CLFLWD
WATERSHED DISTRICT

2023 Progress Report

April 11, 2024 Regular Board Meeting

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WJD-6 Wetland Enhancement Project

Presentation Outline

Summary of Reports

- Three levels of detail
- Three purposes/ target audiences
- Revisions per board direction

Program Highlights

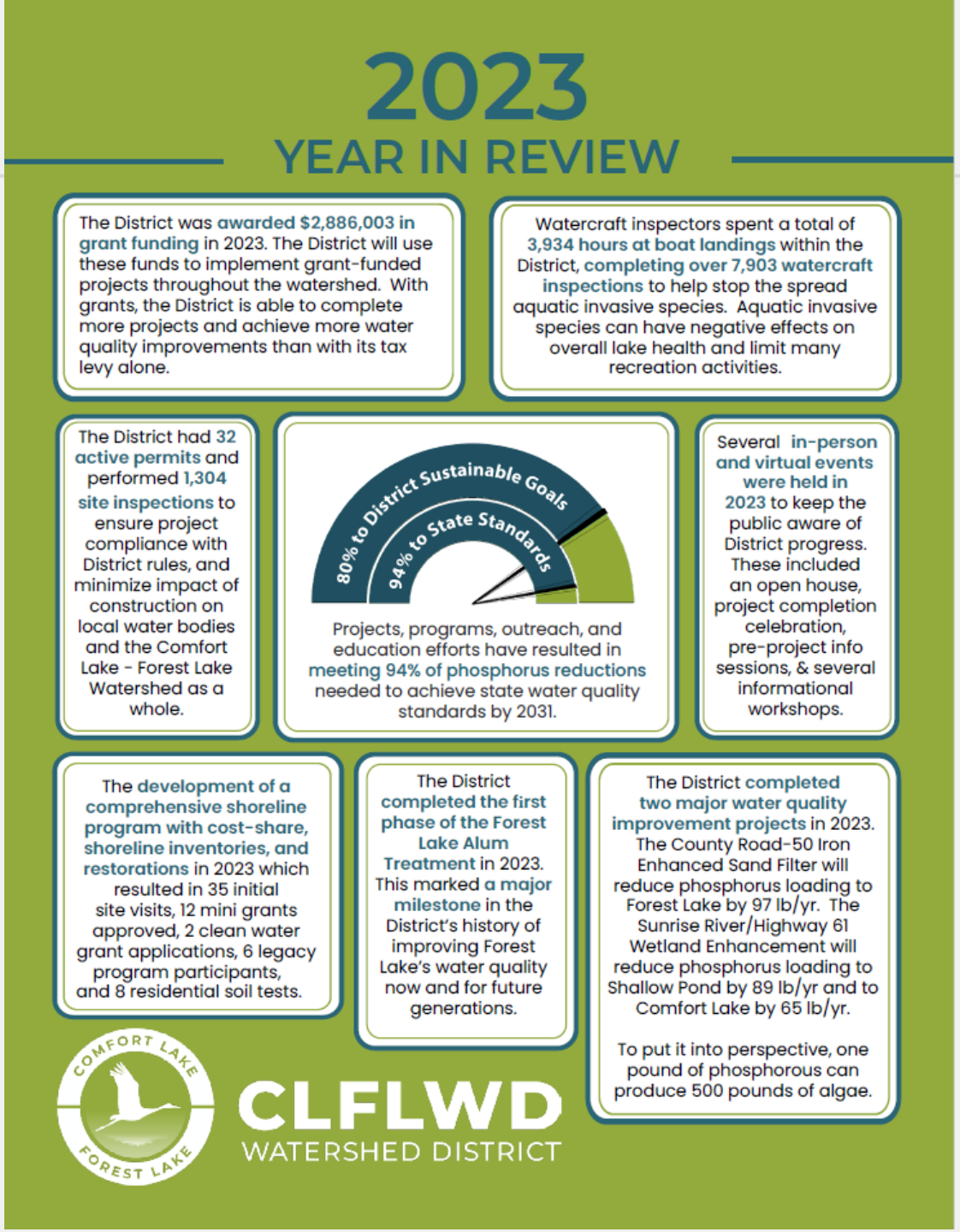
- What's new/notable in each program
- Why it's important

Lake Goal Progress

- State standards and de-listings
- District long-term sustainable goals go beyond state standards in some cases

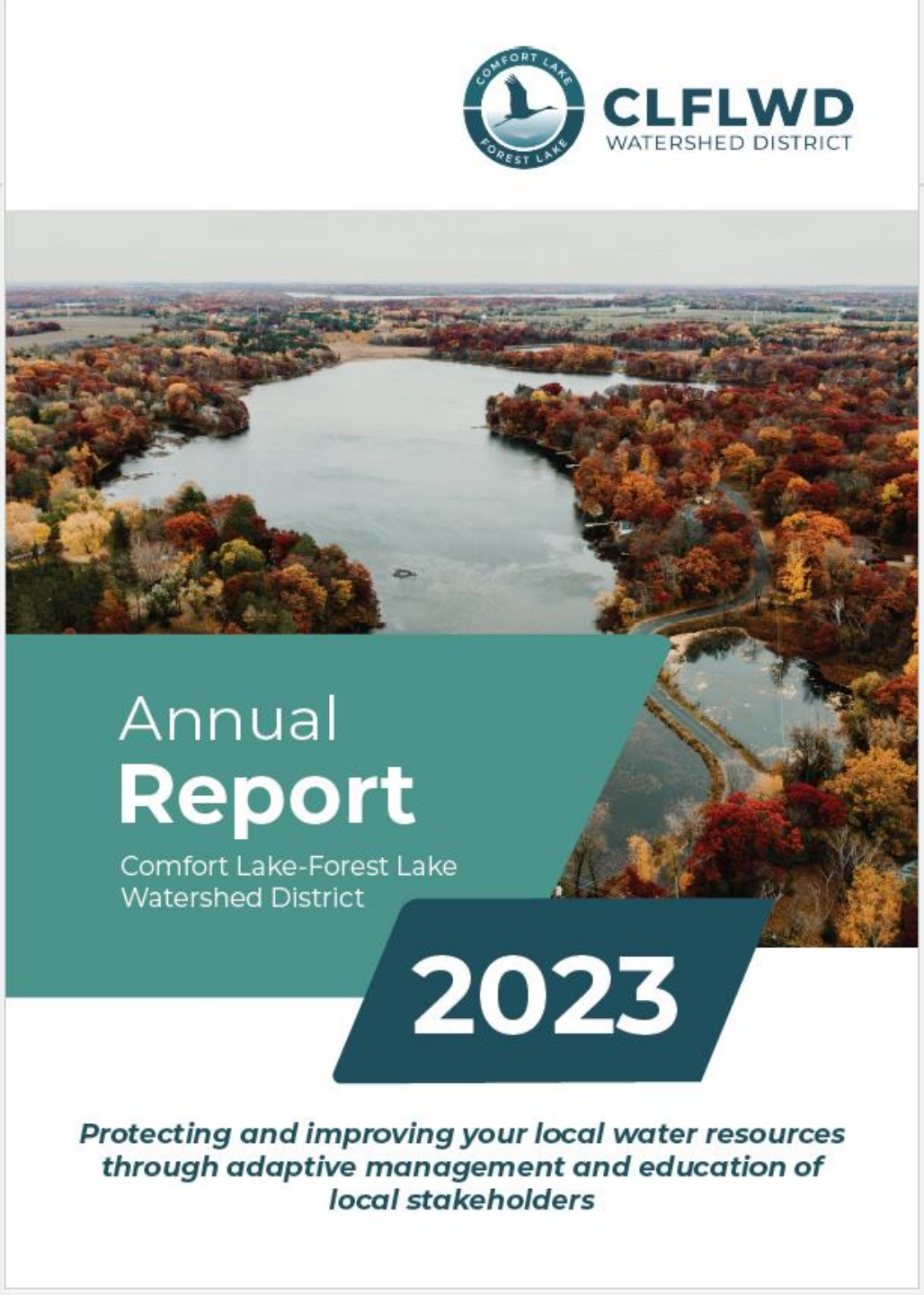
Year-In-Review

- High-level summary of activity
- Revised per manager comments at March 28th meeting
- Answer the question, “so what?” for each item
- Recommend keeping to 1 page, which is standard for infographics
- Primarily distributed via electronic format (readers don’t have to scroll down to pg 2)



