Farlain Lake: Update on Water Levels

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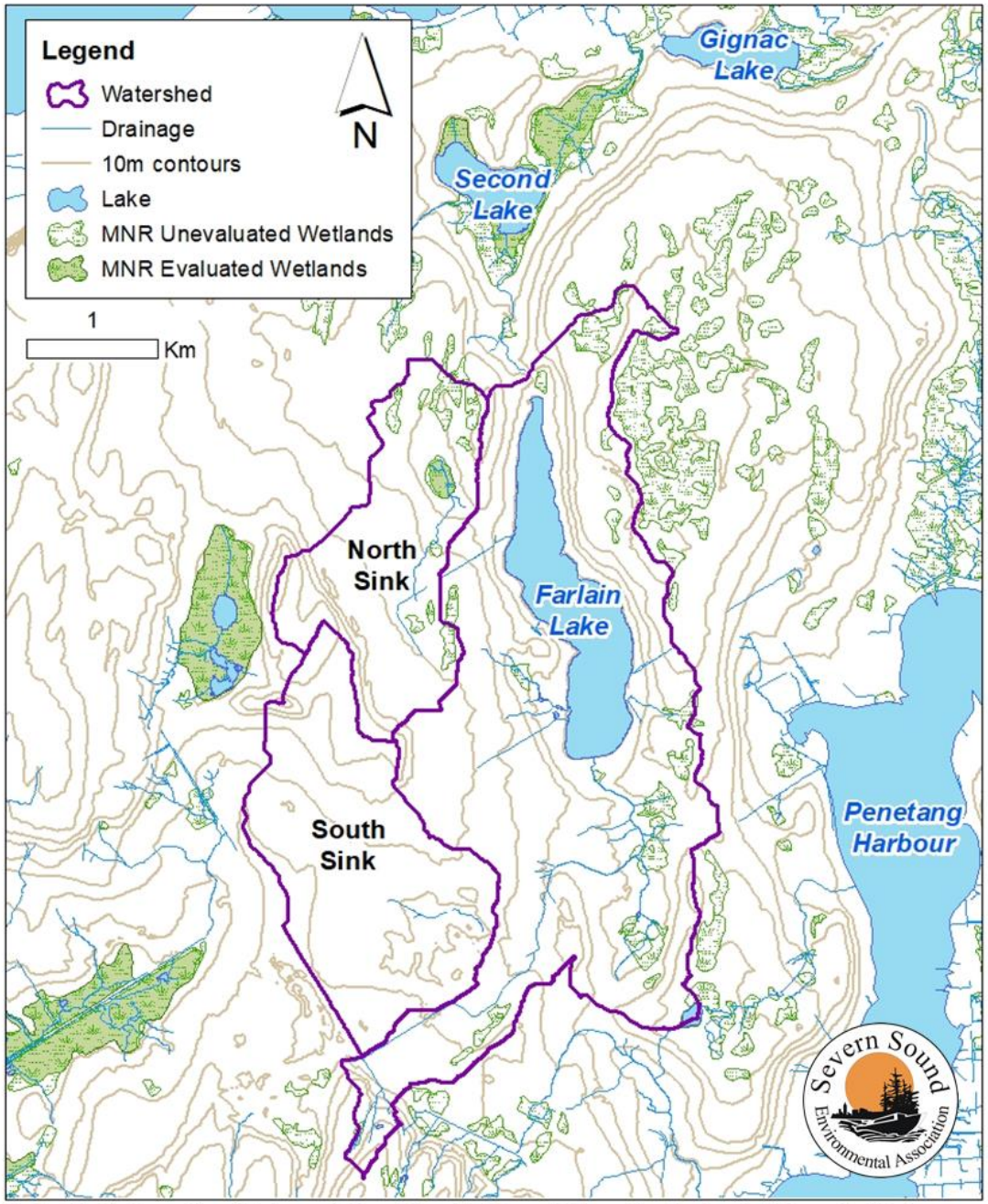
October 17, 2019



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Farlain Lake: Unique Hydrology

- Closed watershed – no surface outflow
- Land bridge separating north end of watershed from Second Lake watershed is ~ 5 m high
- Watershed area is 14 km^2, including N and S sinks
  - North and south sinks not connected to the watershed by direct overland flow
  - May be connected via groundwater flows

