

Findley Lake – 2025 Bathymetry & Sediment Oxygen Demand



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Objectives of Presentation

- ✓ Update on Bathymetry and Sediment Oxygen Demand Analysis
- ✓ Bathymetry conducted by Princeton Hydro
- ✓ SOD conducted by Clarity Resources Group with assistance from Princeton Hydro
- ✓ Next steps



Lake Hopatcong, NJ, summer of 2019. Photo credit: Rick Loomis, New York Times



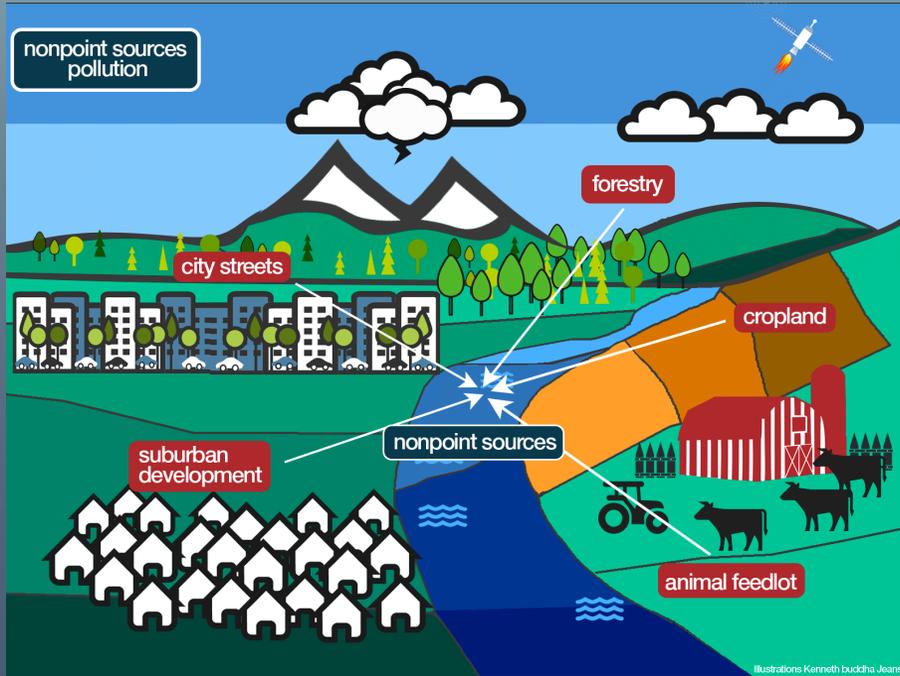
Conditions that Result in a Cyanobacteria Algal Bloom



SCIENCE
ENGINEERING
DESIGN

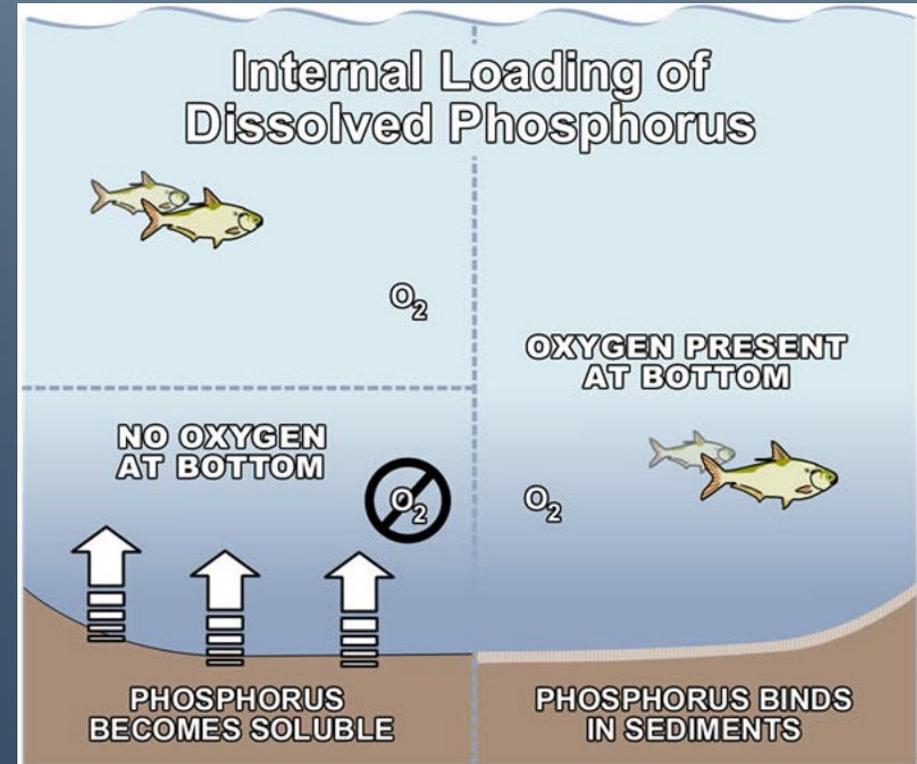
- High seasonal temperatures
- Still water conditions / thermal stratification
- Total Phosphorus concentrations 0.03 mg/L or greater can generate nuisance blooms / scums