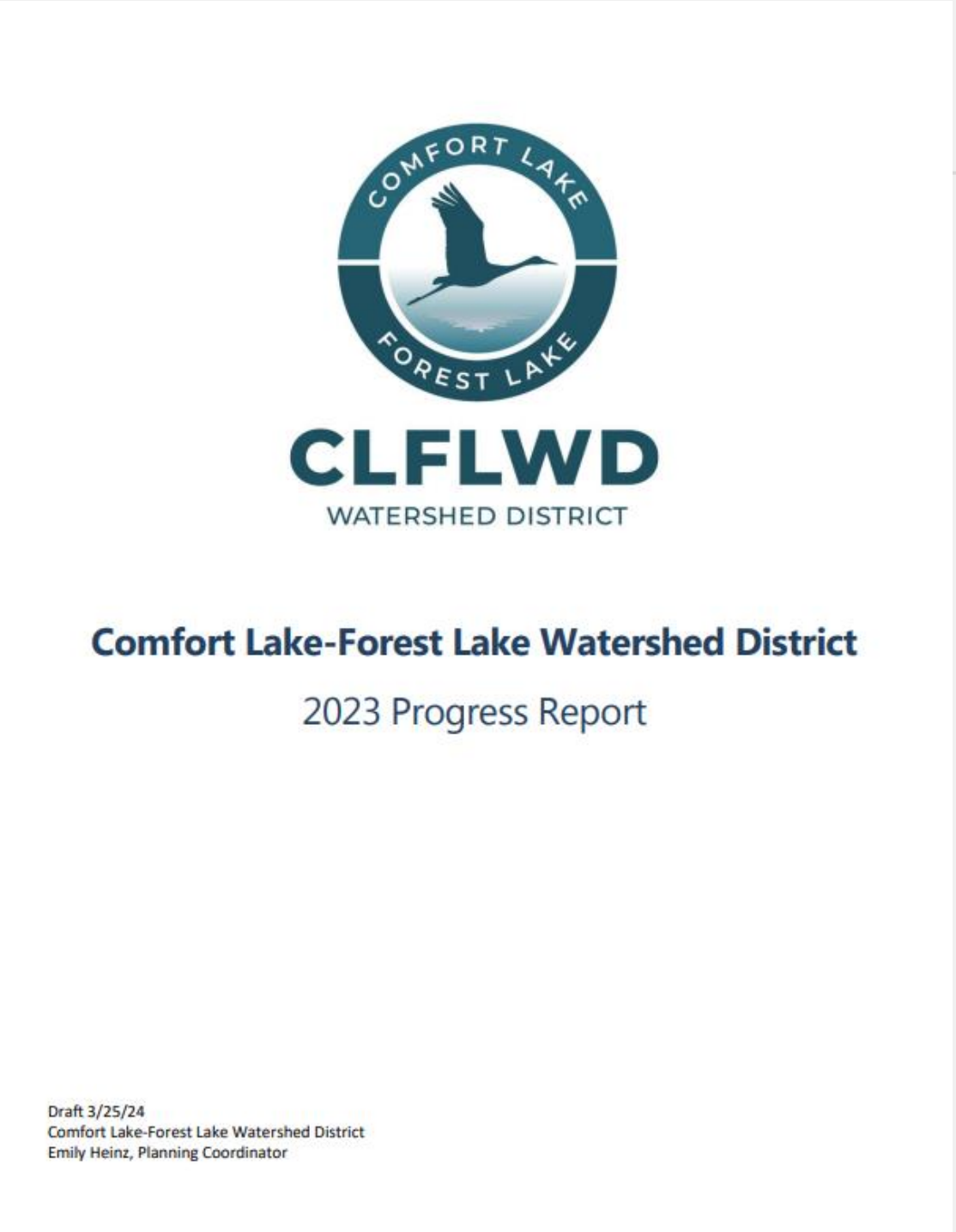
Annual Report

- Greater detail than Year-In-Review
- Meets statute requirements for annual activity report
- Must be submitted to state by April 29th
- Revisions in progress per managers comments received via email



Progress Report

- Detailed evaluation of progress toward all goals in the 10-year Plan
- Biannual alternation between full report and shorter summary
- District is steadily making progress toward all goals in the Plan
- Collecting the necessary data to target efforts
- Establishing the necessary programs to carry out the work



Permitting

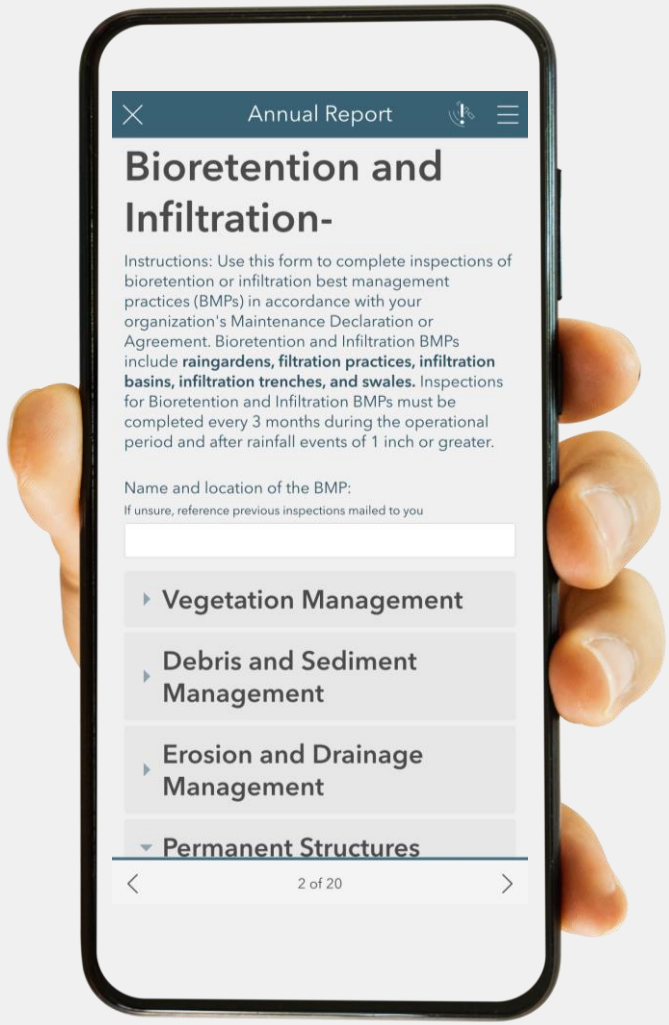
Protecting water resources when development occurs

What's New?

- Record high construction site inspections and compliance rate
- Staff inspected maintenance declaration best management practices (BMPs)
- Created online tools for reporting

So What?

- Clean construction sites = clean water
- Ensure BMPs are doing their job to protect water quality, and control stormwater rate/volume
- Maximize staff efficiency and make it easier for permit holders to be compliant



Water Monitoring

Measuring the health of our lakes

What's New?

- Coordinated program between staff, volunteers and consultants
- Majority of lakes are meeting water quality goals

So What?

- Less costly than hiring out 100% of monitoring work
- Measure water quality metrics to evaluate progress toward WQ goals
- Guide lake management decision-making

Victoria Measuring Water Clarity with Secchi Disk

Cost-Share

Providing resources to residents for stewardship practices such as shoreline buffers

What's New?

- Revamped program offering new resources for technical and financial assistance
- Increased outreach and program participation
- Comprehensive Shoreline Program (outreach, cost-share, inventories)

So What?

