We Love Our Lakes: Preston Lake Open House

Presented by:
Ralph Toninger, Associate Director Restoration & Infrastructure
Angela Wallace, Manager, Aquatic Monitoring & Management

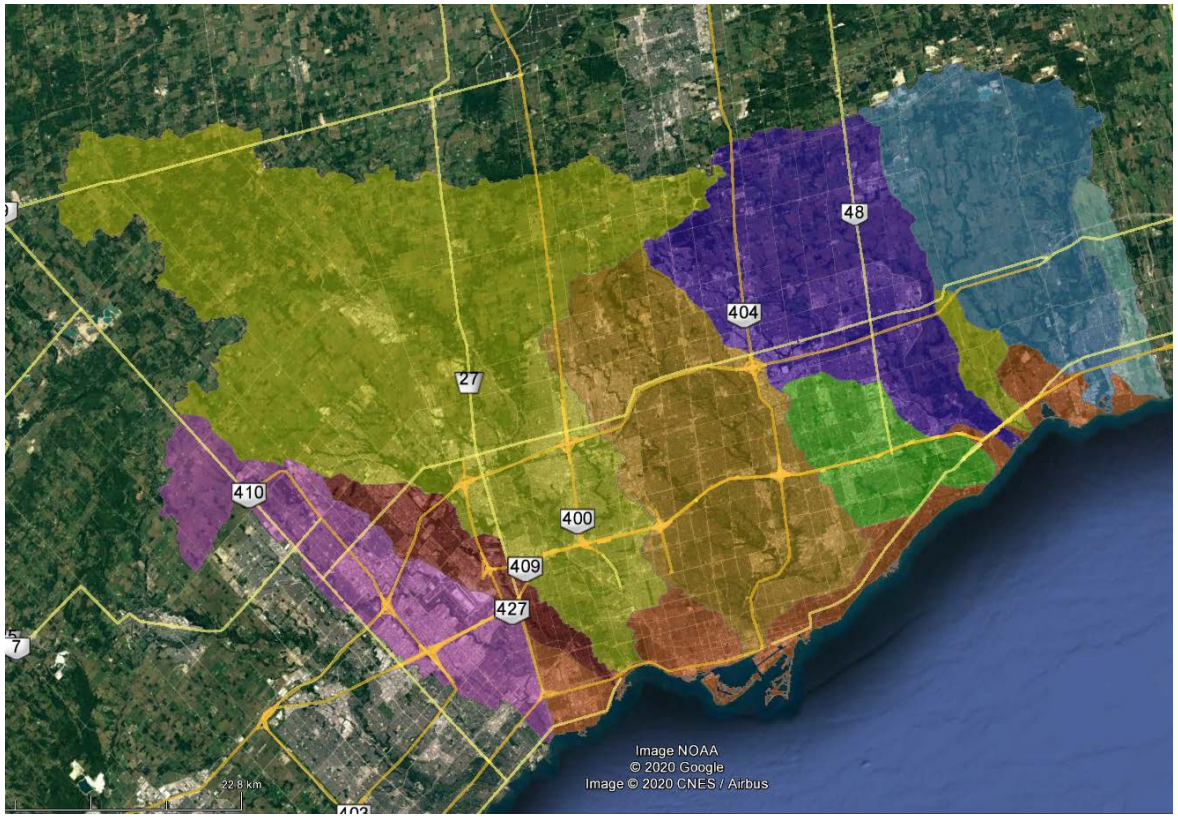
Lemonville Community Centre

April 2, 2024

Toronto and Region Conservation Authority

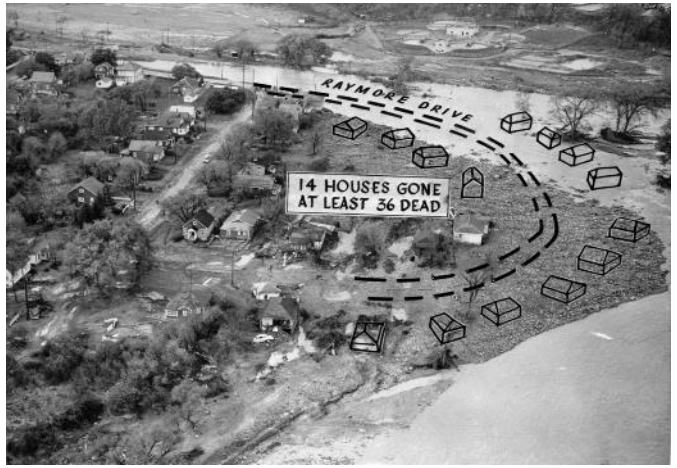
TRCA’s Jurisdiction

- TRCA’s area of jurisdiction includes 3,467 square kilometres: 2,506 on land and 961 water-based
- Nine watersheds:
  - Etobicoke Creek
  - Mimico Creek
  - Humber River
  - Don River
  - Highland Creek
  - Rouge River
  - Petticoat Creek
  - Duffins Creek
  - Carruthers Creek
- 15 municipalities
- Home to 4.3M people (37% of Ontario's population)



About TRCA

- The catastrophic impact of Hurricane Hazel in 1954 led to the expansion of Conservation Authority responsibilities



What Do We Do?

- Flood Risk Management
- Erosion Management
- Environmental Monitoring
- Restoration
- Planning and Watershed Planning
- Community Engagement
- And more!

TRCA Planning & Permits

TRCA's Regulation

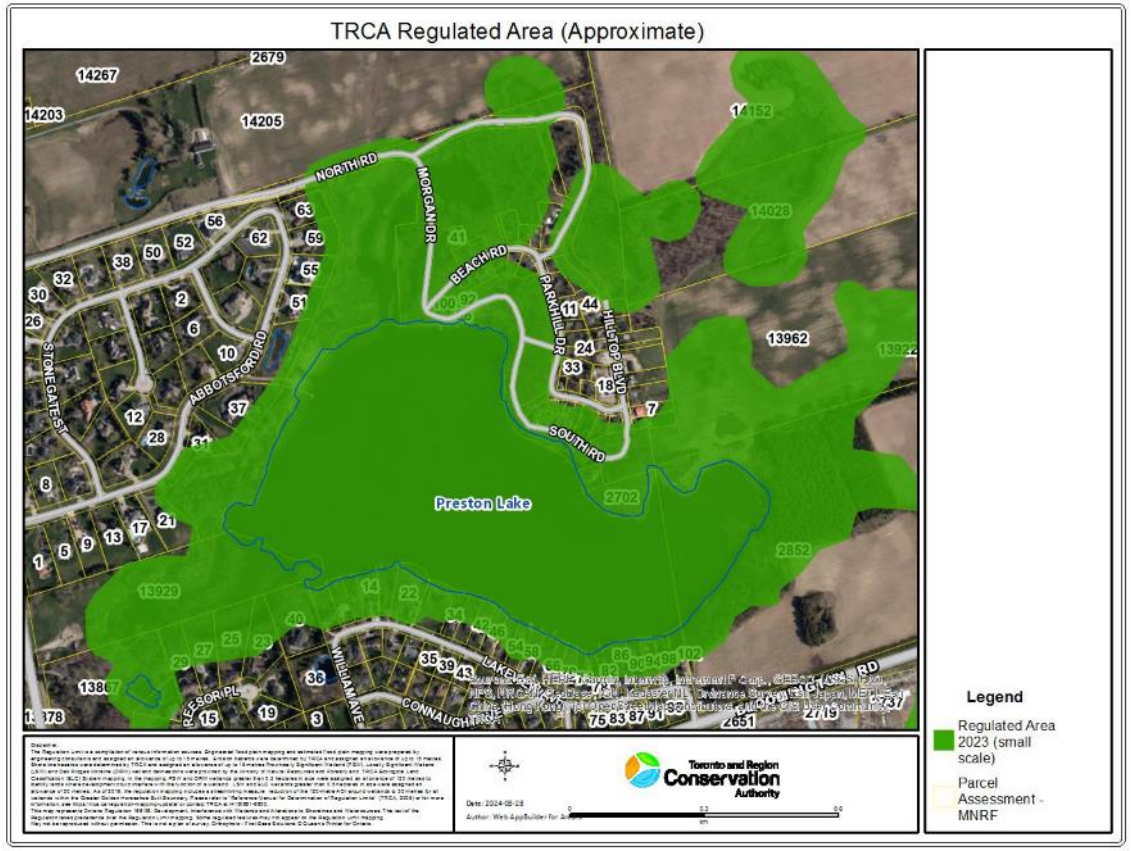
- TRCA planning and permitting staff administer a regulation (Ontario Regulation 41/24: Prohibited Activities, Exemptions and Permits) made under the Conservation Authorities Act to protect life and property from natural hazards such as flooding and erosion.
- Areas that are captured under this regulation are referred to as 'Regulated Areas' and include watercourses, valleys, shorelines, associated flood hazards and erosion hazards, wetlands, and lands adjacent to these natural hazards and features.

