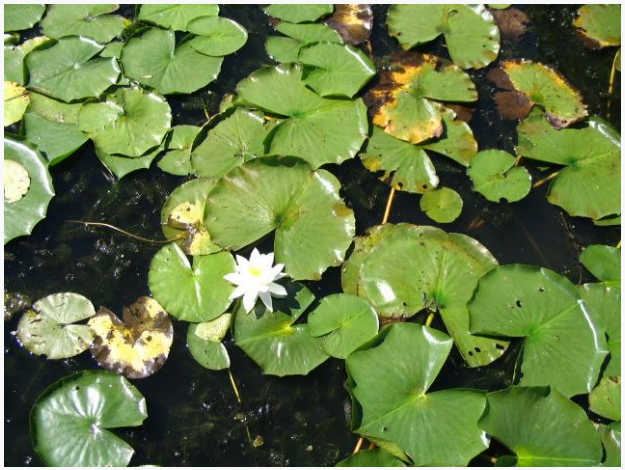

Cedar Island-Pike-Eagle Lakes

TMDL Update

Shingle Creek Watershed Management Commission

Maple Grove
Lake Quality Commission
September 16, 2015

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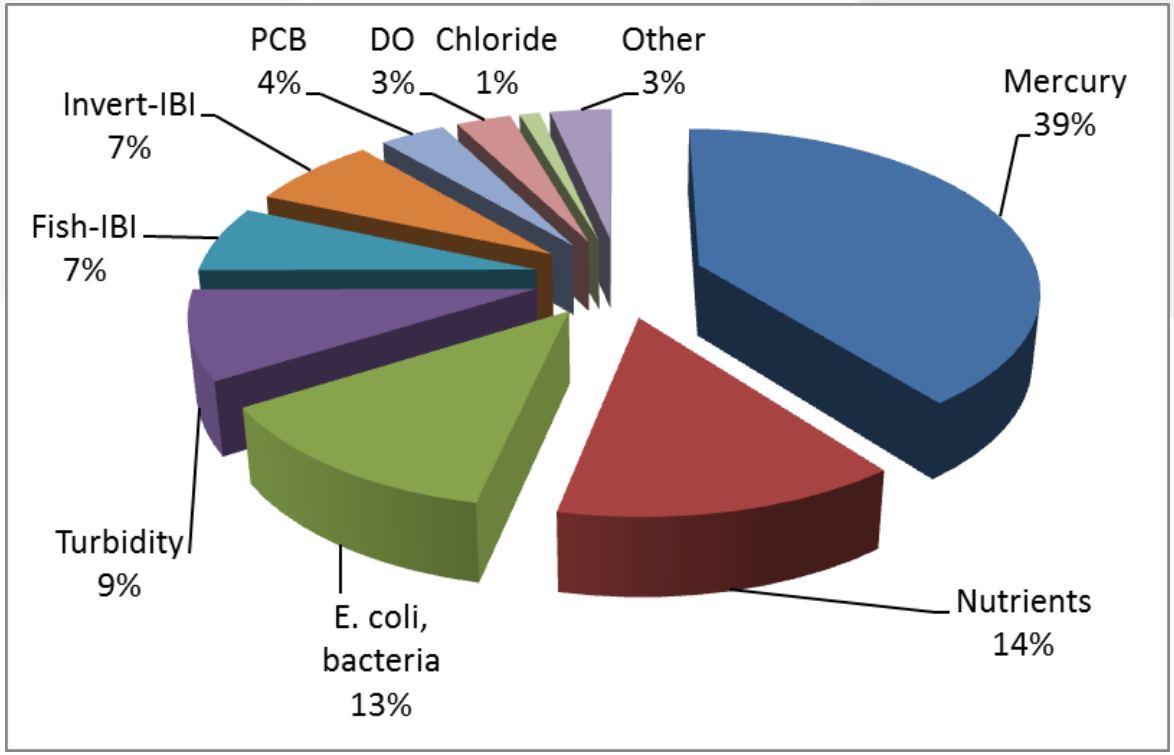
Responsive partner.
Exceptional outcomes.

Minnesota 2014 Impaired Waters

- 4,114 Impairments
  - Mercury: 1,650
  - Nutrients: 573
  - *E. coli*: 533
  - Turbidity: 368
- 35 Restored Waters
  - 18 streams
  - 15 lakes (3 in SC)



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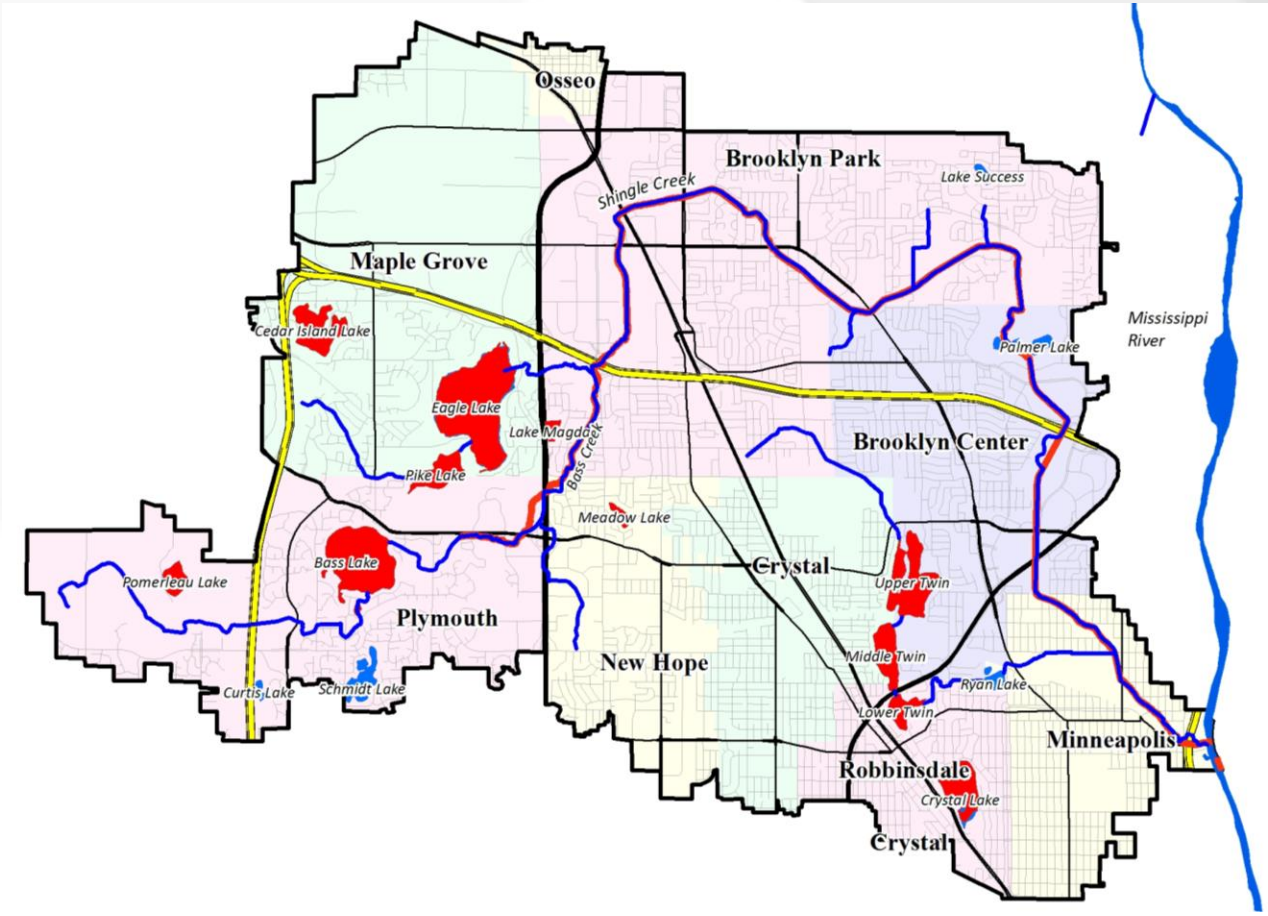
Shingle Creek Impaired Waters

- Shingle Creek: chloride, DO, *E. coli*, inverts
- Bass Creek: chloride, fish
- Mississippi River: mercury, PCB, fecal coliform bacteria
- 10 lakes: nutrients
- 3 lakes: delisted
- 3 lakes: not listed



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TMDL 5 Year Reviews

TMDL	Approved	5 Year Review
Shingle Creek Chloride	February 2007	2014, 2019
Twin and Ryan	November 2007	2014, 2020
Crystal	March 2009	2015, 2020
Pomerleau, Bass, and Schmidt	September 2009	2015, 2021
Meadow	March 2010	2017, 2022
Cedar Island, Pike, and Eagle	April 2010	2016, 2022
Magda	September 2010	2017, 2022
Shingle and Bass Creeks Biotic Integrity and Dissolved Oxygen	November 2011	2018, 2023
Bass Creek Chloride	In final review period	2019, 2024

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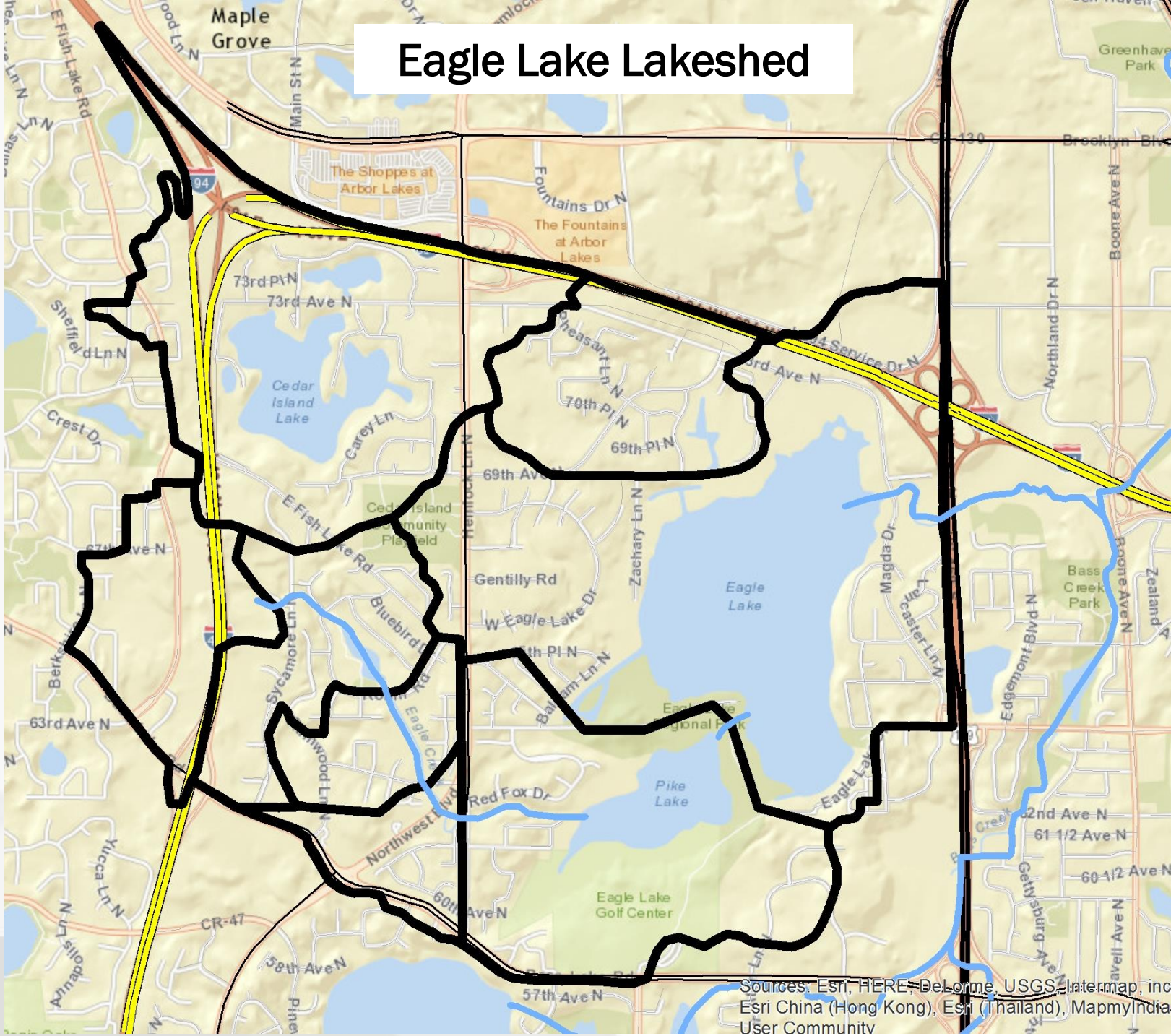
Eagle Lake Lakeshed



