



2021 AIS Program Yearend Summary

Comfort Lake–Forest Lake Watershed District

Lake Management Districts:

Bone Lake District

- Moody Lake
- Bone Lake

Little Comfort Lake District

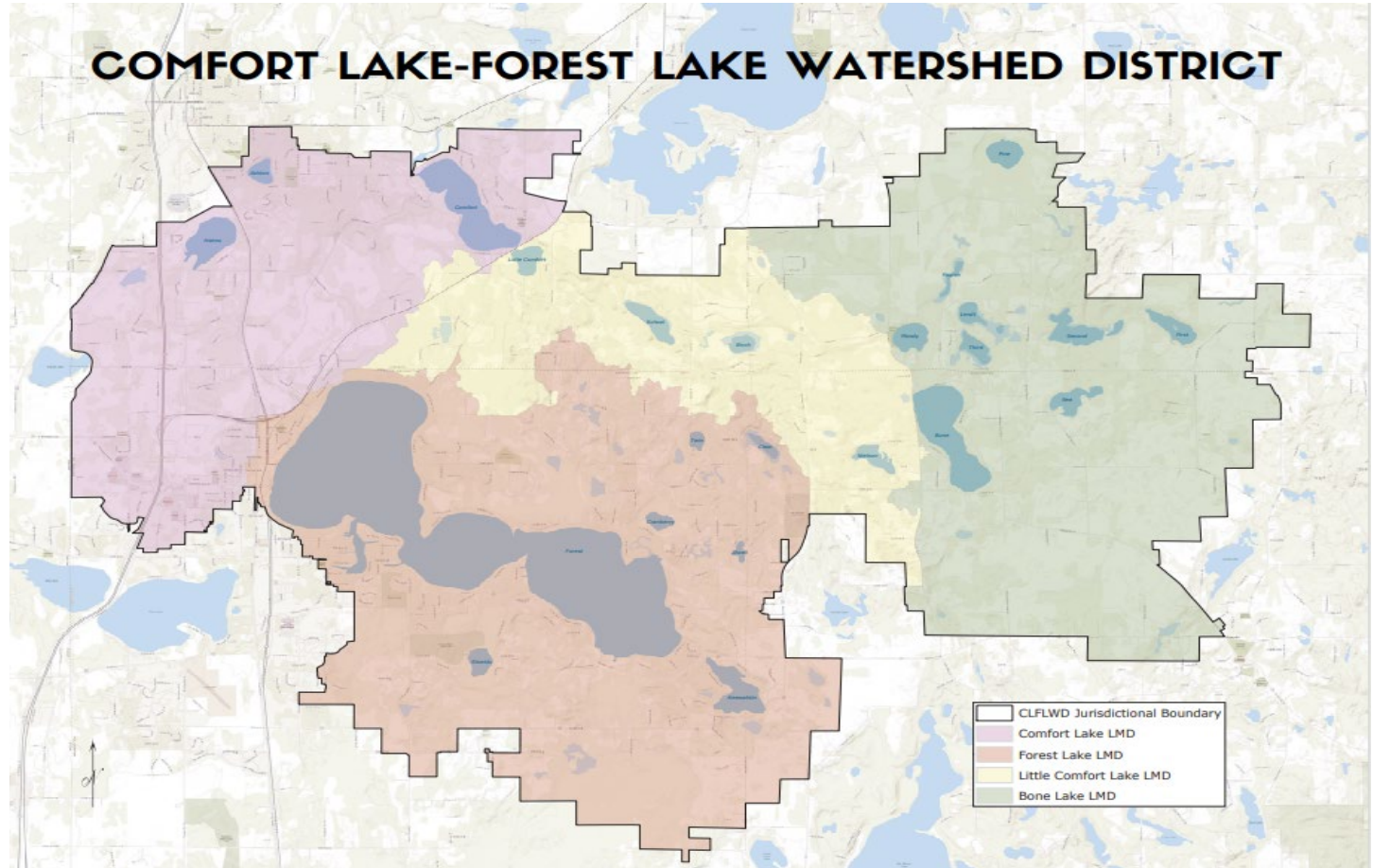
- Little Comfort Lake

Forest Lake District

- Shields Lake
- Lake Keewahtin
- Forest Lake

Comfort Lake District

- Comfort Lake



Comfort Lake-Forest Lake Watershed District

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AIS Budget Summary



Lake	Funding Sources		Estimated Yearend Expense Totals			Balance**	Littoral Acreage	Expense/Littoral Acre
	CLFLWD Local	Grants/Cont.	Blue Water Science	Contractor/ Other	EOR			
District-Wide*	\$5,000			(\$2,500)	(\$2,500)	\$0		
Moody	\$6,400	\$0	(\$3,100)	\$0		\$3,300	22	\$140.91
Bone	\$12,000	\$4,500	\$4,300	(\$12,204)		\$8,596	124	\$63.74
Little Comfort	\$0	\$0	\$0	\$0		\$0	16	\$0.00
Shields	\$4,700	\$1,500	(\$3,100)	(\$1,575)		\$1,525	22	\$212.52
Keewahtin	\$5,000	\$0	\$0	\$1,649		\$6,649	67	(\$24.61)
Forest	\$113,000	\$66,286	(\$7,750)	(\$81,268)		\$90,268	1,531	\$58.14
Comfort	\$10,000	\$5,500	(\$3,200)	(\$18,877)		-\$6,577	90	\$245.30
Total	\$156,100	\$77,786	(\$12,850)	(\$114,775)		\$106,261		

