

2.2 Lower Onaping River subwatershed



General Description

- **Total Area:** 794.33 km²
- **Drainage:** This lower portion of the Onaping River watershed drains the area north of Dowling and southeast of Onaping Lake, as it makes its way toward its confluence with the Vermilion River below the town.
 - The length of the main channel is 107.5 km, with a maximum channel elevation of 541.0 m and a minimum channel elevation of 267.5m. The slope of the main channel is 2.54 m/km.
- **Topography:** The northern reaches of this subwatershed are characterized by a comparatively flat bed gradient of 0.85 m/km, along with the presence of interconnecting, low gradient lakes and marshes. By comparison, the southern sub-basin has a much steeper drainage channel gradient of 3.90 m/km. The mean elevation of the subwatershed is 411.16 m, with a maximum elevation of 551.4m
- **Geology:**
 - **Bedrock Geology:** Precambrian bedrock of the Superior Province made up of varying rock types, make up the majority of this subwatershed. The southern portion is underlain by rocks of the Sudbury Igneous Complex.
 - **Quaternary Geology:** Mainly exposed or thinly covered bedrock. Patches of glaciofluvial outwash deposits and till can also be found throughout. To the south, in the vicinity of the town of Dowling, glaciolacustrine, fluvial and glaciofluvial ice-contact deposits are found.
- **Soils:** The main surface substrate is stable bedrock, with a large gravel area found in the town of Dowling. A large portion to the north of this subwatershed does not have soil data available, but it is reasonable to surmise that a large portion of this area is also bedrock.
- **Groundwater:**
 - Some large areas identified as Highly Vulnerable Aquifers are located in the northern reaches of the subwatershed and surrounding the communities of Levack/Onaping, Dowling and Windy Lake.
 - 'Significant Groundwater Recharge Areas' have been identified in the vicinity of the communities of Levack/Onaping south towards Windy Lake and in the community of Dowling and along the Onaping River.
- **Land Cover:**
 - Forest covers an area of 655.4 km², making up 82.5 % of the subwatershed.
 - Lakes cover an area of 77.9 km², making up 9.8 % of the subwatershed.
 - Wetlands cover an area of 53.9 km², making up 6.8 % of the subwatershed.
- **Land Use Type :**
 - **Zoning:** Because of its northern range, only 17.4% of this subwatershed is subject to the City of Greater Sudbury's zoning bylaws. Of that area, 92.1 km² (66.6%) is industrial, 40.3 km² (29.2%) is rural, and the remainder is residential (1.8%) and seasonal (1.1%) while park, commercial, environmental protection, institutional and open space make up less than <1%.

Indigenous Communities and Traditional Territories

- This subwatershed falls within the Robinson-Huron Treaty Area #61, of 1850 and lies within the traditional territory of both the Wahnapiatae First Nation and the Atikameksheng Anishnawbek First Nation.
- Several First Nations have identified numerous recreational and cultural activities that occur throughout this Treaty area, including the areas designated as conservation reserves.

Development Pressure

Overall: Moderate – Though the majority of the subwatershed is undeveloped, the northern range has large areas of forest identified for harvest, while the southern extent is covered in mine disturbed land and 3 residential communities.

- **Settlement Area :**
 - 3.94 km² is designated as settlement area under the CGS's Official Plan. This includes Dowling (2.39 km²), Levack (0.75 km²) and Onaping (0.8 km²).
 - Based on the City's planning data, most future growth within Dowling will be residential. Growth is not significant in Levack and Onaping, only anticipating a total growth of 365 residents by Ultimate Buildout.
- **Wastewater Facilities:** The Dowling Wastewater Treatment Plant and Onaping-Levak Wastewater Treatment Plant are both municipal facilities servicing their respective communities.
- **Forestry:** Mainly within the Spanish Forest, with the southern extent falling within the Sudbury Forest, this subwatershed has extensive areas that are identified for harvest in the 2020-2030 Spanish Forest Management Plan. The Sudbury Forest Management Plan also has a few areas identified within the southern range of the subwatershed.
- **Aggregates:** There are currently 30 active and 1 inactive aggregate operation, covering an area of 12.2 km².
- **Mining:** There is a heavy mining presence within this subwatershed, specifically within the Township of Levack.
 - Presently there are 4 operating mines: Fraser Mine, Craig Mine, Coleman Mine and McCreedy West Mine. Glencore's Strathcona Mill is also located here, with a tailings impoundment area, a wastewater treatment system and other mining related land-uses.
 - There are 9 historical mines recorded in this subwatershed, including Longvack Mine, Strathcona Mine, McCreedy East Mine, North Mine, Fecunis Mine, Levack Mine, Boundary Mine, Hardy Mine and Onaping Mine, many of which still contain reserves.
 - Exploration reported in the last year has taken place for the Onaping Depth project as well as Windy Lake exploration.
 - There are currently 6 active Mining Plans and Permits registered to this subwatershed.

