



# 2019 AIS Program Year-end Summary

## Comfort Lake–Forest Lake Watershed District

### Lake Management Districts:

#### Bone Lake District

- Moody Lake
- Bone Lake

#### Little Comfort Lake District

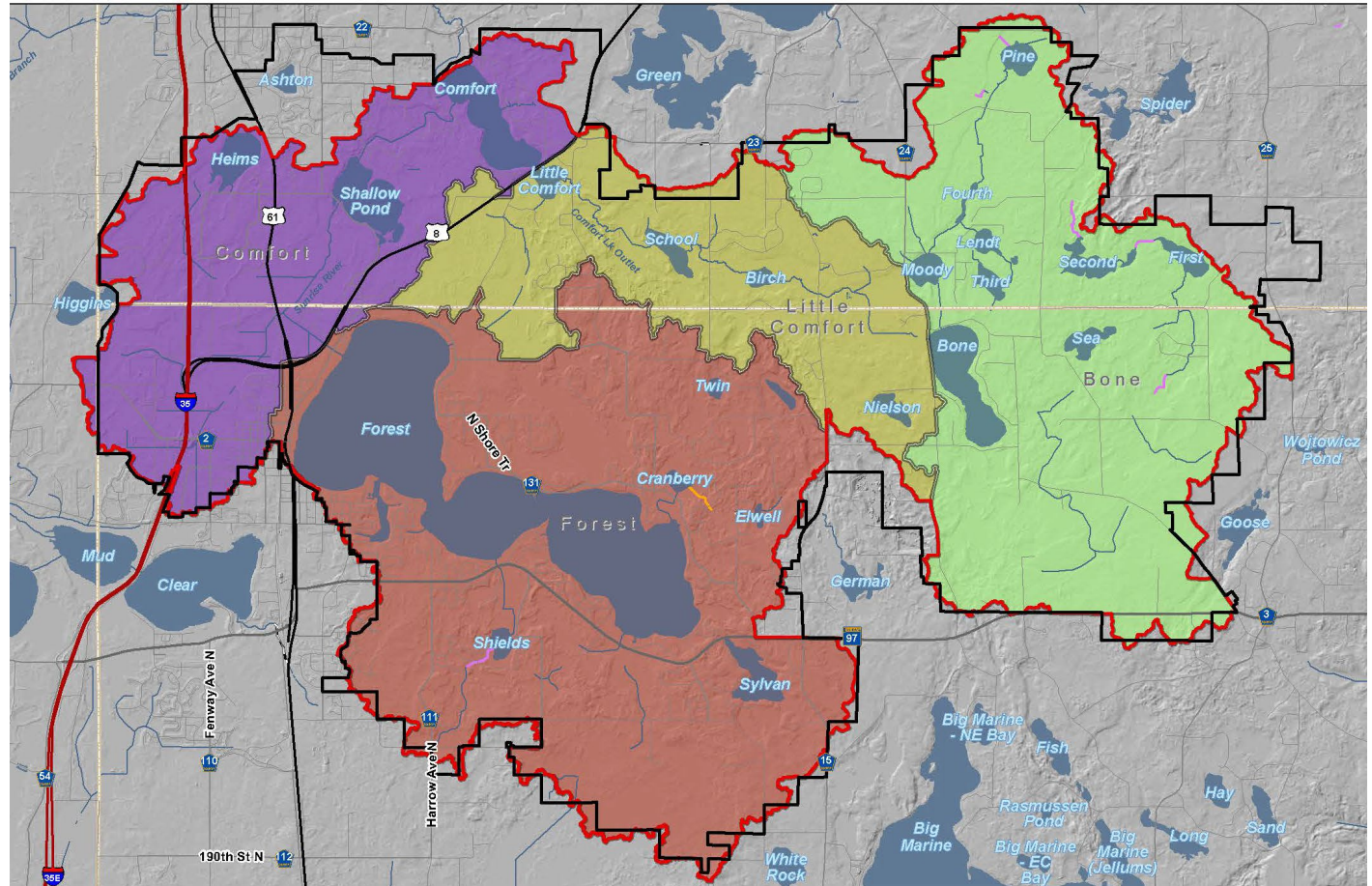
- Little Comfort Lake

#### 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*	\$7,000	\$1,275		(\$24,917)		(\$16,642)		
Moody	\$4,000	\$0	(\$1,200)	(\$2,956)		(\$156)	22	\$188.92
Bone	\$11,000	\$5,500	\$4,300	(\$13,009)		\$7,791	124	\$70.24
Little Comfort	\$0	\$0	\$0	\$0		\$0	16	\$0.00
Shields	\$20,000	\$0	(\$1,200)	(\$17,373)		\$1,427	22	\$844.24
Keewahtin	\$0	\$0	\$0	\$0		\$0	67	\$0.00
Forest	\$106,876	\$72,380	(\$12,300)	(\$136,162)		\$30,794	1,531	\$96.97
Comfort	\$13,700	\$5,500	(\$5,800)	(\$11,500)		\$1,900	90	\$192.22
<b>Total</b>	<b>\$162,576</b>	<b>\$84,655</b>	<b>(\$16,200)</b>	<b>(\$205,918)</b>		<b>\$25,114</b>		

EOR AIS Program Management Costs		
Month of Services	Invoice #	Expense
January	00376-0019-1	\$ (1,826.00)
February	00376-0019-2	\$ (953.25)
March	00376-0019-3	\$ (633.25)
April	00376-0019-4	\$ -
May	00376-0019-5	\$ (3,489.65)
June	00376-0019-6	\$ (2,221.75)
July		
August		
September		
October		
November		
December		
	Running Total	\$ (9,123.90)