Lake Characteristics

Parameter	Cedar Island	Pike	Eagle
Surface Area (ac)	79	60	287
Average depth (ft)	3.6	8.6	10.4
Maximum depth (ft)	7	22	34
Volume (ac-ft)	285	514	2,991
Residence Time (yrs)	0.6	0.5	0.64
Littoral Area (ac)	79 (100%)	55 (95%)	199 (68%)
Watershed (ac)	642	1,071	2,879

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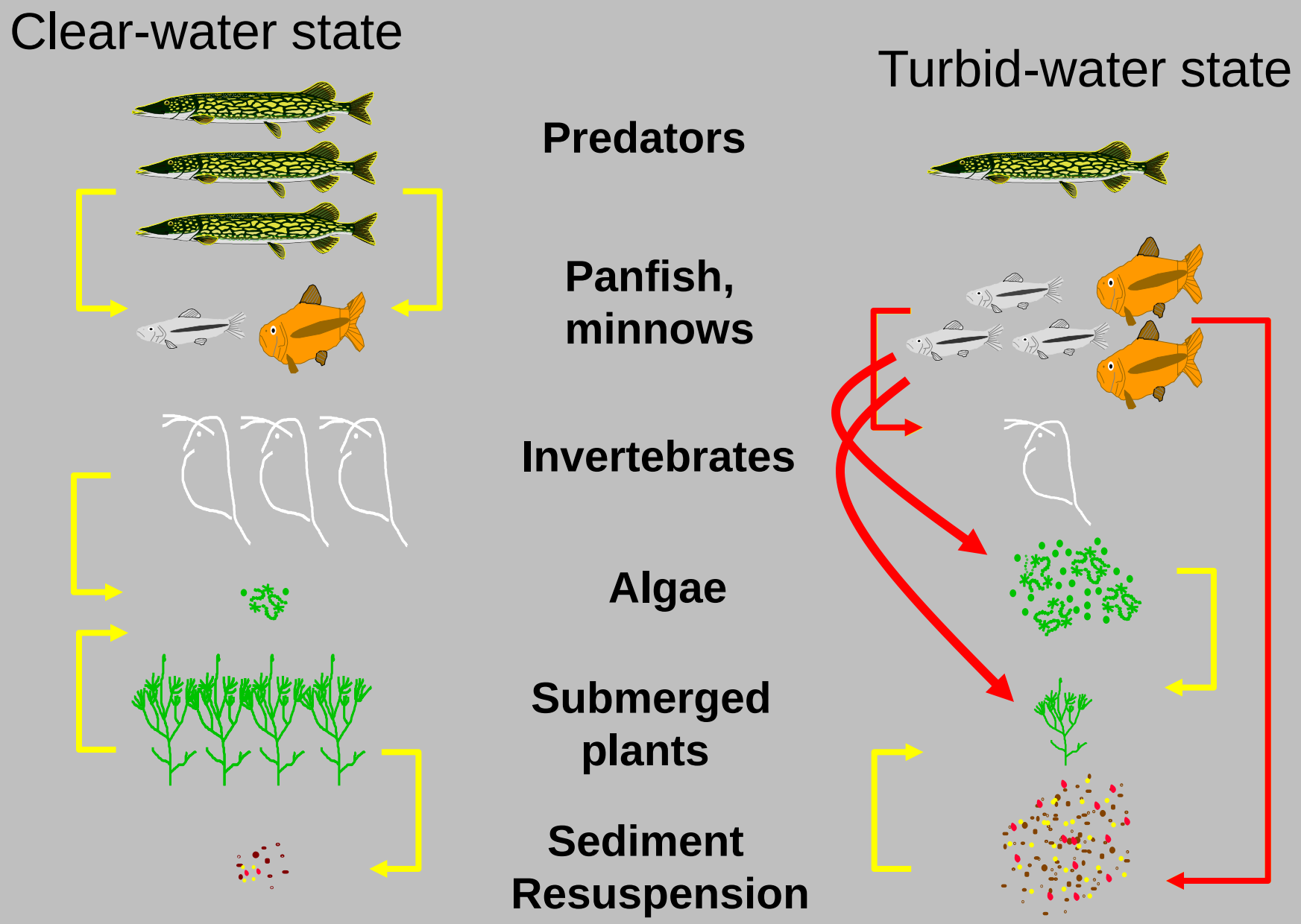
TMDL Load Reductions

Lake	Source	TP Annual Load (lbs/yr)		Load Reduction	
		Current	TMDL	Lbs/yr	%
Cedar Island Lake	Stormwater Load	244.2	106.7	137.5	56%
	Atmospheric Load	18.9	18.9	--	--
	Internal Load	248.8	41.6	207.2	83%
	TOTAL LOAD	**511.9**	**167.2**	**344.7**	**67%**
Pike Lake	Stormwater Load	445.5	280.9	164.6	37%
	Atmospheric Load	14.3	14.3	--	--
	Internal Load	169.4	28.2	141.2	83%
	TOTAL LOAD	**629.2**	**323.4**	**305.8**	**49%**
Eagle Lake	Stormwater Load	674.5	411	263.5	39%
	Upstream Load	460.9	240	220.9	48%
	Atmospheric Load	68.4	68.4	--	--
	Internal Load	11	11	--	--
	TOTAL LOAD	**1,214.8**	**730.4**	**484.4**	**40%**

Shallow Lake Trophic Cascades



Adapted from Metropolitan Council Environmental Services

Strategies for Cedar Island Lake

- Focus on reducing internal load
- Update aquatic plant survey
  - Invasive species control where necessary
- Fish survey and rough fish removal?
- Internal load management such as lake drawdown, chemical treatment (for curly-leaf pondweed), etc.
- Reduce external loads where possible
  - Increase infiltration and filtration in lakeshed.
  - Encourage property owners to plant a native shoreline buffer.

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Strategies for Pike Lake

- Focus on reducing both external and internal loads
- Update aquatic plant survey
  - Invasive species control where necessary
- Fish survey and rough fish removal?

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Strategies for Eagle Lake

- Focus on reducing external loads
- Improve Cedar Island and Pike loads from upstream
- Update aquatic plant survey
  - Invasive species control where necessary
- Internal load management

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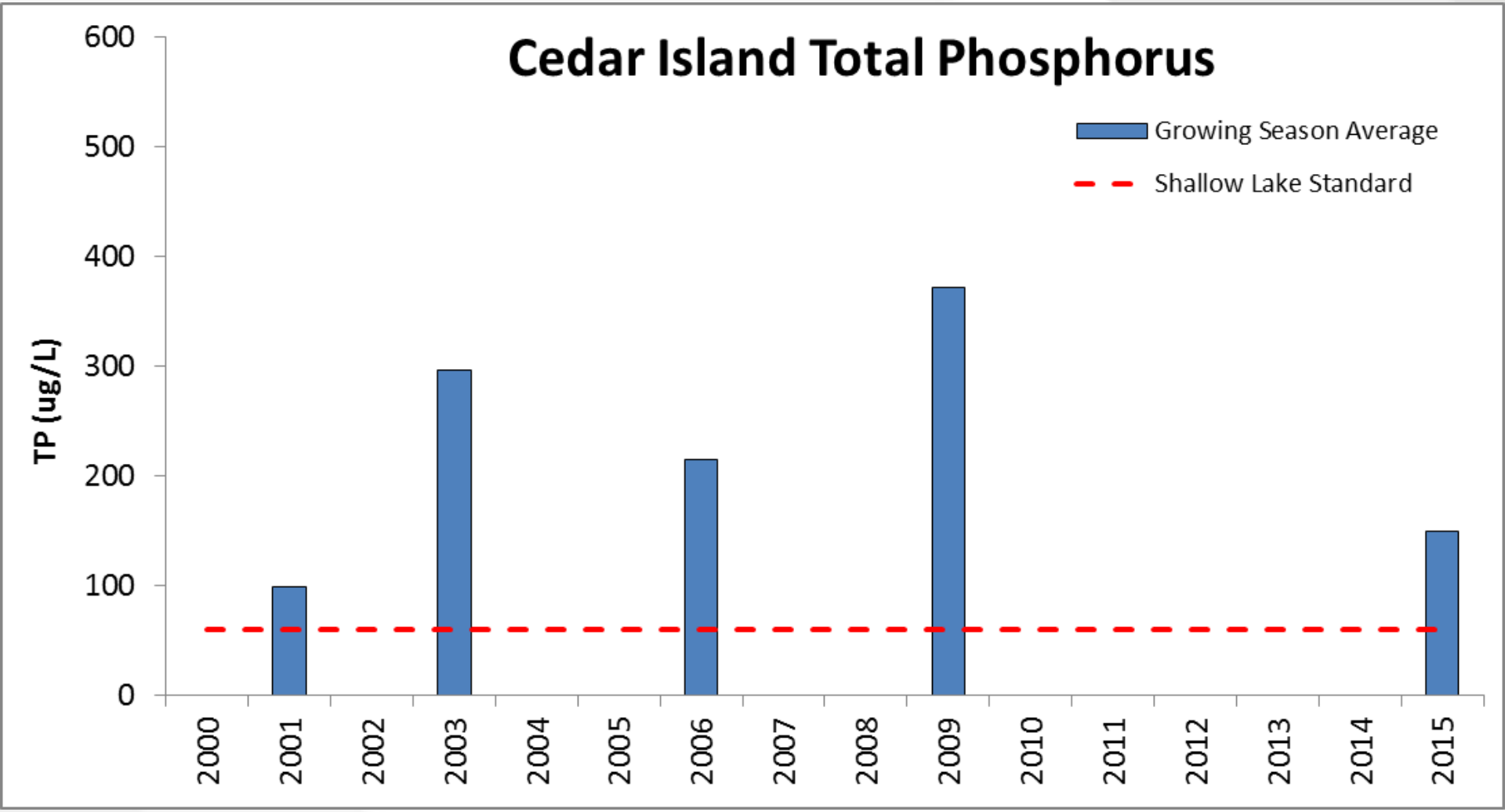
Cedar Island Water Quality