Recreational Use

- The many rivers and lakes in this subwatershed have a wide variety of uses including canoeing/kayaking, swimming, and recreational fishing.
- The area is also commonly used for 'crown-land' camping, hiking, hunting, berry picking and general nature appreciation.
- Trails are plentiful, in part due to forestry activities, supporting snowmobiling and off-road vehicle use. There is also an official snowmobile trail.
- In developed areas, there are several municipal parks and groomed trails, including A.Y Jackson (aka Onaping Falls) trail and lookout managed by Rainbow Routes and the City of Greater Sudbury.

Water use

- There are currently 20 active permits to take water issued within this subwatershed, to Glencore (4), City of Greater Sudbury, Vale, FNX and a local golf course.

Notable Waterbodies

- **Windy Lake** is a large lake with an area of 1,129.0 ha. The lake has 57 permanent residents and 91 seasonal/recreational residents.
- Minor waterbodies: Many small to medium sized lakes also occur across the subwatershed including Venetian Lake and Friday Lake.

Previously Identified Management Issues

Flooding:

- Steep drainage channel gradient in the southern portion of the watershed, as well as no significant attenuative effects (aside from Windy Lake and Moose Lake) causes the subwatershed to respond quickly to rainfall events and give comparatively higher peak flows during spring runoff (Flood Damage Reduction Program for Onaping River at Dowling, 1982).
- The recorded history of flooding in the Dowling area dates back to the early 1900's. From the 1950's onwards, steady growth occurred within the area with increased development in the low-lying areas along the Onaping River. As development increased, so also did the potential for damage from flooding. On May 15, 1960, heavy rainfall and peak spring freshet flows also resulted in considerable flooding. Then again, in 1970 flooding on the Onaping River at Dowling continued to highlight how susceptible the town had become to flood damages. (Report on Study of Onaping-Vermilion River Watershed, 1970).

Data gaps: A stream gauge at Windy Lake Dam was identified as a data gap in the 2014 Source Protection Plan Assessment Report.

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:** Currently, there is no floodplain mapping for this area and no anticipated floodplain mapping work.
 - 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 bankfull elevation 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.

Water Control Structure

- **Windy Lake Dam:** owned and operated by Ministry of Natural Resources and Forestry, to regulate water levels. The dam discharges into Windy Creek, which then discharges into the Onaping River near Dowling.
- **Onaping Lake Dam:** Owned and operated by Domtar, this dam is normally closed and opened only to discharge into the Onaping River during periods of high flow when the discharge through Bannerman Dam is not sufficient to control the Onaping Lake level. The dam controls 797 km² of the total 1645 km² area of the Onaping River drainage basin (both the Upper and Lower Onaping River subwatersheds).
- There are several dams within the footprint of Glencore's mining operations that allow for operation of a wastewater treatment system and control the quantity of treated water leaving the site. These dams prevent the release of untreated water to the environment.

Drinking Water Source Protection

- The Dowling Water System is supplied by two wells; the Riverside Well and the Lionel Well, both owned and operated by the CGS. The wells draw from an unconfined aquifer of sand and gravel deposit, in proximity to the river, and as such, are classified as potential groundwater under the direct influence of surface water (GUDI). There are no known significant conditions present in the Dowling vulnerable areas. Both wells and their WHPAs are within this subwatershed.
- The Onaping drinking water systems consists of 3 non-GUDI wells located close to highway 144. As of 2009, these wells are owned and operated by CGS and supply drinking water to approximately 2150 residents in the towns of Onaping and Levack.
- The entirety of this subwatershed is also located within the headwaters of the Vermilion River Water intake, a municipal drinking water source. As such, all watercourses within this subwatershed and the lands immediately around them are classified as Level 3 Impact Protection Zones as the water ultimately drains towards the Wanapitei River municipal drinking water source.

