

Lake Shoreland & Shallows Habitat Survey

Spider Chain of Lakes

Sawyer County Wisconsin

July, 2020

Sponsored by the Spider Chain of Lakes Association and the Wisconsin Dept. of Natural Resources

Field data collected by Bay Area Environmental Consulting, Washburn, WI and analyzed/mapped by Ecological Integrity Service, Amery, WI

Table of Contents

Introduction	4
Methods	4
Riparian zone.....	4
Bank zone.....	6
Littoral zone.....	8
Coarse woody habitat inventory	11
Results	12
Riparian zone data.....	12
Bank zone data	13
Littoral zone data.....	13
Maps for management (each lake in each section)	15
Tree canopy	15
Ground cover-shrub/herbaceous.....	18
Ground cover-impervious surfaces	21
Ground cover-manicured lawn.....	24
Ground cover-agriculture	27
Ground cover-other (duff, mulch, etc)	28
Riparian structures-buildings	31
Modified bank-vertical sea wall.....	34
Runoff concern-point source	36
Runoff concern-channelized flow.....	36
Runoff potential-stair/path/road to lake	39
Runoff potential-lawn/soil slopes to lake.....	42
Runoff potential-bare soil.....	45
Bank modification-rip rap	48
Bank modification-artificial beach.....	51
Bank erosion > 1 foot face	53
Bank erosion < 1 foot face	55
Aquatic plants-emergent plants present.....	58
Aquatic plants-floating plants present.....	61
Other maps	64
Riparian zone boats on the shore	64
Riparian zone number of fire pits.....	67
Littoral zone-number of piers.....	70
Littoral zone-number of boat lifts	73

Littoral zone-number of swim rafts/trampolines.....	76
Littoral zone-boat houses.....	79
Invasive species observed	81
Coarse woody habitat inventory maps	82
Branches	82
In water	85
Touches shore	88
Segment number reference maps	91
Parcel ID number reference maps.....	95
Data.....	99

Introduction

In July, 2020 a lake shoreland and shallows habitat survey was conducted on the Spider Chain of Lakes (Clear Lake, Fawn Lake, North Lake and Spider (Big and Little) Lake). This survey followed the Wisconsin Dept of Natural Resources field protocol. The methodology involved surveying, assessing and mapping habitat in lakeshore areas which included the riparian zone, bank and littoral zone. The data collected include the following: percent tree cover, percent ground cover by type (impervious surfaces, manicured lawns, and natural), erosion concerns, length of modified banks, density of human structures, presence of floating/emergent plants and coarse woody habitat. This data will provide information to help manage the Spider Chain of Lake. The data is presented as an overview of each lake, followed by maps showing the presence and magnitude of various categories.

Methods¹

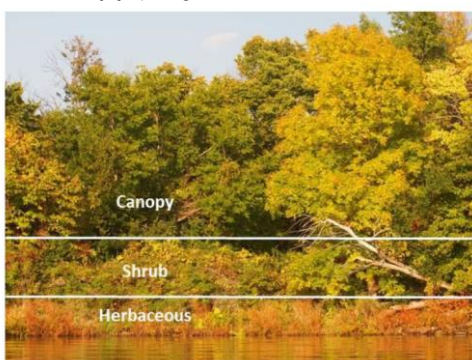
The assessment boundary included the riparian zone (from ordinary high-water level in 35 feet), the bank, and the littoral zone (area with plants). Each zone was evaluated for specific data, which is separated by zone or category. (Note: all lakes were observed to be at the ordinary high-water level).

Riparian zone:

The riparian zone was estimated in 35 feet from the ordinary high-water mark and was evaluated horizontally along the shore for the entire parcel. GPS coordinates marked the corners of the parcel and the position of the boat was used as a position reference.

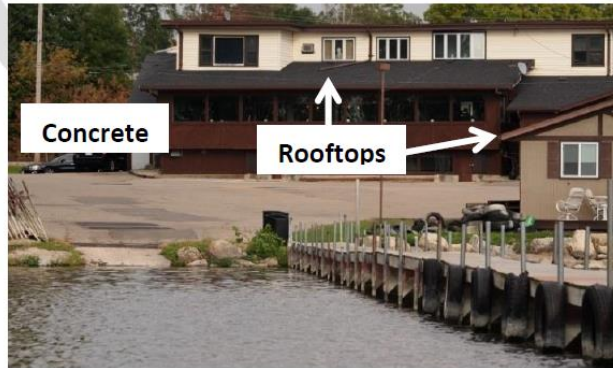


1. The canopy (large trees at least 16 feet tall) cover was estimated by percent cover (0-100%).



¹ The methods used and all pictures in methods were obtained from the *Lake Shorelands and Shallow Habitat Monitoring Field Protocol*. Wisconsin Department of Natural Resources. May 2016.

2. Ground layer coverage (by % which add to 100%). The different types include:
 - a. Shrubs and herbaceous plants (shrubs are woody plants with multiple stems or tree saplings < 16 feet tall and herbaceous plants are grasses and forbs).
 - b. Impervious surfaces (water won't infiltrate into soil) which include concrete, decking, boulders, stone, rip rap, rooftops, compacted gravel/soil and flipped over boats near shore.



- c. Manicured lawn.
- d. Agriculture such as row crops, pasture, range and/or hayfields.



- e. Other which could include duff, bedrock, gravel, bare soil, sand, mulch, etc.

Plants were only quantified in terms of their growth form and not their taxonomy. This includes invasive species which are included in with the native plants for percent cover.

3. Human structures in the riparian zone.
 - a. The number of structures that were present within the riparian zone was counted. These include buildings, boats, fire pits, and any other objects that are not easily moved.



4. Runoff concerns

- a. Changes that could increase runoff were evaluated. The runoff concerns were identified as within the riparian zone or within the parcel, but outside of the riparian zone. These changes may have included culverts, drain pipes, rain gutters, sump pumps, gray water outflow, channelized flow gullies, stairways, trails, sloped lawn, bare soil, sand/silt deposits or any other observed concerns.



Bank zone:

The bank zone (space between ordinary high-water mark and present water level (at time of survey) was evaluated for bank modification and erosion. The length of any modifications and/or erosion was estimated to the nearest 10 feet. These modifications could include:

- 1. Vertical sea wall



2. Rip rap



3. Other erosion control features



4. Artificial beach



5. Slumping banks/erosion of banks > one foot bank face



6. Slumping banks/erosion of banks < one foot bank face



Littoral zone

The littoral zone was surveyed for human structures and aquatic plants. The aquatic plant evaluation was limited to recording if floating and/or emergent plants were present within the littoral zone and if there was evidence of aquatic plant removal within this zone.

The human structures could include:

1. Piers



2. Boat lifts



3. Swim rafts/water trampolines



4. Boat houses

5. Marinas



Aquatic vegetation:

1. Presence of emergent plants-plants that stick up beyond the water surface.
2. Presence of floating plants-leaves lay on surface of the water.



3. Evidence of aquatic plant removal.



Exposed Lake Bed Zone

When lake levels are low and exposed at least three horizontal feet of the lake bed, these areas were evaluated. Since water levels were not low, there were no areas observed with exposed lake beds.

Coarse Woody Habitat Inventory

In this portion of the survey, any “large wood” (defined as greater than 4 inches in diameter and at least 5 feet long). GPS coordinates were recorded for any piece of large wood that was between the ordinary high-water level and 2 feet in water depth. Only dead or alive natural wood (trees) was counted. (Note: Secchi depth needs to be greater than 2ft to record coarse woody habitat. This threshold was met in each lake.)



Each coarse woody habitat recorded was evaluated with a ranking as follows:

- “0” = no branched on the wood
- “1” = a few branches
- “2” = tree trunk was a full crown.

Each coarse woody habitat wood was also evaluated in terms of touching the shore. A “0” was recorded if the log did not cross the high-water level and thus not coming out of the water to the shore. A “1” was recorded if the wood did cross the high-water level and came out of the water and touched the shore. The coarse woody habitat was also evaluated in terms of in water. It was given a “1” if at least 5 feet of the log is under the water, and a “0” if less than 5 feet of log is under the water.



Results²

The shoreland survey data set is very large. To summarize each lake, the mean values for all parcels on a particular lake are listed. It is important to keep in mind that these data do not account for size of the parcels, but are simply means for all parcels. For this reason, some values could be somewhat misleading. For example, a small parcel may have a large lawn, leading to a large % ground cover by manicured lawn. While another parcel may have the same size lawn, but because the parcel is large, the % ground cover by manicured lawn will be smaller. However, in order to summarize the parcels in each lake, it should reflect a fairly accurate comparison for the lakes in the Spider Lake Chain.

Maps of each data set are also presented. This will allow for identifying parcels of concern to help mitigate nutrient loading.

Riparian zone data

Tree cover:

Lake	Mean canopy cover (%)
Clear Lake	75.1
Fawn Lake	60.8
North Lake	60
Spider (Big) Lake	78.3
Spider (Little) Lake	75.1

Ground cover:

Lake	Mean % Shrub/herbaceous cover	Mean % Impervious cover	Mean % manicured lawn cover	Mean % agriculture cover	Mean % other (includes duff, soil, mulch)
Clear Lake	71	3	17.3	0	8.7
Fawn Lake	85	3.1	10	1.1	0.8
North Lake	82.3	5.4	4.6	0	7.7
Spider (Big) Lake	65.3	5.6	6.5	0.3	22.3
Spider (Little) Lake	68.8	3.2	14.5	0	13.3

Human structures:

Lake	Mean buildings/parcel	Mean boats on shore/parcel	Mean fire pits/parcel
Clear Lake	0.21	1.09	0.26
Fawn Lake	0.08	0.62	0.15
North Lake	0.69	2.3	0.15
Spider (Big) Lake	0.37	1.5	0.09
Spider (Little) Lake	0.7	1.51	0.24

² Some parcels are quite large therefore maps may be misleading as it may appear the entire segment has structures or other human activity when in reality it is only a small segment of the entire parcel segment.

Runoff concerns:

Lake	% of parcels with point source runoff observed	% of parcels with channelized flow/gully observed	% of parcels with stair/path/road to lake observed	% of parcels with lawn/bare soil sloping to the lake	% of parcels with bare soil present	% of parcels with Sand/silt deposits
Clear Lake	0.0	0.0	60.5	32.6	9.3	0.0
Fawn Lake	0.0	7.7	46.2	23.1	23.1	0.0
North Lake	0	7.7	61.5	30.8	23.1	0.0
Spider (Big) Lake	0.86	3.45	68.1	31.9	17.2	0.0
Spider (Little) Lake	0.0	1.2	59.5	36.9	7.1	0.0

Bank Data

Modified banks/erosion evidence:

Lake	% of entire shore with vertical sea wall	% of entire shore with rip rap	% of entire shore with other erosion control structures	% of entire shore with artificial beach	% of entire shore with bank erosion >1ft face	% of entire shore with bank erosion <1ft face
Clear Lake	0.10	17.4	0.0	0.14	0.23	1.97
Fawn Lake	0.0	0.0	0.0	1.1	0.0	0.0
North Lake	0.0	5.9	0.0	0.0	0.0	1.21
Spider (Big) Lake	0.06	13.8	0.0	0.26	0.32	5.53
Spider (Little) Lake	1.17	12.7	0.0	0.33	0.54	4.19

Littoral zone data

Structures:

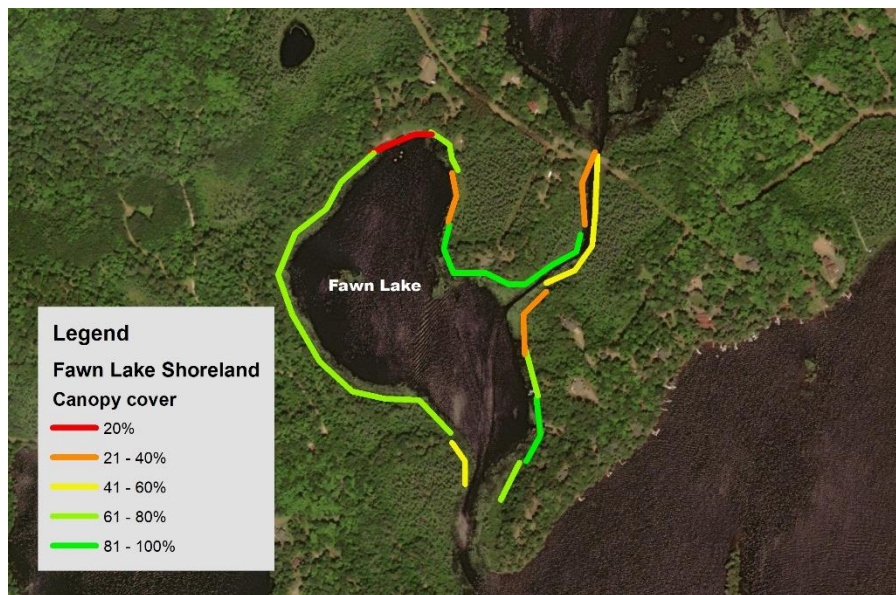
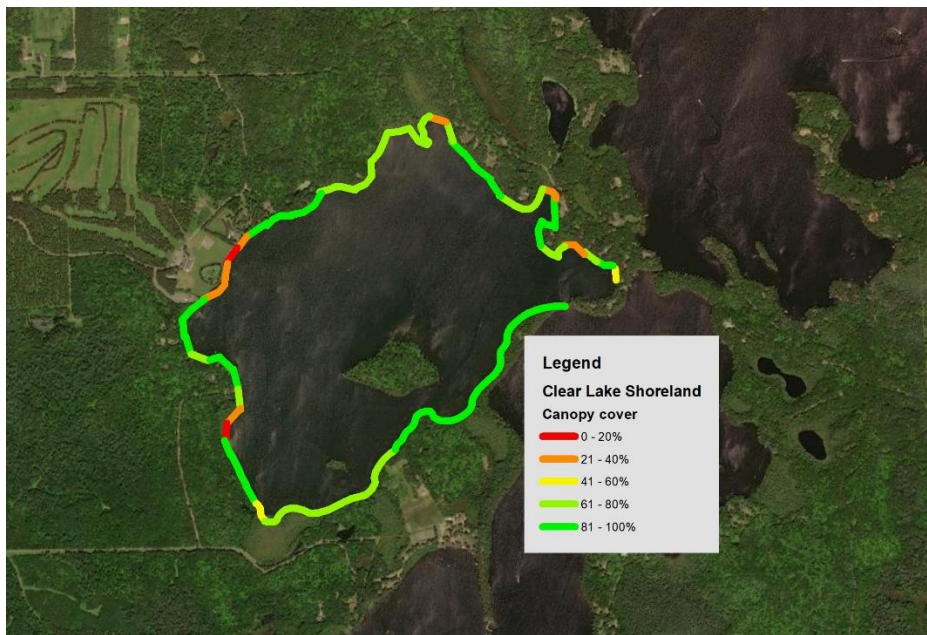
Lake	Mean number of Piers/parcels	Mean number of Boat Lifts/parcel	Mean number of Swim rafts/water trampolines/parcel	Mean number of Boathouses/parcels	Mean number of Marinas/parcel
Clear Lake	0.93	0.35	0.02	0.0	0.0
Fawn Lake	0.92	0.08	0.08	0.08	0.0
North Lake	2.0	1.15	0.0	0.0	0.0
Spider (Big) Lake	1.35	0.78	0.1	0.05	0.0
Spider (Little) Lake	2.68	0.68	0.35	0.12	0.0

