

A

APPENDIX A

Public Participation Materials

Town of Saint Germain

Management Planning Update Project
Planning Meeting
August 27, 2020

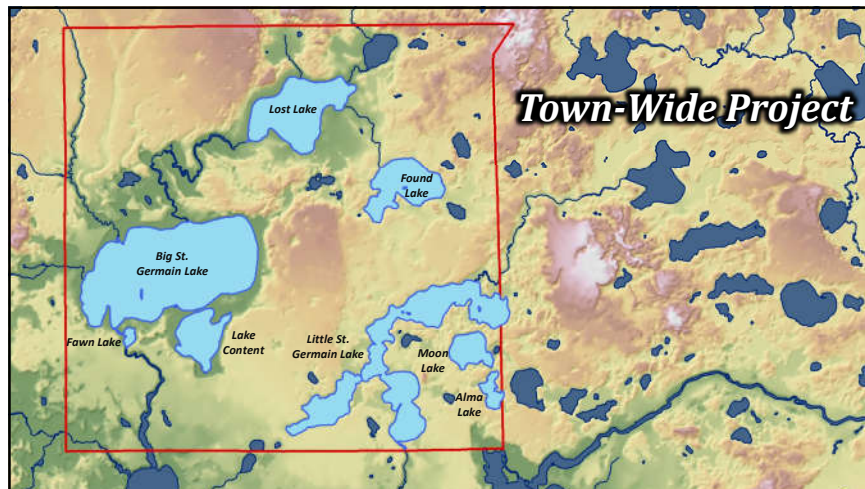
Brenton Butterfield
Onterra LLC
Lake Management Planning

Planning Meeting Agenda

- Lake Management Planning Update Project Overview
- Study Results
 - Water Quality
 - Watershed
 - Shoreland Condition
 - Aquatic Plants
- “Big Picture” Conclusions
- Review Original Management Goals & Update as Necessary



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Management Planning Update Project Overview

- 2004 Town-Wide Management Plan (finalized in 2006)
- Reassessment in 2010 (updated plan finalized in 2013)
- Current project designed to reassess lakes in 2019
- Collect & analyze data – completed
 - Technical & sociological
- Update & Construct long-term & useable plan



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Summary of Project Results

Water Quality

- Parameters measured in 2019 fell within *good* to *excellent* categories for respective lake type
- Exception of Big Saint Germain (two-story classification)
- Recent water clarity declines in Alma, Moon, and Found lakes – increase in *dissolved organic matter*
- Phosphorus concentrations higher than expected on BSG and Lake Content
 - Evidence for *Internal Nutrient Loading*

Watershed & Immediate Shoreline

- Watersheds are in overall good condition – primarily comprised of forests & wetlands
- Degree of shoreland development varies by lake; some have a greater need for restoration

Aquatic Plant Communities

- Significant reductions in plant abundance in Alma, Moon, & Found lakes
- Plant communities more stable in BSG, Lake Content, & Fawn Lake
- Non-native plants: No EWM observed in Found Lake in 2019 or 2020; narrow-leaved cattail and green arrow-arum

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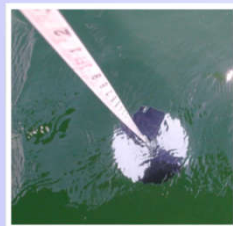


Introduction to Lake Water Quality

↑ Phosphorus
Naturally occurring & essential for all life
Regulates phytoplankton biomass in most WI lakes
Most often 'limiting plant nutrient' (shortest supply)
Human development often increases P delivery to lakes

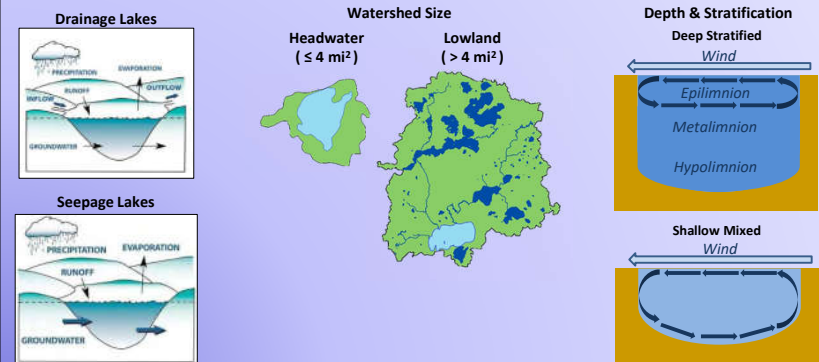
↑ Chlorophyll-*a*
Pigment used in photosynthesis
Used as surrogate for phytoplankton biomass

↓ Secchi Disk Transparency
Measure of water clarity
Measured using a Secchi disk

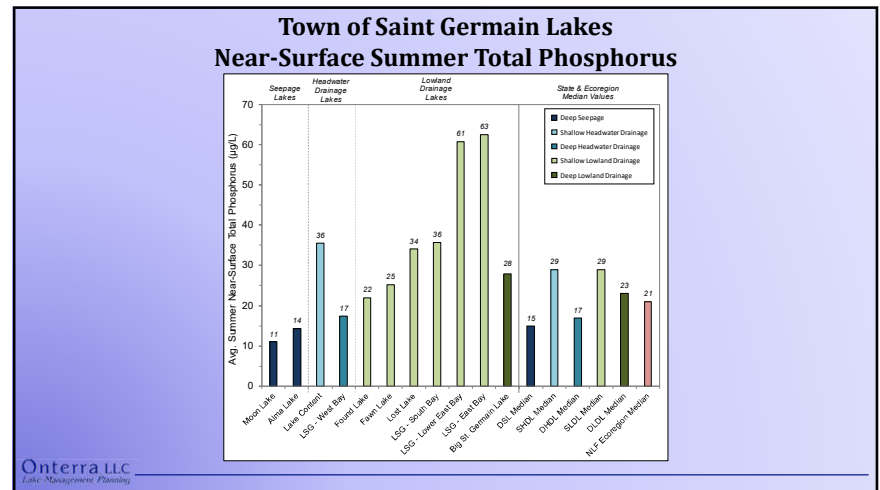
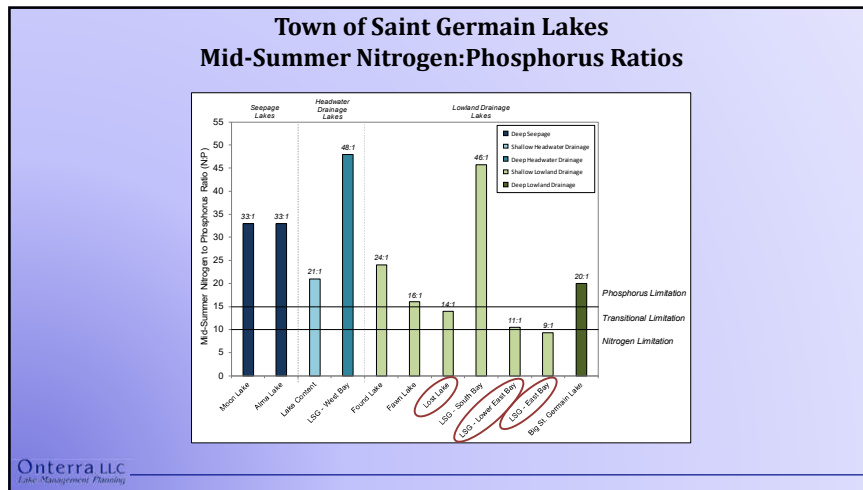
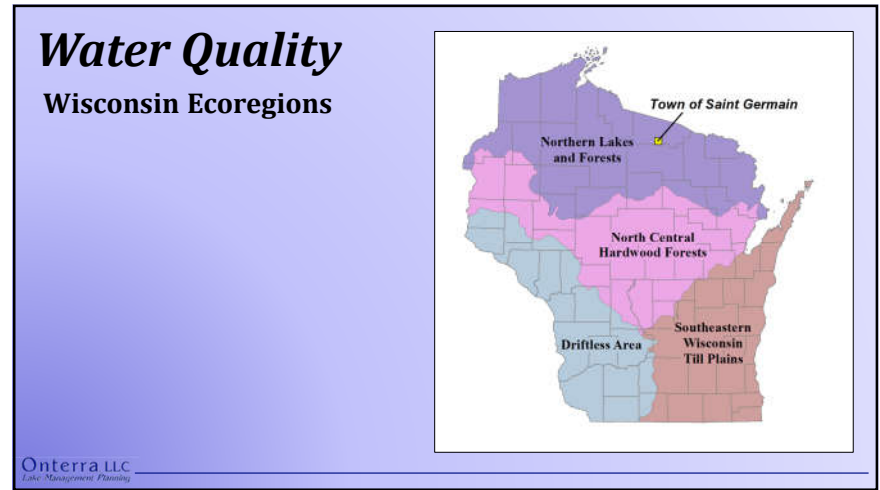
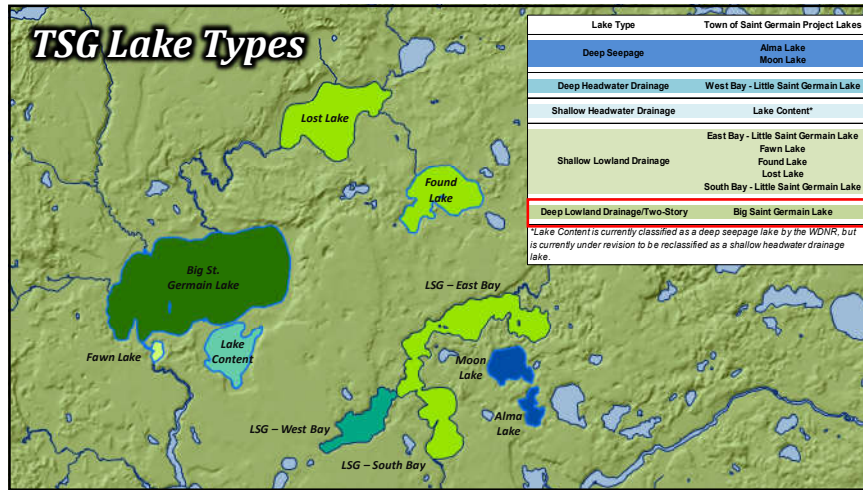