What type of activities require a permit from TRCA?

- A permit from our office is required for development activities within TRCA's Regulated Areas which may include but may not be limited to: the construction of a building, addition, accessory structure or pool, the placement of fill, grading, landscaping works, and shoreline protection works.
- View our conceptual Regulated Area mapping and consult with TRCA staff to confirm if the property of interest or development proposal is located within a Regulated Area (https://trca.ca/planning-permits/regulated-area-search-v3/ , https://trca.ca/planning-permits/contact-information/).

TRCA's Involvement in the Municipal Planning Process

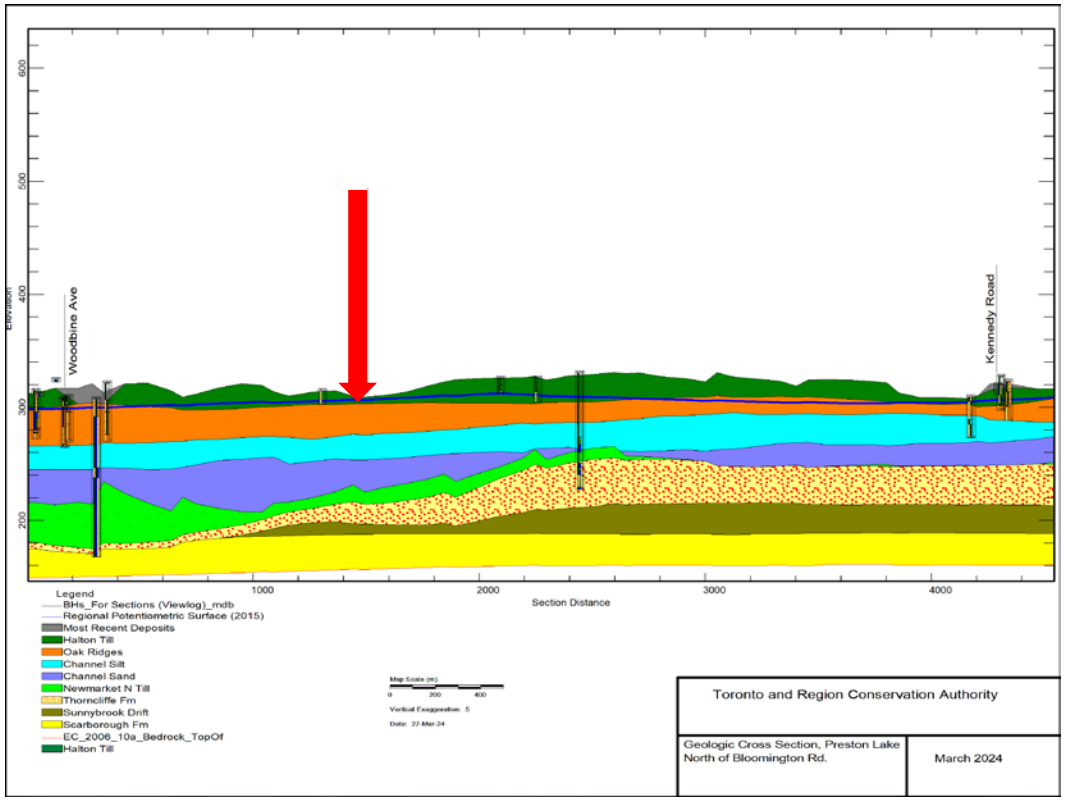
- TRCA is also a commenting agency under the municipal planning review process. Our involvement in the planning process includes reviewing natural hazard matters on behalf of the Province, matters that may affect or be affected by our regulation (for example, planning applications for properties within our Regulated Areas), and other matters such as acquiring environmental lands for conservation purposes.

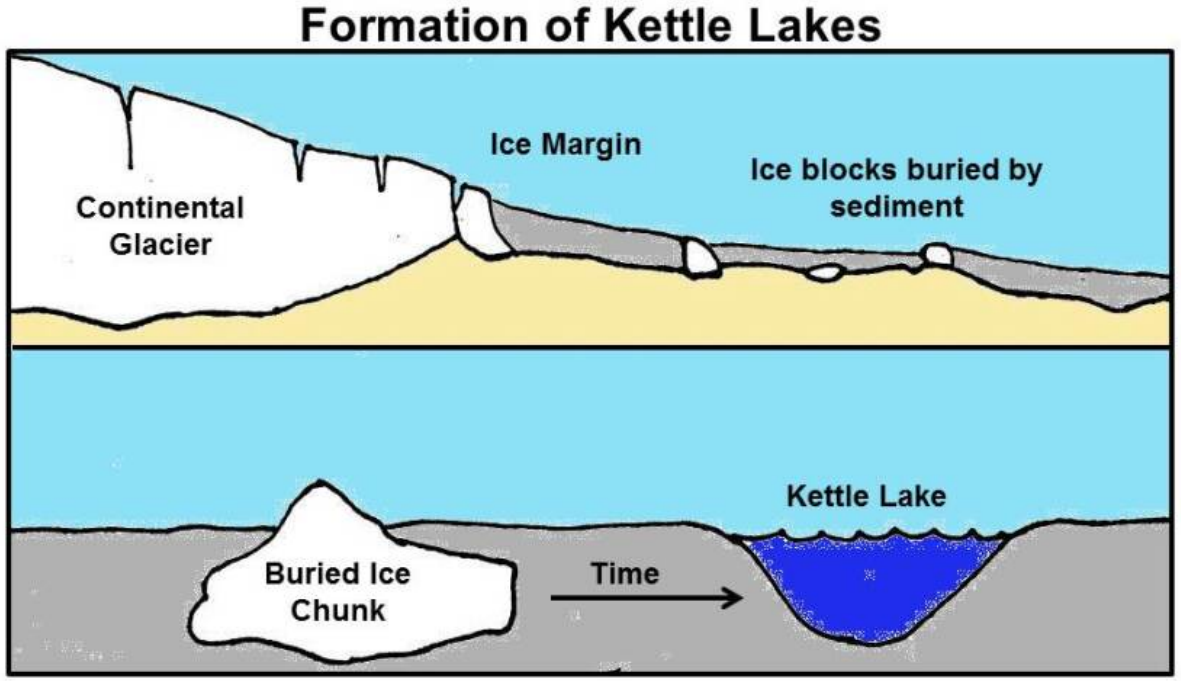


Preston Lake Background

- Preston Lake complex 24 ha
- Surrounded by approximately 200 homes and properties
- Properties are in private ownership
- Land use
  - Residential
  - Agricultural
  - Institutional
- Gasoline-powered motorboats and jet skis restriction since 1971

Kettle Lake Background





Hutchinson (1957)

Preston Lake Surficial Geology and Watershed

- Situated on Oak Ridges Moraine
- With in the silty to clayey Halton Till layer of low permeability