## 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 (Bone Lake zebra mussel rapid response)

Lake	AIS Present in District Lakes				
	Curly-leaf pondweed	Eurasian watermilfoil	Flowering rush	Zebra Mussels	Purple Loosestrife
Moody	X				
Bone	X	X		2019	X
Little Comfort	X				
Shields	X				
Keewahtin	X				X
Forest	X	X	1998	2015	X
Comfort	X	X		2017	X

Date listed if available on Minnesota DNR's Infested Waters List. If not available, a "X" will mark it as present



# Moody Lake

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## 2019 Year-end Summary

### Winter Aeration System

- The District continued operation of aeration system in winter months (2018-2019) to increase dissolved oxygen and reduce winterkills. This was the fourth winter the District ran the aerator.
- Oxygen levels were monitored throughout winter. The dissolved oxygen readings were ample for most fish species (i.e. above 4 mg/L) throughout most of the winter months.
- The winter aerator was activated for the season on January 8, 2019 and remained active until April 9<sup>th</sup>. After deactivation, staff retrieved the floating ice signs and placed them in storage for the season.
- On December 2<sup>nd</sup>, staff submitted a public notice to the Forest Lake Times and the Chisago County Press for inclusion in two issues of their paper 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 1<sup>st</sup> and to use caution when on the ice.

### Curly-leaf Pondweed (CLP)

- The 2019 budget contained \$4,000 for Moody Lake AIS Management. Blue Water Science completed a curly-leaf pondweed delineation on April 24, 2019 and recommended 7.81 acres of treatment that was primarily located less than 150 feet from shore, which triggers additional herbicide application restrictions.
- Moody Lake is a Natural Environment Lake (unlike Bone, Forest, and Comfort which are either Recreational Development or General Development lakes). Due to this fact, regulations for using herbicides in Moody Lake are stricter than some other lakes in the District. In order to be approved for a CLP herbicide treatment permit under these restrictions, a variance request was submitted describing the necessity of this treatment. On May 6<sup>th</sup>, the variance request was approved, and the CLP herbicide treatment permit was submitted to the DNR shortly after. On May 14<sup>th</sup>, the treatment permit was approved giving CLFLWD the authorization to apply the aquatic herbicide Aquathol K to the patches of CLP in the lake, given landowner permission. The District mailed out letters to all landowners around the lake requesting permission to treat within 150 feet of the shore.
- On May 20<sup>th</sup>, Lake Management Inc. treated all 7.81 acres with Aquathol K. The applicator dosed the treatment areas with approximately 1.25ppm of this herbicide. Due to this application rate, there was a total lake control of CLP this year. This treatment assessment was conducted by Blue Water Science on June 18<sup>th</sup>.
- Report:
  - BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2019).

### Fish Survey (same as 2018)

- 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 is not yet scheduled.
- Since the District last conducted a survey in 2015, it should consider doing so again within the next 2 years.

# Moody Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)											
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	September	October	November	December	January	February	
		\$ 4,000	\$ -	\$ (1,200)	\$ (2,956)	\$ (156)												
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants	BWS	Other	Total Expense												
	Surveys-Report			\$ (1,200)		\$ (1,200)	BWS								BWS			
	Permitting/Public Notice	\$ 4,000				\$ -	WD											
	Management				\$ (2,956)	\$ (2,956)	Lake Mgmt Inc.											
	Total	\$ 4,000		\$ (1,200)	\$ (2,956)	\$ (4,156)												
Aeration System	Work Task	CLFLWD*	Grants	BWS	Other	Total Expense												
	Permitting					\$ -					WD							
	Setup - Public Notice					\$ -											WD	
	Operation/Inspections - Electricity					\$ -	WD										WD	
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
2019 General Program Management							WD/EOR											

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

\*Aeration system dollars not shown because they are budgeted separately (under 3010 - Operations and Maintenance)

Moody Lake Water Quality Goals & Measured Averages						
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
<b>Water quality rating at or above</b>	C	C	C	D-	D	D
<b>Mean summer phosphorus concentration below (µg/L)</b>	60	40	40	165	113	101
<b>Mean summer secchi depth at or above (ft)</b>	3.3	4.6	4.6	2.4	2.8	2.1

\*2015-2019 average is in progress and based on the first 4 years of data. Note that that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.clflwd.org/data.php](http://www.clflwd.org/data.php).

**DNR Lake Classification:** Natural Environment

2018 Work	Status Summary
Aeration system	System was deactivated after ice-out and signs collected.
Curly-leaf pondweed	Chemical treatment of CLP not allowed by the DNR in the past. Staff has restarted conversations with DNR in 2018 re 2019 treatment.

2019 Work	Status Summary
Aeration system	Staff anticipate activating the aeration system on or after January 1, 2020.
Curly-leaf pondweed	Lake Management Inc. treated 7.81 acres of CLP with Aquathol K on May 20th. Blue Water Science conducted an assessment on June 18th and found there was a total lake control of CLP this season



# Bone Lake

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## 2019 Year-end Summary

### Curly-leaf Pondweed (CLP)

- **Delineation:** On April 24th, Blue Water Science (BWS) conducted a curly-leaf pondweed delineation on Bone Lake and identified 3.88 acres of CLP for treatment. The heaviest growth of CLP was observed in the north-eastern section of the lake, with some light growth found on the north and south ends of the lake.
- **Treatment:** Lake Management Inc. conducted the CLP treatment on May 20<sup>th</sup>, applying Aquathol K to all 3.88 delineated acres at a dose rate of 1.25ppm or 3.2 gallons per acre.
- **Assessment:** On June 6<sup>th</sup>, BWS conducted a CLP treatment assessment and found that there was poor CLP control within the treatment area. This CLP poor control could be a result of the relatively small treatment area, wave action diluting the herbicide, and/or treatment timing.
- **Report:**
  - BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2019).