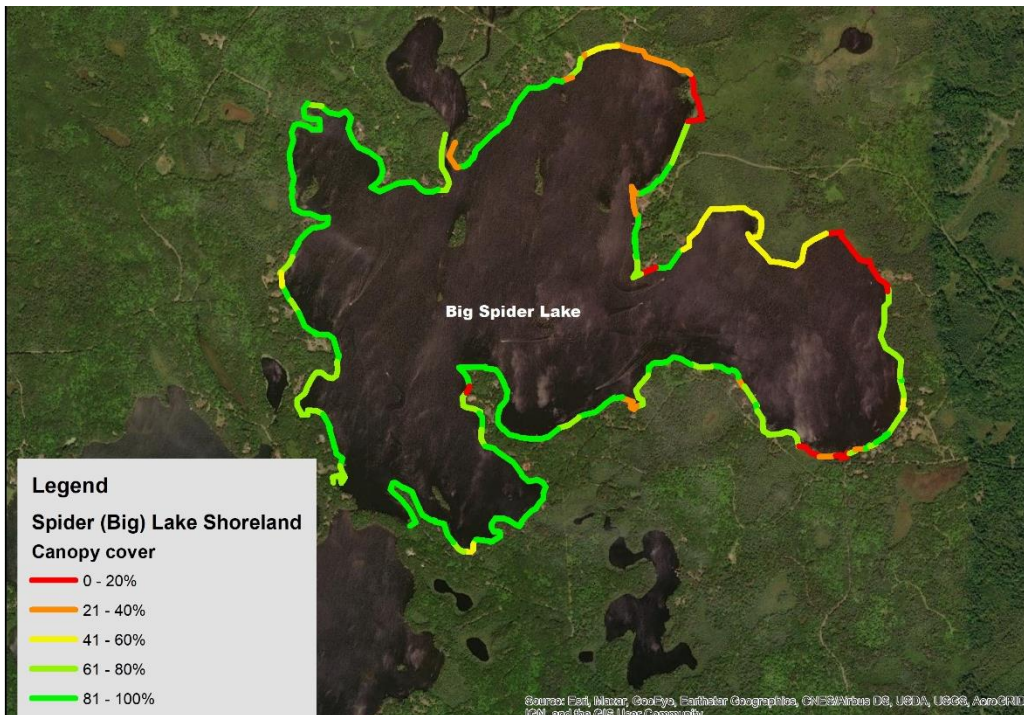
Aquatic plants:

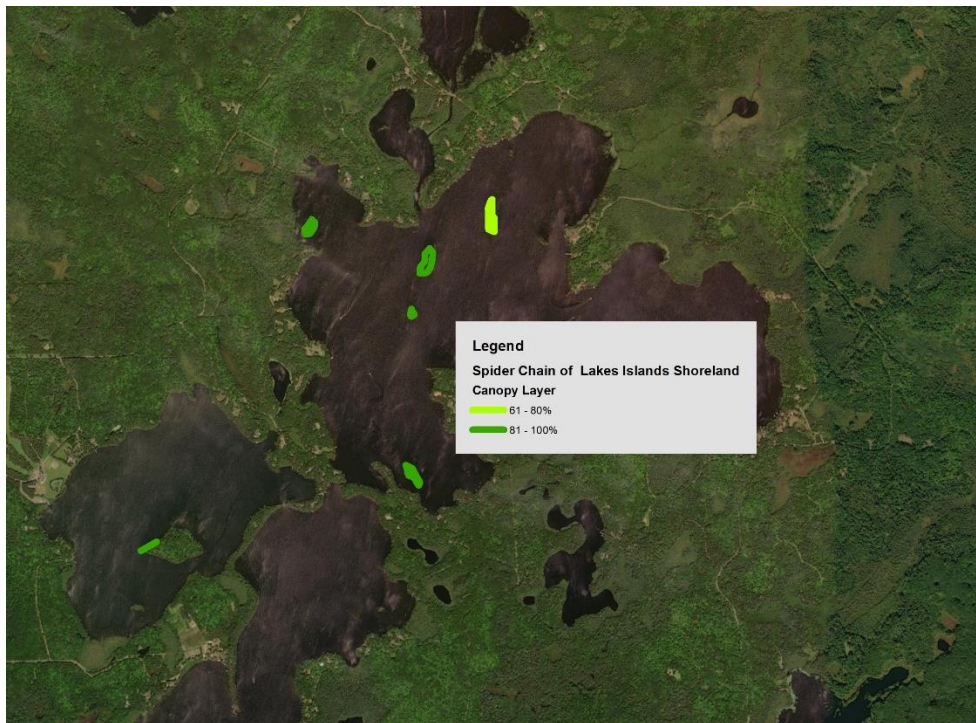
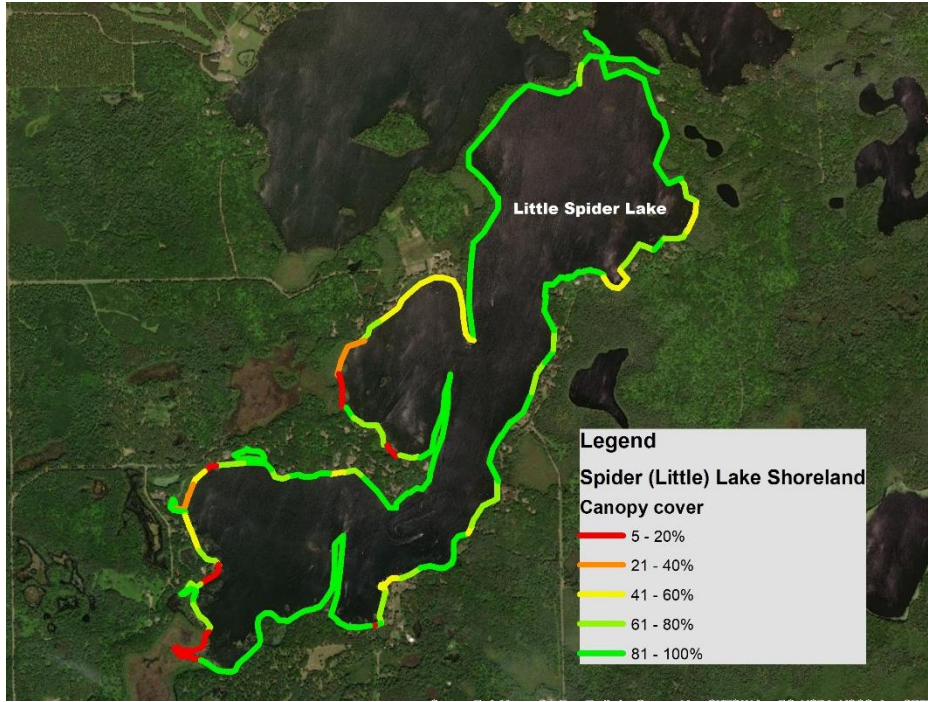
Lake	% of parcels with emergent plants observed	% of parcels with floating plants observed	% of parcels with evidence of Plant Removal
Clear Lake	62.8	90.7	0.0
Fawn Lake	100	100	0.0
North Lake	100	100	0.0
Spider (Big) Lake	43.1	71.6	0.0
Spider (Little) Lake	41.2	67.6	0.0

Maps that may help with management

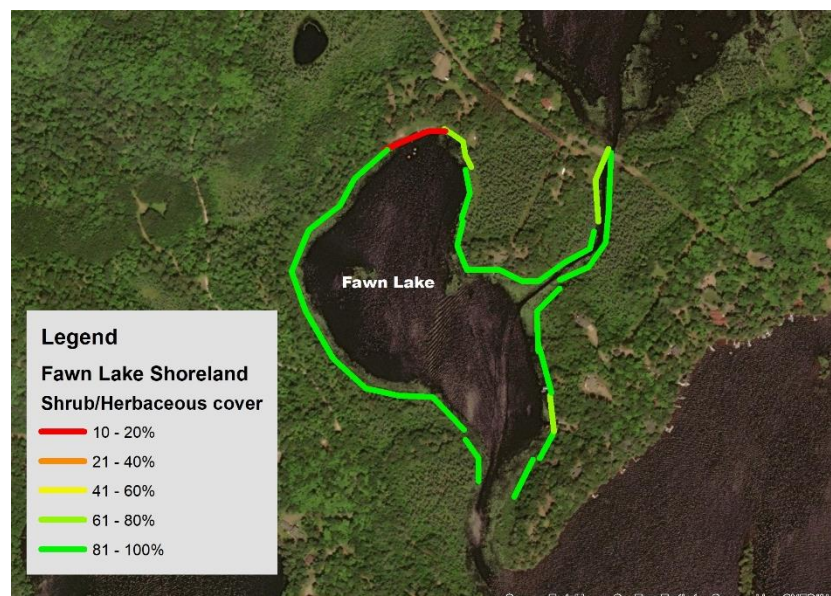
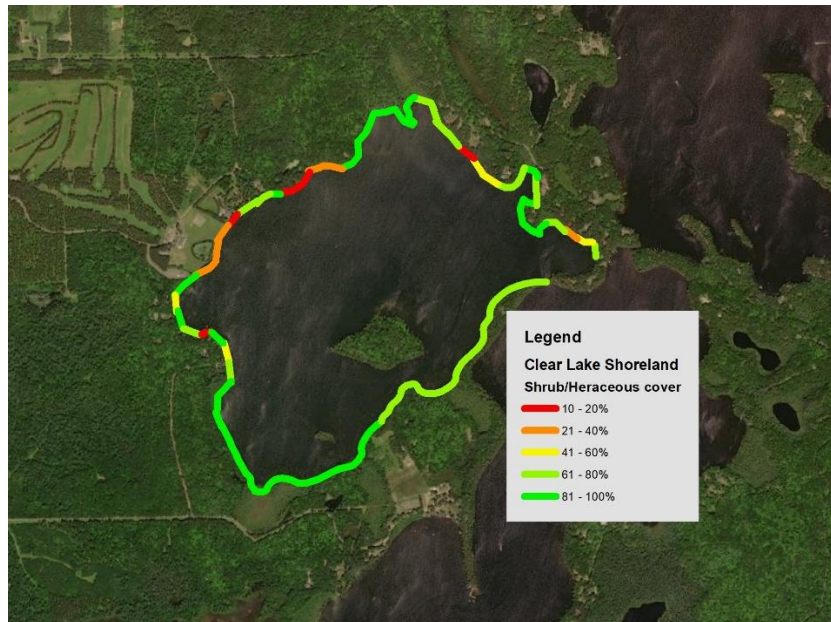
Tree Canopy (some parcels lack tree canopy due to being wetland/bog area):

