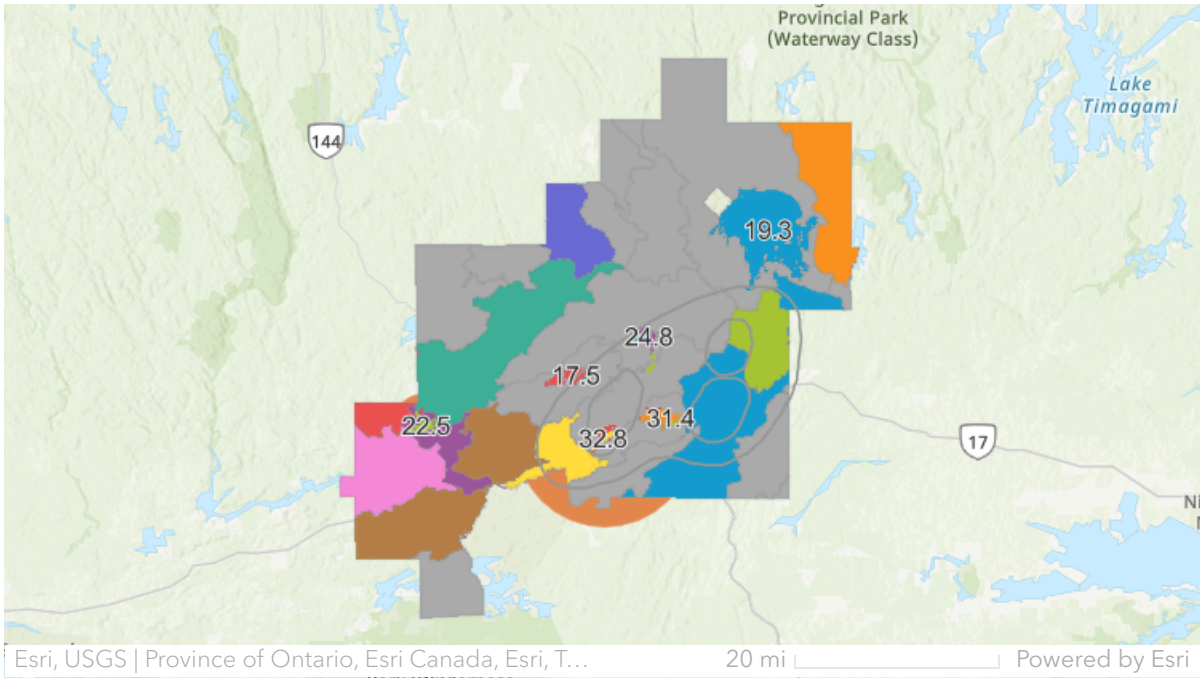
# Environmental Assessment Project (Aditya Thakur)