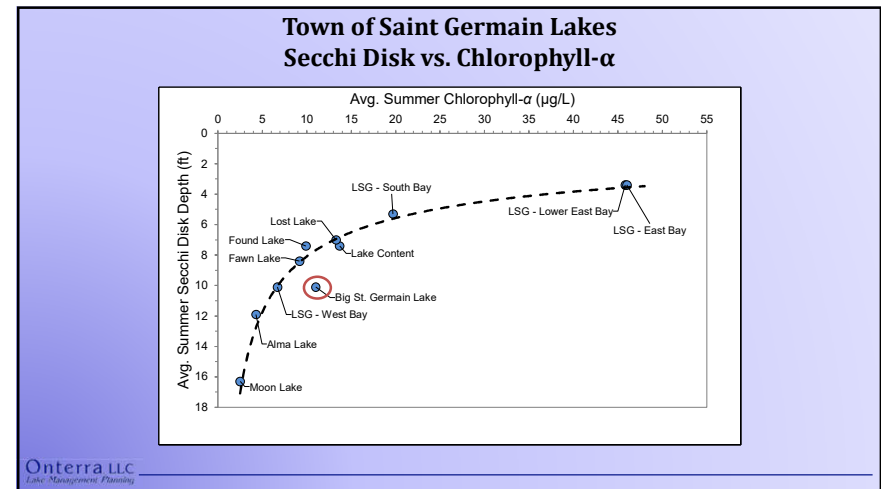
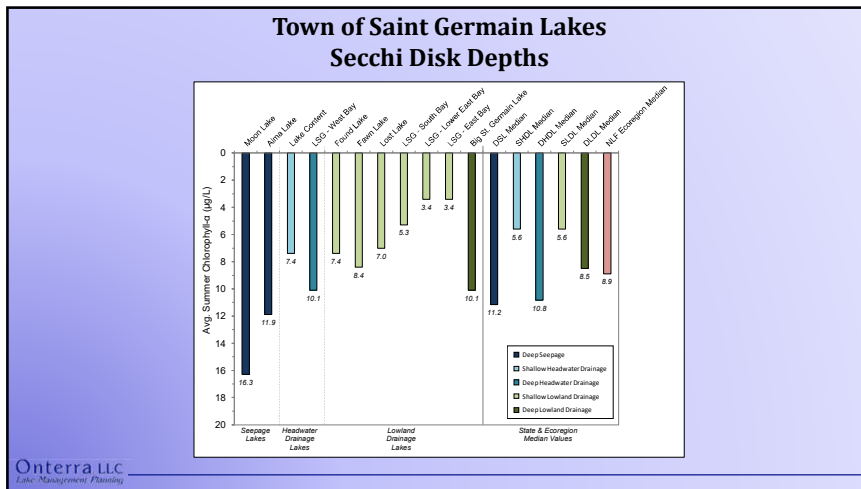
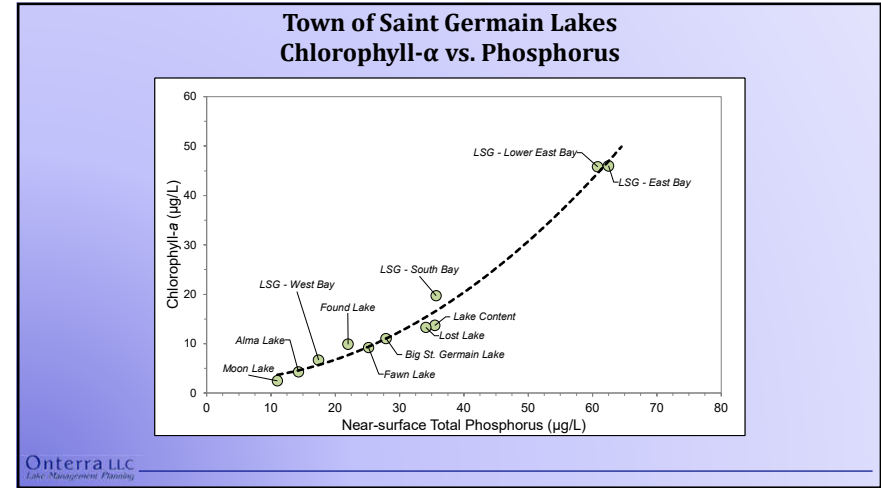
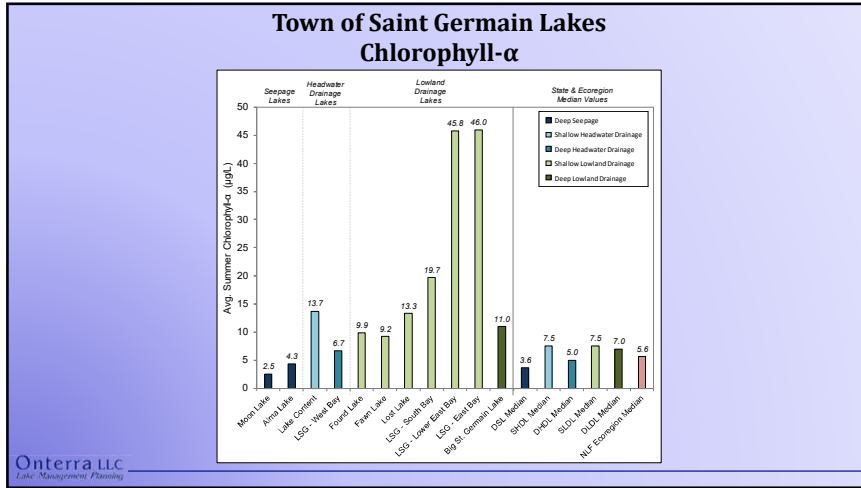
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Wisconsin Lakes Natural Community Types



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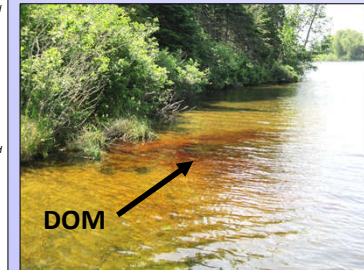
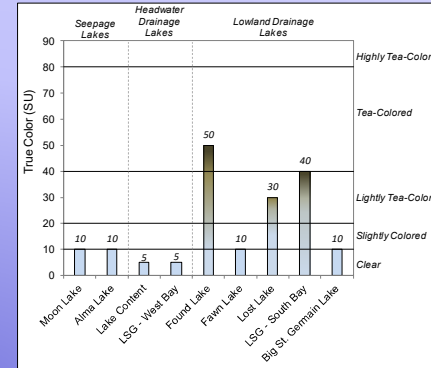


Town of Saint Germain Lakes Water Quality Trends

- No trends detected for phosphorus or chlorophyll-*a*
 - Good to excellent for respective lake types (with exception of Big St. Germain Lake – two story)
- Decreasing trend in water clarity in recent years in Alma, Moon, & Found Lakes
 - Occurring despite no measured increase in algae
 - Believed to be due to increase in Dissolved Organic Matter (DOM)
 - Higher precipitation causing increased DOM or ‘lake browning’ across North America

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Town of Saint Germain Lakes True Color Values



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Internal Phosphorus Loading

- Phosphorus concentrations in Big Saint Germain, Lake Content, & Found Lake are higher than expected
- Evidence suggest *internal phosphorus loading* (like was discovered in LSG and Lost lakes)
- Varies from year to year, but can elevate phosphorus concentrations significantly in BSG and Lake Content later in summer

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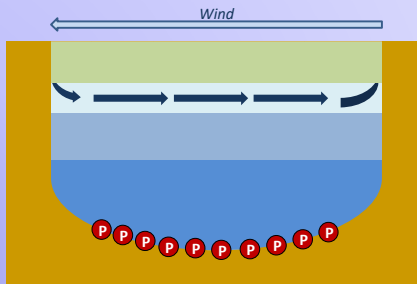
What is Internal Phosphorus Loading?