- Projects are highly cost effective because of the shared cost, and landowner responsibility for maintenance.
- Help local residents take care of our water resources
- Shoreline restorations and other stewardship activities are critical to protecting our investments in water quality

Aidan at Cost-Share Site Visit

Education & Outreach

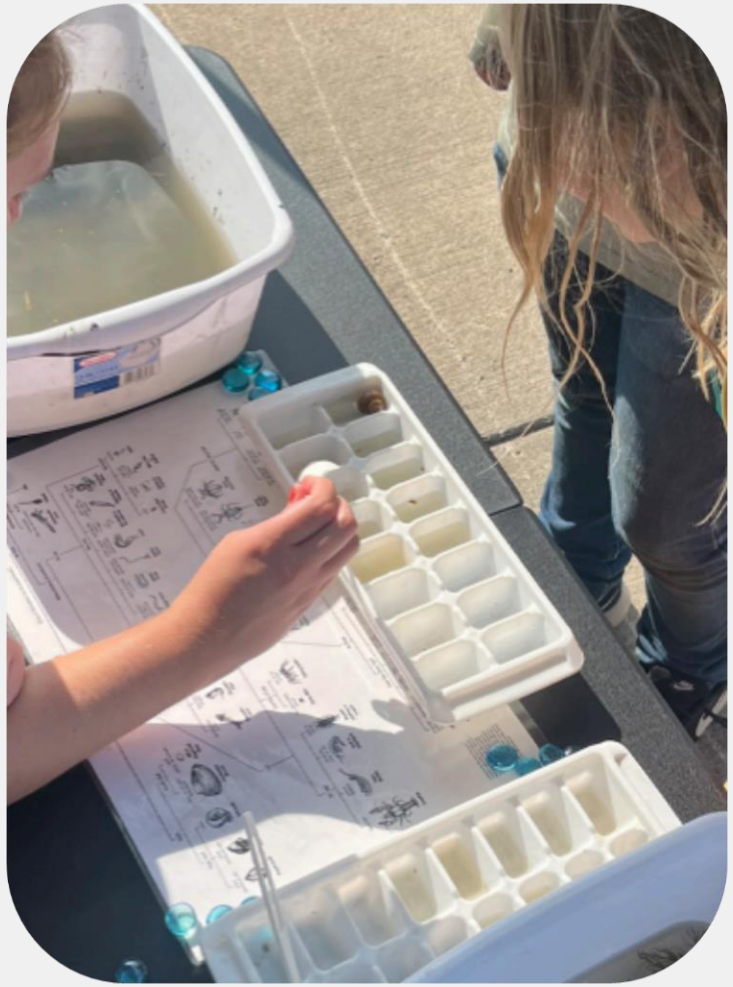
Sharing our story and promoting stewardship

What's New?

- New logo/brand/ website
- Proactive planning
- Targeted outreach for WMP priority metrics: shorelines, dumping, rules, chlorides
- Assistance from PR firm

So What?

- Help local residents understand why and how they can do their part
- Build trust with the community
- Show accountability – explain what tax dollars are buying



Macroinvertebrate Demonstration

Interagency Communication

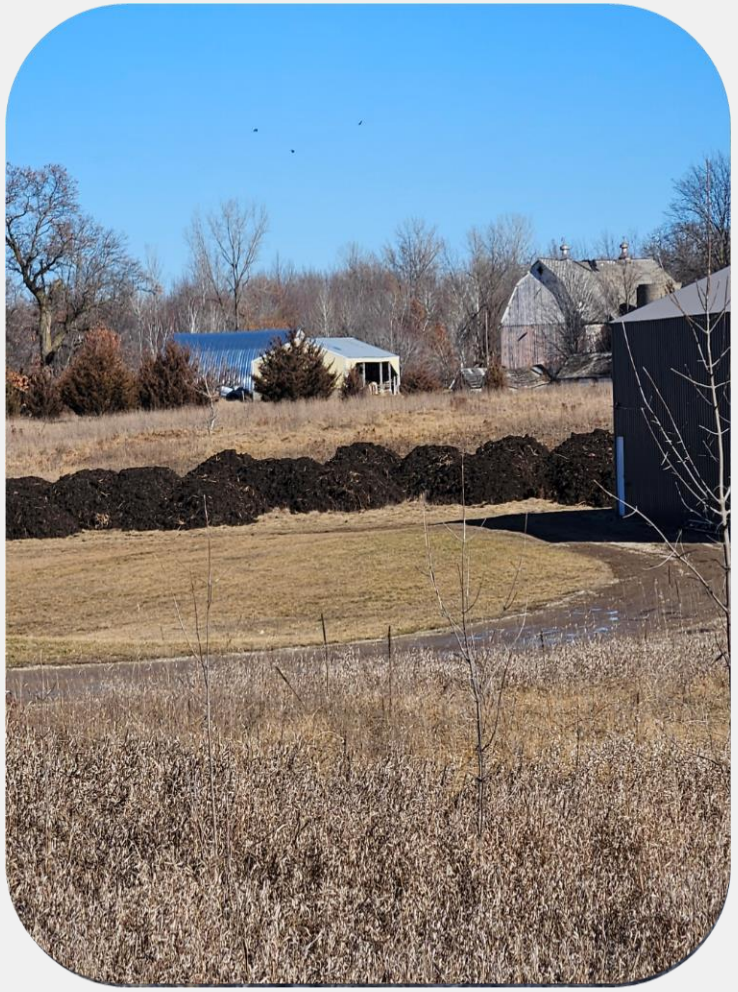
Working with our partners to achieve better outcomes

What's New?

- More frequent and proactive coordination
- Work together to leverage funding and achieve shared goals

So What?

- More efficient government
- Learn from others and don't re-create the wheel
- Reach goals faster by working together
- Create more sustainable change by working together



Coordinated Response to Erosion Concern

Research

Improving efforts by using new techniques/technology

What's New?

- MN Aquatic Invasive Species Research Center: Moody Lake aquatic plant transplant
- St. Thomas: Ecology undergrad research projects
- St. Anthony Falls Lab: iron enhanced sand filter research
- University of Iowa: Little Comfort Lake study

So What?

- Adding native aquatic plants will help preserve water quality, prevent algae blooms, and improve lake ecosystem
- Improve sand filter projects

Moody Lake Aquatic Transplant Project

Grant Seeking

Leveraging funding to do more work

What's New?

- Record high grant awards
- Larger grants for larger projects and land acquisitions
- Wider variety of grant programs applied to
- More partnership grant seeking
- Access Philanthropy assessment

So What?

- Grants enhance the budget and have allowed the District to accelerate its success in delisting impaired lakes
- Much of our work wouldn't occur without grants
- Wouldn't be as far along with goals without grant funding

BWSR Grant Manager Site Visit at Sunrise River Project

Operations & Maintenance

Ensuring the effectiveness of our projects

What's New?

- Comprehensive planning and proactive maintenance
- O&M rapid assessment protocol developed in 2023
- O&M online database in progress

So What?

- Projects were designed with a certain lifespan in mind
- Ensure project functionality to maintaining water quality benefits
- Promote public safety

