



2023 Aquatic Invasive Species Program Yearend Summary

Moody Lake
Bone Lake

Little Comfort Lake
Shields Lake

Lake Keewahtin
Forest Lake

Comfort Lake

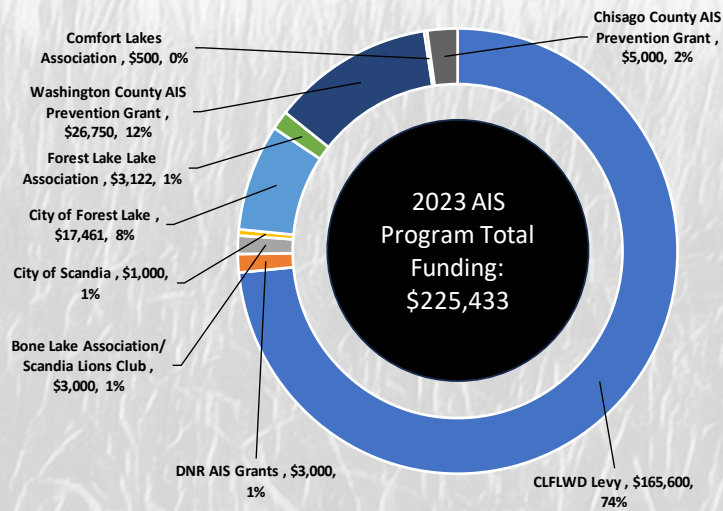


CLFLWD
WATERSHED DISTRICT

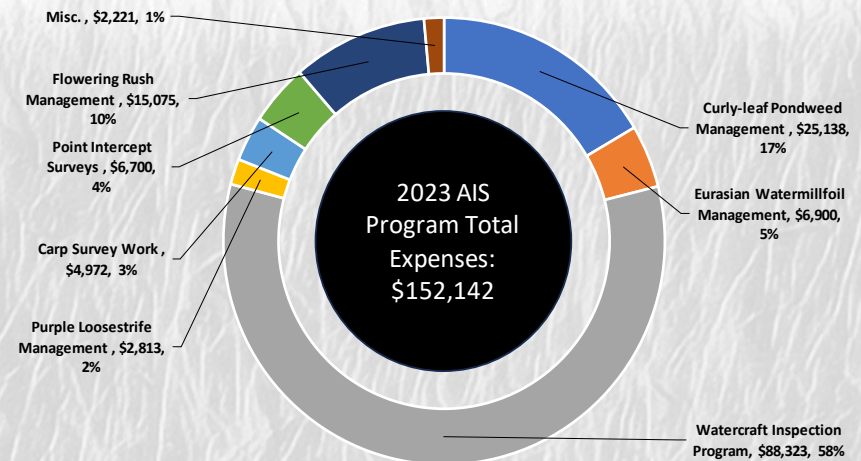
District-Wide AIS Budget Summary



CLFLWD's 2023 District-Wide AIS Program Funding



CLFLWD's 2023 District-Wide AIS Program Expenses



Moody Lake

2023 Yearend Summary

Aeration System

- **Operation:** The District continued operation of the aeration system in winter months (1/5/23–4/3/23) to increase dissolved oxygen, reduce winter fish-kills, and support a healthy fishery that suppresses invasive fish populations. This was the 8th winter the District ran the aerator.
- **Monitoring:** Oxygen levels were monitored throughout the winter and were found to be at healthy levels for the whole season.
- **2024:** District staff will reactivate the aeration system once ice conditions are safe, typically in early January.

Curly-leaf Pondweed (CLP)

- On April 25th, Blue Water Science (BWS) conducted a delineation point intercept survey to assess the CLP population. Growth was primarily light, and no treatment was recommended again this year. For reference, no CLP was treated on Moody Lake in 2022 or 2021, 3.11 acres in 2020, and 7.81 acres in 2019.

Native Aquatic Plant Transplanting Project

- On August 1st, District staff and a researcher from the University of Minnesota implemented a native aquatic plant transplanting project on Moody Lake. A variety of native species were collected from Keewahtin Lake and planted in Moody Lake. In total, more than 700 clay balls with attached aquatic plants were planted in the lake. Next year, staff will survey the lake for signs of new species establishing themselves after the project. Results will aid the researchers in their much broader study on the effectiveness of this new type of aquatic plant management practice.