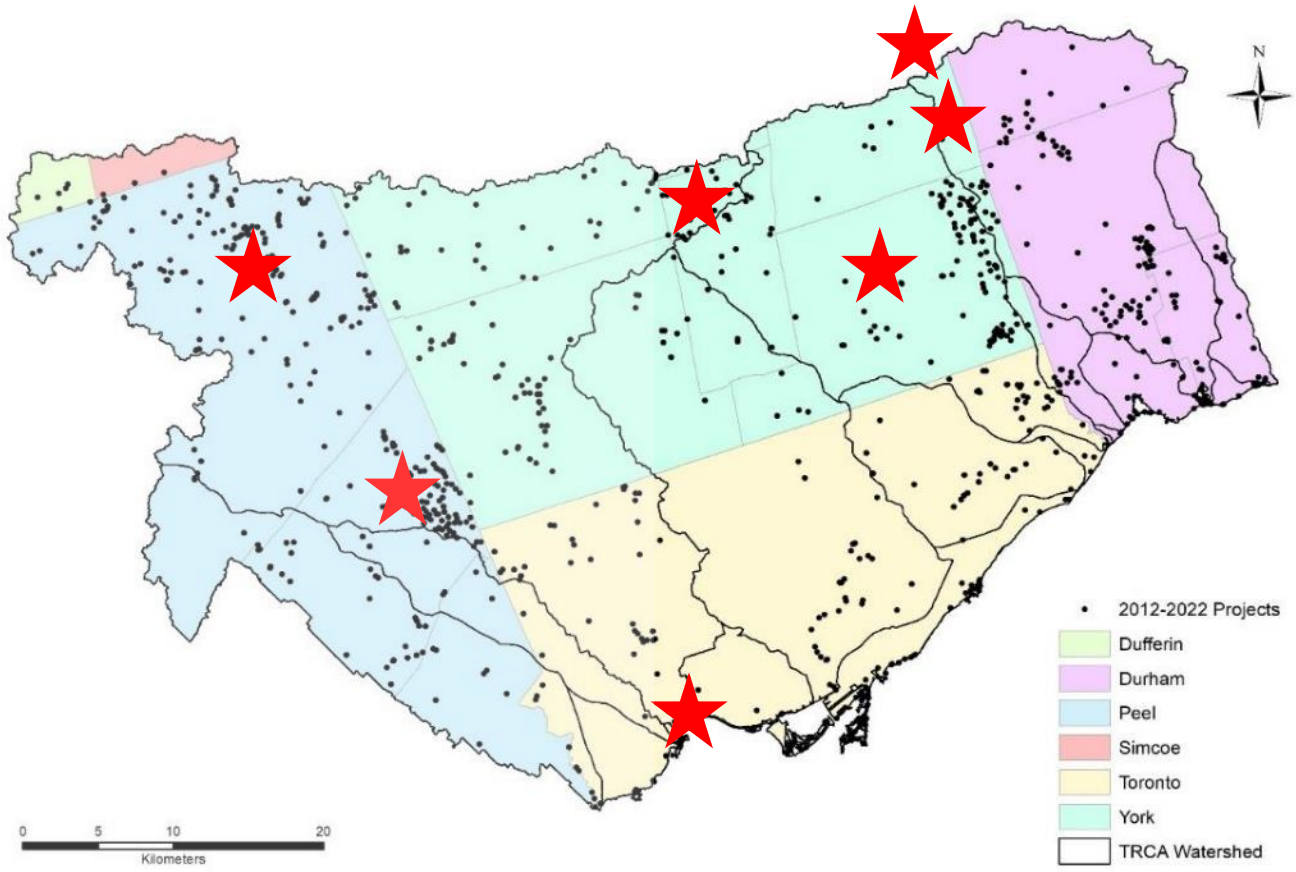
- No significant groundwater source
- It is primarily surface water fed

- Land Use:
  - Agricultural east and north
  - Historic residential to the south
  - Newer 1990's development to the north-west (SWMP)

- Water quality and lake health = land health

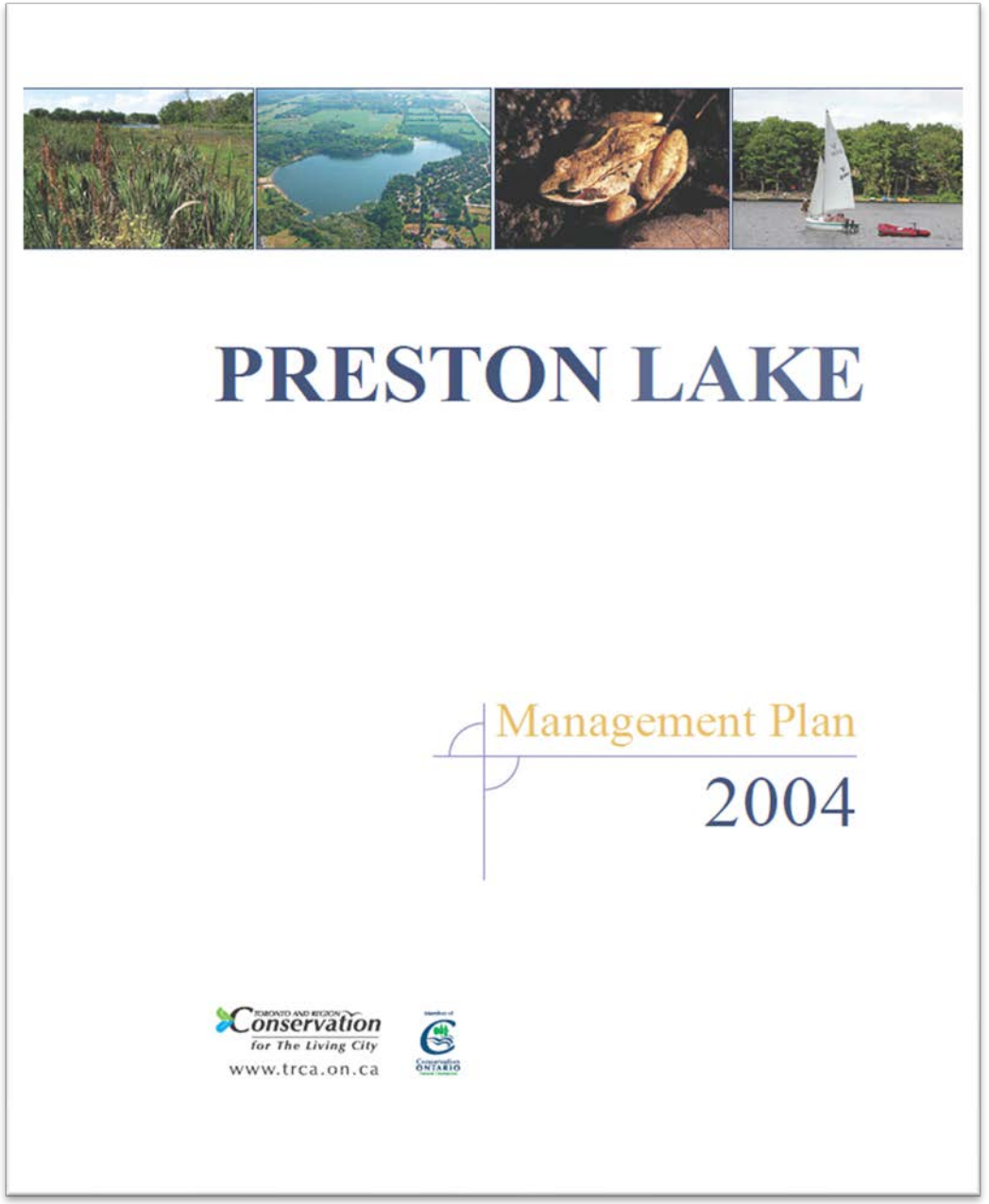
Other Inland Lakes in the Region: Lessons Learned

- Fish community imbalance
- High algae and macrophyte density
- Habitat degradation
  - Shoreline alterations, high impact use
- Water quality/ loading of nutrients
  - Runoff
  - High phosphorus
  - Low Dissolved Oxygen
  - Road salt and salinity
- Beach or swimming closures
- Canada Goose conflict concerns



