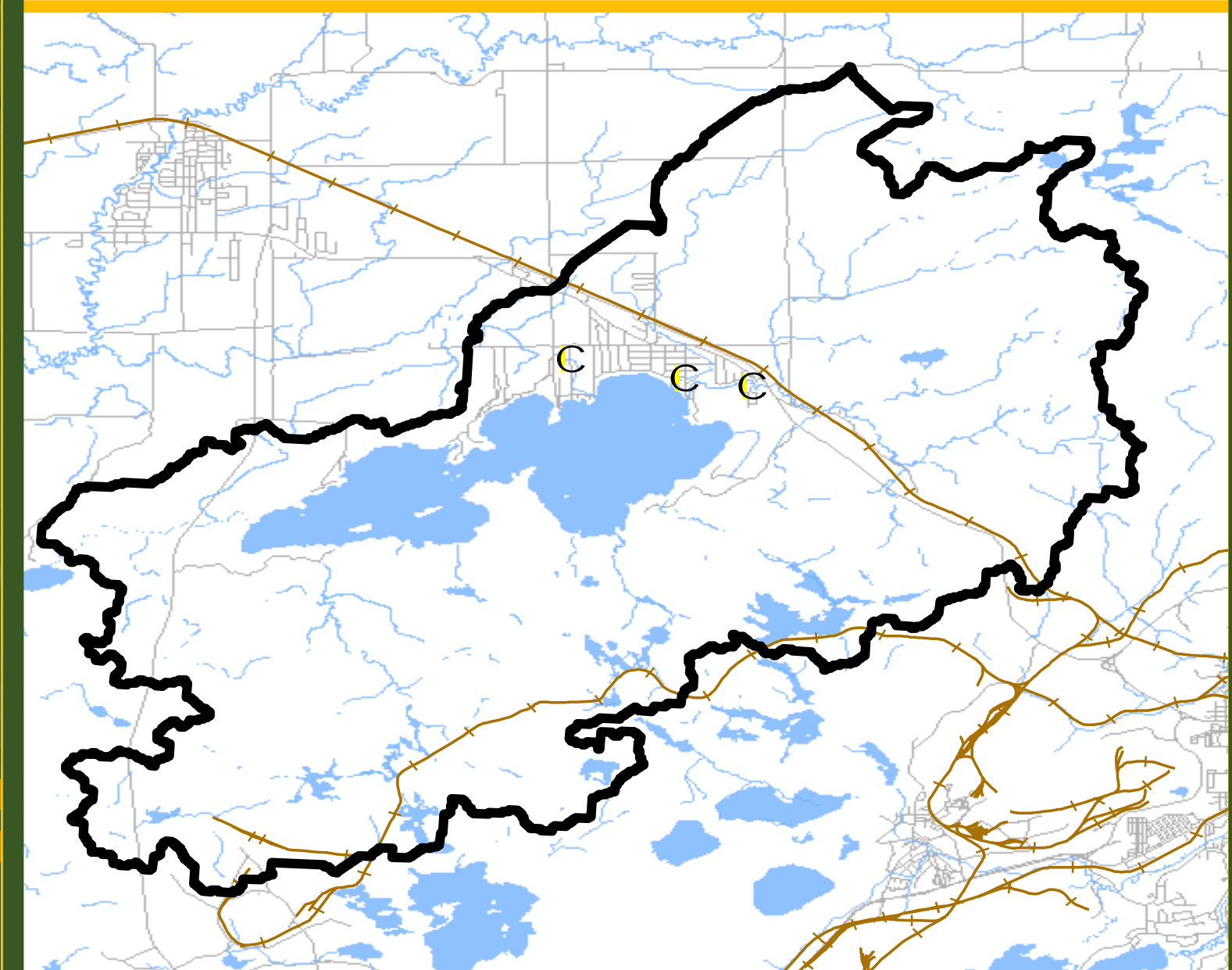


Whitewater Lake Subwatershed Study And Master Plan



Public Information Centre #1