Tori and Victoria Installing Aerator Signs

Aquatic Invasive Species Prevention & Management

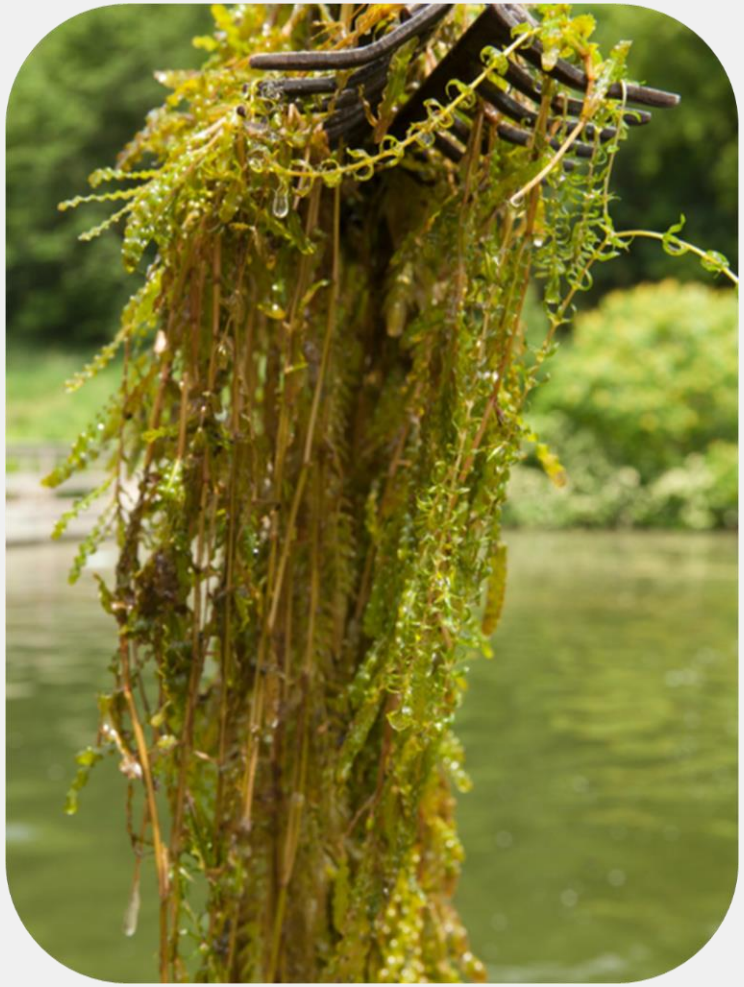
Preventing the spread and mitigating the impacts of invasive species

What's New?

- Most of this program is annually recurring

So What?

- Aquatic invasive species can impact recreation, lake ecology, and water quality
- An ounce of prevention is worth a pound of the cure
- Boaters and shoreline residents must do their part to prevent the spread



Curly-leaf Pondweed

Land Acquisition & Management

Protecting land to improve water resources

What's New?

- Hazardous tree removal, site cleanup, trail system development, and vegetation restoration at North Shore Trail Nature Area
- Additional land acquisition negotiations near Bone Lake and Little Comfort Lake

So What?

- Urban development in our community continues to expand
- Conserve natural spaces to provide wildlife corridors and protect key water resources
- Public open spaces benefit people too

North Shore Trail Nature Area Hazard Tree Removal and Cleanup

Watershed Planning & Resiliency

Adapting to a changing climate

What's New?

- Floodplain Vulnerability Assessment in progress
- Emergency Response Plan in progress

So What?

- Spring seasons are getting wetter, summer seasons are getting drier in MN
- Flooding can impact humans and natural resources
- Mitigate harmful effects of flooding and other water-related natural disasters

Example of Flood Risk – Road Flooding

Context for Water Quality Goals

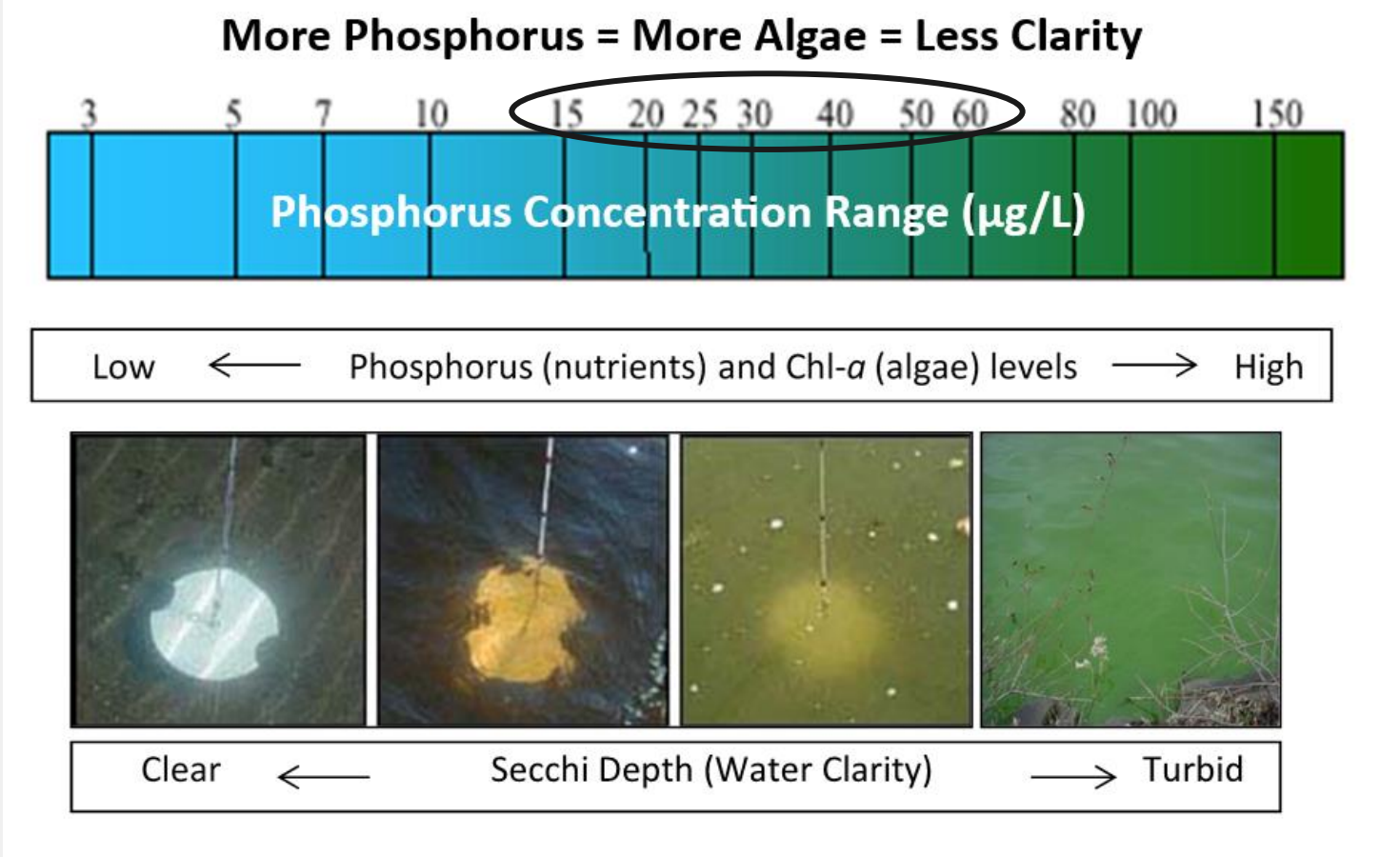
What does meeting goals/state standards mean?

- Cleaner, clearer water
  - See your toes in chest deep water
- Less frequent and less severe algae blooms
- A healthier, thriving lake ecosystem
  - Healthy native plant community
  - Thriving gamefish population

Context for Water Quality Goals

What do we measure and why?

- Phosphorus: feeds algae
  - **1 lb phosphorus = 500 lbs algae**
- Chlorophyll-a: measure of algae growth
- Secchi: measure of clarity
- Total suspended solids: measured in streams and lake inlets/outlets; indicator of land use in surrounding watershed



Intro/Example

Update on lake nutrient impairments

1. Water Quality Samples:
   - Phosphorus standard and
   - Chlorophyll-a or Secchi disk standard
   - *≥8 samples collected from 2 years within most recent 10-year period*
   - *10-year average phosphorus concentrations*
   - *2 most recent summer averages and the individual samples*
2. Trend/Management Activities
   - Improving trend in total phosphorus or
   - Management activities in place
   - "Significantly" improving/declining trends are statistically significant

Example Lake Phosphorus Deep Lake State Standard ≤ 40 µg/L Shallow Lake State Std ≤ 60 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average										
Samples 1-8. Sample dates vary by year. All samples shown were taken between June-September.	Orange cells indicate samples that do not meet state standards					Blue cells indicate samples that meet state standards				