EOR AIS Program Management Costs		
Month of Services	Invoice #	Expense
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
	Running Total	\$ -

Budget Notes

*District-wide budget line items include General Program Mgmt (includes EOR time), Comprehensive Plan & Policy Development, AIS Prevention at Boat Launch Sites, AIS Rapid Response

** Balance refers to the amount of unspent monies left in the budget. This year, \$106,261 will be unspent due to cheaper herbicide costs, fewer watercraft inspectors hired, and increased grant amounts.



Moody Lake

2021 Yearend Summary

Winter Aeration System

- The District continued operation of aeration system in winter months (2020-2021) to increase dissolved oxygen and reduce winterkills. This was the sixth winter the District ran the aerator.
- Oxygen levels were monitored throughout winter and were found to be at healthy levels for the whole season.
- The winter aerator was activated for the season on January 4, 2021 and remained active until March 29th. Following deactivation, staff retrieved the floating ice signs and placed them in storage for the season.
- In early-December, staff submitted a public notice to the Forest Lake Times and the Chisago County Press for inclusion in two issues of their papers for the month of December. These public notices serve to inform Moody Lake visitors that the winter aeration system will be active starting on or after January 1st and to use caution when on the ice.

Curly-leaf Pondweed (CLP)

- The 2021 budget contained \$6,400 for Moody Lake AIS Management. Blue Water Science conducted a point intercept survey on April 16th and did not find sufficient CLP growth to warrant a treatment. For reference, the District treated 3.11 acres in 2020 and 7.81 acres in 2019.
- Report:
 - BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2022).

Fish Survey (same as 2020)

- District staff previously reached out to the DNR Hinckley Area fisheries office to coordinate timing of fish surveys in future years. They indicated that Moody Lake is not surveyed on a regular basis. The last fish survey on Moody Lake was performed in 2012 and the next survey was tentatively scheduled for 2021 but never occurred. Staff will follow up with the Hinckley office in the spring of 2022 to determine if the survey will happen or not.

Moody Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)										
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	September	October	November	December	January	February
		\$ 6,400	\$ -	\$ (3,100)	\$ -	\$ 3,300											
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Surveys-Report			\$ (3,100)		\$ (3,100)	BWS								BWS		
	Permitting/Public Notice Management	\$ 6,400				\$ -	WD										
					\$ -	\$ -	Lake Mgmt Inc.										
	Total	\$ 6,400		\$ (3,100)	\$ -	\$ (3,100)											
Aeration System	Work Task	CLFLWD*	Grants	BWS	Other	Total Expense											
	Permitting					\$ -					WD						
	Setup - Public Notice					\$ -								WD			
	Operation/Inspections - Electricity					\$ -					WD			WD			
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
2021 General Program Management							WD/EOR										

Figures in italics are cost estimates/haven't been invoiced yet

*Aeration system dollars removed because not under AIS Program in budget (under 3010 - Operations and Maintenance)

2020 Work	Status Summary
Aeration system	Deactivated on 4/1, signs collected.
Curly-leaf pondweed	Lake Management Inc. treated 3.11 acres of CLP with Aquathol K on May 22nd. Blue Water Science conducted an assessment on June 17th and found there was a total lake control of CLP this season

2021 Work	Status Summary
Aeration system	Activated on January 4, 2021 and ran until March 29th, 2021.
Curly-leaf pondweed	Blue Water Science did not find sufficient CLP to warrant treatment this year on Moody Lake.

Moody Lake Water Quality Goals & Measured Averages					
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	C	C	C	D	N/A
Mean summer phosphorus concentration below (µg/L)	60	40	40	78	Significantly Improving (-69%) since 2005
Mean summer secchi depth at or above (ft)	3.3	4.6	4.6	2.5	Improving since 2005

- Improving or declining trends means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, but NOT in a statistically significant way.
- Significantly improving or significantly declining means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, AND in a statistically significant way. The percent change in the parameter over the entire time period is reported for statistically significant trends.
- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.clflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: Natural Environment



Bone Lake

2021 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** On April 30th, Blue Water Science (BWS) conducted a curly-leaf pondweed delineation on Bone Lake and identified 4.38 acres of CLP for treatment. Same as last year, the heaviest growth of CLP was observed in the north-eastern and south-western sections of the lake.
- **Treatment:** Lake Management Inc. conducted the CLP treatment on May 26th, applying Aquathol K to all 4.38 delineated acres at a dose rate of 1.25ppm or 3.2 gallons per acre.
- **Assessment:** On June 24th, BWS conducted a CLP treatment assessment and found there was full lake control with no viable CLP observed during the survey.
- **Report:**
 - BWS: Delineation and Assessment Report (Full report distributed in December).