Nutrient Loading in Lakes



Watershed (Septic) /
Atmospheric Sources

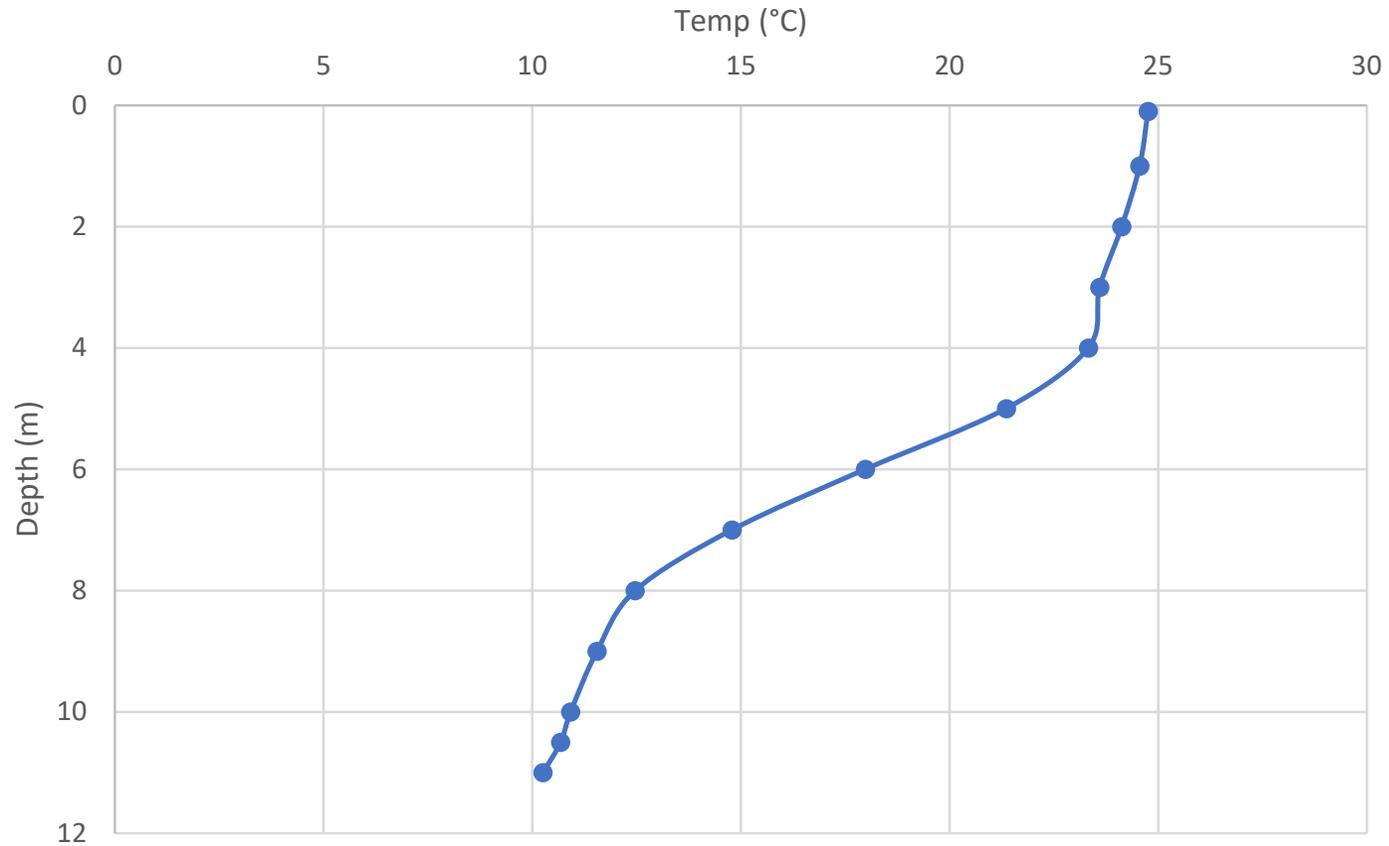