Moody Lake

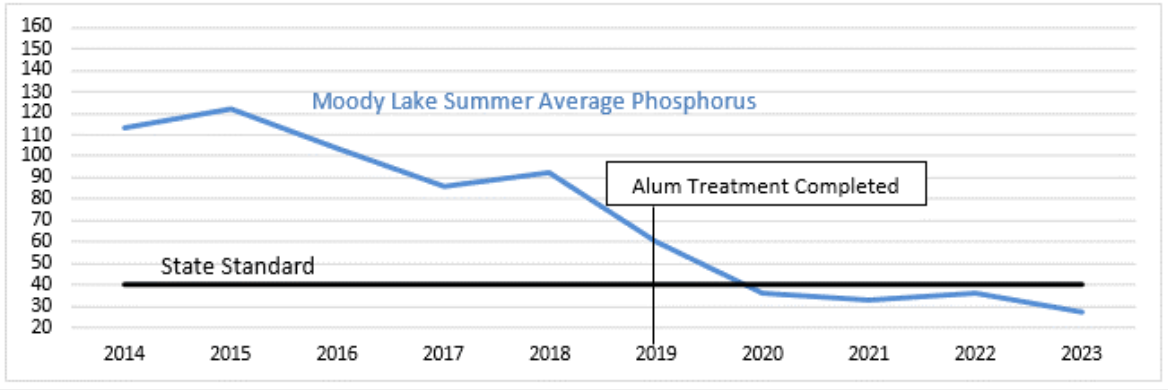
10-Year Average: 71 µg/L

Delisting Verdict:

Close, but not quite, continue monitoring

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Moody Lake	**Significantly Improving Trend Since 2013**	Improving Trend Since 2005	Improving Trend Since 2005

**Trends that are not "significantly" improving or declining are not statistically significant.*



Moody Lake Phosphorus Deep Lake State Standard ≤ 40 µg/L 10-Year Average: 71 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**113**	**122**	**104**	**86**	**92**	**60**	**36**	**33**	**36**	**27**
Sample 1	185	79	59	101	73	75	58	30	46	22
Sample 2	220	114	72	107	103	83	24	62	39	13
Sample 3	102	158	130	152	84	67	45	47	51	38
Sample 4	95	175	106	63	153	109	31	55	37	20
Sample 5	78	195	91	68	112	64	34	14	44	24
Sample 6	62	138	117	72	112	57	30	14	26	22
Sample 7	54	89	162	71	41	37	40	11	17	20
Sample 8	44	84	91	54	60	40	32	27	20	34

Moody Lake Secchi Deep Lake State Standard ≥ 4.6 ft 10-Year Average: 3.6 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**2.7**	**2.1**	**2.7**	**1.9**	**1.8**	**2.4**	**3.6**	**8.7**	**4.2**	**5.5**
Sample 1	3.0	3.0	4.0	4.0	2.5	1.5	2.6	8.9	5.9	5.6
Sample 2	1.5	3.5	3.0	1.0	1.0	2.0	4.3	8.5	5.6	4.6
Sample 3	2.5	1.5	2.0	1.2	1.5	1.7	2.0	7.2	4.9	3.3
Sample 4	2.0	1.0	2.5	1.5	0.5	0.8	3.6	7.9	3.6	5.6
Sample 5	2.0	2.0	2.0	1.5	1.2	1.5	3.3	7.2	3.0	5.6
Sample 6	3.0	1.5	1.5	2.0	1.0	1.0		7.2	3.3	7.5
Sample 7	3.0	1.5	3.0	2.0	3.5	4.0	5.2	9.8	4.3	5.6
Sample 8	3.5	1.5	3.0	2.0	3.5	2.0	3.9	12.5	5.2	7.2

Moody Lake Chlorophyll-a Deep Lake State Standard ≤ 14 µg/L 10-Year Average: 37 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**45**	**59**	**42**	**44**	**77**	**41**	**22**	**4**	**24**	**9**
Sample 1	36	46	28	22	34	60	33	3	8	7
Sample 2	110	17	38	80	110	45	11	5	11	16
Sample 3	61	67	48	66	73	63	41	4	23	21
Sample 4	41	110	30	72	130	45	17	2	20	6
Sample 5	51	67	47	34	84	19	27	7	20	7
Sample 6	45	69	74	27	93	46	23	5	20	6
Sample 7	33	65	44	30	43	22	9	5	11	4
Sample 8	23	47	33	24	30	54	17	1	8	4

NOT Meeting State Standards | Meeting State Standards

Bone Lake

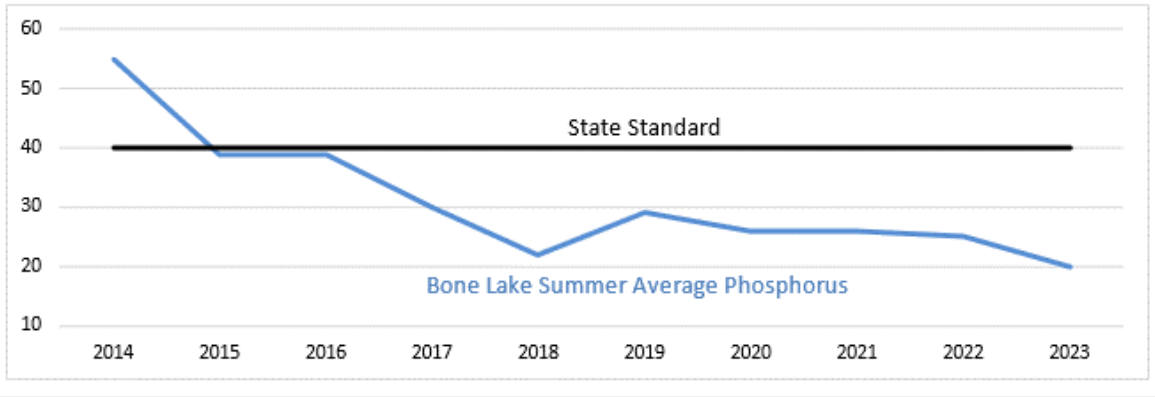
10-Year Average: 31 µg/L

Delisting Verdict:

Qualifies! Slated to be delisted once Environmental Protection Agency posts the list (usually late April)

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Bone Lake	**Significantly Improving Trend Since 2013**	Improving Trend Since 2001	**Significantly Improving Trend Since 2013**

**Trends that are not "significantly" improving or declining are not statistically significant.*



Bone Lake Phosphorus Deep Lake State Standard ≤ 40 µg/L 10-Year Average: 31 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**55**	**39**	**39**	**30**	**22**	**29**	**26**	**26**	**25**	**20**
Sample 1	24	44	35	35	22	24	30	32	24	12
Sample 2	46	26	37	41	21	23	45	36	37	11
Sample 3	130	32	58	38	24	28	13	31	26	22
Sample 4	103	36	31	28	26	35	20	17	16	18
Sample 5	34	45	51	20	22	30	31	28	29	22
Sample 6	25	53	28	23	20	29	22	18	24	26
Sample 7	31	42	41	26	19	30	18	22	19	30
Sample 8	48	37	42	23	20	33		22	28	

Bone Lake Secchi Deep Lake State Standard ≥ 4.6 ft 10-Year Average: 5.3 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**3.6**	**3.9**	**4.2**	**5.8**	**6.5**	**5.0**	**5.8**	**7.3**	**5.9**	**5.5**
Sample 1	4.3	4.0	3.5	2.5	6.5	7.0	4.9	6.2	4.3	7.2
Sample 2	4.6	3.5	4.0	4.5	7.0	6.0	5.6	6.9	5.2	6.6
Sample 3	3.9	4.5	4.5	3.5	6.5	5.0	8.5	7.9	6.6	5.2
Sample 4	3.3	4.0	3.5	4.5	7.5	4.5	5.6	7.5	8.2	6.9
Sample 5	3.0	3.0	3.5	6.5	4.5	3.0	5.6	8.2	6.9	4.9
Sample 6	2.6	3.5	5.5	9.5	5.0	4.5	6.6	8.2	5.9	4.3
Sample 7	3.3	4.0	5.5	8.5	9.0	4.5	3.9	8.2	5.6	3.6
Sample 8	3.6	4.0	4.0	7.0	6.0	5.5		4.9	4.3	