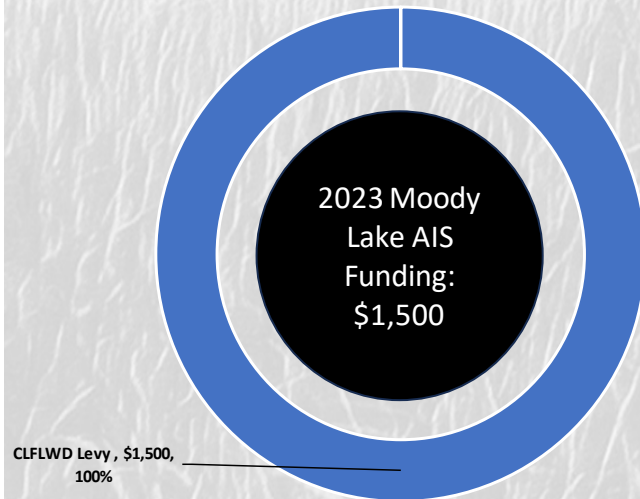
Transplanting Project

Cooler filled with native plants for transplanting project. Clay was packed around the roots to help the plants sink.

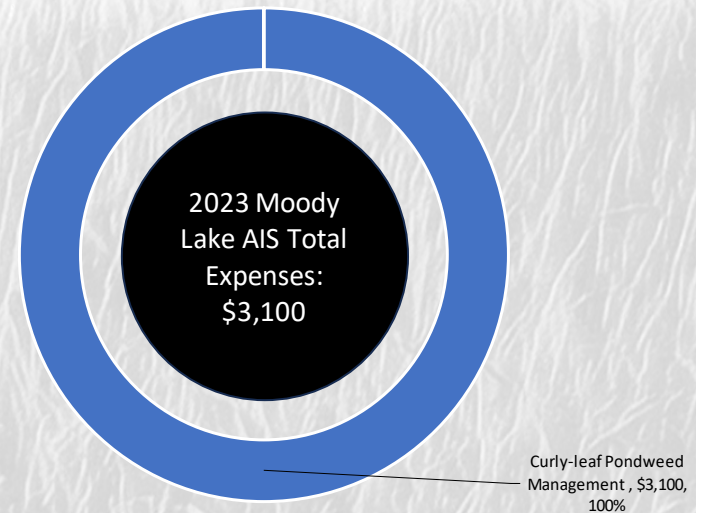
Moody Lake AIS Budget Summary



CLFLWD's 2023 Moody Lake AIS Funding



CLFLWD's 2023 Moody Lake AIS Program Expenses



Bone Lake

2023 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** Performed on May 1st and found only several areas of light CLP growth in the entire lake. Treatment was not recommended based on this survey.
- **Treatment:** No treatment was performed in 2023.
- **Assessment:** Performed on June 2nd and found only a few more locations of light CLP growth since the May 1st survey.
- **History:** For reference, past years' CLP treatments are as follows – 2022: No treatment, 2021: 4.38 acres, 2020: 5.14 acres, 2019: 3.88 acres, 2018: hand pulling only, 2017: treated 3.89 acres, 2016: no treatment, 2015: treated 2.45 acres.

Eurasian Watermilfoil (EWM)

- **Delineation:** Performed on June 2nd and found only several locations of light EWM growth.
- **Treatment:** No treatment was performed in 2023.
- **Assessment:** Performed on July 20th and found only four locations of light EWM growth.

Zebra Mussels

- **Brief Background:** On May 28, 2019, six juvenile zebra mussels were discovered near the Bone Lake public access dock. Following this discovery, an eradication attempt was conducted by the District and partners. Since the initial zebra mussel discovery in 2019, no zebra mussels have been in Bone Lake. However, on July 20, 2023, Blue Water Science found 3 juvenile zebra mussels while performing a point intercept survey. The discovery was communicated to the DNR and long-term population monitoring resumed.
- **Sampler Plates:** In 2023, 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. No zebra mussels were found on sampler plates or water related equipment.



Zebra Mussel Diving Survey

Steve and Connor
McComas dressed
for their chilly late-
September diving
survey on Bone Lake

- **Veliger Tow:** The District, with help from the WCD, performed two veliger tows on June 21st and August 11th. The DNR's analysis found veligers in the submitted samples, suggesting there is a reproductive population somewhere in the lake.
- **Blue Water Science Diving Survey:** A diving survey was performed on October 12th searching for zebra mussels and starry stonewort. Neither was found during this survey.

Rough Fish Management

- **Fish Barrier:** Maintained and managed stop logs in the two fish barriers located at the inlet and outlet of Bone Lake.
- **Surveys:** The DNR typically performs fish surveys on a 5–6 year rotation (except for Forest Lake which is on a 2-year rotation). The upcoming survey schedule for Bone Lake is as follows: June 2024 – standard survey, June 2027 – gill net only survey. Surveys are performed more frequently on Bone Lake than many other District lakes since the DNR stocks Bone Lake with walleye.