## Final Project Story Map Journal

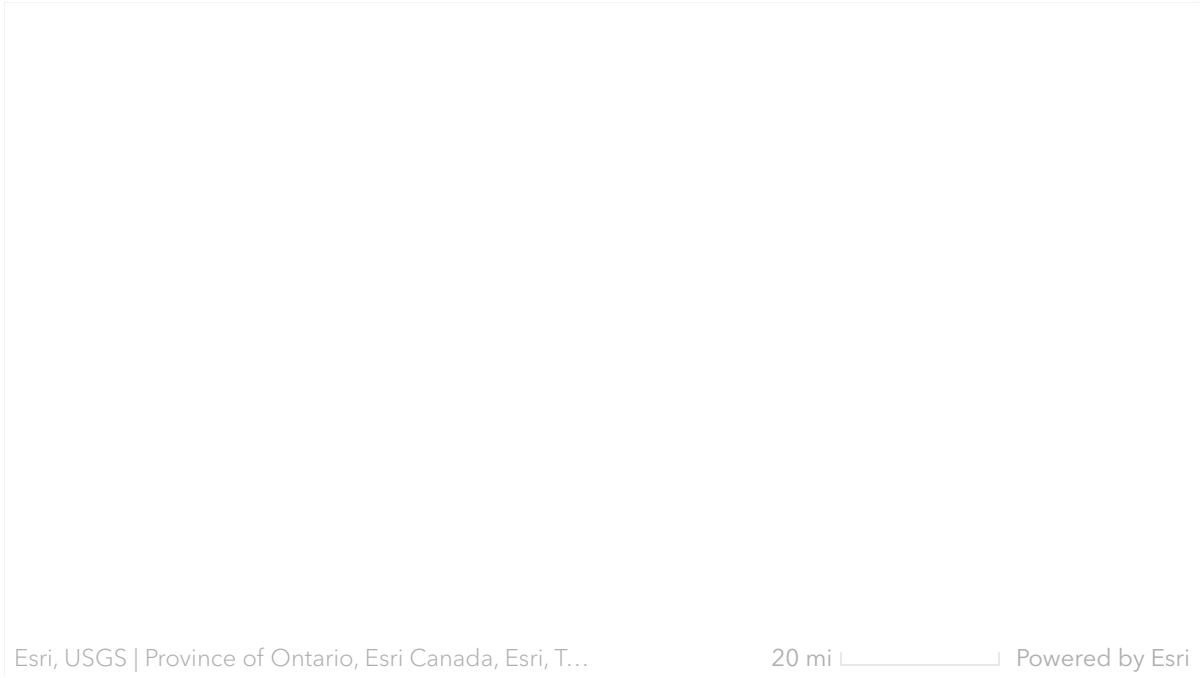
**Aditya Thakur**
**December 11, 2024**


City of Greater Sudbury’s environmental initiatives



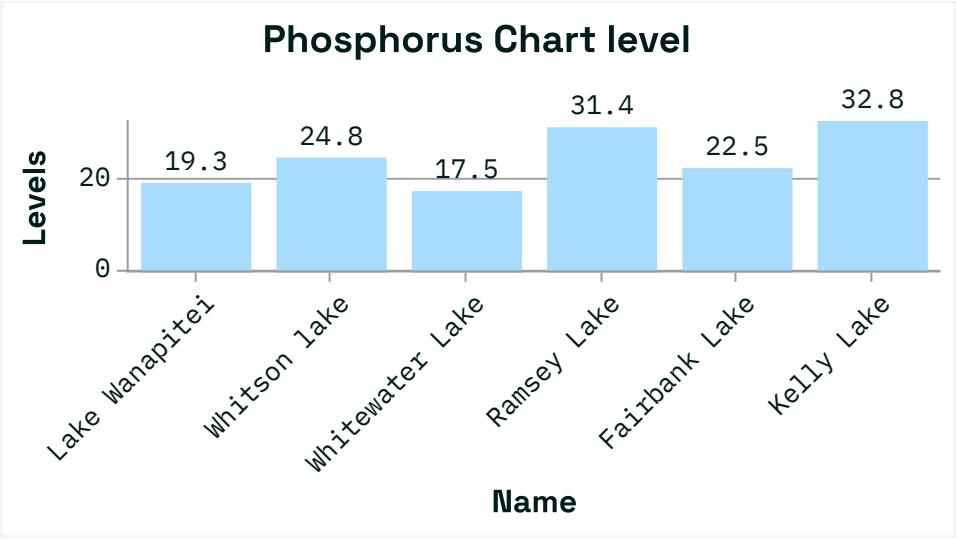

Environmental Assessment Project (Aditya Thakur)

GeoEnv Ltd performed an environmental assessment on six lakes and thirty one tree planting sites with the City of Greater Sudbury. The following story map will showcase our lake water sampling spring phosphorus results and our tree planting health assessment results via maps and photos.




Environmental Web Map Phosphorus levels (Aditya Thakur)

Water samples being collected




Bar chart showing the levels of Phosphorus levels

## Spring Phosphorus

- **Spring phosphorus** refers to the concentration of phosphorus in a lake measured during the spring season, typically after ice melt. This is an important period because spring is when nutrients are evenly mixed throughout the water column due to turnover, providing a representative snapshot of nutrient levels in the entire lake.
- Phosphorus is a key nutrient for aquatic ecosystems and a major driver of primary productivity, influencing the growth of algae and aquatic plants.