- In general, net movement of phosphorus to the sediment in lakes
- Under certain conditions, phosphorus (and other nutrients) get released from bottom sediments into the overlying water
- Anoxic (devoid of oxygen) conditions cause phosphorus release
- Becomes problematic if phosphorus is mobilized to surface in summer

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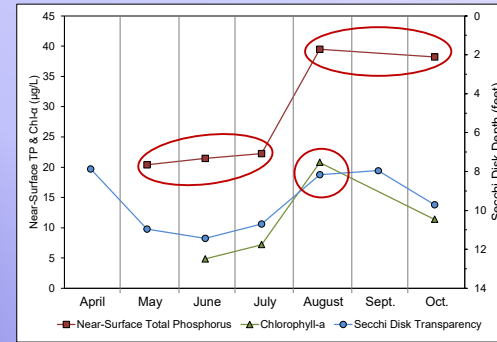
Big Saint Germain Lake: Entrainment

- **Entrainment:** Continual deepening of the epilimnion and erosion of the metalimnion and hypolimnion
- Acts as a nutrient pump, delivering sediment-released nutrients to the surface.



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Big Saint Germain Lake: Entrainment



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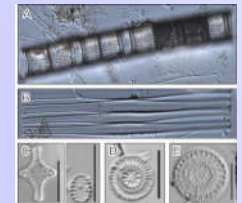
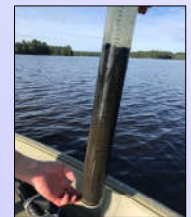
Lake Content Internal Phosphorus Loading

- Unlike BSG, Lake Content does not develop strong thermal stratification
- Anoxia near the bottom created by dense aquatic plant growth
 - Inhibits water exchange and mixing
 - Shading prevents photosynthesis in deeper areas
- Phosphorus released from bottom sediments into the overlying water
- Diffuses throughout water column given relatively uniform temperature & density
- Common occurrence in shallow lakes with abundant plant growth

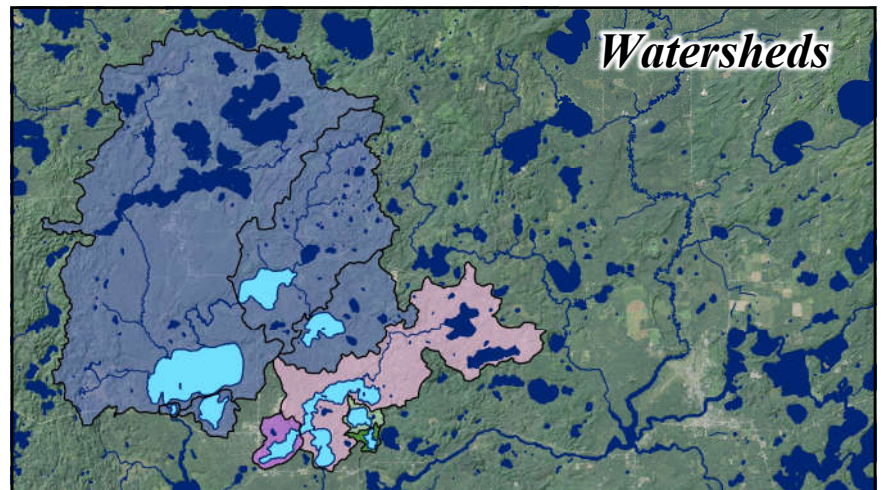
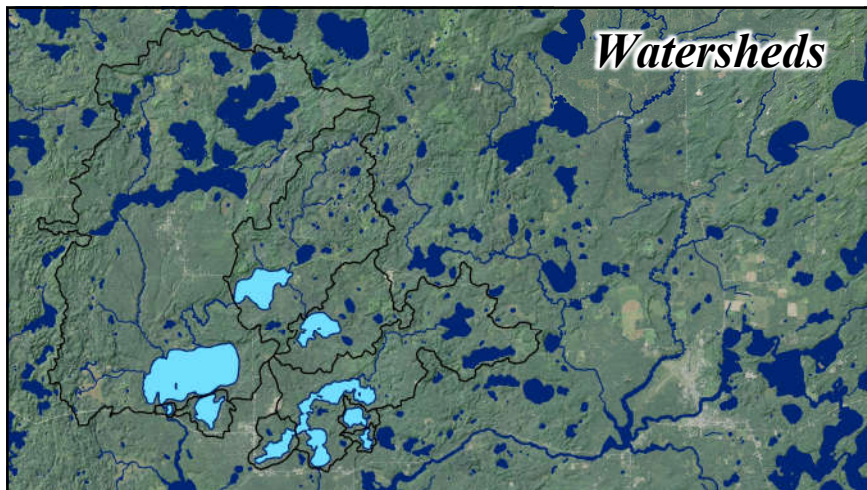
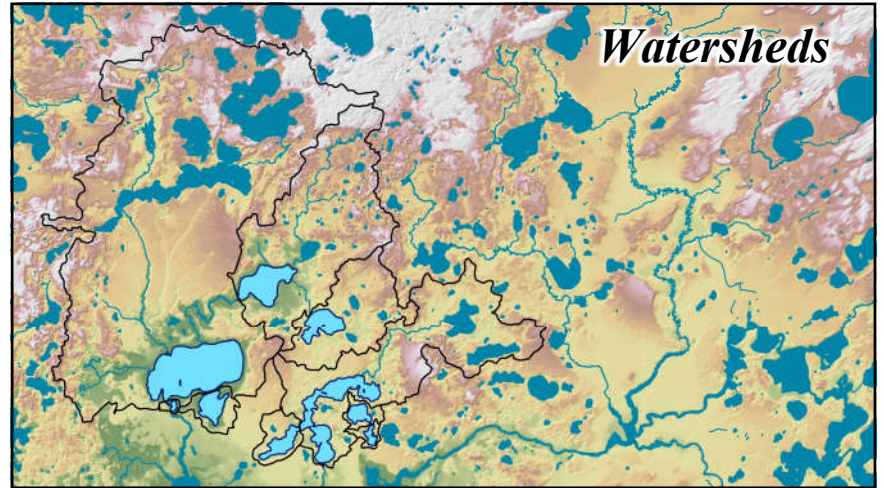
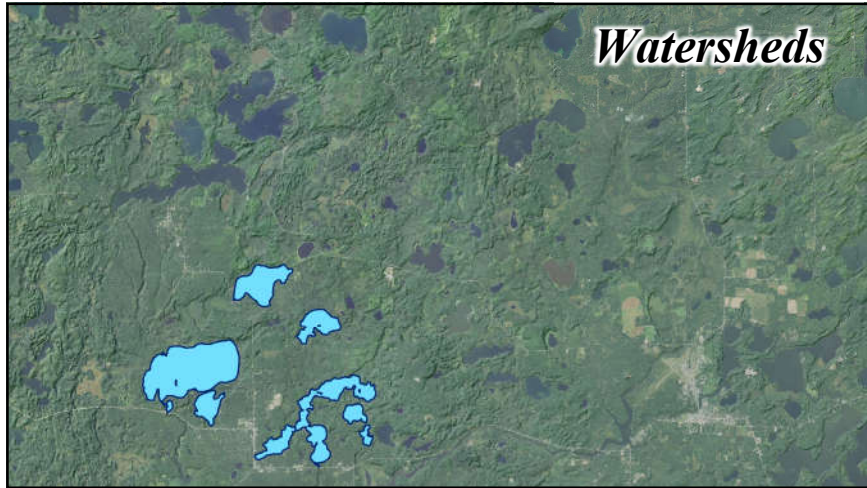
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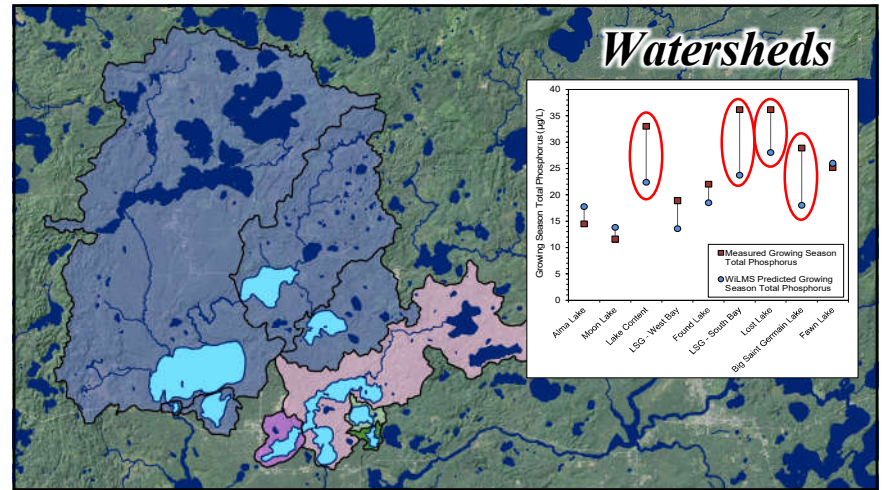
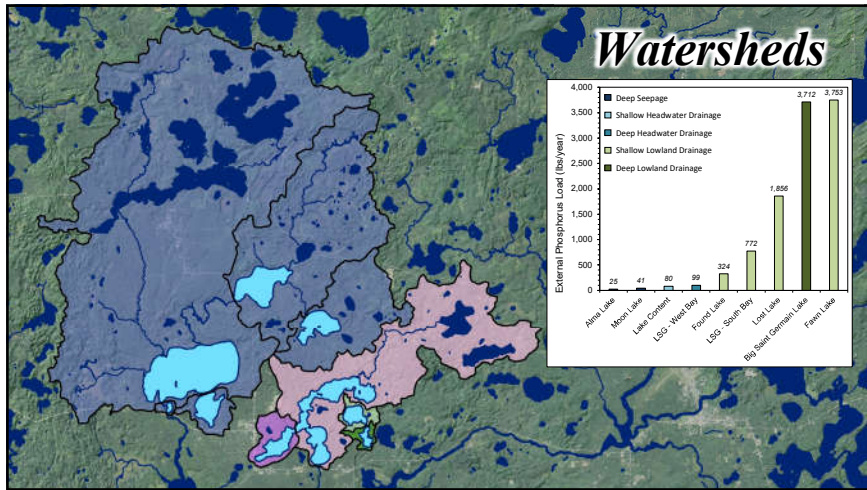
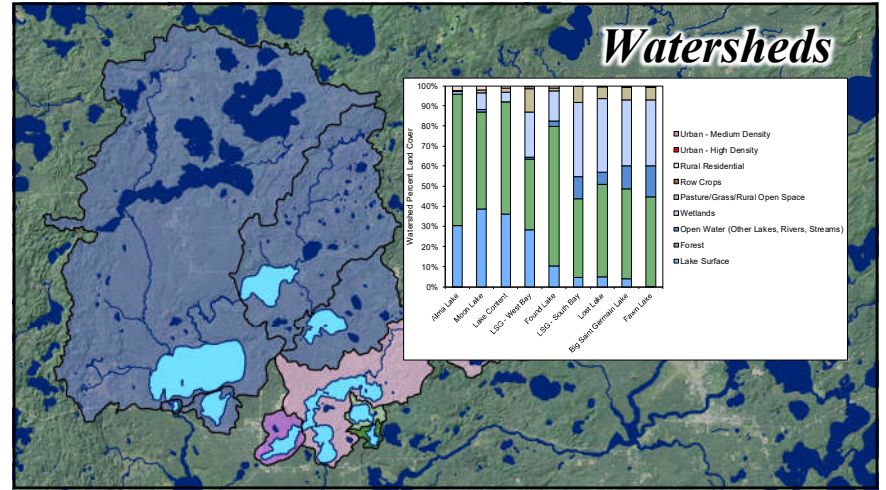
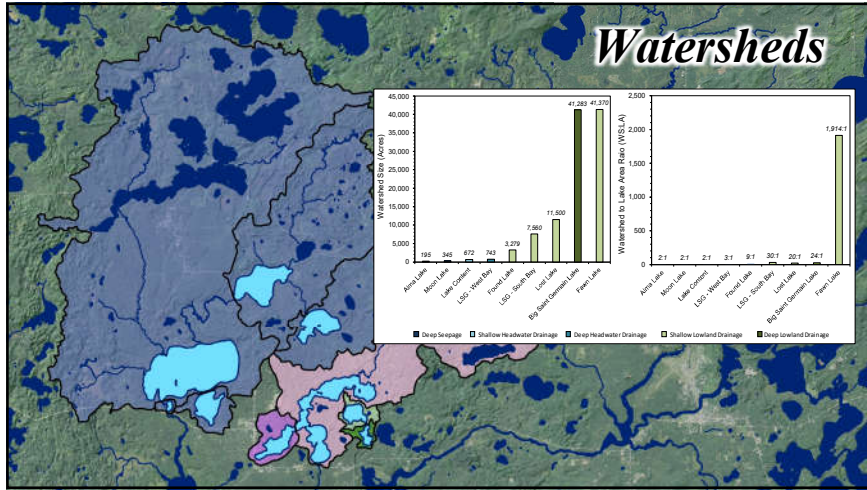
Paleoecology

