

## Baptiste Lake High Water Levels Issue

### General information on Baptiste Lake

- Water levels in lakes and rivers throughout the province rise, fall, and fluctuate throughout the years in response to the local weather and overall climate conditions.
- This year, watersheds in Athabasca County are experiencing high precipitation and consequently flows in streams are high and water levels in the Baptiste Lake have been affected by this wet conditions.
- The lake surface area is approximately nine square kilometres. It has a drainage area of approximately 291 square kilometres. The Baptiste Lake drainage basin is more than 32 times the area of the lake.
  - In the Atlas of Alberta Lakes, drainage basins more than 20 times the area of the lake have been described as relatively large. The ratio of the drainage basin area to the lake area is an important factor influencing the lake level fluctuation. Lakes with proportionately large drainage basins usually receive more runoff, so the lake level may exceed the capacity of the lake outlet, causing a rise in lake water levels.

### High water levels at Baptiste Lake

- Runoff volume can be influenced by soil moisture. When the soil is saturated and the depression storage filled, and rain continues to fall, the rainfall will immediately produce surface runoff. Therefore, due to the wet spring in the Athabasca County area, streams in the area are receiving higher volume of runoff.
- Generally, high flows during storms carry increased levels of suspended solids and substances that adhere to them, such as heavy metals. Therefore, due to high precipitation in the area, Baptiste Lake is expected to receive greater amounts of nutrients and suspended sediment this year.
- Athabasca County has received an extreme level of precipitation (approximately 222 millimetres in July 2017), which is approximately three times the amount of rainfall normally received in the area for that period. Please see the attached maps for more details.

<u>Year</u>	<u>Precipitation in July (mm)</u>
2015	74.8
2016	71.3
<b>2017</b>	<b>222.5</b>

- Additional details can be found at the Environment and Parks website. The weblinks are provided below to access the additional information.
  - <http://environment.alberta.ca/forecasting/data/precipmaps/precipmaps.html>
  - <http://www.environment.alberta.ca/apps/basins/DisplayData.aspx?Type=Figure&BasinID=2&DataType=6&StationID=ATH2>
- There are 13 creeks including seasonal streams that drain into the lake; these creeks are flowing above their capacity and it is expected they will receive greater amounts of nutrients and suspended sediment this year.
- The volume of water coming into the lake exceeds the volume exiting the lake, resulting in high water levels in the lake and flooding of the properties along the shoreline.

- Typically beaver dams cannot sustain high water level conditions and are washed out, which may be another contributing factor for more water from the upstream watershed flowing into the lake.
- According to Summer Village of South Baptiste, there were two beaver dams that were contributing to the high lake level situation.
  - One of the dams was about 200 metres downstream from the mouth of the lake and the second was located about 100 metres downstream from the bridge crossing the secondary road near the Hutterite colony driveway.
  - We have been informed that both the beaver dams have been removed. The beaver dam on the Hutterite-owned land was removed on July 31, 2017.

#### **Potential Impacts of Flooding to Water Quality**

- Due to high sediment loading from flooding, the resident may see some water quality issues in the lake.
- Flooding can have both positive and negative impacts on water quality. In areas with healthy shorelines, flooding can revitalize biological productivity and diversity in the floodplain. However, in areas that have experienced shoreline degradation, flooding can increase erosion.
- Heavy rainfalls can cause an influx of sediments resulting in increases in turbidity. Other water quality parameters associated with sediments such as nutrients, metals, and other contaminants that are present on the landscape can also be transported into lakes during heavy rainfall and flooding events. Heavy storm events can cause high intra-annual variation in water quality parameters (sediments, ions, nutrients, and total metals). These changes to water quality are usually short-term.
- Owing to the difference in water quality characteristics in the north and south basin of Baptiste Lake, we can expect that water quality within each basin may respond differently to a flood event.

#### **Moving Forward**

- The Baptiste Lake and Island Lake Stewardship Society is currently working with Environment and Parks and various local stakeholders to develop a lake watershed management plan.
- Department staff will continue monitoring the situation at Baptist Lake and sharing technical expertise with the concerned residents and local authorities.
- A person wanting to remove a beaver dam is exempt from obtaining a Water Act (WA) approval if they own the land on which the beaver dam is located. For this purpose, the Crown can delegate the removal of a beaver dam to a lessee of the crown land, the beaver dam is located on. Typically, respective local authorities play leading role in removal of beaver dams.
- Harvesting of the 'beaver' (animals) requires a "Damage Control Permit" be obtained from Environment and Parks.
- All beaver dam removal must follow the Federal Department of Fisheries and Oceans [DFO] Operational Statement Beaver Dam Removal. Check the Operational Statement to determine if permission needs to be obtained from DFO,
- The department strongly recommends following the attached best management practices for beaver dam removal to prevent any damage to lands downstream of the beaver dam to be removed.
- Local authorities should be encouraged to work together proactively to have and maintain an inventory of the beaver dams upstream and downstream of the lake and remove beaver dams before getting into high lake level situations.

- Typically, high water events lead to bank erosions and require some repair/modification of bank and shore. Please see the attached link for more information.  
<http://aep.alberta.ca/water/education-guidelines/high-water-lakeshores.aspx>