Sustaining White Birch Lake: Analyzing Water Quality and Stakeholder Concerns

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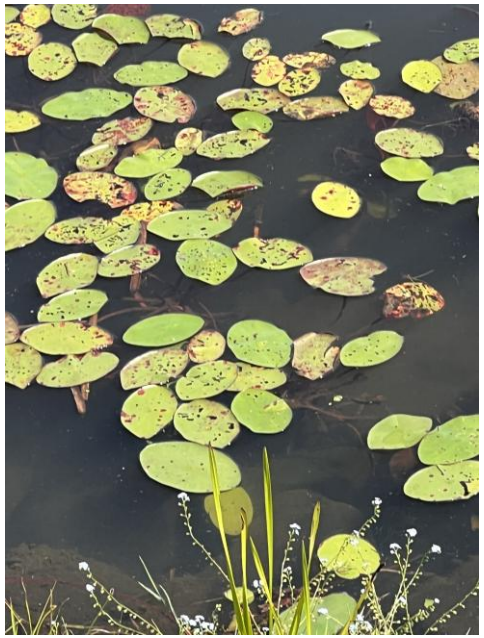
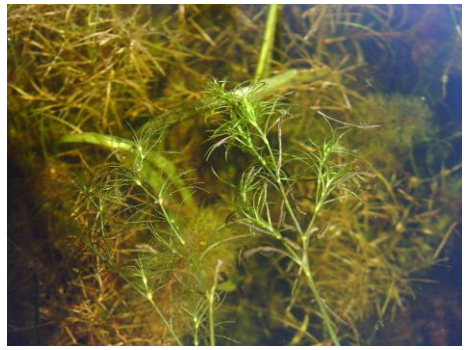
Lake Management Program





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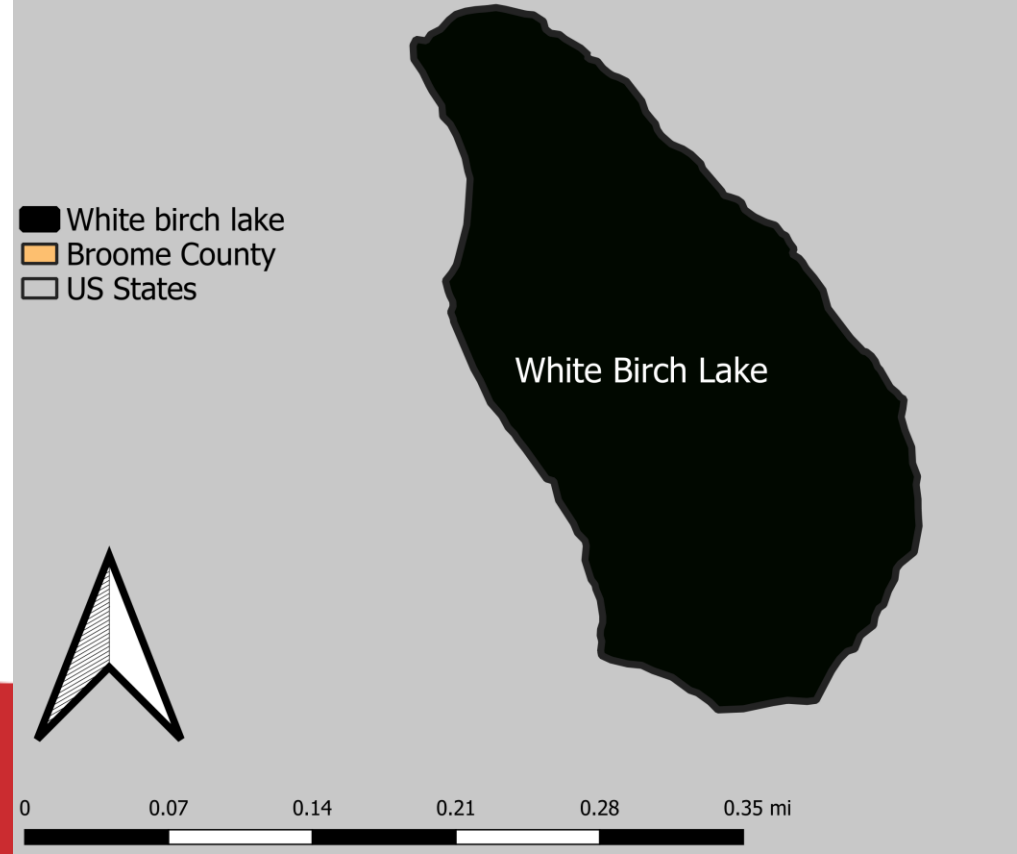
BIOLOGICAL FIELD STATION

White Birch Lake Background

- Lake was built in 1948
- Located in Broome County, NY
- Total lake surface area: 29 acres
- Total Watershed area: 433 acres



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History of the lake

- Lake was founded by Richard and Helen Merritt
- Built on an old farm
- Original size 30 acres,
  - Mean depth of 6 ft
  - Max depth 16 ft

