

# Phosphorus Loads to Lake Simcoe 2021 - 2023

LSRCA Board of Directors  
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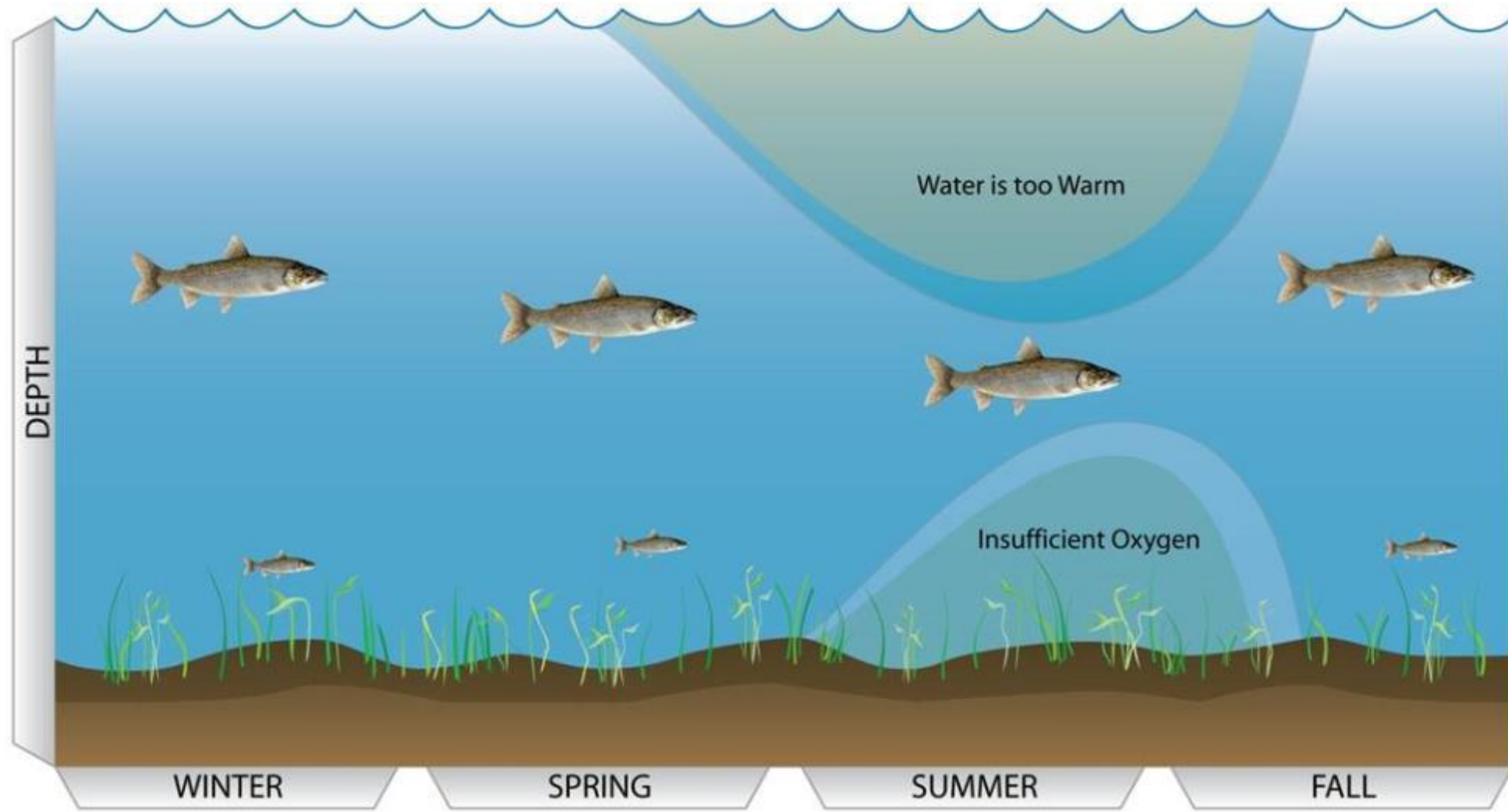