Internal Cycling



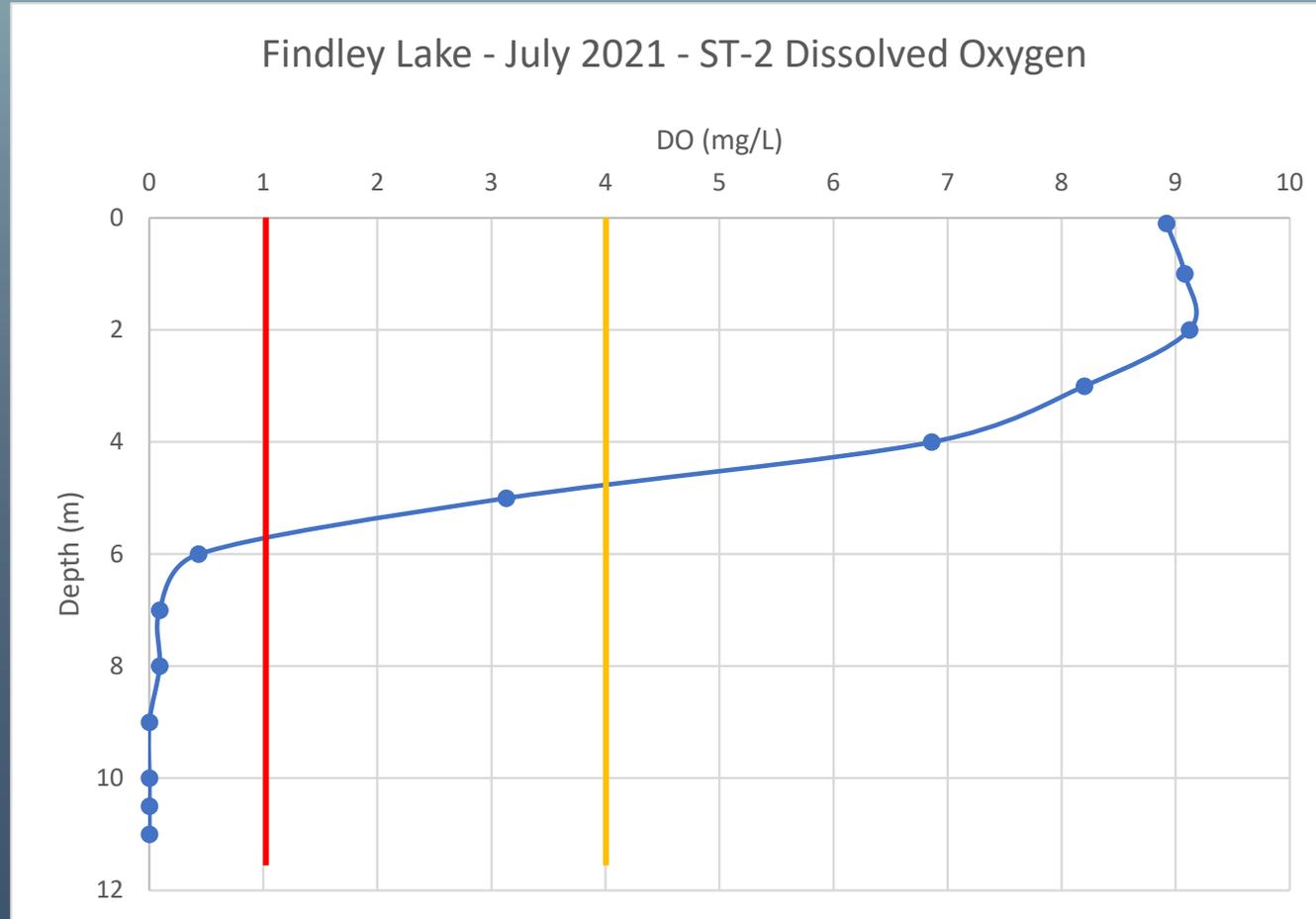
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ST-2 Temperature

