

2018

Lake Vermilion

AIS Prevention Plan



Revision Date

1-25-2018

AIS Prevention Priorities at Lake Vermilion

Assessing Lake Vermilion's Risks to Prioritize Our Activities

The resources to completely defend Lake Vermilion's fishery and business community will never be available. We're committed to deploying the resources we can muster on our highest priority risks as efficiently as we can.

Those high-priority risks have evolved rapidly over the last couple years. By 2017, starry stonewort – a relative newcomer to Minnesota's AIS roster – has been found in 6 counties and 11 lakes, including Upper Red, Cass and Winnibigoshish, after its discovery in Lake Koronis in 2015. This grass-like macro algae can produce dense mats, can interfere with recreation, and can alter habitat for young fish. It's understandable that property values would decrease at lakes and along shorelines with starry.

In the last couple years, hybrid watermilfoil has also made headlines. Little is known about crosses between invasive Eurasian watermilfoil and our native Northern watermilfoil, but anecdotal reports suggest increased invasiveness and evidence of herbicide resistance. In Lake Vermilion, native watermilfoil co-exists with other native vegetation. We have no known Eurasian watermilfoil – an indication our habitat and water chemistry may not be suitable. However, at this point, no one knows whether certain Eurasian x native hybrids may overwhelm our native vegetation.

Zebra mussels, on the other hand, may be a ray of hope. Zebras need sufficient dissolved calcium – about 20 milligrams per liter – to grow and reproduce. Most of Lake Vermilion is below 13 mg/l – well in the safe zone. An exception is East Two River, which flows into Vermilion's east basin, with calcium above 20 mg/l at certain times of the year. However, its <7.0 pH prevents zebra mussels from becoming established. To be safe, we will continue to monitor east-basin water chemistry for a few years.

Starry stonewort and hybrid watermilfoils are major threats and have moved ahead of zebra mussels at the top of Lake Vermilion's AIS concerns. Our current risk assessment – including what we don't know – is summarized below:

Species	Introduction Risk	Habitat Suitability	Impact if Population Established	
			Fishery & Ecosystem	Recreational Boating
Starry stonewort	Increasing as more Minnesota lakes become infested.	Unknown. Limited to specific bays?	Serious stressor. Unknown impact on each fishery.	Severe in bays with suitable habitat.
Hybrid and Eurasian watermilfoil	Very high.	Unknown. Limited to specific bays?	Serious stressor. Unknown impact on each fishery.	Severe in bays with suitable habitat.
Zebra mussels	Very high.	Unknown. Limited to calcium hotspots with suitable pH?	Serious stressor. Filters zooplankton, limiting growth of fry.	Negative but water clarity appeals to some.
Spiny waterfleas	Found in Big Bay in 2015.	High. Likely to spread beyond east basin.	Serious stressor. Consume zooplankton, limiting growth of fry.	Low.
Curly-leaf pondweed	Present in 3 small areas.	Moderate/high in specific bays.	Limited to specific bays with suitable habitat.	May become severe in bays with suitable habitat.
Rusty crayfish	Present in east basin and west to Niles Bay.	High for sandy, rocky, rubble bottoms.	Weed bed destruction impacting several fish species.	Low to moderate.

In addition to the priority threats in the table above, Lake Vermilion is surrounded by a host of other AIS threats which we continually monitor. Examples include quagga mussel, Brazilian waterweed, brittle naiad, and water hyacinth.

Our Resulting Priorities in 2018

#1. Prevent new AIS infestations, especially starry stonewort and hybrid watermilfoil.