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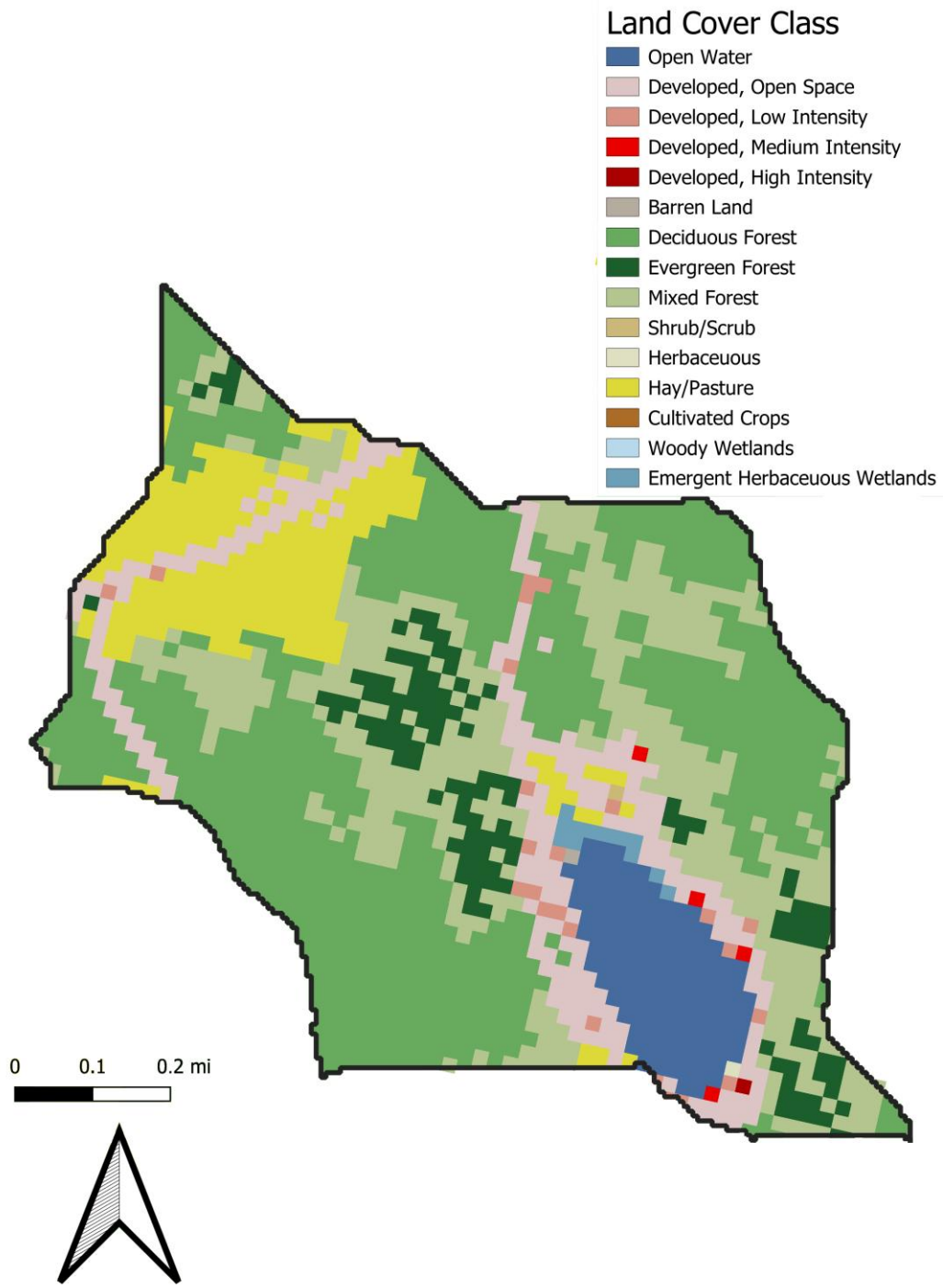
White Birch Lake Watershed

Type	Area (m^2)	Coverage (%)
Open Water	117,503	6.72
Developed, Open Space	183,879	10.51
Developed, Low Intensity	18,836	1.08
Developed, Medium Intensity	3,588	0.21
Developed, High Intensity	897	0.05
Barren Land (Rock/Sand/Clay)	897	0.05
Deciduous Forest	707,708	40.46
Evergreen Forest	110,327	6.31
Mixed Forest	400,945	22.92
Shrub/Scrub	897	0.05
Grassland/Herbaceous	897	0.05
Pasture/Hay	191,951	10.97
Emergent Herbaceous Wetlands	10,764	0.62
Total	1,749,089	100



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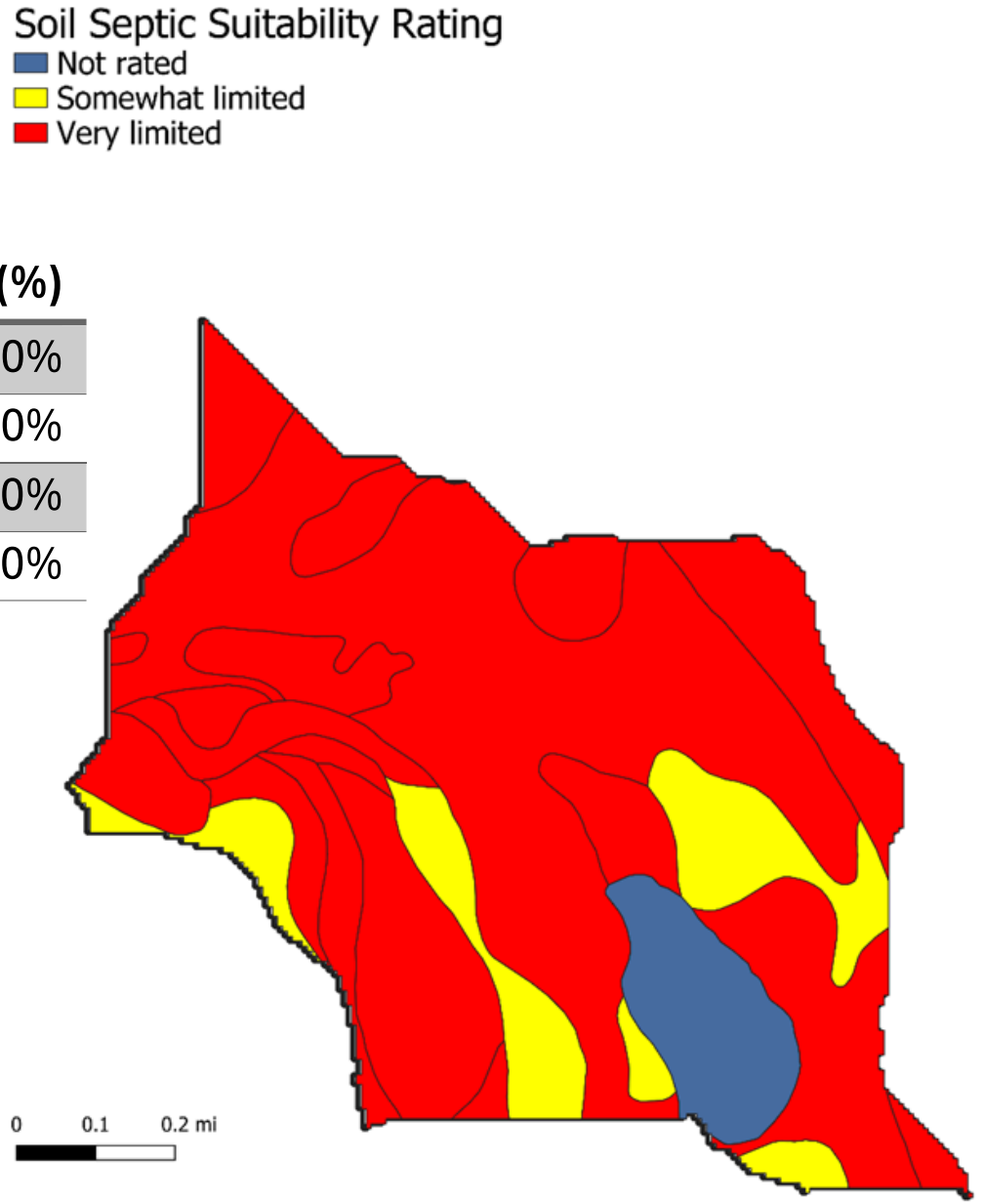
White Birch Lake Watershed