Eurasian Watermilfoil (EWM)

- **Delineation:** On June 24th, Blue Water Science performed an EWM delineation and found only 4 locations of light to moderate growth of EWM in the entire lake.
- **Treatment:** As was the case in 2020, the 2021 budget did not contain funding for Eurasian watermilfoil treatment.
- **Assessment:** BWS performed the assessment survey on August 20th and found EWM abundance had increased from the June 24th survey. More light growth was observed on the west and south ends of the lake.
- **Report:**
 - BWS: Delineation and Assessment Report (Full report distributed in December).

Rough Fish Management

- **Fish Barriers:**
 - Maintained and managed stop logs in the two fish barriers located at the inlet and outlet of the lake
 - Maintained [online spreadsheet](#) that is updated with stop log statuses

Zebra Mussels

- **Brief Background:** On May 28, 2019, six juvenile zebra mussels were discovered near the Bone Lake public access dock. Shortly following this discovery an eradication attempt was conducted where the public access was closed for 10 days while the area was treated with EarthTec copper sulfate. After the treatment was complete, the DNR performed several veliger tows (veligers are microscopic zebra mussel larvae) which found them in high enough densities to suggest a reproductive colony exists somewhere in the lake.
- **District Surveys and Sampler Plates:** During several visits to the lake, District staff conducted wading near shore surveys for zebra mussels 150 meters to either side of the public access. In addition to wading surveys, several Bone Lake residents volunteered to host a sampler plate on their property

while others were asked to inspect their docks at the end of the season and report findings to staff. To date, no zebra mussels have been found in Bone Lake since their initial discovery.

- Blue Water Science: On September 2, 2021, Blue Water Science performed a diving survey 150 meters on either side of the public access. During their survey they found no zebra mussels.

Water Hyacinth (same as 2020)

- Water hyacinth was first reported in Bone Lake on July 30th, 2019. Shortly after its discovery, CLFLWD and WCD staff surveyed the lake and removed all found water hyacinth plants. In 2020, no water hyacinth was found by District staff or reported by lake residents. It is likely that any plants that remained in the lake after the 2019 removal were eradicated by the winter weather.

Non-native Phragmites Treatment (same as 2020)

- On October 4, 2019, PLM Lake and Land Management Corp. treated 900sq. ft. of non-native phragmites near Bone Lake at the intersection of 235th St. N and Meadowbrook Ave. N. Staff surveyed the treatment area in the summer of 2021 and believe the population to have been eradicated. The invasive plant has since been replaced by native species such as Northern Arrowhead.

Watercraft Inspections (brief overview; see full report for more detail)

- Hours: Inspectors performed 542.5 inspection hours on Bone Lake. Based on funding allocations, this year's goal was 500 hours.
- Surveys: 661 inspection surveys were performed on Bone Lake.
- Reports:
 - Chisago County: 2021 AIS Prevention Report (Expected in early 2022)
 - CLFLWD: 2021 Watercraft Inspection Program Report

Bone Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)											
		CLFLWD	Grants/Other	BWS	Other			April	May	June	July	August	Sept	Oct	Nov	December	January	February
		\$ 12,000	\$ 4,500	\$ (4,700)	\$ (12,204)	\$ (404)												
Curly-Leaf Pondweed (CLP)	Work Task	CLFLWD	Grants/Other	BWS*	Other	Total Expense												
	Surveys-Report			\$ (1,900)		\$ (1,900)	BWS											
	Permitting/Public Notice	\$ 3,200				\$ -	WD											
	Management				\$ (1,704)	\$ (1,704)	Lake Mgmt Inc.											
	Total	\$ 3,200	\$ -	\$ (1,900)	\$ (1,704)	\$ (3,604)												
Eurasian Watermilfoil (EWM)	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report	\$ 1,900		\$ (1,900)		\$ (1,900)	BWS											
	Coordination/Mgmt Assistance					\$ -	WD											
	Total	\$ 1,900	\$ -	\$ (1,900)	\$ -	\$ (1,900)												
Rough Fish Management	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Spawning Observations	\$ -				\$ -	WD											
	Harvest					\$ -	TBD											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Zebra Mussels (ZM)	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Samplers	\$ 900.00		\$ (900.00)		\$ (900.00)	WD											
	Total	\$ 900.00		\$ (900.00)	\$ -	\$ (900.00)												
Watercraft Inspections*	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Inspection Hours	\$ 6,000	\$ 4,500		\$ (10,500)	\$ 11,234	WD/Chisago Co.											
	Total	\$ 6,000	\$ 4,500	\$ -	\$ (10,500)	\$ 11,234												
2021 General Program Management							WD/EOR											