- **Inspections at Public and Private Accesses.** *Expand significantly our inspection and education activities at all launch sites, both public accesses and private resort, campground and marina accesses.*
- **Boat Decontamination.** *Partner with private businesses to offer boat decontamination at centralized locations. Develop the communications and publicity support to bring boaters to these centralized decon stations on their way to and from Lake Vermilion. In future years, develop low-cost solutions for cleaning and draining boats and equipment at remote resorts, marinas and campgrounds.*
- **Habitat Evaluation and Risk Assessment.** *To prioritize and focus resources, continue to refine our understanding of Lake Vermilion's risk level for all new and existing threats.*
- **Public Awareness and Education.** *Expand our public awareness and education activities, especially among boaters intending to launch watercraft at Lake Vermilion.*
- **Regional and Statewide Partnership Development and Sharing.** *Expand significantly our partner recruitment, education and sharing among COLAs, lake associations and local Lake Vermilion stakeholders, including local government units, tribal governments, businesses and civic organizations.*

#2. Detect any new infestations early, when AIS control options are most effective.

- **Monitor Existing Invasive Vegetation.** *Biennially evaluate known infestations of curly-leaf pondweed. Monitor native vegetation known to frequently co-exist with serious invasives, especially those stands near invasive entry points.*
- **Early Detection at High-Risk Accesses.** *Expand significantly "sentry" early detection at public accesses and private resort, campground, and marina accesses. Develop a sentry mentoring program using MAISRC Detectors as coaches and identification experts.*

2018 AIS Prevention Plan Project and Activity List

☑ = 2018 Priority Activity

↑ = New or Significantly Expanded in 2018

1. Watercraft Inspection and Decontamination Project

- 1.1 Public Access Inspection and Education ☑
- 1.2 Resort, Marina & Campground Inspection and Education ☑↑
- 1.3 Resort & Campground Educational Materials for Guests ☑
- 1.4 Fishing Tournament Inspection and Education ☑↑
- 1.5 Enhanced Inspector Training ☑
- 1.6 Watercraft Decontamination Stations ☑↑
- 1.7 Watercraft Traffic Analysis and Staffing Optimization ☑↑

2. Public Awareness and Education Project

- 2.1 Newspapers and Newsletters ☑
- 2.2 Events and Shows ☑
- 2.3 Youth Summer Camp and K-12 Education ↑
- 2.4 Restaurants and Local Business ☑↑
- 2.5 Social Media and Website ☑
- 2.6 Resort and Lake Business Stewardship Outreach ☑↑

3. Early Detection, Rapid Response and Population Management Project

- 3.1 Habitat Evaluation and Risk Assessment ☑↑
- 3.2 Annual Evaluation of Existing Vegetation ☑↑
- 3.3 Curly-Leaf Pondweed Control ☑↑
- 3.4 Early Detection of Invasive Vegetation at Public and Private Accesses ☑↑
- 3.5 Boater Early Detection Sample Kits ↑
- 3.6 Rapid Response Readiness ☑↑

4. Regional and Statewide Partnership Development Project

- 4.1 Lake Vermilion Stakeholder Info Sharing and Involvement ☑
- 4.2 Statewide Information Sharing and Involvement ☑↑

2018 AIS Prevention Plan Project Descriptions

Based on our risk assessment and priorities, our plan includes the following four projects in 2018:

1. Watercraft Inspection and Decontamination
2. Public Awareness and Education
3. Early Detection, Rapid Response, and Population Management
4. Regional and Statewide Partnership Development

Each year, those projects incorporate process improvements based on tested ideas we've borrowed from other counties and lake associations and on knowledge we've gained from our past projects. We are committed to continually improving the quality and efficiency of our AIS work.

1. Watercraft Inspection and Decontamination Project

Today, prevention of AIS infestations via boat inspection, boat cleaning, and public education remains our best bet. Population control is very expensive. Eradication is generally not possible.

Watercraft Inspections:

In 2017, the Vermilion Lake Association partnered with North St Louis SWCD to inspect over 17,000 boats, including over 10,000 (60%) of the estimated 16,700 which launch annually at Vermilion.

While 60% coverage is a significant achievement, even more is needed. And that additional coverage needs to be achieved in a very cost-conscious manner.