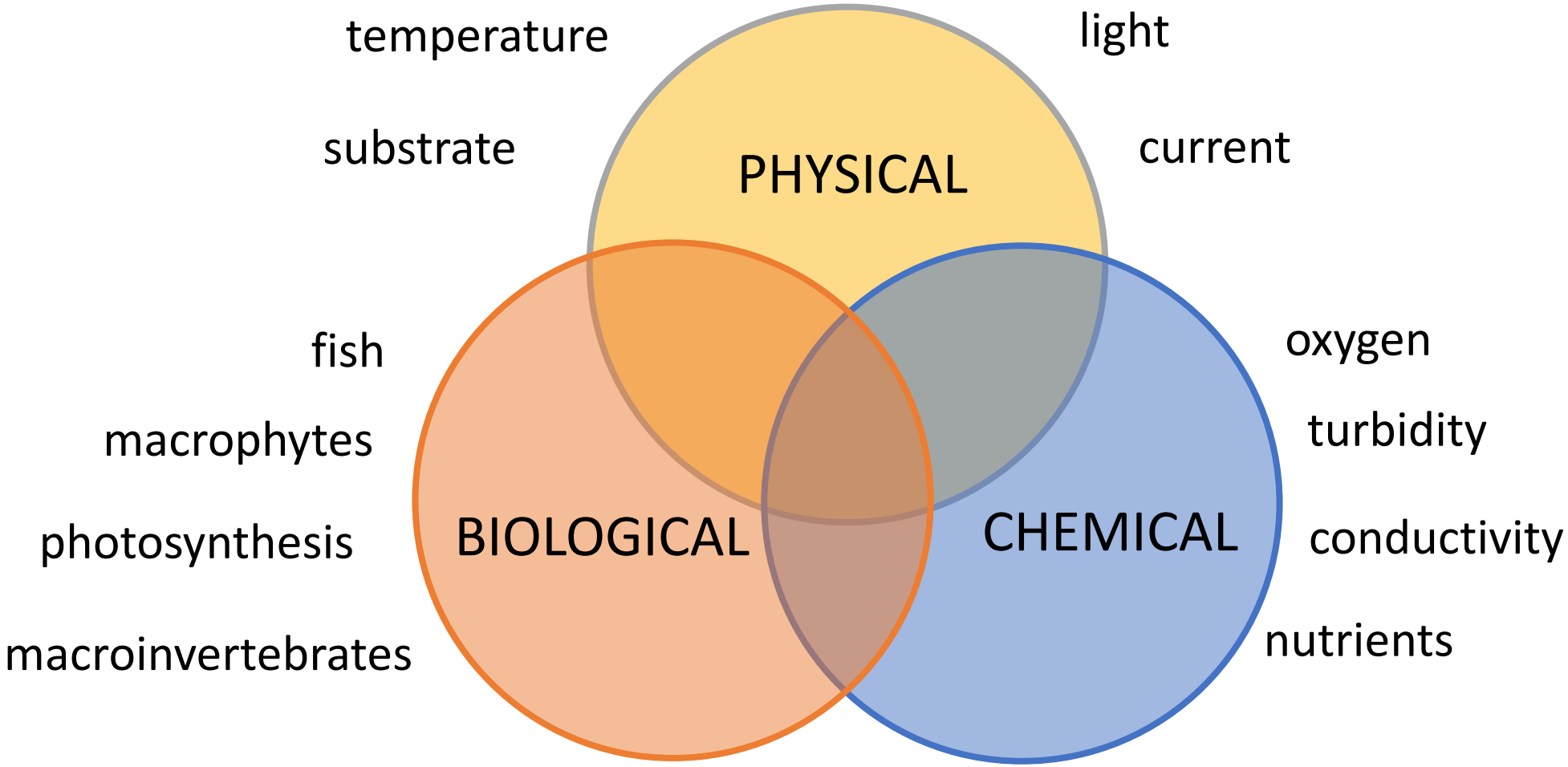
Preston Lake Management Plan Recommendations

- Water Quality
- Water Quantity
- Natural Cover
- Natural Linkages
- Limit Access
- Monitoring
- Goose Management
- Stormwater Management
- Lawn Care
- Septic Systems



Region of York, Town of Whitchurch-Stouffville, York Environmental Stewardship Council, Oak Ridges Moraine Foundation, Human Resources Development Canada, Rouge Park, TD Friends of the Environment Foundation

Preston Lake Ecology



Preston Lake

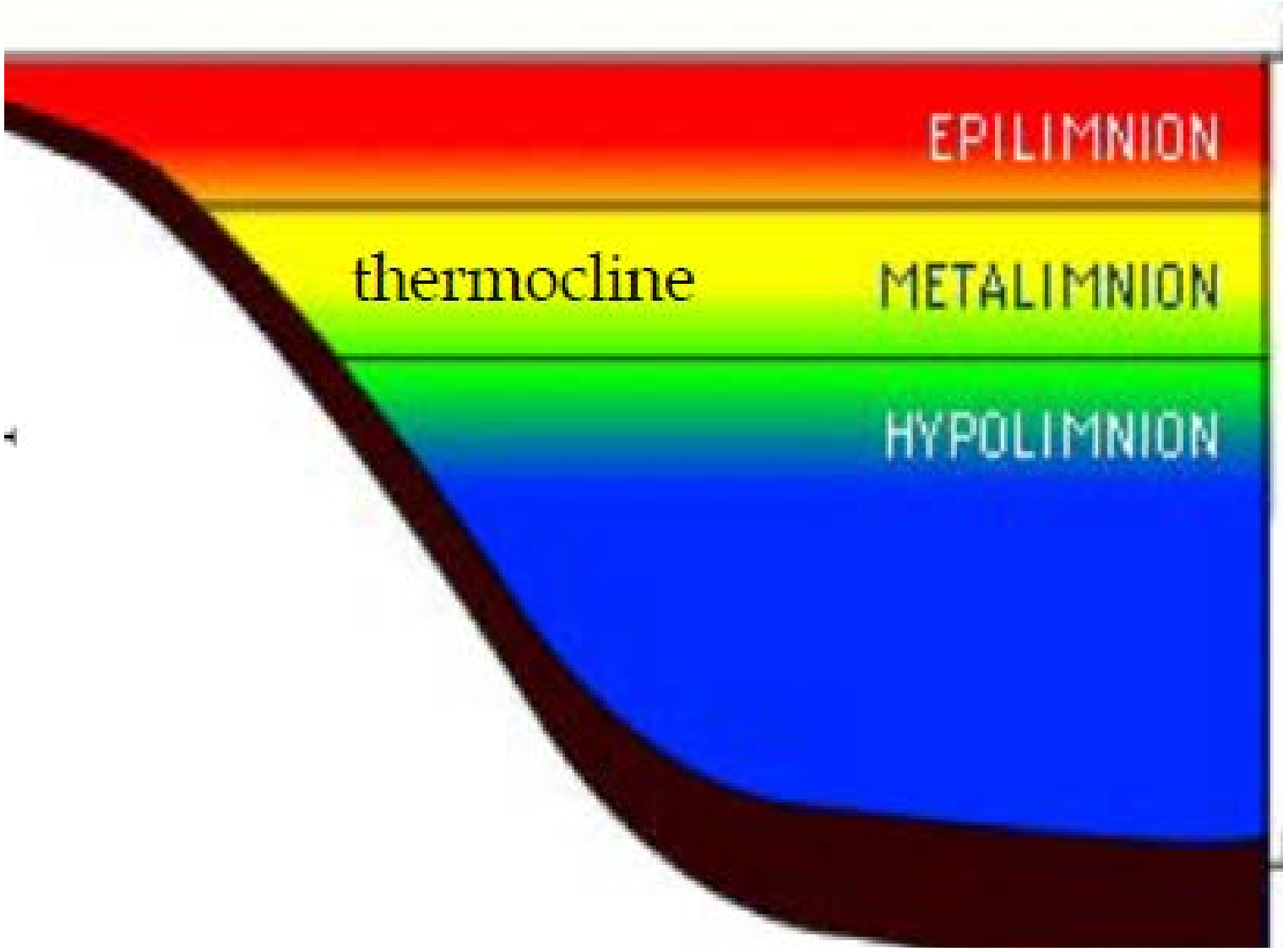
- Surface area 22.7 ha
- Fetch = 690 m
- Max depth ~ 5.5- 9 m/ 18-30 feet deep
- Avg depth 1.1 m/3.6 ft
- Several associated wetlands/SWMP
- A lake and its watershed are considered to be a single ecosystem (Likens 1985)

Preston Lake Water Quality Data

- Historical data from 1995-1997
- Most recent data collected in 2003 (TP*)
- Water temperature, dissolved oxygen, pH, conductivity, total phosphorus, total dissolved solids, *E. coli*
- Total phosphorus data collected by volunteers until 2014

Water Temperature and Stratification

- Many physiological processes are temperature dependent
- Stratification
- Dimictic – turns over twice per year