### Eurasian Watermilfoil (EWM)

- **Delineation:** BWS performed a delineation survey on June 6, 2019, identifying growth in multiple areas ranging from light to heavy in mainly the northeast and southwest ends of the lake. No large areas were delineated for EWM treatment. The delineation map was sent to the Bone Lake Association immediately after receipt.
- **Treatment:** As was the case in 2018, the 2019 budget did not contain funding for Eurasian watermilfoil treatment.
- **Assessment:** BWS performed the assessment survey on August 28, 2019 and observed that EWM had apparently died back and no EWM was observed in Bone Lake.
- **Report:**
  - BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2019).

### 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

- **Detection Monitoring:** One volunteer monitored a sampler plate on their private dock for early detection. Additionally, a sampler plate was placed under the public dock. No zebra mussels were found attached to the plates.

- Zebra Mussel Discovery: The Washington Conservation District operates an AIS prevention program that sends paid staff once a week to boat landings to conduct surveys for newly introduced AIS. On May 28<sup>th</sup>, a WCD employee found 6 juvenile zebra mussels (two clusters of three) attached to a broken stick beneath the public access dock on Bone Lake. Interestingly, this same survey was conducted the week prior with nothing found. Immediately after Matt Downing's (WCD Water Resource Specialist) call breaking the news, two CLFLWD staff members spent the afternoon surveying the northern shore for zebra mussels. In the days following, surveying efforts gained the support from EOR staff members, the Minnesota DNR dive team, and Blue Water Science, which together conducted over 70 hours of surveys on Bone Lake.
- Zebra Mussel Treatment: After much coordination between the Minnesota DNR, Washington Conservation District, Chisago County, PLM Lake and Land Management Corp. (PLM), Forest Lake and Scandia Public Works, Bone Lake Association, and various other organizations, the treatment plan went into effect on June 17<sup>th</sup>, 2019. A floating barrier was borrowed from Carver County and installed around the treatment area in Bone Lake. Due to the initial discovery location of the zebra mussels being at the public access, the landing had to be closed 10 days for the treatment as the barrier would block boat traffic to and from the access. Patrick Selter from PLM was hired as the pesticide applicator because of his experience with zebra mussel treatments. He initially dosed the treatment area with EarthTec copper sulfate on June 17<sup>th</sup> after the barrier's installation. Staff monitored concentration levels which dictated when Patrick needed to re-dose the area to maintain a lethal dose of at least .5ppm. The barrier was removed on June 26<sup>th</sup> and long-term monitoring began shortly after.
- Post-Treatment Monitoring: Following the copper sulfate treatment, CLFLWD staff visited the lake 7 times and surveyed for more than 17 hours total. The initial discovery site and the lake outlet were surveyed the most as these were thought to be the mostly likely places to find more zebra mussels if they were still present in the lake. In addition to CLFLWD staff, the WCD continued their periodic surveys throughout the summer months and the Minnesota DNR conducted a scuba diving survey and veliger tow on September 23<sup>rd</sup>. The results of the veliger tow will be available sometime in early 2020. To recruit help, the CLFLWD staff created and distributed a zebra mussel early detection protocol to the Bone Lake Association members asking for their assistance. To date, no more zebra mussels have been found in the lake. CLFLWD staff will continue to perform periodic lake surveys in 2020.
- Education and Outreach: Prior to the Bone Lake zebra mussel treatment, the CLFLWD made sure to inform residents and visitors of the public accesses closure and the purpose of the subsequent pesticide application. Information regarding the initial zebra mussel discovery and treatment process were not only published in the Chisago County Press, but they were also mailed to all Bone Lake residents. Additionally, similar information was posted to both the District's website and Facebook page. Signage was created and posted at the public launch to ensure all visiting boaters were aware of the 10-day closure. Following the treatment, staff provided periodic updates to the public, Minnesota DNR, local lake associations, Chisago County, and all other involved organizations.
- Publicity: Details regarding the zebra mussel discovery and treatment were detailed in an article by the Pioneer Press on June 14<sup>th</sup> and two articles by the Forest Lake Times on June 10<sup>th</sup> and 17<sup>th</sup>. The Minnesota DNR also published a press release on June 6<sup>th</sup>, which can be found on their website.
- Report:
  - A full report detailing the Bone Lake zebra mussel pilot treatment will be available at the end of December 2019.

## Water Hyacinth

- **Discovery:** Water hyacinth was first reported in Bone Lake on July 30<sup>th</sup> by a resident of the lake. A week prior to their report, they first observed the plant emerging amongst the lily pads in front of their property. After searching the web and determining that the specimen matched water hyacinth, they sent the MN Department of Natural Resources (DNR) photos and a description of their findings. On July 30<sup>th</sup>, April Londo and Keegan Lund confirmed that the specimen was indeed water hyacinth. CLFLWD staff received this confirmation on July 31<sup>st</sup> and immediately began coordinating resources and researching this new aquatic invasive species. Discovery and general water hyacinth information was sent to the Bone Lake Association for distribution to its members.
- **Treatment:** On July 31<sup>st</sup>, shortly after receiving the DNR's confirmation, CLFLWD staff visited the site of initial discovery and began mechanically removing the water hyacinth. A total of 40-50 plants were found and removed from the initial discoverer's property and the two adjacent properties. The removed plants were tied shut in plastic bags and left to bake in the sun before being properly disposed of. Matt Downing from the Washington Conservation District assisted staff with a full lake survey on August 22<sup>nd</sup> and only found 1 plant. Staff believes Minnesota's cold and often harsh winters will eradicate any missed and remaining water hyacinth plants in the lake. Despite its low chances of survival, CLFLWD will continue to monitor the lake for this aquatic invasive species in 2020.