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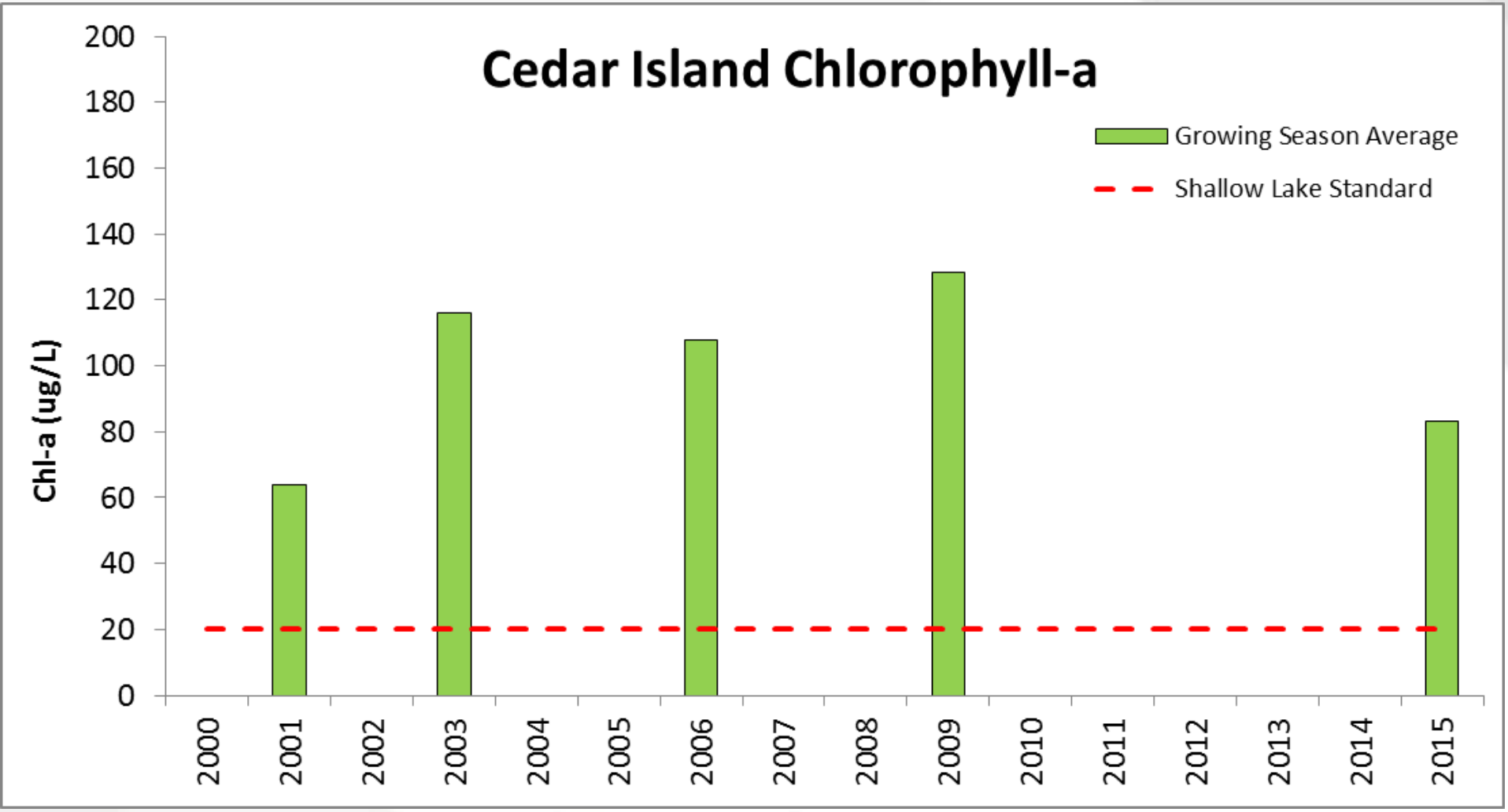
Cedar Island Water Quality



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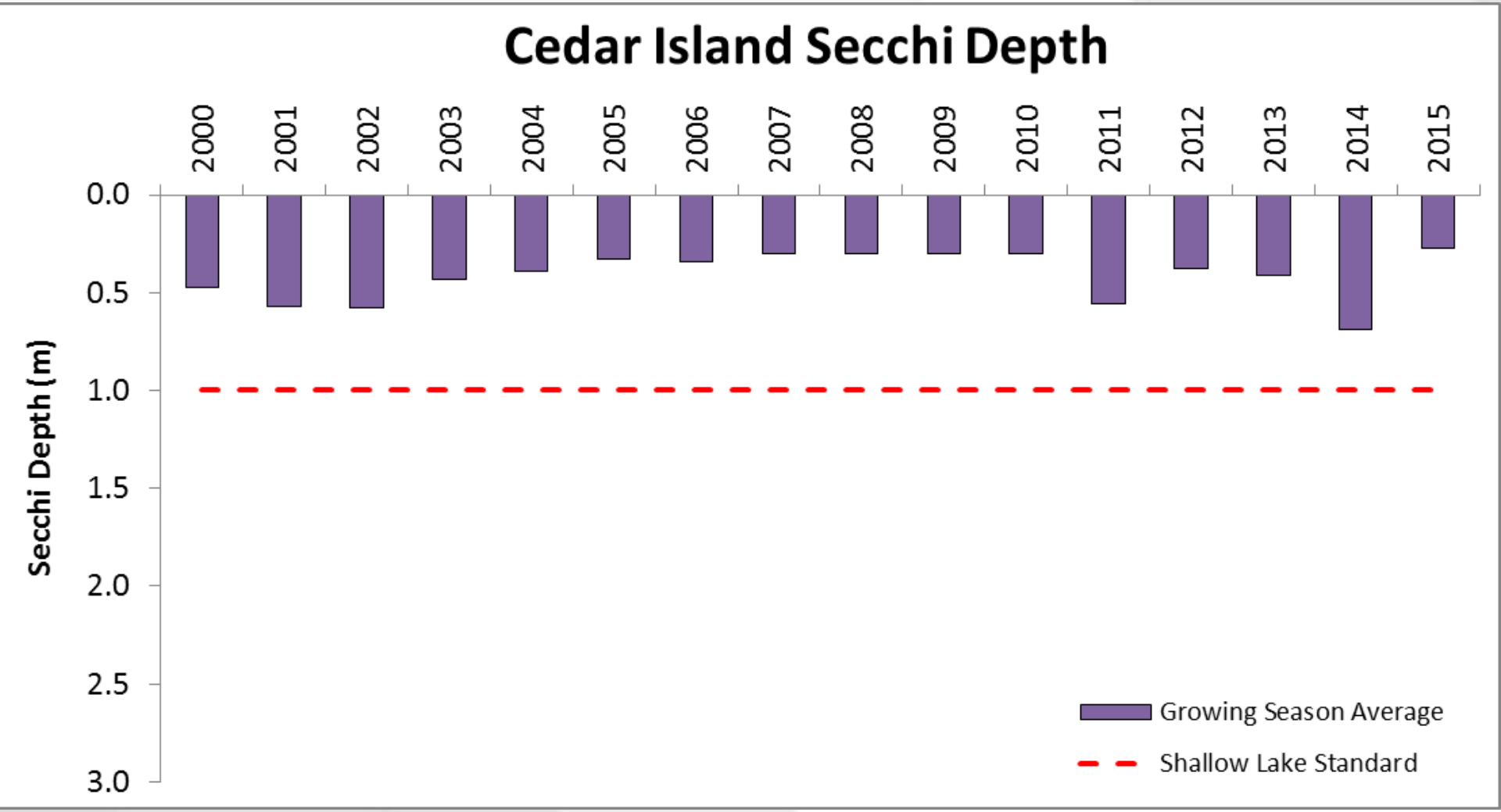
Cedar Island Water Quality



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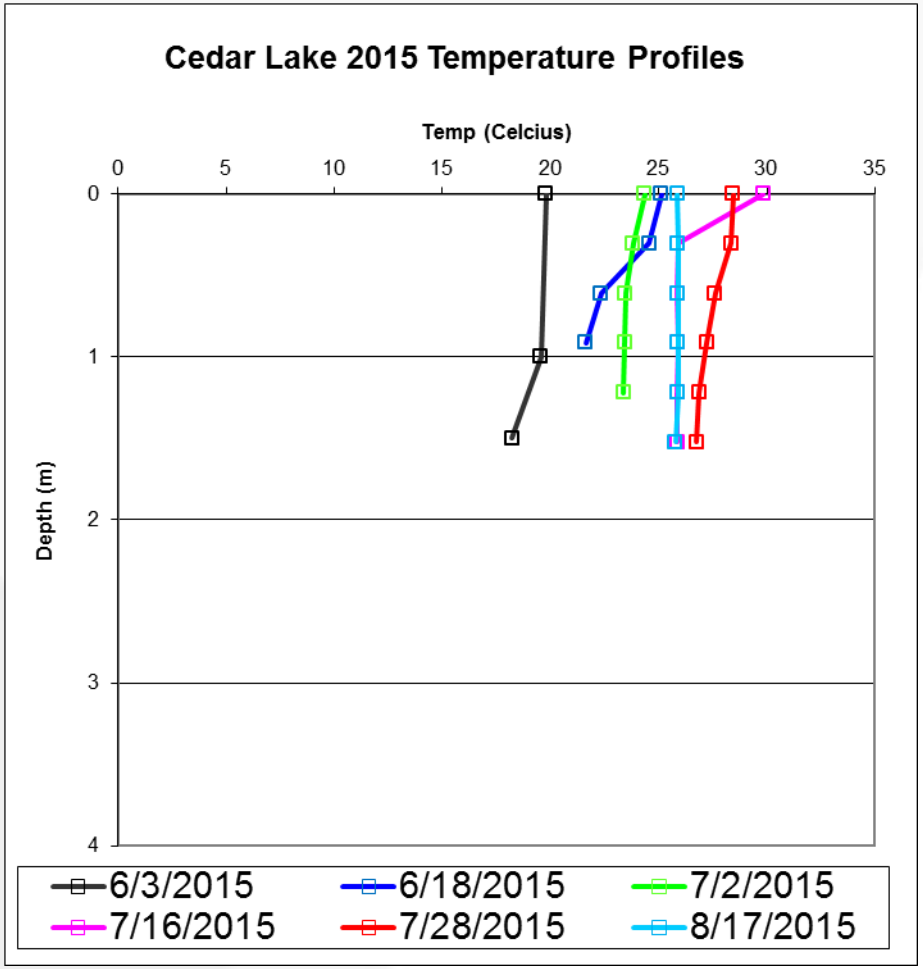
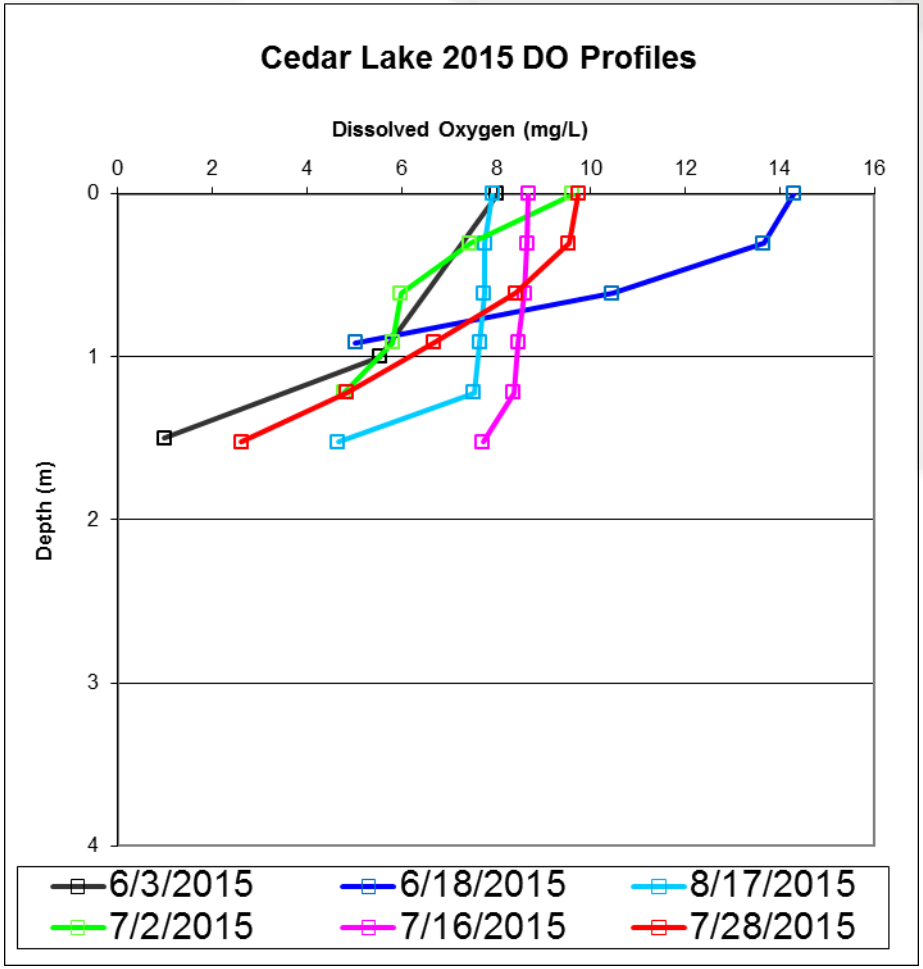
Profiles