Water Quality Indicators

- Historically, sanitary and mine waste from various operations were treated or partially treated and discharged to tributaries of the Onaping River, such as Moose Creek and Grassy Creek. These creeks were described as “foul uninhabited streams, heavily contaminated by both organic and toxic industrial waste.” Consequently, the Onaping River has been impaired by industrial activities in the vicinity of Levack (Biological Survey of the Streams and Lakes of the Sudbury Area, 1966). Since then, enhancements and upgrades to mining operations, water treatment and discharge practices have resulted in improved water quality.
- The Onaping-Levack Water System has historically had elevated levels of sodium (2009-2013), ranging from 50 to 90 mg/L. In addition, there have been historical exceedances of lead in private plumbing in the Onaping-Levack Water System. However, no exceedances of lead in the distribution system were noted (City of Greater Sudbury Water and Wastewater Master Plan, 2017).
- Total phosphorus values for Windy Lake are categorized as oligotrophic (CGS, LPP). Unsurprisingly, single samples through the Lake Partner Program, on Friday Lake and Venetian Lake also categorize them as oligotrophic.

Significant Features

- Windy Lake Provincial Park is a fully operational park hosting 93 campsites and covering an area of 1.39 km².
- There are also several conservation reserves which cumulatively cover an area of 12.5 km². These include:
 - Venetian Creek Old Pine Conservation Reserve
 - Kawawia Lake Old Growth Conservation Reserve
 - Friday Lake Conservation Reserve
 - Green Lake Old Pine Conservation Reserve
- Wildlife Values:
 - There are 580 moose related wildlife value areas, covering a total area of 180.8 km².
 - There are also 2 wildlife value points, which are identified as raptor nesting locations.
- There are no ANSI ecological areas of interest.

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.
- **Windy Lake Stewardship Committee**
- **Vermilion River Stewardship**
- **Ministry of Environment, Conservation and Parks**: Provincial Parks and Conservation Reserves are managed by MECP.

- **Glencore:** Because of their operations on the land, the company must complete regular environmental monitoring to comply with provincial and federal regulations. They also complete internal environmental monitoring and progressive site rehabilitation work on their owned properties.

Data available

- **Provincial Stream Water Quality Monitoring Network:** Conservation Sudbury, in partnership with the province, have collected surface water quality data on the Onaping River, upstream of mining influences. This data has been collected fairly regularly from 1968-1996 and 2007 to present.
- **Water Survey of Canada:**
 - Moose Creek at Levack: Active Stream Gauges (Station 02CF013), 1981-present.
 - Onaping River near Levack: Active Stream Gauges (Station 02CF013), 1976-1997, 2002-present
- **Vermilion River Stewardship** group funded the collection of water quality samples from 27 sites within the Vermilion River watershed between 2013 and 2015, 1 of which were located within the Lower Junction Creek subwatershed.
- **Lake Partner Program:** Windy Lake, Venetian Lake (1 sample) and Friday Lake (1 sample) were sampled for total phosphorus and secchi depth as part of this provincially run, volunteer-based program.
- **City of Greater Sudbury:** Windy Lake was sampled annually for total phosphorus through the municipalities 'Lake Water Quality Program'.
- **Glencore:** As part of their regulatory requirements, Glencore has collected air, surface and groundwater quality data.