Rating	Acres	Percent of Area (%)
Very limited	349.1	80.50%
Somewhat limited	55.0	12.70%
Null or Not Rated	29.7	6.80%
Totals for Area of Interest	433.8	100%



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Stakeholder Concerns

- How to sustainably manage the lake for the future?
- Sediment input into the lake from runoff?
- Current status of the lake?
- What plant life is in the lake?

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Previous Management

- 70 Grass Carp were stocked to manage curly leaf pondweed
- Citizens Statewide Lake Assessment Program for 7 years
- Sediment catch ponds

THE WINDSOR STANDARD, THURSDAY, MARCH 19, 1987—1

Richard Merritt's "Land for Living"

By DIANE FANELLI

Who do you know who has transformed a piece of empty land into a lake surrounded by 65 summer cottages and year round homes? Who hunts caribou in Newfoundaland, Dall sheep in Alaska, and cougars in Idaho? Who carves pine into furniture, raises blueberries, and builds houses complete with fireplaces with waterfalls?

Dick Merritt of White Birch Lake, Windsor, has done all this and more.

Born on a farm in Athens, Pa., Merritt moved to a West Windsor farm as a child. In 1949 he acquired 288 acres on a hillside in Windsor. His experiences as a farmer's son, construction skills he acquired during a stint in the U.S. Navy's SeeBees, and diverse talents and abilities, enabled him to "build his dream" on that land.

With the advice of Cooperative Extension agents and the help of local contractors, the empty field became a 69-acre lake within months. During the first year, 39 building lots around the lake were sold. Named White Birch Lake for the many white birch trees on the land, a new community was born.

While an employee at IBM, Merritt and his family lived "in the city" while spending summers and every spare moment at the lake in a summer camp he built on White Birch Lake Road, overlooking the lake.

Over the next thirty five years, Merritt would sell more lots—there are now 45 summer cottages and 19 year round homes on the Lake. He would also raise Christmas trees and blueberries for sale, and develop commercial bait and fish ponds.

In 1963, Bruce Wilkins, then a Cooperative Extension agent and now a professor at Cornell University in Ithaca, produced a movie at the Lake called "Land For Living." The film has been shown throughout New York State and in other states as an example of how unused land can be reclaimed.

Upon Merritt's retirement from IBM 17 years ago he and his wife Helen erected the Stone Lodge, their present year-round home set right on the Lake. Most of the material, wood and stone, to build the home came from the property and Merritt did much of the work himself. The most striking feature of the home is a massive 80-ton stone fireplace with a built-in waterfall!

Helen, who grew up in the city, now loves the "quiet" of the Lake. Their four children are all grown up and three have moved out of state.

A recent addition to the cluster of buildings the Merritts call home is a board and beam lodge where Merritt displays the trophies from his hunting and fishing adventures. An avid sportsman who "loves being outdoors," Merritt's lodge and home are filled with hundreds of mounts. Prominently featured on one wall of the lodge is the head of a 1000 pound buffalo; its hide covers a table carved by Merritt from 200 year old pine. There are Dall sheep, rattlesnake, caribou, grizzly bear, deer— from Alaska, Canada, Colorado, Idaho, New York, and much much more. The collection overwhelms the first time visitor.

Visitors are welcomed by the Merritts. Their guest book includes names of friends from across New York and the United States, as far north as Alaska and as far south as Florida. Even England, Sweden, and Africa are represented!

When Dick Merritt isn't working on the Lake property, traveling across country to visit friends or children, or hunting, he is working in his workshop, painting landscapes he frames himself, or plowing snow for his neighbors. In the summer, activities focus on the Lake itself with frequent hay rides, swimming races, boat rides. The Merritts harvest and sell several tons of blueberries a season.

Not many of us have the courage or talent or dream as big as Dick and Helen Merritt have. For them, White Birch Lake is truly their "dream come true."

The beautiful fireplace in the living room of the Merritt home at White Birch Lake

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Objectives for the study

- Identify seasonal and long-term limnological trends
- Lake mapping
- Plants survey
- Zooplankton community
- Watershed analysis
- Management plan

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Limnological Methods

- Bi-weekly sampling
- Water profiles
- Data analysis in Rstudio
  - Linear models, model selection & predictions
  - Isopleths