Sediment release rate = 1.5 mg/m^2/day

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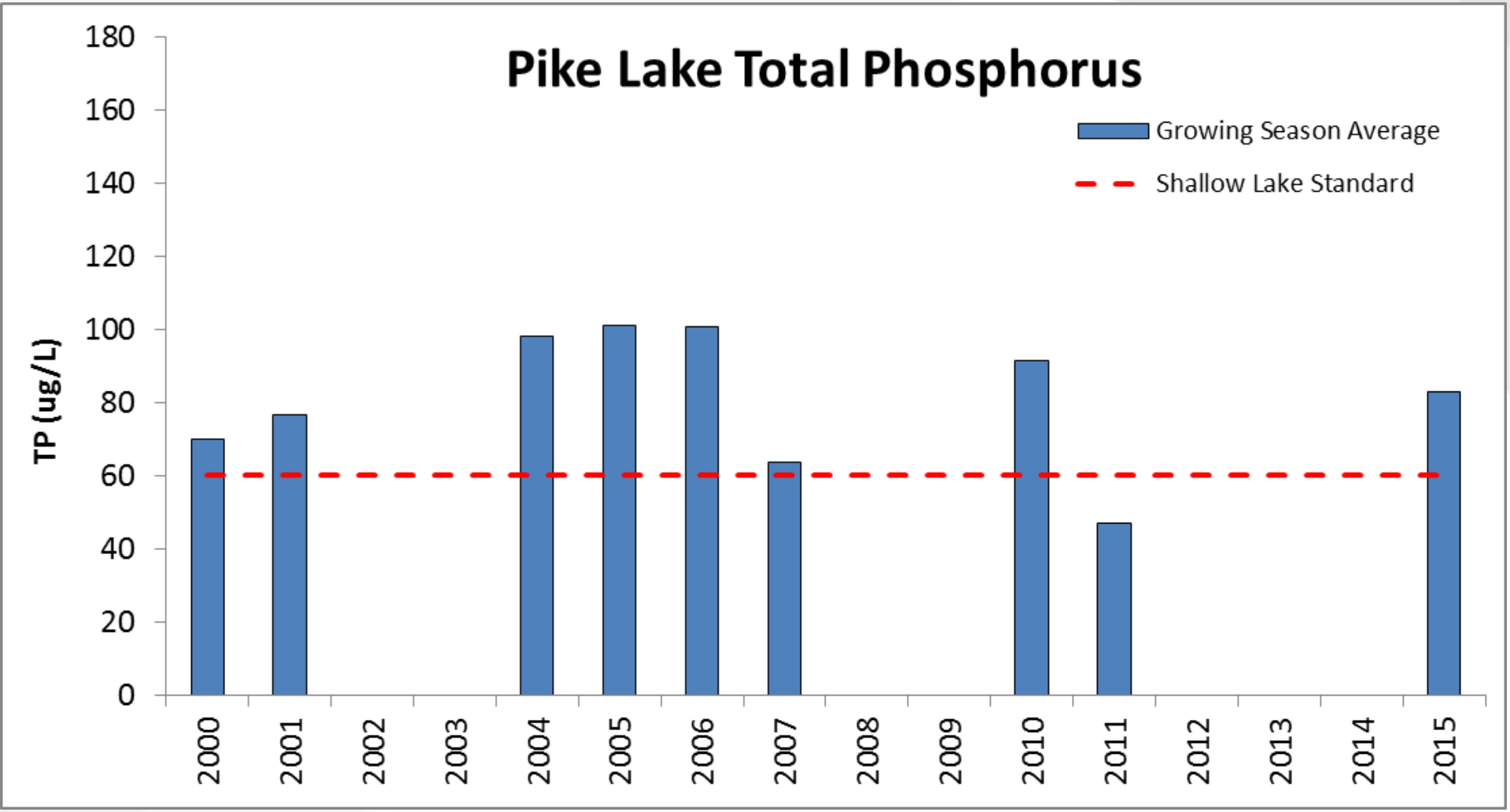
Pike Water Quality



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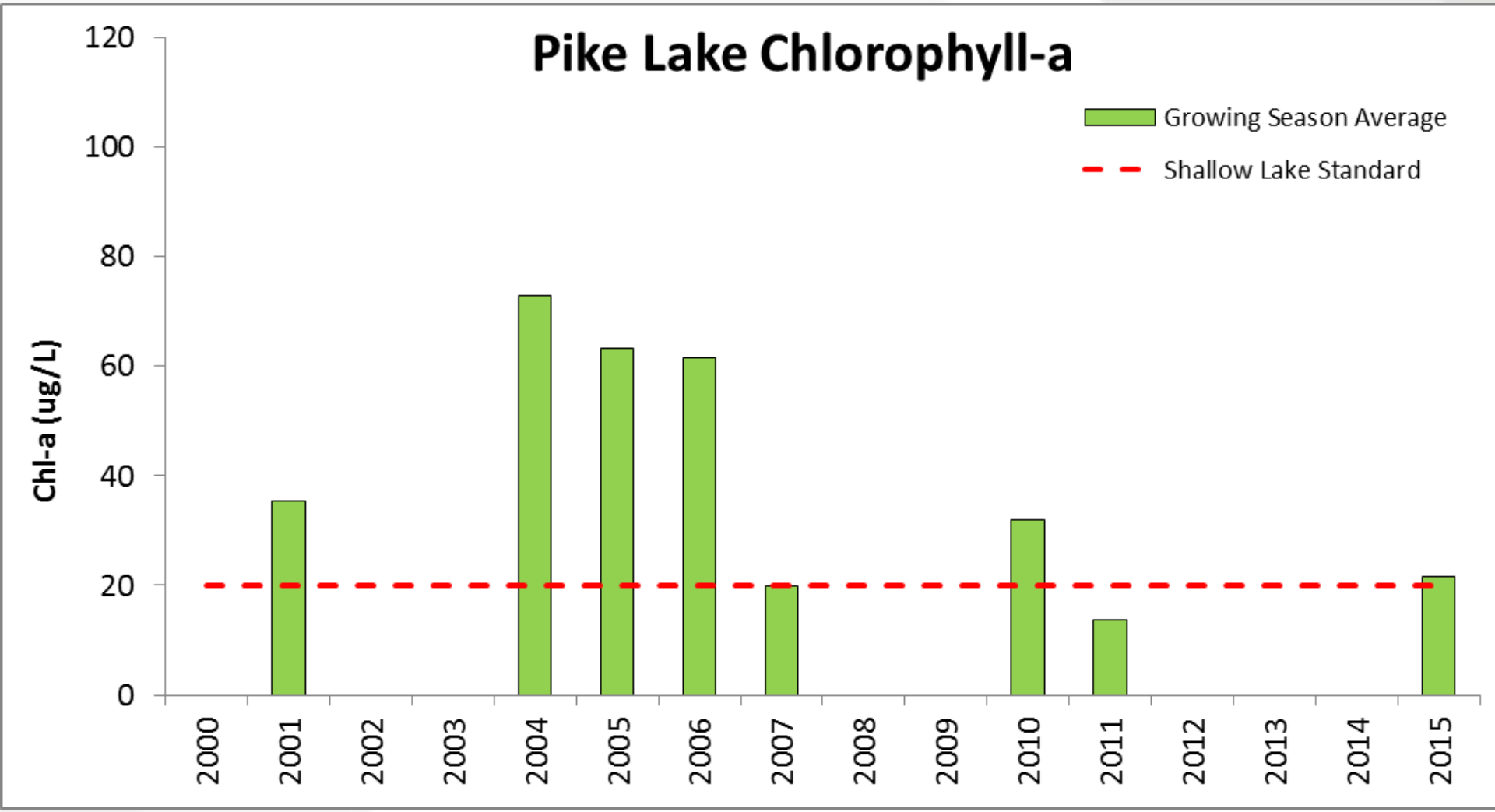
Pike Water Quality



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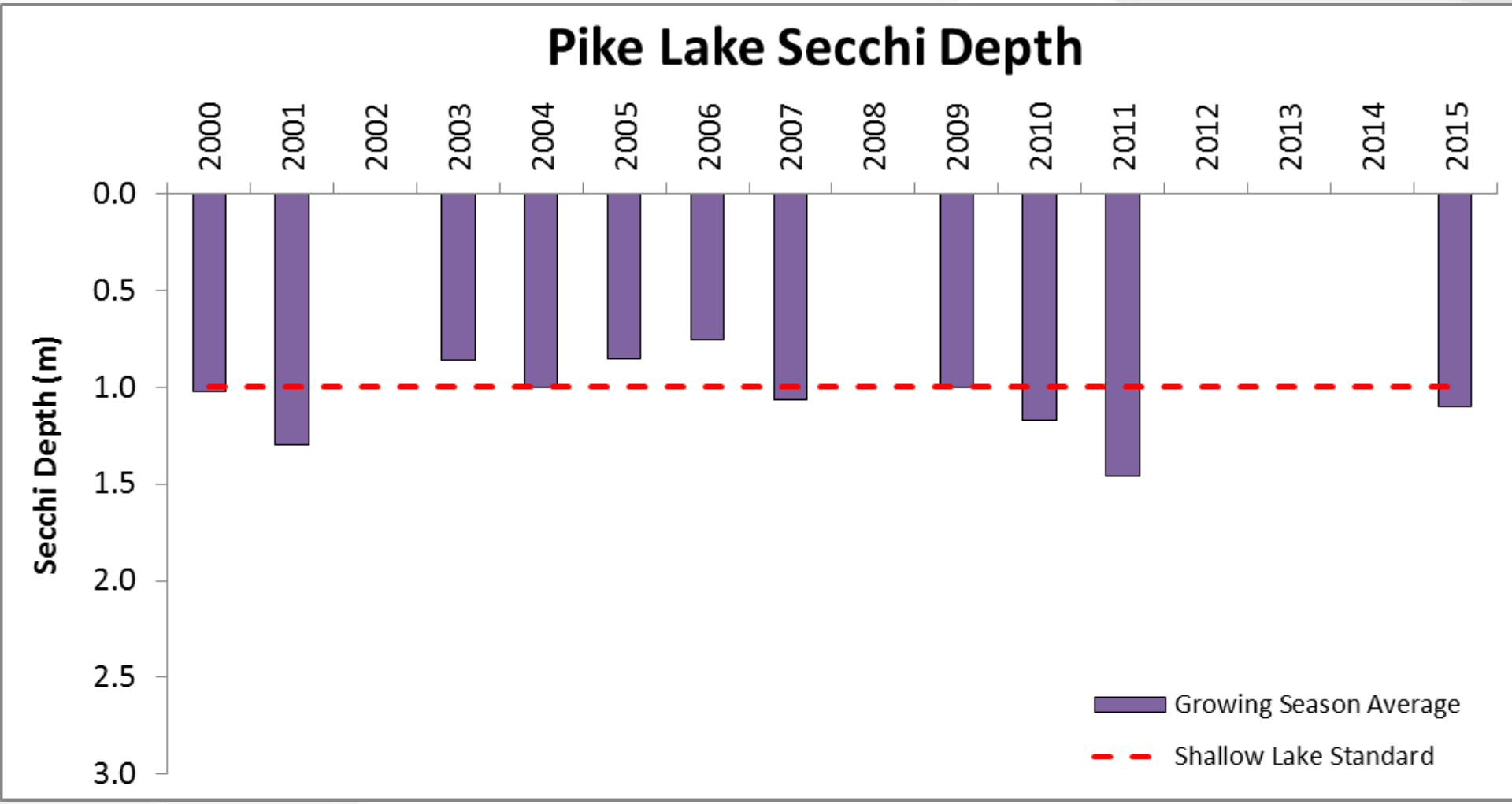
Pike Water Quality