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

- **Hours:** 714.25 hours were worked at Bone Lake
- **Surveys:** 866 inspection survey were performed at Bone Lake
- **Reports:**
 - Chisago County: 2023 AIS Prevention Report (Expected in early 2024)
 - CLFLWD: 2023 Watercraft Inspection Program Report

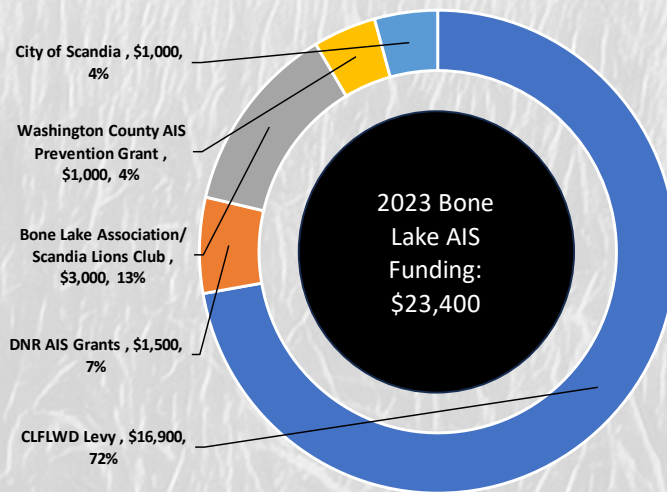
White Water Lily

The Bone Lake outlet is home to a healthy population of white water lilies that typically bloom from June to September

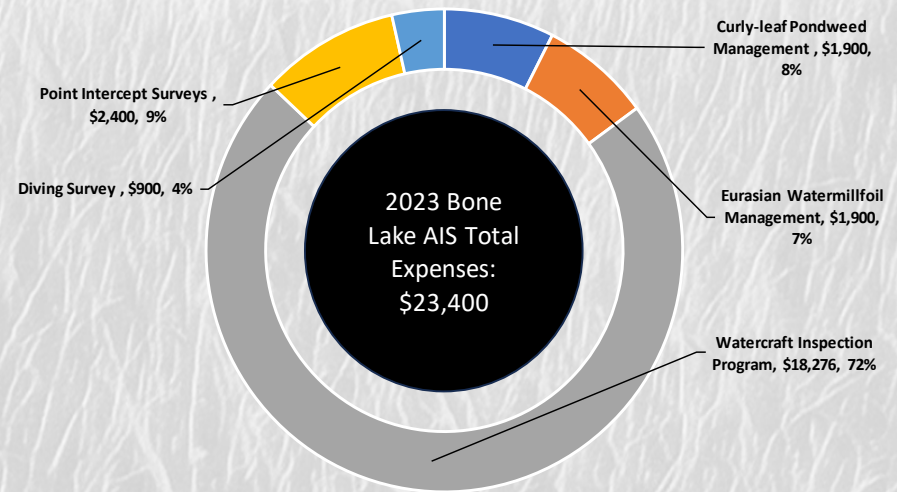
Bone Lake AIS Budget Summary



CLFLWD's 2023 Bone Lake AIS Funding



CLFLWD's 2023 Bone Lake AIS Program Expenses



Little Comfort Lake

2023 Yearend Summary

Curly-leaf Pondweed (CLP)