## Non-native Phragmites Treatment

- On October 4, 2019, PLM Lake and Land Management Corp. treated 900sq. ft. of non-native phragmites near Bone Lake at the intersection of 235<sup>th</sup> St. N and Meadowbrook Ave. N.
- CLFLWD staff plan to conduct a winter mowing to knock down the dead stalks in preparation for a fall 2020 treatment.

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

- **Hours:** Inspectors performed 575.3 inspection hours on Bone Lake. Based on funding allocations, this year's goal was 500 hours.
- **Surveys:** 689 inspection surveys were performed on Bone Lake.
- **Reports:**
  - Chisago County: 2019 AIS Prevention Report (Expected in early 2020)
  - CLFLWD: 2019 Watercraft Inspection Program Report

# Bone Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)										
		CLFLWD	Grants/Other	BWS	Other		April	May	June	July	August	September	October	November	December	January	February
		\$ 11,000	\$ 5,500	\$ (3,900)	\$ (13,009)	\$ (409)											
<b>Curly-Leaf Pondweed (CLP)</b>	<b>Work Task</b>	CLFLWD	Grants/Other	BWS*	Other	Total Expense											
	Surveys-Report			\$ (2,000)		\$ (2,000)											
	Permitting/Public Notice	\$ 3,100				\$ -											
	Management				\$ (1,509)	\$ (1,509)											
	<b>Total</b>	\$ 3,100	\$ -	\$ (2,000)	\$ (1,509)	\$ (3,509)											
<b>Eurasian Watermilfoil (EWM)</b>	<b>Work Task</b>	CLFLWD	Grants/Other	BWS	Other	Total Expense											
	Surveys-Report	\$ 1,900		\$ (1,900)		\$ (1,900)											
	Coordination/Mgmt Assistance					\$ -											
	<b>Total</b>	\$ 1,900	\$ -	\$ (1,900)	\$ -	\$ (1,900)											
<b>Rough Fish Management</b>	<b>Work Task</b>	CLFLWD	Grants/Other	BWS	Other	Total Expense											
	Spawning Observations	\$ -				\$ -											
	Harvest					\$ -											
	<b>Total</b>	\$ -	\$ -	\$ -	\$ -	\$ -											
<b>Zebra Mussels (ZM)</b>	<b>Work Task</b>	CLFLWD	Grants/Other	BWS	Other	Total Expense											
	Samplers	\$ -				\$ -											
	<b>Total</b>	\$ -	\$ -	\$ -	\$ -	\$ -											
<b>Watercraft Inspections*</b>	<b>Work Task</b>	CLFLWD	Grants/Other	BWS	Other	Total Expense											
	Inspection Hours	\$ 6,000	\$ 5,500		\$ (11,500)	\$ (11,500)											
	<b>Total</b>	\$ 6,000	\$ 5,500	\$ -	\$ (11,500)	\$ (11,500)											
<b>2019 General Program Management</b>																	

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

Bone Lake Water Quality Goals & Measured Averages						
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	C	C	B	C+	C	C+
Mean summer phosphorus concentration below (µg/L)	40	40	30	46	38	33
Mean summer secchi depth at or above (ft)	4	4	7	5.0	4.4	5.1

\*2015-2019 average is in progress and based on the first 4 years of data. Note that that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.cflwd.org/data.php](http://www.cflwd.org/data.php).

**DNR Lake Classification:** Recreational Development

2018 Work	Status Summary
CLP surveys and management	Delineated two, 0.5-acre patches on 5/8/18. Coord. w/ BLA/BWS for hand pulling on June 28.
EWM surveys and coordination	Delin. growth in multiple spots on 6/6/18. Incl. EWM pulling during CLP pulling, per BWS rec.
Zebra mussel early detection	No zebra mussel sightings in 2018
Common carp management	Continued operation of fish barrier per O&M manual
Watercraft inspections	520 inspection hours & 500 inspections performed
Point-Intercept macrophyte survey	Completed August 2

2019 Work	Status Summary
CLP surveys and management	Lake Management inc. treated 3.88 acres of CLP on May 20th. There was poor CLP control in the treatment area this year.
EWM surveys and coordination	No funding was budgeted for EWM treatments in 2019.
Zebra mussel early detection	Zebra mussels were first discovered on May 28th. A treatment was conducted from June 17th to June 26th. Lake surveys were conducted periodically since the treatment. To date, no more zebra mussels have been discovered in the lake.
Common carp management	Stop logs were removed by staff on October 28th.
Watercraft inspections	The District achieved 575 hours worth of watercraft inspections on Bone Lake.





# Little Comfort Lake

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## 2019 Year-end Report

### **Curly-leaf Pondweed (CLP)**

- The District did not treat curly-leaf pondweed on Little Comfort Lake this year. However, Chisago County performed a macrophyte point intercept survey on Little Comfort Lake this year and did not observe any CLP during the survey. In a 2015 survey, CLP was only found at 4 locations, and the population was described as very scarce. CLFLWD staff will plan to check on CLP growth in 2020.

### **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 (2019-2020)									
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	September	October	November	December	January
		\$ -	\$ -	\$ -	\$ -	\$ -										
Curly-Leaf Pondweed (CLP)	Work Task	CLFLWD	Grants	BWS	Other	Total Expense										
	Survey					\$ -		WD								
	Summary					\$ -		WD								
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
Zebra Mussels (ZM)	Work Task	CLFLWD	Grants	BWS	Other	Total Expense										
	Samplers					\$ -		WD								
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
2019 General Program Management							WD/EOR									

2018 Work	Status Summary
CLP survey	Low densities in previous years suggest full delin/assessment not necessary.
Zebra mussel early detection	No sampler plate in 2018. Could not find volunteer.