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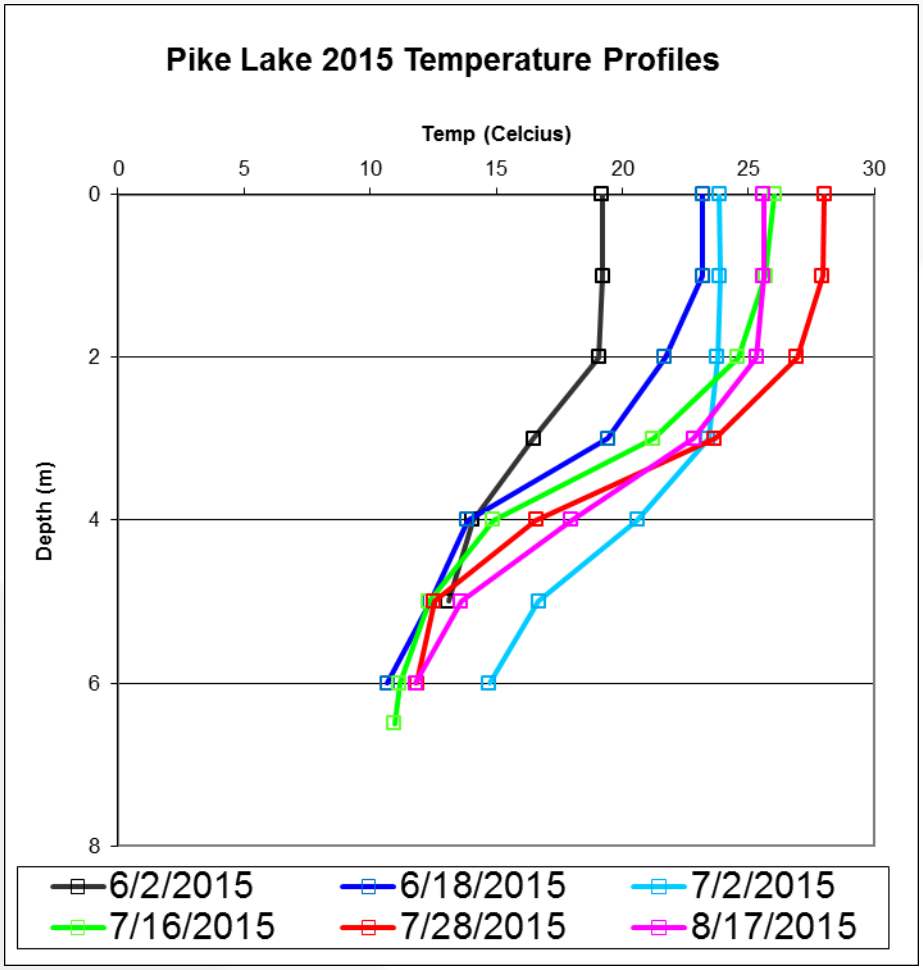
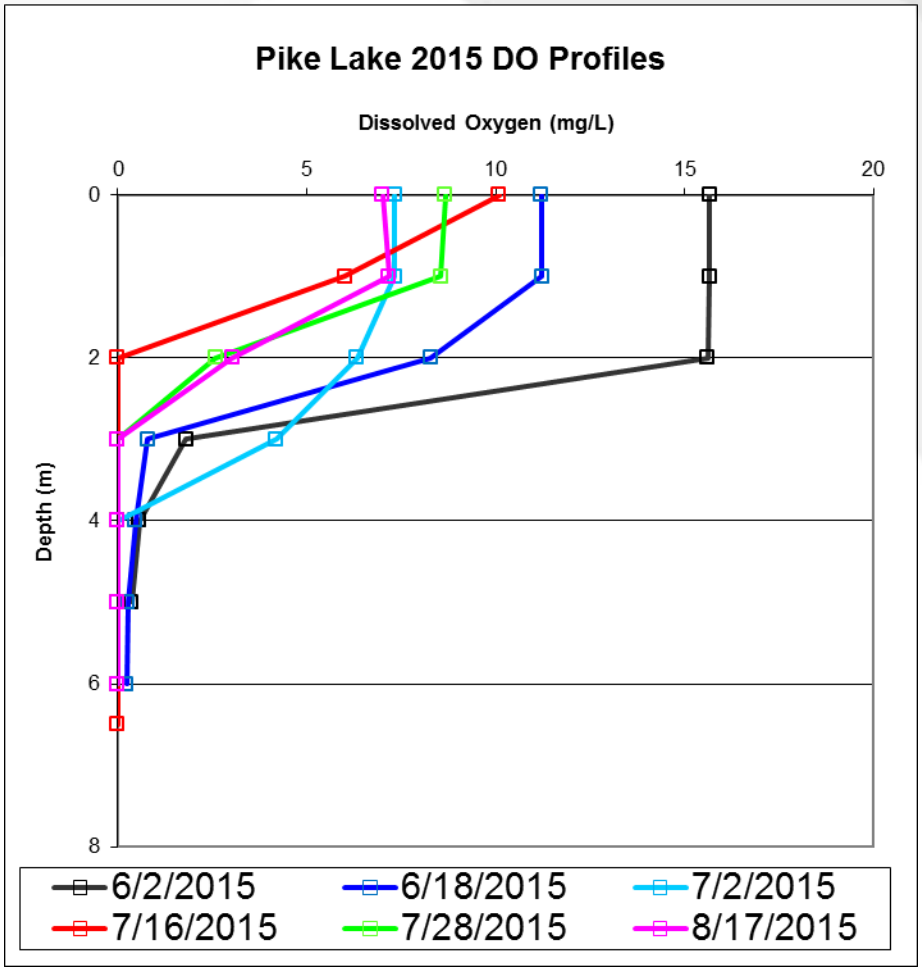
Profiles





Sediment release rate = 8.0 mg/m^2/day

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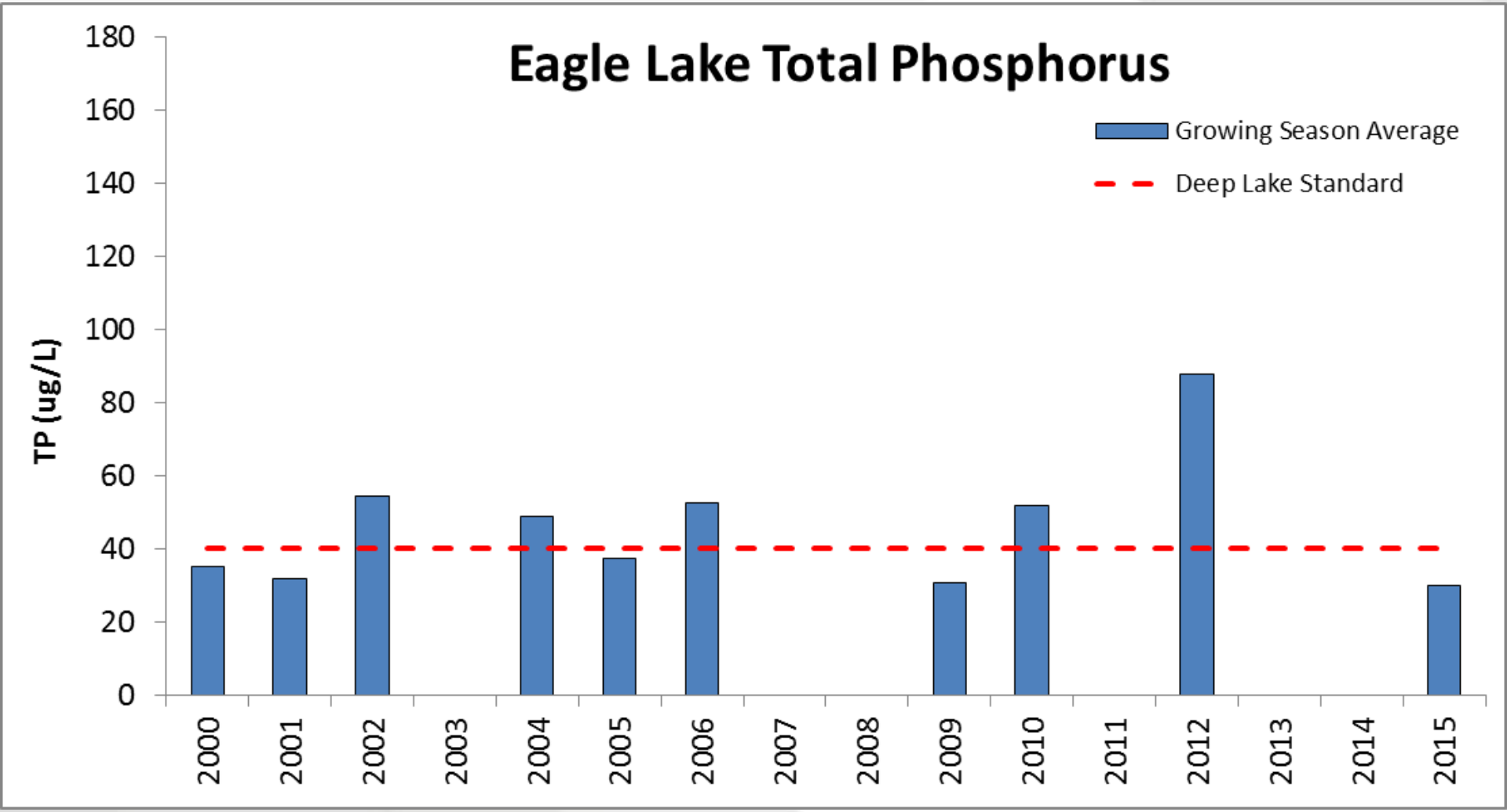
Eagle Water Quality



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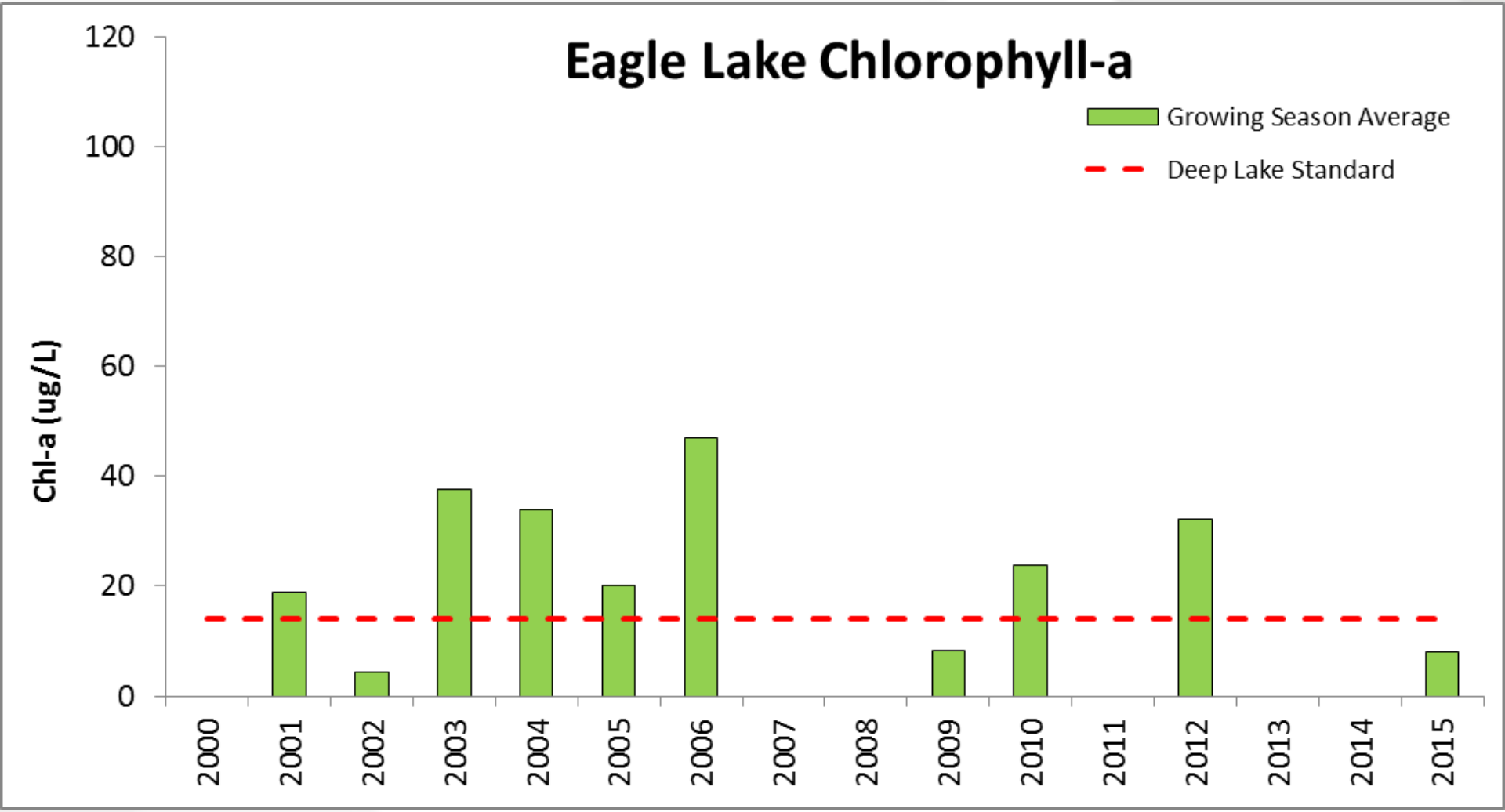
Eagle Water Quality