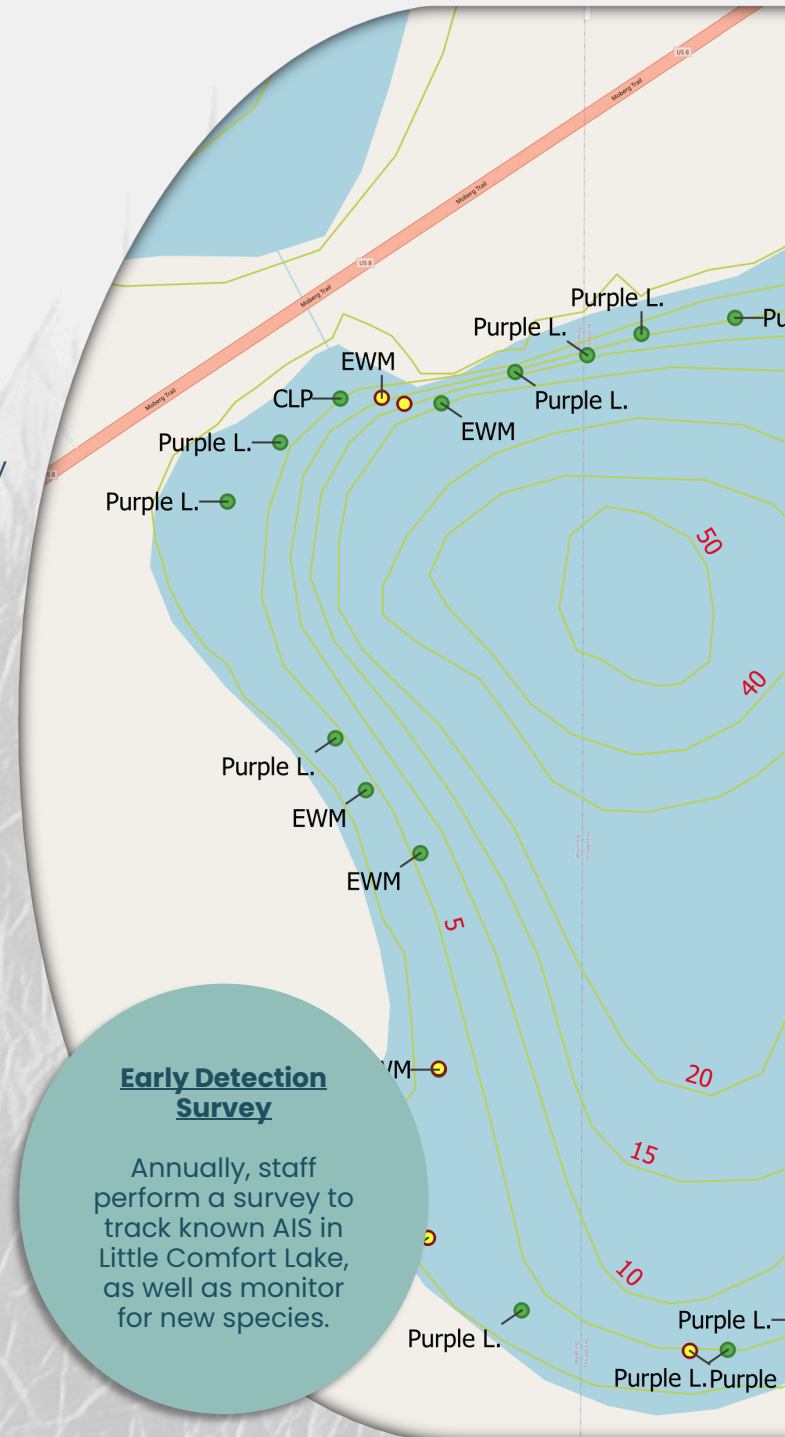
- **Overview:** The 2023 budget did not contain funding for curly-leaf management in Little Comfort Lake. On July 18th, District staff conducted a meandering survey for CLP and only found a few locations with light growth. Given the sparse growth in the lake, no removal was deemed necessary for 2023.

Eurasian Watermilfoil (EWM)

- **Discovery:** EWM was first discovered in Little Comfort Lake in 2021 by the MN Department of Natural Resources Invasive Species Program.
- **2023 Survey:** During the July 18th survey, only a few location of EWM were identified. Growth densities were often light.
- **Management:** Given the sparse growth in the lake, no removal was deemed necessary in 2023.

AIS Tracking and Early Detection Survey

- **Overview:** On July 18th, District staff conducted a meandering survey to monitor the distribution and abundance of existing AIS and to search for species not known to be in the lake. Known species such as curly-leaf pondweed, Eurasian watermilfoil, and purple loosestrife were found again, though mostly in light densities. Fortunately, no new invasive species were found during the survey. Overall, Little Comfort Lake has a healthy and abundant native plant community that seems to be limiting the spread of the AIS.



Little Comfort Lake AIS Budget Summary



CLFLWD's 2023 Little Comfort Lake AIS Funding

2023 Little
Comfort Lake
AIS Funding:
\$0

CLFLWD's 2023 Little Comfort Lake AIS Program Expenses

2023 Little Comfort
Lake AIS Expenses:
\$0
Early Detection
Survey Performed
In-House

Shields Lake

2023 Yearend Summary

Aeration System

- **Operation:** The District continued operation of the aeration system in winter months (1/5/23–4/3/23) to increase dissolved oxygen, reduce winter fish-kills, and support a healthy fishery that suppresses invasive fish populations.
- **Monitoring:** Oxygen levels were monitored throughout the winter and were found to be at healthy levels for the whole season.
- **2024:** District staff have started the 2024 DNR permit renewal process and anticipate reactivating the aeration system once ice conditions are safe, typically in early January.

Curly-leaf pondweed (CLP)

- **Delineation:** Performed on April 25th and identified two treatment areas totaling 3.07 acres.
- **Treatment:** Treatment performed on May 22nd by LMI on the marked 3.07 acres.
- **Assessment:** Performed on June 1st and found treatment had excellent control.
- **Report:** Blue Water Science Delineation and Assessment Report (Summary distributed in December, full report in January 2024).