Two important pioneering activities, funded in part by Initiative Foundation grants totaling over \$92,000 over the 18-month period ending June 30, 2019, will help us move forward on coverage and efficiency:

- **Boat Access Traffic Analysis.** We've been working on inspection efficiency since the beginning. We can now move more quickly with developing algorithms to predict traffic at each public access, each hour of the day, for the entire boating season, taking into account weather, fishing conditions and holidays. Traffic data from TRAFx magnetic monitors, trail cameras, parking lot cameras, plus the inspection surveys, will be combined and compared with historical traffic. While perfect predictions will be elusive, a solid understanding of what drives access traffic will allow us to deploy inspectors for maximum efficiency. We are targeting a 15% efficiency increase by the second year and continuing annual efficiency improvements thereafter. We expect the pay-back period for this investment will be about two years.
- **Expanding Boat Inspections at Private Resort, Campground and Marina Accesses.** About 20% of boats entering Lake Vermilion do so at private accesses while staying at resorts and campgrounds. Others enter at private marinas. To begin to understand who these boaters are and to understand the best way to provide inspections, North St Louis SWCD ran a DNR-approved pilot program at nine Vermilion resorts and one campground during 2017. Business owners and their employees were trained as Level 1 inspectors. This very successful pilot inspected 3,107 boats, provided insight of what works and what needs improvement, and will be the basis for a 2018 expanded program with a 5000-inspection target. The cost per boat inspected at private accesses is expected to be 50% less than the incremental cost for additional inspections at public accesses, even after the traffic-analysis efficiency improvements. Additional details on the pilot and the 2018 plan are available from North St Louis SWCD and the Vermilion Lake Association.

In 2018, North St Louis SWCD plans 7,000 "Level-1" inspection hours targeting 17,500 inspections at Vermilion's public accesses. See their 2018 proposal for additional details.

Watercraft Decontaminations:

In 2017, the Vermilion Lake Association partnered with North St Louis SWCD to staff two centrally located boat decontamination stations, one on each end of Lake Vermilion. The Y Store (Tower) and Country Store (Cook) cleaning stations together decontaminated 217 boats and trailers, a modest decrease from the prior year. The

decon traffic at the Cook Country Store was especially hard hit by highway construction equipment clogging the convenience store parking lot.

In 2018, North St Louis SWCD plans 1,760 "Level-2" inspection hours targeting 650 decons. This aggressive year-to-year increase is fueled by a new partnership with the Pelican Lakeshore Owners Association (up the road from Cook) and by a welcome end to road construction. See the 2018 North St Louis SWCD proposal for additional details.

Related Activities:

Several additional projects complement the boat inspection and decontamination station efforts. Expanded educational materials for resort guests, fishing tournament inspection coverage, and enhanced inspector training class are important elements of success.

All Watercraft Inspection and Decontamination Project activities are summarized below:

1.1 Public Access Inspections and Education.

Summary: Partner with North St Louis SWCD which will provide 7,000 hours of Level 1 inspectors at selected public accesses. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Goal 13,000 total inspections and 50% coverage of boats entering Vermilion at public accesses. Measurements, analysis, and oversight.

1.2 Resort, Marina & Campground Inspections and Education.

Summary: Partner with North St Louis SWCD and with the DNR to develop a method to train business owners and dock attendants to conduct Level 1-equivalent inspections at their private access. About 15 business partners expected in 2018. DNR inspection tablets and "survey" utilized at resorts. Assist resort inspectors on busy Saturdays at selected resorts. Goal 5,000 total inspections and 50% coverage of boats entering Vermilion at private accesses (80% coverage for boats entering at participating resorts).

1.3 Resort & Campground AIS Educational Materials for Guests.

Summary: Support resort and campground partners with AIS information and educational materials for their guests. Provide AIS identification materials tailored to the resort environment. Cover native and invasive vegetation and invertebrates. Pre-visit informational materials and mailings, including recommended stop at regional decontamination station prior to arrival.

