

## 2.7 Whitewater Lake Subwatershed



**CONSERVATION  
SUDBURY**

### General Description

- **Total Area :** 147.7 km<sup>2</sup>
- **Drainage:** Characterized by several small creeks to the north and several larger lakes to the south which all feed into Whitewater Lake. The lake water is then discharged into Levey Creek, where it travels 11 km to joins the Vermilion River. The subwatershed has a main channel length measuring 31.9 km long with a maximum channel elevation of 340.2 m.a.s.l. and a slope of 2.73 m/km.
- **Topography:** Much of the subwatershed is characterized by a flat to undulating topography, with a maximum elevation of 355.7 m.a.s.l., a mean elevation of 294.6 m.a.s.l. and a mean slope of 4.8%.
- **Geology:**
  - **Bedrock Geology:** The Sudbury Igneous Complex is the main formation, located centrally within this subwatershed. To the north is the valley region of the Sudbury Structure, consisting of Precambrian rock of the Superior Province, while to the south there is an intrusion of bedrock from the Huronian Province.
  - **Quaternary Geology:** Bedrock makes up the main material, with glaciolacustrine deposits of silt and clay found in the community of Azilda and to the north of the subwatershed.
- **Soils:** The primary surface substrate is stable bedrock, with a large area of silt loam identified in the community of Azilda and to the north of the subwatershed.
- **Groundwater:**
  - Areas identified as Highly Vulnerable Aquifers (HVA) can be found throughout, with the largest section occurring around Whitewater Lake, the community of Azilda and to the north. Similarly, Significant Groundwater Recharge Areas (SGRA) were identified around the community of Azilda and to the north, where surface materials are of glacial outwash origin.
- **Land Cover:**
  - Forest covers an area of 68.9 km<sup>2</sup>, 46.7 % of the subwatershed.
  - Wetlands cover an area of 21.6 km<sup>2</sup>, 14.6 % of the subwatershed.
  - Lakes cover an area of 18.4 km<sup>2</sup>, 12.5 % of the subwatershed.
  - Exposed bedrock covers an area of 14.9 km<sup>2</sup>, 10.1% of the subwatershed.
  - Mining and other extractive land uses cover 12.0 km<sup>2</sup>, 8.1% of the subwatershed.
  - Community/Infrastructure covers 8.6 km<sup>2</sup>, 5.8 % of the subwatershed.
  - Agricultural land covers an area of 5.1 km<sup>2</sup>, 3.5 % of the subwatershed.

- **Land Use Type:**
  - **Zoning:** 129.5 km<sup>2</sup> (87.6%) of this subwatershed are subject to the City of Greater Sudbury's Zoning By-law. Of this area, 64.5km<sup>2</sup> (49.8%) is rural, 55.4 km<sup>2</sup> (42.8%) is industrial, 3.65 km<sup>2</sup> (2.8%) is agricultural and 2.3 km<sup>2</sup> (1.8 %) is residential. The remainder are small areas designated as seasonal, future development, commercial, environmental protection, institutional, park and open space.

### Indigenous Communities and Traditional Territories

- This subwatershed falls within the Robinson-Huron Treaty Area #61, of 1850. It also lies within the traditional territory of both the Wahnapiatae First Nation and the Atikameksheng Anishnawbek First Nation.

### Development Pressure

- **Overall:** Moderate. This subwatershed has a variety of different impacts, including urban development, mining, and agriculture. Its area is largely undeveloped and covered in natural habitat.
- **Settlement Area:** 4.8 km<sup>2</sup> (3.2 %) in the town of Azilda is designated as settlement area under the City of Greater Sudbury Official Plan.
- **Municipal Wastewater Facilities:** There are no municipal wastewater facilities within this subwatershed.
- **Forestry:** Located within the Sudbury Forest, there are no areas identified for harvest in the 2020-2030 Sudbury Forest Management Plan.
- **Aggregates:** There is currently 1 active aggregate operation, covering an area of 0.13 km<sup>2</sup>.
- **Mining :**
  - Currently, there is 1 producing mine. Creighton Mine is an underground operation owned by Vale and mining primarily nickel and copper.
  - Historically, there were 4 additional mines in operation: North Star Mine, Murray Mine, Elsie Mine and McKim Mine.
  - There are currently no active Mining Plans and Permits registered to this subwatershed.
  - Within the last year, there has been no reported exploration activities.