**Lake Simcoe Region**  
conservation authority

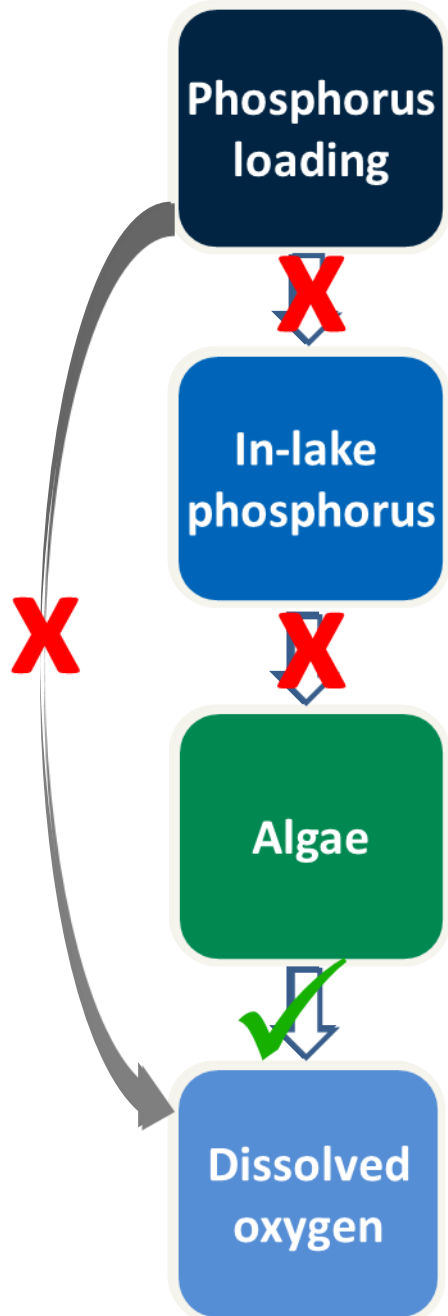


# Lake Simcoe Protection Plan (2009)

- Target for dissolved oxygen = 7 mg/L
- Estimated load = 44 tonnes of phosphorus per year