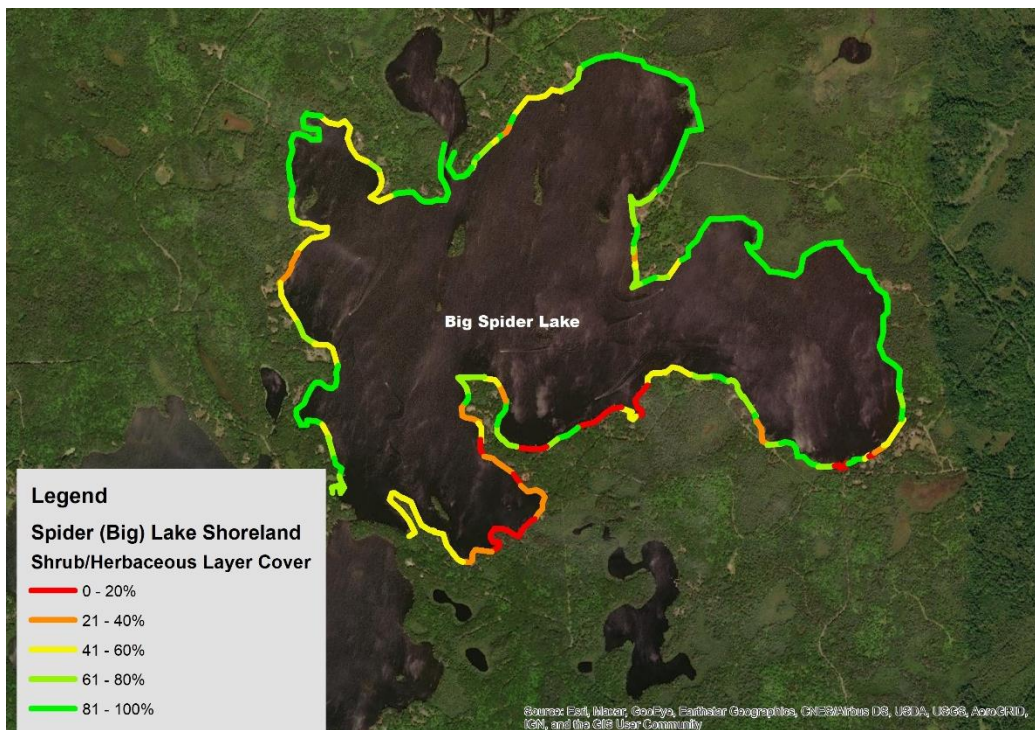


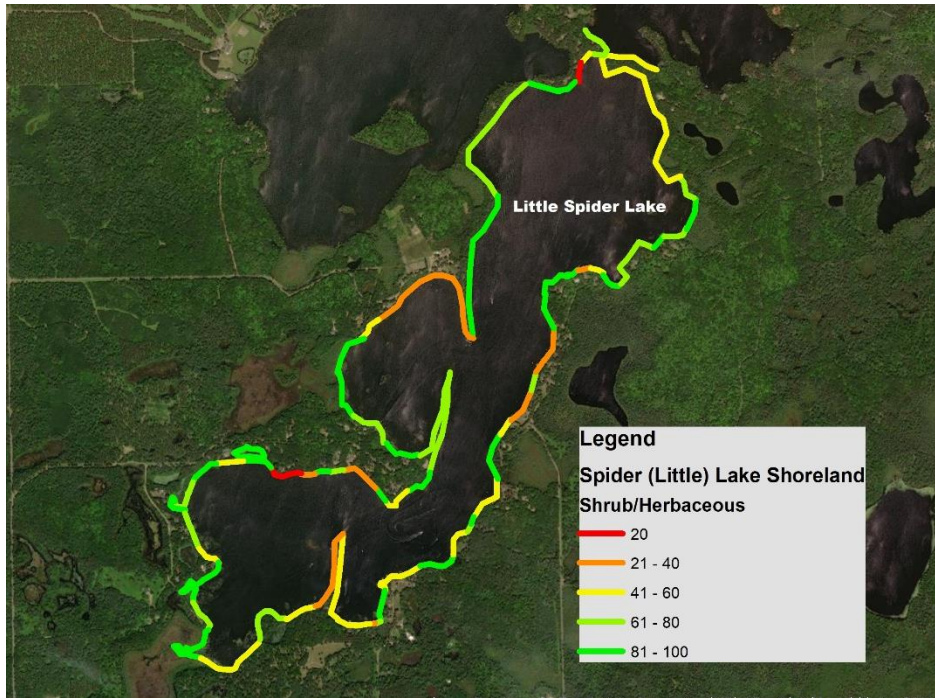




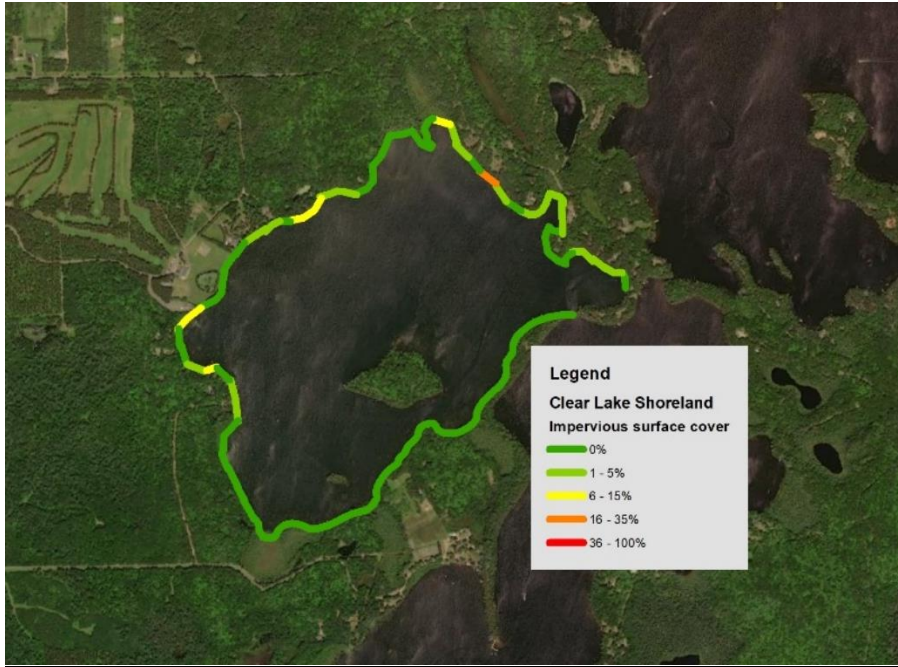
Ground cover-shrub/herbaceous by %:



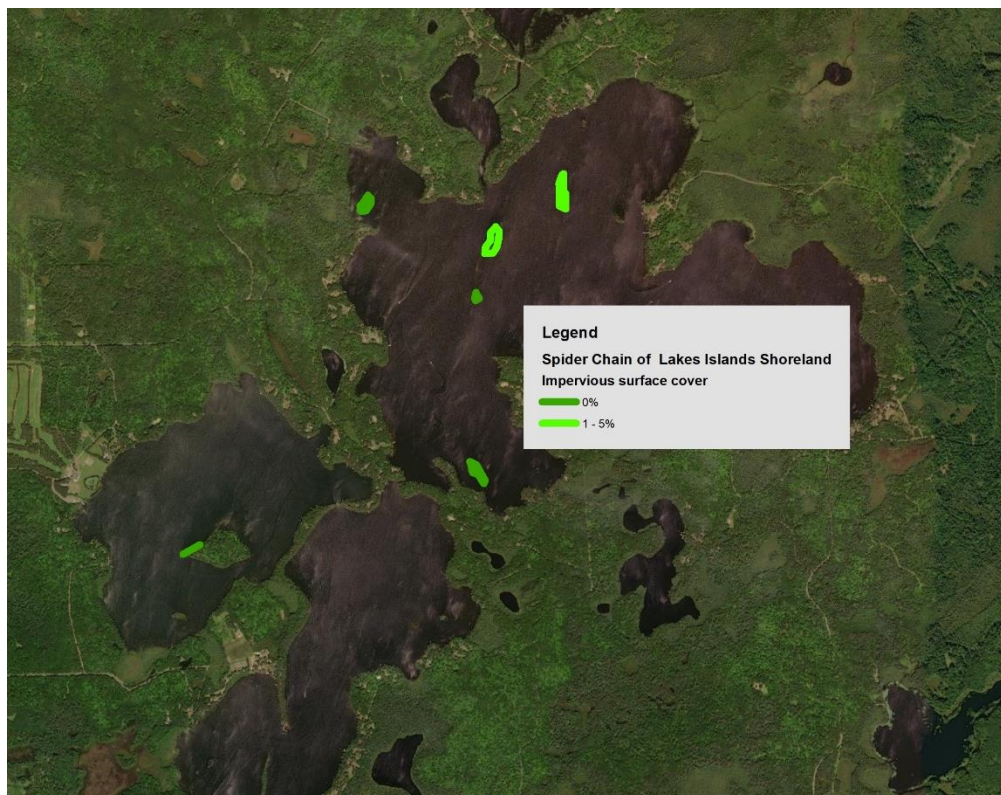
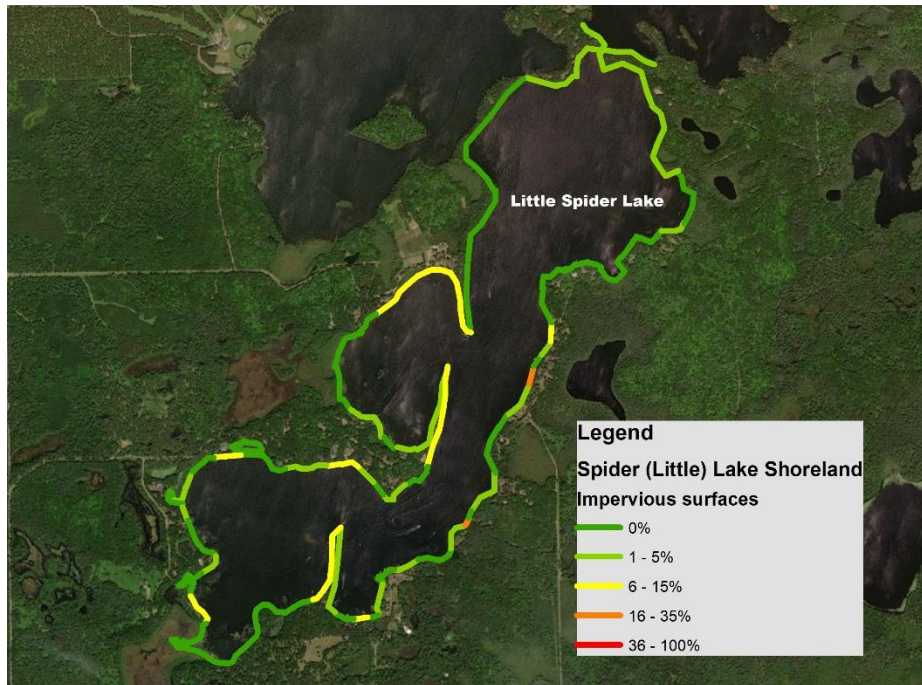




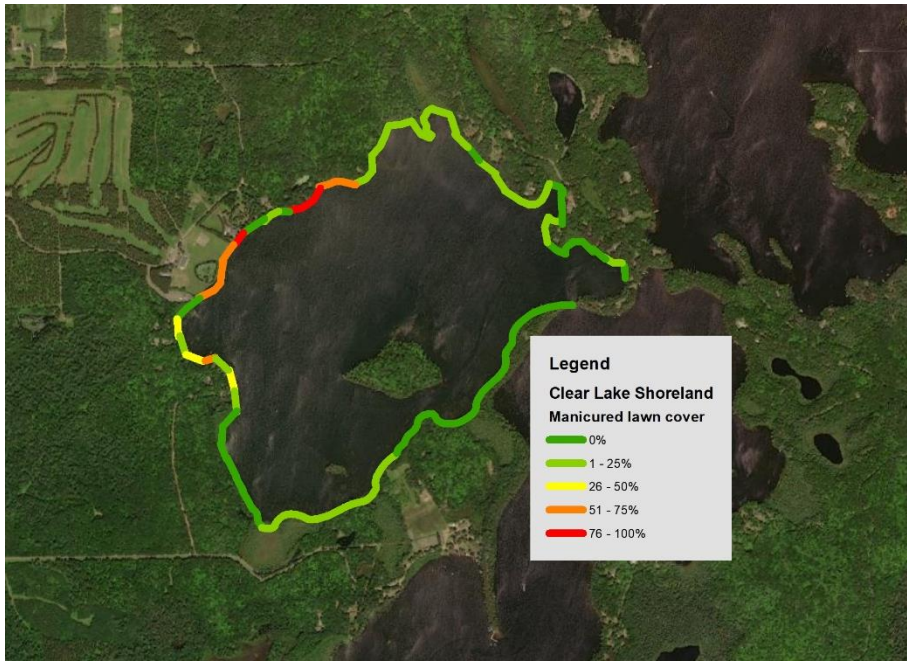
Ground cover-impervious surface by %:

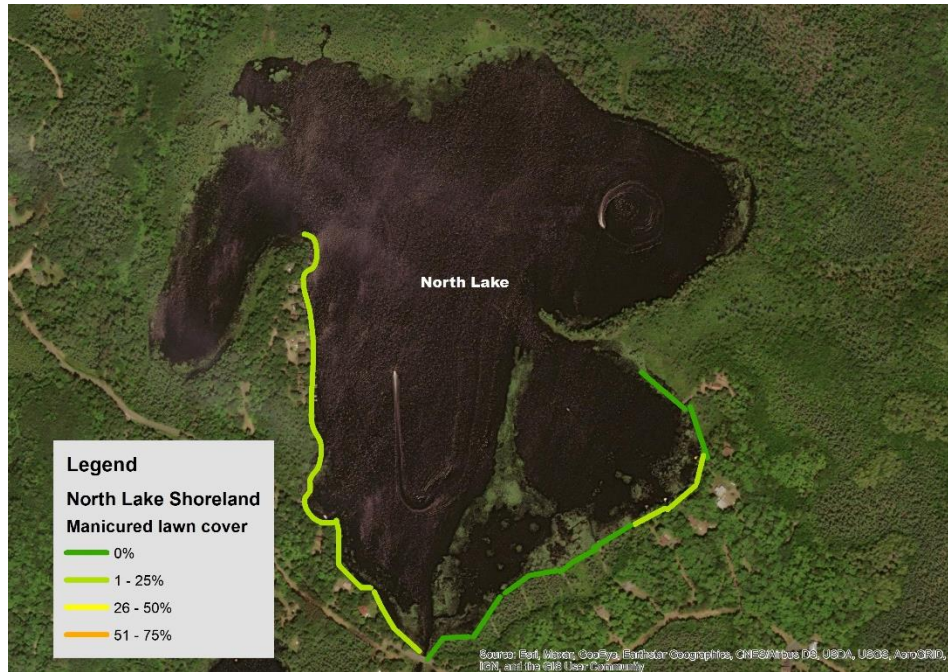


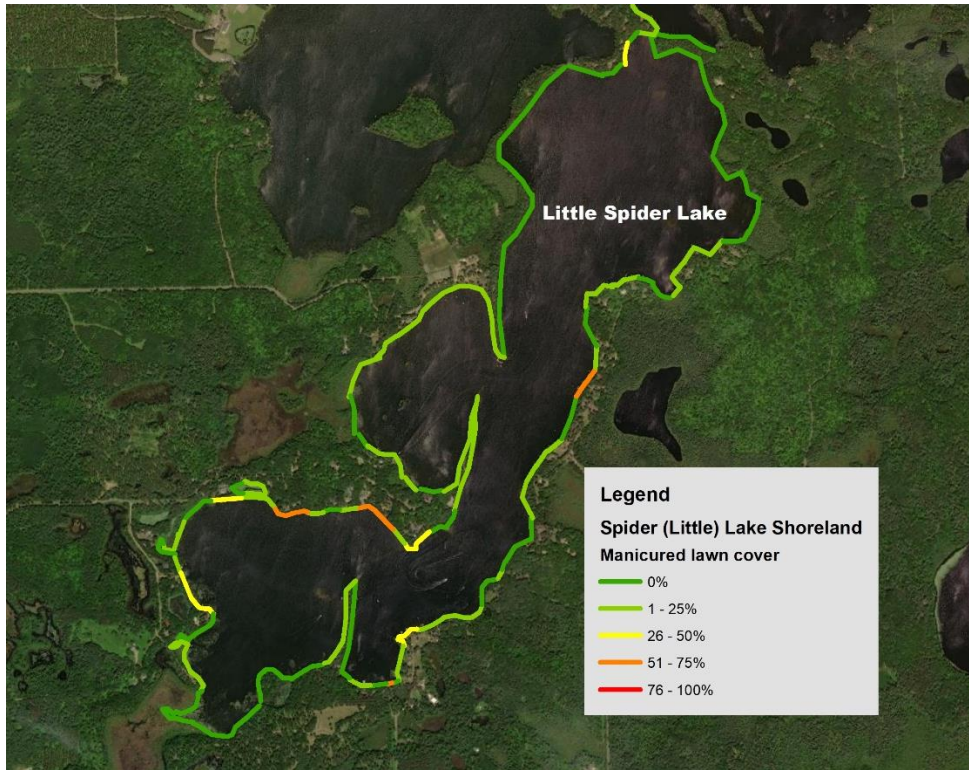




Ground cover-manicured lawn by %:







Ground cover-agriculture by %:

No agriculture ground cover for Clear Lake



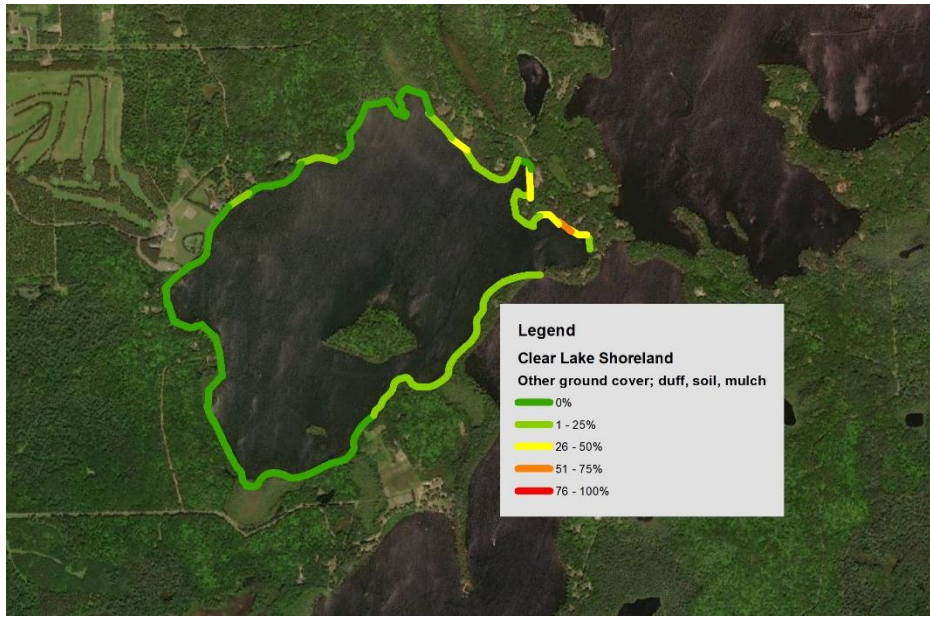
No agriculture ground cover for North Lake.