### Recreational Use

- Much of the land, particularly to the south and west of Whitewater Lake, is privately owned by industrial stakeholders limiting the use of the land for recreational purposes. Despite this, unofficial trails exist throughout and are used recreationally by quad and snowmobile users.
- Two official snowmobile trails run through this subwatershed.
- The rocky areas are commonly accessed for blueberry picking.
- The town of Azilda has several recreational areas, including a municipal beach at Whitewater Lake and a large natural area known as the 'Voyageur Hiking and Cross-Country Ski Trail'
- The subwatershed also supports 1 golf course - Forest Ridge Golf and Country Club.

## Water use

- There are currently 4 active Permits to Take Water, all owned by Vale.

## Notable Waterbodies

- **Whitewater Lake** is a medium shallow urban lake, that has been described as having a fragile ecosystem sensitive to development. Covering an area of 949.1ha, the lake is divided into a shallow east section, with a maximum depth of 3m, and a deeper western section with a maximum depth of 11m. The lake has 386 permanent and 61 seasonal residents.
- **Meatbird Lake** and **Turner Lake** are both medium sized lakes surrounded by industrial lands in the Lively area. Both lakes are not accessible to the public due to their location within private land holdings.

## Previously Identified Management Issues

- A 1978 floodplain study of the Azilda and Whitewater Lake area identified 7 structures that are inadequate and cause extensive flooding upstream under the Timmins and 100-year floods, with priority given to the crossing at St. Jean St. Recommendations were to modify the structures by increasing their capacity to greatly mitigate flooding under both flood scenarios. The road crossing at St. Jean St. was replaced by the City of Greater Sudbury in 2012.
- Several residential and commercial buildings were found to be located within the flood fringe of the Landry Creek system. At the time, the replacement or improvement of the Marier St. and C.P.R. structures were identified as potential actions to reduce potential mean annual damage in the flood plain of Landry Creek (Landry Creek - Flood Damage Reduction Study, 1984).
- The downstream section of Landry Creek has experienced many instances of erosion, bank failure and slope instability due to the straight lines of the creek. Recommendations included lining of the creek bed with coarse material to prevent future erosion and the modification of steep banks to ensure lasting slope stability (Landry Creek Sediment Stability Analysis, 2010).

## Natural Hazard Identification and Regulation

Hazards and features regulated by Conservation Sudbury include flood and erosion hazards, wetlands, unstable soils, rivers, streams, creeks, and small inland lakes. More on these regulations can be found in the Conservation Authorities Act, O. Reg. 686/21 that addresses the risks of natural hazards.

### Floodplain mapping:

- Completed for the Azilda-Whitewater Lake area in 1978 to identify areas prone to flooding under the regional storm, 100-year and 50-year return period floods. Landry Creek, which runs through the town of Azilda, also had floodlines mapped, to inform a Flood Damage Reduction Study in 1984. Conservation Sudbury is currently in the process of updating the floodplain maps for the Whitewater Lake subwatershed.

- In the absence of floodplain mapping, flood hazards are estimated based on site conditions. Typically, the extent of the flood hazard is estimated at 1.2 m above the bank full or high-water elevation.

#### **Erosion hazard mapping:**

- Currently, erosion hazards are evaluated based on the general guidance from the MNRF for confined and unconfined systems.
- Sections of Landry Creek are susceptible to erosion, and a Sediment Stability Analysis was completed for portions of the creek in 2010.
  - A sediment stability study was completed for Landry Creek in 2010, with recommendations, due to ongoing bank stability issues in the creek.