# P Loads, P Concentration, and Oxygen



**Limnological Theory**

Increased P Loading

Increased P Concentration

Lower Oxygen

**Lake Management**

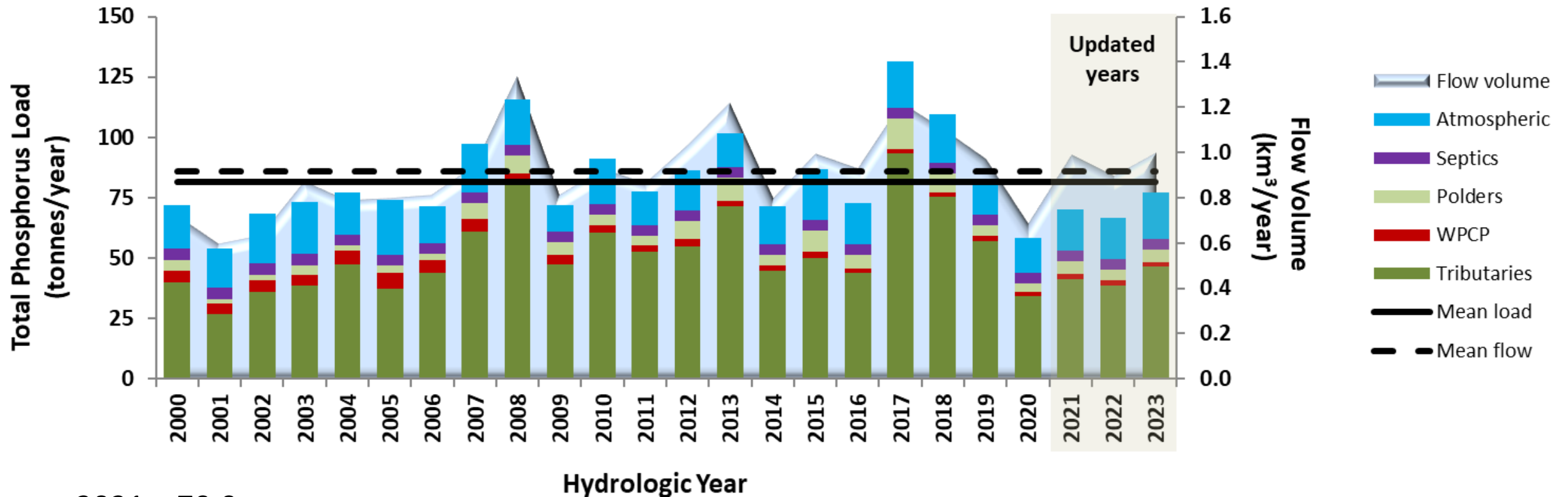
Decreased P Loading

Decreased P Concentration