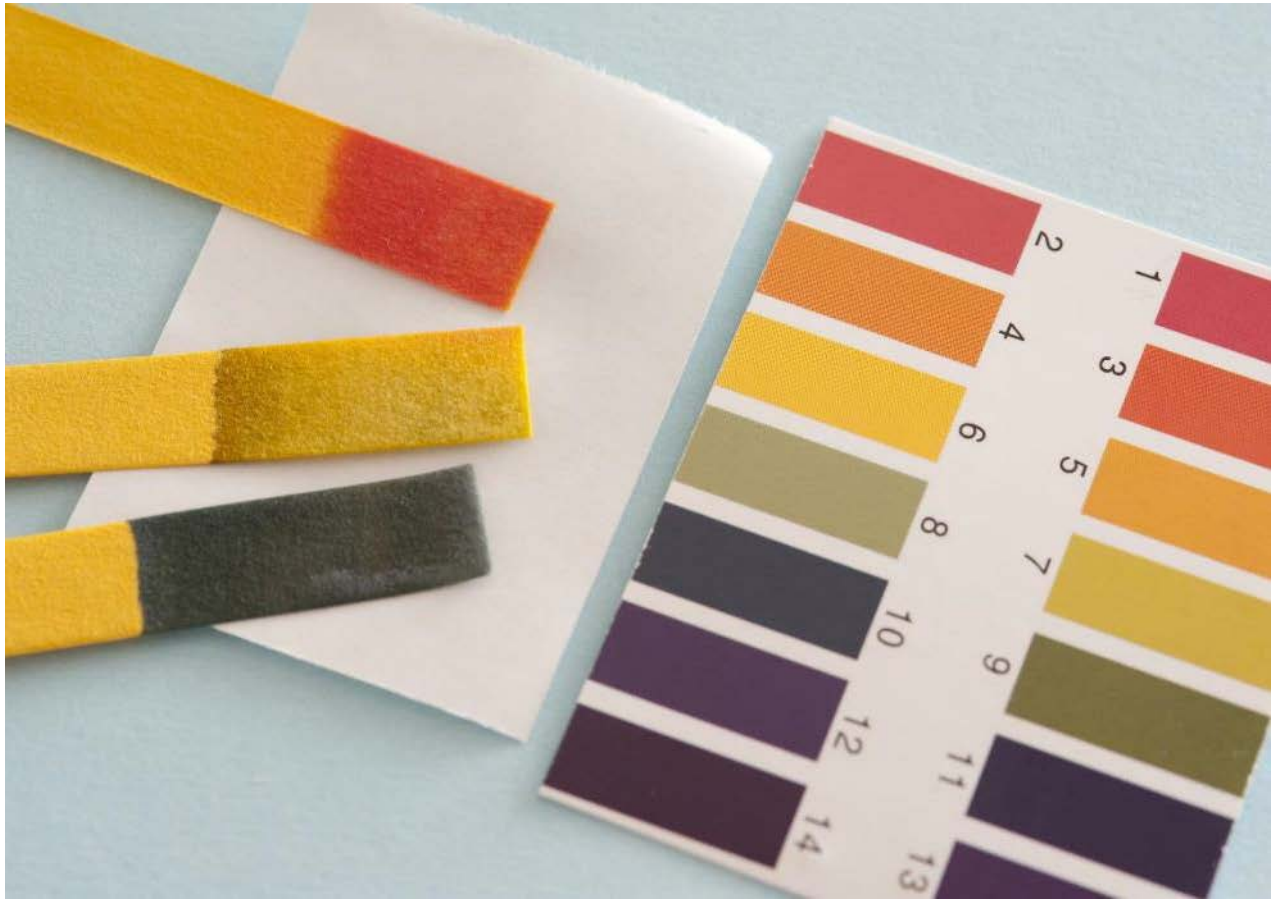
Chemistry

Chemistry controls:

- Physiology
- Biogeochemistry
- Behaviour of pollutants
- How organisms interact with each other and their environment

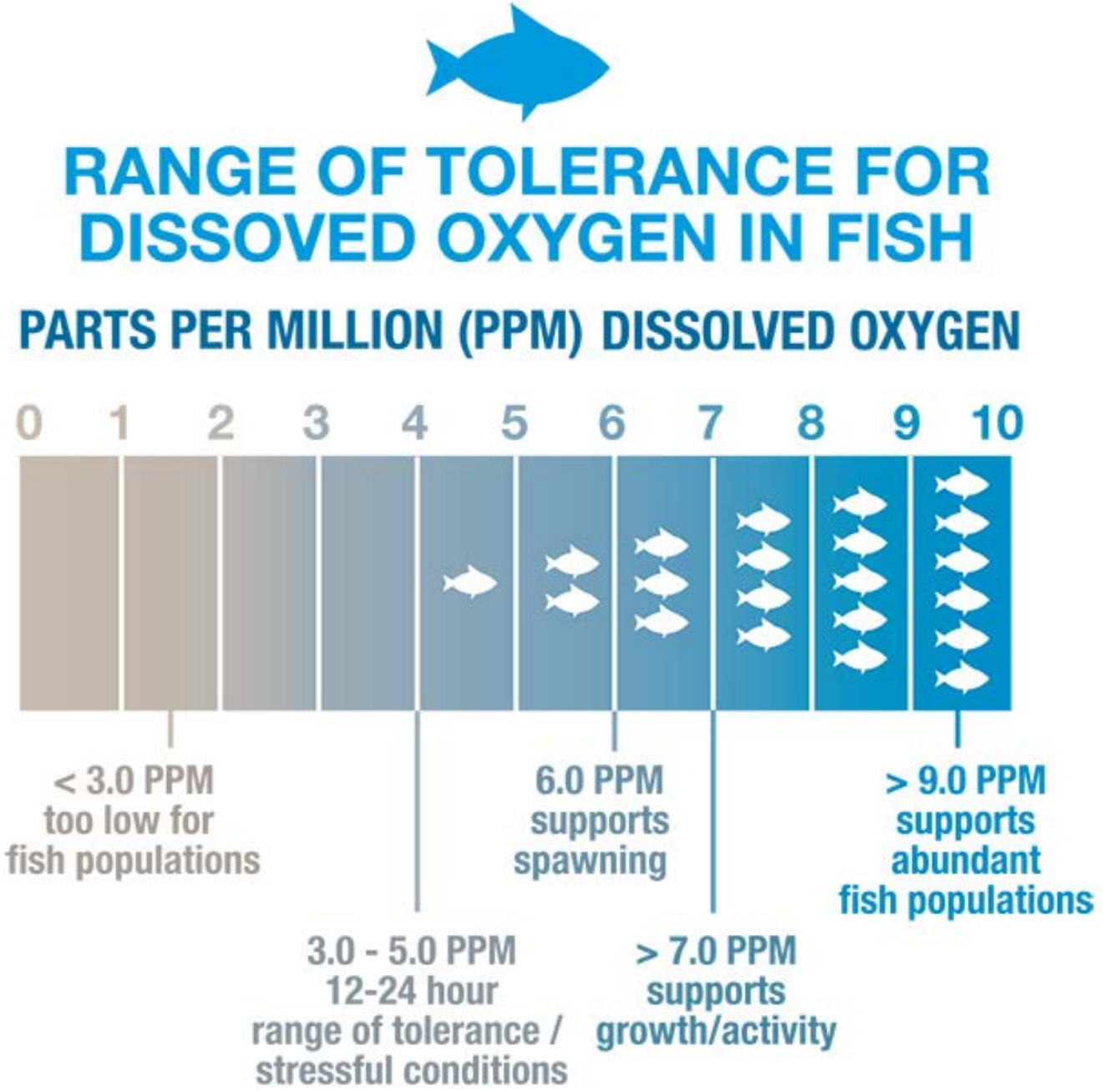
In aquatic ecosystems, chemicals can be two forms:

- Dissolved
- Particulate



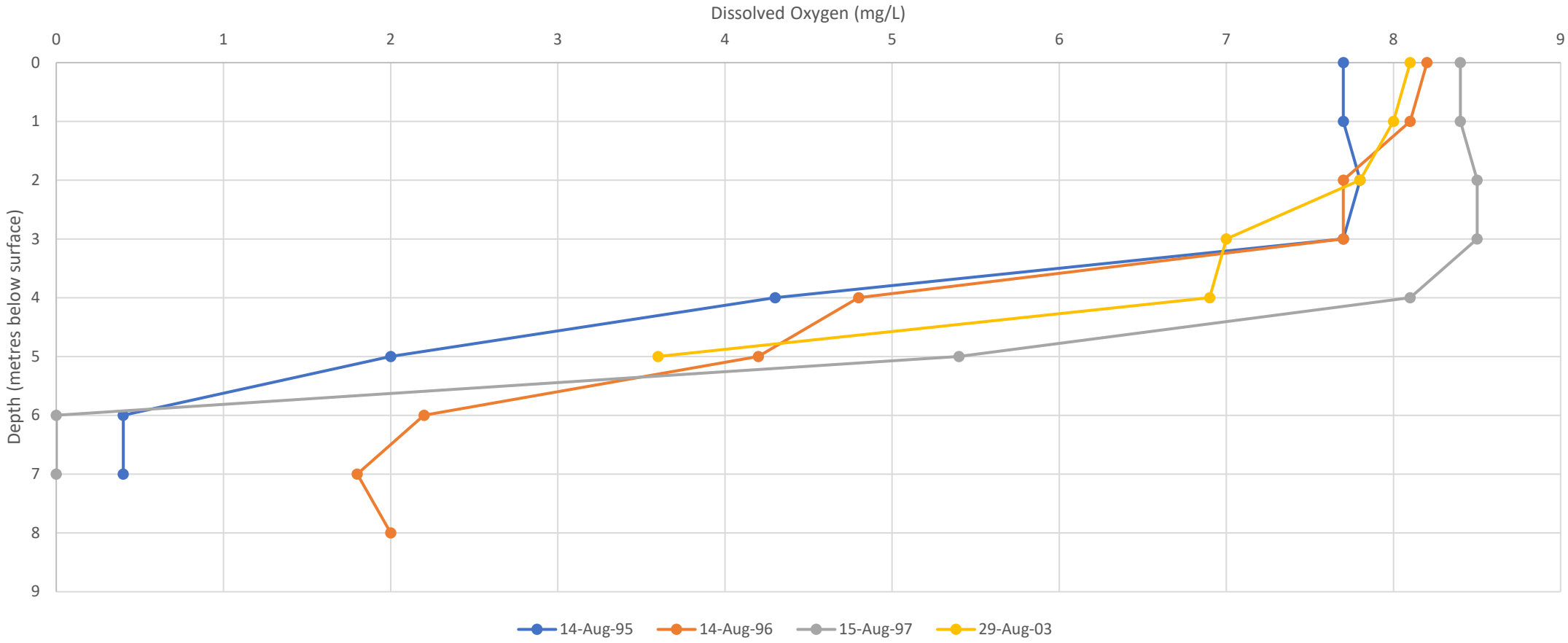
Oxygen

- Oxic/aerobic = oxygen present
- Anoxic/anerobic = no oxygen
- Photosynthesis by plants produces oxygen
- Biological consumption of oxygen due to aerobic respiration



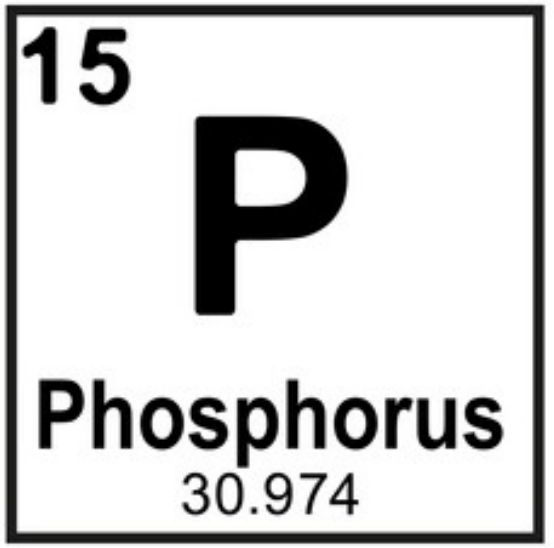
https://www.knowyourh2o.com/outdoor-4/dissolved-oxygen-in-water

Preston Lake Dissolved Oxygen – 1995 - 2003

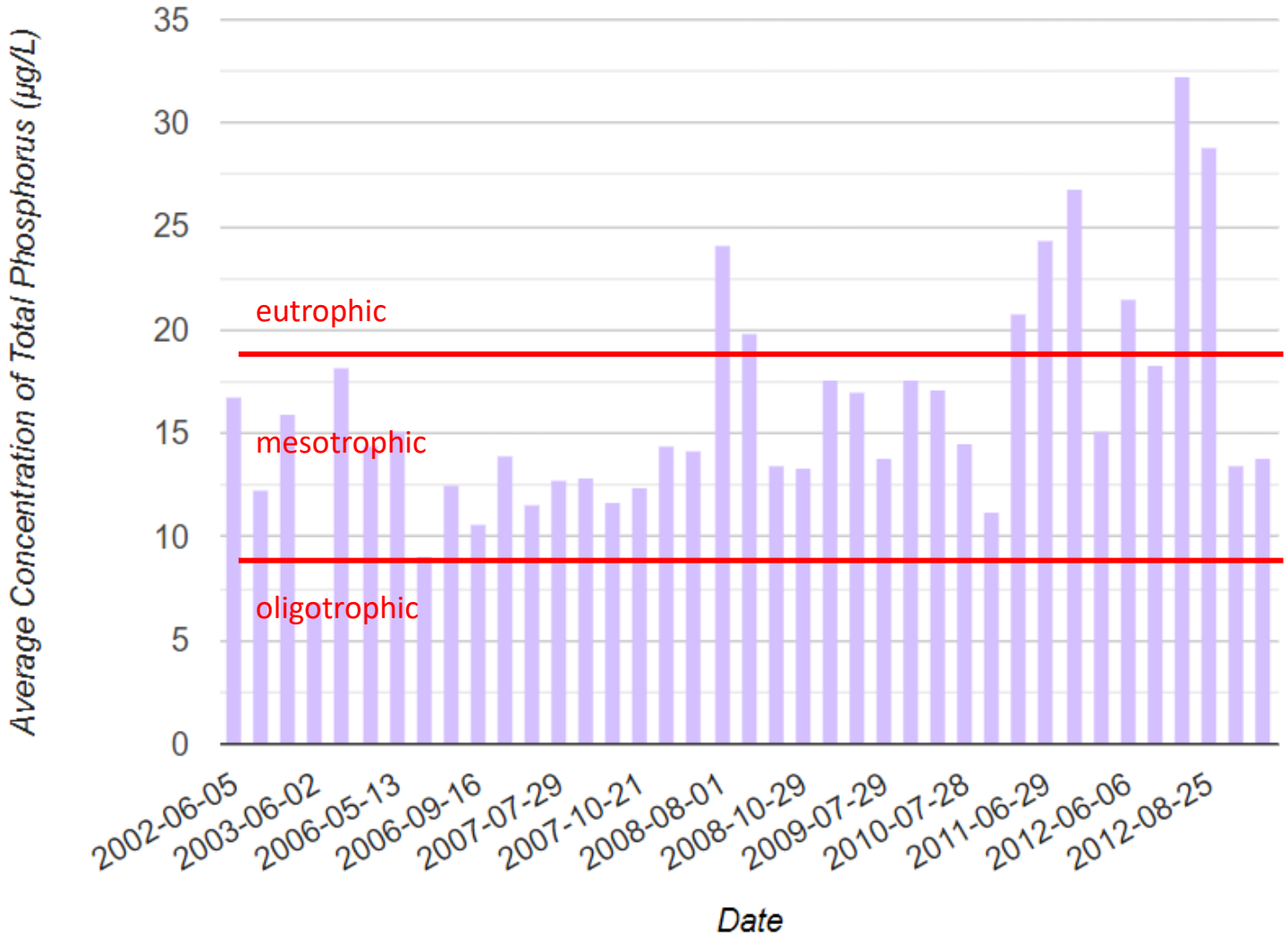


Nutrients

- Primary: phosphorus, nitrogen
- Trace: sulphur, silicon, iron, potassium, calcium, magnesium
- In high concentrations, nutrients can be toxic in aquatic environments
- Sources: soil, fertilizer, failing septic systems, runoff from animals