Findley Lake - July 2021 - ST-2 Temperature

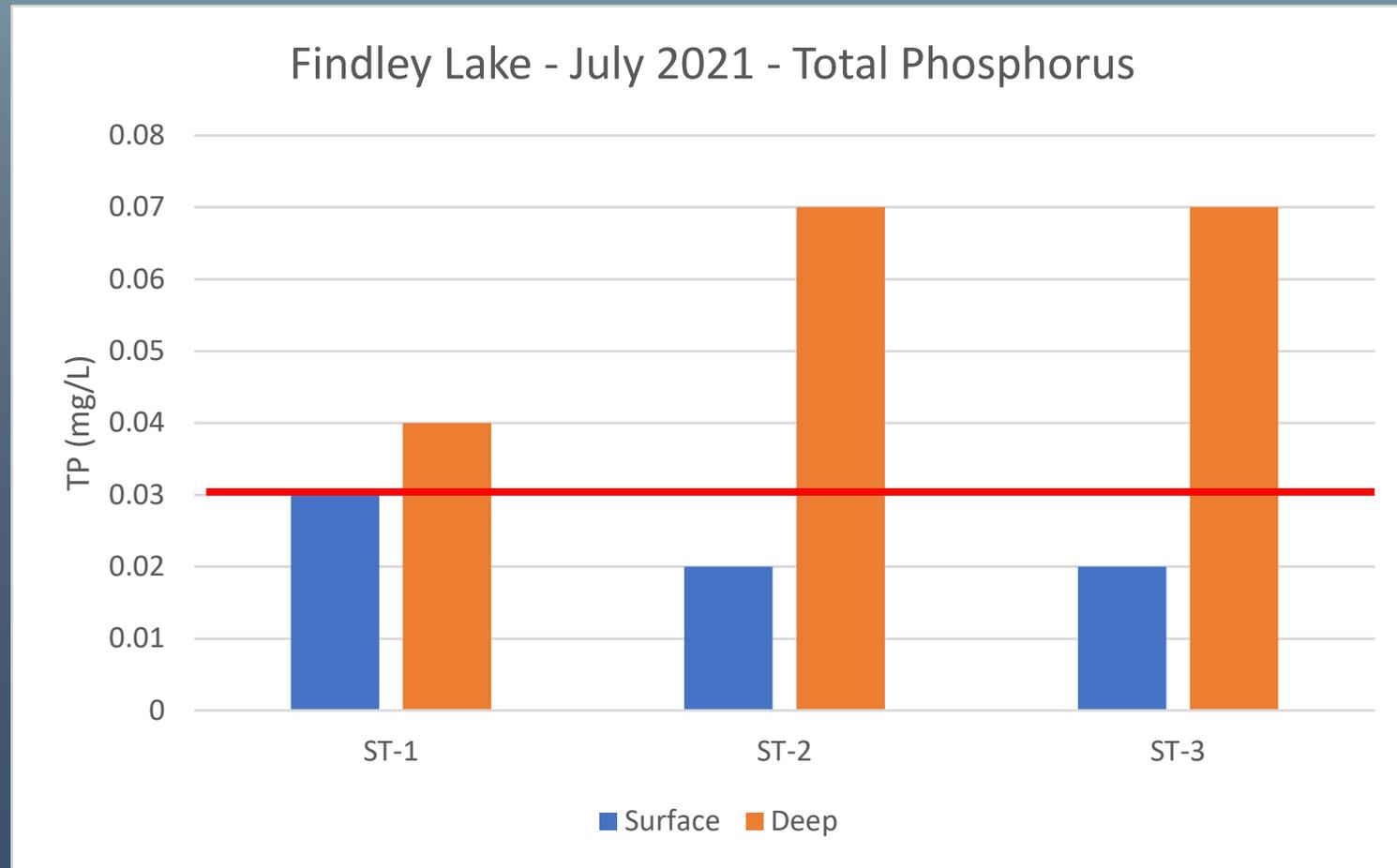


ST-2 Dissolved Oxygen

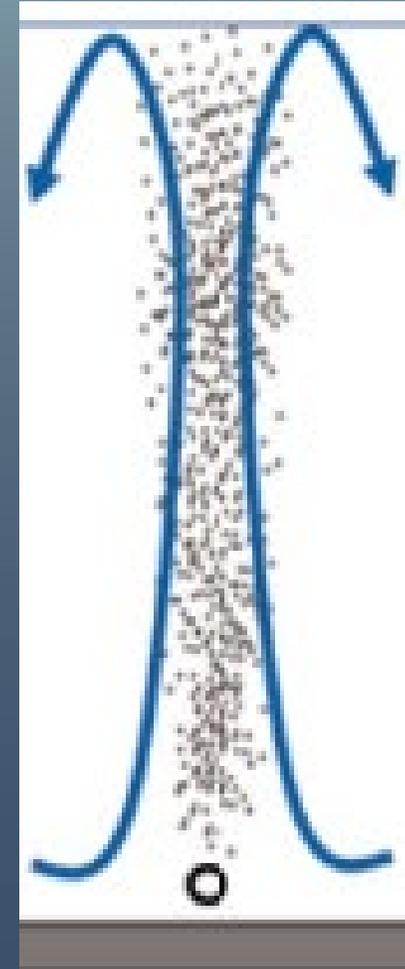
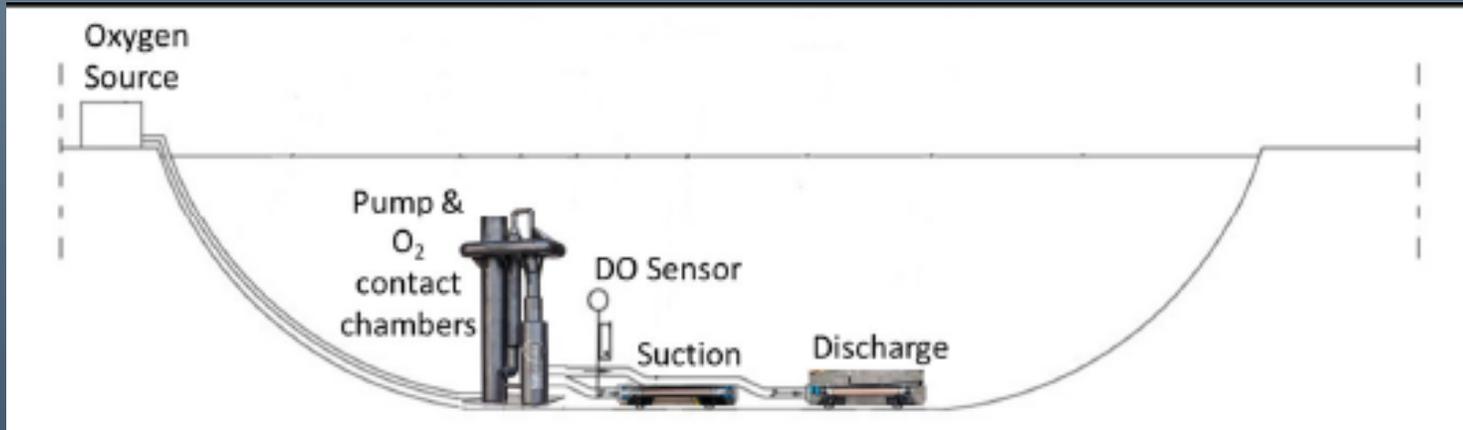