Higher Oxygen

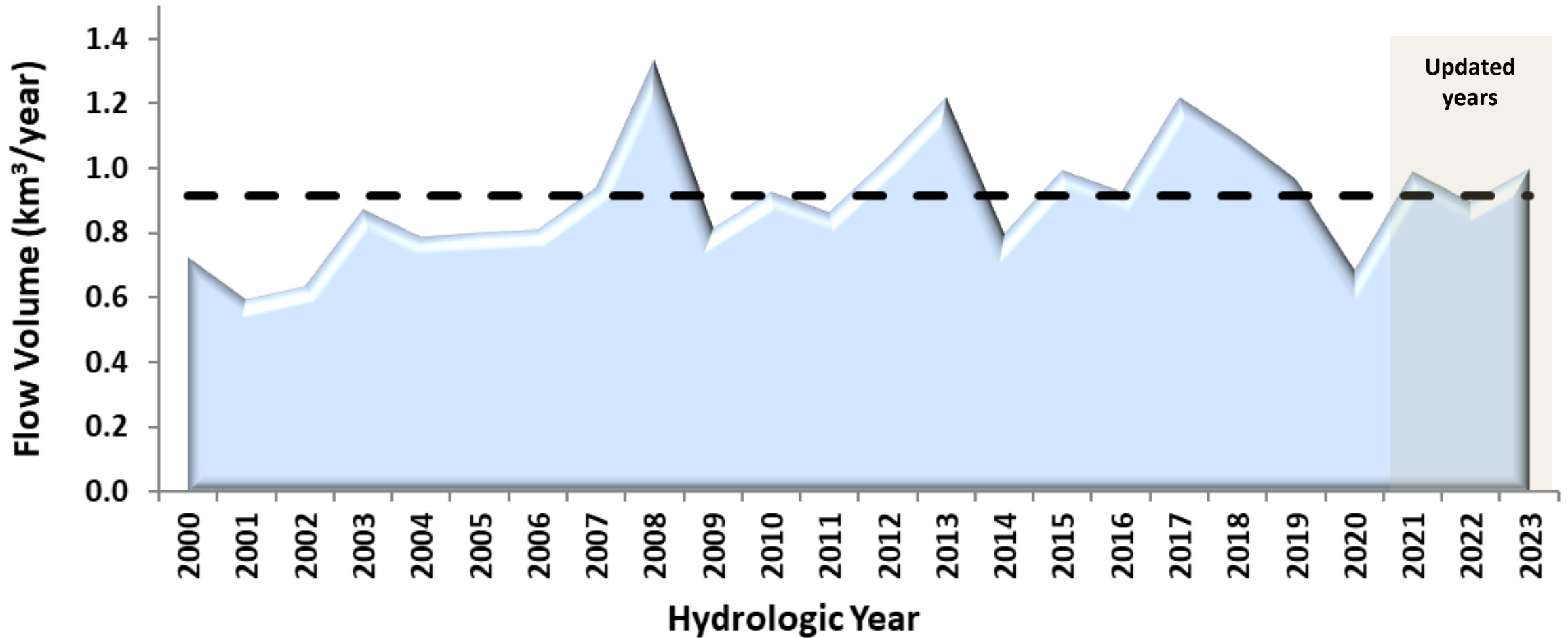


# Annual Phosphorus Loads to Lake Simcoe

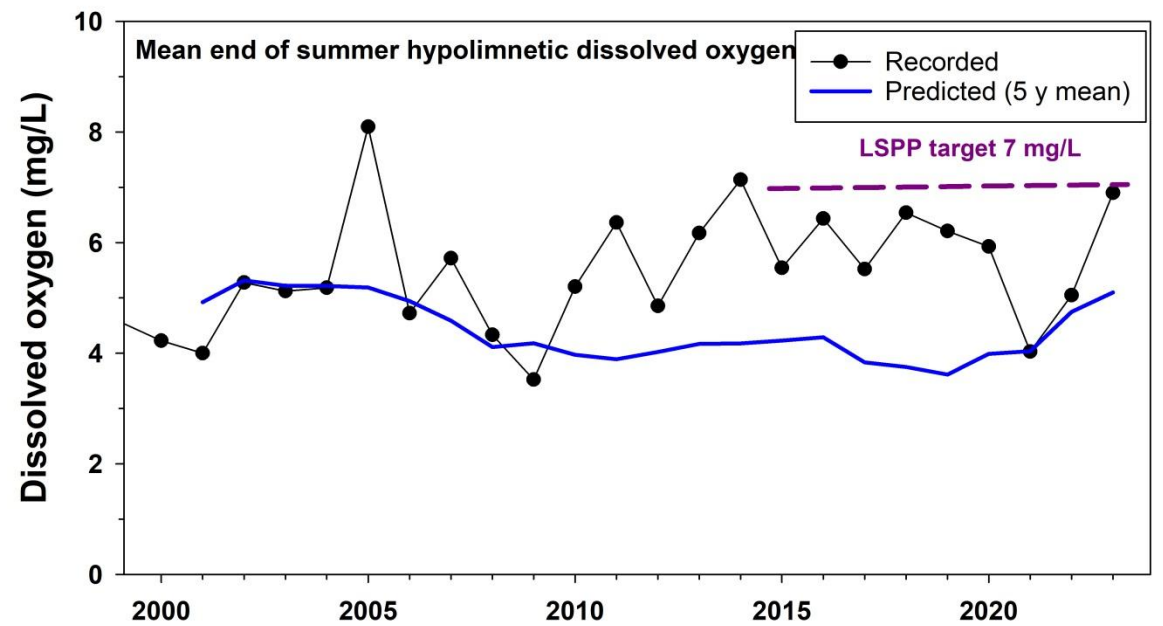
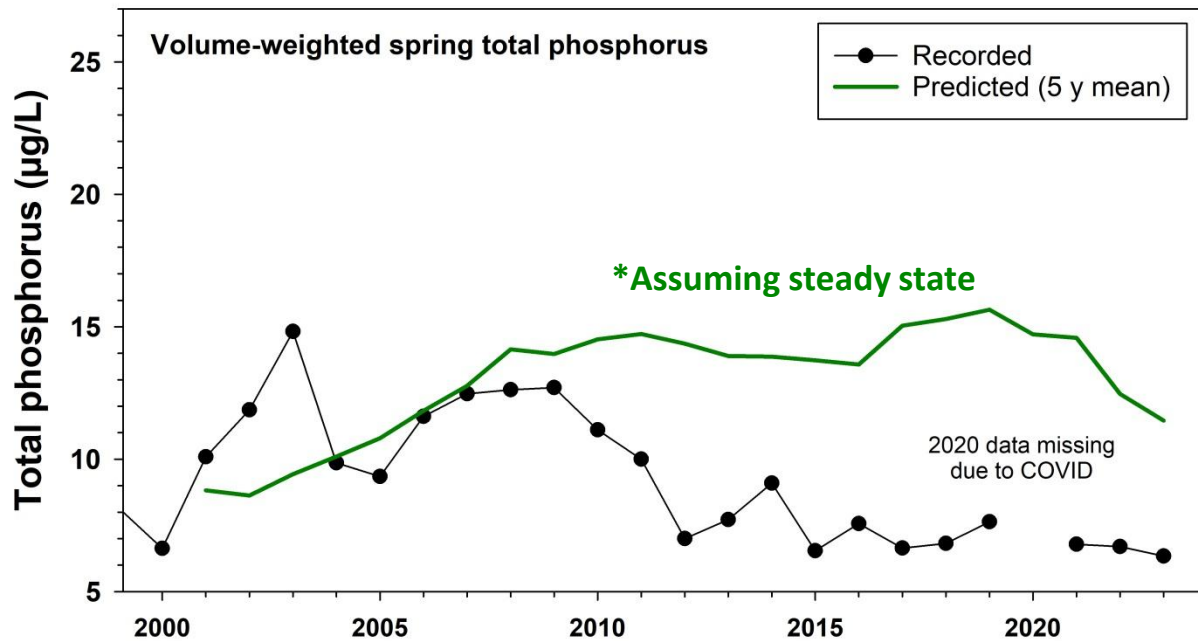
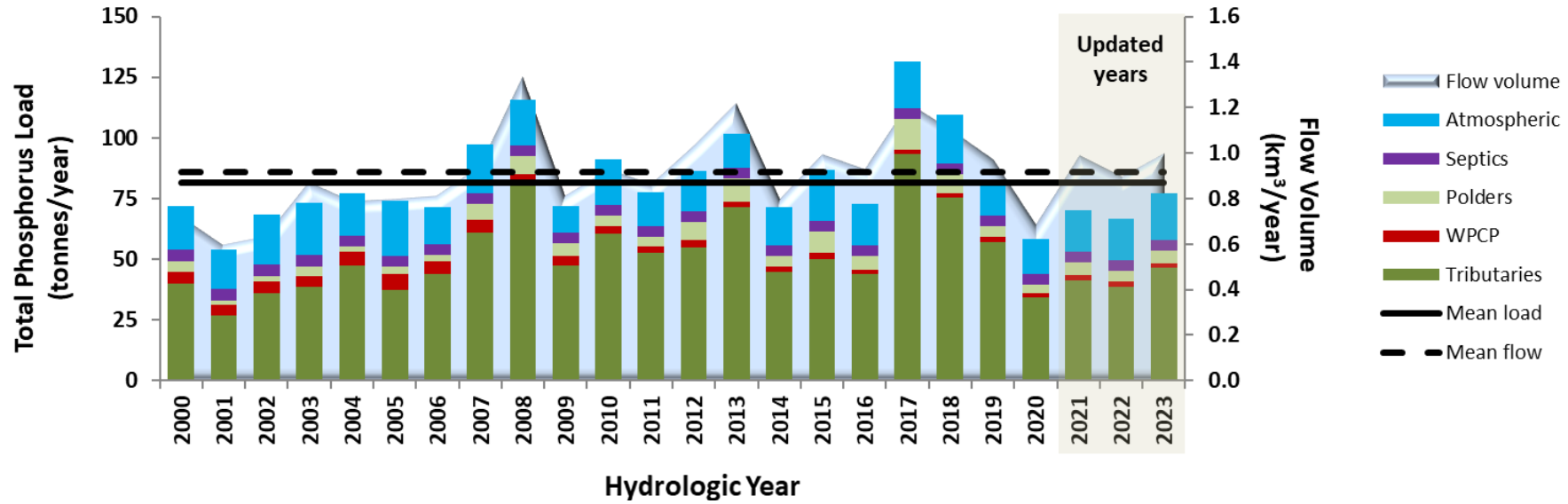


- 2021 = 70.0 tonnes
- 2022 = 66.7 tonnes
- 2023 = 77.3 tonnes
- Three Year Average = 71.3 tonnes

# Annual Tributary Flow Volume to Lake Simcoe



# P Loads, P Concentration, and Oxygen

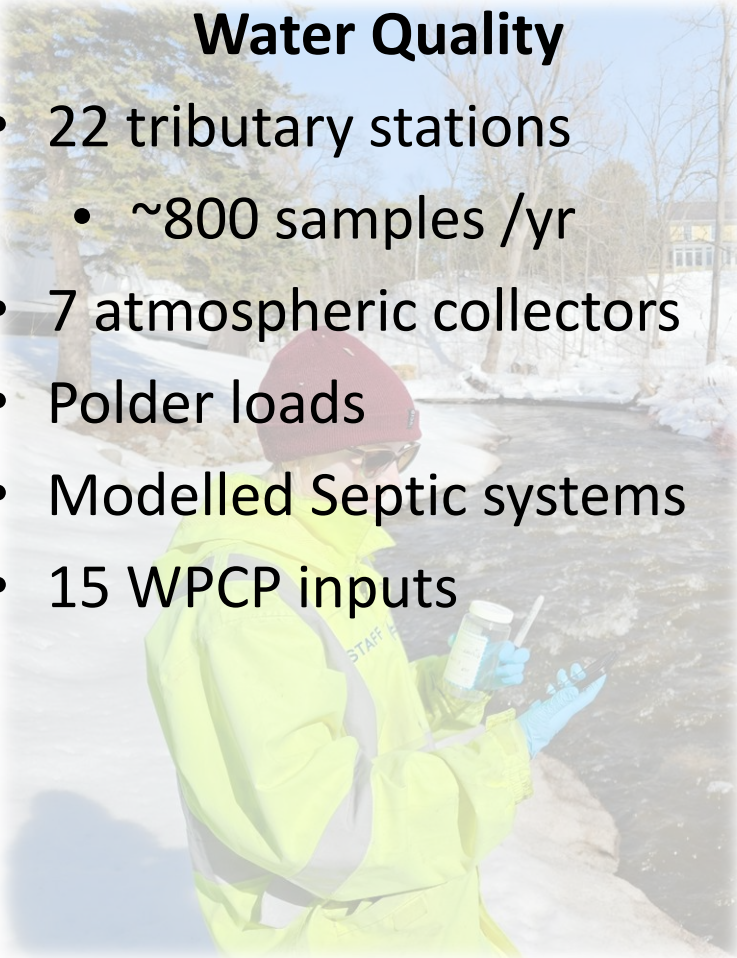


# Data Collection for Annual Load Calculations

(Monitored data not modelled)

