



LSWC Fact Sheet: Water Allocation and Use in the Lesser Slave Watershed

Water is Important

Water is a precious commodity. A reliable supply of fresh water is the foundation of healthy communities and economies. This fact sheet examines water use in the Lesser Slave Watershed.

- 💧 What is a water license?
- 💧 What does 'allocation' mean?
- 💧 How much water is available?
- 💧 How much water is being used?
- 💧 Who is using the water and for what?

Water Allocation vs. Water Use

The Water Act is the provincial legislation in Alberta that manages and protects our water resources. Anyone wanting to use water for anything other than domestic use needs to apply for a water license. Before granting an allocation, the government considers how much water is available, how much water has already been allocated from that source, how much the person has requested and how much water needs to stay in the river to protect the river or lake ecosystem. With a license, you are allocated (allowed to use)

Water licenses can be for things like:

- 💧 municipal water supplies
- 💧 irrigation
- 💧 drinking water for livestock
- 💧 industrial use (pulp and paper production, manufacturing, energy production, etc.)
- 💧 oil and gas injection

You don't need a water license for your own household needs.

a certain volume of water each year.

Holding the license doesn't mean that you must use the entire allocation. Some users actually return most of the water back to the water source after they have used it. This is called non-consumptive use. Ranger Slave Lake Pulp returns 90% of the water it takes from the Lesser Slave River. Even when the water use is consumptive (the water doesn't go back after being used), the amount of water used is often smaller than the amount allocated. Chevron only returns 8% of the water it withdraws from Lesser Slave River, but it also only uses around 50% of its allocation.

The Lesser Slave Watershed

The Lesser Slave Watershed has two main sub-basins: the Lesser Slave River Watershed, and the Lesser Slave Lake Watershed. A watershed or catchment basin is the land around a lake or river that 'catches' water for that lake or river. Nearly every watershed is part of a larger watershed. Many rivers and streams flow into Lesser Slave Lake but the Lesser Slave River is the only place that water flows out of the lake.

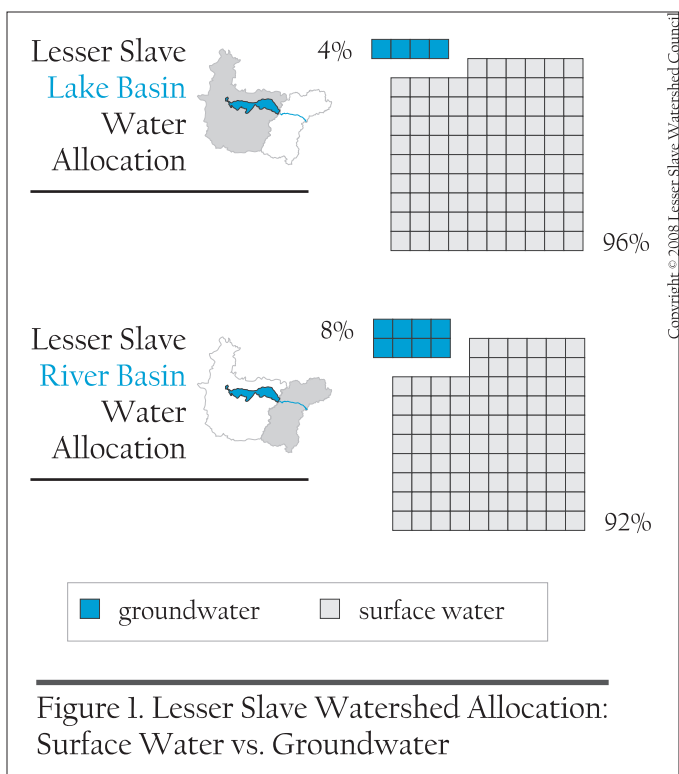


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Water Sources

There are two basic water sources: surface water and **groundwater**. The two sources are closely connected. Groundwater reservoirs are recharged from rain water trickling down from the surface. In dry years, groundwater can help support rivers and lakes by feeding them from below. Surface water is much easier to use and to measure how much is available. Groundwater is both hard to access and hard to measure. We can only estimate the amount of groundwater that is available by analyzing the production of existing wells or by drilling monitoring wells. In the Lesser Slave Watershed, most water licenses are for surface water (Figure 1).