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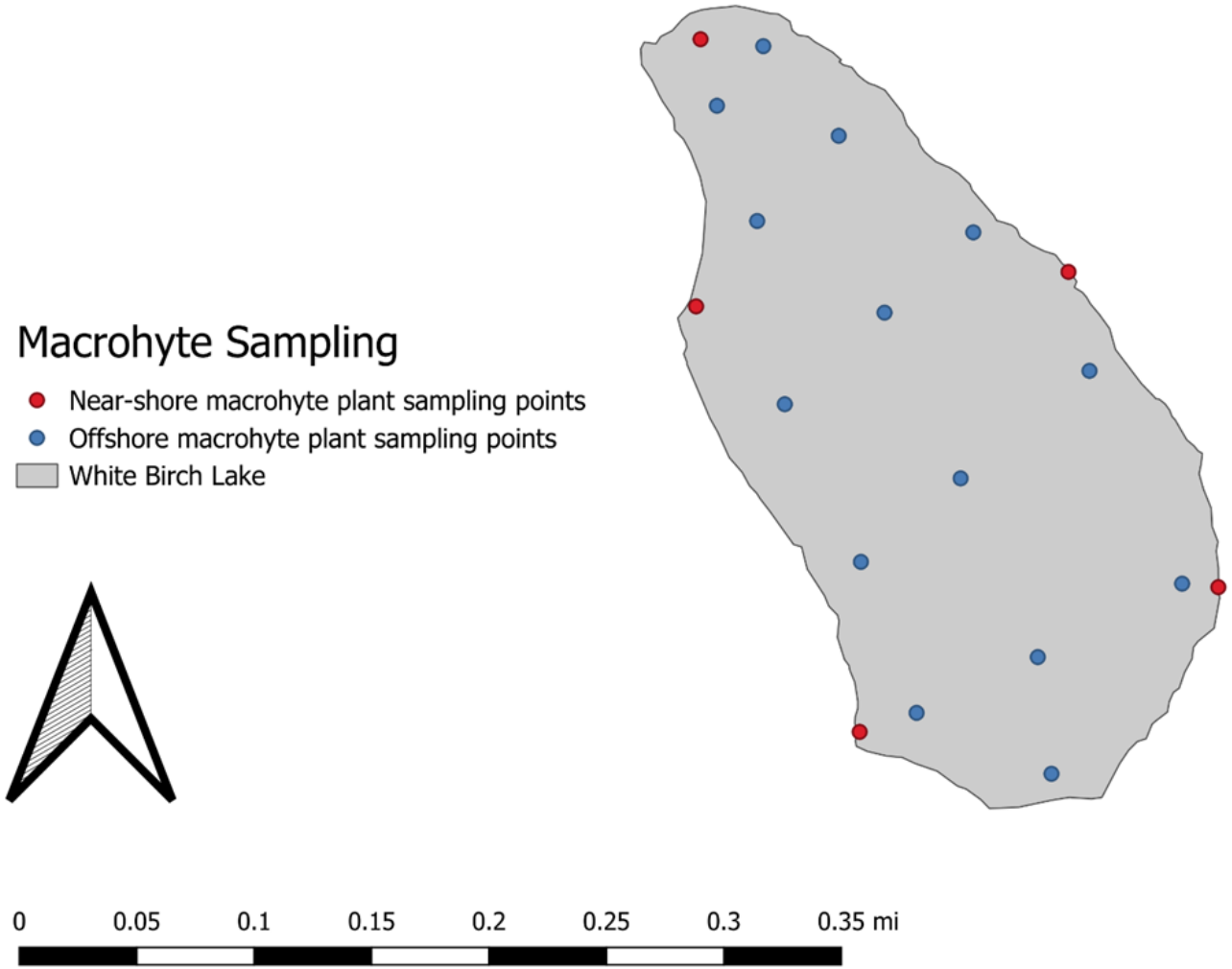
Methods

- Mapping
  - Map the lake before plants grow
  - Use QGIS to analyze data

- Plants
  - Sample 14 offshore areas using rake toss
  - Sample 5 near-shore areas



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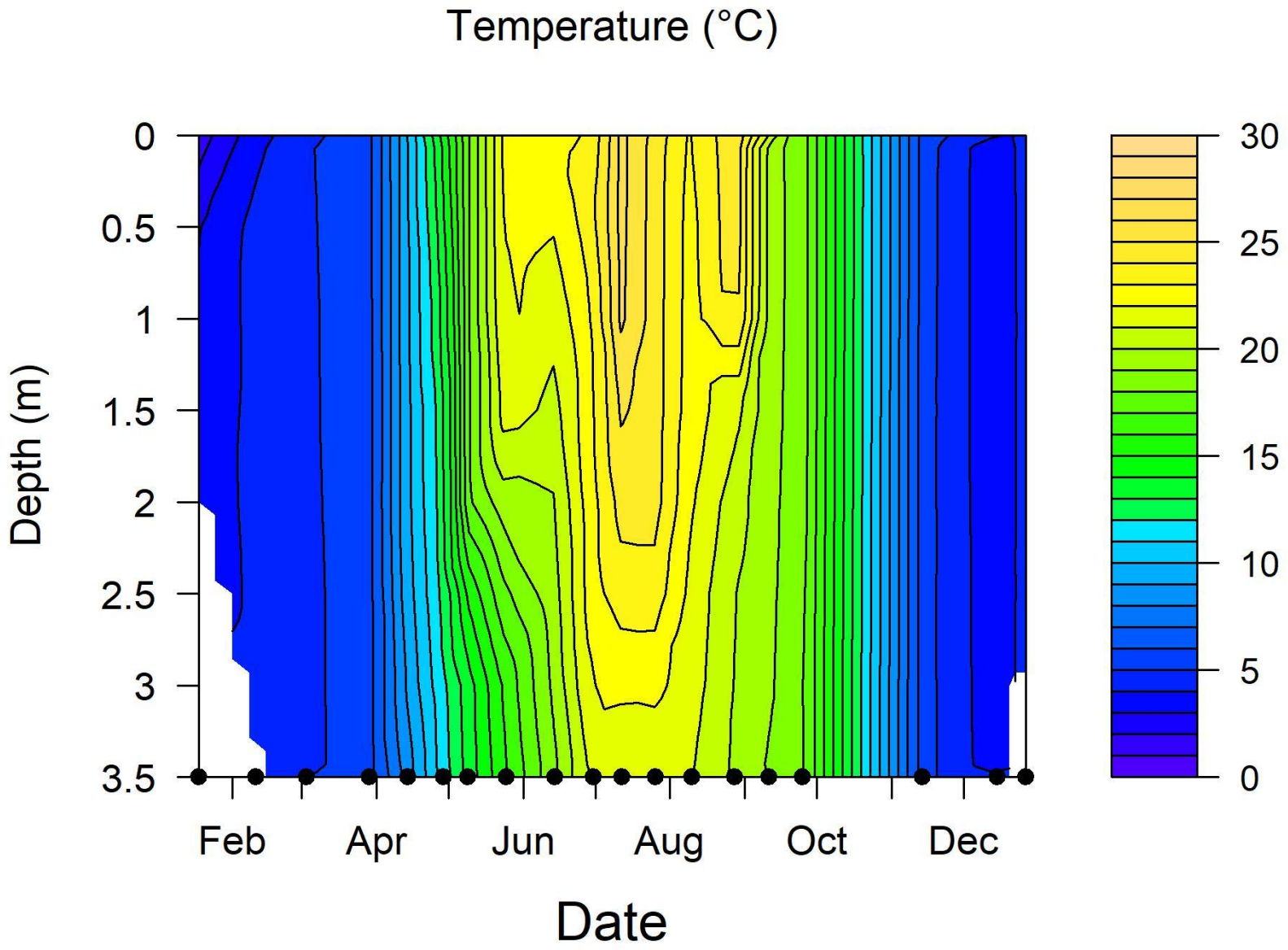
Seasonal limnological analysis