High Water Impacts

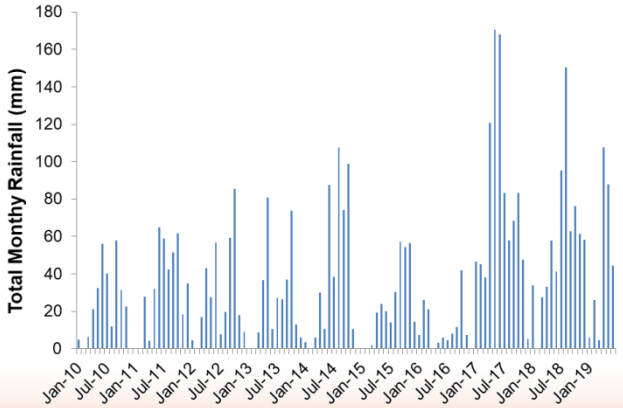
- Inundation of septic systems/water wells
- Damage to shoreline residences, boathouses, outbuildings and other structures (docks, retaining walls)
- Shoreline tree die-back and risk from hazard trees
- Loss of beach area
- Difficulty launching/retrieving boats

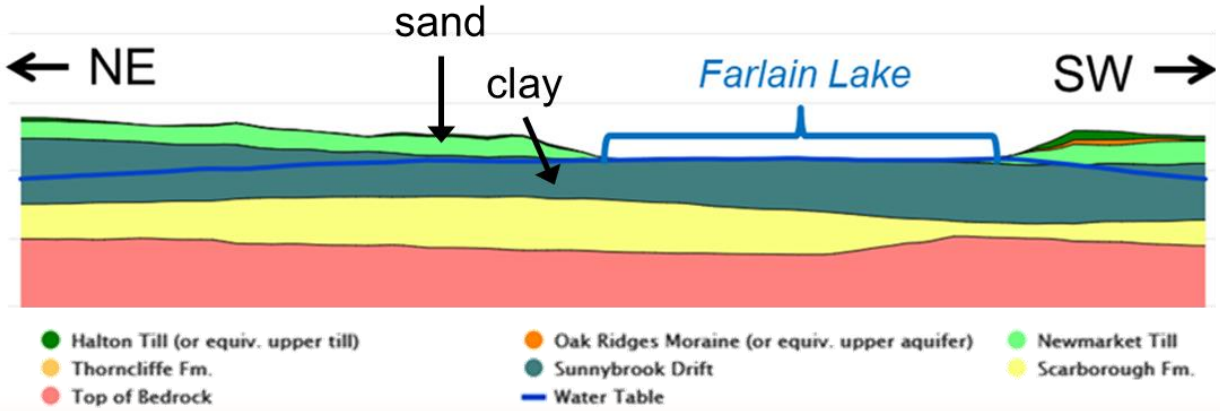
Images: Peter Andrews

Climate and Geological Factors

- Higher total rain and snowfall contribute to greater surface runoff
  - Increased **winter rain fall** can contribute to greater surface runoff, esp. when over frozen ground
  - Total annual rainfall was high in 2014, 2017 and 2018; **spring 2019 high**
- Lower summer temperatures can cause decreased evaporation rates
- Larger water level increases following precipitation would be expected as a result of the local geology:
  - Surface geology: mostly coarse sandy deposits - high permeability
  - Underlying geology: silt and clay layer - lower permeability