#### **Water Control Structure**

- **Whitewater Lake Dam**, also known as Jutras Dam, is a provincially (MNRF) owned and operated dam, used to regulate water levels in Whitewater Lake for recreational purposes.
- **Clarabelle Dam** – Owned and operated by Vale, this dam was originally constructed to alleviate flooding from Nolin and Junction Creek impacting the downtown core.

#### **Drinking Water Source Protection**

- There are no municipal drinking water sources located within this subwatershed.
- The entirety of this subwatershed is located within the headwaters of the Vermilion River Water System, a municipal drinking water source. As such, all watercourses within this subwatershed and the lands immediately around them are classified as Intake Protection Zone 3 as the water ultimately drains towards the Vermilion River drinking water intake.

#### **Water Quality Indicators**

##### **Surface Water:**

- Whitewater Lake, the main water system in the subwatershed has been identified as a mesotrophic lake, with various signs of eutrophication such as algal blooms and increased amounts of aquatic vegetation. Half of the phosphorus loadings to the lake are said to be natural, while 32% were found to be associated with urban runoff. Stormwater runoff has also been identified as a major contributor of nutrients and other pollutants to Whitewater Lake (City of Greater Sudbury Official Plan, 2006).
- Levey Creek, the outlet of Whitewater Lake was also identified as one of the few water systems in the Vermilion River watershed with calcium levels in excess of the provincial objectives. This is believed to be a result of salt application or a byproduct of metal ore processing (Vermilion River Watershed Surface Water Quality Report, 2017).
- Long-term data collected through the PWQMN program (see Data available section) on Levey Creek at the outlet of Whitewater Lake, indicate that copper and nickel concentrations are regularly above provincial water quality objectives.

#### **Groundwater:**

- Water quality collected through the PGMN program (see Data available section) from a bedrock well adjacent to Whitewater Lake possessed water quality that was well below provincial and federal objectives for groundwater.

#### **Significant Features**

- There are no provincial parks, conservation reserves or ANSI ecological areas of interest.
- There are no wildlife values identified in this subwatershed.
- Candidate Regional or Local ANSIs identified in the CGS OP are:
  - Murray Mine Discovery Site
  - Elsie Mountain Formation

#### **Management and Stewardship**

- **Wahnapiatae First Nation and Atikameksheng Anishnawbek First Nation:** Their traditional territories include the area within this subwatershed. They are land holders of the area and, as such, are stewards of the land.
- **City of Greater Sudbury Regreening Program and VETAC:** The CGS's regreening program has completed regreening work on 12.2 km<sup>2</sup> (8.3 %) of this subwatershed.
- **Whitewater Lake - Azilda Community Action Network**

#### **Data available**

- **Provincial Stream Water Quality Monitoring Network:** Conservation Sudbury, in partnership with the Ministry of the Environment, Conservation and Parks, has collected surface water quality data from Levey Creek since 2007.
- **Provincial Groundwater Monitoring Network:** Conservation Sudbury, in partnership with the Ministry of the Environment, Conservation and Parks, collected regular groundwater quantity and sporadic groundwater quality data in the area of Whitewater Lake Park from 2006 to 2021.
- **Vale:** Regular monitoring of groundwater quality, surface water quality and air quality are all completed as a regulatory requirement.
- **Public Health Sudbury and District:** Collects water samples from public beaches in the Sudbury area to identify any health hazards.

#### **Supporting Documents**

City of Greater Sudbury, **Water and Wastewater Master Plan – Existing Water Systems**, 2017

Conservation Sudbury, **Vermilion River Watershed Surface Water Quality Report on Current Conditions**, March 2017.

S. A. Kirchhefer Ltd. **Sediment Stability Analysis – Landry Creek, Azilda**, July 2010.







City of Greater Sudbury, **CGS Official Plan**, 2006.