2019 Work	Status Summary
CLP survey	No CLP surveys occurred on the lake this season and there are no plans to do a treatment.
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

	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	C	C	B	B	C+	C
Mean summer phosphorus concentration below (µg/L)	40	40	30	42	50	62
Mean summer secchi depth at or above (ft)	5	5	7	5.4	5.4	3.9

\*2015-2019 average is in progress and based on the first 4 years of data. Note that that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.cflwd.org/data.php](http://www.cflwd.org/data.php).

DNR Lake Classification: General Development



# Shields Lake

## 2019 Year-end Summary

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### Rough Fish Management

- Fish Barrier:
  - Kyle Crawford, project engineer from Emmons and Olivier Resources, Inc., and Dunaway Construction completed the installation of a new physical barrier at the south end of the culvert that connects Forest Lake to Shields Lake under Scandia Trail N. in August of 2019. District staff will continue to operate the electric fish barrier as is, pursuant to Administrator discretion.
- Carp Removal:
  - Shields Lake Access Improvements: WSB and the local commercial fisherman first visited the lake on September 21<sup>st</sup> to conduct the first gill netting attempt. Due to wet weather that week, the commercial fisherman's boat trailer and truck got stuck on the path down to the lake, thus the removal attempt was cancelled. Shoreline Landscaping spread rock along the path to improve traction on September 27<sup>th</sup>. Not only were these improvements necessary for the carp removal, they also helped the alum treatment trucks get traction on the steep hill.
  - Carp Removal Attempts and Population Estimates: On September 28<sup>th</sup> and 30<sup>th</sup>, gill nets were set by the local commercial fisherman and checked every hour to reduce stress on other fish species that were captured incidentally. To encourage the movement of carp into these nets, the commercial fisherman would maneuver their boat in a zig-zag like fashion to scare fish into the trap. At the same time as the gill netting, one WSB scientist and an CLFLWD staff member performed electrofishing around the perimeter of the nets. A separate electrofishing attempt was performed on October 18<sup>th</sup>. The results of this attempt and the September 30<sup>th</sup> attempt were used to recalculate a new carp population estimate for the lake. In total, 71 common carp were removed from Shields Lake weighing on average 14.8lbs. This equates to a total biomass removal of 1,006 lbs. It is estimated that there are still between 497 and 859 carp left in Shields Lake, meaning 364-630 individual carp need to be removed from the lake to meet a population goal of 181±49 carp.
  - Future Removal Plans: After the third electrofishing attempt on October 18<sup>th</sup>, CLFLWD and WSB staff did a reconnaissance of the stream that connects Shields Lake to Forest Lake. It has been stated by witnesses that the common carp in Shields Lake are using this channel in the spring for spawning. CLFLWD and WSB staff will discuss potential strategies for trapping and removing carp in this stream with the possibility of implementing such a plan during the spring of 2020.
  - Report: WSB submitted their final report to CLFLWD on November 26<sup>th</sup>, describing the carp removal and results in greater detail.

### 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 24<sup>th</sup>, Blue Water Science (BWS) conducted a curly-leaf pondweed delineation on

Shields Lake and projected heavy growth around almost the entire perimeter of the lake. On the northern portion of the lake, BWS delineated 3.1 acres for treatment.

- Treatment: Similarly to Moody Lake, Shields Lake is classified as a Natural Environment lake, and as such has stricter herbicide regulations. Due to these tight restrictions, the District applied for and received a variance from the Minnesota DNR to perform the proposed CLP treatment. On May 20<sup>th</sup>, Lake Management Inc. treated all 3.1 acres with Aquathol K at a dose rate of 4 gallons per acre.
- Assessment: Blue Water Science performed a treatment assessment on June 6<sup>th</sup> and found that there was no viable CLP found in the lake during the survey.
- Report: BWS: Delineation and Assessment Report (Summary distributed in December, full report in January 2020).

# Shields Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)									
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	September	October	November	December	January
		\$ 20,000	\$ -	\$ (1,200)	\$ (17,373)	\$ 1,427										
<b>Fish Barrier*</b>	<b>Work Task</b>	CLFLWD	Grants	Staff/EOR	Other	Total Expense										
	Retrofit Project					\$ -	Contractor									
	Planning/Inspections/Oversight					\$ -	WD/EOR									
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
<b>Zebra Mussels</b>	<b>Work Task</b>	CLFLWD	Grants	BWS	Other	Total Expense										
	Samplers					\$ -	WD									
	Total	\$ -	\$ -	\$ -	\$ -	\$ -										
<b>Curly-Leaf Pondweed</b>	<b>Work Task</b>	CLFLWD	Grants	BWS	Other	Total Expense										
	Surveys-Report			\$ (1,200)		\$ (1,200)	BWS									
	Permitting/Public Notice	\$ 4,000				\$ -	WD									
	Management				\$ (1,373)	\$ (1,373)	Lake Mgmt. Inc.									
	Total	\$ 4,000	\$ -	\$ (1,200)	\$ (1,373)	\$ (2,573)										
<b>Rough Fish Management</b>	<b>Work Task</b>	CLFLWD	Grants	BWS	Other	Total Expense										
	Survey	\$ 16,000			\$ (16,000)	\$ (16,000)	Contractor									
	Total	\$ 16,000	\$ -	\$ -	\$ (16,000)	\$ (16,000)										
<b>2019 General Program Management</b>							WD/EOR									

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

\*Fish Barrier dollars removed because not under AIS Program in budget (under 3010 - Operations and Maintenance)

Shields Lake Water Quality Goals & Measured Averages						
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	D	C	C	D	D	D-
Mean summer phosphorus concentration below (µg/L)	100	60	60	214	219	229
Mean summer secchi depth at or above (ft)	4.26	4.26	4.26	2.8	4.0	2.2

\*2015-2019 average is in progress and based on the first 4 years of data. Note that that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.clflwd.org/data.php](http://www.clflwd.org/data.php).