Rough Fish Management

- **Fish Barriers:** The mechanical fish barrier was installed in August 2019. District staff will continue to operate the electric fish barrier as is.
- **2022 Carp Survey Results:** Data from the three electrofishing attempts in 2022 were used to calculate an updated CPUE population estimate, which now suggests there are between 39.9 ± 26.3 kg/ha of carp biomass remaining in the lake. This estimate puts Shields Lake below the District's adopted management threshold of 100 kg/ha, which is accepted by scientists as the level where carp biomass has minimal impact on water quality. Conservatively, WSB has recommended future management activities be decided with the upper limits of this estimate in-mind.

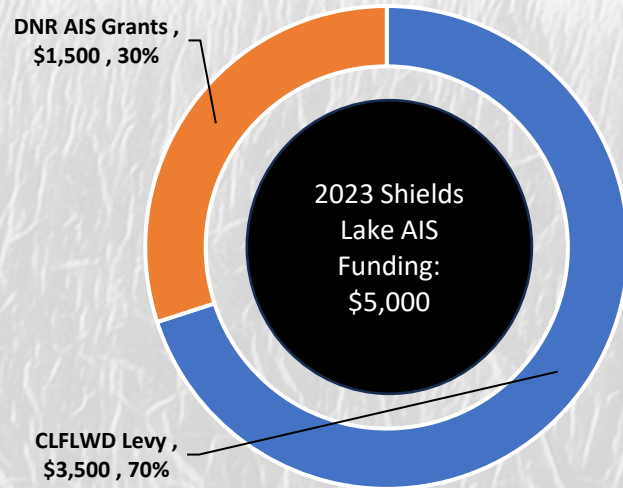
Aeration System

The District updated the Shields Lake aeration system in 2022 to help protect the health of the native fishery.

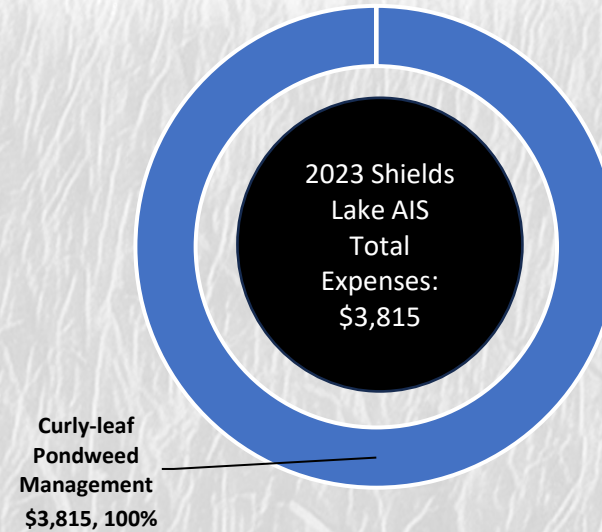
Shields Lake AIS Budget Summary



CLFLWD's 2023 Shields Lake AIS Funding



CLFLWD's 2023 Shields Lake AIS Program Expenses



Lake Keewahtin

2023 Yearend Summary

AIS Tracking and Early Detection Survey

- **Overview:** District staff performed an AIS tracking and early detection survey on July 18th. 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)

- **Survey Results:** During the July 18th survey, District staff did not observe any CLP in the lake. Historically, CLP has only been present in the lake at low densities.

Purple Loosestrife

- **Delineation:** On July 18th, District staff documented all locations of purple loosestrife around the perimeter of Lake Keewahtin and identified 2.6 acres for treatment
- **Treatment:** A treatment was conducted by PLM on August 22nd
- **Assessment:** District staff performed a treatment assessment survey on September 18th and found it had excellent control. Most areas had complete control of purple loosestrife, while some denser areas had a few plants remaining.

Wild Rice

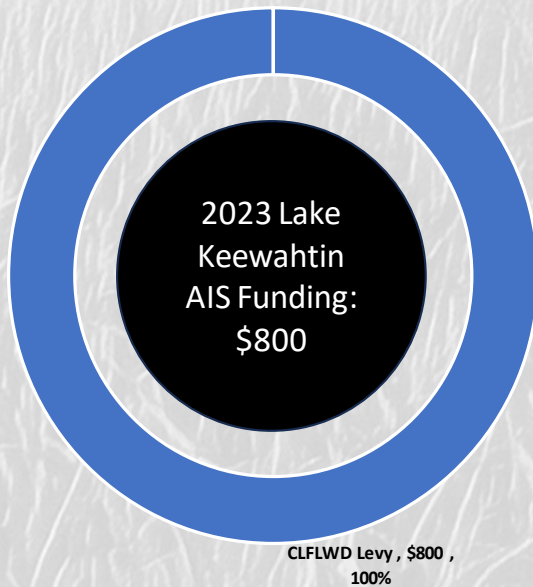
District staff noted a patch of wild rice growing in Lake Keewahtin during a AIS tracking and early detection survey