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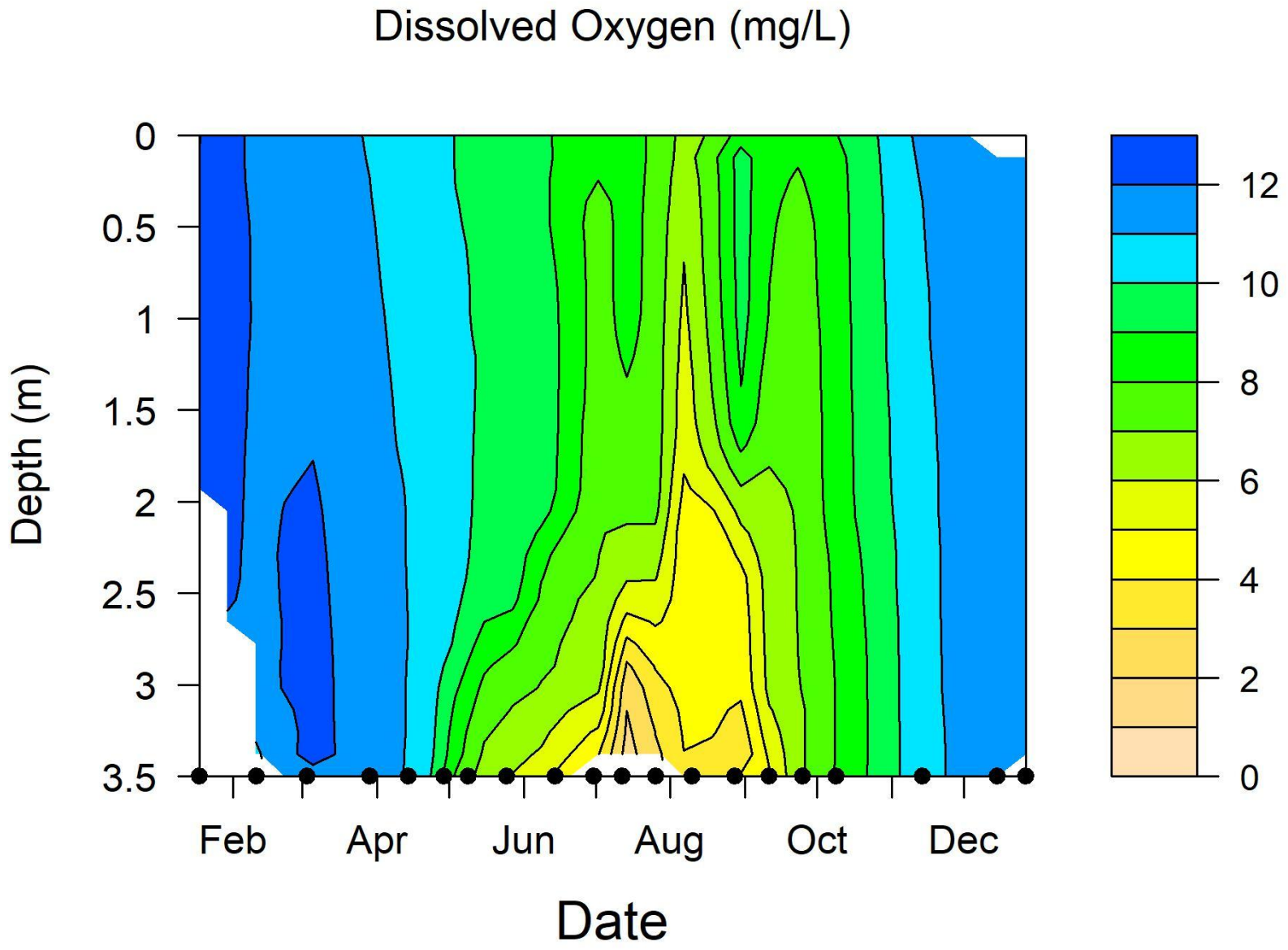

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Seasonal limnological analysis

Month	Alkalinity	Calcium	Chloride	NaCl
Jan	11.00	4.81	8.33	13.75
Feb	10.00	4.81	9.20	15.18
Mar	9.20	4.09	9.40	15.51
Apr	9.60	5.13	9.60	15.84
May	11.90	4.49	9.30	15.34
Jun	16.40	5.45	9.10	15.02
Jul	19.60	5.21	8.00	13.20
Aug	19.00	4.01	7.00	11.55
Sep	20.00	4.81	8.50	14.02
Oct	18.00	5.61	9.00	14.85
Nov	16.86	5.95	9.43	15.56
Dec	12.60	5.05	8.60	14.19
Averages	**14.51**	**4.95**	**8.79**	**14.50**

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Seasonal limnological analysis

Month	Total Phosphorus	Chlorophyll a	Secchi Depth
Jan	34.97	25.30	No Data
Feb	14.05	1.52	1.50
Mar	18.95	9.28	1.25
Apr	20.42	4.60	1.85
May	18.55	4.11	2.20
Jun	16.69	8.83	2.20
Jul	23.03	11.66	1.35
Aug	28.99	14.35	0.70
Sep	25.46	24.02	1.40
Oct	35.88	30.38	1.30
Nov	22.71	8.52	1.65
Dec	18.20	8.28	1.65
Averages	**23.16**	**12.57**	**1.55**