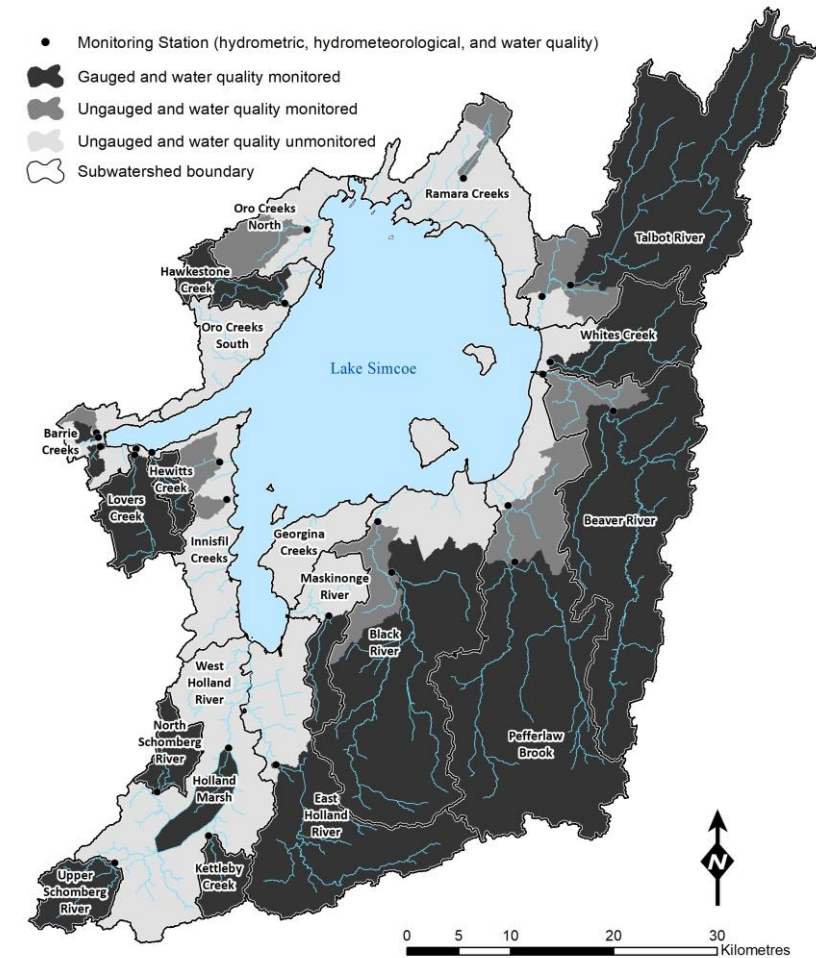
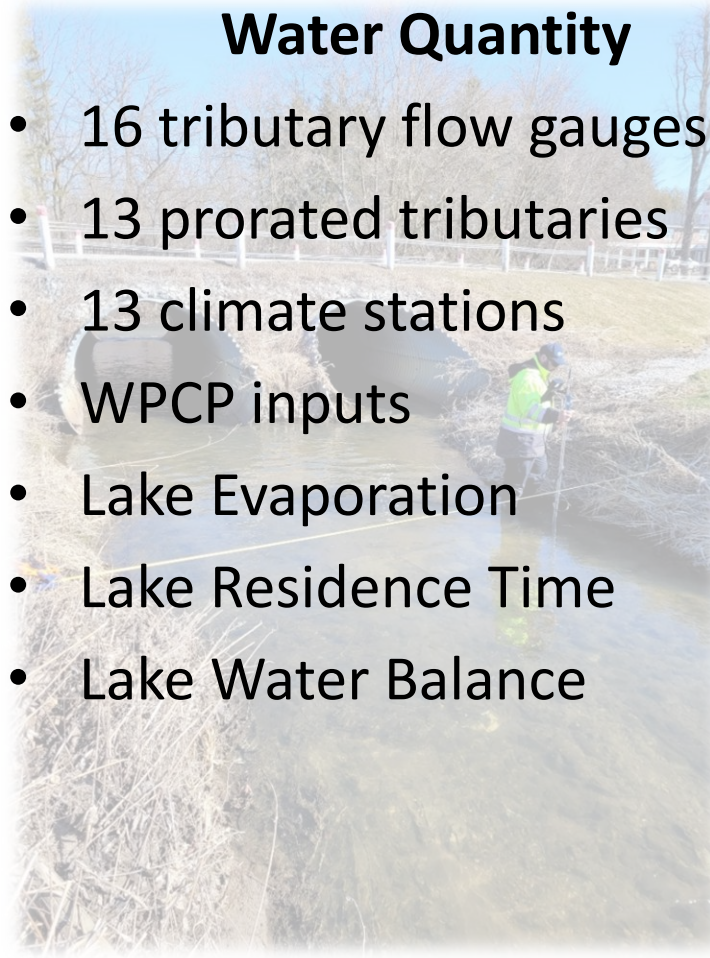
## Water Quality

- 22 tributary stations
  - ~800 samples /yr
- 7 atmospheric collectors
- Polder loads
- Modelled Septic systems
- 15 WPCP inputs