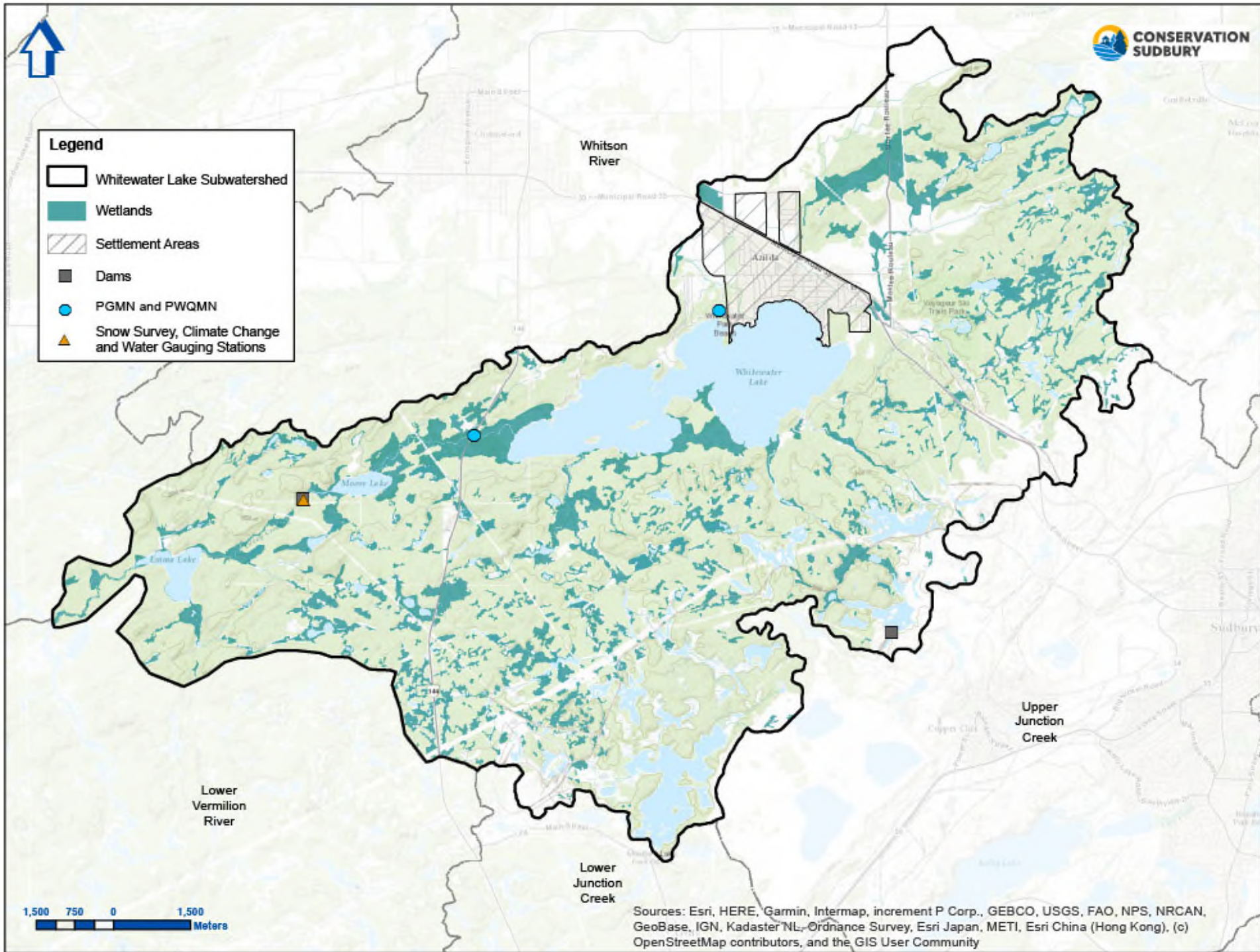
Kilborn Ltd. **Flood Damage Reduction Study, Landry Creek**, April 1984

Crysler & Lathem Ltd. **Floodplain Mapping of Azilda - Whitewater Lake Area**, December 1978.

Nickel District Conservation Authority, **NDCA Watershed Inventory**, September 1980.

**Legend**

-  Whitewater Lake Subwatershed
-  Wetlands
-  Settlement Areas
-  Dams
-  PGMN and PWQMN
-  Snow Survey, Climate Change and Water Gauging Stations



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community