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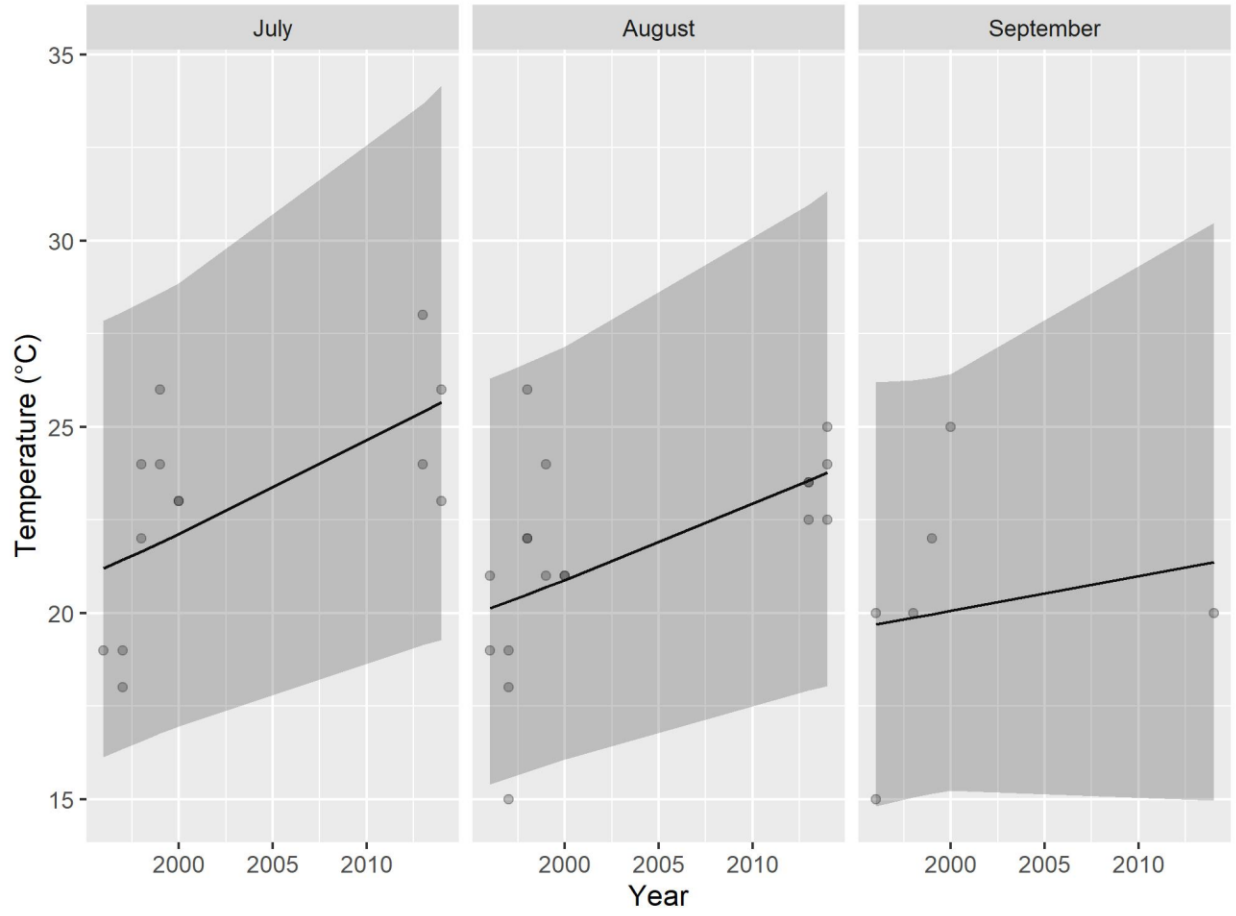
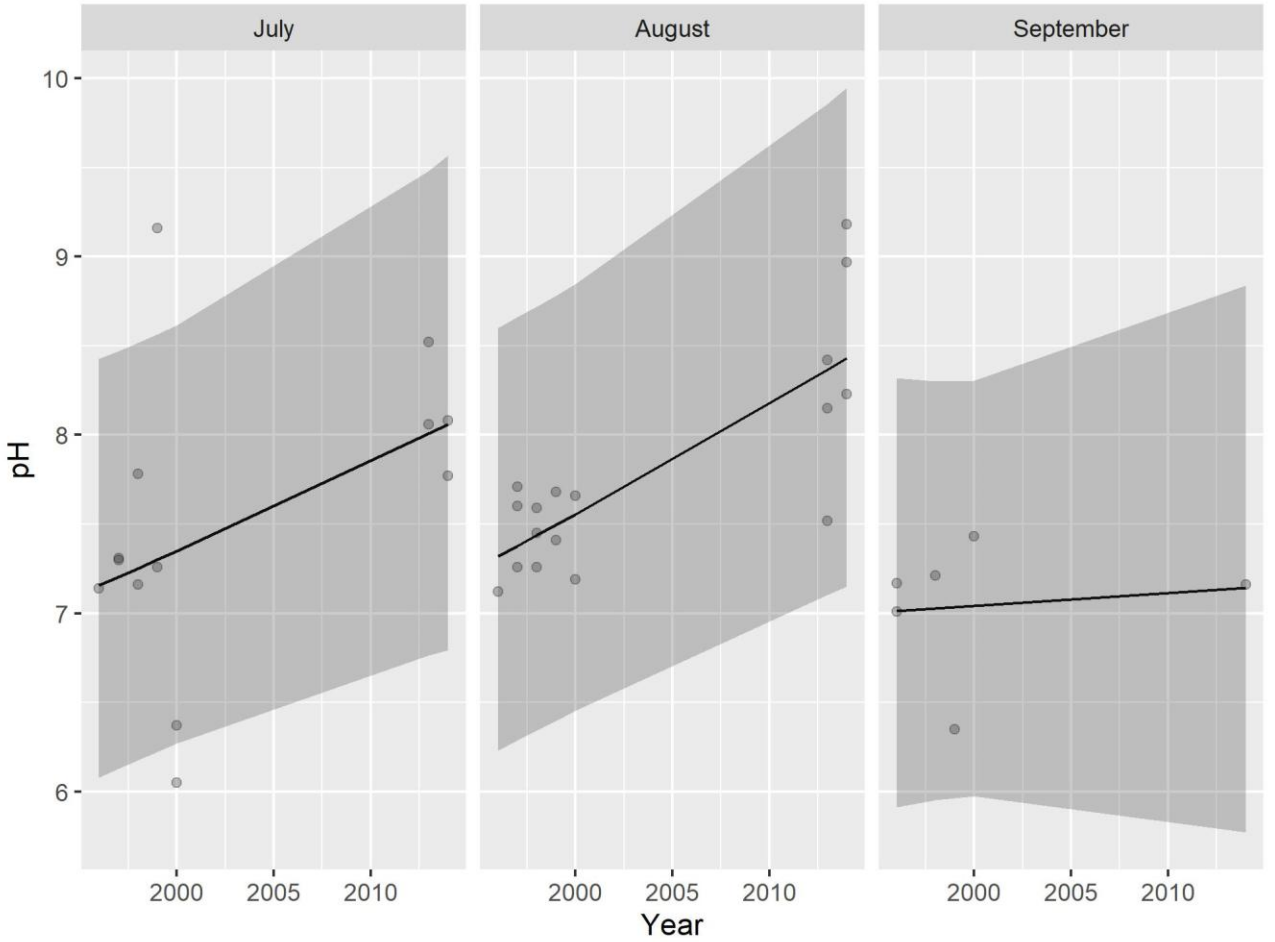
Long-term limnological analysis