- Fossilized diatoms in sediment core used to determine if and how water quality has changed over ~150 years
- Collected from Alma, Moon, Big Saint, & Found
- Slightly higher alkalinity in Alma Lake
- Nutrient concentrations in Alma & Moon haven't changed significantly, but likely more plants at present
- Slight increase in nutrients and plants in Big Saint Germain
- Slight increase in nutrients in Found Lake



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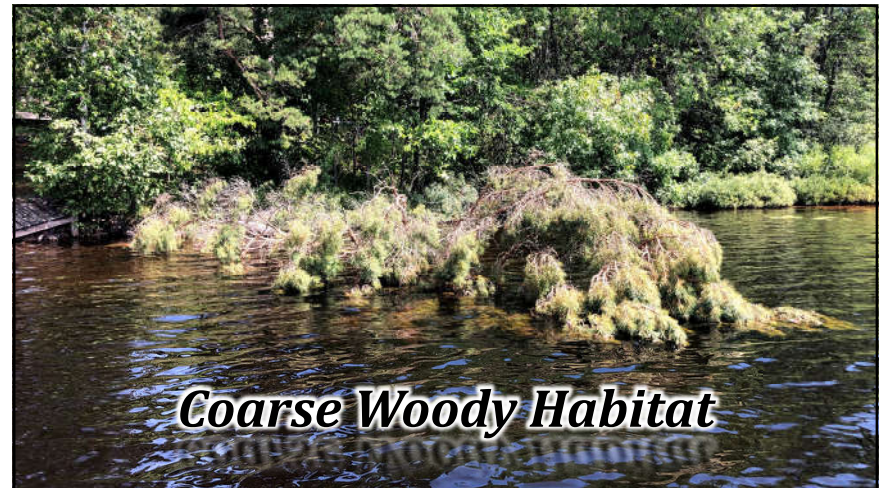
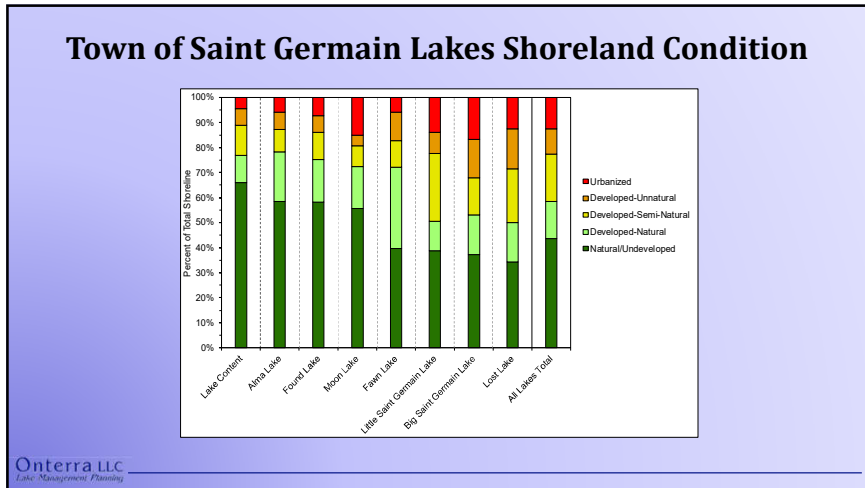
Shoreline Assessment Category Descriptions

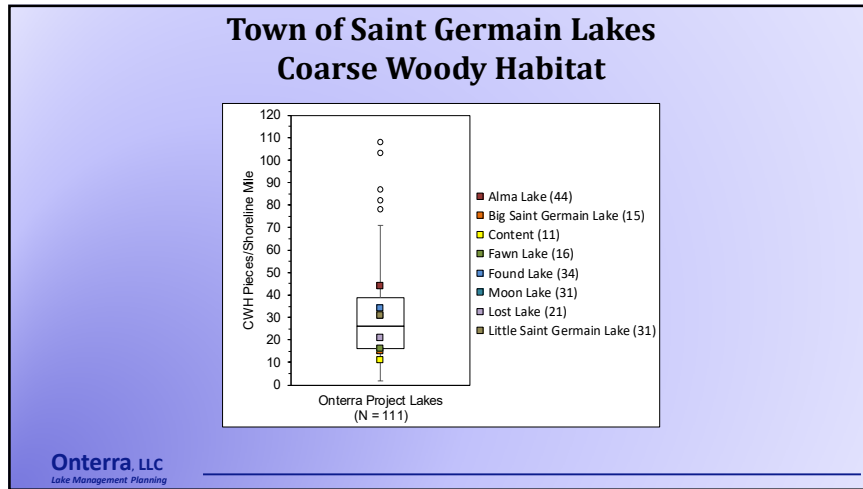
More Natural Habitat

Urbanized Developed-Unnatural Developed-Semi-Natural Developed-Natural Natural/Undeveloped

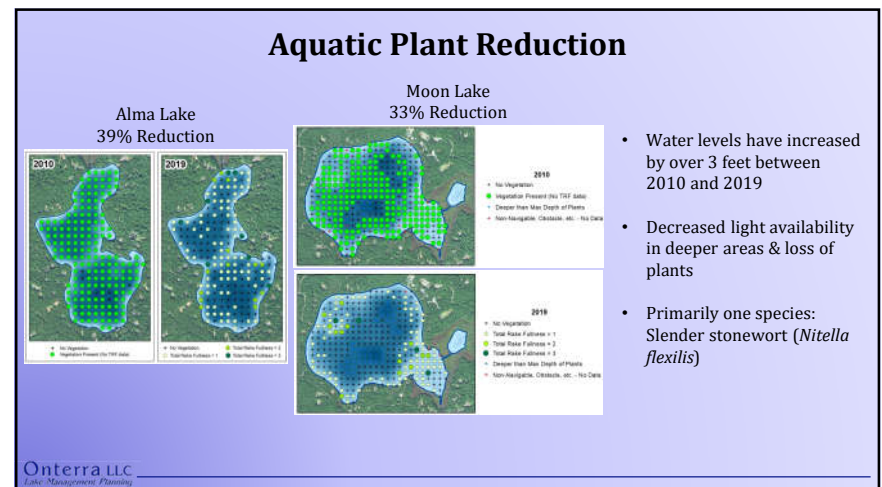
Greater Need for Restoration

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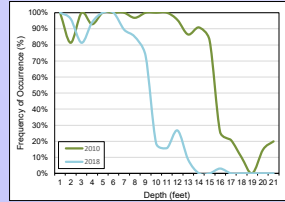
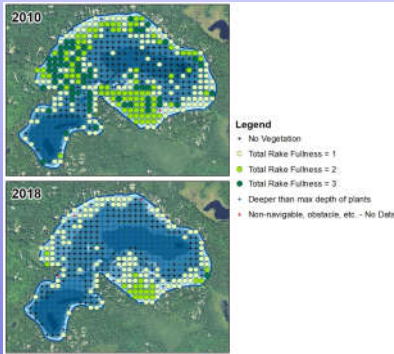