1.4 Fishing Tournament Inspection and Education.

Summary: Partner with North St Louis SWCD, 1854 Treaty Authority, and Fortune Bay Marina to inspect boats during pre-fishing and tournament days. Use Level 1 inspectors from North St Louis SWCD, Level 1-equivalent inspectors from Fortune Bay, trained 1854 inspectors, and Landa decontamination units. Provide tournament participants with proof-of-inspection certificate. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Target: 95% coverage for all tournament participants entering Vermilion.

1.5 Enhanced Inspector Training.

Summary: Partner with Burntside Lake Association and North St Louis SWCD to provide enhanced training for Level 1 and Level 2 inspectors. Based on successful 2017 one-day training, improved version will put additional emphasis on customer service, AIS identification and biology, and conflict management. Conduct classroom with hands-on advanced inspection training at Vermilion Community College for public access Level 1s and Level 2s. Develop an alternative training method for resort employees who are unable to attend live session.

1.6 Watercraft Decontamination Stations.

Summary: Partner with North St Louis SWCD which will provide 1,760 hours of Level 2 inspectors at the Country Store (Cook) and the Y Store (Tower) decontamination stations. Offer courtesy cleaning, pre-emptive decontamination for boats heading to Vermilion accesses, and corrective decontamination for boats denied entry. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Select hours of

operation based on traffic patterns, aiming for 650 total decons. Significant marketing campaign to boost decontaminations per hour open. Support with improved highway and on-site signage.

1.7 Watercraft Traffic Analysis and Staffing Optimization.

Summary: Analyze all available ramp traffic data collected at public and private accesses by both the inspector surveys and unstaffed monitors (e.g., TRAFx sensors, cameras). Develop a usage model to fill in the time and spatial gaps where data is weak. Combine with risk-of-establishment data to optimize equipment and inspector deployment. Test promising ideas to reduce cost-per-boat and increase percentage of boats inspected before launch. In time, provide increased focus on high-risk boats (i.e., last lake, dry time, style of boat). Actively seek proven ideas from other lakes or counties and adapt to Lake Vermilion situation. Involves concept and tool development, analyst support.

2. Public Awareness and Education Project

Launch-site education activities (Project 1) are tailored to a specific audience and focused on Lake Vermilion's most significant AIS risks. We propose to complement that work with an awareness and education package – still focused on Lake Vermilion's risks – but aimed at the general public in their daily life.

The campaign will be local, emphasizing the region within 50 miles of Lake Vermilion.

- Display ads and feature articles in the *Cook News-Herald*, the *Tower News*, and the *Timberjay* (Tower edition) complementing the county-wide ads by Wildlife Forever.
- AIS content in the VLA quarterly newsletter, which is offered free to resort guests and in local businesses.
- AIS information booth at local fairs, carnivals, parades, and similar events.

The campaign will seek out tourists when they visit local businesses.

- Lake service providers, such as resorts, campgrounds, marinas, boat dealers.
- Grocery stores, cafes and restaurants catering to lake visitors.

The campaign will seek out the tech-savvy younger generation, a group hard to reach with traditional media.

- A significant increase in the AIS content of the VLA Facebook page and website, with AIS news and practical videos on boat cleaning and AIS identification.
- Youth summer camp (e.g., Camp Vermilion) or K-12 school AIS projects. Combination of AIS class room projects and field projects that train and inspire our next generation.

All Public Awareness and Education activities are summarized below:

2.1 Newspapers and Newsletters.

Summary: Informational articles in local newspapers and VLA newsletter to increase public awareness of AIS threats and prevention activities at Lake Vermilion. Complement AIS info and display ads from Wildlife Forever. News releases to *Cook News-Herald*, *Tower News*, the *Timberjay*, and, at times, the *Mesabi News* and *Hometown Focus*. Feature articles for same. Display ads, especially for AIS milestone announcements and “thank you” to partners and donors. Regular AIS presence in VLA newsletter, which is offered free to resort guests and in local business establishments catering to lake visitors..