Groundwater is water stored underground between grains of soil and in cracks in the bedrock—imagine the soil as a giant sponge filled with water. It does flow like surface water but not as fast. Actually, ‘flows’ is being generous; creeps is a better description. Depending on what kind of soil it is ‘flowing’ through, groundwater can move less than a millimetre per day.



A household’s water usage isn’t regulated through the Water Act, and many rural households rely on groundwater from private wells. We don’t really know how much groundwater is being used in this way because this domestic use is not reported.

Water Allocation and Use in Alberta

One of the water management challenges in Alberta is the fact that most of the available water is in northern Alberta while most of the people and industry needing the water are in southern Alberta (Figure 2). The Lesser Slave Watershed is part of the larger

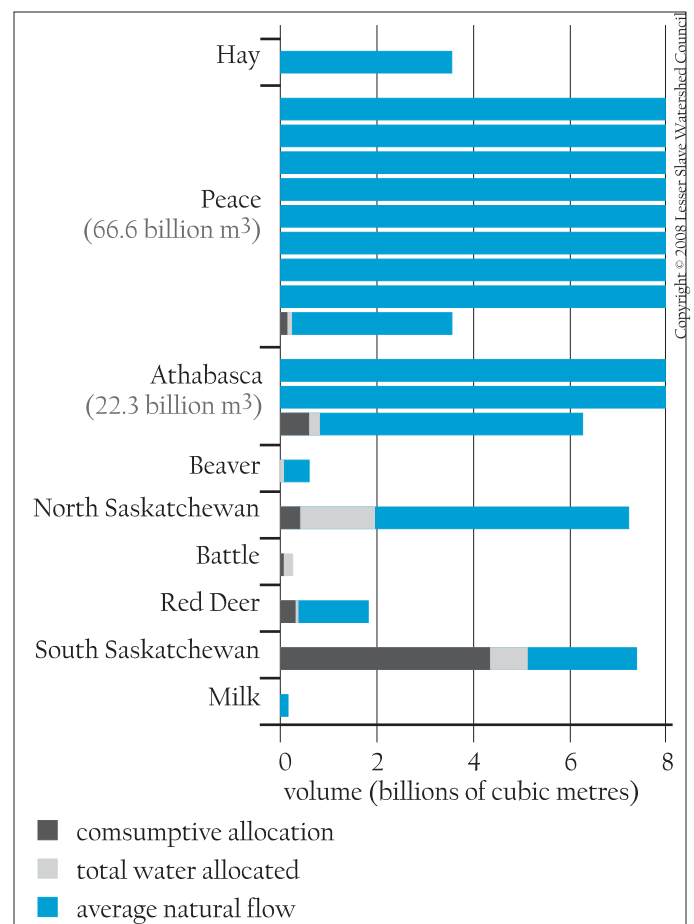


Figure 2. Water Allocations in Alberta by Major River Basin

These allocations are for both surface and groundwater in 2005. You can see that in the northern basins, the amount of water allocated is very small compared to the amount of water available (average natural flow). The southern basins don’t have such a plentiful supply.

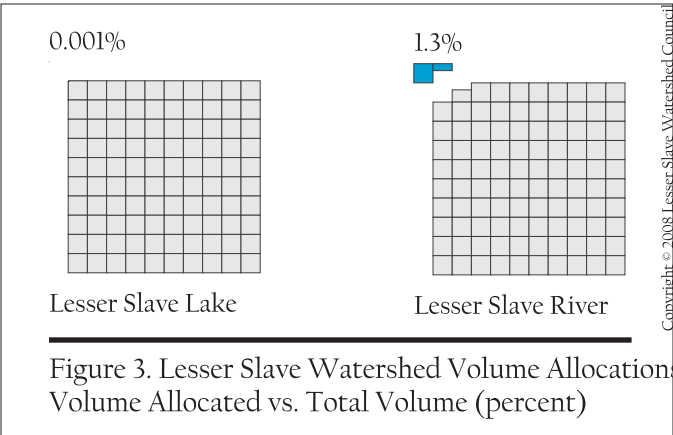
Athabasca River Watershed and has an abundance of water in most years. It's important to realize that the available water varies from year to year. Even in the water rich northern basins, a series of dry years can make water scarce. In 1999, Lesser Slave Lake water levels were so low over the winter that water temporarily stopped flowing from the lake into the Lesser Slave River.