- ### Aquatic Plant Survey Results Summary
- 97 native aquatic plant species located among 6 project lakes since 2004/05
 - 4 non-native species:
 - Eurasian watermilfoil (Found Lake 2018)
 - Purple loosestrife (Found Lake in 2010)
 - Narrow-leaved cattail (BSG & Lake Content 2019)
 - Green arrow-arum (Moon Lake [Engle Bog] 2019)
 - Significant reductions in plant abundance in Alma, Moon, & Found Lakes
 - Plant communities of Big Saint, Content, & Fawn relatively stable
 - Overall, native plant communities still very healthy and high quality



Aquatic Plant Reduction

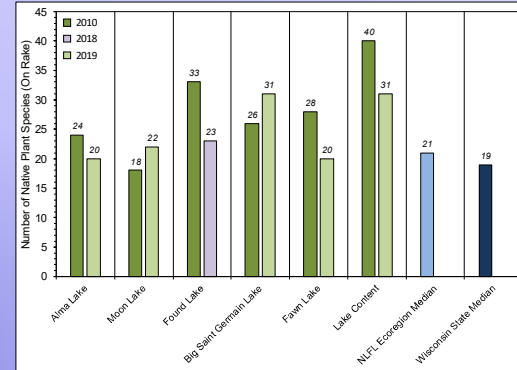
Found
34% Reduction



- Water clarity decrease of over 3.5 feet
- Due to increase in *dissolved organic matter*
- Creates reduced light availability for plants

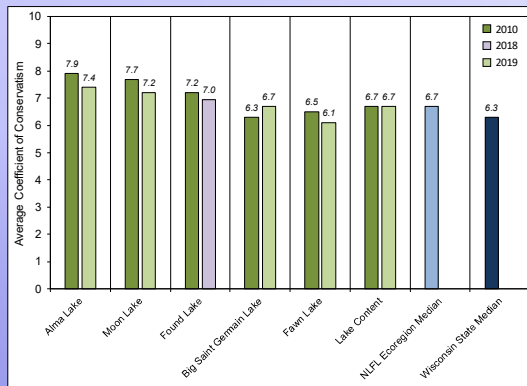
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Native Aquatic Plant Species Richness



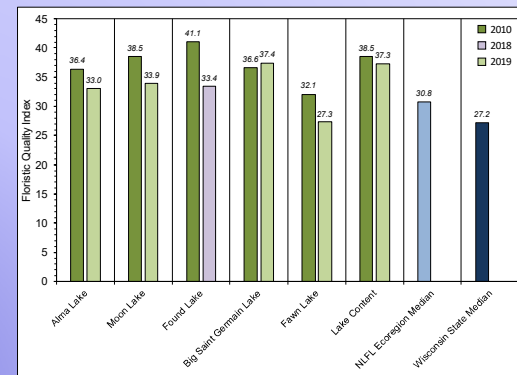
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Average Conservatism



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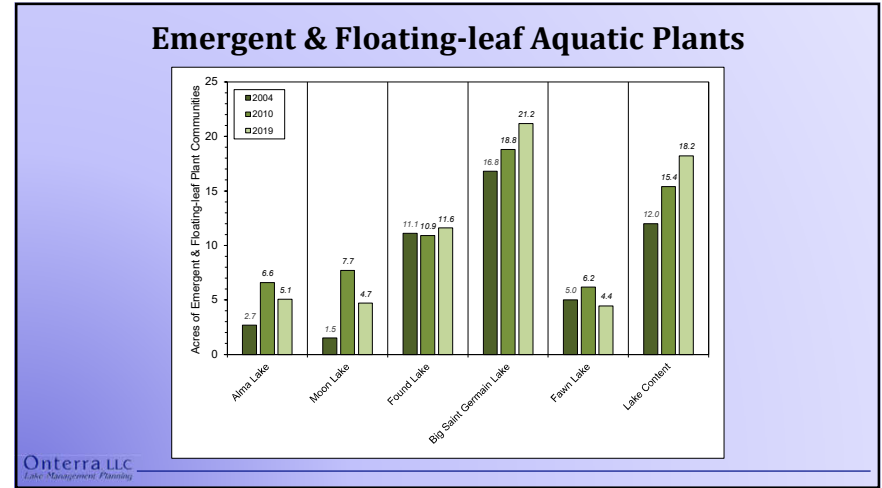
Floristic Quality



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Emergent & Floating-leaf Aquatic Plants



Aquatic Invasive Plants: Eurasian watermilfoil

- Discovered in Found Lake in 2018; implemented hand-harvesting
- No plants could be located in 2019 or 2020

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Aquatic Invasive Plants: Narrow-leaved cattail

- Small colonies found on Big Saint Germain & Lake Content in 2019

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Aquatic Invasive Plants: Green Arrow-Arum

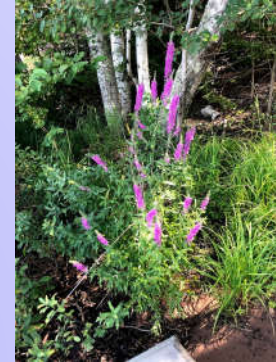
- Clumps and colonies found around edge of Engle Bog in 2019
- Ongoing debate as to whether or not this species is considered native or not



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Aquatic Invasive Plants: Purple Loosestrife

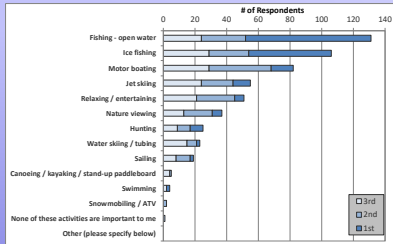
- None found on project lakes in 2019



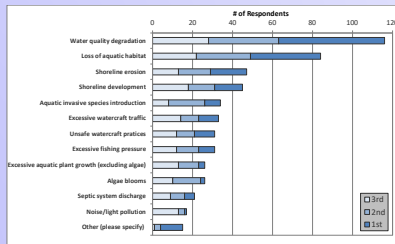
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Stakeholder Survey Results

Rank up to three activities that important reasons for owning your property on or near the lake.



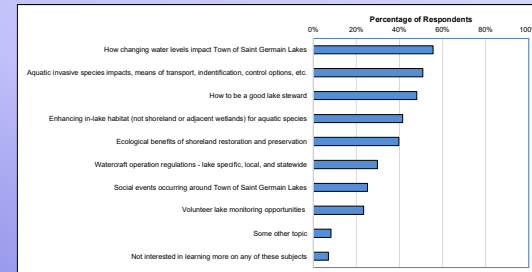
Please rank your top three concerns regarding your lake, with 1 being the greatest concern.



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Stakeholder Survey Results

Which of these subjects would you like to learn more about?



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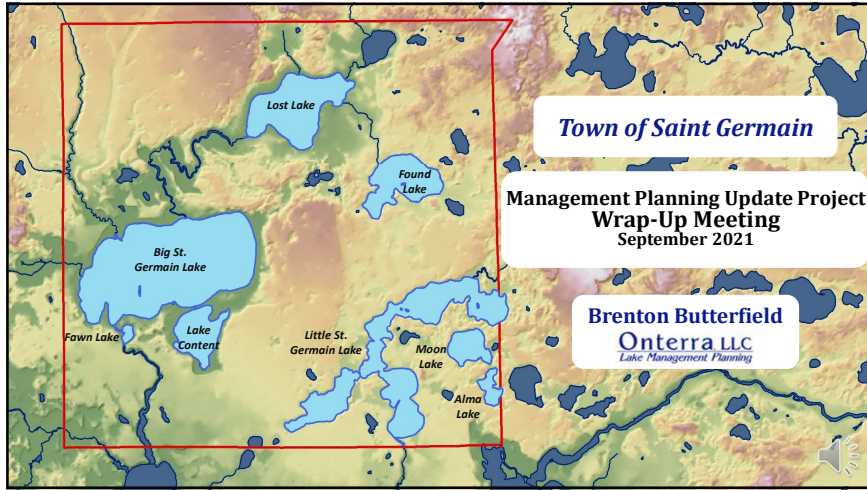


Conclusions

- Overall, lakes are still in good shape with good to excellent water quality & healthy native plant communities
- Internal phosphorus loading can cause late-summer algal blooms on Big Saint Germain & Lake Content
- Changes observed in plant communities on Alma, Moon, & Found lakes driven by natural factors
- Measured declines in water clarity due to increased DOM
- Invasive species populations are small and currently at manageable levels