Figures in italics are cost estimates/haven't been invoiced yet

*Planned watercraft inspection funding sources include:

- CLFLWD levy: \$6,000 (1 access)
- Washington County AIS Prevention grant rec. award: \$1,000 (same as last year)
- Bone Lake Association: \$2,000
- City of Scandia: \$1,000
- Scandia Lions Club: \$500

2020 Work	Status Summary
CLP surveys and management	LMI treated 5.14 acres of CLP on May 12th. Treatment was very effective.
EWM surveys and coordination	BWS conducted a delineation on June 17th. No treatments were conducted in 2020.
Zebra mussel early detection	In 2020, staff continued wading surveys near the public access and deployed 7 sampler plates. No zebra mussels have been found since the initial discovery in 2019.
Carp management	Continued operation of fish barrier per O&M
Watercraft inspections	543 inspection hours & 1049 inspections

2021 Work	Status Summary
CLP surveys and management	4.38 acres of CLP was treated on May 26th. This year the treatment had full lake control.
EWM surveys and coordination	EWM was mostly observed as light growth this year.
Zebra mussel early detection	Two surveys were performed this year and both found no signs of zebra mussels
Common carp management	Continued operation of fish barrier per O&M.
Watercraft inspections	This year 661 inspections were performed over the course of 542.5 hours.

Bone Lake Water Quality Goals & Measured Averages	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	C	B	B	B-	N/A
Mean summer phosphorus concentration below (µg/L)	40	30	30	30.4	Significantly Improving (-39%) since 2011
Mean summer secchi depth at or above (ft)	4	7	7	5.1	Significantly Improving (55%) since 2011

- Goals shown in green are currently being met according to their latest 5-year average
- Improving or declining trends means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, but NOT in a statistically significant way.
- Significantly improving or significantly declining means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, AND in a statistically significant way. The percent change in the parameter over the entire time period is reported for statistically significant trends.
- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.clflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: Recreational Development



Little Comfort Lake

2021 Yearend Report

Curly-leaf Pondweed (CLP)

- The 2021 budget did not contain funding for curly-leaf pondweed management in Little Comfort Lake. On July 22nd, District staff conducted a meandering survey for CLP and found several locations with light growth. Given the sparse growth in the lake no removal was deemed necessary for 2021.

Zebra Mussels

- The District is still seeking a volunteer to monitor a zebra mussel sampler plate for Little Comfort Lake. As the Comfort Lake zebra mussel population expands over the years, sampler plates will help to track trends.

Little Comfort Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)									
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.
		\$ -	\$ -	\$ -	\$ -	\$ -										
Curly-Leaf Pondweed (CLP)	Work Task	CLFLWD	Grants	BWS	Other	Total Expense										
	Survey					\$ -										
	Summary					\$ -										
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
Zebra Mussels (ZM)	Work Task	CLFLWD	Grants	BWS	Other	Total Expense										
	Samplers					\$ -										
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
2021 General Program Management																

2020 Work	Status Summary
CLP survey	No CLP surveys occurred on the lake in 2020.
Zebra mussel early detection	No sampler plate in 2020. Could not find volunteer.

Little Comfort Lake Water Quality Goals & Measured Averages					
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	C	C	B	C	N/A
Mean summer phosphorus concentration below (µg/L)	40	40	30	49	Improving since 2011
Mean summer secchi depth at or above (ft)	5	7	7	4.5	Declining since 2011

2021 Work	Status Summary
CLP survey	Staff conducted a survey on July 22nd.
Zebra mussel early detection	Continue to try to find a new volunteer to monitor a zebra mussel sampler plate on their dock in order to monitor zm spread from Big Comfort Lake

- Goals shown in green are currently being met according to their latest 5-year average
- Improving or declining trends means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, but NOT in a statistically significant way.
- Significantly improving or significantly declining means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, AND in a statistically significant way. The percent change in the parameter over the entire time period is reported for statistically significant trends.
- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.cflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: General Development