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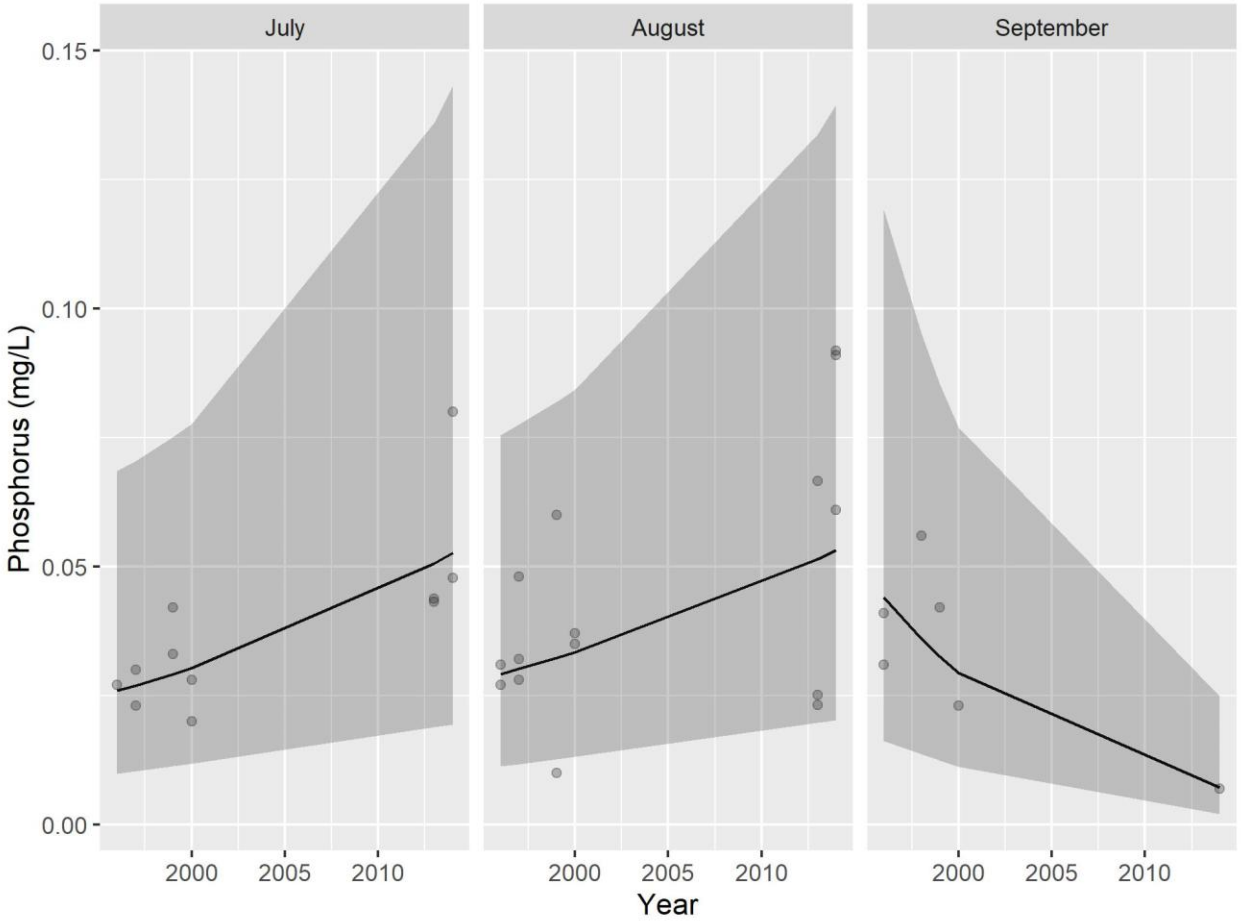
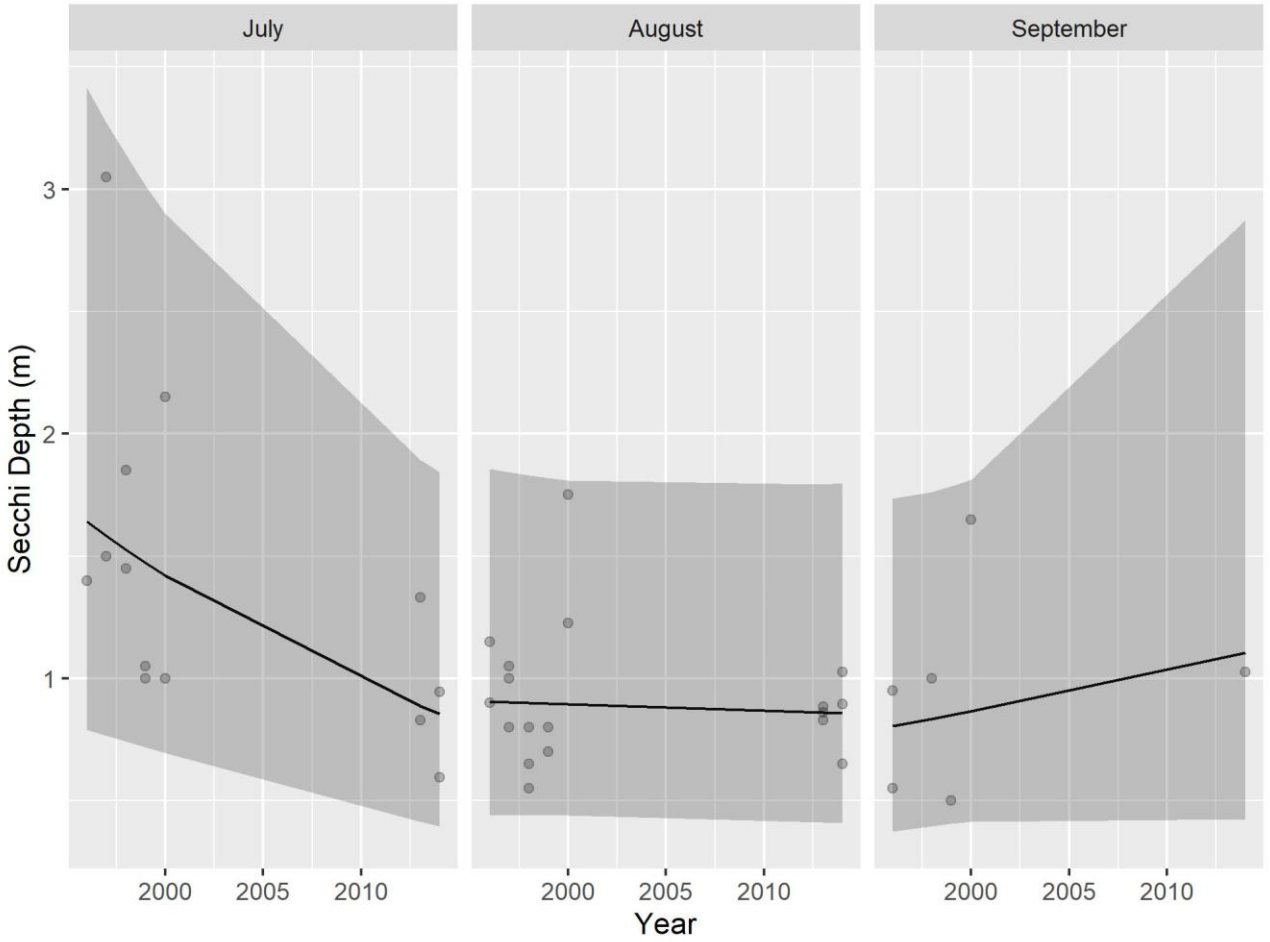
Long-term limnological analysis