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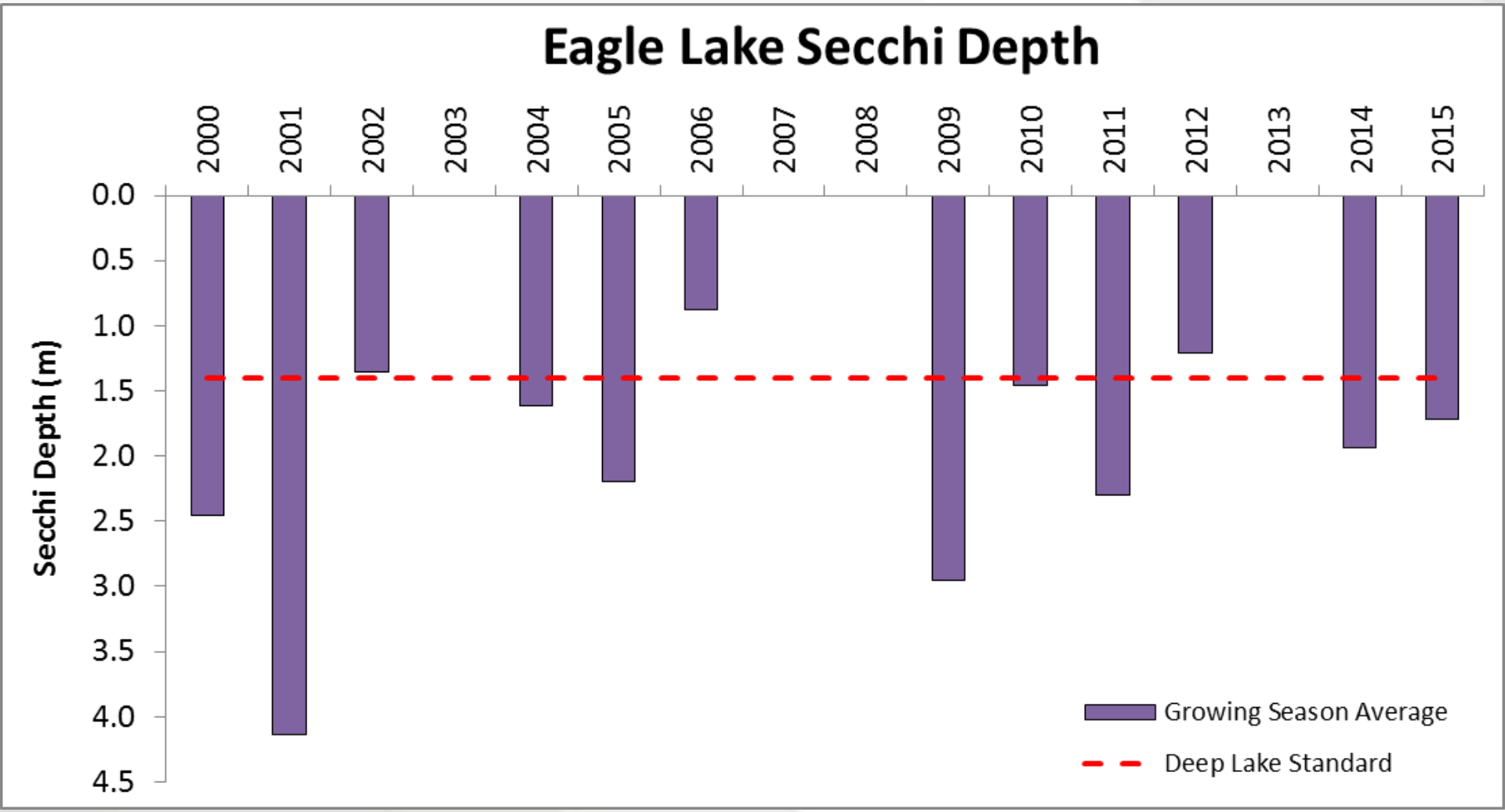
Eagle Water Quality



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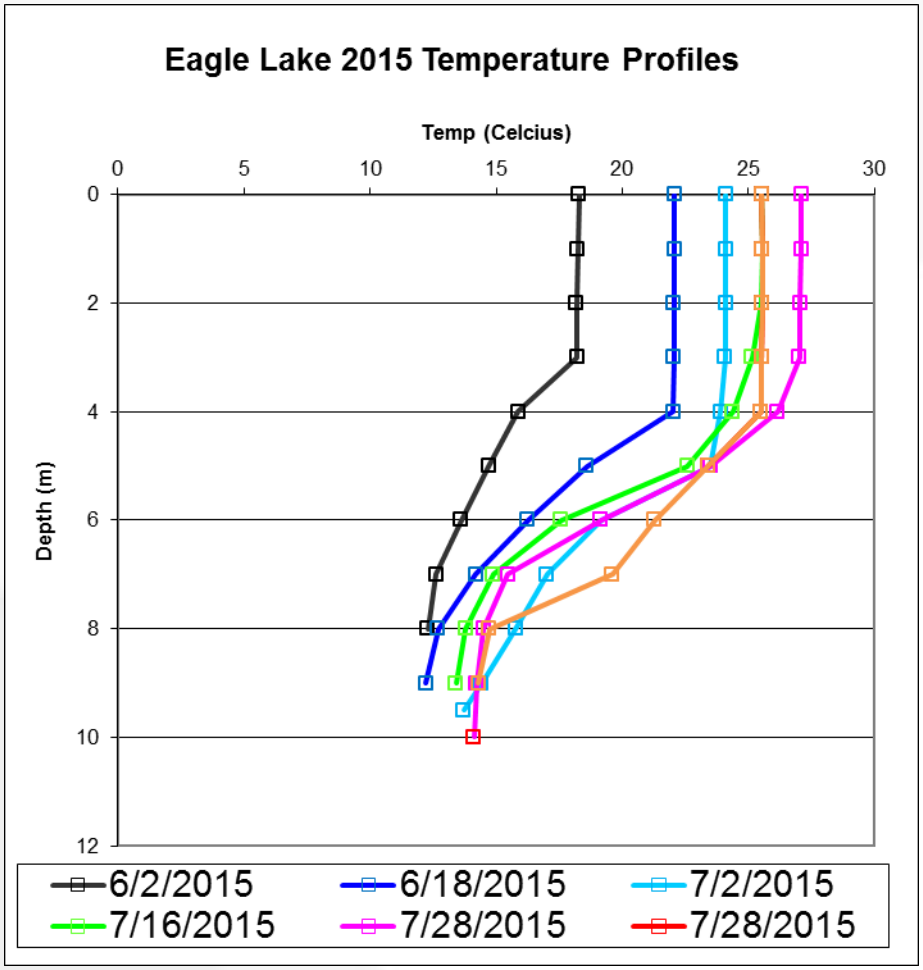
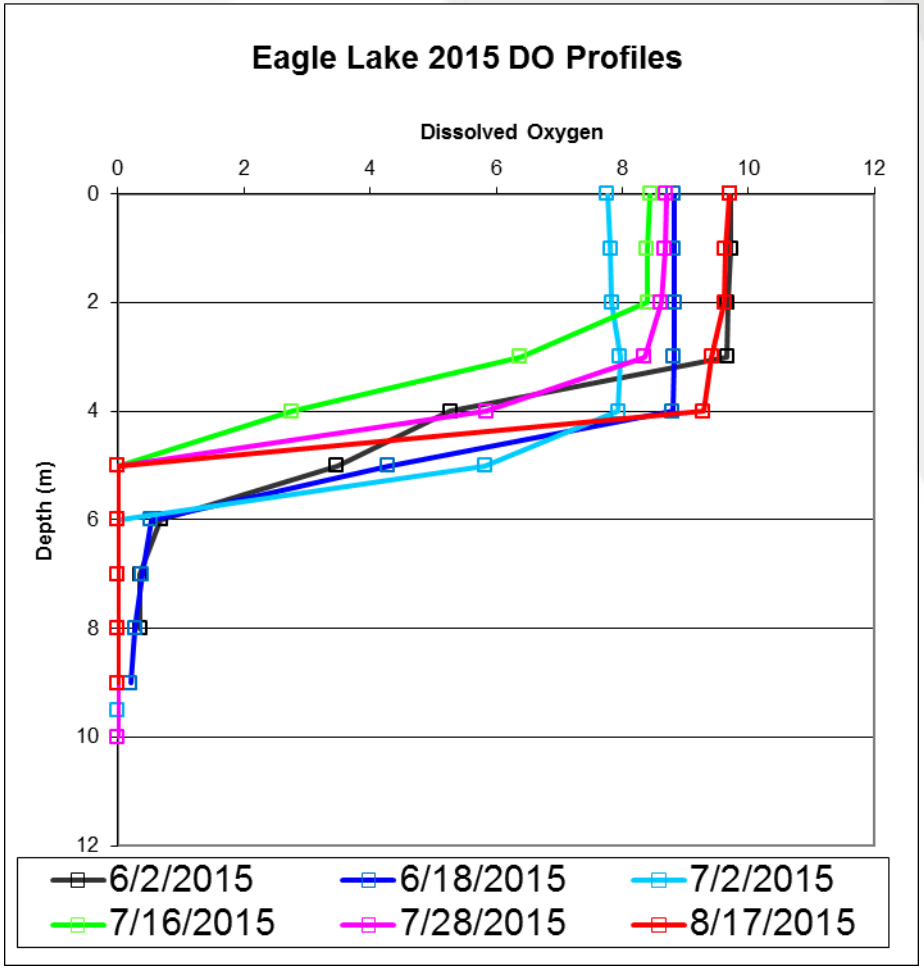
Profiles