## What is Considered a High Concentration of Phosphorus?

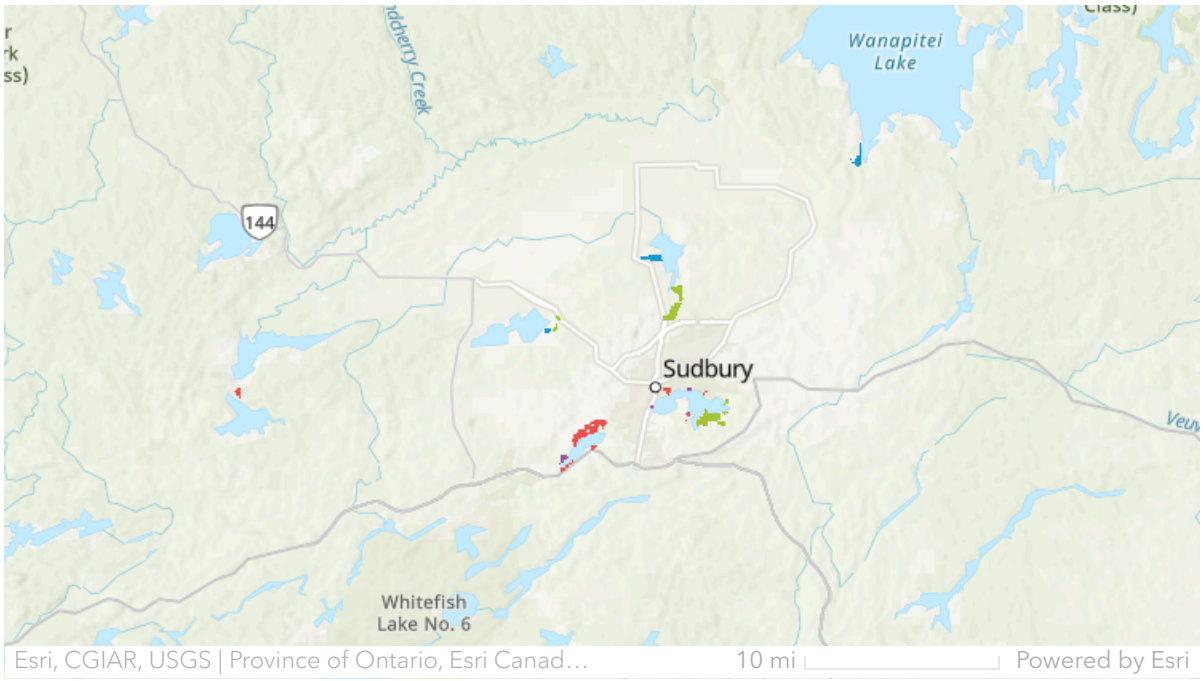
- Phosphorus concentrations are categorized based on their impact on water quality and trophic state (nutrient level):
  - **Oligotrophic (Low Phosphorus):** <10 µg/L
    - Low nutrient levels, clear water, and minimal algal growth.
  - **Mesotrophic (Moderate Phosphorus):** 10–20 µg/L
    - Moderate nutrient levels, balanced aquatic ecosystems.
  - **Eutrophic (High Phosphorus):** >20 µg/L
    - High nutrient levels, increased risk of algae blooms.
  - **Hypereutrophic (Very High Phosphorus):** >50 µg/L
    - Excessive nutrient levels, often leading to harmful algal blooms and poor water quality.

For most lakes, **a phosphorus concentration above 20 µg/L (0.02 mg/L)** is considered high, indicating a eutrophic or hypereutrophic state. This can result in:

- Algal blooms, including harmful cyanobacteria blooms.
- Reduced water clarity.
- Decreased oxygen levels, affecting fish and aquatic organisms.

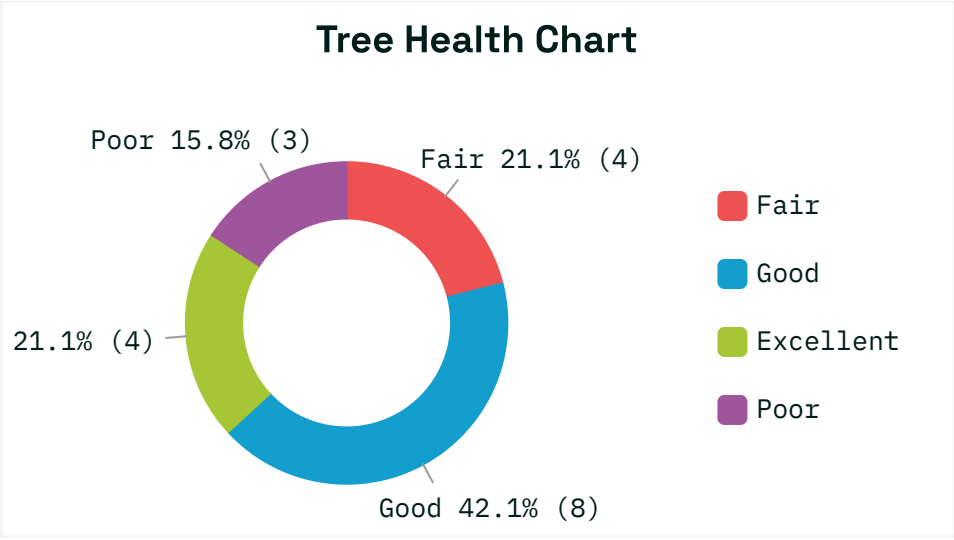
## Why is Spring Phosphorus Important?