Bone Lake Chlorophyll-a Deep Lake State Standard ≤ 14 µg/L 10-Year Average: 17 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**24**	**30**	**22**	**20**	**10**	**21**	**12**	**8**	**14**	**13**
Sample 1	22	14	26	59	9	10	16	10	11	9
Sample 2	31	13	20	15	6	11	11	6	18	8
Sample 3	26	20	27	26	1	15	4	6	8	6
Sample 4	26	36	21	12	12	26	9	6	10	7
Sample 5	26	56	24	11	20	40	12	6	15	10
Sample 6	13	33	15	7	10	18	19	6	18	26
Sample 7	23	43	17	9	7	26	11	5	18	24
Sample 8	27	37	33	17	16	21		15	16	

NOT Meeting State Standards | Meeting State Standards

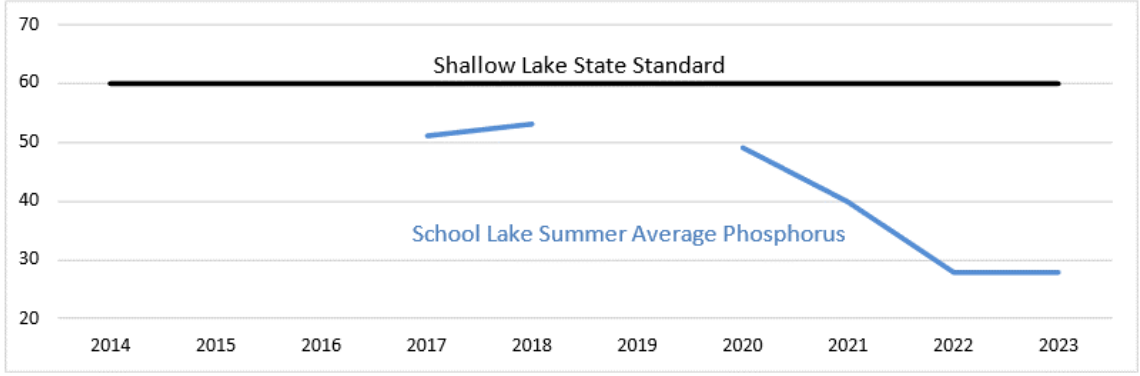
School Lake

10-Year Average: 42 µg/L

Delisting Verdict:

Qualifies, but projects are in progress and not enough data to calc. long-term trend

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
School Lake	Not enough data exists to calculate long-term trends for School Lake.		



School Lake Phosphorus Shallow Lake State Standard ≤ 60 µg/L 10-Year Average: 42 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average				**51**	**53**		**49**	**40**	**28**	**28**
Sample 1				54	38		49	52	37	28
Sample 2				53	40		49	39	29	28
Sample 3				41	49		64	72	14	24
Sample 4				59	125		34	17	27	20
Sample 5				34	62			70	33	20
Sample 6				31	56			30		22
Sample 7				116	40			27		38
Sample 8				40	48			21		42

School Lake Secchi Shallow Lake State Standard ≥ 3.3 feet 10-Year Average: 4.8 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average				**2.8**	**2.5**		**4.8**	**5.3**	**6.1**	**7.1**
Sample 1				4.5	4.0		3.0	7.5	7.4	9.2
Sample 2				2.5	3.0		3.3	5.6	6.6	7.5
Sample 3				1.0	2.0		6.6	7.2	5.2	7.5
Sample 4				1.5	1.0		6.2	4.3	5.9	6.2
Sample 5				3.0	1.5			3.8	5.6	9.2
Sample 6				3.5	1.5			4.3		6.9
Sample 7				3.0	4.0			4.3		4.6
Sample 8				3.0	3.0			4.6		5.6

School Lake Chlorophyll-a Shallow Lake State Standard ≤ 20 µg/L 10-Year Average: 23 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average				**31**	**50**		**24**	**12**	**14**	**9**
Sample 1				24	46		38	4	13	6
Sample 2				42	22		29	4	14	4
Sample 3				61	44		17	5	16	8
Sample 4				56	69		13	17	19	20
Sample 5				19	75			16	10	7
Sample 6				19	54			15		7
Sample 7				38	47			17		9
Sample 8				32	46			17		10

NOT Meeting State Standards | Meeting State Standards

Shields Lake

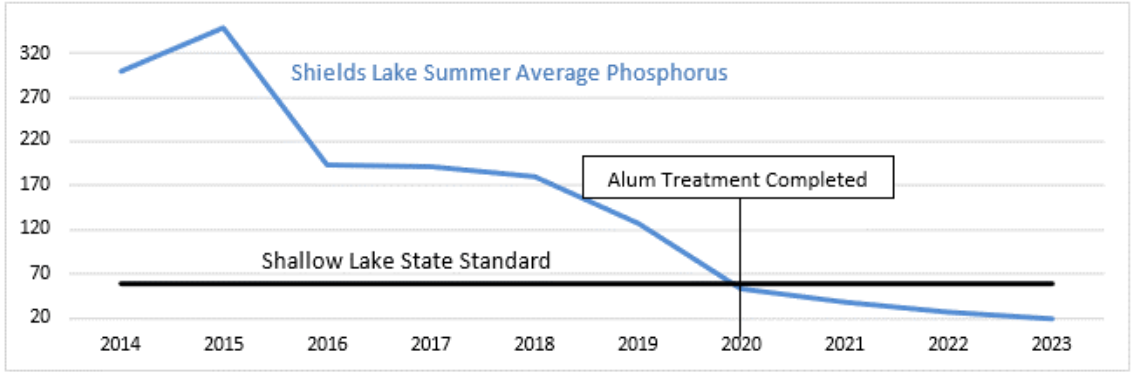
10-Year Average: 148 µg/L

Delisting Verdict:

Qualifies, but collect more years of data

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Shields Lake	**Significantly Improving Trend Since 2013**	Improving Trend Since 2001	Improving Trend Since 1993

**Trends that are not "significantly" improving or declining are not statistically significant.*



Shields Lake Phosphorus Shallow Lake State Standard ≤ 60 µg/L 10-Year Average: 148 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**299**	**349**	**194**	**191**	**180**	**128**	**54**	**38**	**27**	**20**
Sample 1	255	358	121	74	222	102	19	27	22	18
Sample 2	326	366	238	170	210	150	45	27	33	16
Sample 3	291	333	317	262	283	212	66	28	32	11
Sample 4	356	346	241	300	201	141	81	25	23	19
Sample 5	299	329	153	203	174	138	75	104	21	24
Sample 6	327	383	128	226	149	93	65	36	36	24
Sample 7	332	303	190	190	122	82	24	51	22	20
Sample 8	288	582	168	118	76	114		23	14	22

Shields Lake Secchi Shallow Lake State Standard ≥ 3.3 feet 10-Year Average: 3.9 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**3.4**	**1.9**	**2.7**	**2.2**	**1.9**	**2.5**	**3.7**	**8.4**	**6.5**	**5.9**
Sample 1	5.0	3.5	5.0	6.5	4.0	5.5	5.9	13.6	7.9	7.5
Sample 2	3.5	1.0	3.0	4.5	0.5	2.0	3.6	14.4	6.6	4.6
Sample 3	3.0	1.5	2.5	1.0	1.0	1.5	5.2	14.4	5.2	6.2
Sample 4	2.5	1.5	2.5	1.0	1.5	3.2	3.3	8.4	5.9	6.6
Sample 5	2.0	1.0	2.0	1.5	1.7	0.5	2.5	2.6	6.9	4.6
Sample 6	2.5	1.0	1.5	1.5	1.5	2.0	2.0	6.6	6.6	3.6
Sample 7	3.5	1.0	2.5	1.0	2.0	2.0	3.6	4.3	7.9	6.9
Sample 8	2.5	1.5	3.5	2.0	3.0	2.5		5.9	6.9	8.9