Shields Lake

2021 Yearend Summary

Rough Fish Management

- Carp Removal
 - Brief Background: A common carp removal was attempted during the Fall of 2019 and yielded less carp than expected. In total, only 71 carp were removed that amounted to roughly 1,006lbs of biomass. According to WSB's "Shields Lake: 2019 Carp Removal Project Report" there are still between 364 and 630 individual carp that need to be removed from the lake to reach management goals. To achieve these goals, the CLFLWD hired WSB again in 2020 to attempt another removal. To avoid disturbing lake bottom sediment after the District performed an alum treatment during the Fall of 2019, WSB and District staff sought removal strategies that were outside the main body of Shields Lake. Temporary barriers were installed at the outlet of lake near the mouth of a shallow pond that eyewitnesses claimed was used for spawning. Ultimately, the plan failed to capture any carp.
 - Future Removal Plans: Carp removal on Shields Lake has proven to be very difficult due to restrictions set by the DNR, the shape of the Lake and its sediment composition, and avoiding disruption of alum in lake bottom sediments. With these challenges in-mind the District has been seeking expert opinions for alternative removal strategies and from these conversations electrofishing has remained the most viable option. However, electrofishing is typically not used as a primary removal approach as it is expensive, yields less per unit of effort, and stressful for native fish species. District staff will continue these conversations until a cost-effective approach is developed that will make meaningful reductions in the carp population.

Zebra Mussels

- The District is seeking a volunteer to monitor a zebra mussel sampler plate on a private dock on Shields Lake. A sampler plate is no longer deployed on the public fishing pier because of past issues with damage and theft.

Curly-leaf pondweed (CLP)

- Delineation: On April 16th, Blue Water Science (BWS) conducted a curly-leaf pondweed delineation on Shields Lake and marked 3.17 acres for treatment.
- Treatment: On May 26th, Lake Management Inc. treated all 3.17 acres with Aquathol K at a dose rate of 4.8 gallons per acre.
- Assessment: Blue Water Science performed a treatment assessment on June 16th and found that treatment was very effective with only 4 locations of light to moderate growth remaining in the whole lake.
- Report: BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2022).

Shields Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)										
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
		\$ 4,700	\$ 1,500	\$ (3,100)	\$ (1,575)	\$ 1,525											
Fish Barrier*	Work Task	CLFLWD	Grants	Staff/EOR	Other	Total Expense											
	Retrofit Project					\$ -											
	Planning/Inspections/Oversight					\$ -											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
Zebra Mussels	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Samplers					\$ -											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Surveys-Report			\$ (3,100)		\$ (3,100)											
	Permitting/Public Notice	\$ 4,700				\$ -											
	Management		\$ 1,500		\$ (1,575)	\$ (1,575)											
	Total	\$ 4,700	\$ 1,500	\$ (3,100)	\$ (1,575)	\$ (4,675)											
Rough Fish Management	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Survey					\$ -											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
2021 General Program Management																	

Figures in italics are cost estimates/haven't been invoiced yet

Shields Lake Water Quality Goals & Measured Averages					
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	D	C	C	D-	N/A
Mean summer phosphorus concentration below (µg/L)	100	60	60	153	Improving since 1993
Mean summer secchi depth at or above (ft)	4.26	4.26	4.26	2.6	Significantly Declining (-59%) since 1993

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- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.clflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: Natural Environment

2020 Work	Status Summary
Zebra mussel early detection	No sampler plate in 2020. Could not find volunteers
Curly-leaf pondweed planning	Lake Management Inc. completed CLP treatment on May 22nd. Blue Water Science conducted a treatment assessment on June 17th and found there was total lake control of CLP.
Rough fish management	An experimental carp removal project was attempted in the Spring of 2020. No carp were observed in the trap.

2021 Work	Status Summary
Zebra mussel early detection	Seek volunteers to hang a sampler plate from their dock for the 2021 season.
Fish barrier	Operate per O&M manual.
Curly-leaf pondweed	3.17 acres of CLP were treated on May 26th. Results of the treatment were very good, with only a couple light patches left.
Rough fish management	Staff is researching alternative carp removal options for possible future attempts.



Lake Keewahtin

2021 Yearend Summary

AIS early detection survey

- District staff performed an AIS early detection survey on June 24th. During this survey, staff looked for new invasive species such as Eurasian watermilfoil, flowering rush, or starry stonewort and monitored the distribution of existing invasive species, purple loosestrife and curly-leaf pondweed.

Curly-leaf pondweed (CLP)

- During the June 24th early detection survey, staff found only a couple locations of very sparse CLP growing in the lake. The low abundance of the specie warrants no action.

Purple loosestrife

- Locations of purple loosestrife were documented in 2020 during a point intercept survey conducted by Blue Water Science. This survey found an abundance of purple loosestrife around most of the lake's perimeter. On September 23rd, PLM Lake & Land Management performed a herbicide treatment. On October 14th, District staff conducted a treatment assessment and found it had good control. Areas with denser growth will likely need another season or two of treatments to significantly reduce the abundance of purple loosestrife.

Zebra mussels

- In 2021, District staff was not able to find a zebra mussel sampler plate volunteer.