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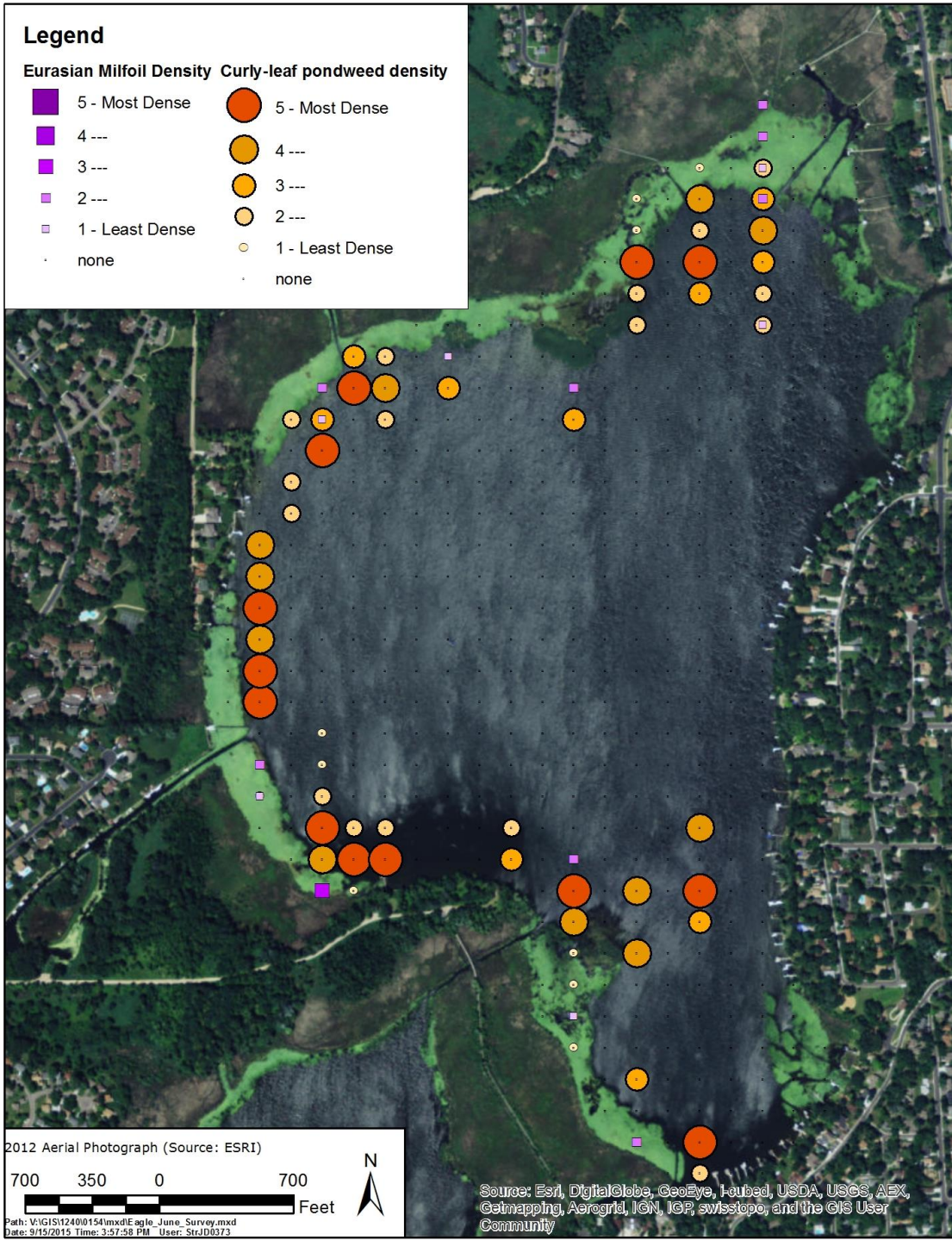
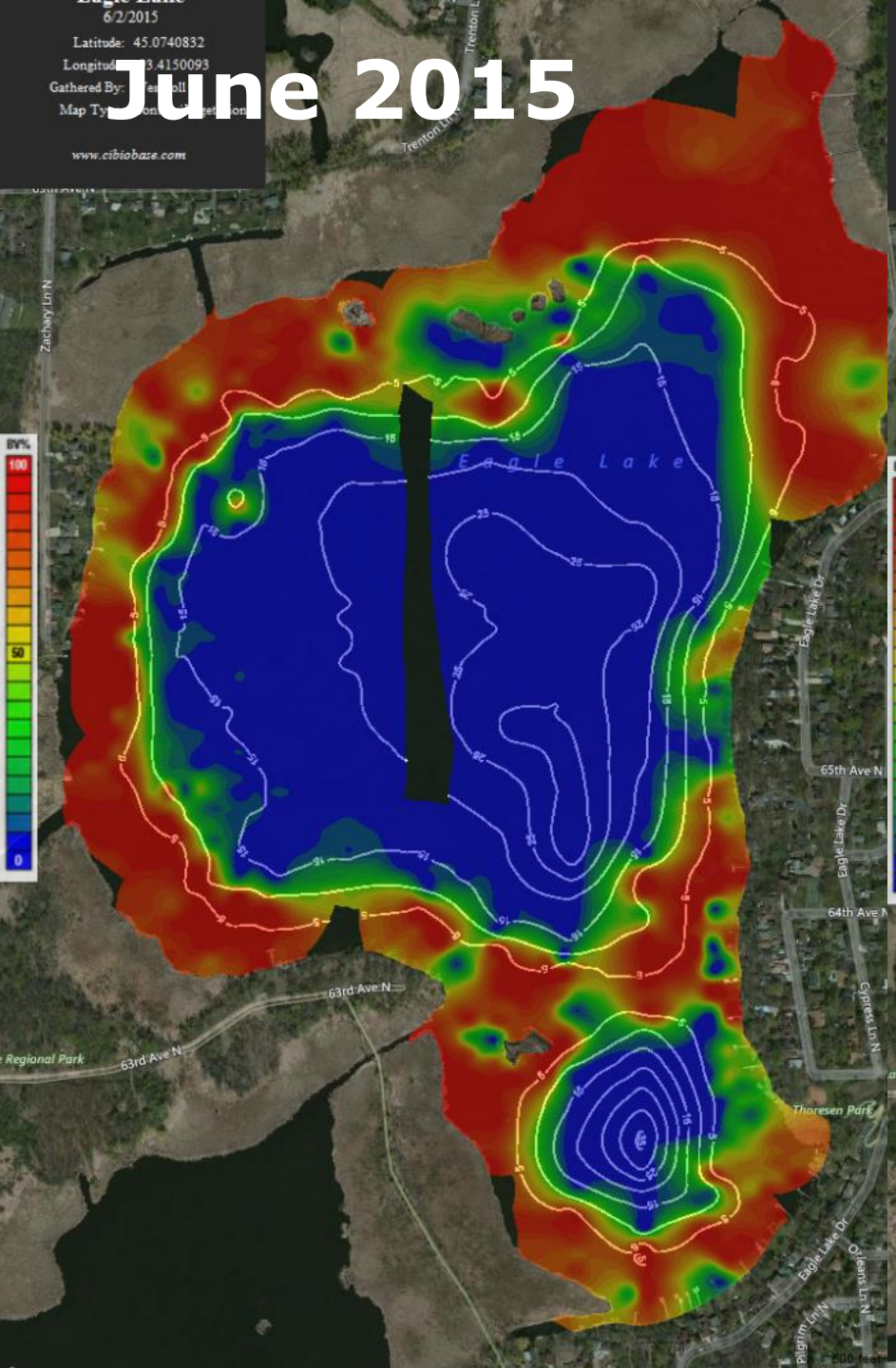
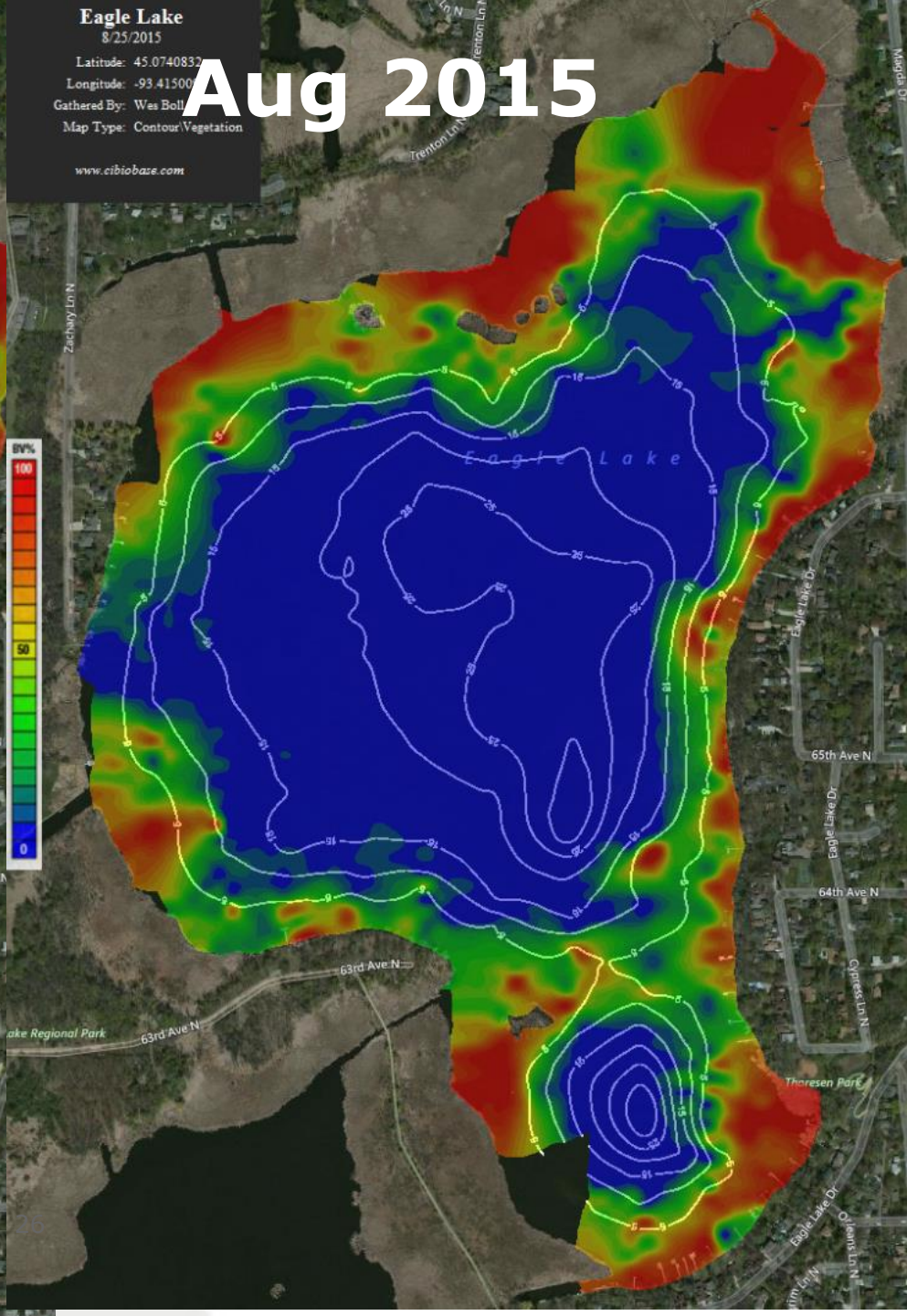
Vegetation Surveys