## Water Quantity

- 16 tributary flow gauges
- 13 prorated tributaries
- 13 climate stations
- WPCP inputs
- Lake Evaporation
- Lake Residence Time
- Lake Water Balance



- 74.8% of watershed area is monitored by a stream flow or water quality station
- More than 3,000,000 data points annually are used to calculate the load

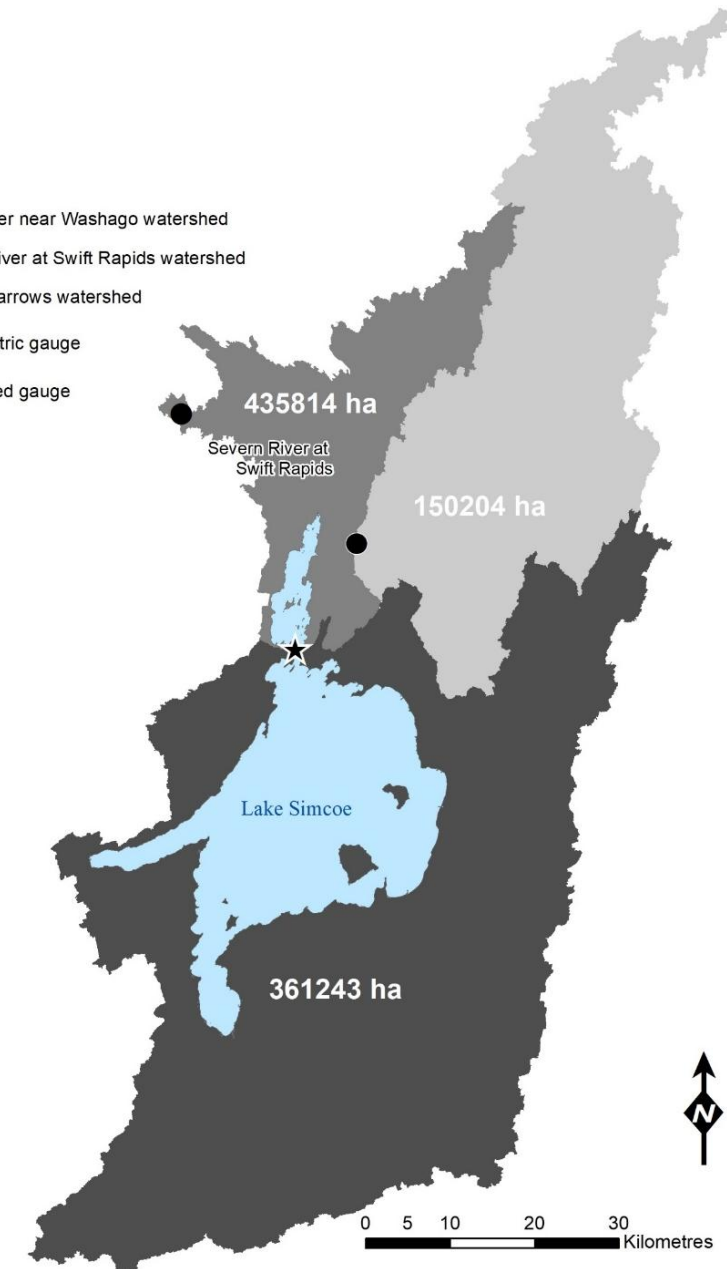
# 2021 -2023 Water Balance Facts

- Calculation of the loads also requires balancing all water into and out of the Lake (2021-2023 = <5%)
- Lake residence time = 11.28 yrs
- Largest water supply source = Tributaries (57.5%)
- Largest water loss source = Outflow at Atherley (63.3%)



## Legend

- Black River near Washago watershed
- Severn River at Swift Rapids watershed
- Atherly Narrows watershed
- Hydrometric gauge
- Calculated gauge