Lake Keewahtin AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)											
		CLFLWD	Grants	BWS	Other		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	
		\$ 5,000	\$ -	\$ -	\$ (800)	\$ 4,200												
Purple Loosestrife	Work Task	CLFLWD	Grants	BWS	Other	Total Expense												
	Check-Up Assessment					\$ -												
	Biocontrol Collection and Release	\$ 5,000			\$ (800)	\$ (800)												
	Total	\$ 5,000	\$ -	\$ -	\$ (800)	\$ (800)												
AIS Detection Survey	Work Task	CLFLWD	Grants	BWS	Other	Total Expense												
	Survey																	
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Zebra Mussels	Work Task	CLFLWD	Grants	BWS	Other	Total Expense												
	Samplers			\$ -		\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Curly-leaf Pondweed	Work Task	CLFLWD	Grants	BWS	Other	Total Expense												
	Hand pulling					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
2021 General Program Management							WD/EOR											

2020 Work	Status Summary
AIS early detection survey	BWS included this survey in their point intercept survey (PI)
Purple loosestrife check-up	Include in PI
Zebra mussel early detection	Volunteer observed no ZM in 2020
Curly-leaf pondweed pulling	No hand pulling in 2020

Lake Keewahtin Water Quality Goals & Measured Averages					
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	A	A	A	A	N/A
Mean summer phosphorus concentration below (µg/L)	20	20	20	14.8	Declining since 2011
Mean summer secchi depth at or above (ft)	10	10	10	14.3	Significantly Improving (+26%) since 1974

- Goals shown in green are currently being met according to their latest 5-year average
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- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.clflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

2021 Work	Status Summary
AIS early detection survey	Conducted on June 24th.
Purple loosestrife check-up	Good control this year.
Zebra mussel early detection	Find a volunteer
Curly-leaf pondweed pulling	Removal not warranted

DNR Lake Classification: Recreational Development



Forest Lake

2021 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** Blue Water Science conducted a curly-leaf pondweed delineation on April 30th and identified 120.34 acres for treatment.
- **Treatment:** On May 26th, Lake Management Inc. treated all 120.34 acres of CLP with Diquat.
- **Assessment:** On June 9th, Blue Water Science conducted a treatment assessment and found it to be very effective within delineated areas. Late season growth in Forest Lake 1 and 3 were missed during the survey and went untreated.
- **Reports:**
 - BWS: Delineation and Assessment report (Full report distributed in December).

Eurasian Watermilfoil (EWM)

- **Delineation:** Blue Water Science conducted an Eurasian watermilfoil delineation on June 9th and found no viable EWM in the entire lake. It is believed the diquat CLP treatment may have inadvertently provided some control for EWM.
- **Treatment:** On July 27th, Blue Water Science performed another survey and found some very light growth in Forest Lake 1 (West). Despite the low abundance, the Forest Lake Lake Association decided to treat on August 13th.
- **Assessment:** BWS conducted an EWM treatment assessment on September 9th, found good control in delineated areas with only a few scattered areas outside treatment polygons.
- **Reports:**
 - BWS: Delineation and Assessment report (Full report distributed in December).

Flowering Rush

- **Treatment Round 1:** On July 26th, PLM Lake and Land Management Corp. treated four large flowering rush patches totaling 7.67 acres based off heavy growth locations from 2020.
- **Flower Cutting:** Due to abnormally high abundances, staff visited the lake on 3 separate days in late-August and removed more than 1,100 seed heads. The increase in flowering seed heads is thought to be linked to the low water levels which provided more shallow water habitat and exposed shoreline.
- **Delineation 1:** On July 27th, Blue Water Science performed the first delineation of 2021 and found 75 sites covering about 0.6 acres. Some of these sites were grouped into larger area which resulted in approximately 3 acres delineated for treatment.
- **Treatment Round 2:** Using information from the delineation survey, PLM performed the 2nd round of herbicide treatment on August 13th.
- **Delineation 2:** On September 9th, Blue Water Science found 93 sites with regrowth that totaled 0.44 acres. Again, some of these sites were grouped into larger treatment areas which resulted in 3.0 acres delineated for treatment.

- Treatment Round 3: Using information from the delineation survey, PLM performed the 3rd round of herbicide treatment on September 13th.
- Final Assessment: Blue Water Science's final treatment assessment was performed on October 18th and found only 0.13 acres remaining in the lake.
- Reports:
 - BWS: Delineation and assessment report (Full report distributed in December).

Zebra Mussels

- Monitoring: Four zebra mussel sampling plates were deployed on Forest Lake this year. Zebra mussels were discovered in Forest Lake in 2015. It is expected that densities will continue to rise over the upcoming years, then potentially crash after reaching a peak.