Water Allocation and Use in the Lesser Slave Watershed

The total volume of water allocated for use from Lesser Slave Lake is 11,604,377m³. That may seem like a lot of water, but that's only 0.001% of the total volume of Lesser Slave Lake, which is 12,380,000,000 m³.

The total volume of water allocated for use from the Lesser Slave River is 18,484,796 m³. That's more than is allocated for use from the lake, but it's still only 1.3% of the total water that flows out of Lesser Slave Lake and into the Lesser Slave River each year (Figure 3).

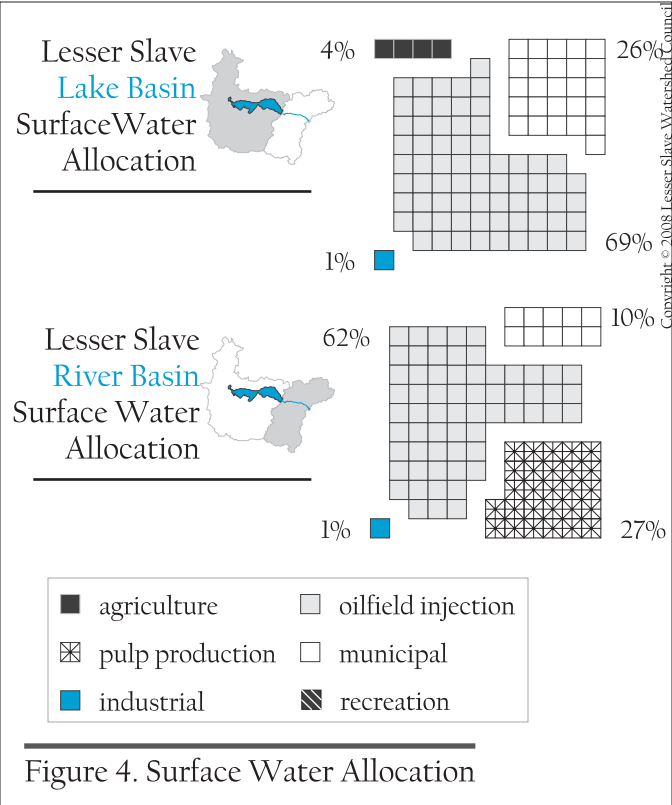
Of all the allocations in the Lesser Slave Watershed,



more than half are to oil companies for oilfield injection—a process that helps extract the oil from the ground (Figure 4).

Four major licenses account for 99% of the allocations from the Lesser Slave River: Chevron, Ranger Slave Lake Pulp, the MD of Lesser Slave River (Mitsue Industrial Park) and the Town of Slave Lake (Figure 5).

There are more licenses issued in the lake basin. The major water licenses from the Lesser Slave Lake Basin are for oil injection (Apache, Devon, Conoco, PennWest) and municipal supply (M.D. of Lesser Slave River, M.D. of Big Lakes, Driftpile Indian Band, Sucker Creek Indian Reserve, Kapawe'no Indian Reserve, East Prairie Metis Settlement,



| Water License | Chevron | Ranger Slave Lake Pulp | Town of Slave Lake | Mitsue Industrial Park |
|--------------------|--------------------|------------------------|------------------------|-------------------------|
| Purpose | Oilfield Injection | Pulp Production | Municipal Water Supply | Industrial Water Supply |
| Allocation | 11,201,160 | 4,932,430 | 1,850,230 | 246,700 |
| Average Withdrawal | 5,772,899 | 3,375,555 | 983,372 | 231,034 |
| Return Flow | 8% | 90% | 112% | 0% |