2.2 Events and Shows.

Summary: Staff AIS information tables at local fairs, carnivals, parades, and similar events. Examples: Cook Timber Days, Tower Harbor Days. Coordinate with info tables by Sea Grant et al. Develop AIS pamphlets and other handouts. Utilize 10x10 EZ-Up canopy when outdoors. Organize event staffing..

2.3 Youth Summer Camp and K-12 Education.

Summary: Partner with a summer youth camp (e.g., Camp Vermilion) or K-12 schools on youth AIS projects. Combination of AIS class room projects and field projects that train and inspire our next generation. For summer camps, program could be repeated several times during the summer and tailored to various age groups. In some cases, field trips may involve actual AIS monitoring/control (e.g., removal of Chinese mystery snails from shallow shorelines). Curriculum development, materials and school support staff.

2.4 Restaurants and Local Businesses.

Summary: Provide informational AIS materials and assistance to local businesses. Emphasis on those catering to lake visitors. Reutilize materials created for local fairs. Create special-purpose materials (e.g., placemats, bar coasters) unique to a business segment. Provide display racks. Work with business owners to determine what's working..

2.5 Social Media and Website.

Summary: Maintain up-to-date AIS information on the VLA website and Facebook page to increase public awareness of AIS threats and prevention activities. Focus on reaching the tech-savvy younger generation. Provide dedicated landing pages where appropriate. Focus on outreach to potential AIS volunteers. Utilize Google Analytics and other tools to understand what's working. Content development and hosting by WA Fisher (Virginia).

2.6 Resort and Lake Business Stewardship Outreach.

Summary: Work with lake business owners to explain the significant risks posed by AIS. Teach best management practices for boat inspections, client discussions, bait disposal, water removal, and boat cleaning tailored to specific threats at Lake Vermilion. Develop a tiered recognition program to publicly recognize business owners who have attended training and have implemented key AIS practices.

3. Early Detection, Rapid Response, and Population Management Project

If a new invasive were to evade our inspection and boat-cleaning firewall, we rely on early detection to give us the best chance of eradication or control.

With starry stonewort and hybrid watermilfoil in the headlines, we chose to complete during 2017 a vegetation survey of all remaining littoral waters to locate undetected vegetation infestations as quickly as possible. This effort began as a multi-year project in 2016 with an initial emphasis on locating any curly-leaf pondweed which might have escaped from our small Everett and Stuntz Bay infestations.

RMB Environmental Labs (Detroit Lakes) surveyed Vermilion for three weeks in June and August. They mapped the known curly-leaf pondweed infestations in Everett and Stuntz Bays and checked all high-risk areas around the lake. RMB found additional curly-leaf in Wolf Bay and a sparse presence in Wakeumup Narrows. No starry stonewort was discovered.

In addition, no Eurasian or hybrid watermilfoil was detected. Eurasian watermilfoil can overwhelm native vegetation and form dense surface mats. Vermilion does have native Northern watermilfoil, which can hybridize with Eurasian. Northern watermilfoil is a desirable, well-behaved species, but its presence means we need to be vigilant for hybrids.

To stay on top of the existing curly-leaf and continually monitor high-risk areas for hybrid watermilfoil and starry, we will expand two important efforts in 2018:

- RMB will begin short, focused biennial vegetation surveys. Timing will be adjusted based on what's found.
- After an excellent initial year in 2017, our sentry early detection program at public and private accesses will be expanded. MAISRC Detectors will provide coaching and vegetation identification expertise. At public accesses, interns from Vermilion Community College will provide coverage where volunteers are not available. Sentries will monitor assigned access once or twice a month and become familiar with "their" location to reliably recognize changes which could signal a new invader.

We will also begin or continue the following activities:

- Continue habitat assessment work to select the high-risk locations for our vegetation volunteers and to identify high-risk species for all our AIS work.
- Begin distributing sample collection kits to involve recreational boater and fishermen in the early detection of new AIS infestations and mapping of existing infestations.
- Develop a stand-by threat-by-threat rapid response plan for Lake Vermilion to guide our actions during the first 30 days.