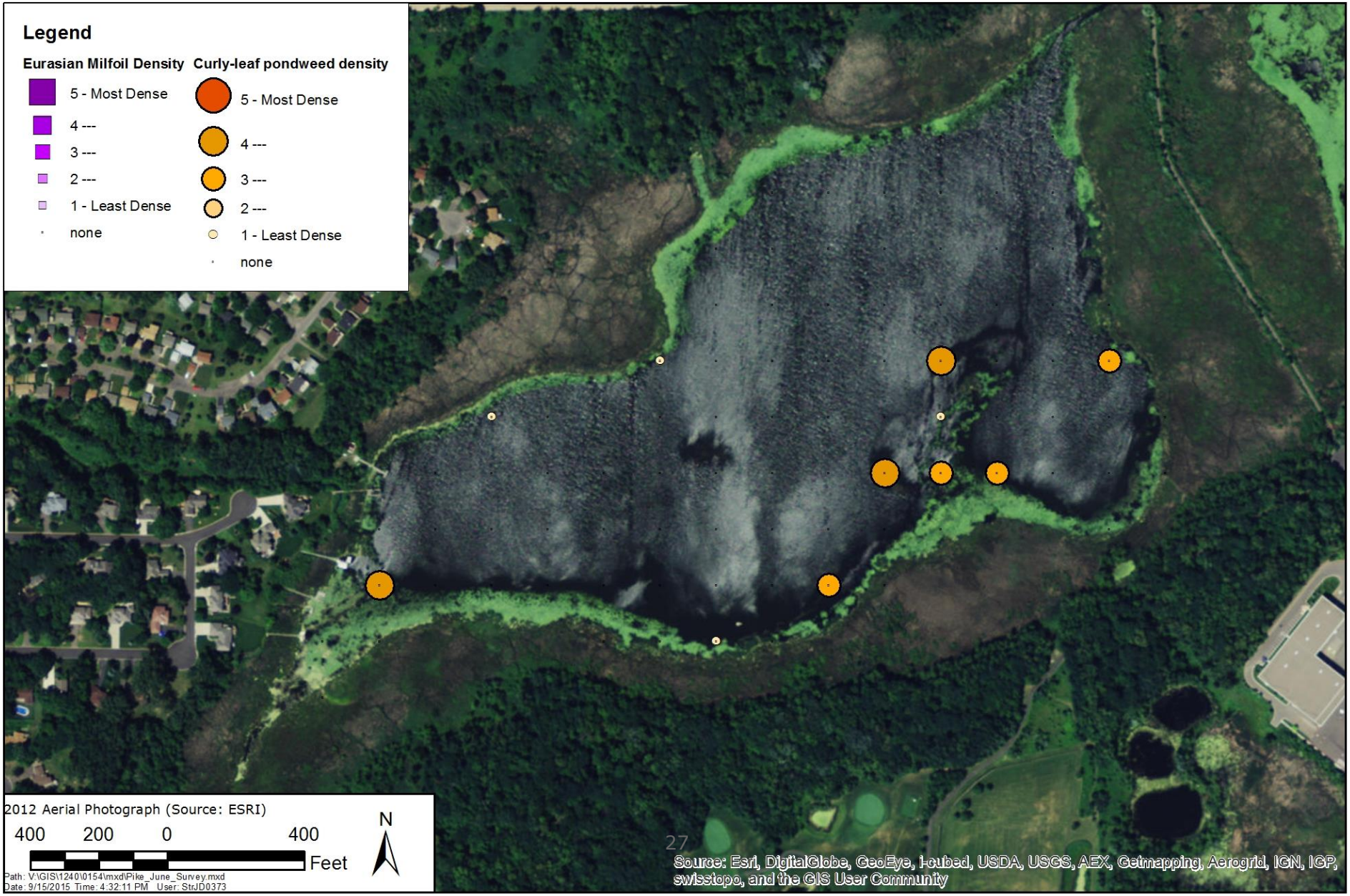
Eagle June 2015 veg survey



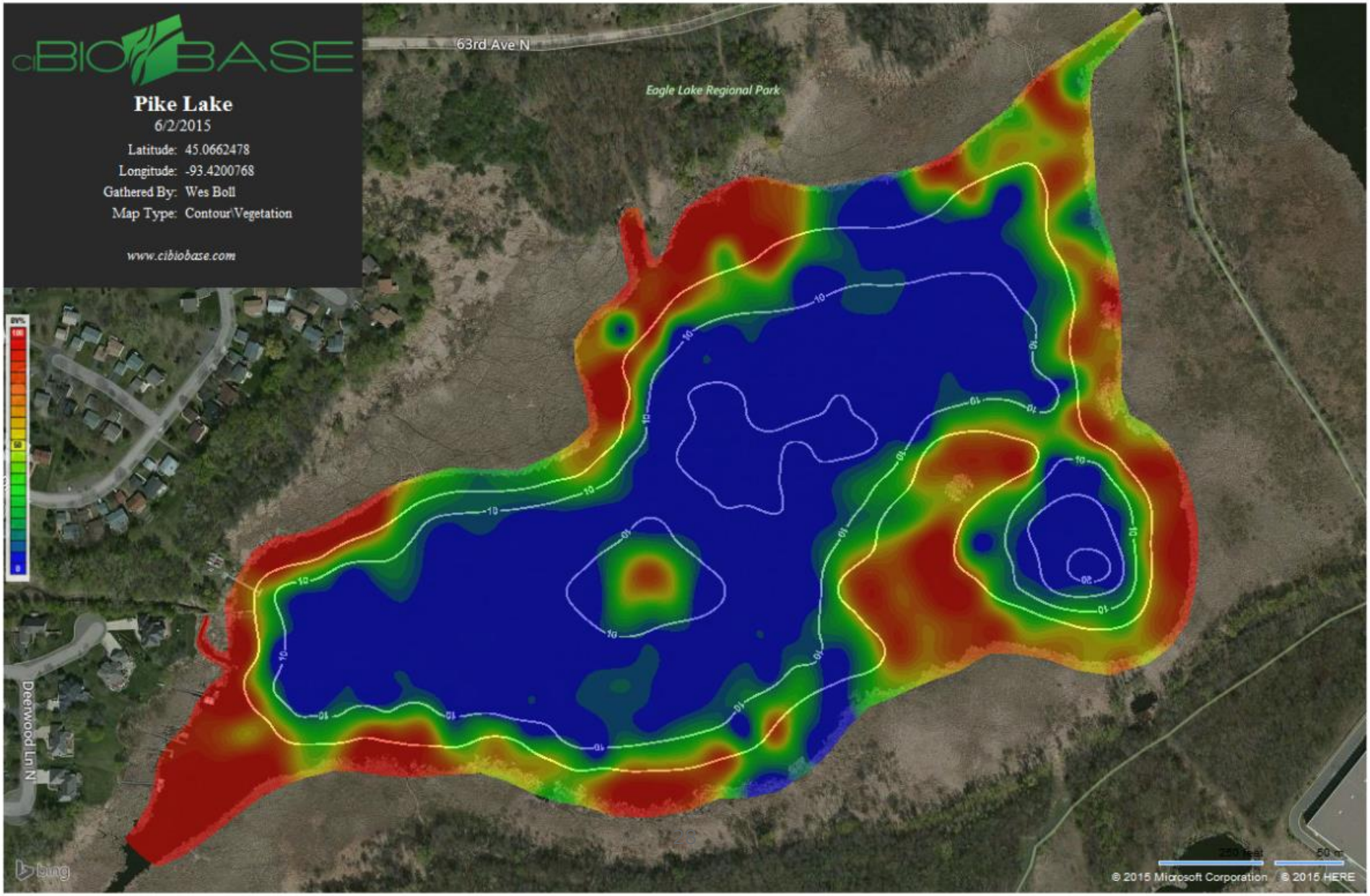

June 2015
6/2/2015
Latitude: 45.0740832
www.cibiobase.com
Eagle Lake
Zachary Ln N
Trenton Ln N
Eagle Lake Dr
65th Ave N
64th Ave N
63rd Ave N
Cypress Ln N
Thoresen Park
Orleans Ln N
Pilgrim Ln N
BV%
100
50
0


Aug 2015
Eagle Lake
8/25/2015
Latitude: 45.0740832
Longitude: -93.41500
Gathered By: Wes Boll
Map Type: Contour\Vegetation
www.cibiobase.com
Zachary Ln N
Trenton Ln N
Eagle Lake Dr
65th Ave N
64th Ave N
63rd Ave N
Cypress Ln N
Thoresen Park
Orleans Ln N
BV%
100
50
0

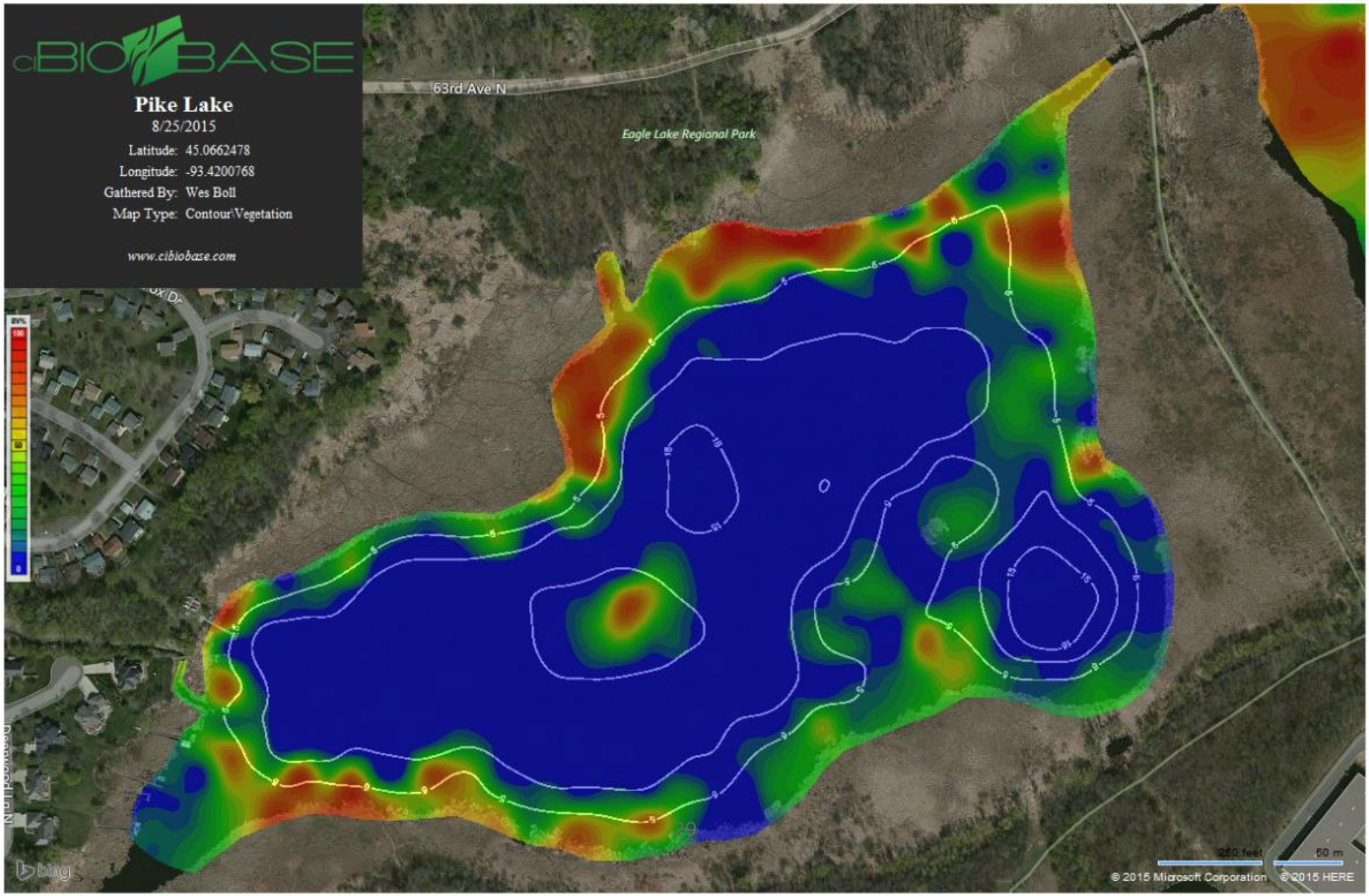
Pike June 2015 vegetation survey



Pike June 2015 vegetation density



Pike August 2015 vegetation density



Fish Survey Data

- *Eagle: last surveyed 2011*
  - Few carp but large
  - Near-shore seining/electrofishing found 14 species
  - Sensitive minnow/darter species
  - IBI = 88.5/160, high compared to other West Metro lakes, but still impacted
- *Pike: last surveyed 1993*
  - Few carp but large
- *Cedar Island: no published survey data*

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Where Are We At So Far?

- Eagle seems to have an increasing curly-leaf problem
- Need updated fish survey on Pike & Cedar Island
- Pike has high sediment release rate and anoxia, need to determine why: carp?
- Useful to monitor flow and water quality at outlet of Pike Creek: loading from creek?
- Need veg survey data for Cedar Island
- Cedar Island stays well-mixed and oxic, low release rate
- Investigate inflows to Cedar Island: wetland/pond outflow?

Next Steps

- Fill in data gaps
- Gather data on load reduction actions in the lakesheds
- At least one public meeting
- Develop plan of action:
  - Rough fish control
  - Curly-leaf pondweed management
  - Watershed load reductions

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