Figure 5. Major Water Licenses from the Lesser Slave River Basin

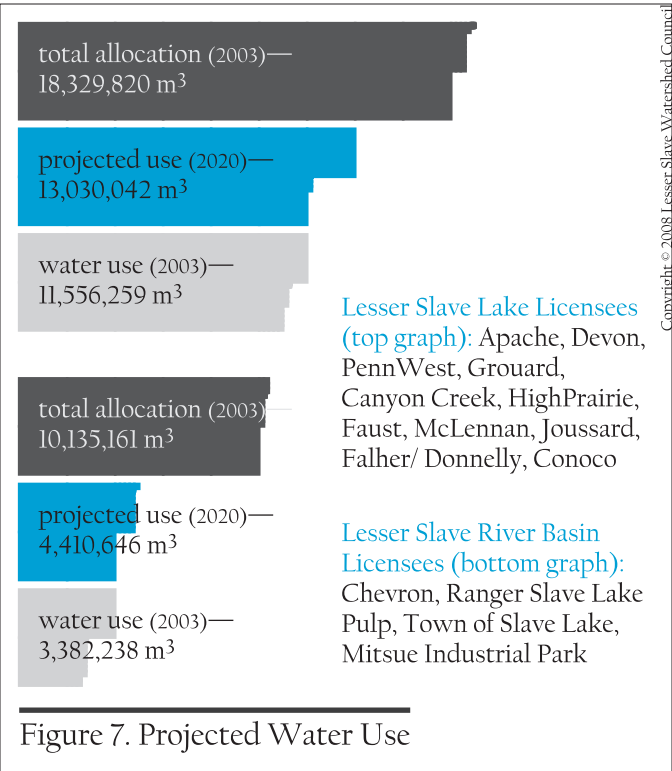
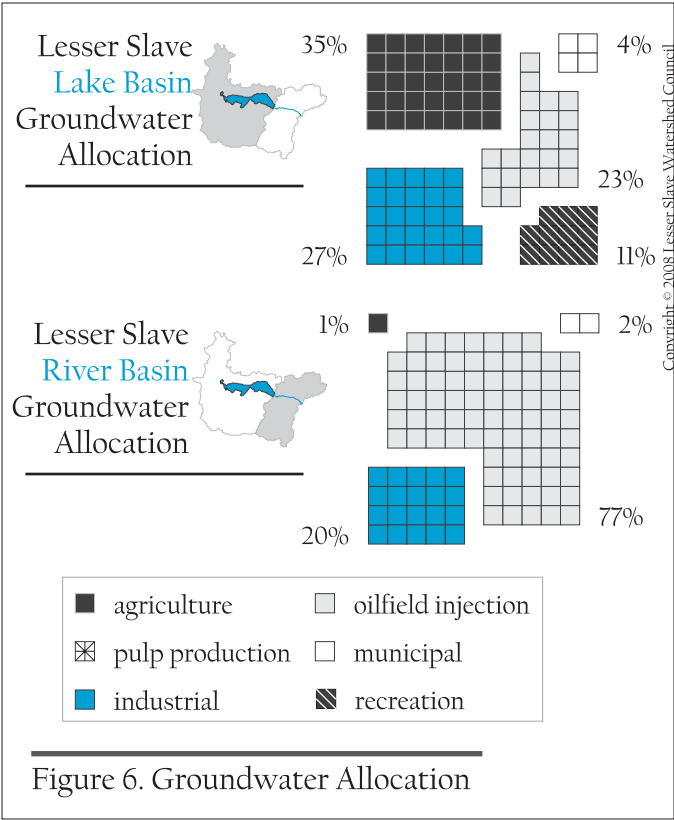
The numbers given are in cubic metres, and the average data is taken from 1993-2000. The return flow from the Town of Slave Lake is higher than 100% because of groundwater seeping into the system.

Town of High Prairie, Town of McLennan, Village of Donnelly, Town of Falher, and Peaving Metis Settlement). These licenses are from the lake and the rivers that feed the lake, including the East and the West Prairie Rivers, the South Heart River, and the Swan River.

Groundwater use in the Lesser Slave River Basin is dominated by oil company and industry use. Agriculture is much more important in the lake basin. It has seventeen groundwater licenses and 110 registries. A registry is similar to a license except used for traditional agriculture and stock watering (Figure 6).

Looking Ahead ...

Figure 7 compares the actual water use in 2003 and the projected use for 2020 to the total water allocated in 2003. The numbers are based on the



water use reported in 2003 and used population and industry growth trends to make projections. While some individual licenses are expected to grow past their 2003 allocation, the total projected water use in both watersheds is expected to remain well below the total amount of water that was allocated in 2003.

The Lesser Slave Watershed is fortunate to have an abundant water supply to support the communities and the industry within its boundaries, today and for years to come.

References
Davis, Ron. (2004). Future Water Uses: Lesser Slave Basins Water Management Plan. Powerpoint Presentation: Alberta Environment, Alberta, Canada.