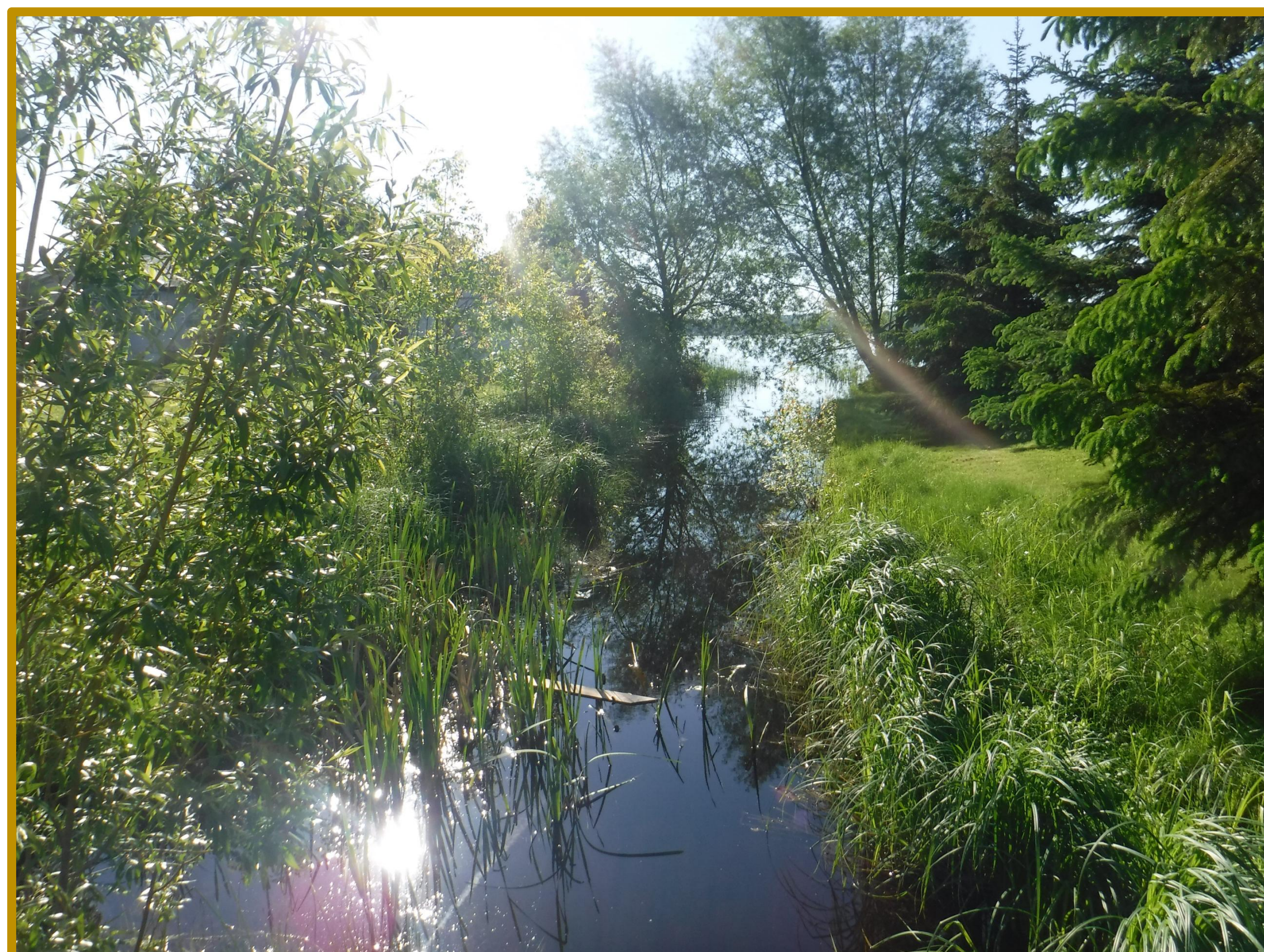
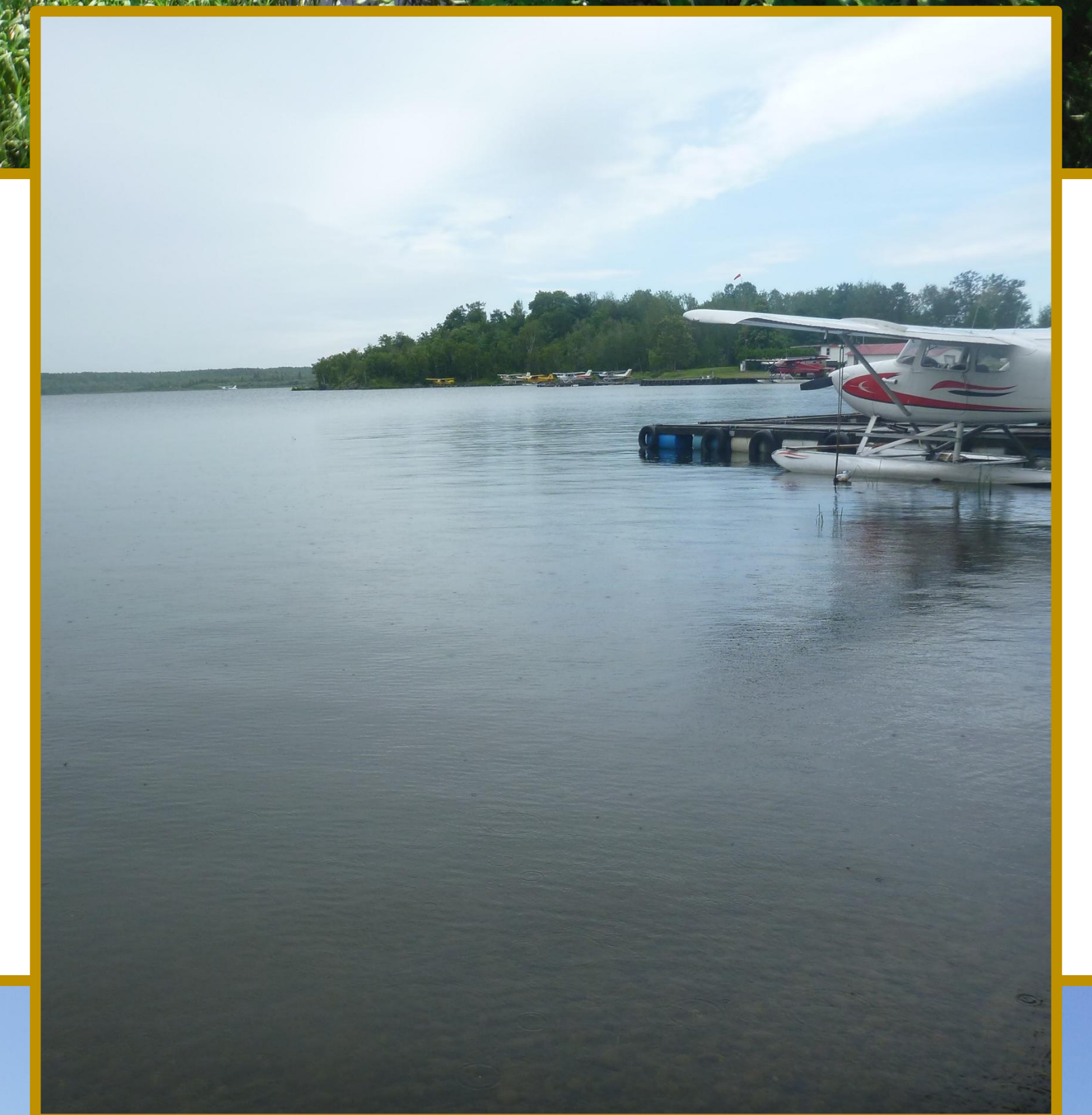
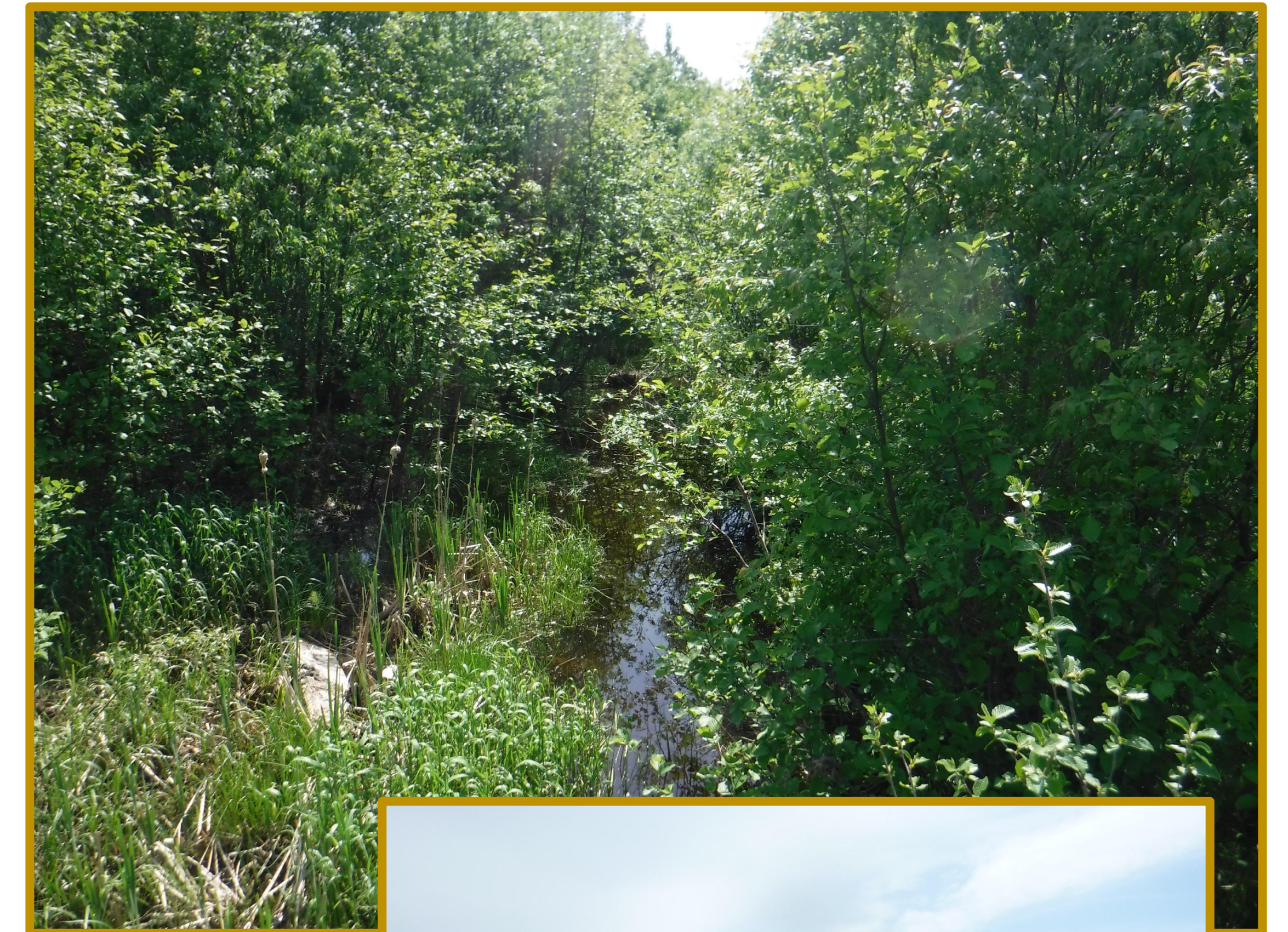
November 2, 2017