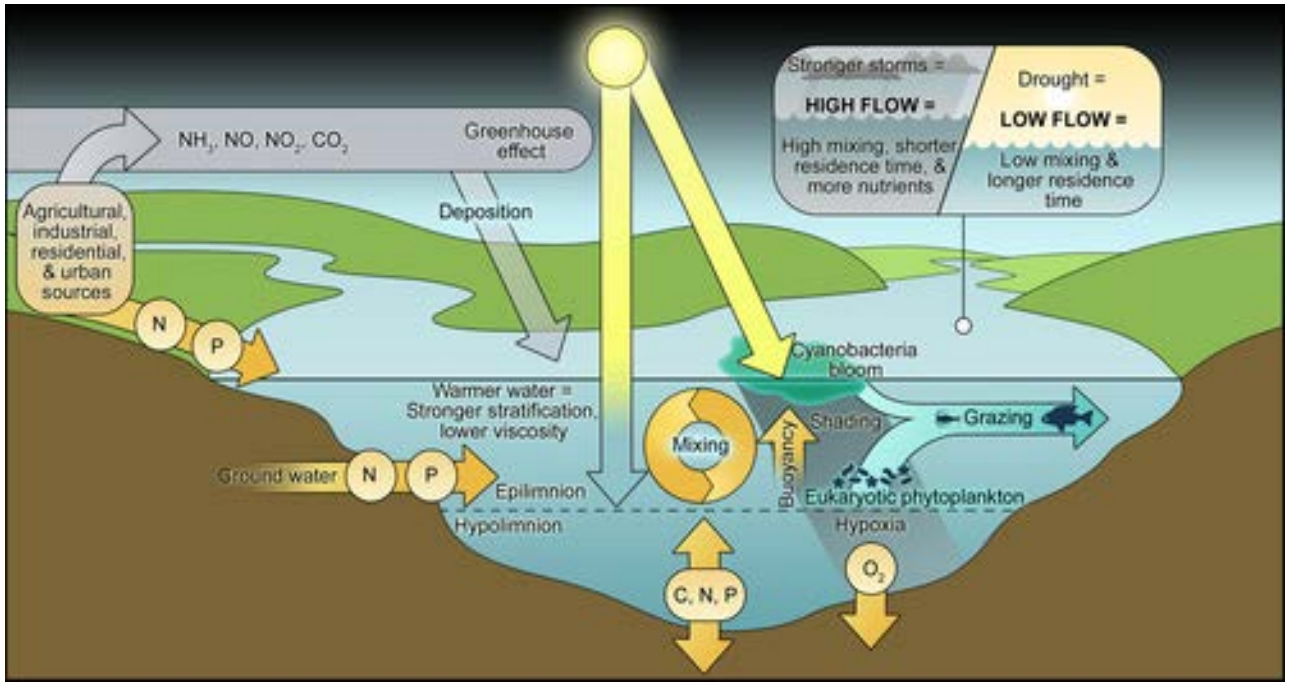
Preston Lake Phosphorous – 2002 - 2014



https://www.ontario.ca/page/total-phosphorus-report?id=70060002

Eutrophication

- The enrichment of an ecosystem with chemical nutrients, typically phosphorus, nitrogen, or both
- Natural process - lakes age though time
- Human activities accelerate the rate at which nutrients enter the ecosystem
- Cultural eutrophication – nutrient enrichment caused by humans
- Eutrophication is a leading cause of impairment in many freshwater ecosystems
- Characterized by excessive plant and algal growth due to the increased availability of one or more of the limiting growth factors need for photosynthesis (sunlight, carbon dioxide, nutrients)



Paerl, H. 2017 Microb Biotechnol 10(5):1106-1110.

Algae Blooms in Lakes

Can cause:

- Anoxic hypolimnion
  - Fish kills
  - Internal phosphorus loading
- Toxic Harmful Algae Blooms (HABs)
  - Cyanobacteria / blue-green algae can produce neurotoxins
- Water taste & odour problems
  - Increased cost for potable water
- Altered biotic integrity
  - Decrease species richness & diversity
  - Change food web
- Not aesthetically pleasing

What to do if you suspect blue-green algae?

- Contact the MECP's Spills Action Centre
  - Submit a report online or call 1-866-MOE-TIPS (663-8477)
- https://www.ontario.ca/page/blue-green-algae

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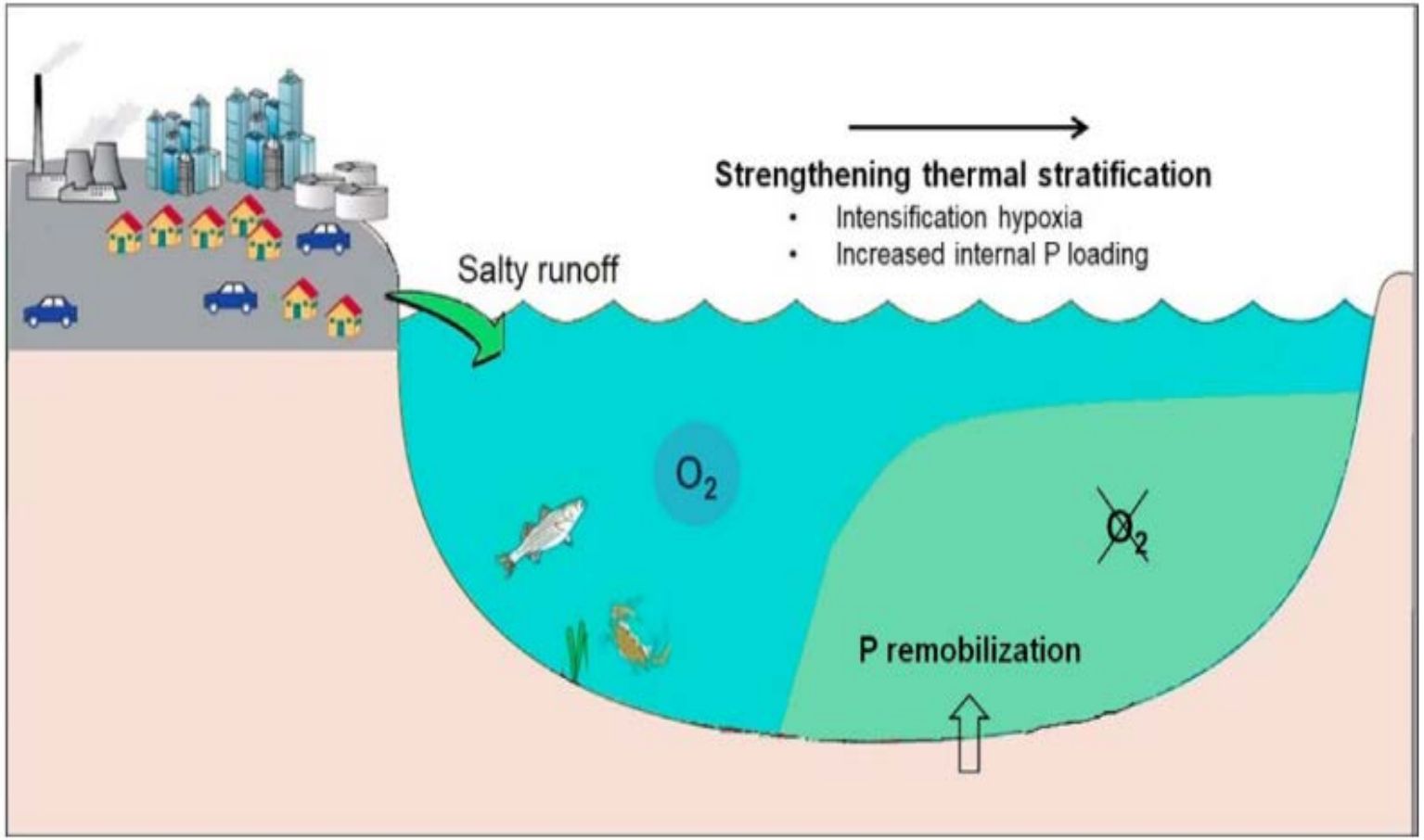
Chloride