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Presentation Outline

- Project Goals
- Overall Study Conclusions
- Key Study Results
- Management Goals & Actions
- Questions




Engle Bog, Moon Lake

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Management Planning Update Project Overview

- Collect & analyze data – completed
 - Technical & sociological
- Update & Construct long-term & useable plan



Little St. Germain Lake

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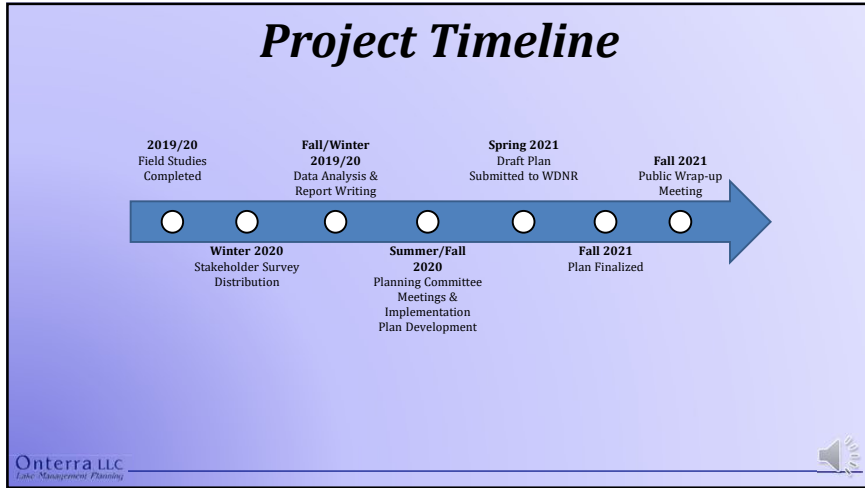
Data and Information Gathering

- **Study Components**
 - Water Quality Analysis
 - Paleocore Collection & Analysis
 - Watershed Assessment
 - Shoreland Assessment
 - Aquatic Plant Surveys
 - Fisheries data integration
 - Stakeholder Survey



Lake Content

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Summary of Project Results

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- Parameters measured in 2019 fell within *good* to *excellent* categories for respective lake type
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Introduction to Lake Water Quality

Phosphorus

Chlorophyll-a

Secchi Disk Transparency

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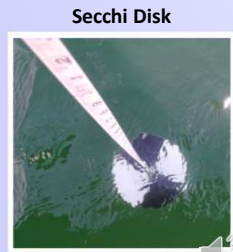
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Secchi Disk Transparency

Measure of water clarity
Measured using a Secchi disk



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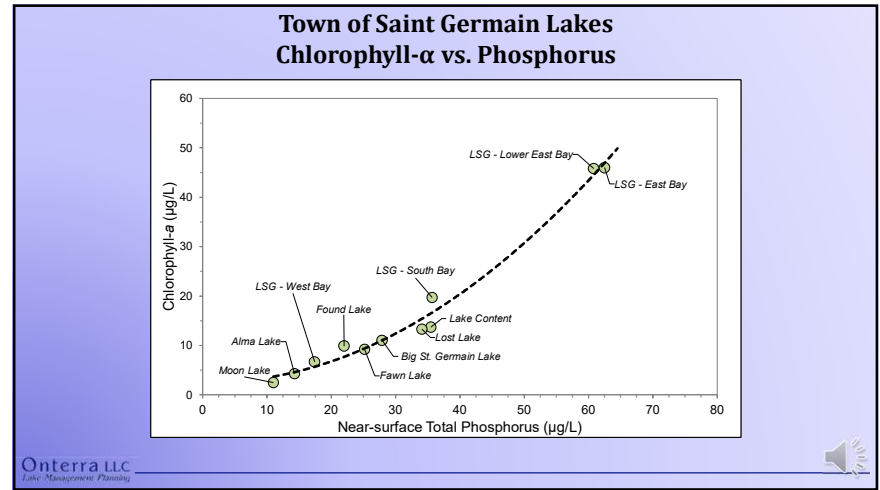
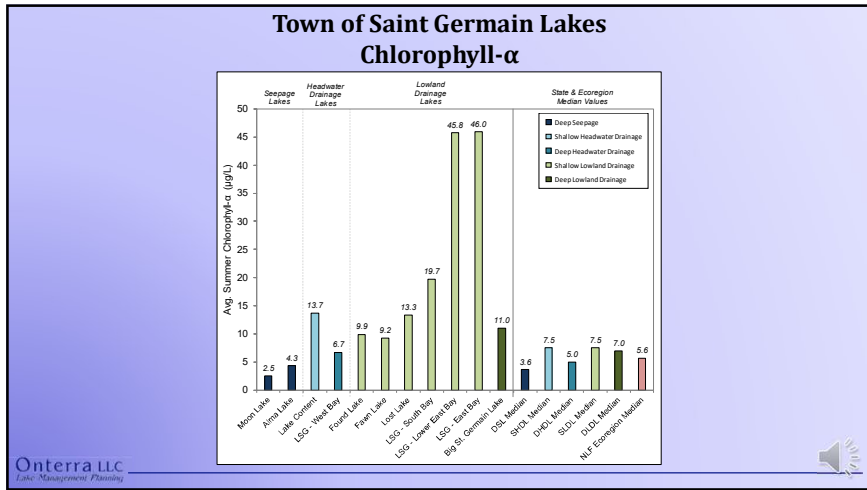
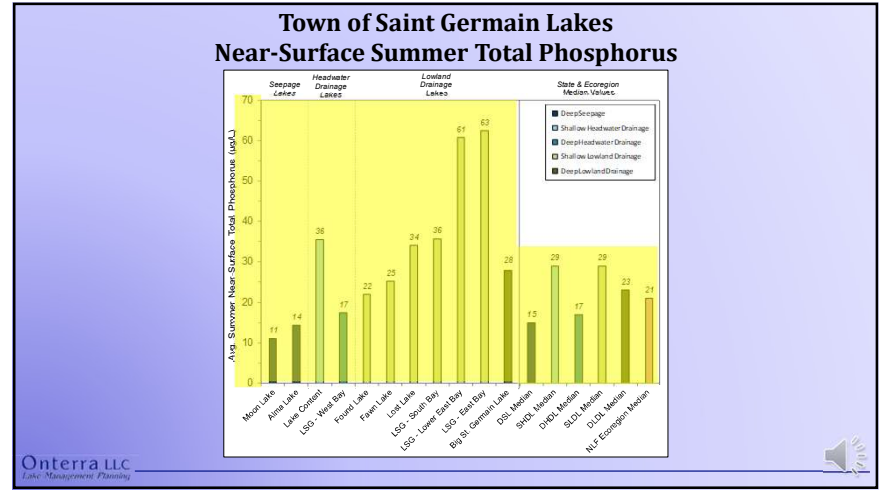
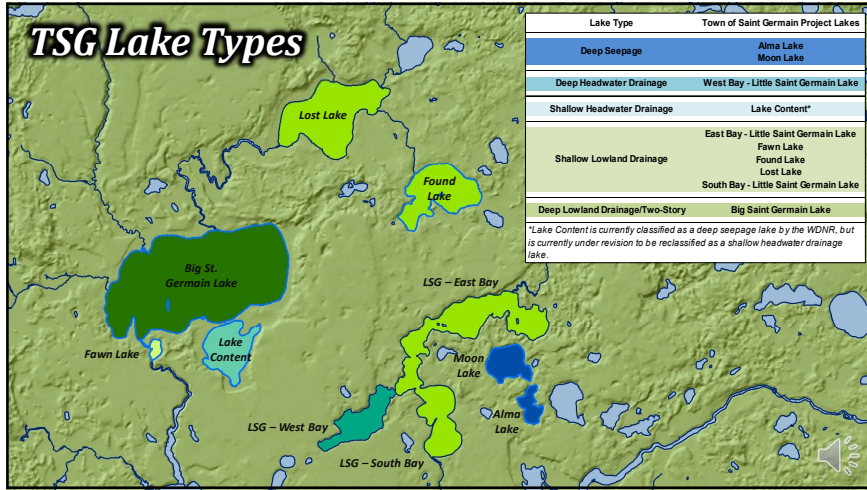
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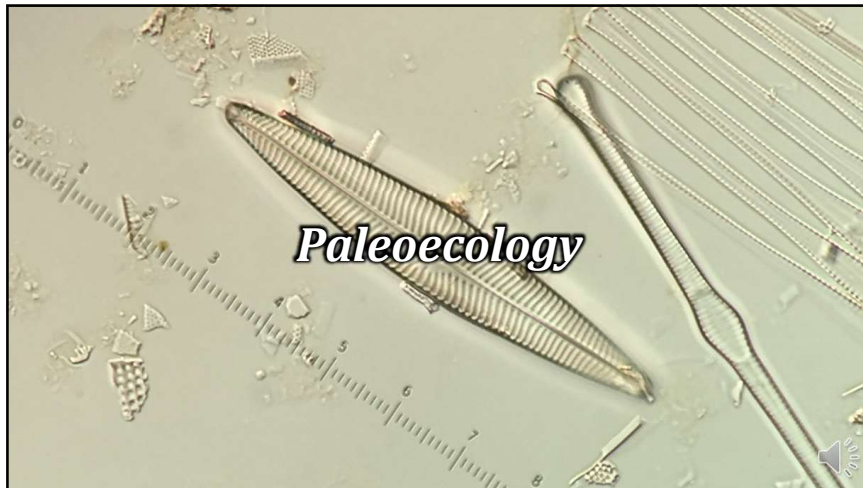
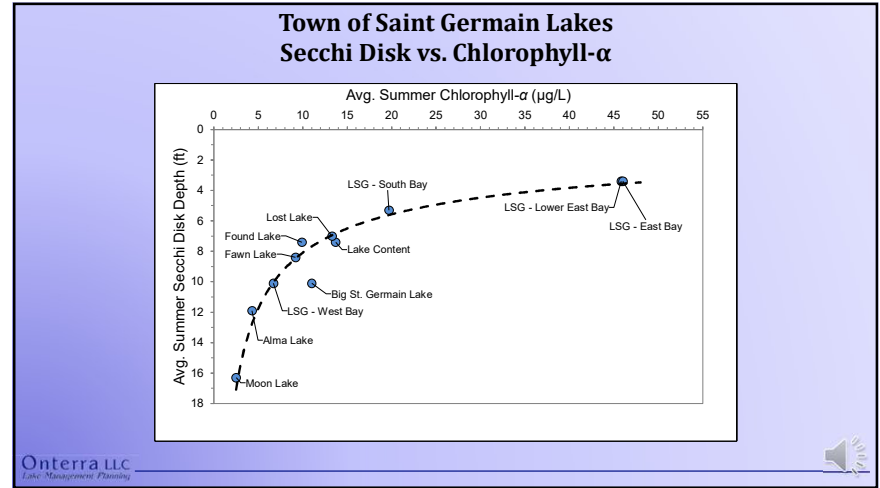
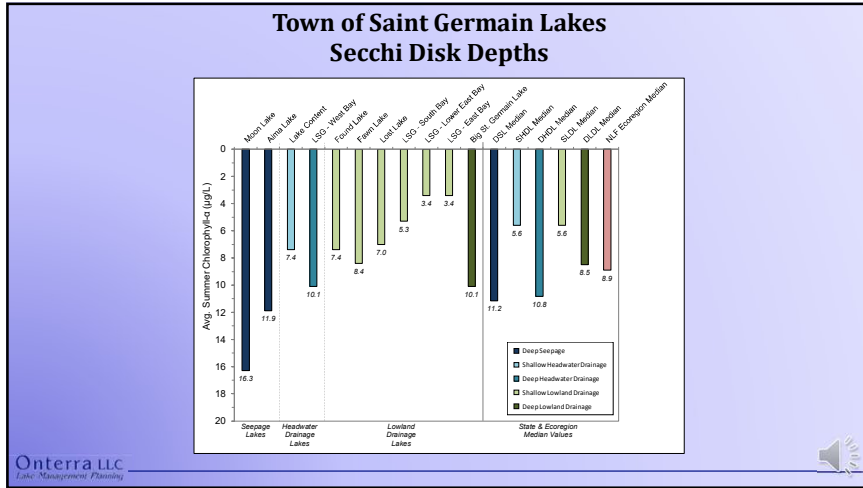
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↓ Secchi Disk Transparency