Shields Lake Chlorophyll-a Shallow Lake State Standard ≤ 20 µg/L 10-Year Average: 40 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**34**	**77**	**52**	**64**	**67**	**52**	**31**	**6**	**7**	**7**
Sample 1	11	59	22	7	21	25	14	1	9	9
Sample 2	44	120	37	35	160	88	25	2	1	8
Sample 3	33	64	76	160	99	52	13	4	5	4
Sample 4	39	75	82	97	56	28	48	9	7	5
Sample 5	28	86	59	92	68	62	45	9	8	12
Sample 6	37	98	41	55	47	68	58	10	7	6
Sample 7	59	64	51	58	52	73	13	5	5	2
Sample 8	47	126	65	39	36	51		14	5	7

NOT Meeting State Standards | Meeting State Standards

Little Comfort Lake

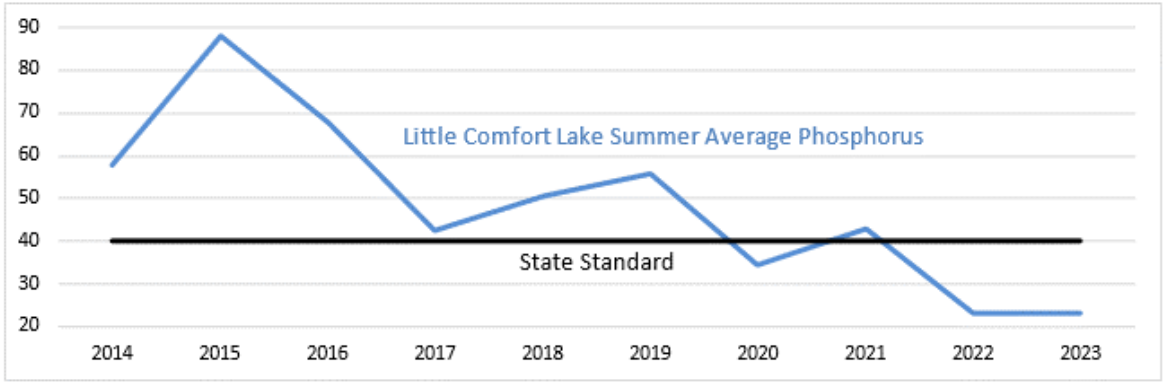
10-Year Average: 49 µg/L

Delisting Verdict:

Qualifies, but goal nutrient load reduction not reached – do more projects

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Little Comfort Lake	**Significantly Improving Trend Since 2013**	Improving Trend Since 2013	Improving Trend Since 2013

**Trends that are not "significantly" improving or declining are not statistically significant.*



Little Comfort Lake Phosphorus Deep Lake State Standard ≤ 40 µg/L 10-Year Average: 49 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**58**	**88**	**68**	**43**	**50**	**56**	**34**	**43**	**23**	**23**
Sample 1	63	26	28	19	33	74	33	54	24	17
Sample 2	93	67	176	42	33	37	29	86	24	19
Sample 3	97	74	44	26	45	41	44	34	31	22
Sample 4	50	366	50	63	114	76	30	12	26	13
Sample 5	40	56	61	71	52	113	36	22	24	22
Sample 6	44		56	34	50	39		34	17	18
Sample 7	72	23	71	36	33	29		100	12	26
Sample 8	25	28	92	50	43	39		24	10	24

Little Comfort Lake Secchi Deep Lake State Standard ≥ 4.6 ft 10-Year Average: 5.4 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**5.9**	**4.3**	**3.5**	**3.6**	**4.2**	**4.5**	**5.8**	**8.4**	**7.5**	**6.9**
Sample 1	6.0	6.0	5.0	3.5	6.0	5.5	5.7	9.8	8.5	5.9
Sample 2	3.5	3.5	2.5	3.0	4.5	4.5	4.8	9.8	8.2	7.2
Sample 3	3.7	2.0	4.0	1.5	3.0	5.5	6.2	9.5	7.2	3.3
Sample 4	5.5	3.5	3.0	2.0	2.5	2.0	5.6	10.2	7.1	7.9
Sample 5	8.5	4.5	2.5	3.0	3.0	3.5	6.6	7.2	7.5	9.8
Sample 6	5.5	4.5	4.0	3.5	3.5	4.8		5.9	6.9	9.2
Sample 7	5.0	4.5	3.0	5.0	4.5	5.5		4.6	8.5	6.2
Sample 8	7.5	4.5	4.0	7.0	7.0	4.5		7.2	7.2	8.5

Little Comfort Lake Chlorophyll-a Deep Lake State Standard ≤ 14 µg/L 10-Year Average: 21 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**22**	**28**	**47**	**26**	**26**	**27**	**13**	**7**	**7**	**10**
Sample 1	13	7	19	29	5	15	23	3	3	11
Sample 2	24	37	43	26	7	13	16	3	7	8
Sample 3	30	77	27	44	30	19	12	4	7	36
Sample 4	16	24	36	28	41	30	10	3	7	5
Sample 5	12	20	51	20	43	35	2	13	8	6
Sample 6	27		31	23	24	36		15	6	2
Sample 7	37	23	90	19	28	27		12	6	5
Sample 8	16	28	77	17	27	41		10	8	3

NOT Meeting State Standards | Meeting State Standards

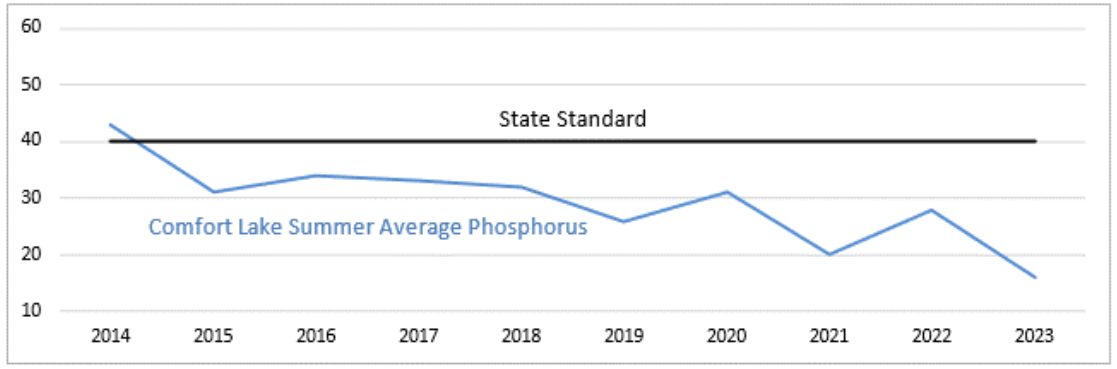
Comfort Lake

10-Year Average: 29 µg/L

Delisting Verdict:
Qualifies, but more projects in progress

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Comfort Lake	Improving Trend Since 1994	**Significantly Improving Trend Since 2014**	**Significantly Improving Trend Since 2014**

**Trends that are not "significantly" improving or declining are not statistically significant.*



Comfort Lake Phosphorus Deep Lake State Standard ≤ 40 µg/L 10-Year Average: 29 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**43**	**31**	**34**	**33**	**32**	**26**	**31**	**20**	**28**	**16**
Sample 1	45	23	16	18	51	57	21	31	26	10
Sample 2	61	14	27	67	20	22	13	44	34	13
Sample 3	85	28	86	27	34	24	17	20	38	25
Sample 4	45	50	28	55	38	20	16	8	25	10
Sample 5	17	38	32	23	24	30	73	12	25	16
Sample 6	16	36	29	23	22	33	45	15	15	22
Sample 7	41	38	29	17		19	30	16	24	17
Sample 8	30	28	27	18		23	18	15	33	

Comfort Lake Secchi Deep Lake State Standard ≥ 4.6 ft 10-Year Average: 6.2 ft	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**4.6**	**5.5**	**5.5**	**5.8**	**7.7**	**5.3**	**6.0**	**8.4**	**5.9**	**7.4**
Sample 1	6.0	7.5	8.0	7.5	14.0	7.5	6.6	9.8	8.2	5.6
Sample 2	4.0	6.5	6.0	6.5	8.5	6.0	9.5	9.8	6.6	7.9
Sample 3	3.5	4.5	6.5	6.0	7.0	5.5	7.5	8.9	4.6	8.5
Sample 4	4.0	3.0	6.0	4.5	4.5	5.0	5.6	10.2	5.2	7.7
Sample 5	4.5	4.5	3.0	4.5	6.0	4.0	6.0	7.9	4.6	8.0
Sample 6	6.0	4.5	4.5	6.0	6.0	4.5	5.7	9.2	5.9	5.2
Sample 7	4.5	4.5	4.0	5.5		5.5	5.5	6.2	6.9	9.0
Sample 8	4.5	5.0	4.5	6.0		6.0	4.9	5.6	5.6	7.2