Objective of Public Information Centre #1

Tonight's Public Information Centre (PIC) will:

- § Introduce the study area
- § Provide an overview of the Subwatershed Study purpose and objectives
- § Review the Subwatershed Study process
- § Provide an opportunity for the public to review the work completed to date as well as upcoming work
- § Allow the public to provide input to the study, and to discuss questions and issues with staff

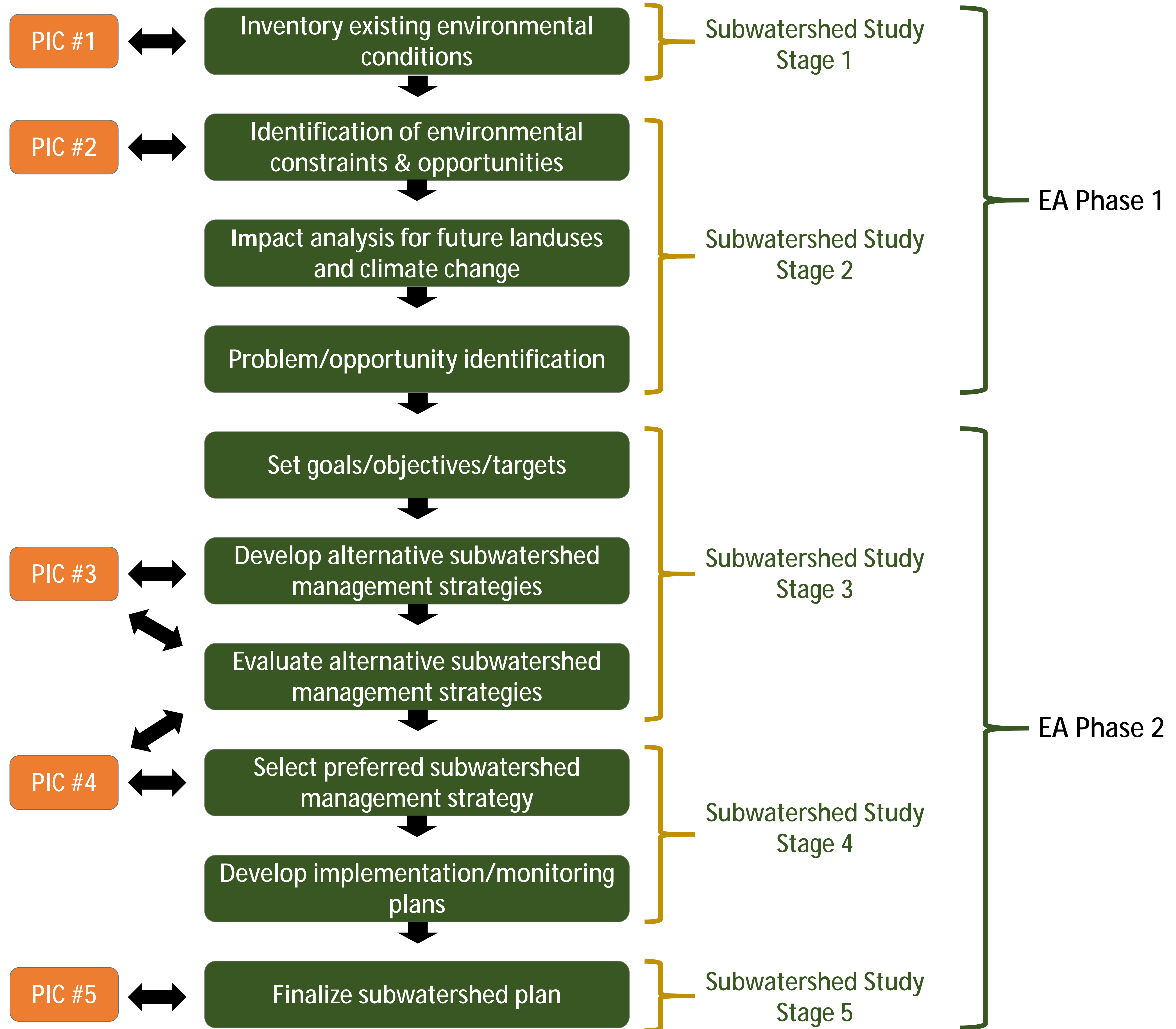


Subwatershed Study/Environmental Assessment Process

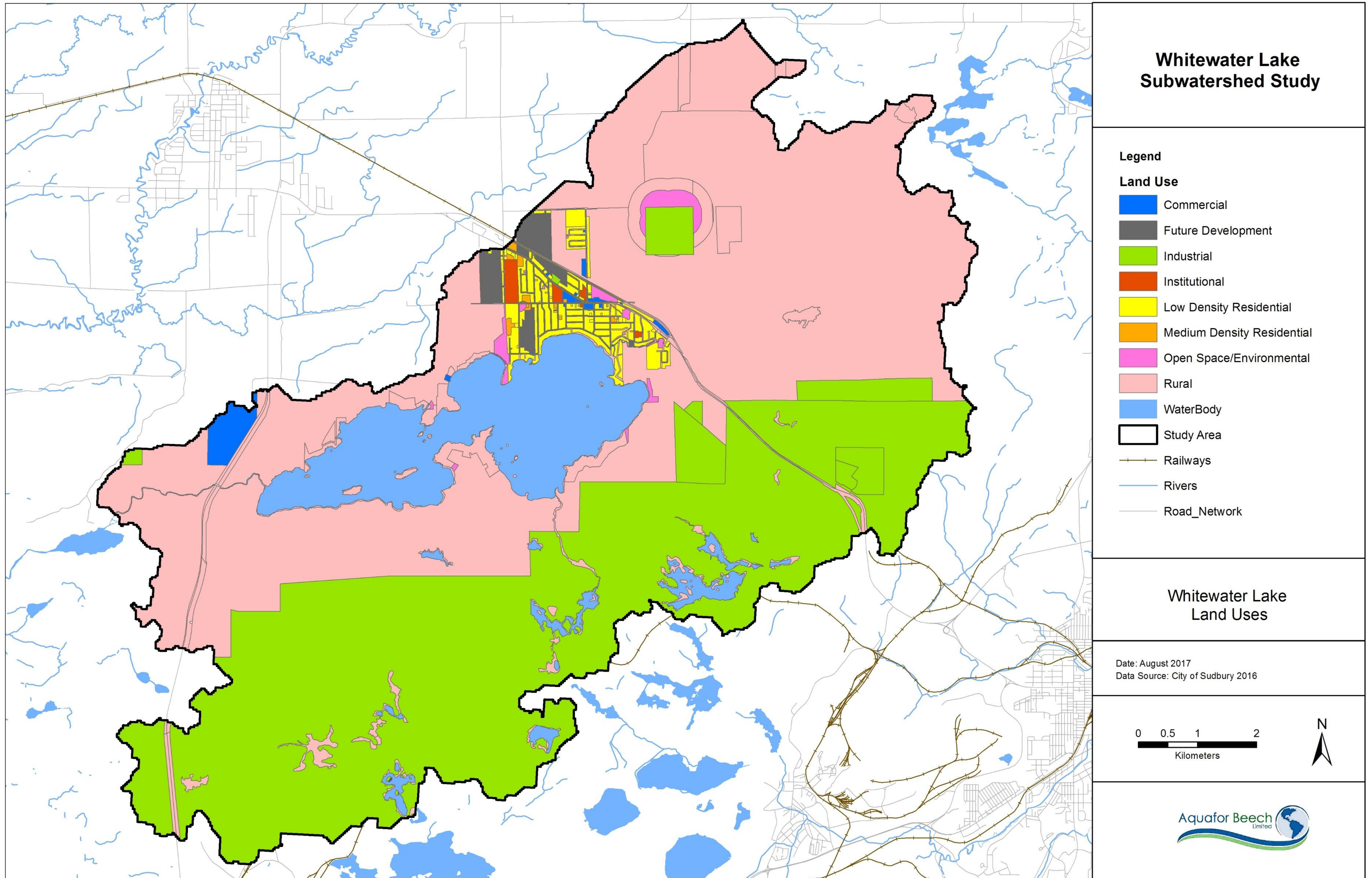
We are here

The Subwatershed Study is being conducted as a Master Plan and is intended to satisfy Phases 1 and 2 of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment Act (Class EA) process. This will involve a process of problem/opportunity identification, evaluation of alternative solutions, and selection of a preferred solution. Stakeholder consultation is an important part of the EA process and a key component of the study.

Consultation with Stakeholders, the Public, and Agencies



Land Use



Erosion and Stream Morphology

Objectives

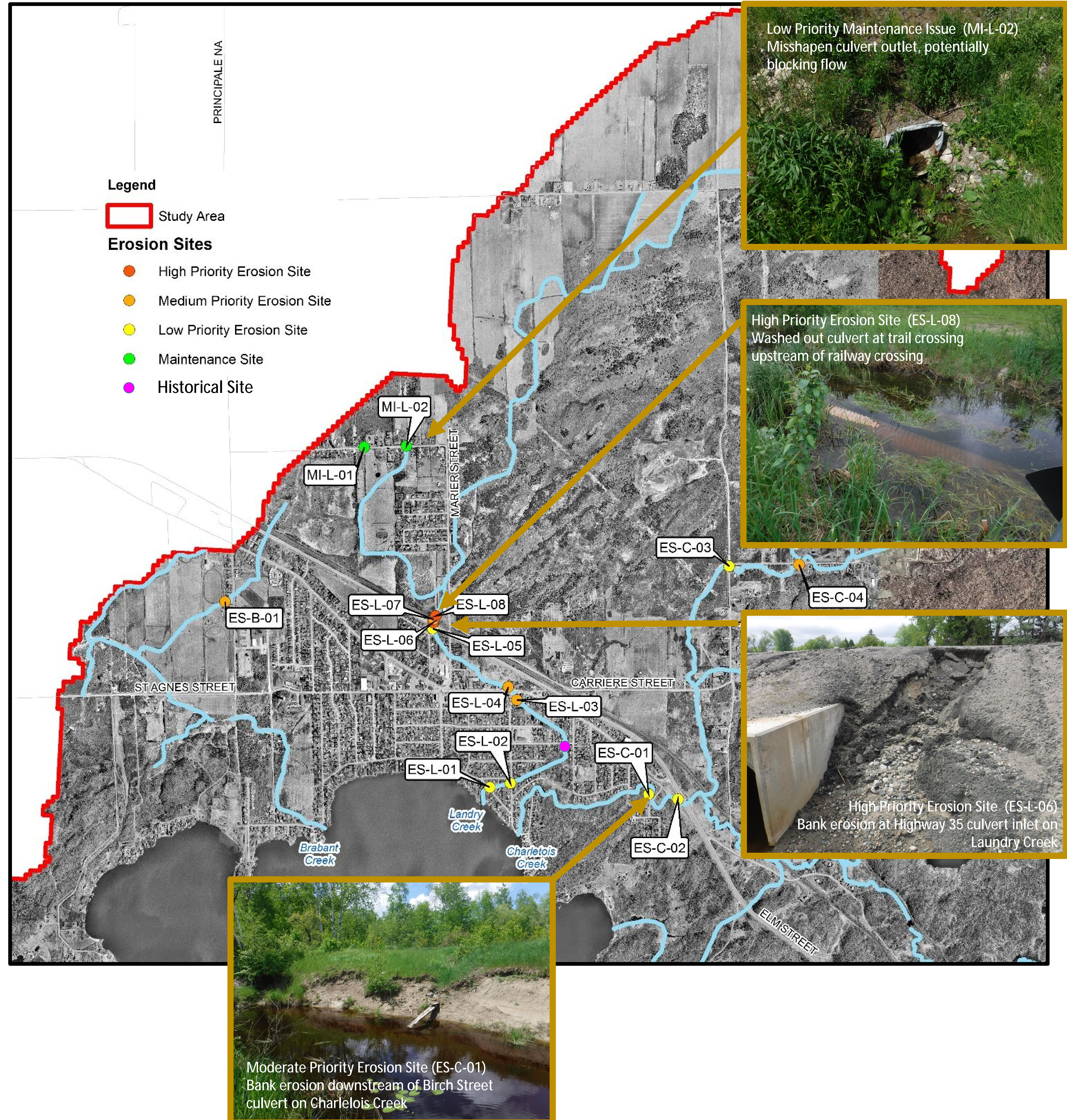
- § Stream characterization
- § Identify erosion issues

Study Tasks:

- ü Identified erosion sites and maintenance issues along water courses
- ü Identified stream restoration opportunities

Key Findings

- § 13 Erosion Sites were identified
 - § Only two High Priority erosion sites were identified upstream of the Highway 35 culvert along Laundry Creek (shown on map)
- § 2 Maintenance Issues were identified
 - § Culvert inlets and outlet have become distorted and could potentially block flow
 - § Both maintenance issues are Low Priority sites