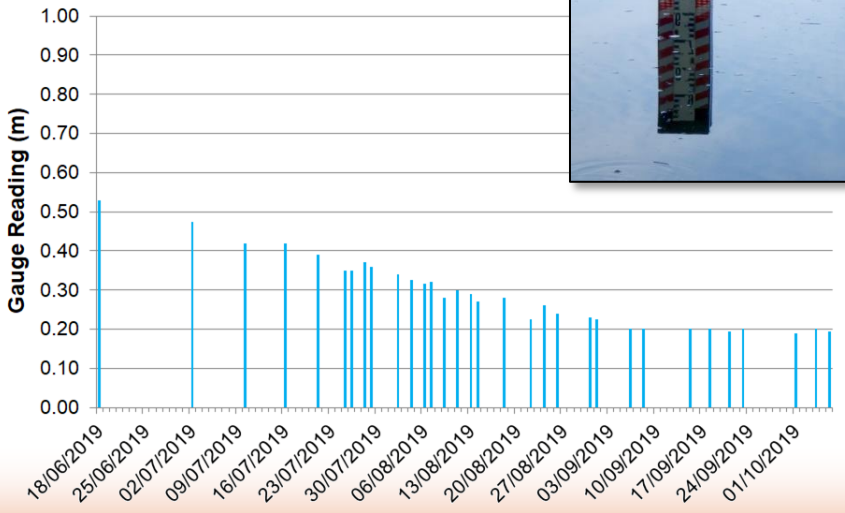
Monthly Rainfall





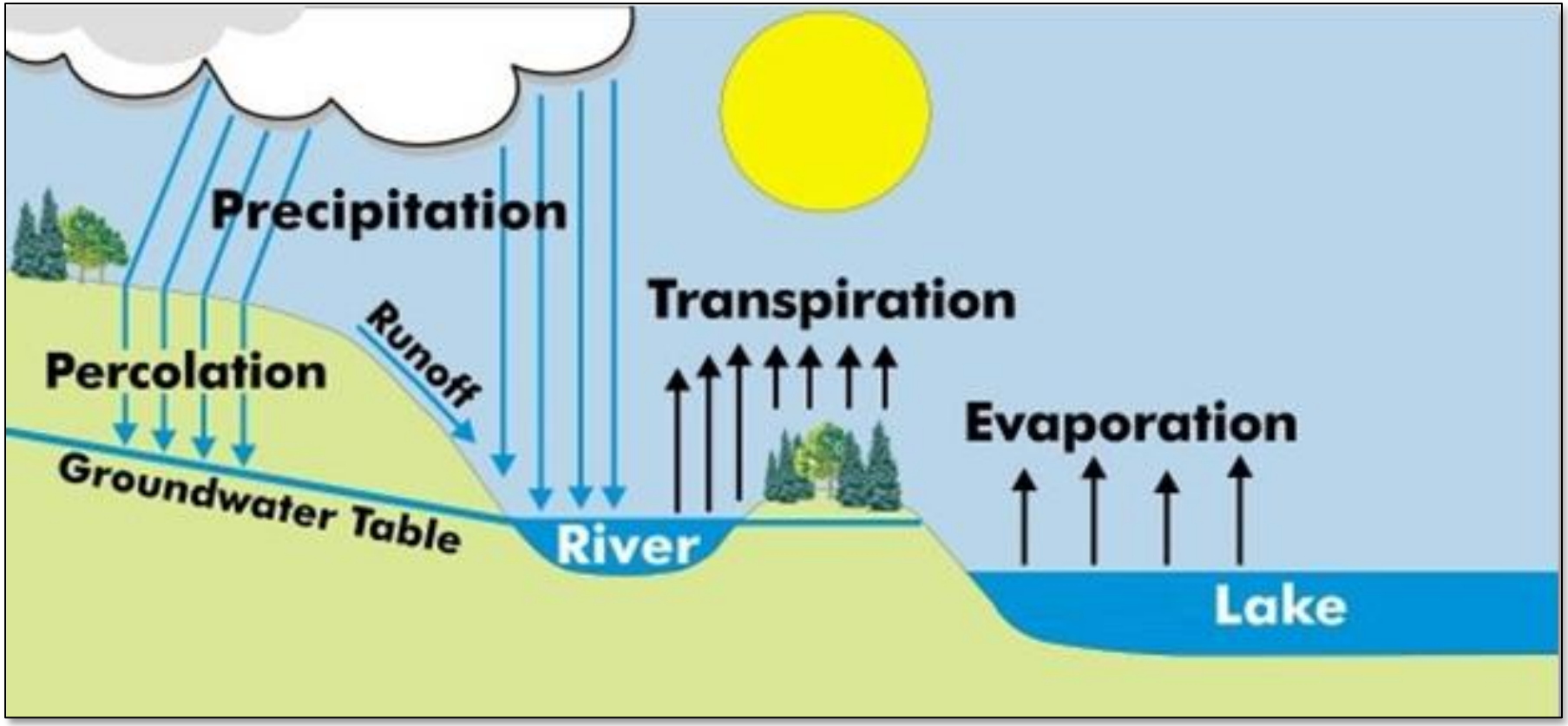
Climate data sources: Midland up to 2016, Coldwater 2017-2019

New Water Level Gauge Installed!