Comfort Lake Chlorophyll-a Deep Lake State Standard ≤ 14 µg/L 10-Year Average: 12 µg/L	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Summer Average	**17**	**20**	**16**	**12**	**14**	**16**	**10**	**4**	**10**	**5**
Sample 1	6	10	7	9	4	9	5	4	2	6
Sample 2	28	10	10	1	9	13	7	7	8	3
Sample 3	16	26	9	13	10	21	6	2	16	3
Sample 4	24	27	14	17	33	21	8	1	10	3
Sample 5	16	28	31	13	12	15	16	3	13	8
Sample 6	7	25	22	13	14	27	10	4	8	3
Sample 7	16	26	25	13		20	11	8	8	6
Sample 8	26	24	23	21		15	12	6	13	

NOT Meeting State Standards | Meeting State Standards

Forest Lake

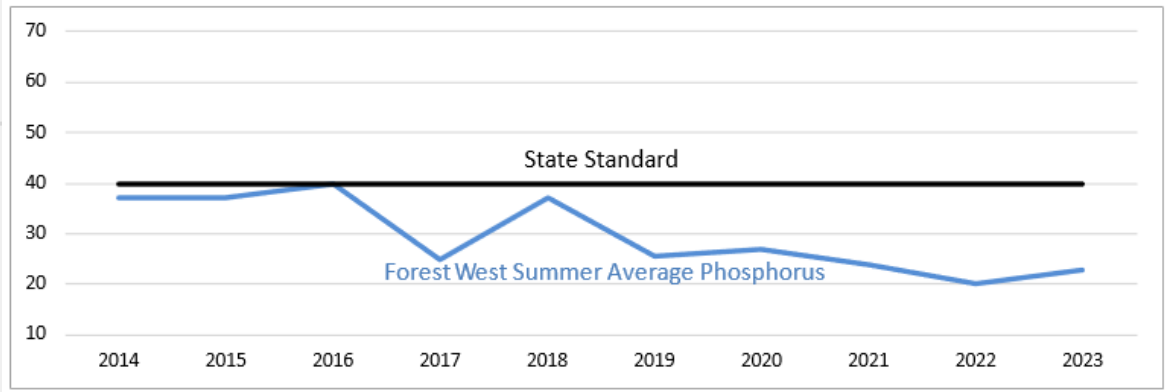
Not Impaired

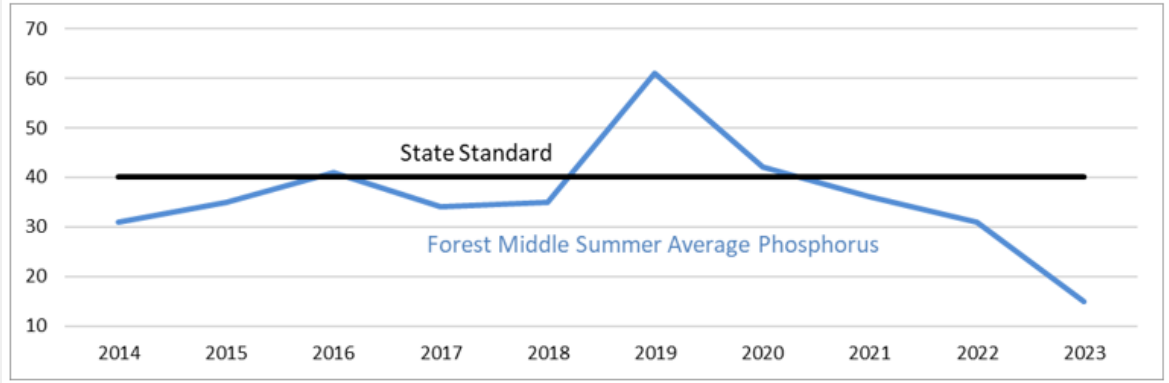
Protect against becoming impaired

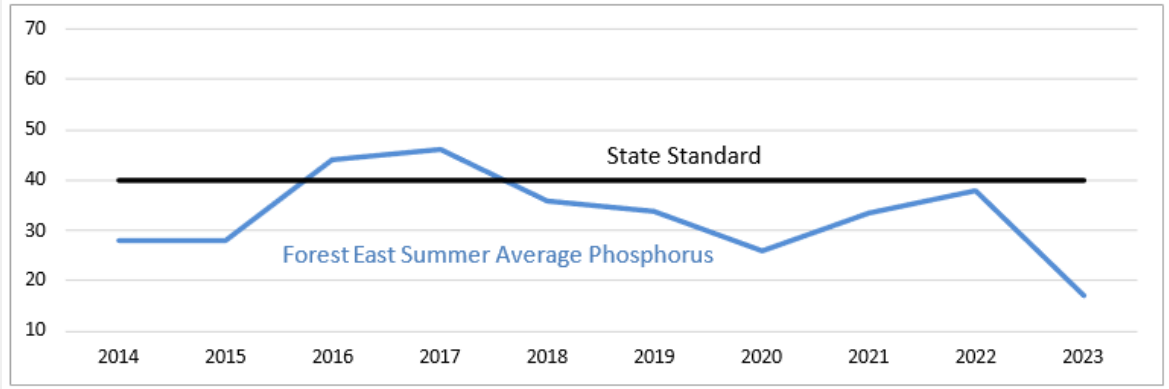
Watershed projects address external loading, alum treatment will address internal loading

Lake	Total Phosphorus Trend	Chlorophyll-a Trend	Secchi Disk Trend
Forest Lake West	**Significantly Improving Trend Since 1984**	**Significantly Improving Trend Since 2001**	**Significantly Improving Trend Since 2013**
Forest Lake Middle	Improving Trend Since 2013	Improving Trend Since 2013	Improving Trend Since 2013
Forest Lake East	Declining Trend Since 2013	Improving Trend Since 2013	Improving Trend Since 2013

**Trends that are not "significantly" improving or declining are not statistically significant.*







Other Pollutants

Sediment

- All sites below ecoregion standard (30 mg/L)
- Planned projects will further reduce sediment loading

Chloride

- Low concentrations in streams
- Doing further investigation in Comfort & Little Comfort bottom water

Nitrate

- Low concentrations monitored in streams

Overall Assessment

- Major lakes are generally in good condition
- Not all the way toward District goals, but getting closer
- Original timeline to achieve long-term goals was 2040. We are well ahead of that schedule and have moved up the goal to 2031 (and likely even sooner)
- Projects are in the hopper to make further improvements

Secchi Depth 5-Year Average and progress to 2040 goals in all District Lakes

Lake	Total Phosphorus			Secchi Depth		
	Existing 5-year Average TP (2019-2023) (ug/L)	2040 District Goal	Year	Existing 5-year Average Secchi Depth (2019-2023) (ft)	2040 District Goal	Year
Bone	25.1	30✓	5	5.8	7	5
Comfort	24.7	30✓	5	6.8	7	5
Elwell	56.2	60✓	3	2.1	3.3	3
Forest (M)	36.7	30	5	6.7	7	5
Forest Lake (E)	29.6	30✓	5	7.6	7✓	5
Forest Lake (W)	23.5	30✓	5	6.9	7	5
Forest Lake	29.9	30✓	5	7	7✓	5
Keewahtin Lake	14	20✓	5	12.7	10✓	5
Little Comfort	36.7	30	5	6.7	7✓	5
Moody	39.8	40✓	5	4.7	4.6✓	5
School	35.7	60✓	4	5.8	3.3✓	4
Shields	52.9	60✓	5	5.6	4.3✓	5
Third	16.9	60✓	3	5	3.3✓	4
Twin	26.9	60✓	2	4.1	3.3✓	2