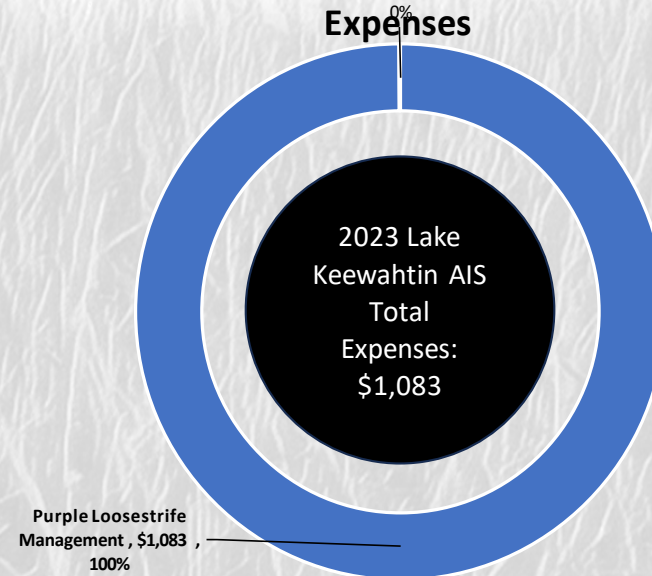
Lake Keewahtin AIS Budget Summary



CLFLWD's 2023 Lake Keewahtin AIS Funding



CLFLWD's 2023 Lake Keewahtin AIS Program Expenses



Forest Lake

2023 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** Performed on May 9th. Eight treatment locations totaling 61.55 acres were identified for treatment.
- **Treatment:** Treatment performed on May 22nd on all 61.55 acres.
- **Assessment:** Performed on June 13th and found it had excellent control.
- **History:** For reference, past years' CLP treatments are as follows – 2022: 103.96 acres, 2021: 120.34 acres, 2020: 58.29 acres, 2019: 99.12 acres, 2018: 16.6 acres, 2017: 169 acres, 2016: 114 acres, 2015: 88 acres.

Eurasian Watermilfoil (EWM)

- **Delineation:** Performed on June 13th and July 11th. Both survey found no treatable EWM.
- **Assessment:** Performed on August 8th and found 8.41 acres of EWM.
- **Treatment:** The Forest Lake Lake Association decided to coordinate a treatment for all 8.41 acres of EWM in the west basin of Forest Lake.

Flowering Rush

- **Delineation #1:** Blue Water Science (BWS) performed the first delineation survey on July 11th and identified 84 flowering rush sites totaling 0.24 acres.
- **Treatment # 1:** On July 26th, PLM conducted treatments on four larger areas, totaling 2.92 acres.
- **Treatment #2:** On August 15th, PLM conducted spot treatments on locations identified in the July 11th delineation.
- **Delineation #2:** BWS performed the second delineation survey on September 20th and identified 155 flowering rush growth sites totaling 0.93 acres.
- **Treatment #3:** To test its feasibility, PLM walked the entire shoreline of Forest Lake's west basin with backpack sprayers on August 29th.



Flowering Rush Backpack Spraying

Backpack sprayers help applicators treat flowering rush that is growing in shallow water or on shore

- **Treatment #4:** Adopting the approach, PLM walked the entire shoreline of Forest Lake with backpack sprayers on September 29th. PLM revisited the lake on October 10th to treat areas that were offshore and couldn't be reached during the walking treatment.
- **Seed Head Collection:** In 2023, District staff and partners clipped and disposed of more than 4,000 flowering rush seed heads.
- **2024 Plans:** After eight years of management, Forest Lake has fewer large beds of flowering rush and more smaller patches. Shoreline walking with backpack sprayers has been identified as an effective strategy to stay on top of these scattered patches. In addition, new herbicide formulations and shoreline owner engagement are planned to be introduced into 2024's flowering rush management plan.

Common Carp Population Assessment

- **Overview:** To calculate the common carp population in Forest Lake, the District contracted WSB to perform the survey. With help from staff, WSB visited the lake three times this fall to electro-fish for carp. In total, only 5 carp were captured during more than 3 hours of active surveying, which covered a large portion of Forest Lake's shoreline. According to WSB's calculations, there is an estimated 50.9 ± 6.5 lbs/acre of common carp biomass in the lake. This falls below the 89.9 lbs/acre threshold value that scientists have determined to be the population size that is damaging to a waterbody's water quality and ecosystem.

Purple Loosestrife

- **Delineation:** On July 18th, District staff identified ten large purple loosestrife treatment areas, totaling 2.8 acres when combined.
- **Treatment:** A treatment was conducted by PLM on August 29th
- **Assessment:** District staff performed a treatment assessment survey on September 18th and found it had excellent control.