Orange – WQ Standard
Red Line – Anoxia

Total Phosphorus

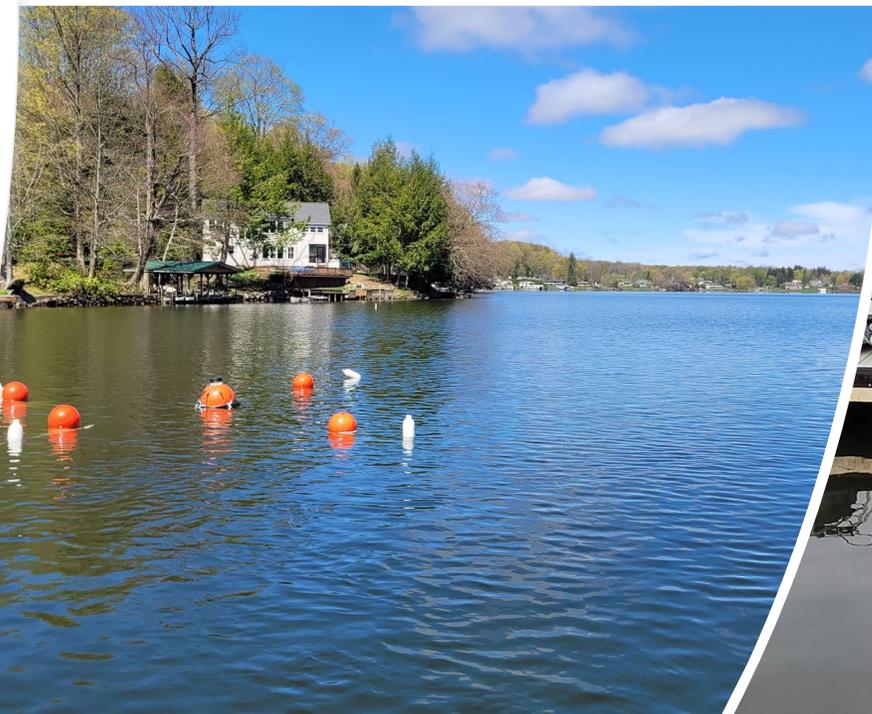


Aeration / Oxygenation

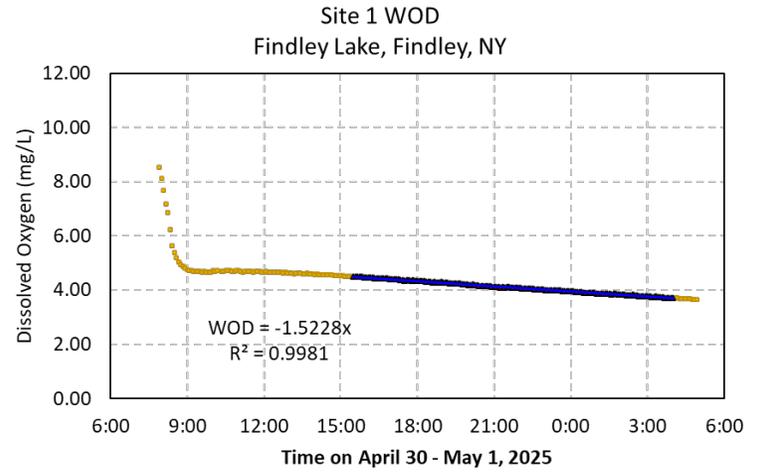
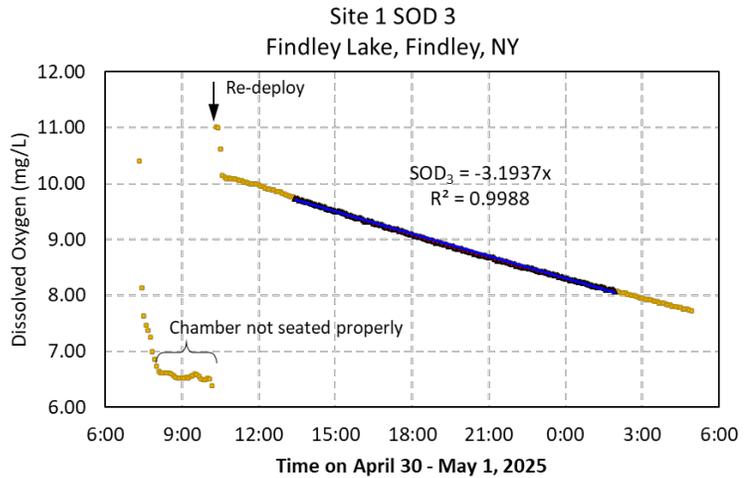
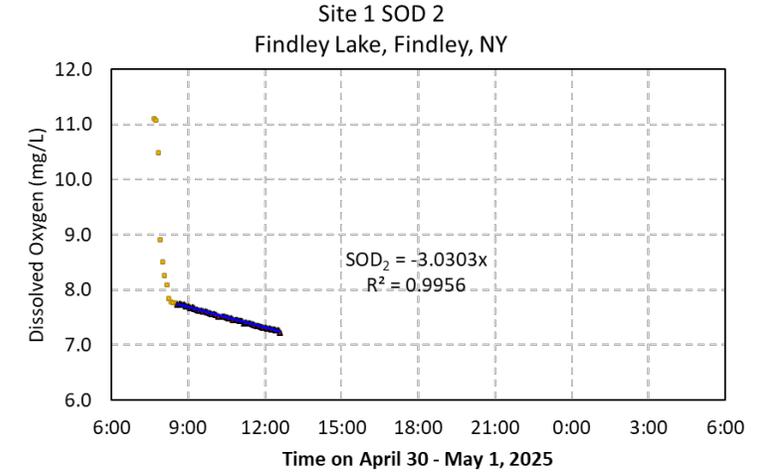
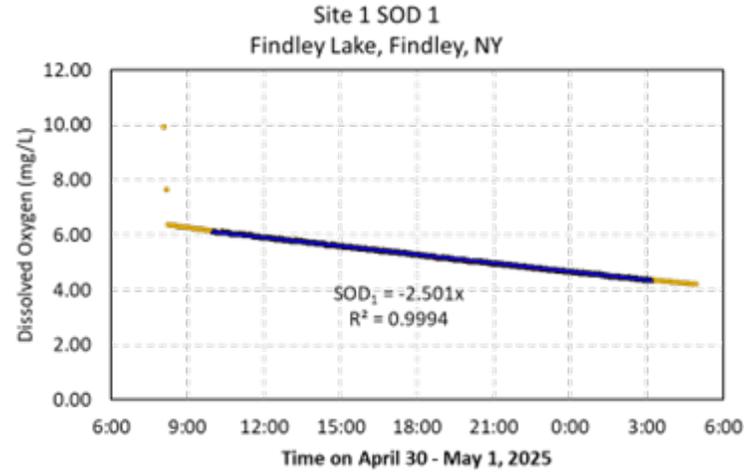