Municipal Drains

Objective

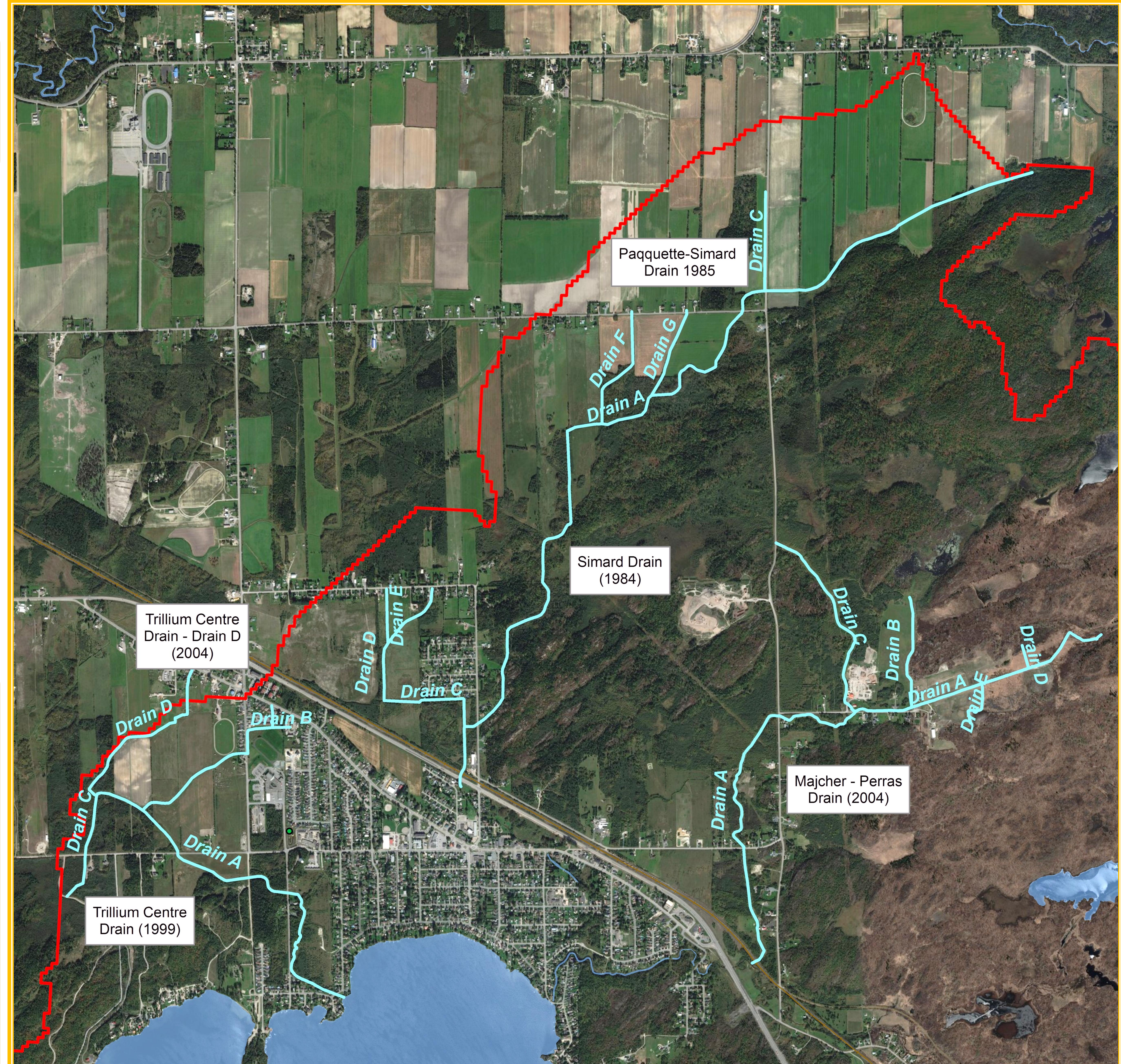
- § Evaluate existing municipal drains within the Study Area

Study Tasks:

- ü Review existing reports for each municipal drain
- ü Include municipal drains in the PCSWMM model using the design provided in original report
- ü Evaluate performance of municipal drains per applicable standards

Drainage Act Implications

- § This Study may determine that specific municipal drains require improvement
- § Future improvement projects for municipal drains would be carried out under separate Engineer's Reports, prepared in accordance with the Drainage Act process



Hydrology

Objectives

- § Define flows at four tributaries and overall watershed

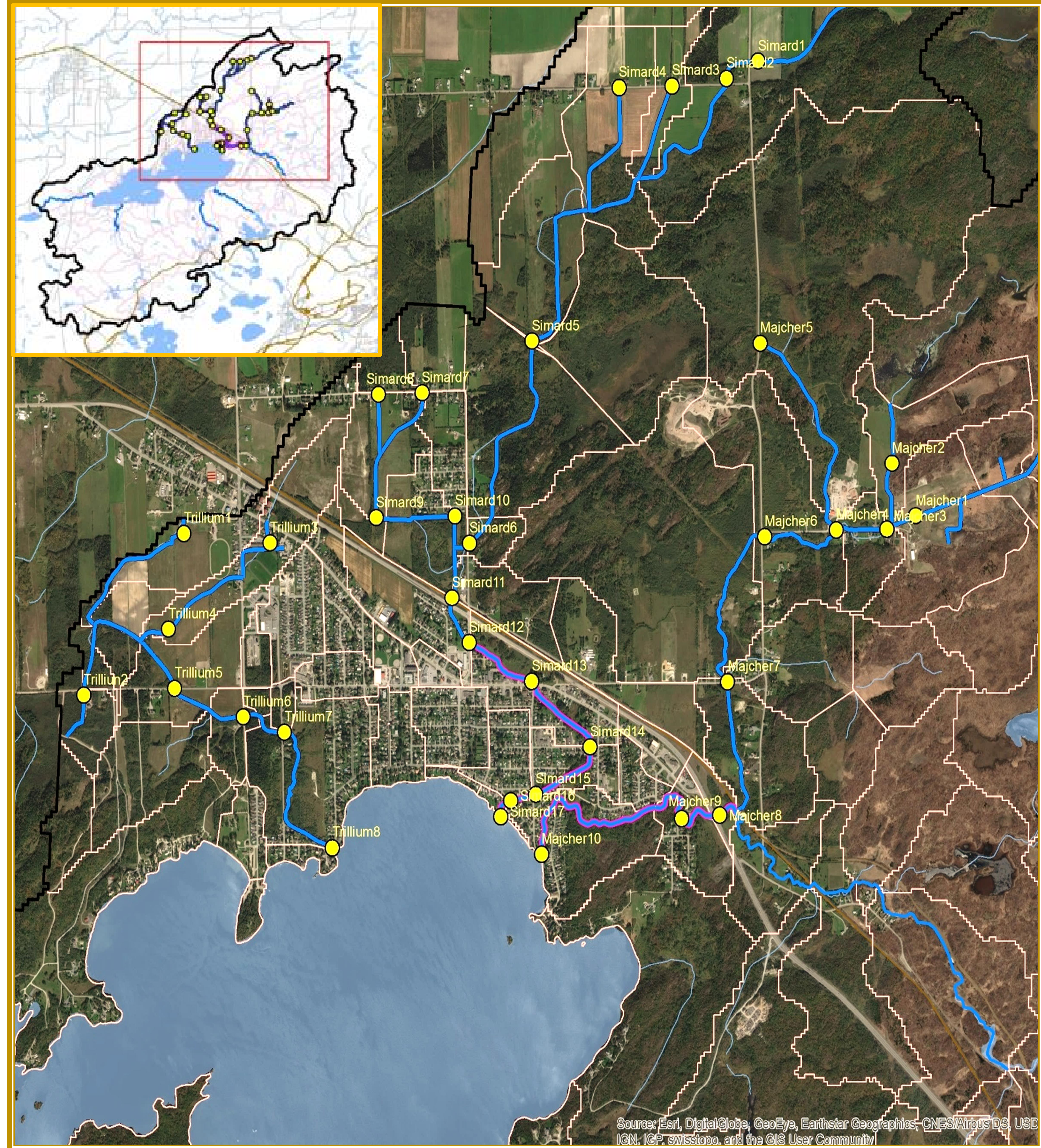
Study Tasks:

- ü Hydrologic model (PCSWMM) setup
- ü Determined the flow rates at key locations along the creek using the hydrologic model
- ü Flow rates were used to establish the flood hazard maps

Key Findings

- § Flow rates were determined at key locations along the creeks

Node	Regional Timmins	24hr-SCS						Events Monitored Apr30-May1
		2-year	5-year	10-year	20-year	50-year	100-year	
Majcher-Node1	3.039	0.013	0.182	0.402	0.712	1.128	1.55	1.855
Majcher-Node2	7.135	0.024	0.368	0.81	1.449	2.323	3.162	3.719
Majcher-Node3	12.94	0.075	0.526	1.159	2.063	3.232	4.245	4.772
Majcher-Node4	14.339	0.034	0.563	1.24	2.207	3.448	4.51	5.007
Majcher-Node5	9.044	0.056	0.736	1.597	2.804	4.427	5.954	5.69
Majcher-Node6	13.182	0.059	0.858	1.911	3.46	5.74	8.634	8.199
Majcher-Node7-Site1	13.174	0.059	0.858	1.91	3.46	5.74	8.633	8.196
Majcher-Node8	14.056	0.059	0.881	1.965	3.56	5.905	8.867	8.37
Simard-Node1	2.612	0.021	0.135	0.28	0.532	0.825	1.092	1.059
Simard-Node10	9.46	0.422	0.599	0.741	0.869	1.157	1.303	0.942
Simard-Node11	7.558	0.467	0.686	0.863	1.052	1.329	1.88	1.786
Simard-Node12	6.305	0.388	0.672	0.905	1.181	1.546	1.994	1.886
Simard-Node13	5.813	0.364	0.657	0.913	1.21	1.598	1.994	1.885
Simard-Node14-Site2	6.624	0.417	0.706	0.965	1.261	1.825	2.197	1.972
Simard-Node15	6.966	0.646	1.037	1.323	1.641	2.096	2.569	2.155
Simard-Node16	8.112	1.624	2.556	3.212	3.994	5.135	6.071	3.258
Simard-Node17	8.153	1.609	2.53	3.177	3.961	5.055	5.961	3.285
Simard-Node2	1.461	0.024	0.147	0.3	0.551	0.823	1.092	1.052
Simard-Node3	0.4	0.039	0.07	0.099	0.137	0.376	0.282	0.131
Simard-Node4	2.305	0	0	0	0	0.031	0.071	0.07
Simard-Node5	1.535	0.019	0.062	0.125	0.19	0.272	0.394	0.353
Simard-Node6	4.665	0.064	0.195	0.383	0.627	0.955	1.383	1.648
Simard-Node7	0.588	0.053	0.081	0.11	0.148	0.215	0.28	0.262
Simard-Node8	0.289	0.029	0.044	0.058	0.077	0.108	0.139	0.129
Simard-Node9	2.453	0.209	0.318	0.462	0.6	0.808	1.016	0.817
Trillium-Node1	1.162	0.029	0.039	0.063	0.132	0.257	0.393	0.592
Trillium-Node2	0.66	0.011	0.014	0.02	0.034	0.064	0.101	0.168
Trillium-Node3	0.003	0	0	0	0	0	0	0
Trillium-Node4	0.222	0	0	0.004	0.014	0.035	0.062	0.078
Trillium-Node5	1.273	0.002	0.025	0.086	0.166	0.279	0.438	0.262
Trillium-Node6	2.283	0.021	0.063	0.162	0.294	0.48	0.734	0.499
Trillium-Node7-Site3	2.616	0.012	0.078	0.191	0.342	0.555	0.843	0.604
Trillium-Node8	4.976	1.122	1.603	1.982	2.404	3.005	3.523	1.751