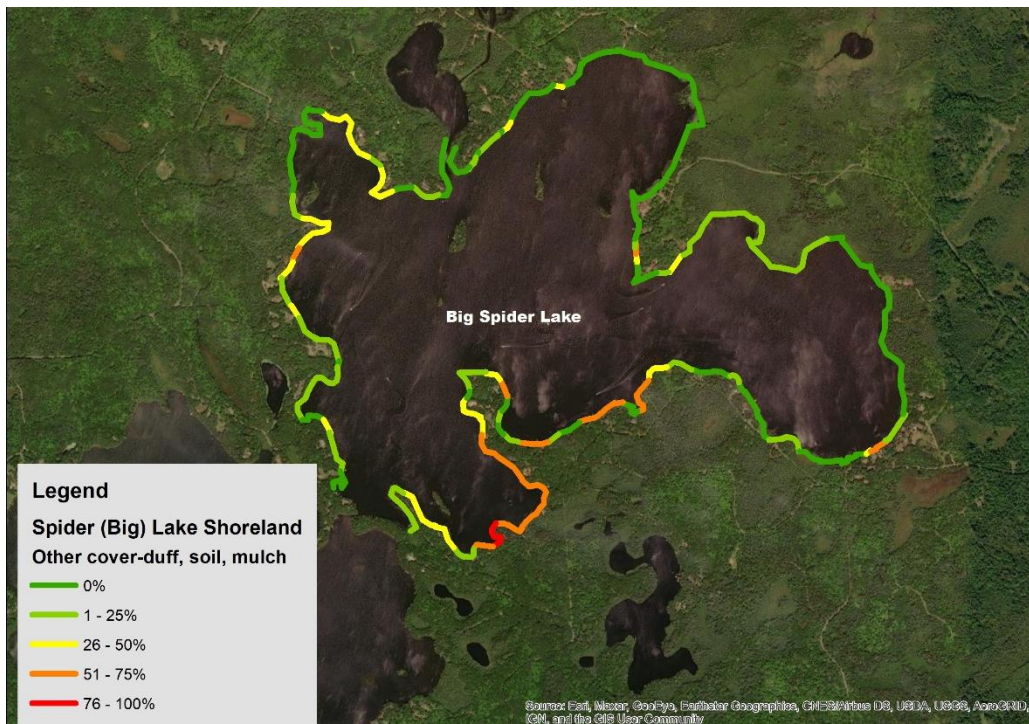


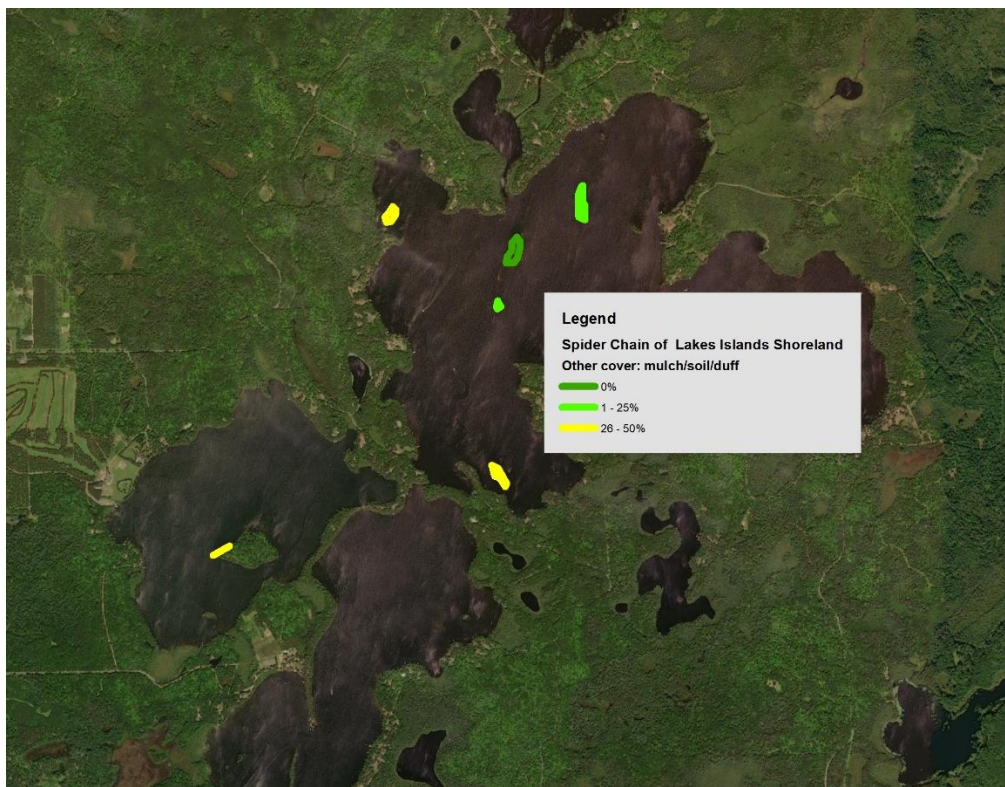
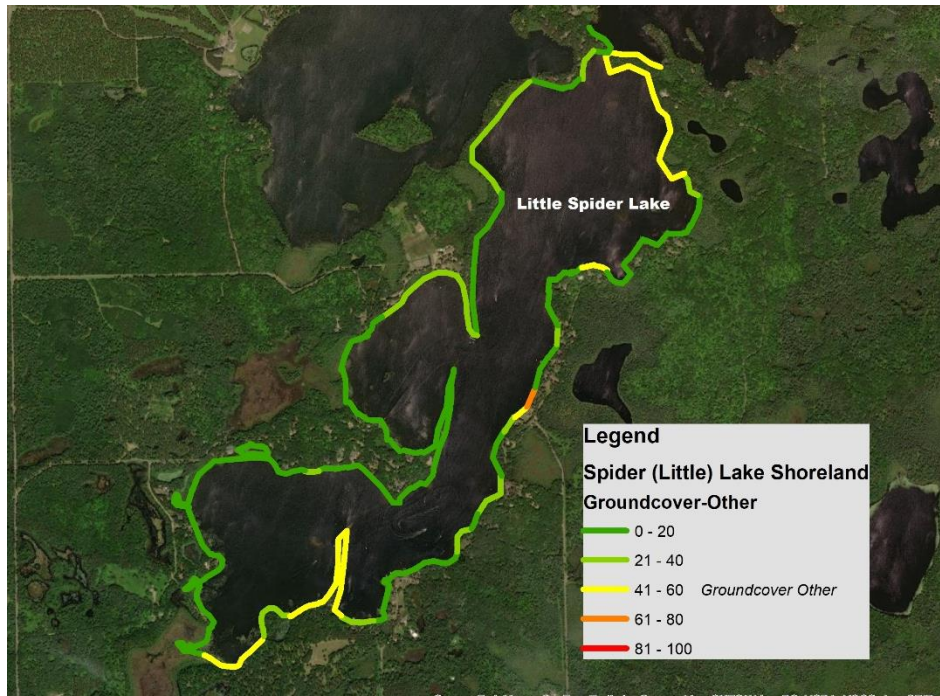
No agriculture ground cover on Spider (Little) Lake.

No agriculture ground cover on islands.

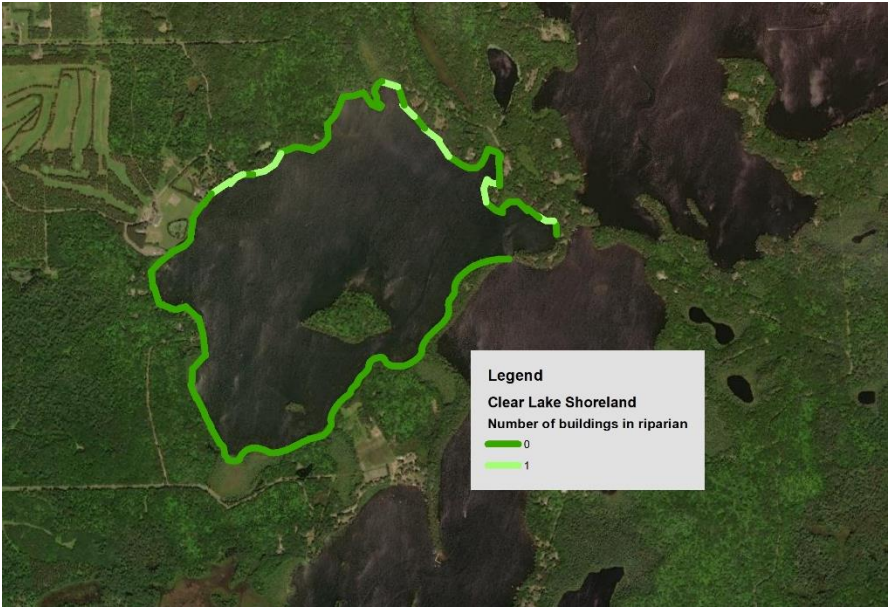
Ground cover-other (duff, soil, mulch, etc.):



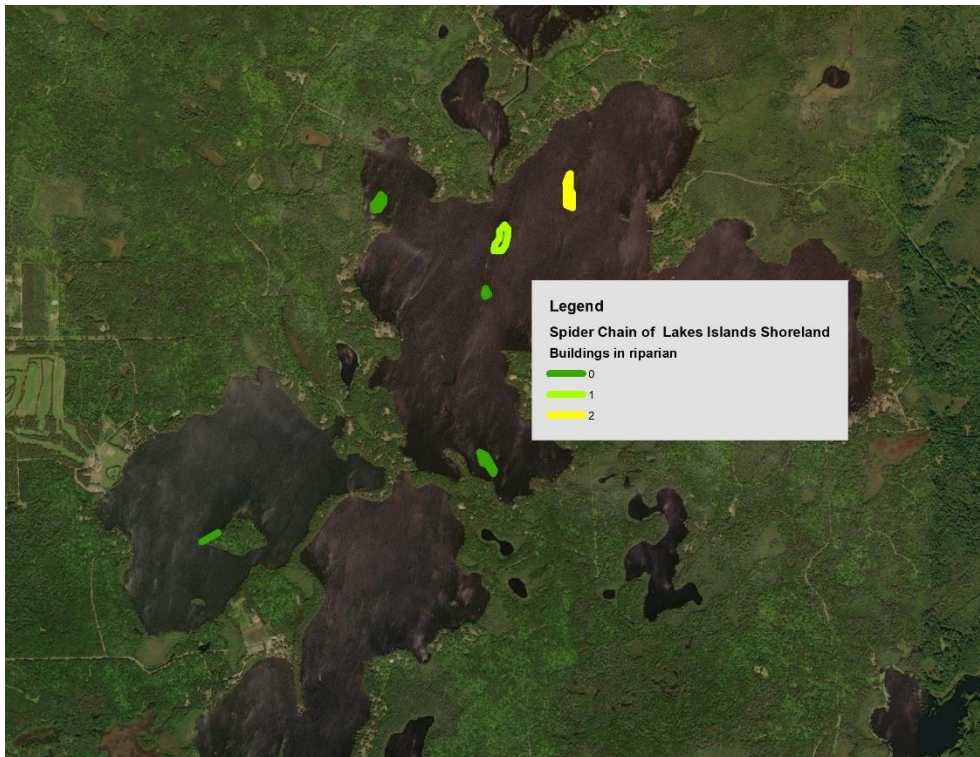
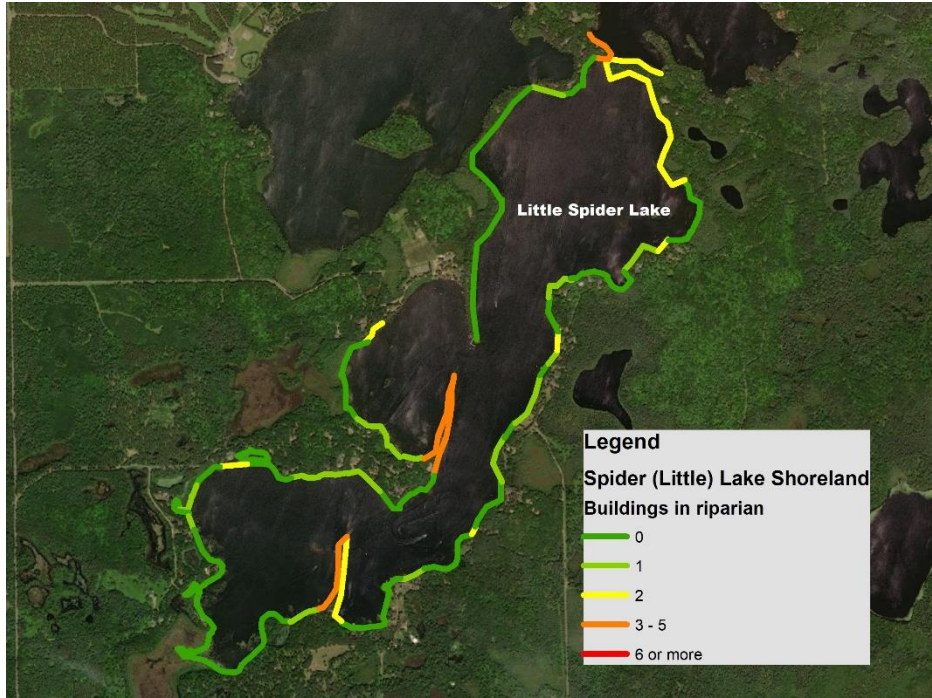