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SOD Analysis – Princeton Hydro & Clarity Resources Group



Findley Lake – SOD Analysis

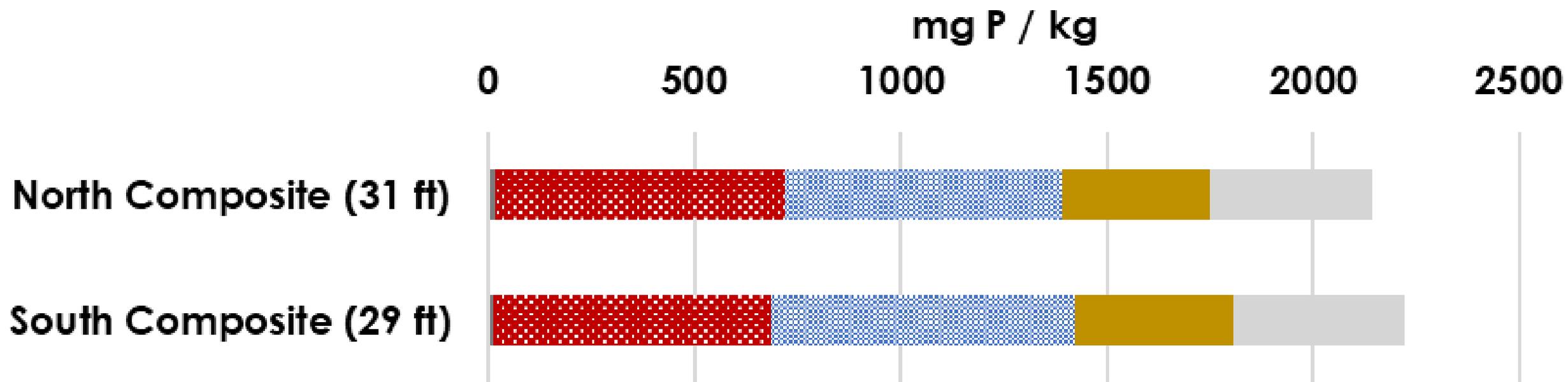


SOD Rates

Location	Sample	Observed Rate of Change (mg/L day)	R ²	SOD (g/m ² day)	Average (g/m ² day)	Std Dev	Coefficient of Variation (%)	Water Temp (°C)	SOD @ 12° C (g/m ² day)	SOD @ 15° C (g/m ² day)
Findley Lake	SOD ₁	2.501	0.999	0.601	0.699	0.087	12.4	8.4	0.82	0.95
	SOD ₂	3.029	0.996	0.728						
	SOD ₃	3.194	0.999	0.767						
	WOD*	1.523	0.998	0.366						

** WOD chamber not representative of water column demand. Chamber flush tubing was observed to have entrained sediment and sediment was observed in the chamber upon recovery.*