Hydraulics - Flooding

Objectives

- § Identify limits of Regional flood

Study Tasks:

- ü Bridges/culverts surveyed
- ü Hydrologic/hydraulic model developed
- ü Mapped flood hazard lands

Key Findings

Majcher Drain:

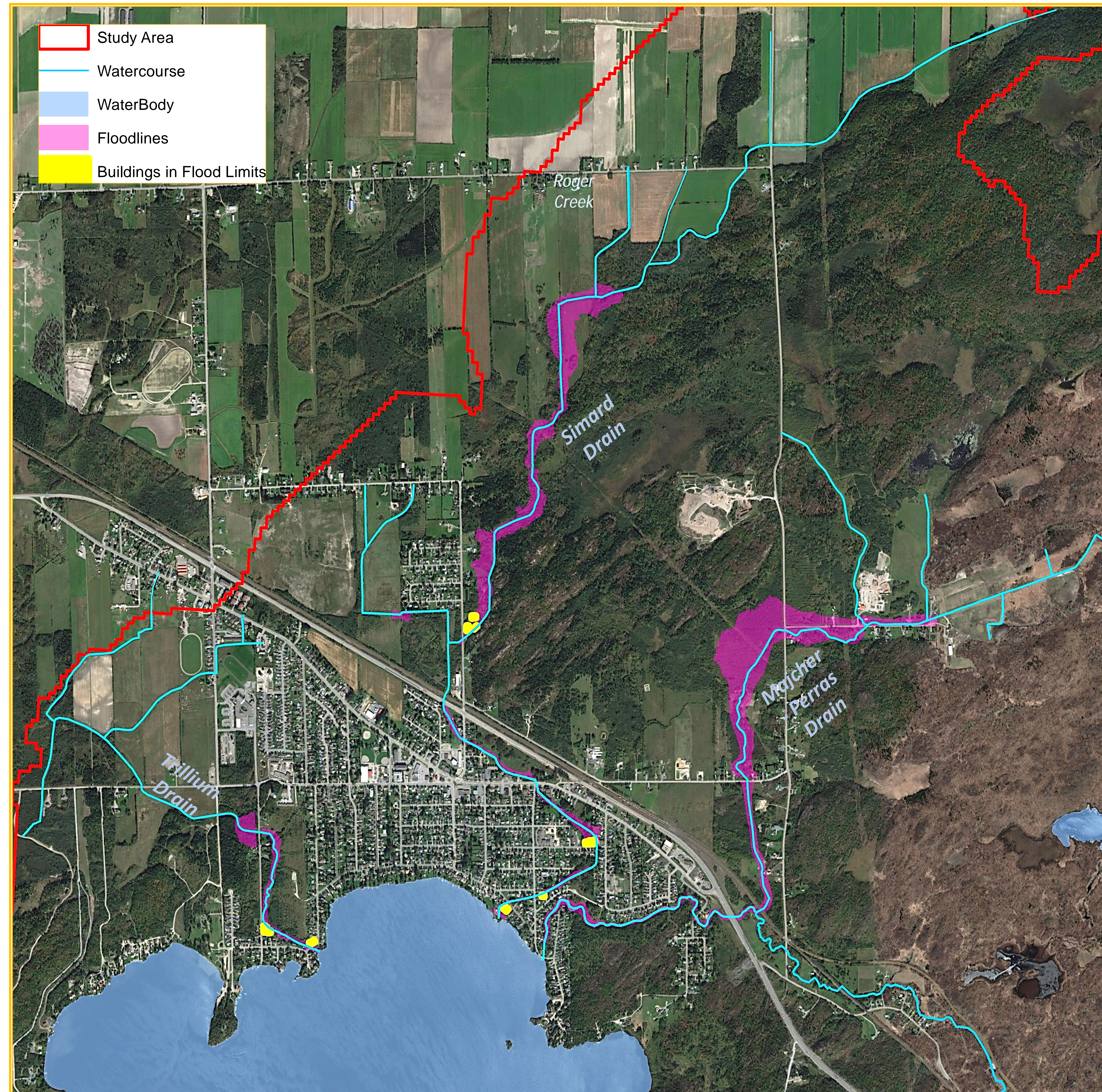
- § No buildings are within the flood limits.
- § Under the Regional flood conditions two roads (Bruno Street and Montee Rouleau) are overtopped.

Simard Drain:

- § 7 buildings are within the flood limits.
- § Under the Regional flood conditions one road (Marier Street) is overtopped and one culvert is overtopped.

Trillium Drain:

- § 3 buildings are within the flood limits.
- § Under the Regional flood conditions one road (Laurier Street) and one culvert is overtopped.



Hydrogeology: Objectives and Data Compilation

Overall Objectives

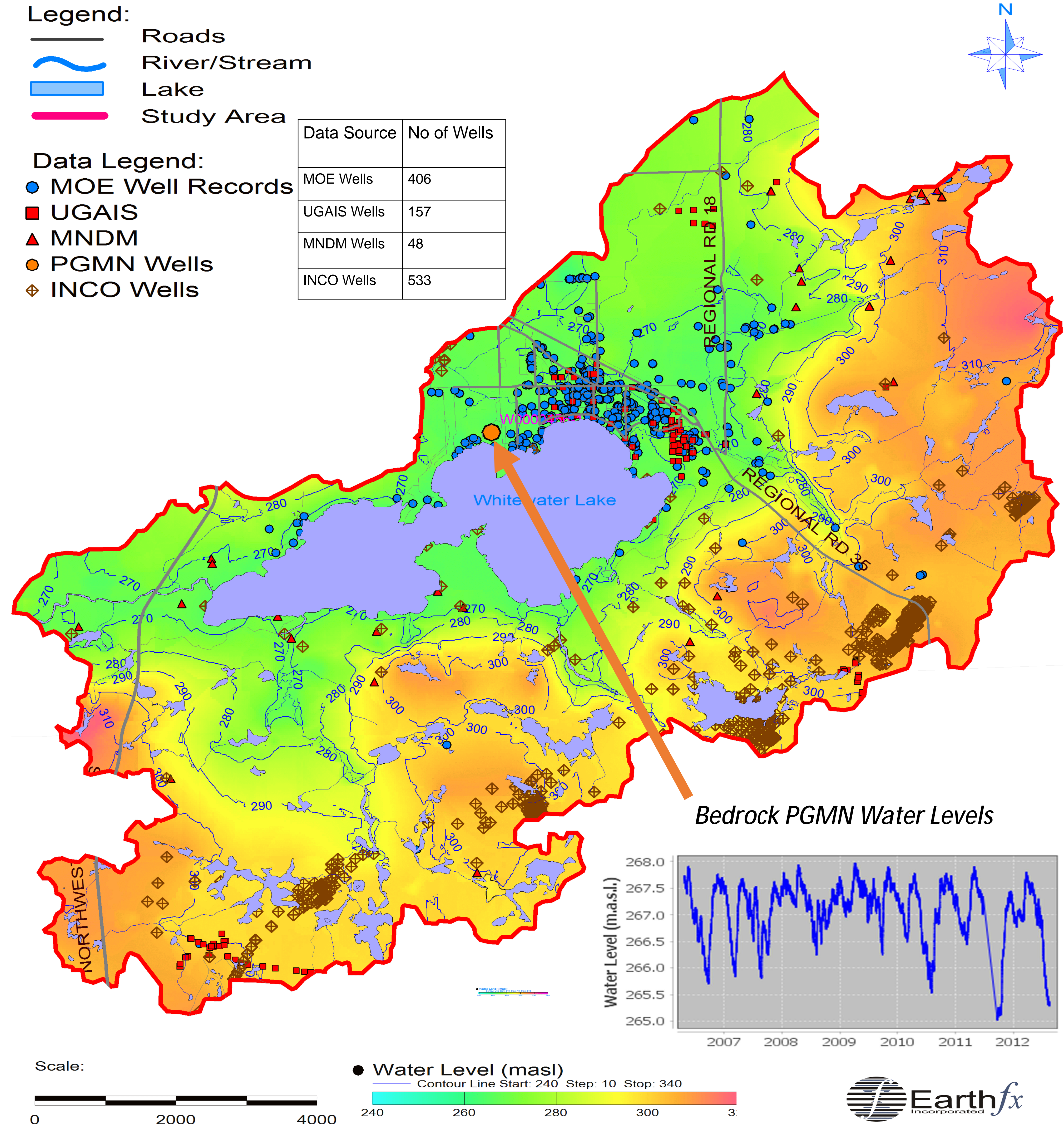
- § Characterize hydrogeologic conditions and identify system components that may be sensitive to future land use changes
- § Identify opportunities for mitigating negative long-term impacts to groundwater resources

Study Task 1:

- ü Compilation and review of existing information and datasets related to regional geologic and hydrogeologic conditions

Key Findings

- § Compiled water well records, permits, geologic and Source Water Protection mapping
- § Supplemented Water Well data with Urban Geotechnical boreholes (UGAIS), MNDM and INCO boreholes: coverage highly localized.
- § Groundwater levels indicate Whitewater Lake is a regionally significant GW discharge point
- § Relatively large summer groundwater level recession of 2 m in PGMN well near lake



Hydrogeology: Overburden Thickness and Stratigraphy

Objectives

- § Characterize geologic setting from boreholes and geologic mapping
- § Identify groundwater resources and issues (aquifers, recharge areas, etc.)