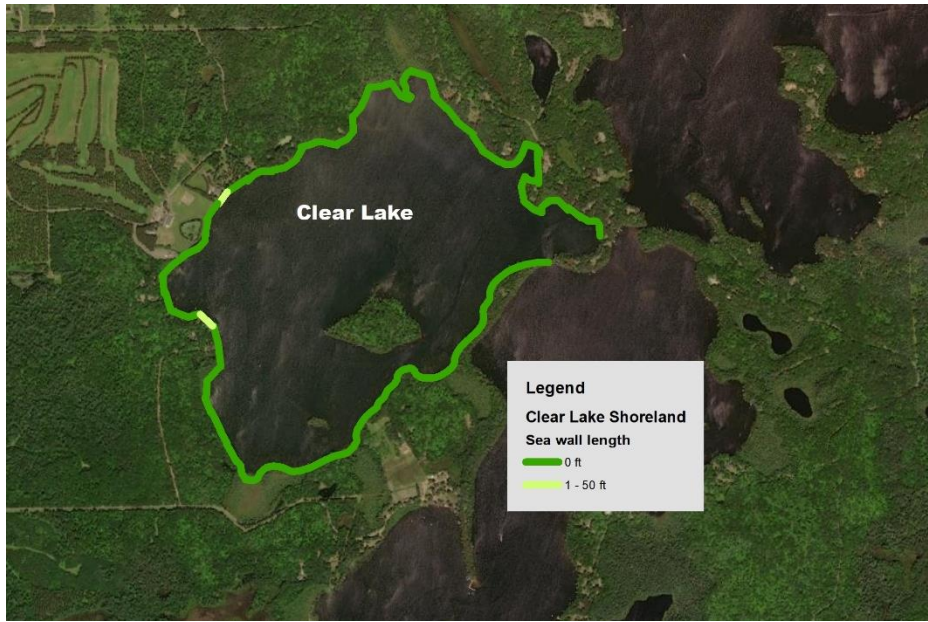
Human structures in riparian zone-buildings:





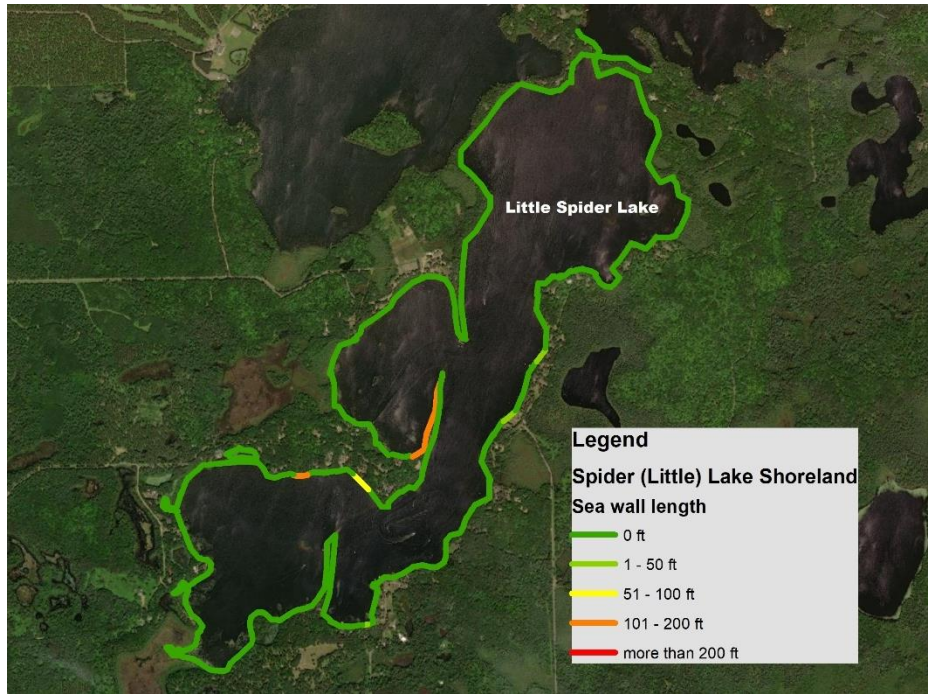


Modified banks-vertical sea wall by length:



Fawn Lake and North Lake have no vertical sea walls.





Runoff concerns-point source:

None observed in Fawn Lake, North Lake and Spider (Little) Lake or islands.



Runoff concerns-channelized flow observed:

None observed in Clear Lake.

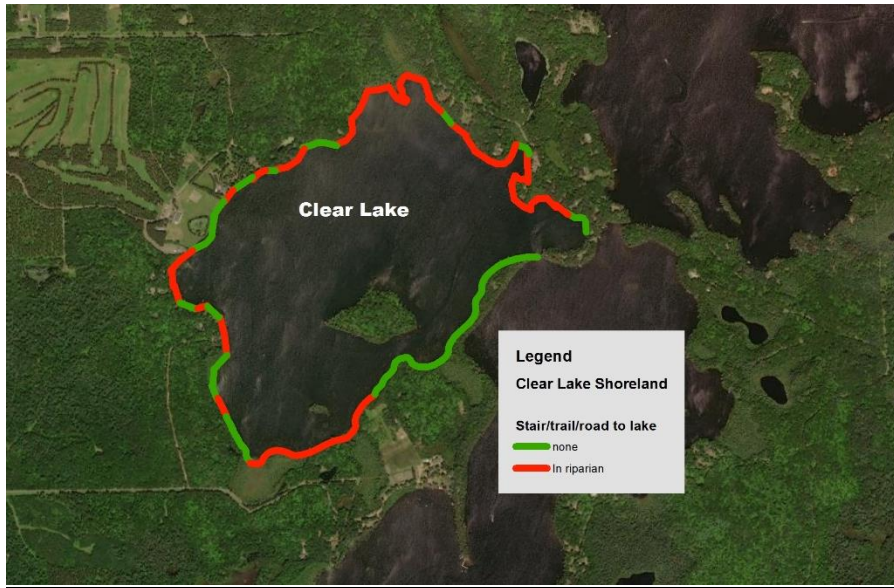






No channelized flow was observed on any islands.

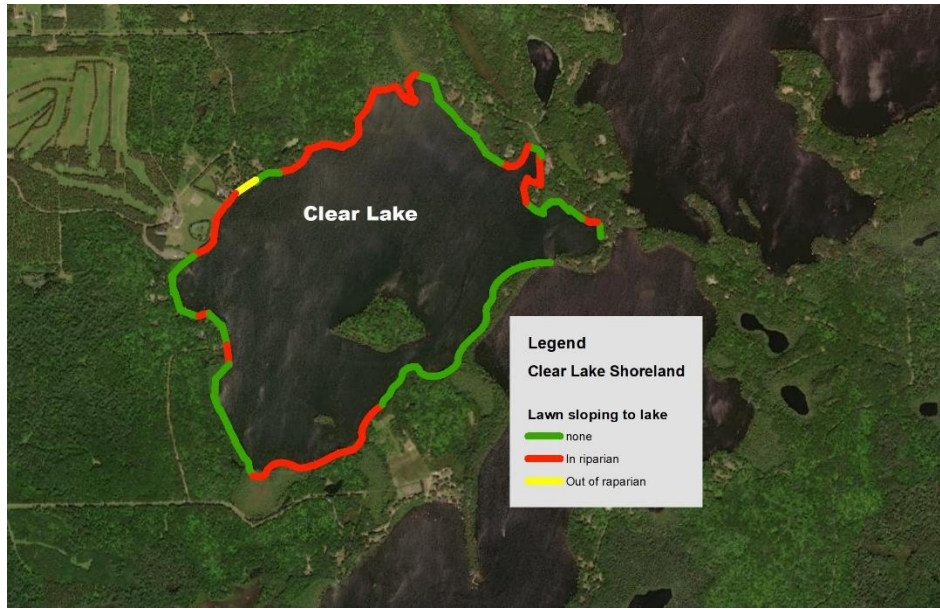
Runoff concerns-stair/path/road/walk to the lake:



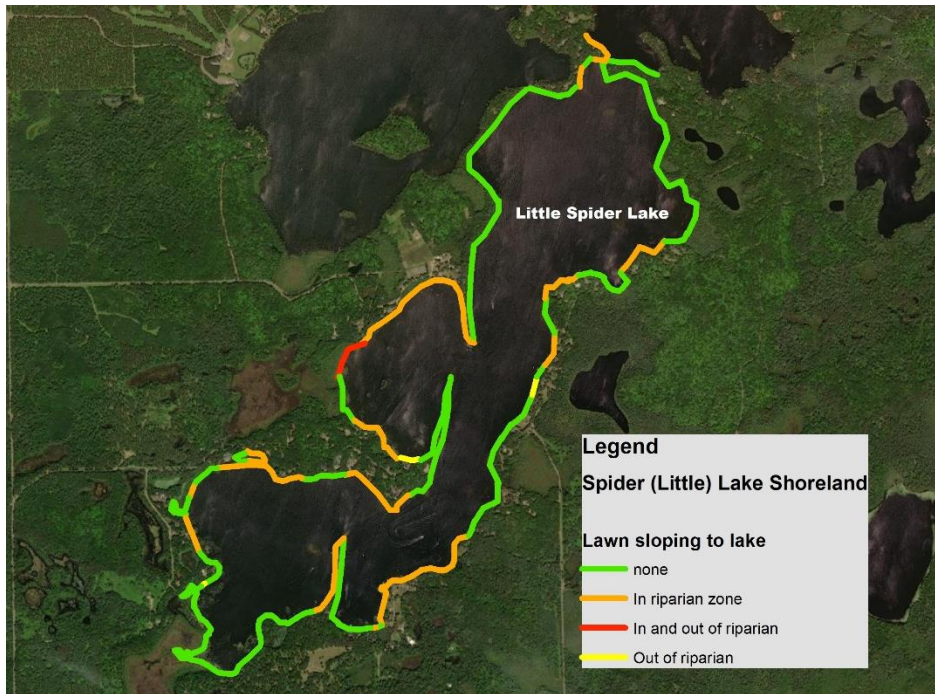




Runoff concerns-lawn/soil sloping directly to the lake:



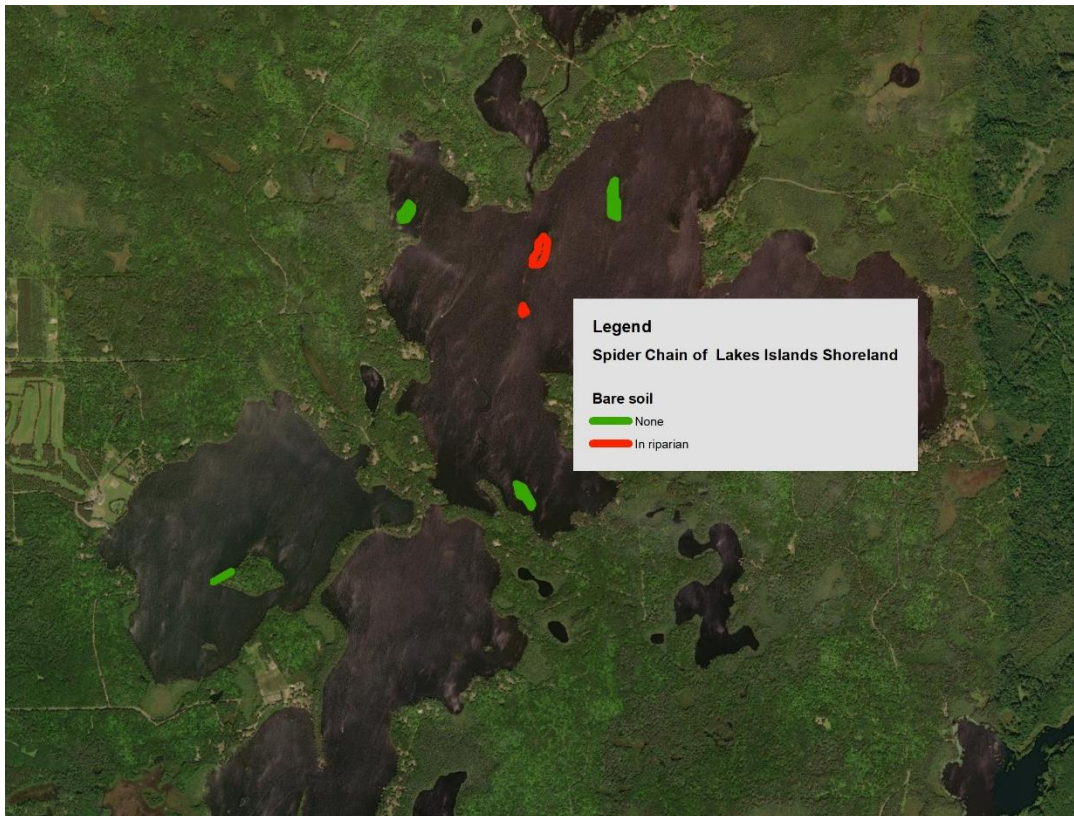
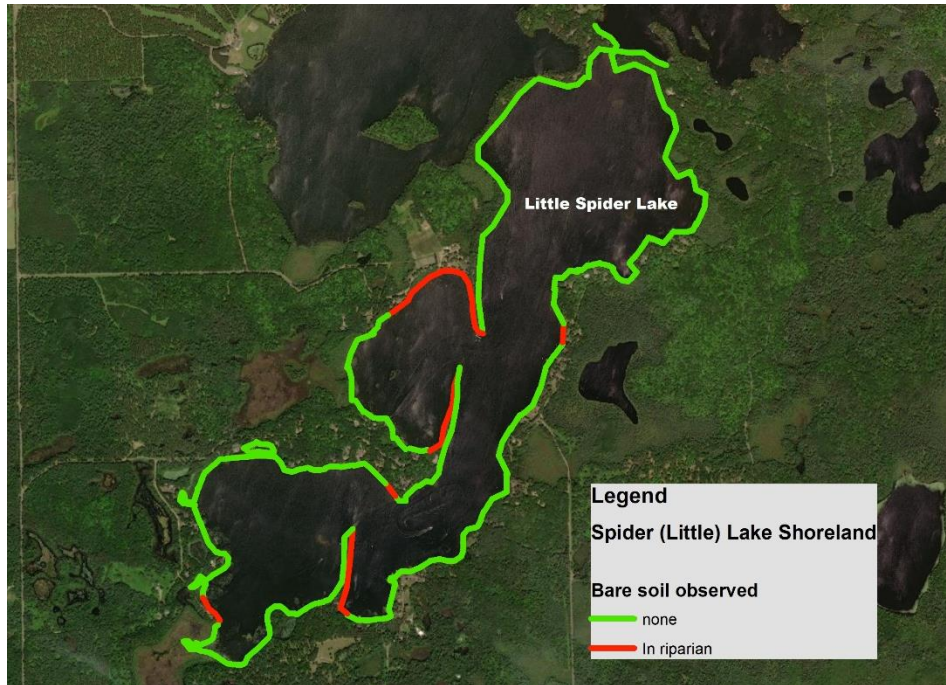




Runoff concerns-bare soil observed:

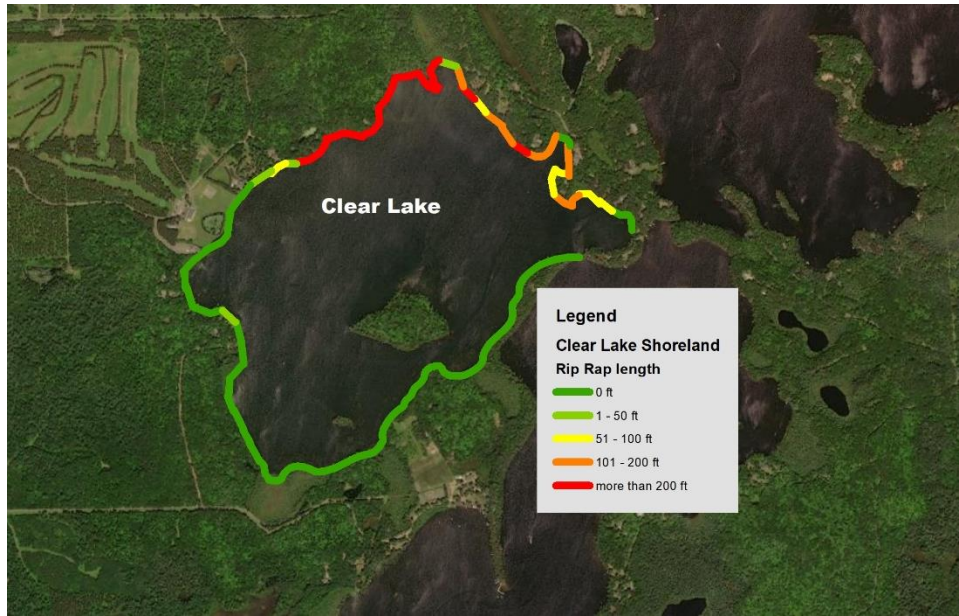


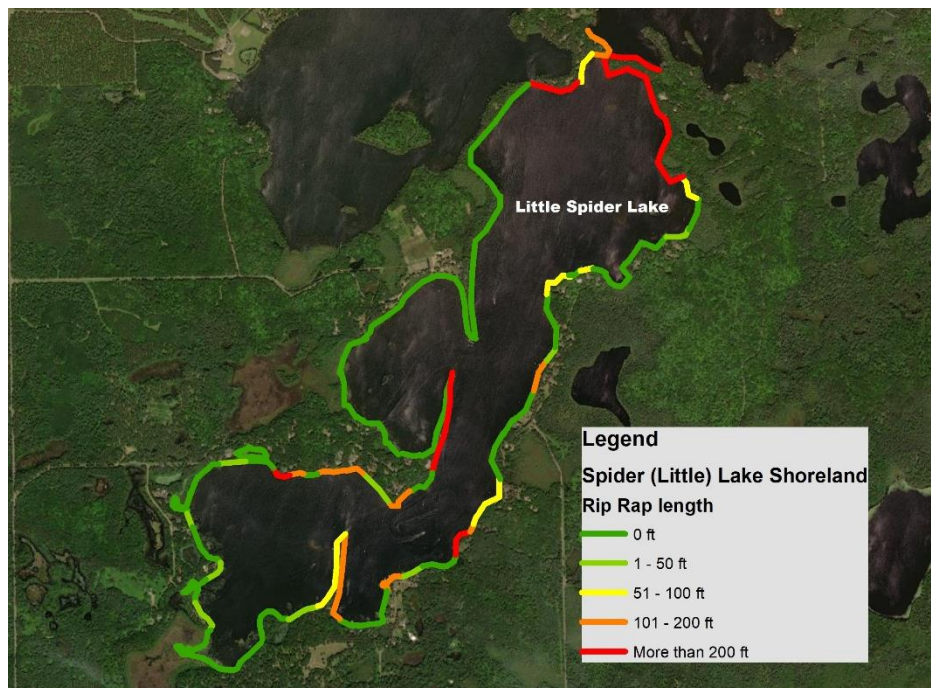
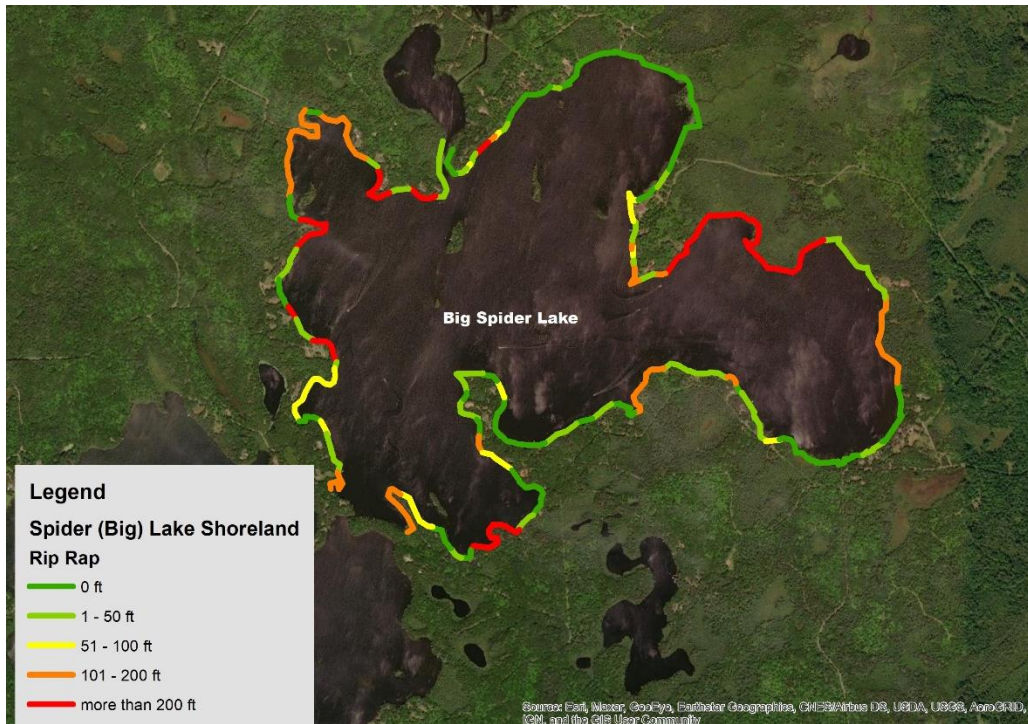




Modified bank-rip rap by length:

Fawn Lake no rip rap areas.



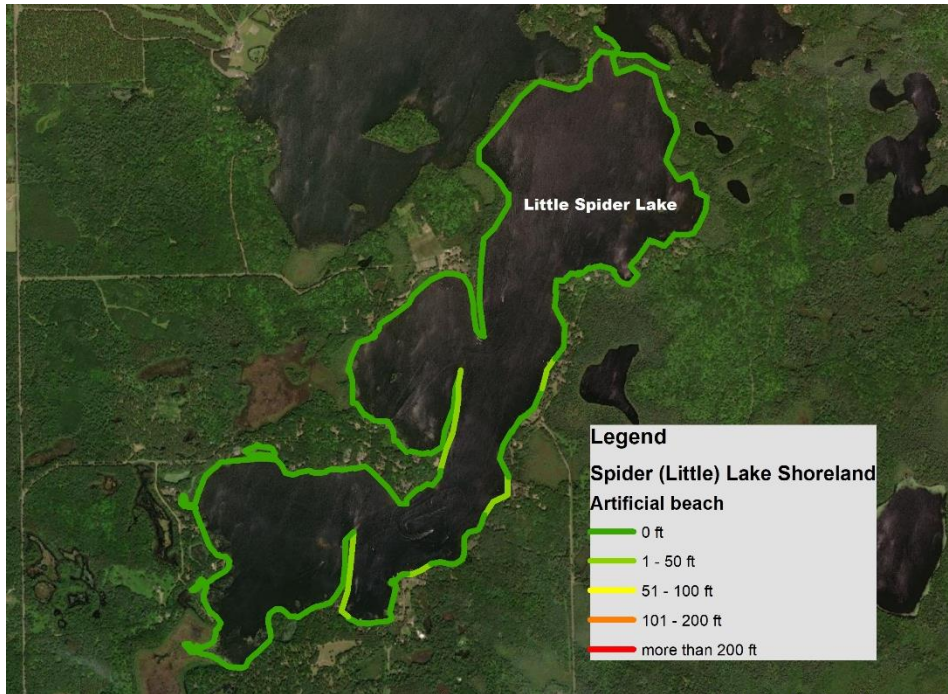




Modified bank-artificial beach by length:



No artificial beach was observed on North Lake or on islands.



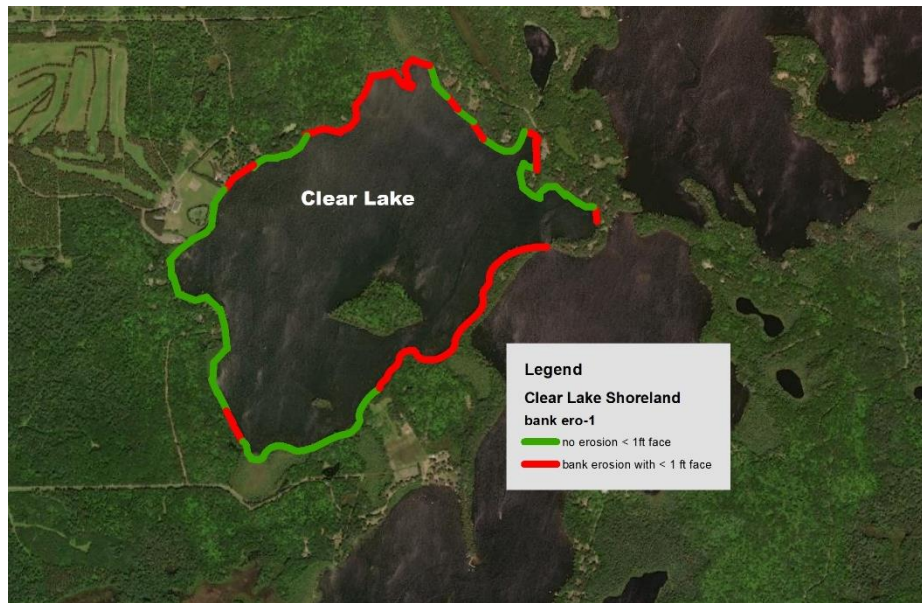
Bank erosion-face > 1 foot by length:

None was observed on Fawn Lake and North Lake.





Bank erosion face < 1 foot by length:



None observed on Fawn Lake.



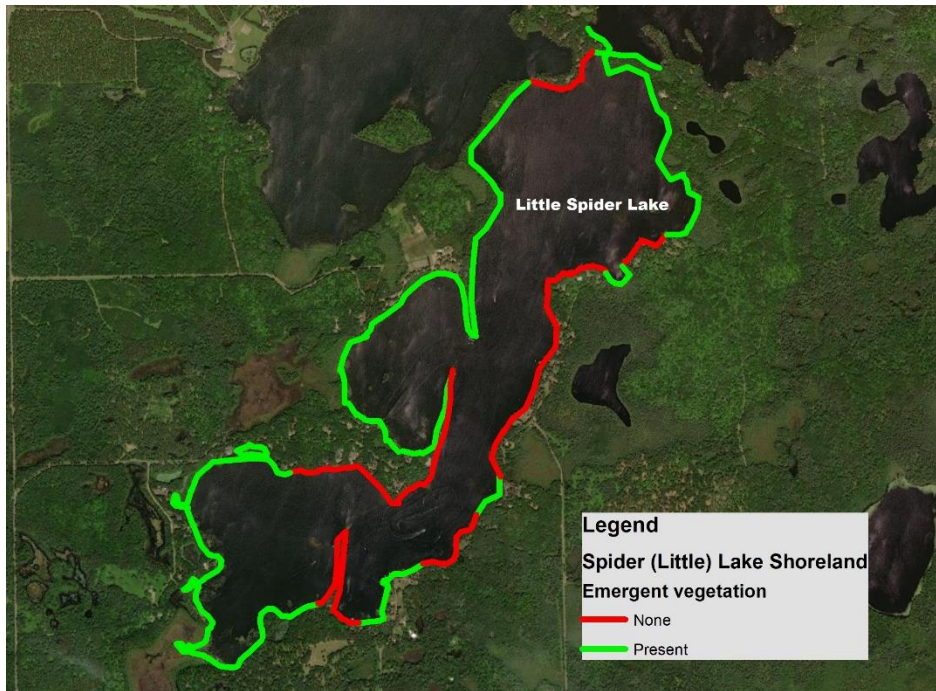




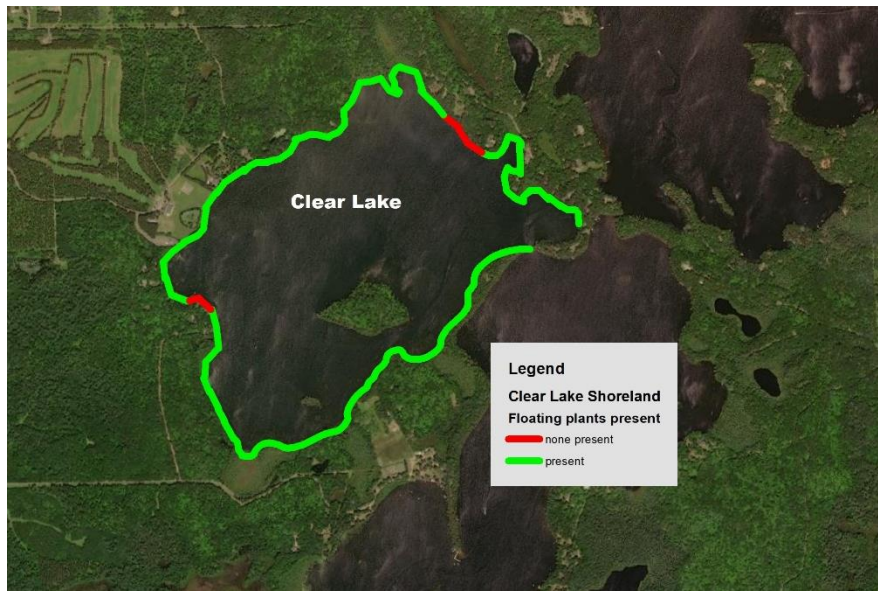
Aquatic plants-emergent plants observed:







Aquatic plants-floating plants observed:

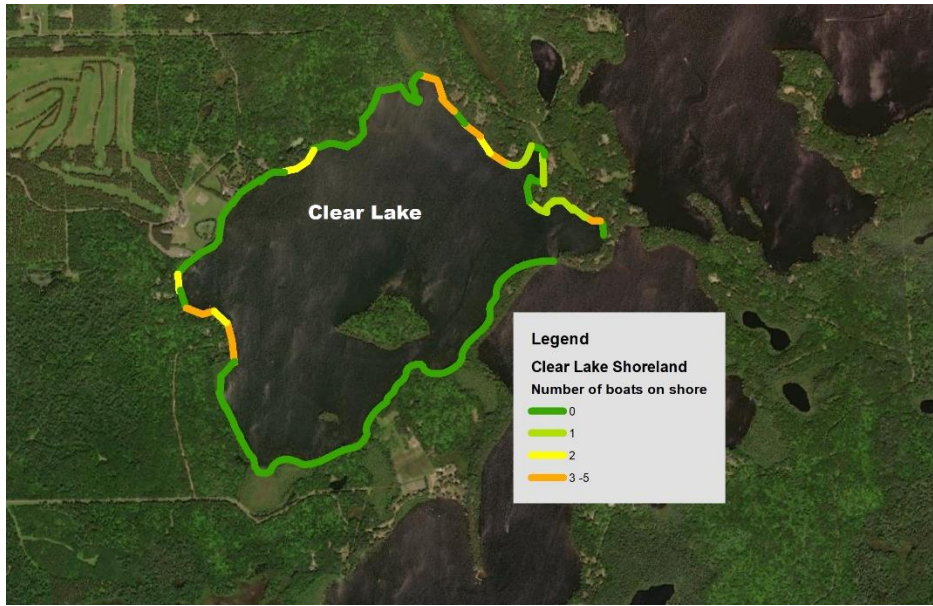




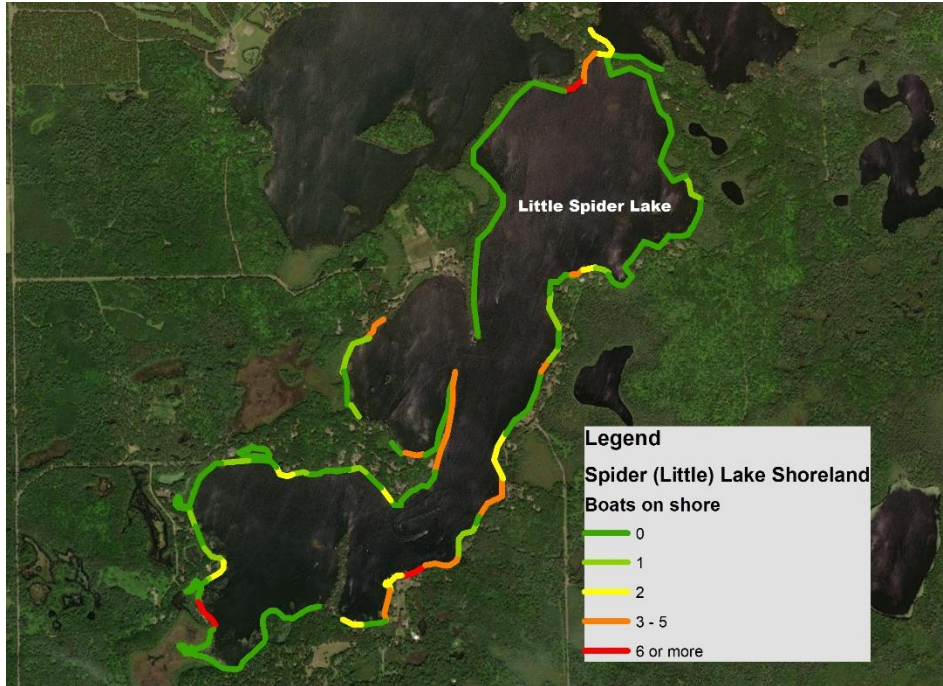


Other Maps

Riparian zone-number of boats onshore:



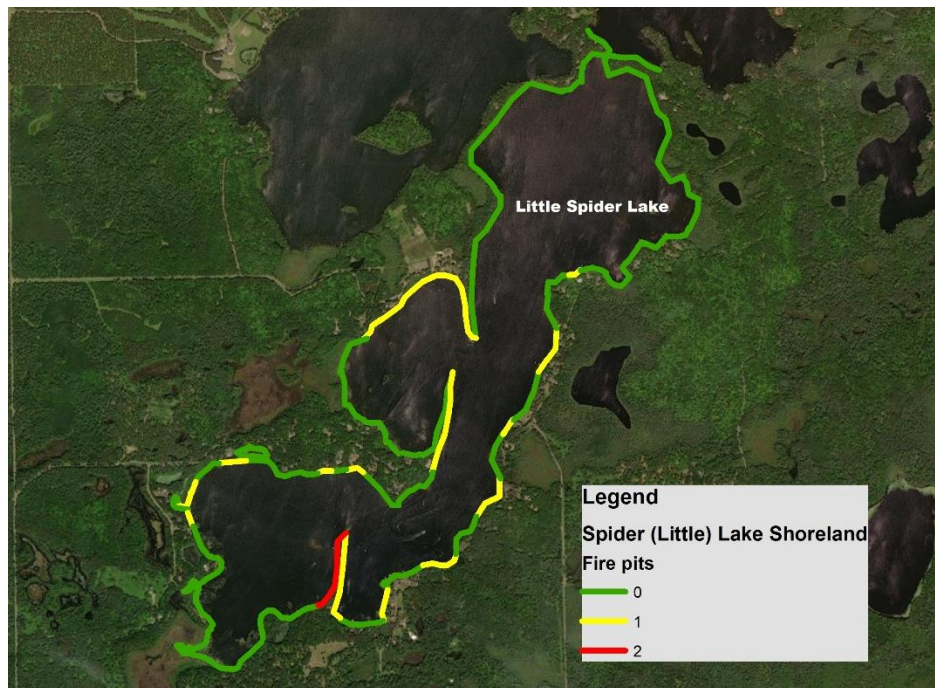




Riparian zone-number of fire pits:

No fire pits observed on Clear Lake.

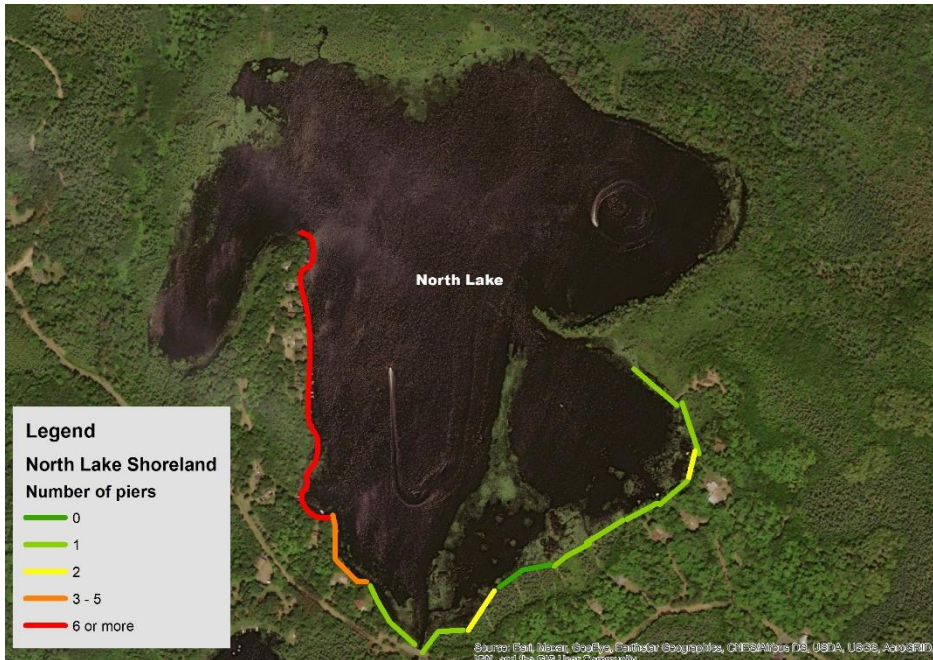


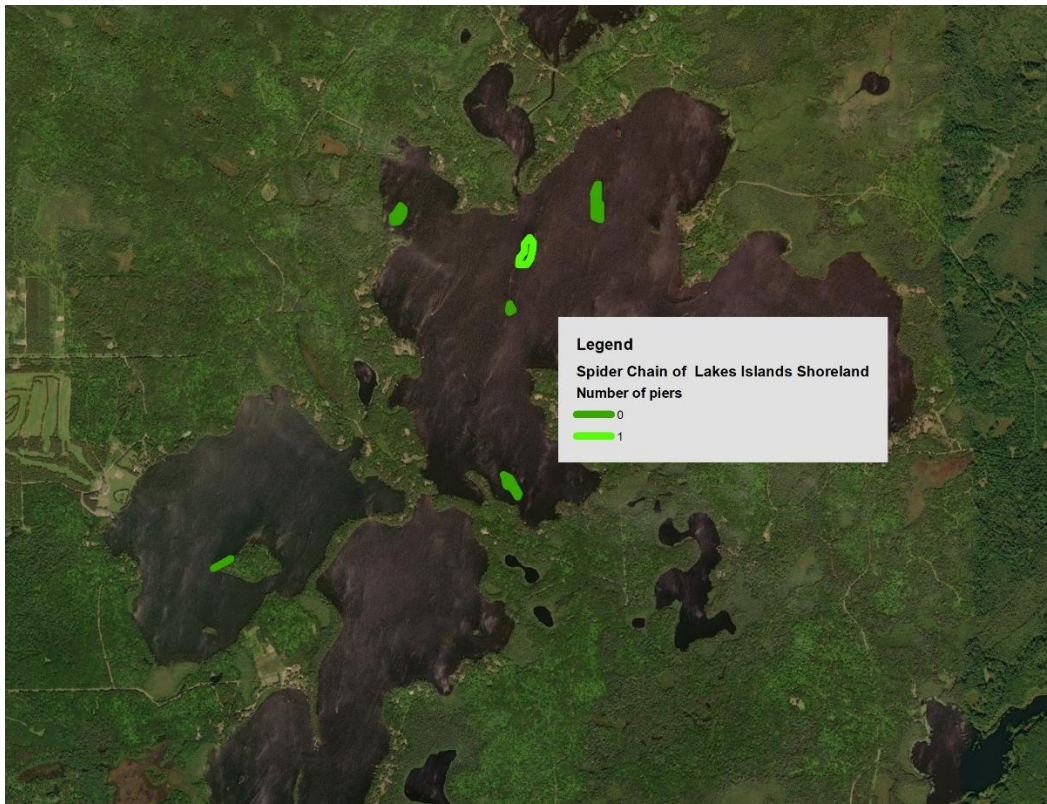




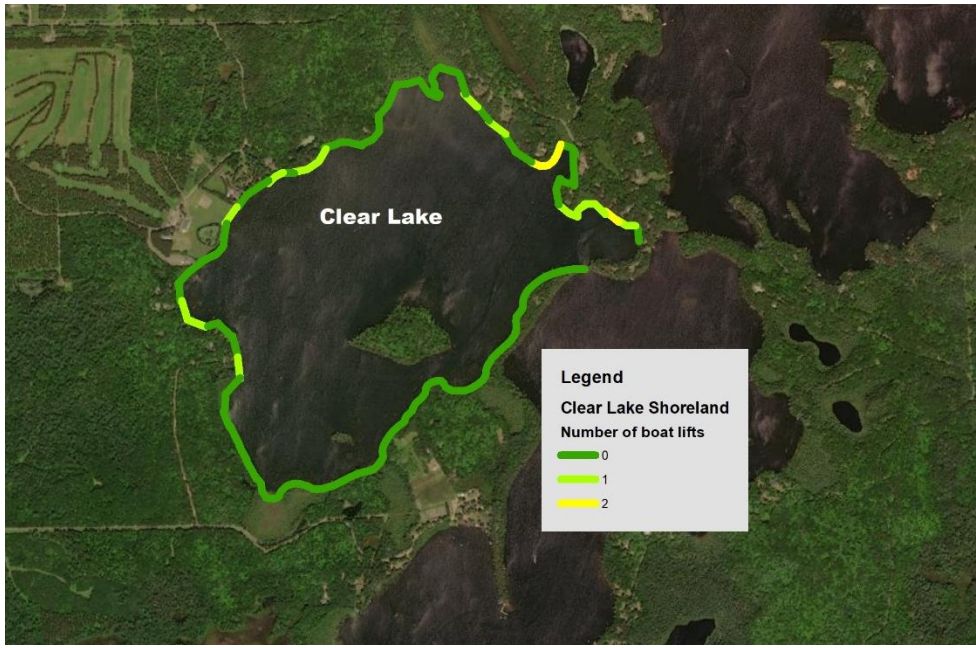
Littoral zone-number of piers:

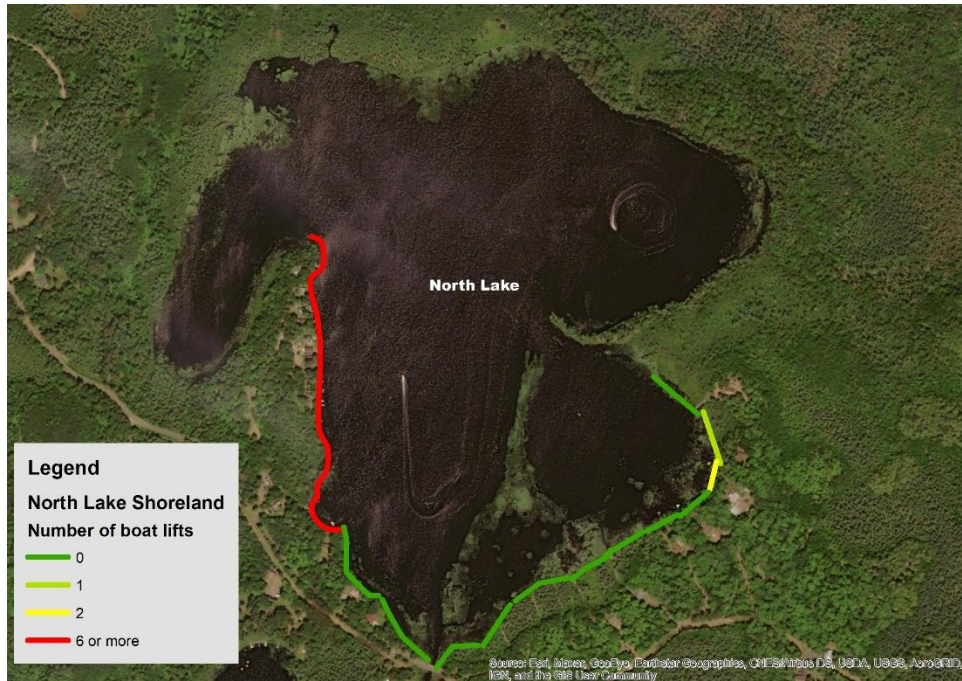






Littoral zone-number of boat lifts:

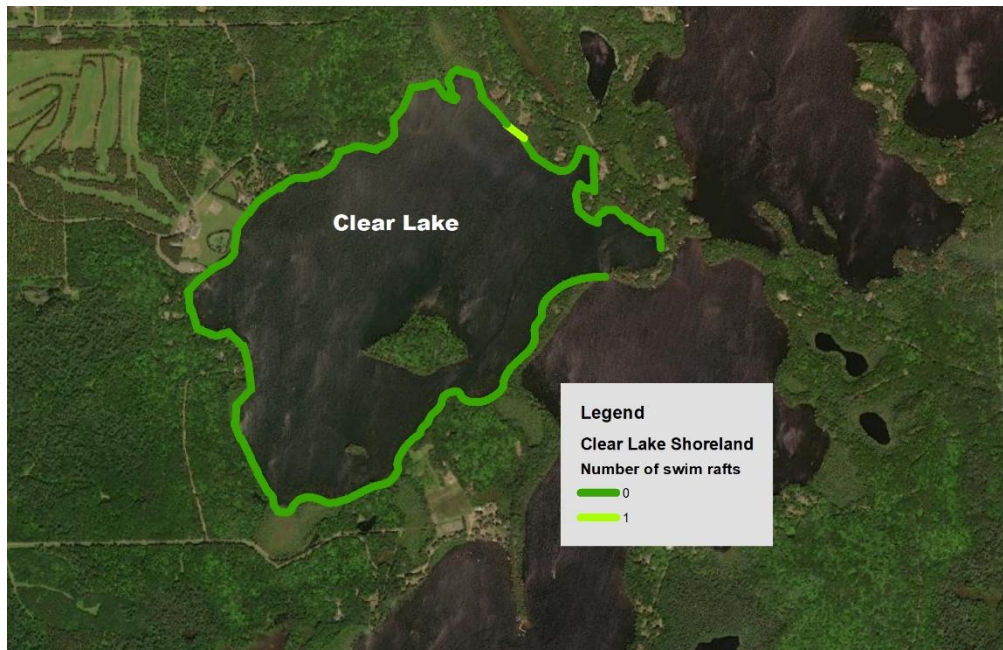






No boat lifts were observed on the islands.