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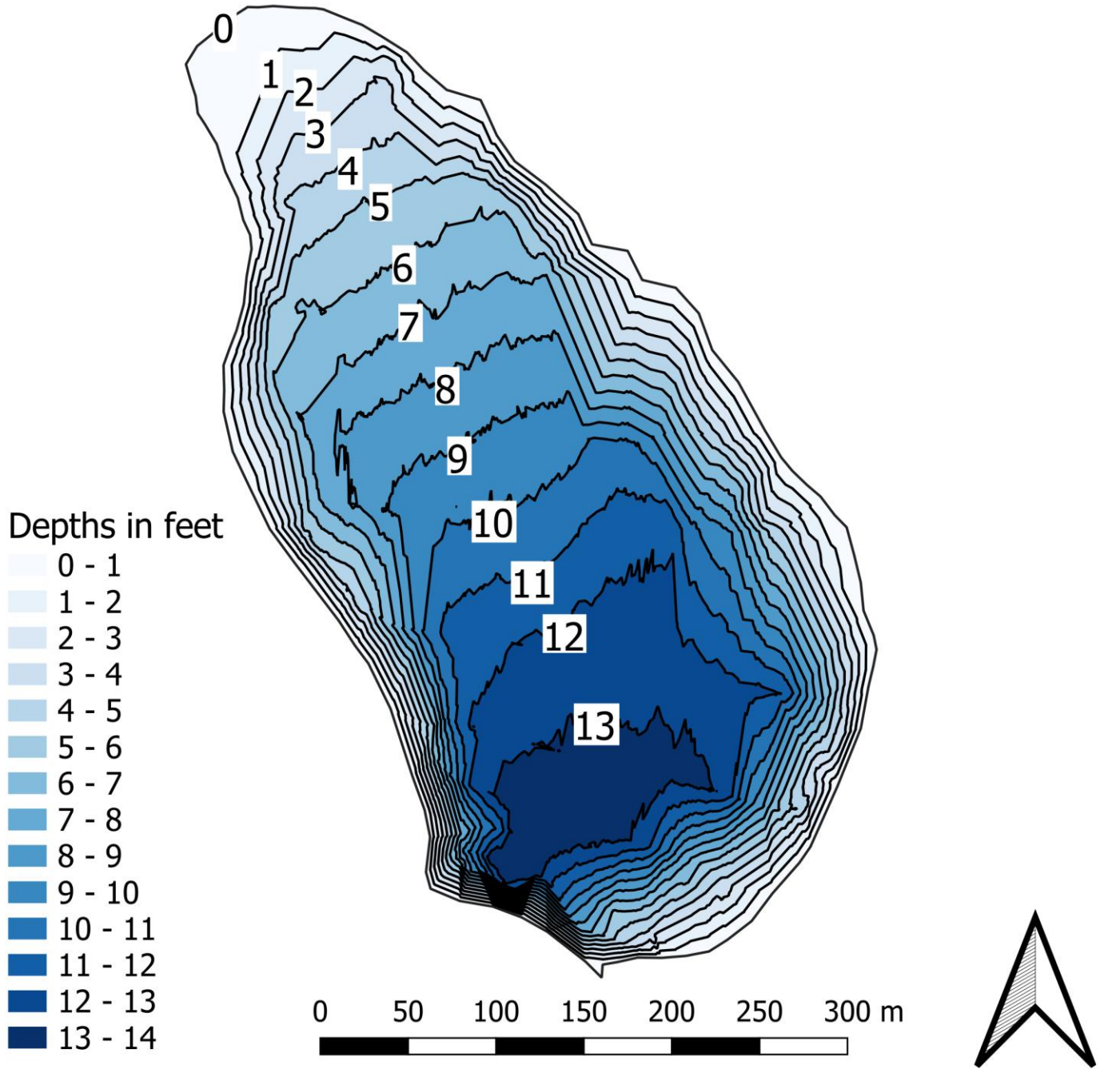
Mapping results

- Mean depth 4ft
- Deepest point 14.1ft
- Volume of 38.7 million gallons



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Plant results

- 6 plant species found
- 5 native plants
- 1 macroalga
- 1 unknown plant

Common name	Scientific name	Status
Northern naiad	*Najas gracillima*	Native
Oaks pondweed	*Potamogeton oakesianus*	Native
Broadleaf arrowhead	*Sagittaria latifolia*	Native
Longleaf pondweed	*Potamogeton nodosus*	Native
Watershield	*Brasenia schreberi*	Native/Nuisance
Musk grass	*Chara vulgaris*	Native
Unknown reed		Unknown/Nuisance

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Conclusions

- Dimictic
- Lost oxygen during the summer
- Historical limiting factors have shifted

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Conclusions

- The lake has shrunk over the last 74 years
- 0.5% loss in original volume per year
- No signs of curly leaf pondweed

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Acknowledgments

White Birch Lake Association

NYSFOLA

CSLAP

SUNY Oneonta Biological Field Station Staff

The Scriven Foundation

Questions

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