Study Task:

- ü Develop depth to bedrock and overburden thickness map
- ü Develop relevant geologic cross sections

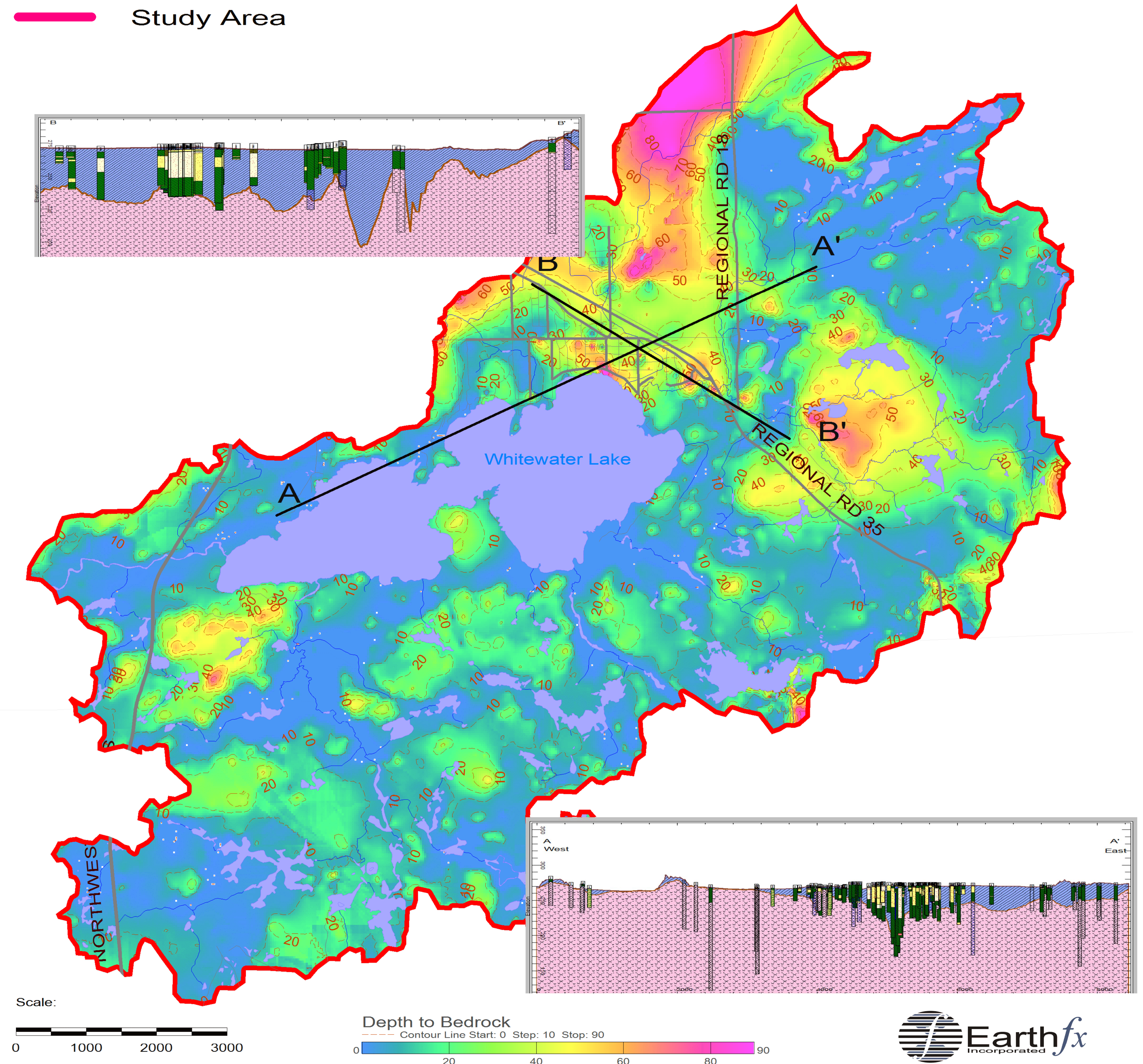
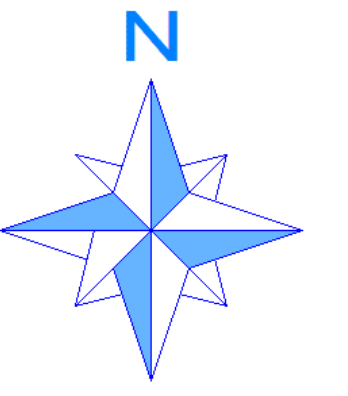
Key Findings

- § Thick glaciolacustrine silt and sand deposits occur in a SW-NE orientation surrounding Azilda. Overburden thickness highly variable and up to 80 m thick. Some adjacent pockets of overburden
- § Bedrock includes igneous complex rocks including Onaping formation (Lapilli tuff), Onwating formation (Carbonaceous Slate) and Elliot Lake Group rocks (siltstone)

Legend:

- Roads
- ~ River/Stream
- Lake
- Study Area

Overburden Thickness



Hydrogeology: Management and Monitoring

Management/Monitoring

- § Identify opportunities for mitigating negative long-term impacts to groundwater resources
- § Identify Monitoring Locations

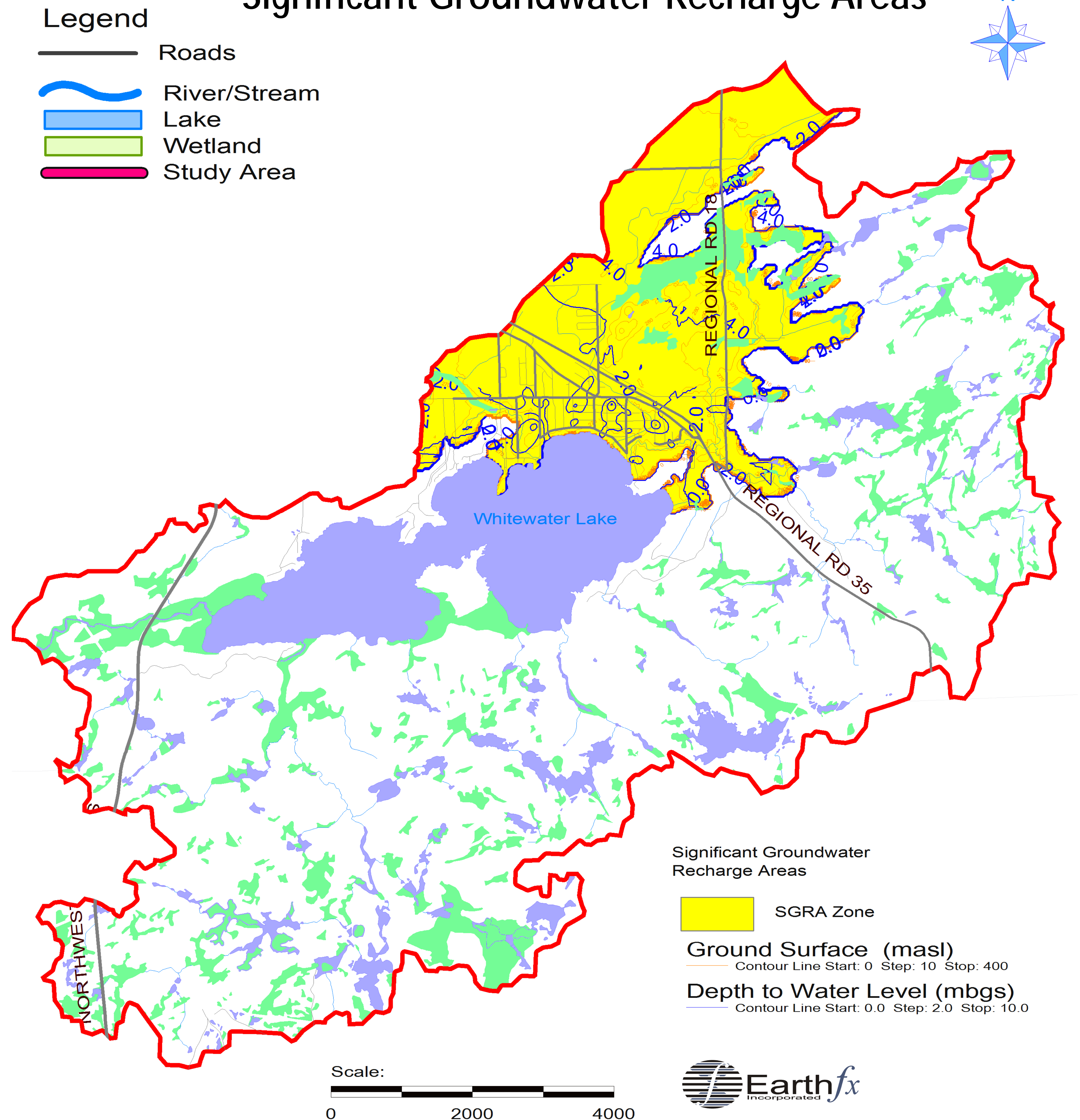
Study Tasks:

- ü Mitigation and management strategies
- ü Long-term GW monitoring program

Key Findings

- § SWP map of Significant Groundwater Recharge Areas (SGRA) identifies sensitive local shallow overburden aquifers
- § Local topographic depressions with thick sandy layers at the surface and shallow depth to water table also potentially important to support flow systems
- § Working to further refine local understanding and SW/GW interconnections
- § Water quality issues under investigation
- § Working to define monitoring locations

Significant Groundwater Recharge Areas



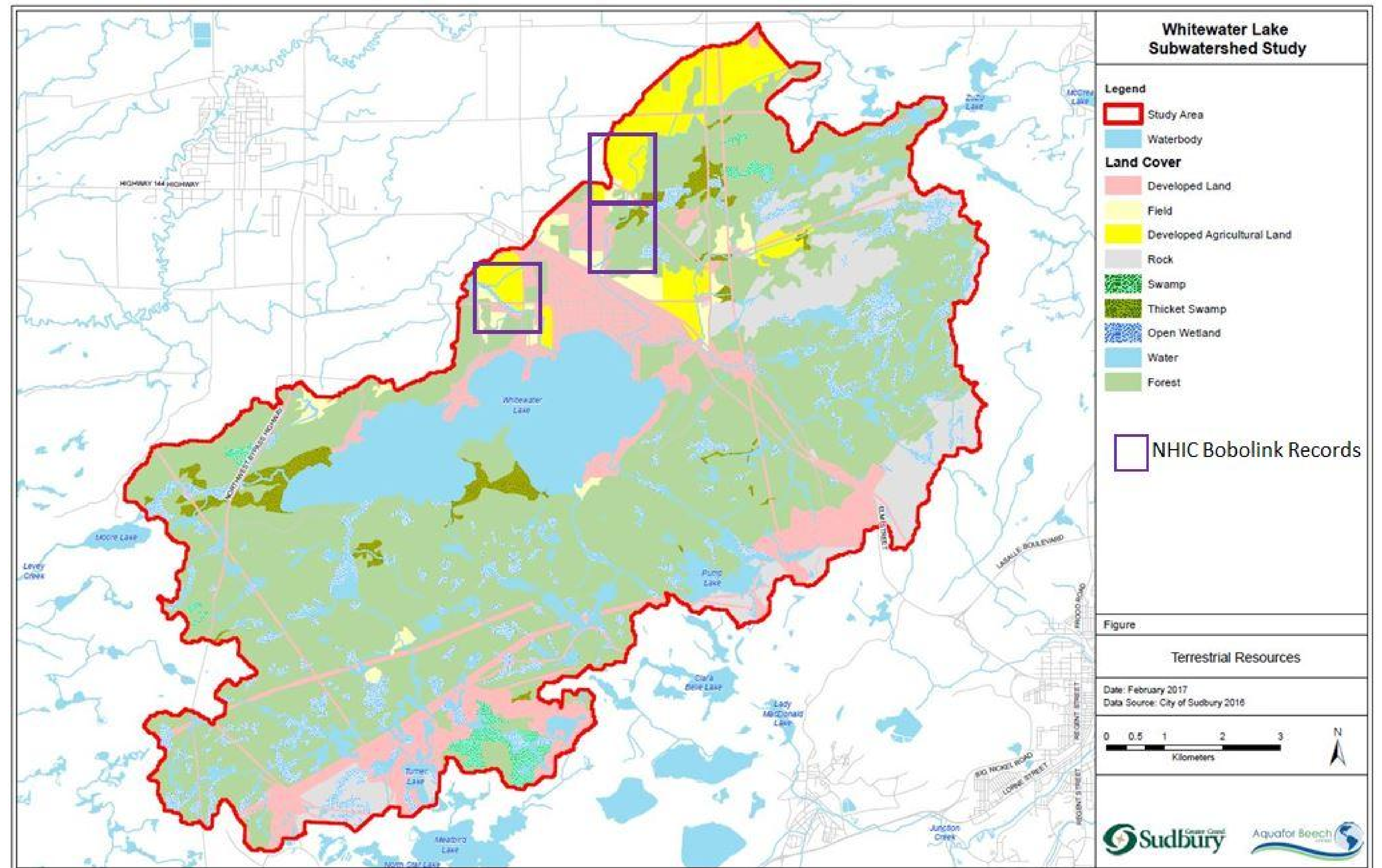
Terrestrial Resources

Objectives

- § Identify and assess the sensitivity of terrestrial features and functions to inform the natural heritage system protection areas as well as habitat enhancement, restoration, and management opportunities. The project team will focus on areas which may be potentially impacted by proposed mitigation areas and activities

Study Tasks:

- ü Consolidation of existing information
- ü Natural heritage assessment
- ü Gap analysis
- ü Adaptive management plan
- ü Identification and classification of natural heritage constraints
- ü Restoration/enhancement and protection measures
- ü Implementation and monitoring recommendations



Key Findings

Natural lands include:

- § Bare rock
- § Swamps
- § Thicket swamps
- § Forests
- § Open aquatic (lakes, ponds, shallow marshes, and rivers)
- § Species-at-risk: Bobolink

Data gaps include:

- § Vegetation community surveys
- § Botanical surveys
- § Faunal surveys

Water Quality (Lake Environment)

Objectives

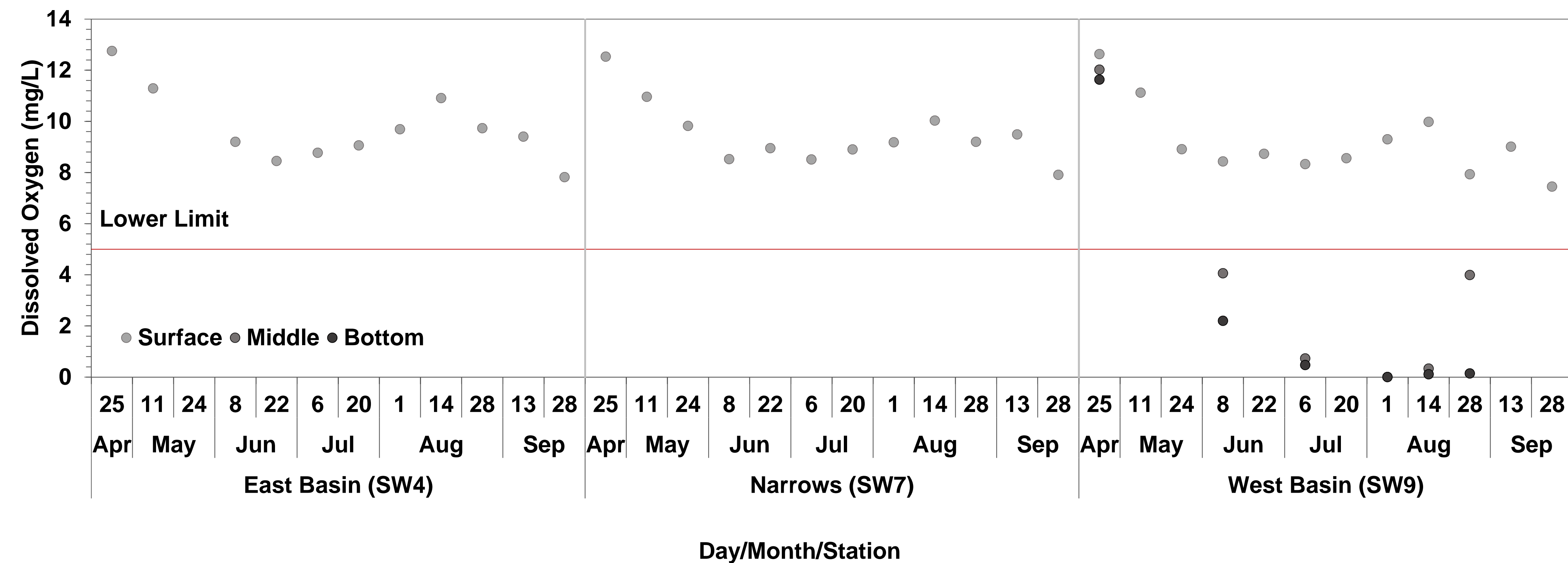
- § Identify sources of pollution and water quality trends

Study Tasks

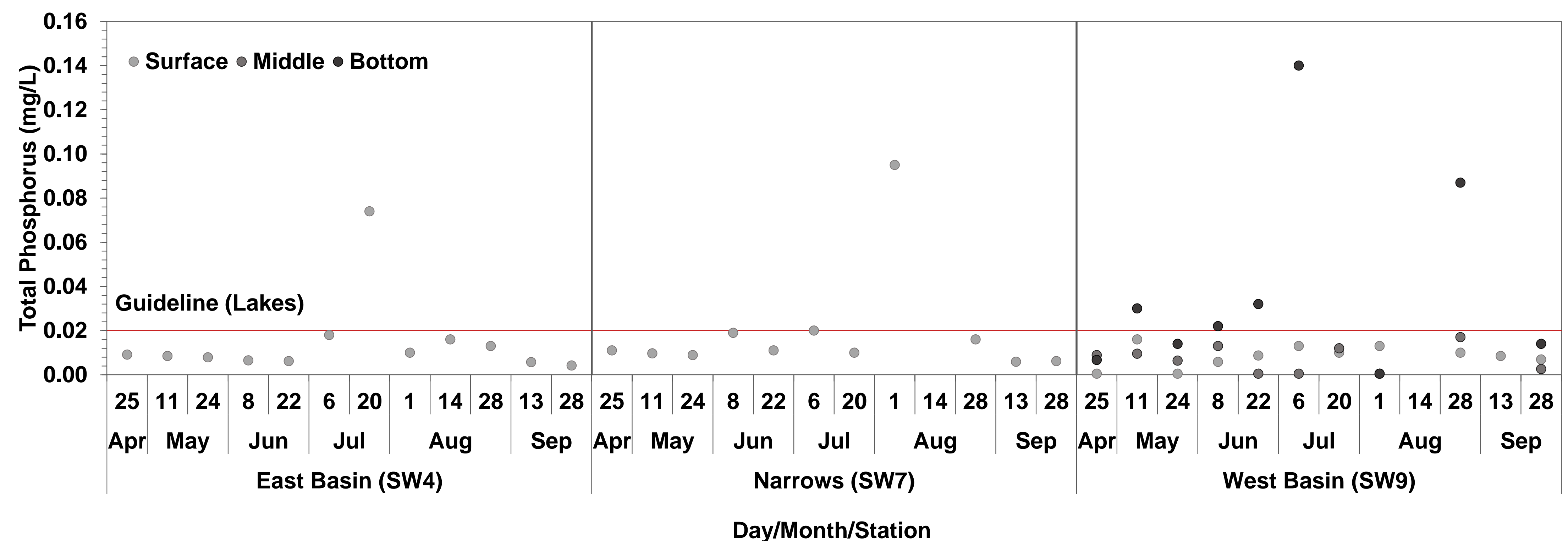
- ü Collected water and phytoplankton samples every two weeks in spring-summer-fall of 2017
- ü Characterize nutrients, metals, dissolved oxygen and other conventional measures
- ü Comparison of quality data relative to provincial guidelines