Supporting Documents

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

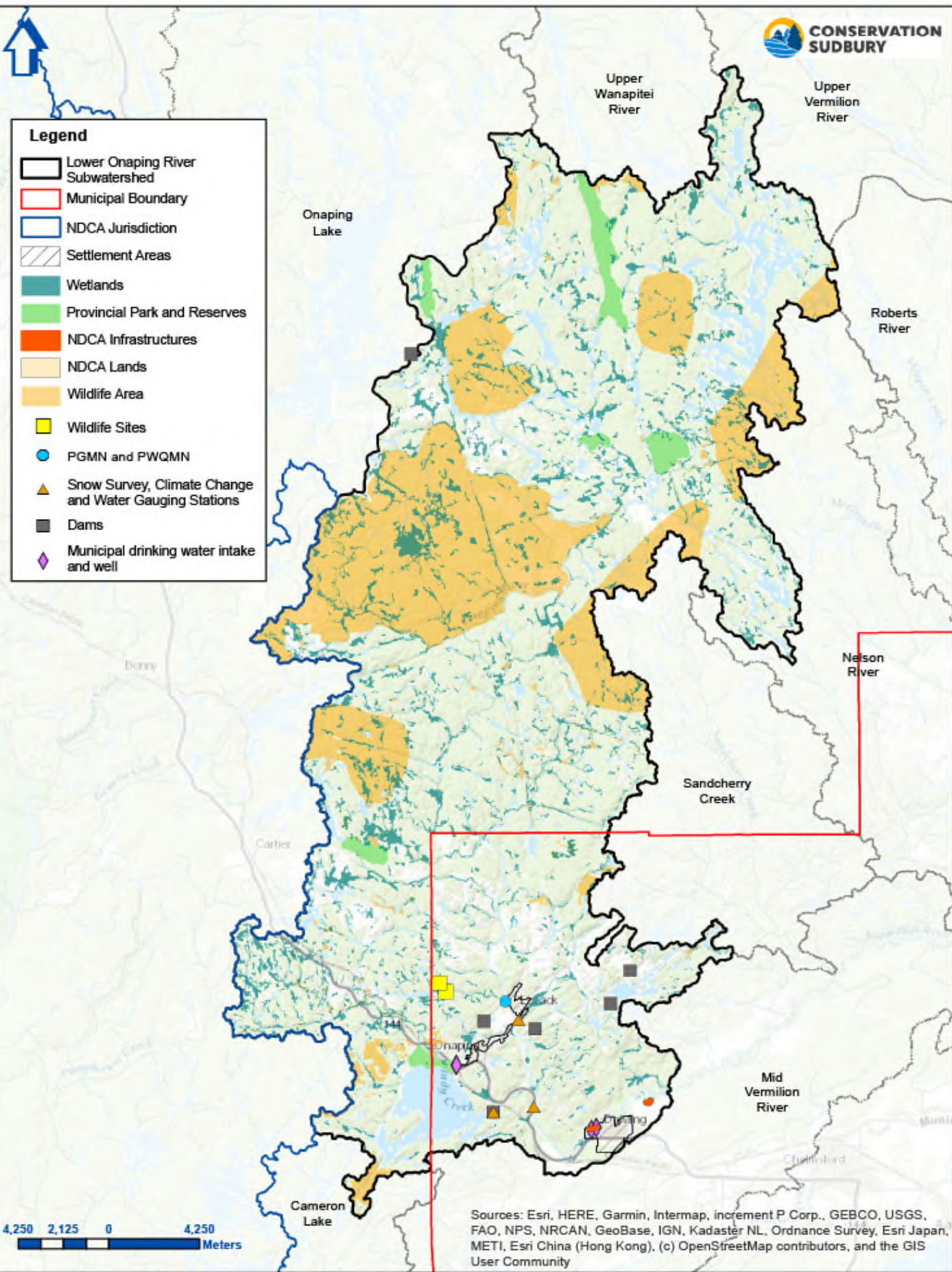
Conservation Sudbury, **Greater Sudbury Source Protection Area - Assessment Report**, September 2, 2014.

Dennis Consultants Ltd, **Flood Damage Reduction Program for Onaping River at Dowling**, Jan 1982.

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

J.V. Svanks., **Report on Study of Onaping-Vermilion River Watershed**, 1970.

Ontario Water Resource Commission, **Biological Survey of the Streams and Lakes of the Sudbury Area**, 1966.



- Legend**
-  Lower Onaping River Subwatershed
 -  Municipal Boundary
 -  NDCA Jurisdiction
 -  Settlement Areas
 -  Wetlands
 -  Provincial Park and Reserves
 -  NDCA Infrastructures
 -  NDCA Lands
 -  Wildlife Area
 -  Wildlife Sites
 -  PGMN and PWQMN
 -  Snow Survey, Climate Change and Water Gauging Stations
 -  Dams
 -  Municipal drinking water intake and well

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