Zebra Mussels

- **Overview:** Five 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.



Common Carp Population Survey

Beth Carreno
(CLFLWD Senior
Program Manager)
holding a carp
captured during the
2023 population
survey

Point-Intercept Macrophyte Survey (PI Survey)

- **Overview:** The last PI survey was performed on Forest Lake in 2018. Following the District's 5-year rotation for PI surveys, Forest Lake was due for another in 2023. On August 8th, Blue Water Science performed a point intercept survey to document the plant community in Forest Lake.

Plant Harvester

- **Overview:** The Forest Lake native aquatic plant harvester is operated solely by the City of Forest Lake, and the District only helps to create a harvesting map that avoids locations of AIS. This year, the City operated the harvester from June 12th to early-September. During that time, more than 2,208 cubic yards of native aquatic plants were removed from the lake. This required 182 dump truck loads to haul and dispose of the removed material.

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

- **Hours:** 2,570 hours were worked at Forest Lake accesses
- **Surveys:** 6,056 inspection survey were performed at Forest Lake accesses
- **Reports:**
 - Chisago County: 2023 AIS Prevention Report (Expected in early 2024)
 - CLFLWD: 2023 Watercraft Inspection Program Report

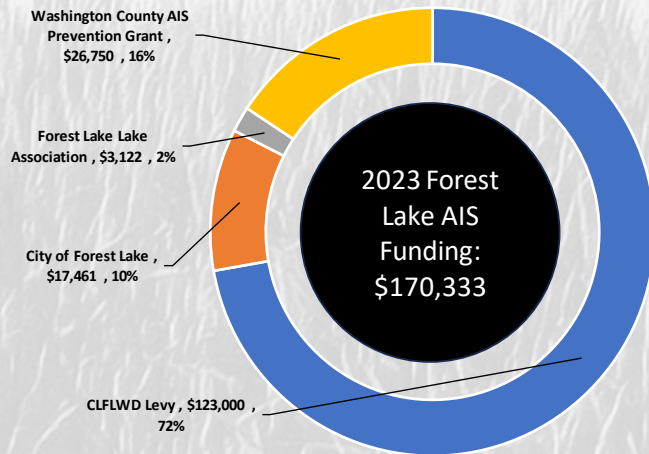
Flowering Rush Flowers

While pretty, these flowers are capable of producing thousands of viable seeds that help spread the plant