- Water level measurements allow us to:
  - set a baseline to track change over the long term
  - determine how quickly the lake responds to local weather & climate
  - gather data needed in creating a water balance
- 34 cm drop from Jun 18 to Oct 1 2019
- Indicates strong precipitation influence

Hydrological Cycle



- Need to measure each of these components of the cycle to know which is dominating factor in lake water inputs and outputs → **Water Budget**
- **Changes in precipitation** and **timing/intensity of snow melt** may have a large impact on water levels in the lake due to local geology/physiography

Filling Data Gaps

- Need data to characterize water movement in/out of the lake on a year round basis
- Lake levels – citizen science
- Localized daily rainfall and snowfall data
  - Year round residents can help by using snow and rain gauges and submitting data
  - Gauges must be located away from tall structures that could block precipitation
- Groundwater level data
  - Year round residents with shallow dug wells can work with SSEA to provide level data
- Rate of groundwater inflow
  - Must be modelled

Summary | Recommendations | Next Steps

- High lake levels are causing significant damage to residential properties and shoreline trees
- Some data exists that leads to multiple causes for the increase; factors include geological and climate conditions
- Significant data gaps to be filled to fully understand cause
- Commission a hydrogeological study to quantify water inputs and exports and create a water balance
- Compile existing data: well records, property surveys, resident photos
- Implement citizen science programs to gather lake water levels, local rain and snowfall amounts, and shallow groundwater well levels
- Continuing to support FLCA, providing technical advise
- Continuing to monitor lake levels until ice up

Farlain Lake Eurasian Watermilfoil Control Project

Robert Canning

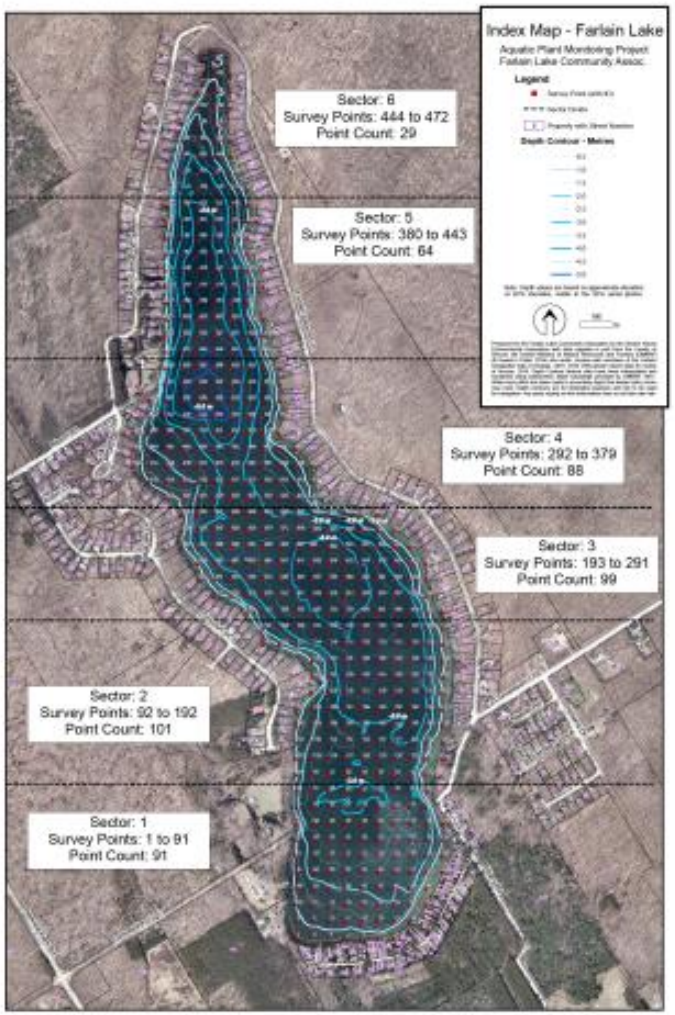
Invasive Species Program Coordinator

Project Overview

- EWM detected in 2012
- FLCA harvesting EWM since 2014
- SSEA providing guidance since 2018
- FLCA successful recipients of Trillium Grant for 2019-2021

EWM Monitoring

- SSEA assisted FLCA with monitoring plan:
  - point intercept (472 points)
  - maps + GPS coordinates
  - data sheets
- “Weed Watcher” training session
  - plant ID
  - equipment
  - sampling protocol



EWM Management

- EWM management on Farlain Lake is 100% volunteer driven
- EWM management techniques:
  - Herbicide
  - DASH
  - Benthic mats


Work Boat
Skimmers
DASH Boat
Dive Boat


SMOKERCRAFT

Project Status

- Year 1 of Trillium funded project
  - 3 out of 5 sites treated
- 2019 FLCA EWM operations: $129K
  - 2370 hours of in-kind volunteer work
- Post-treatment monitoring in spring


Thank You
CAUTION
COMMUNITY
CLEAN-UP
IN PROGRESS
Tiny
Questions?