**DNR Lake Classification:** Natural Environment

2018 Work	Status Summary
Zebra mussel early detection	No sampler plate in 2018
Fish barrier upgrades/maint.	Construction to be completed by the end of July.
Curly-leaf pondweed planning	Staff in communication with MN DNR about managing CLP in Shields Lake after the watershed P load is addressed
Rough fish management	Three electrofishing surveys completed in Aug/Sept, est. biomass ~530 kg/ha, carp removal recommended

2019 Work	Status Summary
Zebra mussel early detection	Continue to try to find a volunteer to monitor a zebra mussel sampler plate on their dock. In past years, public dock sampler went missing.
Fish barrier upgrades/maint.	Construction was completed in August.
Curly-leaf pondweed	Lake Management Inc. completed CLP treatment on May 20th. Blue Water Science conducted a treatment assessment on June 18th and found there was total lake control of CLP.
Rough fish management	WSB, District staff, and the local commercial fisherman attempted several carp removals on Shields Lake and only removed 71 carp. WSB estimates there to be between 505 and 873 carp left in the lake. Staff will discuss potential spring removal options with WSB this winter.



# Lake Keewahtin

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## 2019 Year-end Summary

### **AIS early detection survey**

- On October 3<sup>rd</sup>, staff attempted an early detection survey on the lake. Due to the windy and cold weather, the survey was cut short and canceled. Staff will plan for a full lake survey in the spring when weather conditions are better.

### **Purple loosestrife**

- In 2016 and 2017, purple loosestrife-eating beetles were collected in White Bear Lake and released at Lake Keewahtin. In 2020, following the AIS early detection survey, staff will determine if purple loosestrife-eating beetles will again need to be collected and released.

### **Zebra mussels**

- One volunteer monitored a sampler plate on private dock for early detection. No zebra mussels detected in 2019.

# Lake Keewahtin AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)										
		CLFLWD	Grants	BWS	Other		April	May	June	July	August	September	October	November	December	January	February
		\$ -	\$ -	\$ -	\$ -	\$ -											
Purple Loosestrife	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Check-Up Assessment					\$ -				WD							
	Biocontrol Collection and Release					\$ -				WD							
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
AIS Detection Survey	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Survey									WD/BWS							
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
Zebra Mussels	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Samplers			\$ -		\$ -				WD							
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
Curly-leaf Pondweed	Work Task	CLFLWD	Grants	BWS	Other	Total Expense											
	Hand pulling					\$ -				TBD							
	Total	\$ -	\$ -	\$ -	\$ -	\$ -											
2019 General Program Management										WD/EOR							

2018 Work	Status Summary
AIS early detection survey	Completed on Aug 16, no new invasives found
Purple loosestrife check-up	Completed on Aug 16
Zebra mussel early detection	Volunteer observed no ZM in 2018
Curly-leaf pondweed pulling	Plan to perform in 2019

Lake Keewahtin Water Quality Goals & Measured Averages						
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	A	A	A	A	A	A
Mean summer phosphorus concentration below (µg/L)	20	20	20	15	16	17
Mean summer secchi depth at or above (ft)	10	10	10	15.4	15.6	10.4

\*2015-2019 average is in progress and based on the first 4 years of data. Note that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.clflwd.org/data.php](http://www.clflwd.org/data.php).

2019 Work	Status Summary
AIS early detection survey	Have staff survey next spring.
Purple loosestrife check-up	Plan for staff to perform survey next spring
Zebra mussel early detection	Continue to work with same volunteer.
Curly-leaf pondweed pulling	Perform as capacity allows.

**DNR Lake Classification:** Recreational Development



# Forest Lake

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## 2019 Year-end Summary

### Curly-leaf Pondweed (CLP)

- **Delineation:** Blue Water Science conducted a curly-leaf pondweed delineation on May 1<sup>st</sup> and identified 12 large sites totaling 99.12 acres for treatment.
- **Treatment:** On May 20<sup>th</sup>, Lake Management Inc. treated 99.12 acres of CLP with Aquathol K at a dose rate of 1.25 ppm or 8.8 gallons per acre.
- **Assessment:** On June 11<sup>th</sup>, Blue Water Science conducted a treatment assessment and found that there was good CLP control within the treated areas.
- **Reports:**
  - BWS: Delineation and Assessment report (Summary distributed in December, full report in January 2020).

### Eurasian Watermilfoil (EWM)

- **Delineation:** Blue Water Science conducted a Eurasian watermilfoil delineation on June 11<sup>th</sup> and found light to heavy growth around the perimeter of basin 1 with a few patches of light growth in basin 2. In total, BWS delineated a total of 49.34 acres for treatment.
- **Treatment:** The District did not treat EWM in 2019. The Forest Lake Lake Association contracted with Clarke Aquatic Services to treat the entire delineated acreage using split applications on June 27<sup>th</sup> and 28<sup>th</sup>, 2019.
- **Assessment:** BWS conducted an EWM treatment assessment on August 12<sup>th</sup> and found that there was very good control within the treatment areas.
- **Reports:**
  - BWS: Delineation and Assessment report (Summary distributed in December, full report in January 2019).