- Monitoring spring phosphorus helps assess nutrient loading and predict the lake's productivity and ecological health for the growing season.
- High phosphorus levels can signal the need for management interventions to prevent eutrophication and protect water quality.




Environmental Web MapTree planting sites (Aditya Thakur)

Tree saplings volunteers planting trees




Tree Health Pie chart

## Land Reclamation (Tree Planting)

Land reclamation through tree planting restores degraded or disturbed land by planting trees to

improve soil, biodiversity, and water quality while combating erosion and storing carbon. It is often applied to mining sites, abandoned farmland, and urban wastelands.

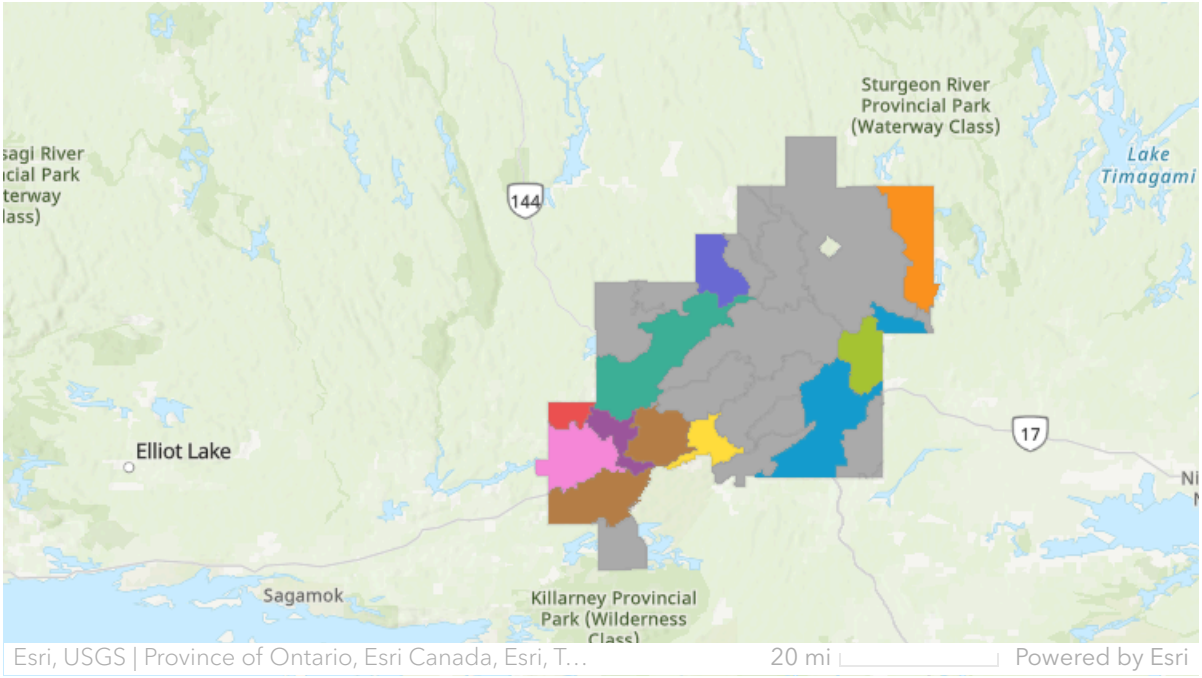
**Applications of Tree Planting in Land Reclamation:**

- Reclaiming **mining sites** by planting native tree species to restore ecosystems.
- Converting **abandoned agricultural fields** into forests.
- Stabilizing slopes and controlling erosion in degraded areas.
- Rehabilitating urban and industrial wastelands.

## What is a Healthy Forest?

A healthy forest is a balanced ecosystem with:

- **Diverse species** of native trees and wildlife.
- **Layers of vegetation** (canopy, understory, ground cover).
- **Good soil health** and water regulation.
- **Resilience** to disturbances like pests or climate change.
  It provides habitats, stores carbon, and supports ecological balance.




Environmental Web Map Watershed Mapping (Aditya Thakur)

A diagram showing a watershed type(eg: flowing river or a basin)

## What is a Watershed?

A watershed is like a big natural funnel. It's the area of land where all the rain, snow, and water flows downhill into the same river, lake, or ocean. It includes everything in that area—streams, trees, soil, plants, animals, and people. Whether you live in a city, a farm, or a forest, you're part of a watershed.