Watercraft Inspections (brief overview; see full report for more detail)

- Hours: District inspectors performed 1,904.5 inspection hours on Forest Lake. DNR inspectors performed 550 inspection hours on Forest Lake (at no cost to the District). Inspection hours on Forest Lake totaled 2,454.5. Based on funding allocations, this year's goal was 2,318 hours.
- Surveys: a combined total of 5,751 inspection surveys were performed on Forest Lake (4,334 by District inspectors, 1,417 by DNR inspectors).
- Reports:
 - Chisago County: 2021 AIS Prevention Report (Expected in early 2022)
 - CLFLWD: 2021 Watercraft Inspection Program Report

Forest Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)											
		CLFLWD	Grants/Other	BWS	Other		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	
		\$ 113,000	\$ 66,286	\$ (7,750)	\$ (81,268)	\$ 90,268												
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Delin-Report			\$ (2,900)		\$ (2,900)												
	Permitting/Public Notice	\$ 48,400				\$ -												
	Management		\$ 27,143		\$ (25,435)	\$ (28,335)												
	Total	\$ 48,400	\$ 27,143	\$ (2,900)	\$ (25,435)	\$ (28,335)												
Flowering Rush	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Delin-Report			\$ (6,100)		\$ (6,100)												
	Permit/Outreach/Pub. Notice	\$ 43,400	\$ 5,143		\$ (921)	\$ (921)												
	Management				\$ (10,523)	\$ (10,523)												
	Total	\$ 43,400	\$ 5,143	\$ (6,100)	\$ (11,444)	\$ (17,544)												
Eurasian Watermilfoil	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report	\$ 3,200		\$ 1,250		\$ 1,250												
	Coordination/Mgmt Assistance					\$ -												
	Total	\$ 3,200	\$ -	\$ 1,250	\$ -	\$ 1,250												
Zebra Mussels	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Samplers					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Watercraft Inspections*	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Inspection Hours	\$ 18,000	\$ 34,000	\$ -	\$ (44,389)	\$ (44,389)												
	Total	\$ 18,000	\$ 34,000	\$ -	\$ (44,389)	\$ (44,389)												
Plant Harvester	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	DNR Aquatic Plant Mgmt Permitting					\$ -												
	Harvester Operation					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Macrophyte Survey	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Point-Intercept Survey					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
2021 General Program Management																		

Figures in italics are cost estimates/haven't been invoiced yet

*Watercraft inspection funding sources include:

CLFLWD levy: \$18,000 (3 accesses)

Washington County AIS Prevention grant rec. award: \$15,500 (same as last year)

Forest Lake Lake Association: \$3,500

City of Forest Lake: \$15,000 (same as last year)

Forest Lake Water Quality Goals & Measured Averages							
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend		
Water quality rating at or above	C	C	B	C+	Forest- West	Forest- Middle	Forest- East
Mean summer phosphorus concentration below (µg/L)	37	30	30	36.8	Sig. Improving (-49%) since 2011	Declining since 2011	Declining since 2011
Mean summer secchi depth at or above (ft)	5	7	7	6.2	Sig. Improving (+86%) since 2011	Improving since 2011	Improving since 2011

- Goals shown in green are currently being met according to their latest 5-year average
- Improving or declining trends means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, but NOT in a statistically significant way.
- Significantly improving or significantly declining means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, AND in a statistically significant way. The percent change in the parameter over the entire time period is reported for statistically significant trends.
- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.cflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: General Development

2020 Work	Status Summary
CLP surveys & management	LMI treated 58.29 acres. BWS found good control in FL3, but poor control in FL1 and FL2.
EWM surveys & coord.	BWS delienated 53.83 acres of EWM. FLLA conducted a treatment which was very effective.
FR surveys & management	Only 0.07 acres of flowering rush remained at the end of the season following two spot treatments and a seed head removal.
Watercraft inspections	The District achieved 2,639 hours worth of watercraft inspections on Forest Lake this season resulting in 8,093 surveys.

2021 Work	Status Summary
CLP surveys & management	120.34 acres of CLP were treated on May 26th with good results. However, a couple patches in Forest Lake 1 and 3 were missed.
EWM surveys & coord.	Some EWM control may have occurred due to the District using Diquat for it's CLP treatment this year. FLLA treated light growth patched in the west basin of the lake.
FR surveys & management	This year three flowering rush treatments were performed as well as an extensive seed head removal effort. The final assessment only found 0.13 acres of FR left in the lake.
ZM population monitoring	4 individuals volunteered this year
Watercraft inspections	This year 5,751 inspections were performed over the course of 2,454.5 hours.