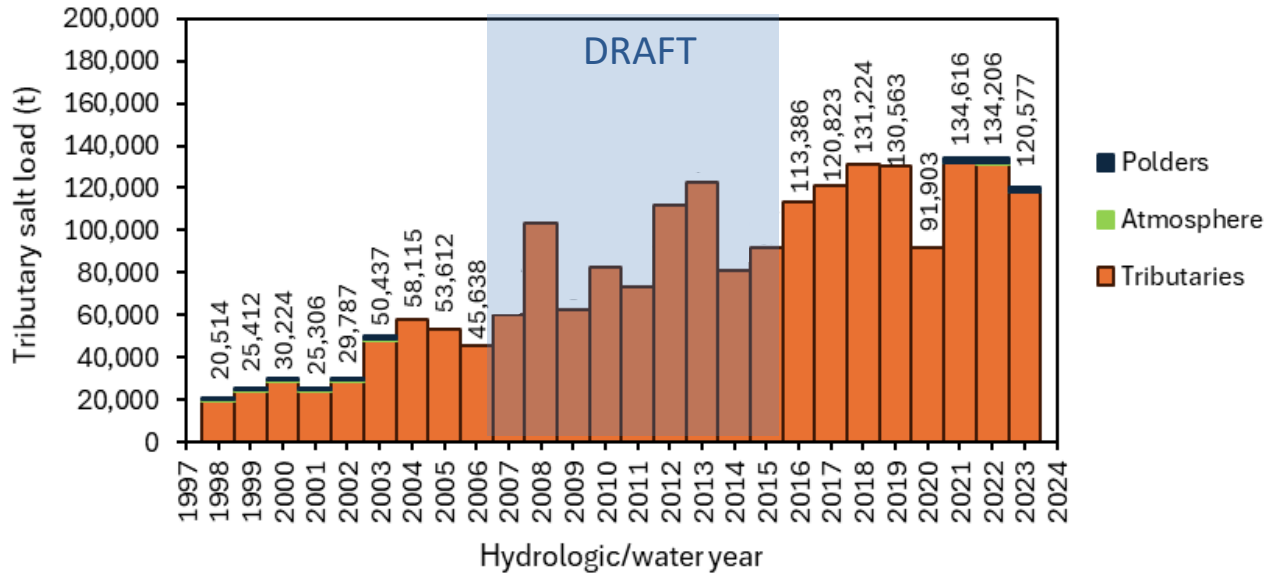
# Load Calculation Improvements

- Investigating Atherley tilt sensor
- Pump house autosampler
  - 2024 High resolution sampling load = 2.68t
- New climate station at Lagoon City and North Schomberg
- Replace bulk precipitation network
- New Lake Level Gauge

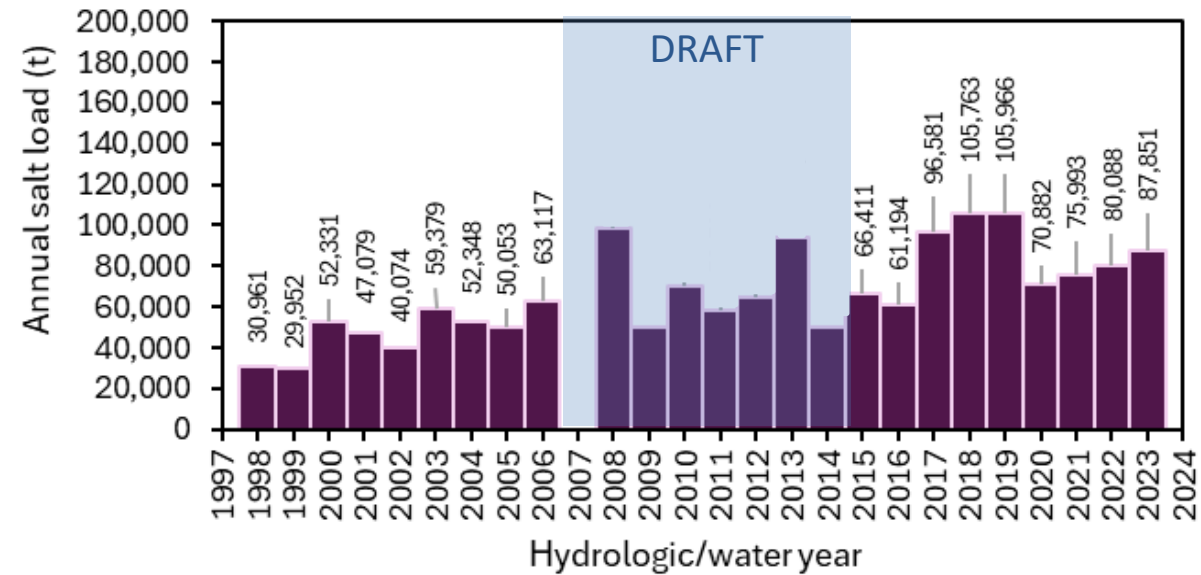


# Tributary Salt Loads and Output at Atherley (1998-2023)

Annual tributary salt load (all available data)



Salt loss at Atherley Narrows



Estimates based on municipal salt usage (2012-2013): 66,561 t Cl, or 109,825 t NaCl  
 Our estimates based on monitoring (2012-2013): 67,655 t Cl, or 111,630 t NaCl

