regional district's aquifer mapping project will shed more light on what is happening underground, and whether industrial development has had anything to do with such watering.

"For years we've been pressing to get monitoring wells and baseline (data)," Johansson said. "It's already past time that we should have had that information."

Cumulative impacts

That the province is just now doing more detailed mapping of groundwater aquifers is an issue for First Nations, who have long demanded an assessment of the accumulating effects of water from logging, mining, agriculture and oil and gas before they'll consider increased drilling to support LNG production.

Chief Roland Wilson of the West Moberley First Nations, near Chetwynd, said while other jurisdictions are slowing down shale gas development, "B.C. is going as hard as it can, (although) they have no understanding of groundwater up there."

Wilson said First Nations communities are already dealing with issues such as mercury contamination of fish from Williston Lake, selenium in streams near coal mines, and watersheds that don't retain as much water as they once did because trees that used to sop up water have been logged or killed by mountain pine beetles.

"There is still eight million cubic metres of timber that's cut (in the northeast) annually," said Chief Liz Logan of the Fort Nelson First Nation.

The Fort Nelson First Nation launched its own water-management effort, before the province launched the Northeast Water Strategy, so it could come up with its own water strategy, Logan said. It included biologists and hydrologists, and initially included provincial input.

"Now all of a sudden that the province is touting this Northeast Water Strategy, they've pulled back their negotiators and representatives and are basically saying, 'If you want to talk about water, you've got to come talk to us,'" Logan said.

The Fort Nelson First Nation did win one argument over water use earlier this month when the B.C. Environmental Appeal Board cancelled the water license of Calgary-based Nexen, which had permission to draw 2.5 billion litres per year from Tsea Lake, a small, shallow lake about 90 kilometres northeast of Fort Nelson.

Logan told The Sun she is hopeful that decision sets a precedent with respect to the scientific background required by an applicant to get a water license.

“They just can’t arbitrarily make a decision because of industry’s request,” she said.

The water pipelines that run beneath the Weder’s ranch are a point of contention for Wilson, who considers it “an enormous amount of water” to commit to shale gas development.

“We’re trying to get B.C. to the table to get some sort of land-development planning going on,” Wilson said. “It’s like trying to pull teeth. They want the resources, but they don’t want the responsibility of cleaning it up.”

Mitigation

Recognizing its potential for affecting the environment, the oil and gas sector is putting considerable resources into reducing water use as the prospects for increased drilling loom.

“Like any resource, you need to use it wisely,” said Geoff Morrison, manager of B.C. operations for the Canadian Association of Petroleum Producers.

Companies need licences or short-term permits to use any water, and amounts they can use from any one source is limited, so it’s in their interest to cut water use, Morrison said.

“The industry pays for water, in one form or another,” said Morrison. “(Companies) either pay a direct fee or pay to move it, and moving it is expensive. So there are all these financial incentives to minimize the amount of water they use.”

Recycling water used in hydraulic fracturing has become fairly standard in the industry, Morrison said.

Typically, 30 per cent of the water injected into a well comes back up shortly after fracking. Much of the remainder will flow out with gas over time during its production cycle.

Reusing that water serves a dual purpose, Morrison said, reducing demands on fresh water sources and lowering costs.

Otherwise, water recovered from fracking is disposed of in deep underground wells, far below water aquifers, so it doesn’t contaminate other water sources. In 2014, companies disposed of five billion litres of such water.

Among companies seeking alternatives to fresh water, Shell Canada struck a deal with the city of

Dawson Creek to build a secondary treatment plant to handle the community's sewage effluent and provide the treated water for Shell fracking operations. The \$13 million facility, paid for mostly by Shell, opened in 2012 and can deliver up to 3.4 million litres of water daily for fracking.

Encana spent \$100 million developing what it is calling a water resource hub for its operations west of Dawson Creek. The plant recycles water that comes from the gas production process, taps a deep aquifer with non-drinkable saline water and captures water found naturally in gas formations.

In the industry's terminology, it is a "tailored approach" to water, which puts an emphasis on "looking for any alternatives to surface water," said Mike Forgo, an Encana senior manager.

Marked by two massive tan-coloured tanks — a third is being added — the hub is centrally located within the company's Groundbirch area operations and the saline water wells it has drilled. Each tank has the capacity to hold 16 million litres of water, and since its start-up last September, has provided 90 per cent of Encana's water needs in the area.

Because it's connected to the company's wells and compressor sites by pipelines, it has also reduced its truck traffic by an estimated 19,000 trips, Forgo said.

The hub takes water from three sources, said Brian Lieveise, a senior community-relations adviser for Encana. These are "produced water" or water that is in gas formations to start with, returned water from fracking operations and saline water from an aquifer 1,000 metres underground, which was discovered during the company's gas drilling.

The hub's facilities strip out residual hydrocarbons and filtering the returned water before storing it to be piped back out to wells when it is needed for fracking. (The company wrapped up its latest round of hydraulic fracturing in the region in June.)

It is not the first time the company has tapped a saline source to reduce its fresh water use, but Forgo said such sources aren't always an option to cut down its demands on fresh water sources.

"What we're most focused on is how to use (water) responsibly," Forgo said. "That's what we are most worried about and spend most of our time on answering."

Morrison said the strategies the industry is adopting mean its water use won't ramp up in proportion to any increase in drilling, should the province's hoped-for LNG industry develop.

"If you tripled the (number) of wells, you wouldn't triple the need for water," he said.

Other industry observers want the province to put more of an emphasis on reducing water use in fracking as a standard practice.

"That's going to require some longer-term planning and stronger policy (direction) from the province to encourage those kinds of approaches," said Matt Horne, associate regional director for B.C. at the Pembina Institute, a think-tank devoted to sustainable energy and climate issues.

The Institute published an interactive online tool in June that attempts to quantify potential effects of increasing development of drilling and fracking in the northeast, and offer potential ways to reduce those effects. In its estimation, water demand could double, depending on the number of LNG plants built.

Focusing drilling development in areas that require less water to frack to begin with, along with emphasizing alternatives to fresh water and newer technologies, could help lighten their impact, Horne said.

“If we take some of those interesting projects and get to a place where they’re standard practice, we can do quite a bit (to reduce) total water demand,” Horne said.

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Ray Wagner, a BC Hydro manager, during tour of the facilities at the W.A.C. Bennett dam.

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