Comfort Lake

2021 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** Blue Water Science (BWS) performed a delineation survey on April 16th and found very light growth that did not warrant treatment.
- **Treatment:** The District did not treat CLP on Comfort Lake in 2021 (same as the last five years).
- **Assessment:** BWS performed assessment on June 24th and only found 3 locations with light growth in the entire lake.
- **Reports:**
 - BWS: Delineation and Assessment report (Full report distributed in December)

Eurasian Watermilfoil

- **Delineation:** BWS performed a delineation survey on April 16th and found sparse light growth around the perimeter of the lake.
- **Treatment #1:** The District did not treat EWM in 2021. However, the Comfort Lake Association (CLA) had purchased a boat and herbicide application equipment in 2019 and conducted their own treatment. On May 28th, the CLA treated 6.9 acres on the southern half of the lakes at 4 locations.
- **Assessment #1:** On August 20th, Blue Water Science surveyed the lake and found abundant growth around the entire perimeter of the lake.
- **Treatment #2:** On September 15th, the CLA hired Lake Management Inc. to perform an 8.05 acre ProcellaCOR treatment near the public access.
- **Assessment:** BWS performed the final treatment assessment survey on October 18th and again found light to heavy growth scattered around the perimeter of the lake, but less than the August 20th survey.
- **Reports:**
 - BWS: Delineation and Assessment report (Summary distributed in December, full report in January 2022).

Zebra Mussels

- **Monitoring:** Three zebra mussel sampling plates were deployed on Comfort Lake this year. Zebra mussels were first discovered in Comfort Lake in 2017. It is expected that densities will continue to rise over the upcoming years, then potentially crash after reaching a peak.

Watercraft Inspections (brief overview; see full report for more detail)

- **Hours:** Inspectors performed 554 inspection hours on Comfort Lake. Based on funding allocations, this year's goal was 523 hours.
- **Surveys:** 753 inspection surveys were performed on Comfort Lake.
- **Reports:**
 - Chisago County: 2021 AIS Prevention Report (Expected in early 2022)
 - CLFLWD: 2021 Watercraft Inspection Program Report

Comfort Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2021-2022)											
		CLFLWD	Grants/Other	BWS	Other		April	May	June	July	August	September	October	November	December	January	February	
		\$ 10,000	\$ 5,500	\$ (3,200)	\$ (18,877)	\$ (6,577)												
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report			\$ (1,400)		\$ (1,400)												
	Permitting/Public Notice	\$ 2,000				\$ -												
	Management (N/A)					\$ -												
	Total	\$ 2,000	\$ -	\$ (1,400)	\$ -	\$ (1,400)												
Eurasian Watermilfoil	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report	\$ 2,000		\$ (1,800)	\$ (7,381)	\$ (9,181)												
	Coordination/Mgmt Assistance					\$ -												
	Total	\$ 2,000	\$ -	\$ (1,800)	\$ (7,381)	\$ (9,181)												
Zebra Mussels	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Samplers					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Watercraft Inspections*	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Inspection Hours	\$ 6,000	\$ 5,500		\$ (11,496)	\$ (11,496)												
	Total	\$ 6,000	\$ 5,500	\$ -	\$ (11,496)	\$ (11,496)												
Macrophyte Survey	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Point-Intercept Survey					\$ -												
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
2021 General Program Management																		

Figures in italics are cost estimates/haven't been invoiced yet

*Planned watercraft inspection funding sources include:

CLFLWD levy: \$6,000 (1 access)

Chisago County AIS Prevention Funds: \$5,000

Comfort Lake Association: \$500

Wyoming: TBD

Comfort Lake Water Quality Goals & Measured Averages					
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2016-2020)	Long-Term Trend
Water quality rating at or above	C	C	B	C+	N/A
Mean summer phosphorus concentration below (µg/L)	40	30	30	32.4	Improving since 1994
Mean summer secchi depth at or above (ft)	5	7	7	5.6	Significantly Improving (+52%) since 2011

- Goals shown in green are currently being met according to their latest 5-year average
- Improving or declining trends means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, but NOT in a statistically significant way.
- Significantly improving or significantly declining means that the water quality parameter is consistently increasing or decreasing from year to year over the time period, AND in a statistically significant way. The percent change in the parameter over the entire time period is reported for statistically significant trends.
- A scientific trend analysis of District lake water quality is available in the District's Draft 2020 Water Monitoring Report available at <https://www.clflwd.org/documents/Agendaitem6e-Draft2020MonitoringReport.pdf>

DNR Lake Classification: General Development

2020 Work	Status Summary
CLP surveys & management	Blue Water Science delineated CLP in the lake and determined growth was not abundant enough for treatment.
EWM surveys & coordination	BWS conducted delineation and assesment surveys. The CLA conducted an EWM treatment which had good control.
Zebra mussel monitoring	ZM discovered in 2017, densities increasing over time. Two sampler plate volunteers in 2020.
Watercraft inspections	The District achieved 574 hours worth of watercraft inspections, resulting in 1221 surveys.

2021 Work	Status Summary
CLP surveys & management	Blue Water Science's survey did not find sufficient CLP growth to warrant treatment this year.
EWM surveys & coordination	The CLA performed two treatments and the BWS treatment assesment found EWM growth around the perimeter of the lake.
Zebra mussel monitoring	3 individuals volunteered this year.
Watercraft inspections	This year 753 inspections were performed over the course of 554 hours.