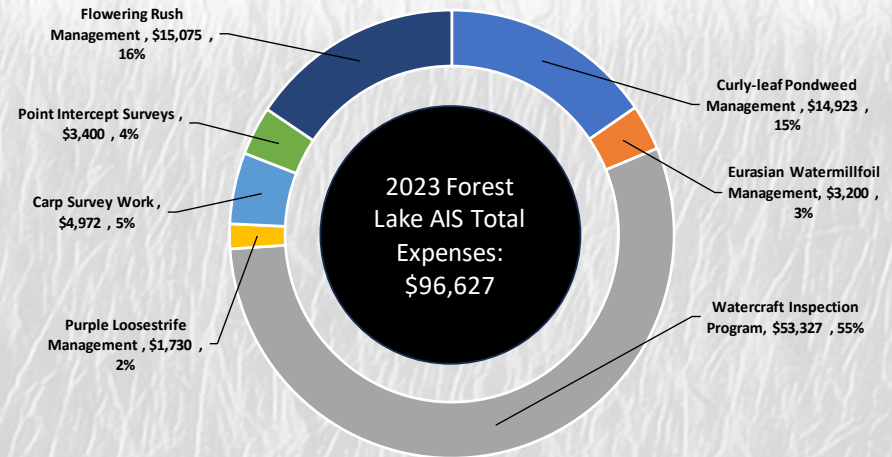
Forest Lake AIS Budget Summary



CLFLWD's 2023 Forest Lake AIS Funding

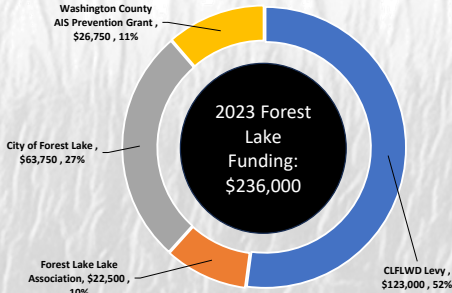


CLFLWD's 2023 Forest Lake AIS Program Expenses

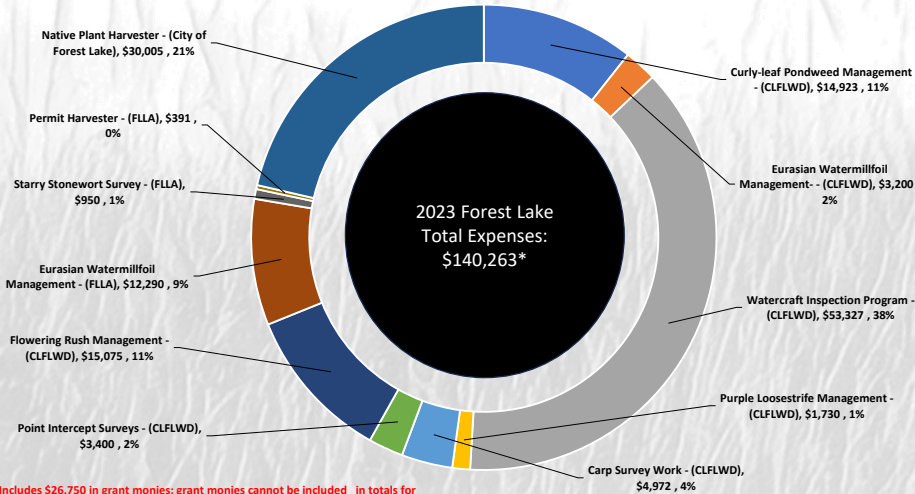




2023 Forest Lake AIS and Lake Management Funding



2023 Forest Lake AIS with Partner Lake Management Expenses
Tri-Party Funding Support Agreement : City of Forest Lake, Forest Lake Lake Association, Comfort Lake Forest Lake Watershed District



* Includes \$26,750 in grant monies; grant monies cannot be included in totals for reconciliation as per the tri-party agreement

AIS and Lake Management Expense Totals			
City of Forest Lake	Forest Lake Lake Association	CLFLWD	Total
\$47,446	\$16,753	\$76,064	\$140,263

Comfort Lake

2023 Yearend Summary

Curly-leaf Pondweed (CLP)

- **Delineation:** Performed on April 24th and found only four areas of light CLP growth in the entire lake. Treatment was not recommended based on this survey.
- **Treatment:** No treatment was performed in 2023.
- **Assessment:** Performed on June 2nd and found CLP growth had expanded slightly, but most was at light densities

Eurasian Watermilfoil (EWM)

- **Point Intercept (PI) Survey:** Per the DNR's reporting requirements for the Comfort Lakes Association's 2022 whole lake Fluridone treatment, Blue Water Science was contracted to perform a PI survey on June 2nd. Their survey found four locations of light EWM growth.
- **Follow-Up Delineation:** On August 8th, Blue Water Science's survey found a slight increase in EWM growth since the June 2nd survey.
- **Treatment:** The Comfort Lakes Association coordinated a treatment on 2.77 acres of EWM on September 19th. The herbicide ProcellaCOR was used by Lake Management Inc.

Zebra Mussels

- **Overview:** In 2023, the Comfort Lakes Association participated in a zebra mussel monitoring program being piloted by the University of Minnesota. Instead of hand counting zebra mussels at the end of the season, researchers hope to develop technology to count them from a photograph of the sampler plate.

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

- **Hours :** 718.25 hours were worked at Comfort Lake
- **Surveys :** 981 inspection surveys were performed at Comfort Lake
- **Reports :** Chisago County: 2023 AIS Prevention Report (Expected in early 2024)
CLFLWD: 2023 Watercraft Inspection Program Report

12/11/2023



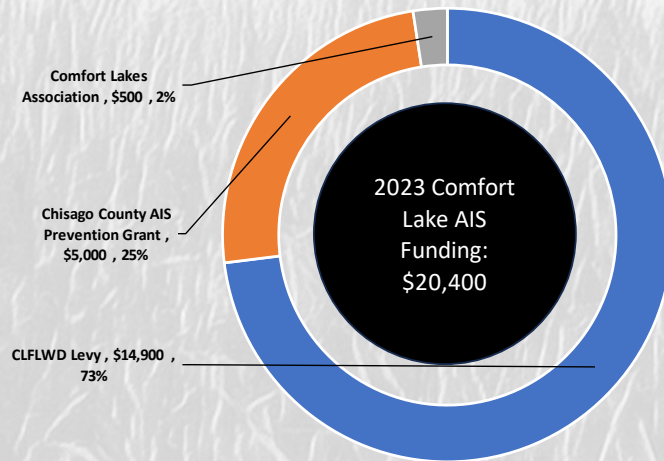
Great Blue Heron

Perched on a
swimming platform
in Comfort Lake

Comfort Lake AIS Budget Summary



CLFLWD's 2023 Comfort Lake AIS Funding



CLFLWD's 2023 Comfort Lake AIS Program Expenses