Sources:

- Road salt, water softeners, wastewater treatment

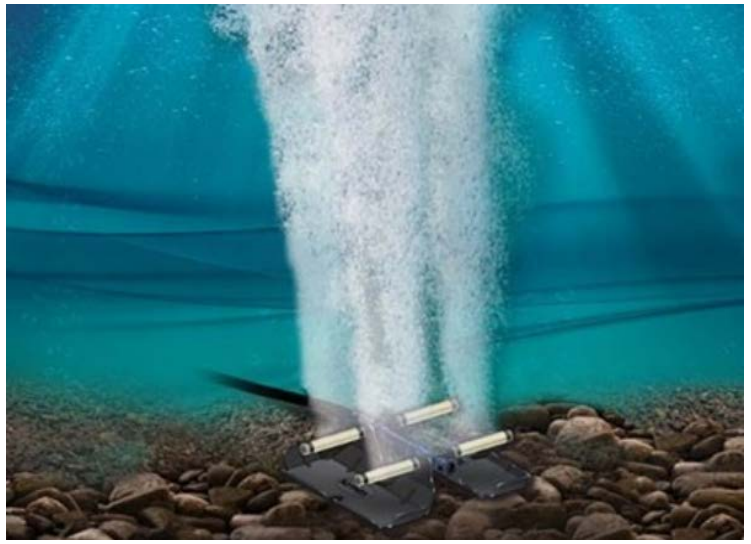
- Can cause chemical stratification of lake
- Chemical stratification may last longer than thermal stratification which increases possibility of anoxia/ internal phosphorus loading



Radosavljevic et al. 2022. Salinization as a driver of eutrophication in an urban lake (Lake Wilcox, Ontario, Canada). Science of the Total Environment.

Mitigating Lake Eutrophication

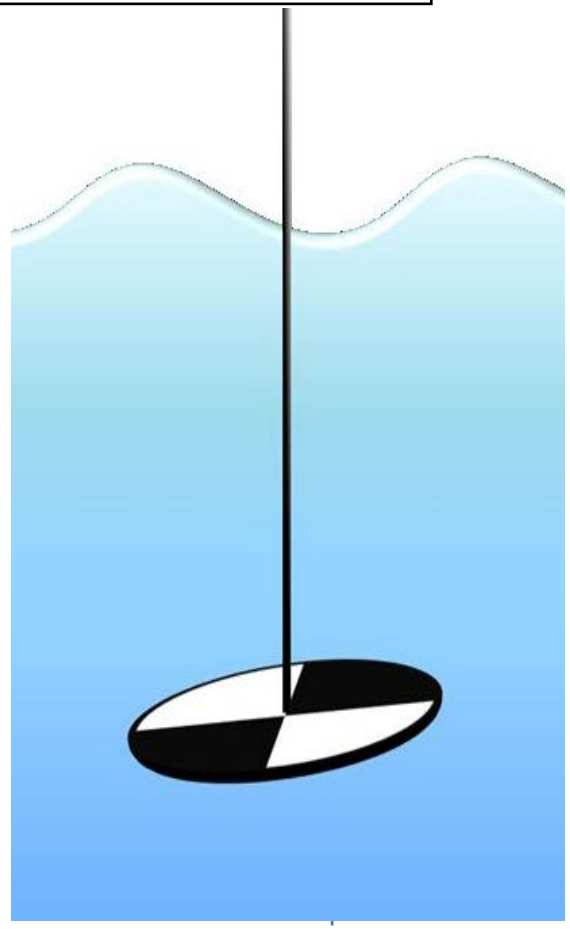
- ↓ External loading from drainage basin
  - Mitigate point and non-point nutrient sources
- ↑ mixing / destratification
  - Keep oxygen in hypolimnion
  - Aerators / bubblers
- Sediment / water manipulation
- Biological
  - Plants
  - Fish stocking
  - Goose management



MECP Lake Partner Program

Gavin Vance
Assistant Lake Steward &
Coordinator of Lake Partner Program
Lakepartner@ontario.ca
705-832-8700

- Administered by Federation of Ontario Cottagers Association (FOCA)
- Volunteer monitoring program
- Monthly water samples and Secchi disk depths from April/May to November
- MECP will provide all sampling material (kit mailed to the volunteer)
- Can start this year! Email **lakepartner@ontario.ca** with your name, contact information, and mailing address
- https://www.youtube.com/watch?v=8NUFVK8eQ6Q&t=1s
- https://foca.on.ca/lake-partner-program/



Water Rangers

- www.waterrangers.ca
- Tools for community water monitoring
- Easy-to-use water quality test kits
- Open data portal
- Field guides and training videos

Shoreline Restoration and Management

- Creating a “no-mow” zone near the shoreline and allowing vegetation to re-establish on its own
- Active planting of native trees, shrubs, grasses, wildflowers and aquatic plants
- “Softening” of existing hard structures like retaining walls, and stone with wood and bioengineering materials
- Promote opportunities for wildlife
- Make your shorelines less attractive to Geese

Essential Wildlife Habitat

Stormwater Management Maintenance and Green Infrastructure

- Ensure peek efficiency of the North Shore SWMP
  - Clean out and Maintenance schedule
  - Large bands of emergent aquatic plants

- Seek Opportunities to retain run-off on the land
  - Bioswales, raingardens, infiltration areas, downspout disconnects and rain barrels
  - Seek naturalization opportunities and planting

Bond Lake Public School Bioswale

Private Land Tree Planting Programs

Eligibility Requirements

Who is eligible to participate?

- Landowners with a minimum of 0.8 Ha (2 acres) of land on a single property within the TRCA's jurisdiction

Projects that are eligible:

- Planting along stream banks or seasonally wet areas such as ponds perimeters, marshes, and wetlands
- Establishing windbreaks and/or hedgerows for wildlife habitat
- Establishing new woodlots
- Connecting or expanding established woodlots
- Understory plantings in existing forest
- Restoring marginal farmland
- Naturalizing lawn or fallow field for wildlife habitat enhancement & biodiversity

Community- Based Restoration Activities

- Native Tree & Shrub Plantings
- Pollinator Plantings
- Watershed Clean-Ups
- Restoration Site Monitoring & Maintenance
- Invasive Species Management
- Habitat Creation






Citizen Science Volunteer Program

Recruit and train volunteers for commitment and participation in Citizen Science Volunteer activities, including:

- **Turtle Nest Monitoring & Nest Protection** – identifying turtle nesting sites and installing nest protectors.
- **Wildlife monitoring**
- **Invasive Species Management** – removal of select invasive species.
- **Restoration Site Maintenance and Monitoring** - watering, weed control, mulching and garbage clean-up, as well as collecting data on tree/shrub health, pests.
- **Event Support** – assist TRCA staff on-site with the delivery of community stewardship events.

Septic Systems

- Regular maintenance inspection required for proper function (every 3-5 years)
- Water conservation improves septic system function, particularly for older systems
- Properly dispose of waste
- Maintain your drainfield

Rural Clean Water Program

Grants up to 50-100%* are available for the planning and implementation of eligible projects in York Region.

- Tree planting
- Erosion and runoff control
- Irrigation management

Manure, silage, fuel and chemical storage facilities

- Cover crops
- Livestock fencing
- Natural area restoration

Integrated pest & nutrient management plans

To apply or learn more, please scan the QR code or visit: trca.ca/rural-clean-water/

You can also email rcwp@trca.ca or call 437-224-4347

*Funding is dependent on region and project category

Toronto and Region Conservation Authority

Funding also relevant to non-farm property owners

Septic Upgrades

50% up to $5000

- Repair or replace biologically failing system within 100 m of surface water

Well Decomissioning

100% up to $1500

- Decommissioning of old and/or abandoned wells

Well Upgrade

50% up to $1000

- Grading soil around well
- Casing improvements
- Sealing annular space & adding proper head cap

* Main eligible projects listed only. For full list please contact program staff.

What Can You Do For Your Lake!

- Get involved in tree planting, Rural Clean Water Programs
- Maintain run-off from your property
- Naturalize your property
- Reduce or eliminate fertilizer use
- Native plant gardening
- Maintain your septic
- Practice water conservation
- Fish friendly dock structures

Thank You

Toronto and Region Conservation Authority