Measure of water clarity
Measured using a Secchi disk


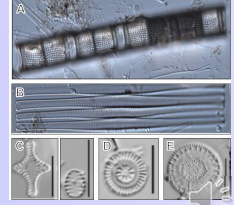


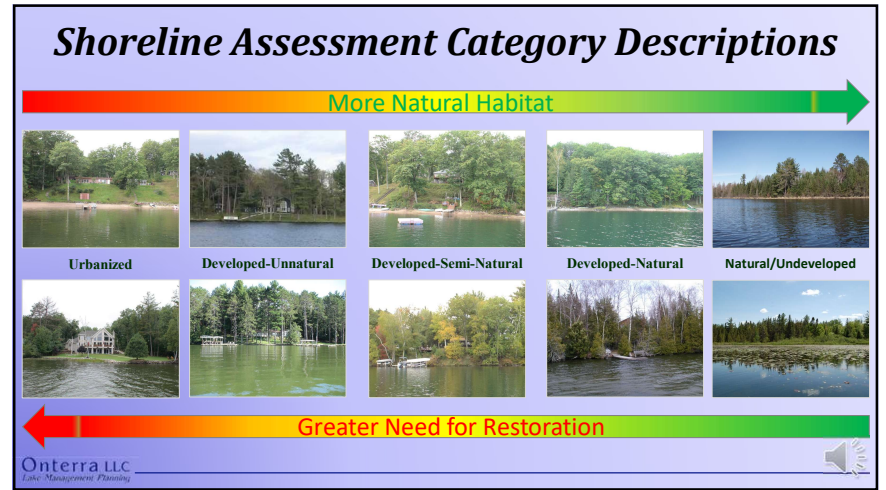
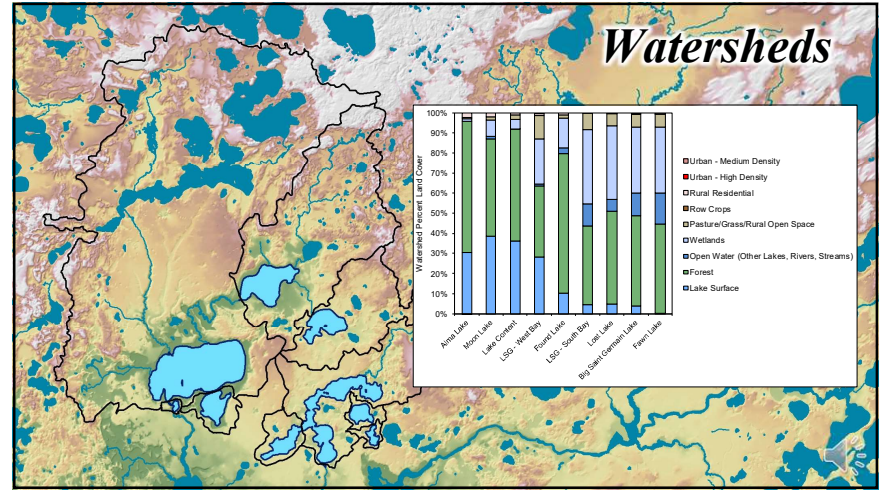
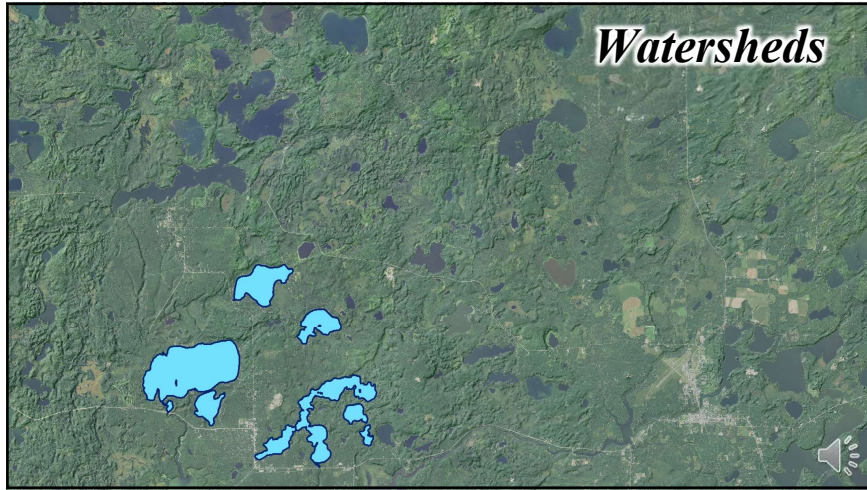




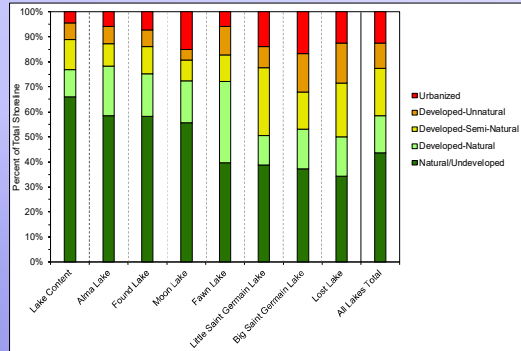
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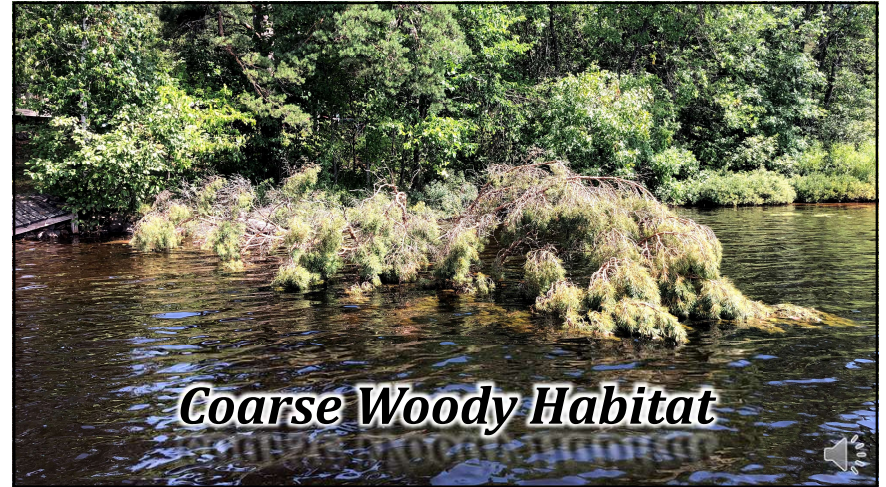





Town of Saint Germain Lakes Shoreland Condition



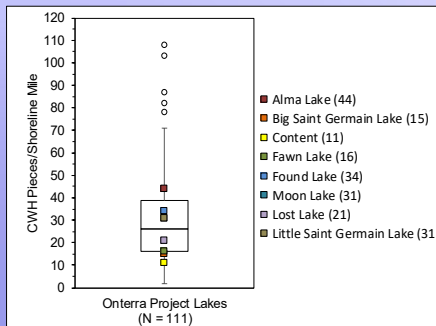
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Coarse Woody Habitat



Town of Saint Germain Lakes Coarse Woody Habitat



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Management Goal:

Protect & Enhance Current Water Quality Conditions

Management Actions

1. Continue and expand monitoring of Town of Saint Germain lakes' water quality through the WDNR Citizens Lake Monitoring Network (CLMN) program.