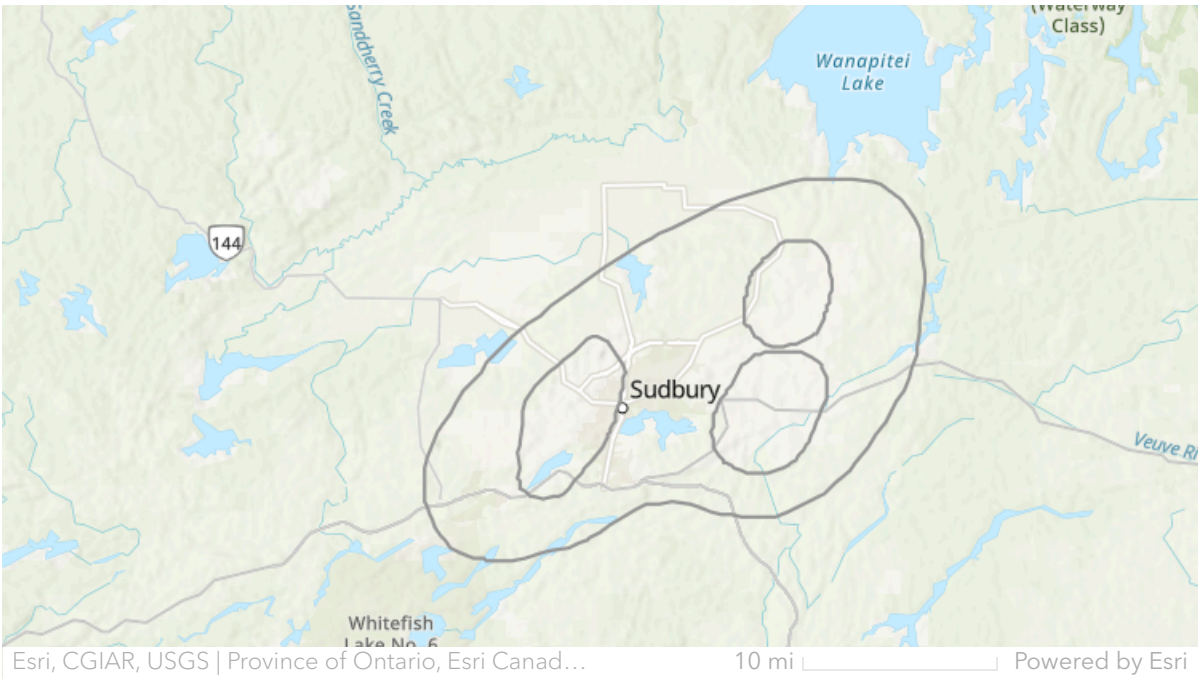
## Why is a Watershed Important to a Community?

Watersheds are essential to our daily lives. They provide the water we drink, water our crops, and keep our rivers and lakes full of life. A healthy watershed acts like nature's filter, cleaning the

water as it flows through plants, soil, and wetlands. It also helps protect us from floods by soaking up rain and slowing down water.

For wildlife, watersheds are home. They provide habitats for fish, birds, and countless other creatures. For people, they're places to kayak, fish, or just relax by the water. They also boost local economies through farming, fishing, and tourism.

Taking care of our watershed means taking care of our community—it keeps our water clean, our environment healthy, and our lives connected to nature.




Environmental Web Map Barren Ring (Aditya Thakur)

A barren ring in Sudbury

## How Were the Barren Rings Created?

The barren rings around Greater Sudbury were caused by decades of mining and smelting, which released **toxic gases** and **acid rain** that killed vegetation, poisoned the soil, and left the land eroded and lifeless. The areas closest to the smelters were hit hardest, creating the treeless "rings" that scarred the landscape.

## How is Greater Sudbury Regreening the Rings?

Since the 1970s, Sudbury has been bringing these areas back to life through a massive regreening effort. Here’s how:

- **Fixing the Soil:** They spread lime to neutralize acidity and added fertilizers to make the soil fertile again.
- **Planting Trees:** Millions of native trees like birch and pine were planted to rebuild forests and stabilize the land.
- **Seeding Grass and Shrubs:** Grasses and shrubs were introduced to cover bare ground and prevent erosion.
- **Community Effort:** Residents, schools, and volunteers have helped plant trees and restore the land.

## The Results

The once-barren rings are now greening up with growing forests, thriving wildlife, and cleaner air. It’s a remarkable transformation that shows how a community can come together to heal the environment and create a legacy of renewal.