- Continue water sample collection along Vermilion’s eastern shore to obtain a second year of data on possible high-calcium inflows, a zebra mussel habitat concern.

All Early Detection, Rapid Response, and Population Management activities are summarized below:

3.1 Habitat Evaluation and Risk Assessment.

Summary: For all AIS threats, understand our “risk of establishment” once introduced. Compare Vermilion’s habitat (e.g., water chemistry, bottom structure, water temperature, nutrient content, etc) with that of infested lakes and with the preferred and minimum requirements for each species. Evaluate each bay’s risk where micro-habitats exist. Check calcium levels along east Vermilion shorelines where high-calcium inflows may allow zebra mussel establishment. Include upstream habitats where appropriate. Provide recommendations on resource priorities.

3.2 Annual Evaluation of Existing Invasive Vegetation.

Summary: Annually evaluate known infestations of curly-leaf pondweed. Monitor native vegetation known to frequently co-exist with serious invasives (e.g., Northern watermilfoil and hybrid watermilfoil), especially those stands of native vegetation near invasive entry points.

3.3 Curly-Leaf Pondweed Control.

Summary: Develop a management plan to control the expansion and, over time, reduce the infestation area of curly-leaf pondweed on Lake Vermilion. Work with Rich Rezanka et al to stay on top of new control and eradication options. Consider divers for small infestations. Work with contractor as needed to implement large-area controls.

3.4 Early Detection of Invasive Vegetation at Public and Private Accesses.

Summary: Monitor about 10 high-risk public accesses and 20 private resort, campground and marina accesses for new invasive vegetation infestations. One or two visits per month by trained “Sentries” who each will become familiar with their assigned site. Focus on vegetation matched to our water chemistry and habitat at access. Sentry training, coaching and supervision by two U of M Extension “Detectors” covering each end of Vermilion. Detectors follow-up when suspicious vegetation found.

3.5 Boater Early Detection Sample Kits.

Summary: Develop and assemble 2400 sample collection kits to involve recreational boaters and fishermen in the early detection of new AIS infestations and mapping of existing infestations. Arrange for volunteers, resorts, and guides to distribute kits free to boaters and lake residents. Initial concept: ZipLoc bag with instructions, AIS ID cards, extra ZipLoc bags for sample collection, sample info recording form, etc. Frequently update the kits to match new threats. Arrange for data collection and analysis.

3.6 Rapid Response Readiness.

Summary: Develop and maintain a stand-by threat-by-threat rapid response plan for Lake Vermilion to guide our actions during the first 30 days. Update as new threats emerge or rise in priority. Continuously refresh with new tools, contacts, and best practices.

4. Regional and Statewide Partnership Development Project

The Vermilion Lake Association will work statewide to share information and exchange ideas among AIS prevention leaders. We will attend conferences and meetings as a participant and as a presenter, building contacts and partnerships at the county level and statewide.

We will also work closely with nearby lake associations, SWCDs, local government units, lake resorts and businesses, service clubs, the Lake Vermilion Resort Assn, and the Lake Vermilion Guides League to share ideas, cement partnerships, and encourage community organizations to spread the AIS story through their internal communication channels.

All Regional and Statewide Partnership Development activities are summarized below:

4.1 **Lake Vermilion Stakeholder Info Sharing and Involvement.**

Summary: Share AIS information and exchange ideas among nearby lake associations, schools, townships, cities, SWCD, service clubs, LVRA, Guides League, chambers of commerce, etc. Build partnerships to share resources. PowerPoint prep and customization. Estimate 18 collaborative meetings and presentations annually.

4.2 **Statewide Information Sharing and Involvement.**

Summary: Share information and exchange ideas among AIS prevention leaders statewide. Attend statewide conferences and meetings as a participant and as a presenter. Build partnerships to share resources at the regional and statewide levels. PowerPoint prep and customization. Estimate 12 collaborative meetings and presentations annually. Estimate 3 major conferences annually. Overnight travel.