Key Findings

- § Lake water is generally moderately soft, with neutral pH
- § Dissolved oxygen concentrations support fish in all basins, with exception of deep hole in the western basin
- § Bacterial numbers in surface water were indicated safe bathing



Variations in dissolved oxygen in bays of the lake, relative to limits that generally support fish (5 mg/L)



Variations in total phosphorus concentrations in bays of Whitewater Lake, relative to the PWQO of 0.02 mg/L

Water Quality (Lake Environment)

Objectives

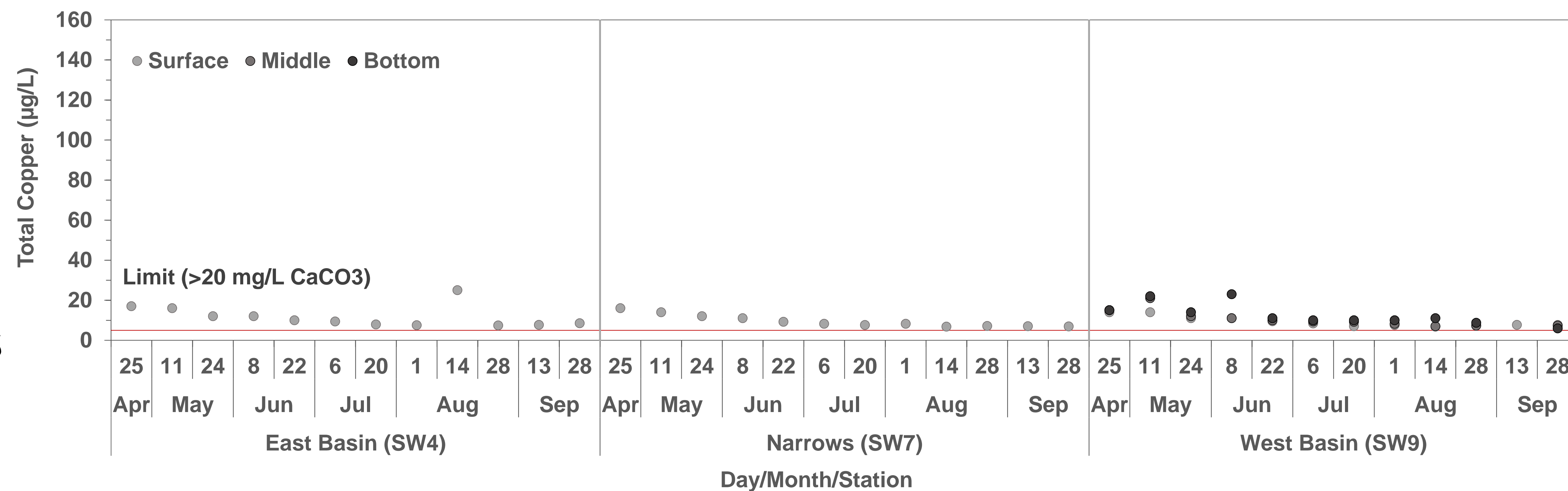
- § Identify sources of pollution and water quality trends

Study Tasks

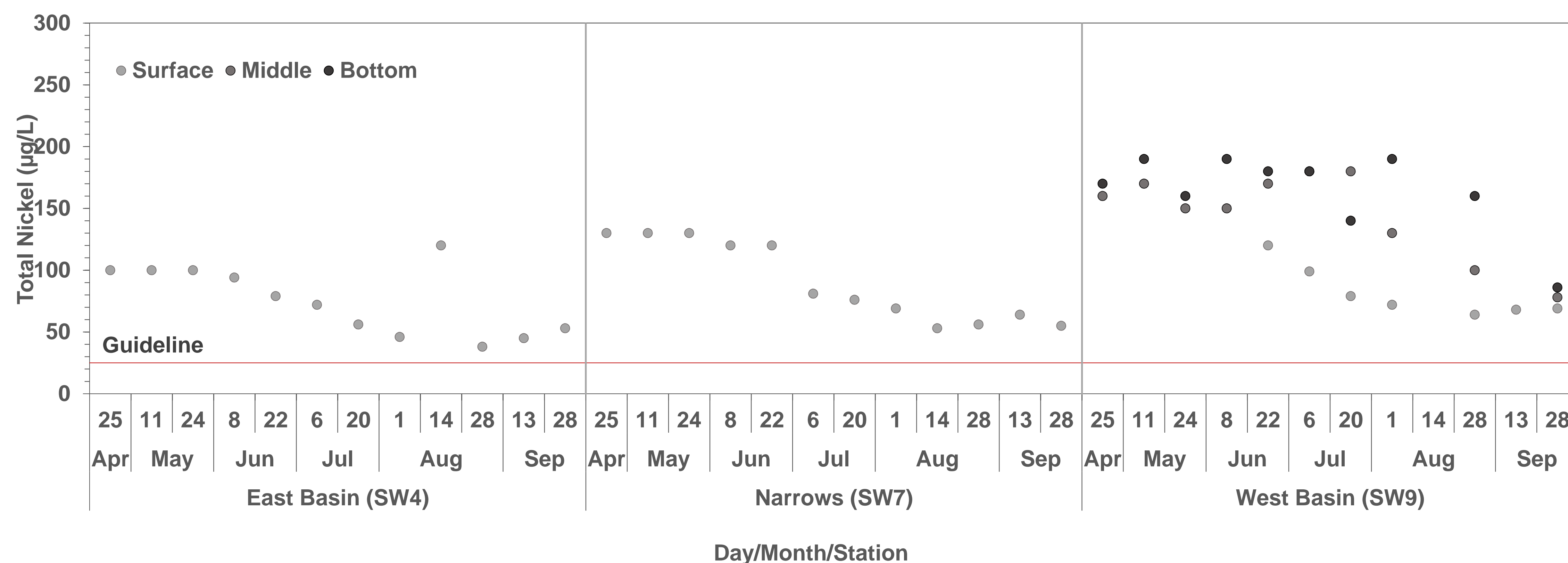
- ü Collected water and phytoplankton samples every two weeks in spring-summer-fall of 2017
- ü Characterize nutrients, metals, dissolved oxygen and other conventional measures
- ü Comparison of quality data relative to provincial guidelines

Key Findings

- § Metals concentrations are enriched in the lake
- § Copper and nickel, specifically, were high, exceeding PWQOs



Variations in copper concentrations in the bays of Whitewater Lake, relative to the PWQO of 5 mg/L



Variations in nickel concentrations in bays of Whitewater Lake, relative to the PWQO of 5 mg/L

Aquatic Environment

Objectives

- § Identify aquatic features and habitats that are of high importance to aquatic communities

Study Tasks:

- ü Review existing information related to biota (fish, invertebrates) and their habitats
- ü Describe habitat conditions in Whitewater Lake and its tributaries

Key Findings

- § Although shoreline habitat around Azilda has been altered by development, much of the lake shoreline remains natural, consisting mostly of bedrock and large marshes
- § Aquatic vegetation growth is dense in shallow waters throughout the lake
- § Historically, phosphorus concentrations have exceeded Provincial guidelines. High phosphorus levels were periodically recorded in the lake in 2017
- § The water column thermally stratifies for a short period in the summer months. The lake is most suitable to support warmwater fish species (bass, yellow perch)



How You Can Help

We look forward to working through the Whitewater Lake Subwatershed Study with residents and stakeholders. If you wish to participate, please complete our sign-in sheet at the entrance and we will send you updates on study progress and opportunities to participate.

For this first stage of the study to identify the *Existing Conditions* for the Whitewater Lake subwatershed, we wanted to introduce the study and share our preliminary findings with you. We are interested to hear from you on observations and input regarding additional issue, opportunity (for enhanced of ecosystem health), and constraint (sensitive to disruption) areas within the Whitewater Lake subwatershed.

To share you observations and ideas, or to obtain further information, please:

- Ø Speak to any of our representatives present tonight; they will be pleased to help you
- Ø Complete our feedback survey on paper (available at the registration desk), or online at:
<http://www.greatersudbury.ca/living/lakes-facts/watershed-study-2016/>
- Ø Contact the study project managers at any time:

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City of Greater Sudbury
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Aquafor Beech Limited
Phone: 905-629-0099 ext. 290
Fax: 905-629-0089
Email: maunder.d@aquaforbeech.com

The display boards from tonight's meeting are available online at the City website noted above.