### Flowering Rush

- **Treatment Round 1:** On July 31<sup>st</sup>, PLM Lake and Land Management Corp. treated large flowering rush patches totaling 9.08 acres, as well as performed numerous spot treatments around the lake.
- **Assessment Survey Round 1:** On August 12<sup>th</sup> Blue Water Science performed an assessment survey to evaluate treatment effectiveness. BWS determined that the first treatment of the year was effective within the treatment areas. Approximately 101 flowering rush sites totaling less than 0.44 acres remained for the second treatment.
- **Treatment Round 2:** Using information from the assessment survey, PLM performed the 2<sup>nd</sup> round of herbicide treatment on August 30<sup>th</sup>. In total, 2.5 acres were spot sprayed during the 2<sup>nd</sup> round of treatment with a few large flowering rush patch treatments.
- **Flower Cutting:** With the help of Washington Conservation District, District staff performed one round of manual flower removal to prevent the spread of the viable seeds. Overall, stem collection counts were significantly lower than in 2018. It is hypothesized that the combination of herbicide



treatments and flower removals is effective in reducing the amount of re-growth year after year.

- First round occurred on 8/22/19; approximately 67 stems (flowers) were collected.
- Final Assessment: BWS observed good control during assessment; surveyed 0.06 acres of flowering rush post-treatment. For comparison, flowering rush coverage was initially 7.8 acres in 2014.
- Reports:
  - BWS: Delineation and assessment report (Summary distributed in December, full report in January 2020).

### **Zebra Mussels**

- Monitoring: One zebra mussel sampling plate was 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 2,172.3 inspection hours on Forest Lake. Based on funding allocations, this year's goal was 2,700 hours. DNR inspectors performed 600 inspection hours on Forest Lake (at no cost to the District). Inspection hours on Forest Lake totaled 2,772.3.
- Surveys: a combined total of 5,496 inspection surveys were performed on Forest Lake (4,440 by District inspectors, 1056 by DNR inspectors).
- Reports:
  - Chisago County: 2019 AIS Prevention Report (Expected in early 2020)
  - CLFLWD: 2019 Watercraft Inspection Program Report

# Forest Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)											
		CLFLWD	Grants/Other	BWS	Other		April	May	June	July	August	September	October	November	December	January	February	
		\$ 106,876	\$ 72,380	\$ (12,300)	\$ (136,162)	\$ 30,794												
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Delin-Report			\$ (2,900)		\$ (2,900)	BWS											
	Permitting/Public Notice	\$ 29,625				\$ -	WD											
	Management		\$ 16,380		\$ (71,379)	\$ (71,379)	Lake Mgmt Inc.											
	Total	\$ 29,625	\$ 16,380	\$ (2,900)	\$ (71,379)	\$ (74,279)												
Flowering Rush	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Delin-Report			\$ (6,100)		\$ (6,100)	BWS											
	Permit/Outreach/Pub. Notice	\$ 29,625	\$ 14,500		\$ (812)	\$ (812)	WD											
	Management				\$ (4,471)	\$ (4,471)	PLM											
	Total	\$ 29,625	\$ 14,500	\$ (6,100)	\$ (5,283)	\$ (11,383)												
Eurasian Watermilfoil	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report	\$ 29,625		\$ (3,300)		\$ (3,300)	BWS											
	Coordination/Mgmt Assistance					\$ -	WD											
	Total	\$ 29,625	\$ -	\$ (3,300)	\$ -	\$ (3,300)												
Zebra Mussels	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Samplers					\$ -	WD											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Watercraft Inspections*	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Inspection Hours	\$ 18,000	\$ 41,500	\$ -	\$ (59,500)	\$ (59,500)	WD/Chisago Co.											
	Total	\$ 18,000	\$ 41,500	\$ -	\$ (59,500)	\$ (59,500)												
Plant Harvester	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	DNR Aquatic Plant Mgmt Permitting					\$ -	WD/FLLA											
	Harvester Operation					\$ -	City of Forest Lake											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Macrophyte Survey	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Point-Intercept Survey					\$ -	BWS											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
<b>2019 General Program Management</b>							<b>WD/EOR</b>											

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: \$2,500
- City of Forest Lake: \$23,500

	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	C	C	B	C+	C+	C+
Mean summer phosphorus concentration below (µg/L)	37	37	30	36	34	37
Mean summer secchi depth at or above (ft)	5	5	7	4.2	5.3	6.3

\*2015-2019 average is in progress and based on the first 4 years of data. Note that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.clflwd.org/data.php](http://www.clflwd.org/data.php).

**DNR Lake Classification:** General Development

2018 Work	Status Summary
CLP surveys & management	Treated all delineated 16.6 acres on 5/30/18.
EWM surveys & coord.	Delineation on 6/15/18. FLLA treated on 7/23 & 7/24.
FR surveys & management	2 rounds of treatment & flower cutting. Assessment found good control (0.06 acres of FR).
ZM population monitoring	ZM discovered in 2015, densities increasing over time.
Watercraft inspections	1,983 paid inspection hours & 4,577 inspections performed.
Point-Intercept Macrophyte Survey	Completed August 15

2019 Work	Status Summary
CLP surveys & management	On May 20th, Lake Management Inc. treated 99.12 acres of CLP. Blue Water Science conducted an assessment survey on June 11th and found treatment had good control within delineated areas.
EWM surveys & coord.	Blue Water Science delineated 49.34 acres of EWM on June 11th. The FLLA contracted Clarke Aquatic Services to treat all 49.34 acres. BWS conducted a treatment assessment on August 12th and found that it was very effective.
FR surveys & management	All treatments have been completed for the season. Only 0.06 acres of flowering rush remained at the end of the season.
ZM population monitoring	Continue working with volunteers to monitor population
Watercraft inspections	The District achieved 2776 hours worth of watercraft inspections on Forest Lake this season.
Purple Loosetrife	Staff sent an identification and treatment email to the lake association.