Management Goal:

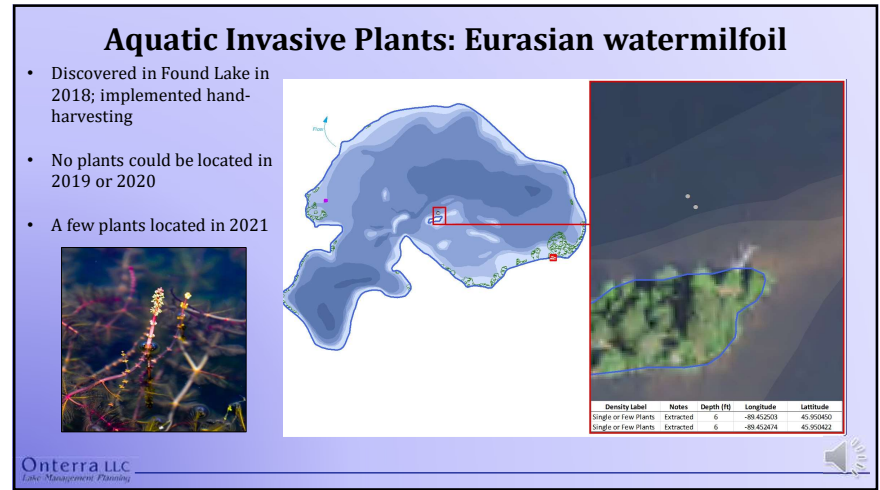
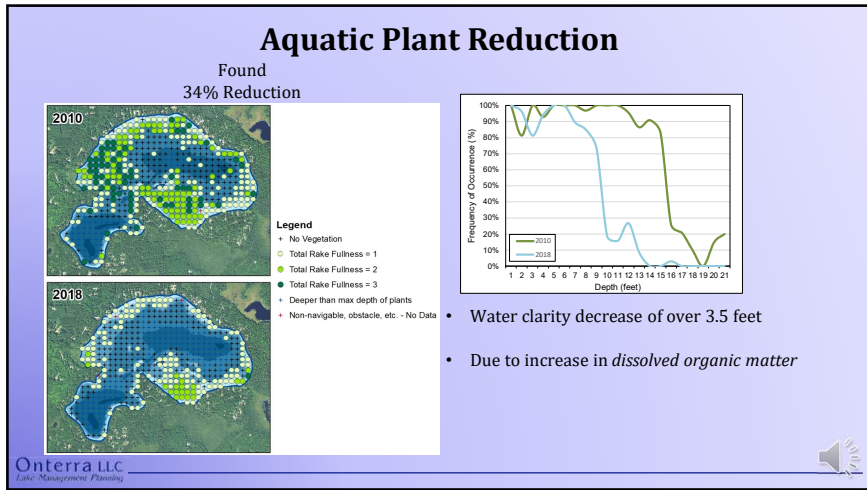
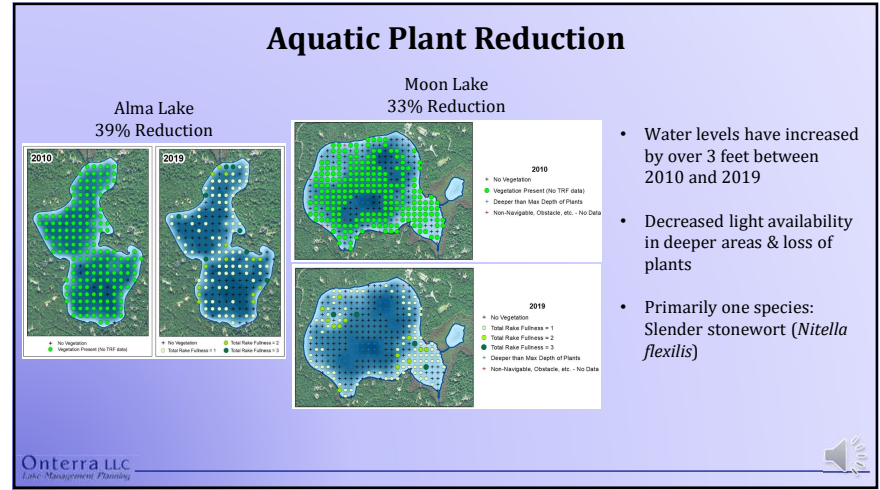
Reduce Phosphorus & Sediment Runoff from Immediate Shoreland Areas on the TSG Lakes

Management Actions

1. Conserve undeveloped and restore highly developed shoreland areas on the Town of Saint Germain lakes to protect and enhance habitat, reduce erosion, and protect water quality.

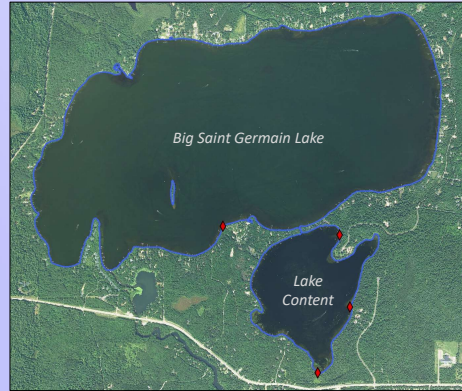
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Aquatic Invasive Plants: Narrow-leaved cattail

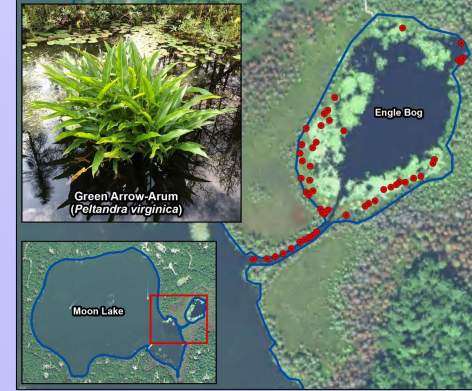
- Small colonies found on Big Saint Germain & Lake Content in 2019



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Aquatic Invasive Plants: Green Arrow-Arum

- Clumps and colonies found around edge of Engle Bog in 2019
- Ongoing debate as to whether or not this species is considered native or not



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Management Goal:

Actively Manage Existing & Reduce the Likelihood of Future Aquatic Invasive Species Introductions in the TSG Lakes

Management Actions

1. Continue coordination of annual volunteer-based and periodic professional-based monitoring for aquatic invasive species in the Town of Saint Germain Lakes.
2. Initiate aquatic invasive species rapid response plan upon discovery of a new infestation.
3. Continue Clean Boats Clean Waters watercraft inspections and education at Town of Saint Germain Lakes' public access locations.
4. Monitor and control narrow-leaved cattail on Big Saint Germain Lake and Lake Content

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Management Goal:

Protect Native Aquatic Plant Communities in the TSG Lakes

Management Actions

1. Coordinate periodic, quantitative aquatic plant monitoring on the Town of Saint Germain Lakes.

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Management Goal:
Continue and Expand Awareness and Education of Lake Management, Stewardship, and Navigational Safety Matters to Town of Saint Germain Riparians and General Public

Management Actions

1. The Town of Saint Germain Lakes Committee will continue to promote stakeholder involvement and inform stakeholders of various lake issues as well as the quality of life on the Town of Saint Germain Lakes.

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Management Goal:
Conserve and Enhance the Town of Saint Germain Lakes as a Fishery Resource

Management Actions

1. Develop a fisheries management plan for the Town of Saint Germain Lakes.

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Management Goal:
Work with Local Governmental Agencies to Increase Enforcement of Existing State, County, and Town Boating, Fishing, and Shoreland Development/Disturbance Laws on the Town of Saint Germain Lakes

Management Actions

1. Meet with the local WDNR Warden Supervisor to develop a plan for increasing State Boat Patrol presence on the Town of Saint Germain Lakes.
2. Meet with Vilas County Zoning to discuss methods for detecting and responding to shoreland development/disturbance violations.
3. Meeting with Town of Saint Germain Board to discuss what role town government might play in increasing law enforcement presence on the TSG lakes.

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Thank You

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