Sediment Bound Phosphorus

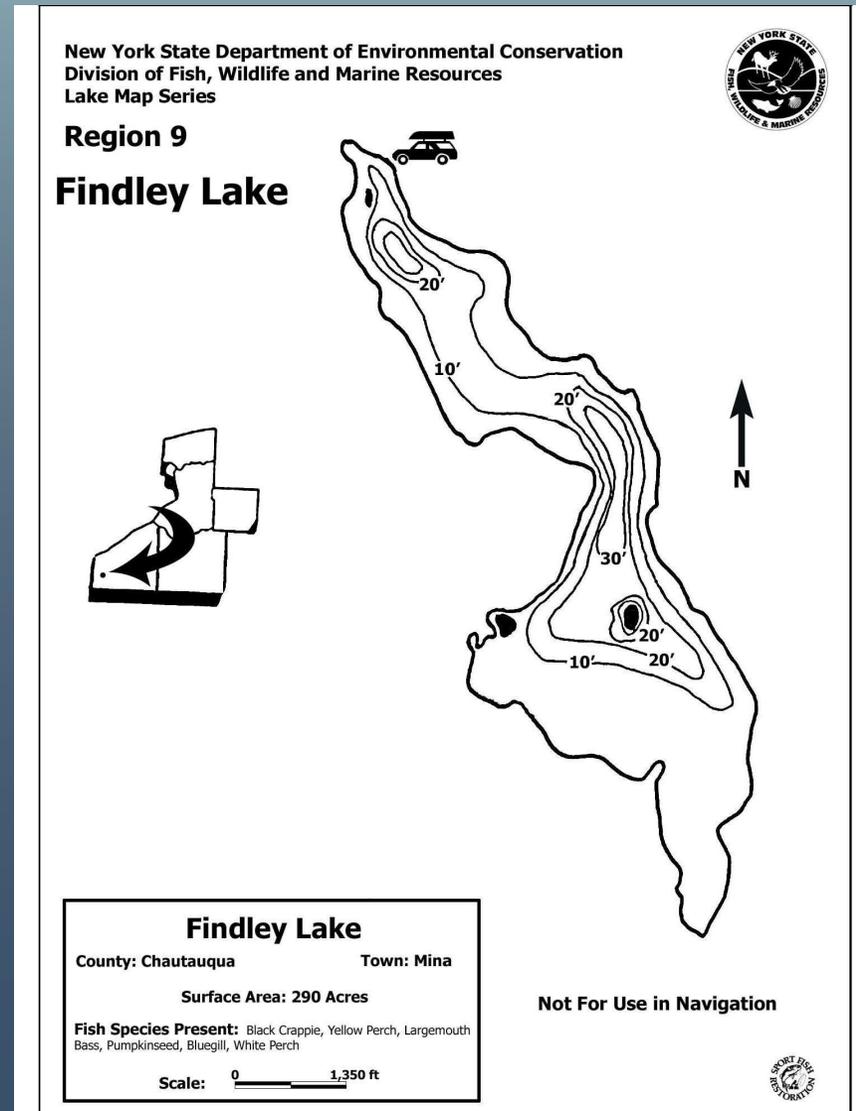


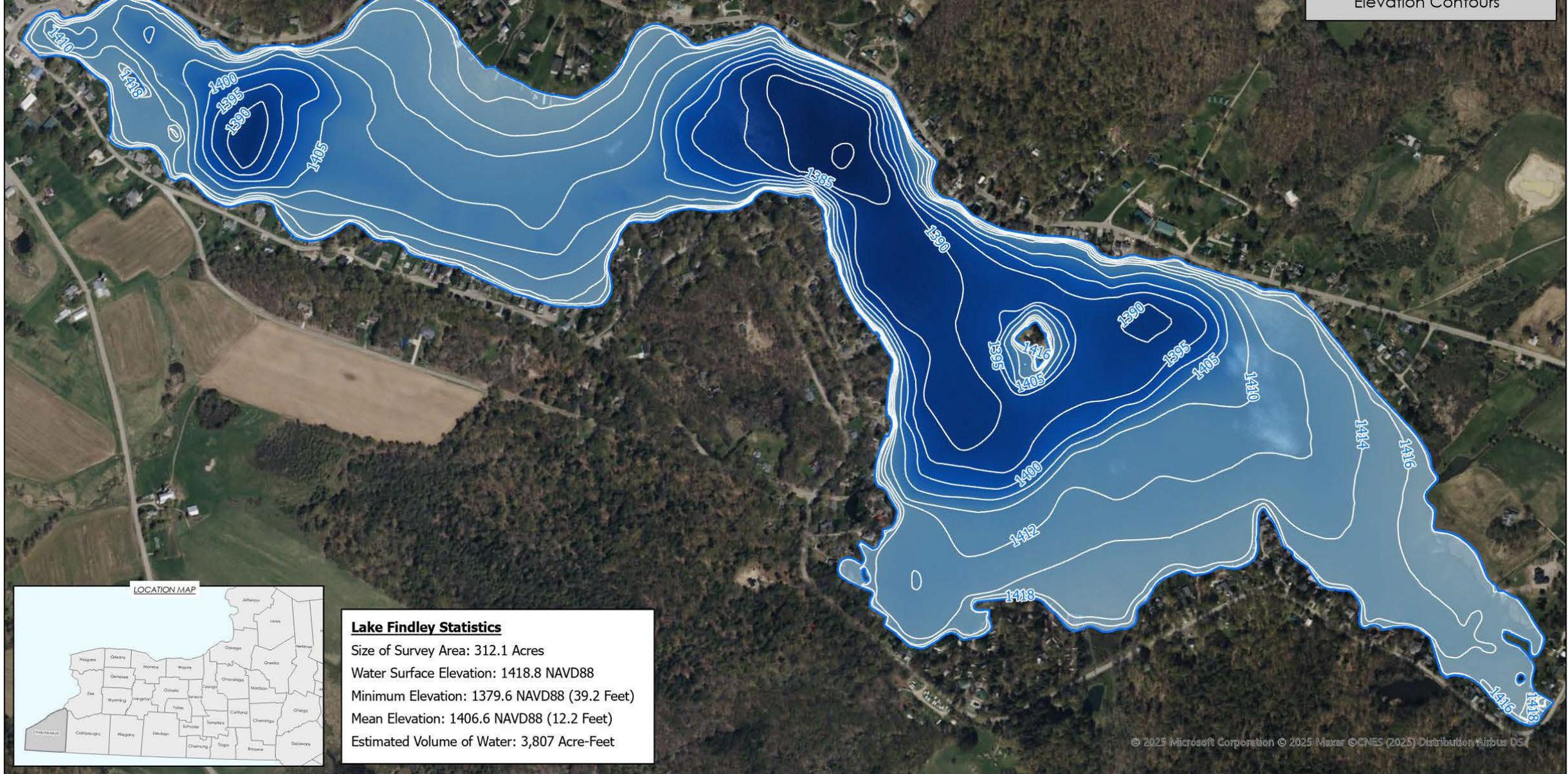
	South Composite (29 ft)	North Composite (31 ft)
■ Labile-P	14	15
■ Fe-P	669	706
■ Al-P	741	672
■ Organic-P	381	355
■ Ca-P	415	394

Sediment Phosphorus / Iron Data

- ✓ Sediment TP - > 500 mg/kg considered high
 - Findley – **2,181** mg/kg
- ✓ Iron bound P > 50 mg/kg considered high, > 500 mg/kg very high
 - Findley – **688** mg/kg
- ✓ Sediment Iron to TP ratio – 15 or above for binding
 - Findley - **16**