# Comfort Lake

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## 2019 Year-end Summary

### Curly-leaf Pondweed (CLP)

- **Delineation:** Blue Water Science (BWS) performed a delineation survey on May 1, 2019, identifying no areas of nuisance growth for treatment by the District.
- **Treatment:** The District did not treat CLP on Comfort Lake in 2019 (same as 2016, 2017, and 2018).
- **Assessment:** BWS performed assessment on June 6, 2019, identifying 16 sites of light growth.
- **Reports:**
  - BWS: Delineation and Assessment report (Summary distributed in December, full report in January 2020).

### Eurasian Watermilfoil

- **Delineation:** BWS performed a delineation survey on May 1, 2019, finding a mix of dead EWM with light growth of new EWM. Another survey was conducted about a month later on June 6, 2019 and EWM was found at 135 sites.
- **Treatment:** The District did not treat EWM in 2019. This year the Comfort Lake Association had purchased a boat and was planning to treat 3.2 acres of EWM. Due to mechanical issues with the watercraft, the treatment was cancelled for this year. However, there was evidence of nearshore treatment conducted by homeowners.
- **Assessment:** BWS performed the assessment survey on August 28, 2019 and found EWM growth had been reduced and was growing at light to moderate densities with a few sites of heavy growth.
- **Reports:**
  - BWS: Delineation and Assessment report (Summary distributed in December, full report in January 2019).

### Zebra Mussels

- **Monitoring:** One zebra mussel sampling plate was deployed on Comfort Lake this year. At the end of the summer the plate had no visible zebra mussels attached to it. 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 571.3 inspection hours on Comfort Lake. Based on funding allocations, this year's goal was 525 hours.
- **Surveys:** 884 inspection surveys were performed on Comfort Lake.
- **Reports:**
  - Chisago County: 2019 AIS Prevention Report (Expected in early 2020)
  - CLFLWD: 2019 Watercraft Inspection Program Report

# Comfort Lake AIS Prevention and Management



		Revenues		Expenses		Annual Balance	Timeline (2019-2020)											
		CLFLWD	Grants/Other	BWS	Other		April	May	June	July	August	September	October	November	December	January	February	
		\$ 13,700	\$ 5,500	\$ (5,800)	\$ (11,500)	\$ 1,900												
Curly-Leaf Pondweed	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report			\$ (1,400)		\$ (1,400)	BWS											
	Permitting/Public Notice	\$ 2,500				\$ -	WD											
	Management (N/A)					\$ -												
	Total	\$ 2,500	\$ -	\$ (1,400)	\$ -	\$ (1,400)												
Eurasian Watermilfoil	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Surveys-Report	\$ 2,500		\$ (1,800)		\$ (1,800)	BWS											
	Coordination/Mgmt Assistance					\$ -	WD											
	Total	\$ 2,500	\$ -	\$ (1,800)	\$ -	\$ (1,800)												
Zebra Mussels	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Samplers					\$ -	WD											
	Total	\$ -	\$ -	\$ -	\$ -	\$ -												
Watercraft Inspections*	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Inspection Hours	\$ 6,000	\$ 5,500		\$ (11,500)	\$ (11,500)	WD/Chisago Co.											
	Total	\$ 6,000	\$ 5,500	\$ -	\$ (11,500)	\$ (11,500)												
Macrophyte Survey	Work Task	CLFLWD	Grants/Other	BWS	Other	Total Expense												
	Point-Intercept Survey	\$ 2,700		\$ (2,600)		\$ (2,600)	BWS											
	Total	\$ 2,700	\$ -	\$ (2,600)	\$ -	\$ (2,600)												
2019 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)

Chisago County AIS Prevention Funds: \$5,000

Comfort Lake Association: \$500

Wyoming: TBD

2018 Work	Status Summary
CLP surveys & management	Delineated no significant patches on 5/8/18. Coord. w/ CLA/BWS for CLP/EWM hand pulling effort on July 8.
EWM surveys & coordination	Delin. widespread growth on 6/6/18. Sent map to CLA. Included EWM pulling during CLP pulling, per BWS rec.
Zebra mussel monitoring	ZM discovered in 2017, densities increasing over time
Watercraft inspections	575.5 inspection hours & 727 inspections performed

2019 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	Due to mechanical issues, the CLA did not treat EWM this year.
Zebra mussel monitoring	Continue to work with volunteers to monitor sampler plates.
Watercraft inspections	The District achieved 571 hours worth of watercraft inspections on Comfort Lake this season.

Comfort Lake Water Quality Goals & Measured Averages						
	2020 Goal	2030 Goal	2040 Goal	5-Year Avg (2005-2009)	5-Year Avg (2010-2014)	5-Year Avg (2015-2019)*
Water quality rating at or above	C	C	B	B-	B-	B-
Mean summer phosphorus concentration below (µg/L)	40	40	30	30	35	32
Mean summer secchi depth at or above (ft)	5	5	7	6.0	4.8	6.1

\*2015-2019 average is in progress and based on the first 4 years of data. Note that that the changes presented in the 5-year averages do not represent a statistical trend. A scientific trend analysis of District lake water quality is available in the District's 2017 Comprehensive Data Review available at [www.clflwd.org/data.php](http://www.clflwd.org/data.php).

DNR Lake Classification: General Development