

FORUM NOTES: Engineered Infrastructure on the Battle River

Storage Overview

- Total volume of water stored by major structures on the Battle River mainstem = 61,200 dam³ (71,200 dam³ *)
 - ATCO: 9,000 dam³
 - Dried Meat: 14,200 dam³ (24,000 dam³*)
 - Coal Lake: 38,000 dam³
- Natural Annual Flows:
 - Median: 285,000 dam³
 - Min: 50,000 dam³
 - Max: 1,200,000 dam³
- Percent of natural flow stored:
 - Median flow: 21% (25%*)
 - Min flow: 122% (142%*)
 - Max flow: 5% (6%*)
- There are also approximately 450 small farm dams and weirs on the Battle system, mostly on the tributaries.

AENV infrastructure on Battle River

- Alberta Environment **owns** and **operates** four structures on the Battle River and its tributaries: a stop log weir on Pigeon Lake, a dam on Coal Lake, a stoplog weir on Dried Meat Lake, and a stoplog weir in the Ribstone Complex. For more information go to: www3.gov.ab.ca/env/water/wmo/index.html

Pigeon Lake outlet

- Alberta Environment has a stoplog weir on the outlet of Pigeon Lake. Alberta Environment's role is to operate and maintain the weir. The weir is managed for a target elevation, and AENV attempts to keep the water at a certain level in the lake.
- There are structural and operational limitations to operating this weir. Only so much water can be physically let out of the weir by removing the logs. In addition, decisions about how the weir is to be operated are determined by an association of municipalities around Pigeon Lake. In addition, the waterbody itself presents limitations: e.g. it takes a long time to draw down a large lake such as Pigeon Lake.
- An association of municipalities around Pigeon Lake worked with a former Minister to establish a scenario for operation of the weir. This scenario only allows a 6" elevation range. For a lake of this size, this is often an unrealistic scenario. People send their concerns about lake levels to this association.
- When operating this structure, Alberta Environment must balance competing demands from key stakeholders in the Pigeon Lake area. People at different ends of Pigeon Lake want different water levels. They also have to consider flooding in the downstream channel, and must balance the flooding concerns of downstream owners with those of Pigeon Lake residents.

Coal Lake

- Alberta Environment has a dam on Coal Lake. The Coal Lake reservoir was built to serve as both a water supply, and as water storage to supplement downstream flows during low-flow times of year. Coal Lake is the municipal water supply for Wetaskiwin. Until recently it hasn't been actively managed to augment flows.
- The Coal Lake spillway is a 23 meter wide concrete structure in the middle of the 700 meter long earthen fill dam. The structure holds back a lot of water (38,000 dam³ or 13% of the Battle River's annual median flow), but it has limited operational possibilities. The dam has a 30" pipe outlet that can only let out a maximum of 1.4

* * With extra Dried Meat storage capacity supplied by planned weir extension = +9,800 dam³

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cubic meters of water per second. The only time outflow can exceed this is during spring high flow periods when the lake fills up and water breaches the dam and flows over top.

- Fish and wildlife habitat are always a concern during drawdown of the lake. Lower lake levels can dramatically impact oxygen levels for the fish and impact shoreline habitat for birds and animals. Drawdown also impacts water supply for other users reliant on Coal Lake.
- The outlet Alberta Environment controls on the dam isn't fully connected to Coal Lake's main water body, because of siltation between the dam and the main part of the reservoir. This limits how much can be drawn down. AENV are looking at ways we can correct this. Removing the silt bar will increase operational ability of the dam, and reduce constraints. At the moment, silt moves downstream into the river when we do a draw down: if the silt bar is removed, the amount of downstream siltation will be removed.

Dried Meat Lake

- Alberta Environment has a fairly minor weir on Dried Meat Lake, but it plays a significant role in that part of the river: it is the municipal water supply for Camrose and is used for recreation by county residents
- The Dried Meat outlet is slightly larger than Coal Lake's, and is a stoplog formation. The structure holds back 14,200 dam³ of water (5% of the Battle River's median annual flow). It is approximately 4' high by 4' wide, and consists of a steel sheet piling weir with a steel chute containing control stop logs and a Denil fishway.
- Alberta Environment in conjunction with Alberta Infrastructure and Transportation are currently looking at a reconstruction of the Driedmeat Lake weir to raise the lake level approximately 0.60meters. The new riparian outlet will allow release of up to 1.4 cubic meters per second. The dam physically cannot release more water than this, unless it is spilling over the top during high flows. This new structure will increase the reservoir volume to 24,000 dam³.

Ribstone Creek Complex

- Alberta Environment also has a dam in the Ribstone Creek complex, west and east of Wainwright. Although AENV owns the structure, Ducks Unlimited operates this structure in conjunction with their projects in the area to provide spring and fall habitat.
- This dam consists of two culverts and a stoplog system, similar to the one on Pigeon Lake. This is used to stabilize the level of the lake. The lake is used for recreation and habitat for waterfowl. Water levels are held higher in the spring and in the fall, when the lake is used as an important gathering point for waterfowl.

ATCO Dam

- The ATCO dam was build to create the Forestburg Reservoir, to supply cooling water for the Battle River Electricity Generating Station.
- The ATCO dam is a spillway designed to release a base flow at all times, 365 days a year. When inflow to reservoir is > 5 cfs (0.142 cu.m/sec), the downstream release flow must be 5 cfs. When inflow < 5 cfs, the downstream release flow must be 2 cfs (0.057 cu.m/sec). The dam physically can't release any more water than this, unless it is spilling over the top of the dam during high flows.
- The size of the existing reservoir cannot be increased, however, there is potential to use a bladder to increase to the storage capacity of the reservoir.

Ducks Unlimited Infrastructure

- Ducks Unlimited has over 100 licensed wetland projects in the Battle Watershed, including 27 structures in the Ribstone Area. They use a variety of structures to create wetlands and backflood hay meadows for agriculture and habitat improvement. These wetland creation projects also help recharge groundwater and augment river and creek flows during low flow periods. There are no DU structures on the main stem of the Battle River.