Findley Lake – Bathymetry

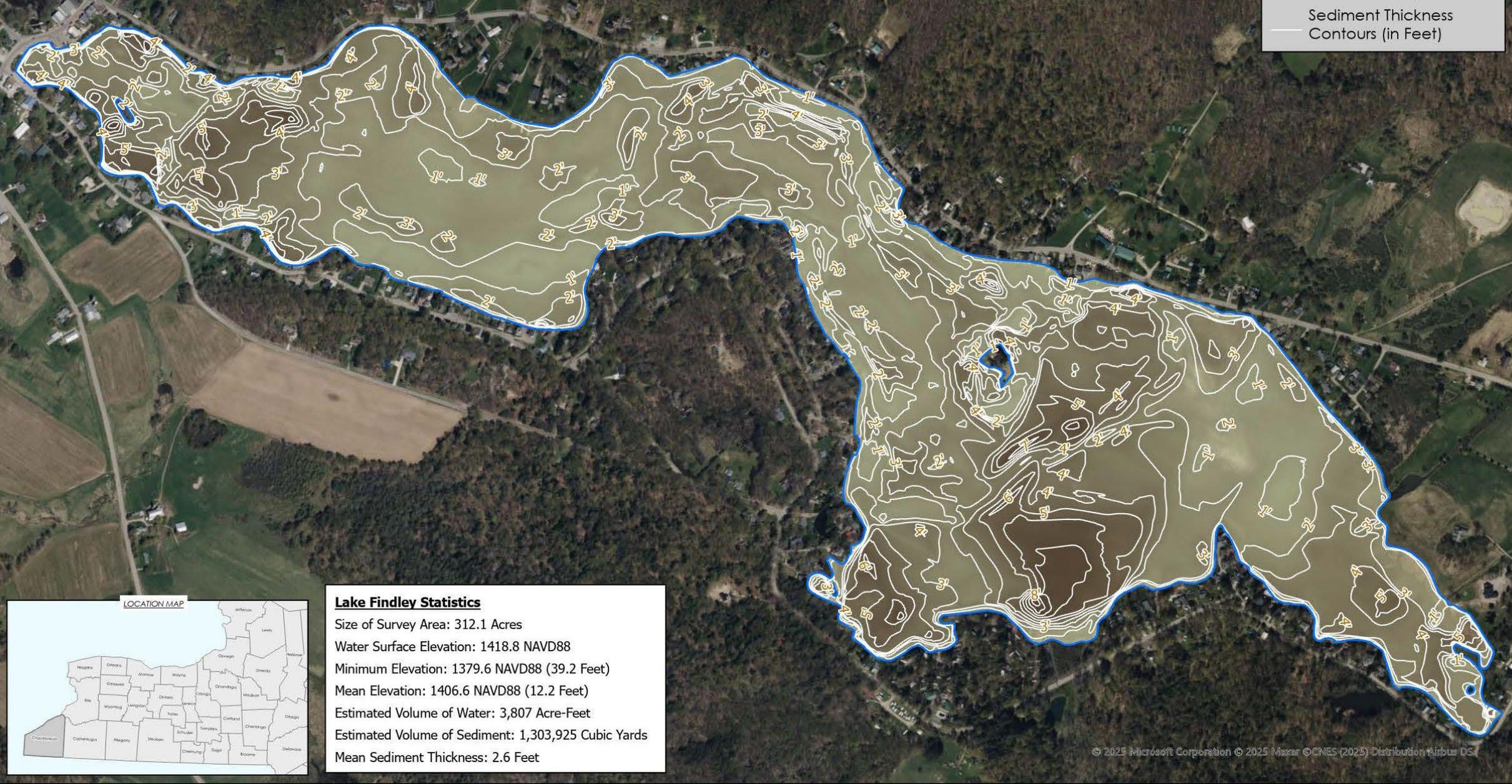




Lake Findley Statistics
 Size of Survey Area: 312.1 Acres
 Water Surface Elevation: 1418.8 NAVD88
 Minimum Elevation: 1379.6 NAVD88 (39.2 Feet)
 Mean Elevation: 1406.6 NAVD88 (12.2 Feet)
 Estimated Volume of Water: 3,807 Acre-Feet

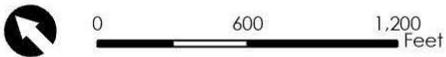
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Sediment Thickness
Contours (in Feet)



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Minimum Elevation: 1379.6 NAVD88 (39.2 Feet)
Mean Elevation: 1406.6 NAVD88 (12.2 Feet)
Estimated Volume of Water: 3,807 Acre-Feet
Estimated Volume of Sediment: 1,303,925 Cubic Yards
Mean Sediment Thickness: 2.6 Feet

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Next Steps

- ✓ Initiate planning and design phase
- ✓ Design and size system
 - Deciding on which system - OST / Line Diffuser
 - Compressor / O₂ generator needs
 - Number of OST units / size of line diffuser
 - Length of air tubing
 - Location of infrastructure
 - Power sources
- ✓ Consult with regulators for permitting
- ✓ 30%, 60%, 90-100% phases

Funding

- ✓ We are investigating the NY Non-Point Source Grant program which may fund up to \$50,000 for planning efforts

QUESTIONS?



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THANK
YOU!

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