Littoral zone-number of swim rafts/trampolines:



None observed on North Lake.





Littoral zone-number of boathouses:

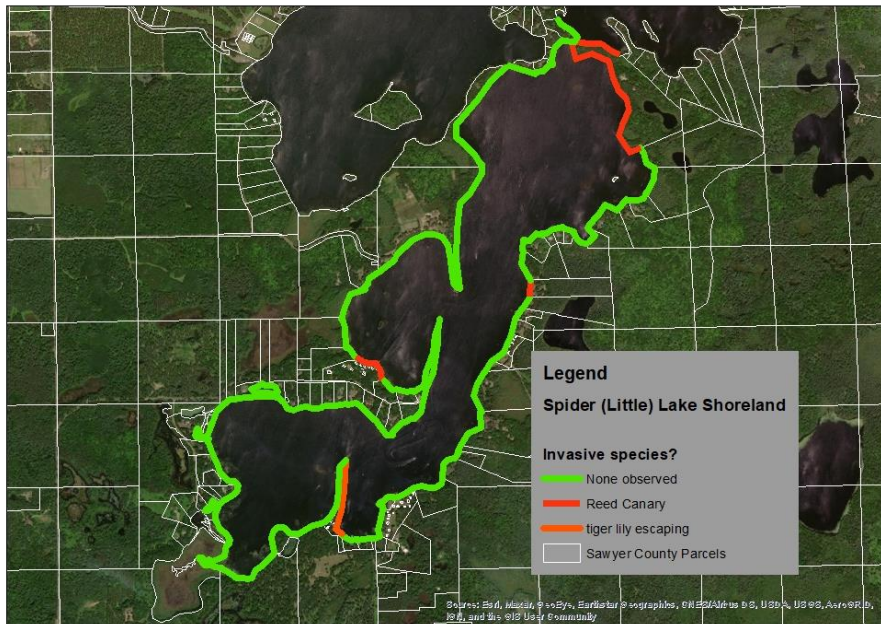
None observed on Clear Lake and North Lake.

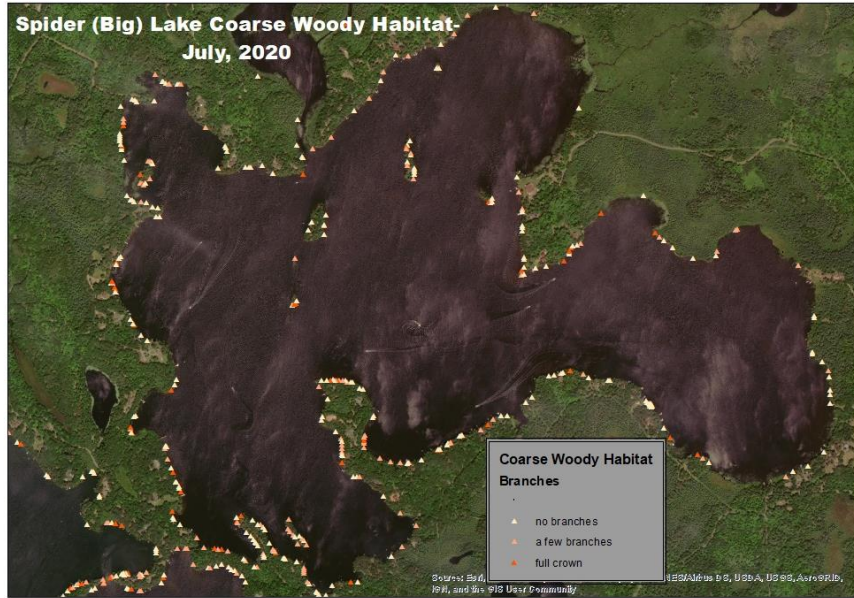




Invasive species observed:

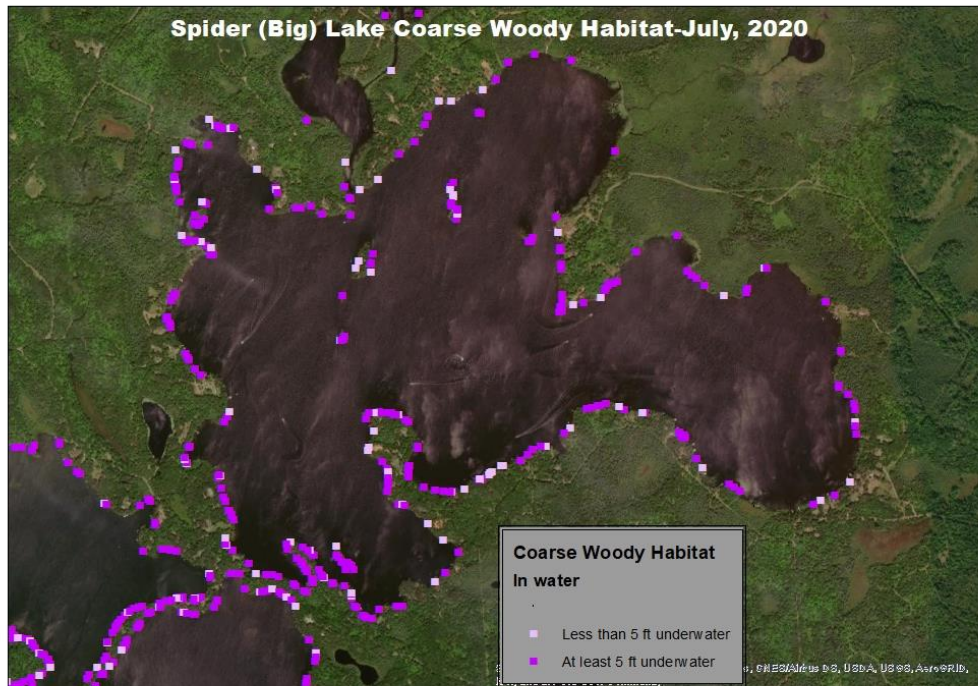
No invasive species were recorded for Clear Lake, Fawn Lake, and North Lake, or any islands.

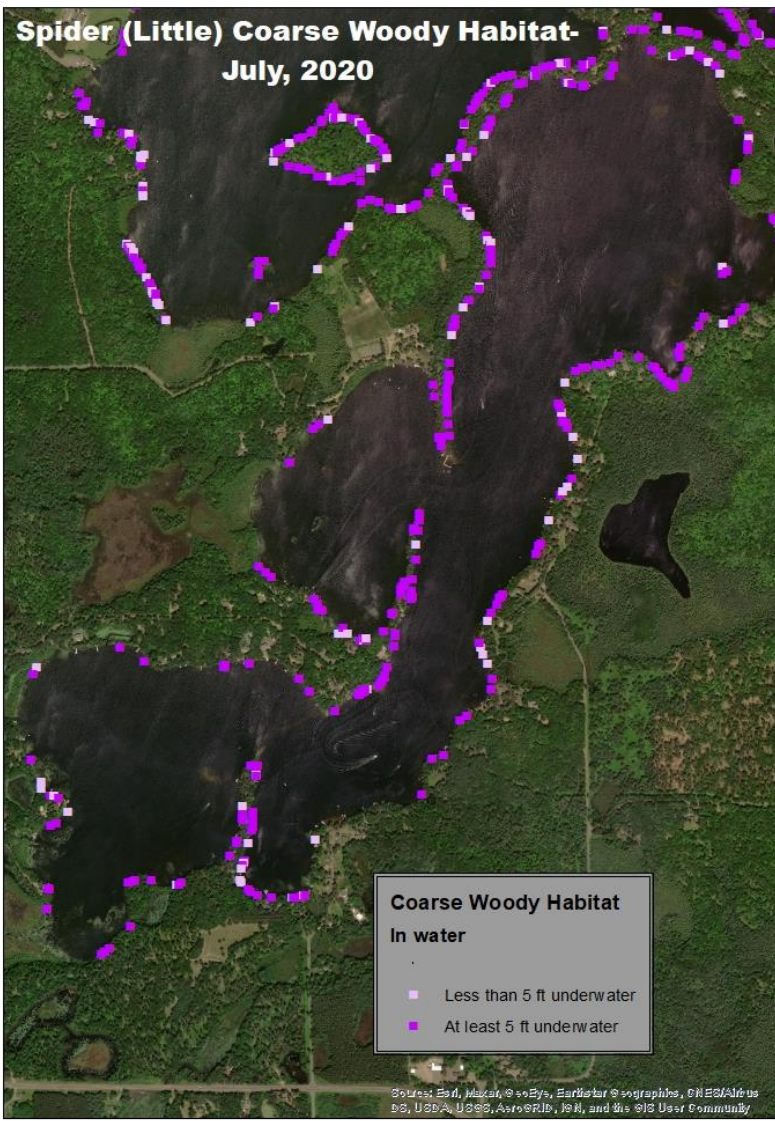


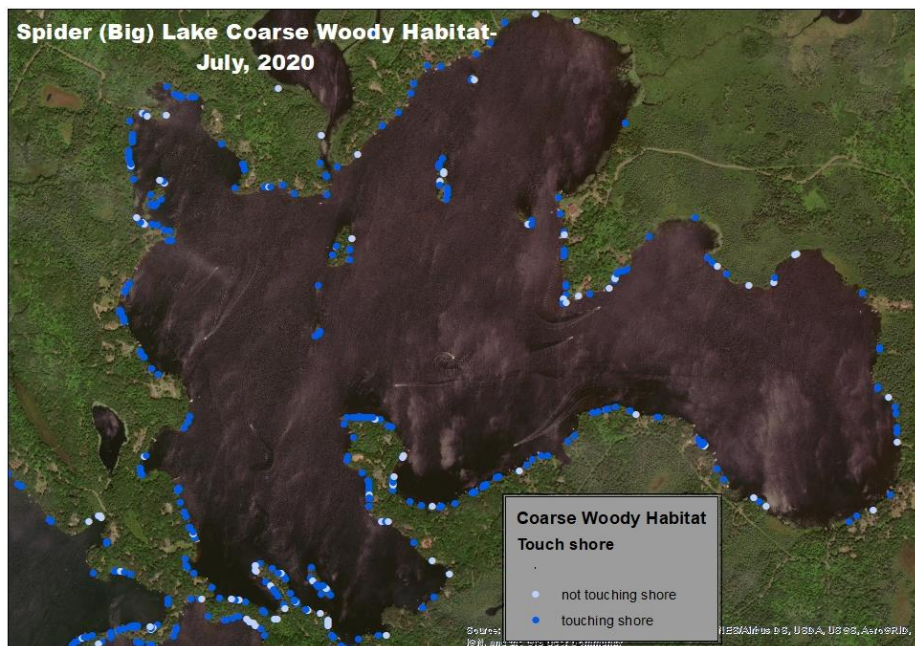


In water:









Segment number reference maps

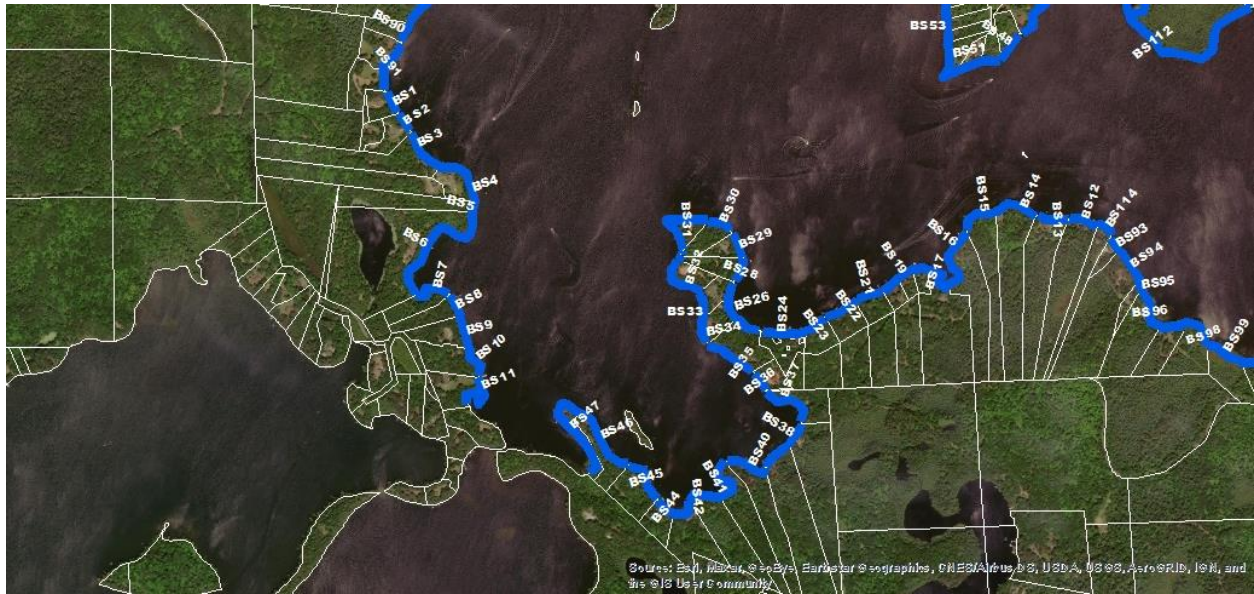
Clear Lake-north:



Clear Lake-south:



Spider (Big) Lake-south:



North Lake:



Parcel ID numbers:







