

2021

Lake Vermilion

AIS Prevention Plan



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Introduction

An Important St Louis County Asset Needing Protection

Lake Vermilion is a St Louis County scenic crown jewel. The French voyageurs translated the Ojibway name *Onamuni*, "Lake of the Sunset Glow," to the Anglo-French word *Vermeillon*. It is St Louis County's largest lake (40,000 acres). It has the longest shoreline (341 miles) and the most islands (365). Few would dispute its legendary scenery and its breathtaking sunsets.

Lake Vermilion is an important financial asset for the local business community, drawing fishermen and recreational boaters who drive the local economy. Lake Vermilion's resorts and campgrounds host over 20,000 guests who spend \$7 million for lodging annually. When food, recreation, and retail purchases are included, the direct impact to local businesses likely exceeds \$20 million.

Lake Vermilion is an important financial asset for St Louis County. Its lakeshore property has an estimated 2020 market value of \$1.08 billion, easily the largest lake valuation in northern Minnesota and about 10% of the estimated market value (EMV) outside Duluth. That valuation and the significant net tax it generates for the county, school districts and local governments is at-risk should a game changing AIS invade Lake Vermilion.

Risk of AIS Introductions is Very High

Being a fishery and scenic "super star" can also be a problem. On summer weekends, there's a steady parade of trailered boats between AIS-infested lakes and Vermilion's 17 public and 23 private resort accesses for fishing and recreational boating. Approximately 16,000 trailered boats launch at Lake Vermilion annually.

As the fisheries at other major walleye lakes decline after AIS infestations, we are likely to see additional fishermen trailering their boats to Lake Vermilion, further increasing our risk of AIS introduction.

The Fishery, Business Community and Property Owners Cannot Absorb Further AIS Stress

Adding an AIS stressor to Lake Vermilion will clearly weaken the resiliency of its fishery and ecosystem. The DNR confirmed the presence of spiny waterfleas in Vermilion's east basin in July 2015. Spinys can now be found in all of Vermilion's deep bays.

The lake's west basin is still experiencing a walleye population anomaly – too many large fish and too few smaller ones – a population distribution which is not fully understood. An unknown combination of events triggered this situation in the mid-2000s. The inability of the west-basin walleye fishery to absorb those triggering events or to recover quickly suggests the walleye fishery may be more vulnerable to additional stresses than we'd like.

Lake Vermilion is a Canadian Shield lake, which tend to be less fertile than lakes in the central part of the state (e.g., Lake Mille Lacs). The fisheries of less fertile lakes – those with fewer nutrients to support organisms – may be more fragile and more readily disrupted by a new AIS infestation directly affecting the food chain. The presumed resilient "walleye factory" at Lake Mille Lacs, which now has zebra mussels, spiny waterfleas and Eurasian watermilfoil, has collapsed and is not expected to recover for decades, if ever.

It's impossible to know beforehand which stressor is one too many and is the one that begins a downward fishery and business community spiral at Lake Vermilion.

The Financial Risk for St Louis County of a Game Changing AIS Infestation at Lake Vermilion

A major game changing AIS infestation at Lake Vermilion would be disaster in so many ways. Just how the slow-motion train wreck manifests itself depends on whether it's starry stonewort, hybrid watermilfoil, an unknown soft-water vegetation, or localized zebra mussels adjacent to a calcium "hot spot." In all cases, a New Era for Lake Vermilion would have commenced.

Our understanding of the current AIS risks for Lake Vermilion is discussed in the next section. Invasive vegetation tops the list with a localized zebra mussel infestation possible. Here's a summary of what a lake might expect after invasion:

- **Eurasian or hybrid watermilfoil, starry stonewort.** Aggressive expansion after invasion. Cabin owners and recreational boaters contend with dense surface mats in depths to 10 feet, fouling equipment. Docks and swim platforms clogged. Native vegetation shaded out. Changing habitat favors some fish species, hurts others.
- **Zebra mussels.** This serious invader is perhaps limited to local infestations at Vermilion. Water clarity increases two-fold. Increased light penetration encourages plant growth. Fish move to deeper waters. Food web disruption.

The financial impact on St Louis County and county taxpayers might take several forms in the first few years after infestation:

- **Lakeshore property values would drop.** A Univ of Wisconsin study (Horsch & Lewis 2009) on 17 northern Wisconsin lakes found land values declined 13% after Eurasian watermilfoil invasion. In Washington state, a study (Olden & Tamayo 2014) on over 170 lakes with and without watermilfoil showed a -19% difference attributable to infestation.
- **Tax burden would shift to other taxpayers.** With lakeshore property values in decline, the property tax burden would transfer to property owners away from Lake Vermilion.
- **Jobs would be lost.** Tourism at Lake Vermilion would decline. Resorts occupancy would take a hit, as would businesses which rely on tourism.

Lake Vermilion Today: Existing AIS and Current Threats

Before we can set goals to protect Lake Vermilion and a strategy to meet those goals, we need to know where we are today.

• Existing AIS Infestations

Rusty crayfish	Initially discovered in Armstrong Bay in mid-1980s. Game changing to fisheries, but at a very slow pace. East-end fisheries appear to be adapting over the years.
Spiny waterfleas	Discovered in the water column in Big Bay in 2015. May have been present for years in low abundance before that. Potentially game changing to fisheries. So far, little evidence beyond impact to growth of age-0 walleyes and perch.
Curly-leaf pondweed	Known to exist in Minnesota for 110 years. Appears to be in equilibrium with native vegetation statewide. Expansion unlikely.
Chinese mystery snail	Local nuisance in specific bays. Not likely to be game changing lake wide.
Purple loosestrife.	Wetland plant. Small infestations along shorelines. Not game changing.

• Current AIS Threats

Due to the hard work of our volunteer corps and a little luck, no new AIS infestations have been discovered at Lake Vermilion since spiny waterfleas in 2015. But no one's resting on their laurels. Current threats abound.

Lake Vermilion's water chemistry sets us apart from most Minnesota lakes. Our low calcium and low pH make us low risk for zebra mussels. Our risk for Eurasian watermilfoil may also be low, based on no known infestations and a high likelihood of introduction since the species was first discovered in Lake Minnetonka in 1987.

On the other hand, our susceptibility to hybrid watermilfoil and starry stonewort is unknown, as they are relative newcomers to our state. Until those risks are fully evaluated by researchers, both stay at the top of our threat table.

Research is underway on hybrids between invasive Eurasian watermilfoil and our native northern watermilfoil. 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 a specific hybrid genotype may find our habitat suitable and overwhelm our native vegetation.

To understand better our risk that hybrid watermilfoil might be introduced at Vermilion, the Vermilion Lake Association (VLA) asked RMB Environmental Labs to check the Eurasian watermilfoil infestation at the Gilbert Pit for evidence of northern or hybrid watermilfoil. Neither was found during a 2018 visit.



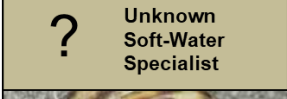


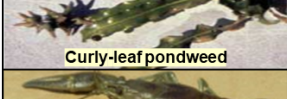

At this point, it's unclear whether northern watermilfoil cannot live in the Gilbert Pit ... or it can but was largely displaced by the more aggressive Eurasian watermilfoil that dominates the waterbody. A hybrid watermilfoil incubator in the Gilbert Pit – a 45-min trip for a trailered boat to Vermilion – would be a significant risk.

The recent discovery of zebra mussel veligers (larvae) at Muskeg Bay in Lake of the Woods re-opens the question on whether zebras might get a foothold at a calcium “hot spot” at Vermilion. Lake of the Woods has generally low calcium levels – like Vermilion – below the levels suitable for zebras. East Two River, which empties into Lake Vermilion’s east basin, has widely varying calcium concentrations which conceivably could support a local zebra infestation. We will re-evaluate that possibility when more is understood about the Lake of the Woods situation during 2021. In the meantime, zebras remain in the middle of our threat table and our team has re-started precautionary early detection activities on East Two River.

Minnesota Sea Grant has identified over 70 invasives in Lake Superior believed capable of moving to inland lakes. In addition, the Minnesota Invasive Species Advisory Council (MISAC) lists 21 aquatic plant species with the potential for “high ecological impacts.”

While our soft water protects us from many game-changing invasives that plague central Minnesota and much of Wisconsin and Michigan, it can also expose us to other invaders few are talking about. We are working with Minnesota Sea Grant and the Minnesota Aquatic Invasive Species Research Center (MAISRC) to help us identify possible threats to Lake Vermilion. We’re also looking toward the Canadian Shield lakes to our north for information about AIS that prefer a soft water habitat.

Currently, our threat table looks like this:

Species	Introduction Risk	Habitat Suitability	Impact if Population Established	
			Fishery & Ecosystem	Recreational Boating
 Hybrid and Eurasian watermilfoil	Hybrid increasing as more lakes become infested.	Hybrid unknown. May be suitable in specific bays.	Serious stressor. Unknown impact on each fishery.	Severe in bays with suitable habitat.
 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.
 ? Unknown Soft-Water Specialist	Likely low. Connectivity to soft water lakes limited.	Presumed moderate/high.	Unknown	Unknown
 Zebra mussels	Very high.	Low. Limited to calcium hotspots with suitable pH?	Serious stressor. Filters zooplankton, limiting growth of fry.	Generally negative but water clarity appeals to some.
 Spiny waterfleas	Present in many bays. Discovered in 2015.	High in deep basins.	Varies by fish species. Consume zooplankton, limiting growth of fry.	Low. Gets tangled in fishing or recreational gear.
 Curly-leaf pondweed	Present in 4 small areas.	Moderate/high in specific bays.	Stress on native plant diversity. Unknown impact on each fishery.	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.

Goals of the AIS Program at Lake Vermilion

Based on our existing infestations and current threats above, the goals of our long-term AIS program are:

- Goal 1. Prevention.** Prevent all new aquatic invasives from being introduced at Lake Vermilion, with emphasis on those which would be game changers for our fishery, recreational lake use, and business community.
- Goal 2. Early Detection.** Detect all new AIS infestations quickly, before they have become established, when eradication options are most viable. Emphasis on those which would be game changers.
- Goal 3. Containment.** Prevent the expansion of all existing infestations, with emphasis on those which are game changers.

Strategy to Achieve Prevention, Early Detection & Containment Goals

We understand well that the resources – funding, trained volunteers, and proven contractors – to fully defend Lake Vermilion from all game changing AIS threats will never be completely available. We're committed to deploying the resources we can muster efficiently on our highest priorities to protect Lake Vermilion and St Louis County.

Our strategy for preventing game changing AIS from becoming established or expanding is comprised of the following components:

1. Watercraft Inspection and Decontamination. [Supports [Goal 1: Prevention](#)]

- **Private Business Accesses.** Develop the means to inspect 100% of boats which arrive at resorts, campgrounds, and marinas and to ensure those boats are safe to launch. Emphasize higher-risk boats from other states and Minnesota lakes other than Vermilion.
- **Public Accesses.** Develop the means and funding to inspect >70% of boats launching at Vermilion's 17 public accesses, with emphasis on higher-risk boats from lakes other than Vermilion.
- **Tournaments.** Develop the means to inspect 100% of boats participating in fishing tournaments during pre-fishing. Emphasize higher-risk boats from lakes other than Vermilion.

2. Public Education. [Supports [Goal 1: Prevention](#)]

- **Public Education.** Assure that all the people who share Lake Vermilion – especially those who bring trailered boats to the lake – understand our AIS risks, all AIS laws, and the best practices to clean and dry their watercraft.

3. Habitat Evaluation and Threat Assessment. [Supports [Goal 1: Prevention](#)]

- **Threat Assessment.** Continuously monitor AIS threats – both habitat generalists and soft-water specialists – which would be compatible with Lake Vermilion's habitat.

4. **Early Detection of New Infestations.** [Supports [Goal 2: Early Detection](#)]

- **Public and Private Business Accesses.** Check each public access and private accesses at resorts, campgrounds, and marinas multiple times each year for new infestations, with emphasis on game-changing vegetation near the top of our threat list.
- **High Risk Habitats.** Survey weed-friendly bays every few years to discover new infestations, with emphasis on game-changing vegetation near the top of our threat list.
- **AIS Detectors.** Develop a team of trained AIS Detectors to respond to suspicious vegetation reports.
- **Rapid Response.** Work jointly with the DNR and North St Louis SWCD to respond quickly to a new discovery.

5. **Management of Existing Infestations.** [Supports [Goal 3: Containment](#)]

- **Evaluation of Existing Invasive Vegetation.** In partnership with 1854 Treaty Authority and the DNR, survey known infestations of curly-leaf pondweed to evaluate appropriate control methods.

6. **Growing Capacity to Handle AIS Threat.**

[Supports [Goal 1: Prevention](#), [Goal 2: Early Detection](#), and [Goal 3: Containment](#)]

- **Building Local Capacity.** Develop the volunteer corps, leadership team, skills, and other resources to better protect Lake Vermilion from the AIS threat.
- **Regional and Statewide Partnerships.** Share information and ideas among AIS prevention leaders regionally and statewide. Attend statewide conferences and meetings as a participant and as a presenter.

2021 Lake Vermilion AIS Projects

Based on our AIS program goals and the strategy above, we plan to pursue the following six projects in 2021. Each project addresses one of the six strategy components (above). A seventh section covers indirect AIS expenses.

1. Watercraft Inspection and Decontamination Project

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

In 2020, the Vermilion Lake Association partnered with North St Louis SWCD to inspect almost 15,000 boats at Vermilion's public accesses, including over 8,400 (65%) of the estimated 13,000 which launch annually at public accesses.

Our partnership also documented (via the tablet survey) the inspection of over 1500 incoming boats at Vermilion's private business accesses, mostly resorts and a marina. Based on interviews with resort owners, we estimate the total number of private-access inspections to be over 2400 in 2020. Several resorts did not use the private-access tablet survey, feeling it made greeting the incoming guest and inspecting his/her boat more difficult.

While the inspection levels at both public and private business accesses are significant achievements, even more is needed to protect Lake Vermilion. And that additional coverage needs to be achieved efficiently, taking the risk levels of incoming boats into account. Three areas will change or receive increased focus in 2021:

- **Expanded Boat Inspections at Private Resorts and Marinas.** Data on incoming resort boats tells us those boats were much more likely to have come from an out-of-state lake or a Minnesota lake with Eurasian watermilfoil or starry stonewort. We estimate the risk level to be twice that of a boat arriving at a typical public access. To address this risk, we have set a goal of eventually inspecting 100% of boats arriving at Vermilion's resorts and marinas. In 2021 we will work with resort owners to help them inspect more boats and document those inspections to track progress and to help us further understand risk.
- **More Efficient Boat Decontamination.** Our team will work with North St Louis SWCD to deploy a watercraft decontamination unit at Hoodoo Point N public access – Vermilion's busiest access. That access ramp will be staffed by an L2 inspector 10 hours a day, 7 days a week, for the full season. This plan allows the L2 to efficiently break away from his/her launch duties to perform a decontamination whenever needed. The Hoodoo decon unit will support inspectors at public and private business accesses lake wide.
- **Optimizing Inspector Staffing at Public Accesses Based on Traffic and Risk Levels.** Our team has made great progress on forecasting traffic and risk to position public-access inspectors to intercept the most boats per hour. In 2021, we will provide a full-season staffing recommendation in April. This reduces mid-season volunteer hours and allows North St Louis SWCD to more easily forecast the number of inspectors they will need throughout the season.

All activities in the Watercraft Inspection and Decontamination project are summarized below. Activities marked with ↑ are new or expanded in 2021.

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
1.1 Public Access Inspections and Boater Education	120	24	\$ 1,296
1.2 Resort, Marina & Campground Inspections and Boater Education ↑	240	24	1,396
1.3 Expanded Training for Resort Inspectors	20	16	1,164
1.4 Pilot Project to Test Methods to Expand Saturday Inspections in the Resort Environment ↑	40	16	1,164
1.5 Fishing Tournament Inspection and Boater Education	80	8	232
1.6 Watercraft Decontamination Stations and Boater Education	20	16	664
1.7 Traffic Forecasting, Risk Analysis, and Staffing Optimization	40	20	580
Total	560	124	\$ 6,496

1.1 Public Access Inspections and Boater Education

Leaders: Natalya Walker, Jeff Lovgren

Key targets/objectives: 6000 inspection hours, 9000 entering inspections, 60% coverage for entering boats.

Summary: Partner with North St Louis SWCD which will provide about 6000 hours of L1/L2 inspectors at selected public accesses. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Target 9000 total inspections and 60% coverage of boats entering Vermilion at public accesses. Monitor and track progress. Assist SWCD as needed to solve problems.

Funding Note: Funding for Level 1 and Level 2 inspectors, tablets, cleaning & safety tools, and SWCD supervisory team will be requested by North St Louis SWCD.

1.2 Resort, Marina & Campground Inspections and Boater Education

Leaders: Resort Ambassadors, Natalya Walker, Jeff Lovgren

Key targets/objectives: 1650 private-access inspections (\$7 stipend & survey data), 900 other private-access inspections, 85% coverage for boats entering at participating resorts.

Activity Summary: Partner with North St Louis SWCD to improve the online private-access inspector certification process and the methods for training and mentoring dock attendants during the season. Recognizing that each business is unique, work with owners to solve their individual inspection problems. About 14 business partners with private accesses expected in 2021. Target 2550 total inspections at private accesses and >85% coverage of boats entering Vermilion at participating resorts.

Funding Note: Funding for private business inspection stipends, tablets, cleaning & safety tools, and SWCD supervisory team will be requested by North St Louis SWCD.

1.3 Expanded Training for Resort Inspectors

Leaders: Natalya Walker, Resort Ambassadors, Jeff Lovgren

Key targets/objectives: Improved practical inspection training for private-access inspectors after certification.

Activity Summary: Work with SWCD and our resort partners to provide expanded training for private-access

inspectors. SWCD trainer/mentor to visit 10 resort inspectors at 6 resorts about 2 times a year. Build skills for inspection and simple cleaning. First visit soon after certification, then 1 more time later as needed. Estimate 1.5 hours per visit, counting travel.

1.4 **Pilot Project to Test Methods to Expand Saturday Inspections in the Resort Environment.**

Leaders: Resort Ambassador team.

Key targets/objectives: Evaluate feasibility of 2-3 ideas at a couple resorts.

Activity Summary: Work with our resort partners to come up with a few ideas – tailored to specific resort Saturday situation – which have the potential to move us closer to the 100% long-term inspection goal. Test two or more ideas. Expand the test to additional resorts if shows promise.

1.5 **Fishing Tournament Inspection and Boater Education.**

Leaders: Dick Vohs, Terry Grosshauser

Key targets/objectives: 100% inspection coverage

Activity 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, private-access inspectors at Fortune Bay and resorts, plus 1854 Treaty Authority inspectors and Landa decontamination unit. Provide tournament participants with proof-of-inspection certificate. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Target: 100% coverage for all tournament participants entering Vermilion.

Funding Note: Funding for L1/L2 inspectors and private-access inspection stipend, tablets, cleaning & safety tools, and SWCD supervisory team will be requested by North St Louis SWCD.

1.6 **Watercraft Decontamination Stations and Boater Education.**

Leaders: VLA coordinator position open, Natalya Walker, Jeff Lovgren assisting.

Key targets/objectives: 10 incoming decons, 100 total decons

Activity Summary: Partner with North St Louis SWCD which will provide about 1500 hours of Level 2 inspectors at Hoodoo Point N public access. This single location will support public and private business inspectors lake wide. Offer corrective decontamination for boats denied entry, decontamination for boats exiting, and courtesy cleaning. Educate boat operators to self-inspect and to clean, drain and dry their equipment. Select hours of operation based on traffic patterns. Initial data suggests 10 hours per day, 7 days a week for a 22-week season.

Funding Note: Funding for Level 2 inspectors, tablets, cleaning & safety tools, and SWCD supervisory team will be requested by North St Louis SWCD.

1.7 **Traffic Forecasting, Risk Analysis, and Staffing Optimization.**

Leaders: Jeff Lovgren, Susan Bies, Mark Schmidt

Key targets/objectives: Cumulative 3% boats/hour annual improvement without sacrificing coverage.

Activity Summary: Using historical traffic data and the forecasting methods developed so far, provide a full-season forecast prior to Fishing Opener. Minimal adjustments during the inspection season. Post-season review of process, making process adjustments as needed for following season.

2. Public 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 will 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.

- AIS billboard on major artery leading to Vermilion west-end resorts.
- Display ads and feature articles in the *Cook News-Herald*, the *Tower News*, and the *Timberjay* (Tower edition) complementing (and not duplicating) county-wide ads by Wildlife Forever.
- AIS content in the Vermilion Lake Association’s quarterly newsletter, which is offered free to resort guests and in local businesses.
- AIS information booth at local fairs and similar events. One event planned.

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

- Lake service providers, such as resorts, campgrounds, marinas, boat dealers.
- Bait shops, 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.

- An increase in the AIS content on the Vermilion Lake Association (VLA) website, Facebook page, and possibly Twitter.
- Focus: AIS news and practical videos on boat cleaning and AIS identification.

All activities in the Public Education project are summarized below. Activities marked with ↑ are new or expanded in 2021.

	Description of Activities	Resources Required		
		Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
2.1	Print Media: Newsletters, Newspapers, Signage and Billboards	40	40	\$ 4,060
2.2	Electronic Media: Website and Social Media	40	40	4,580
2.3	Public Events and Shows	56	16	664
2.4	Partnerships with Lake Service Providers and Local Businesses ↑	40	8	2,332
2.5	Stewardship Education and Materials for Resort Owners and Guests	40	8	2,282
	Total	216	112	\$ 13,918

2.1 Print Media: Newsletters, Newspapers, Signage and Billboards

Leaders: Lori Ptak, Terry Grosshauser, Jeff Lovgren

Key targets/objectives: One feature article in newspapers, two display ads on milestones and partner recognition, three news releases, 4.5 AIS pages per newsletter.

Activity 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*. One AIS feature articles for same. Display ads, especially for AIS milestone announcements and “thank yous” 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. AIS billboard on Hwy 53 near Cook managed by Wildlife Forever.

2.2 Electronic Media: Website and Social Media.

Leaders: Lori Ptak, Jeff Lovgren

Key targets/objectives: AIS website info up to date, 1 website and 1 Facebook blog post per week during summer.

Activity Summary: Maintain up-to-date AIS information on the VLA website. Use Facebook to increase public understanding of AIS threats and prevention activities at Vermilion. Focus on reaching the tech-savvy younger generation. Provide dedicated landing pages where appropriate. Outreach to potential AIS volunteers. Content development, hosting and analysis by WA Fisher (Virginia).

2.3 Public Events and Shows.

Leaders: Lori Ptak, Pat Michaelson, Jeff Lovgren

Key targets/objectives: 1 or 2 events per season.

Activity Summary: Staff AIS information tables at a small number of local fairs, carnivals, parades, and similar events. Example: Antique and Classic Boat Show. Utilize 10x10 EZ-Up canopy when outdoors. Organize event staffing.

2.4 Partnerships with Lake Service Providers and Local Businesses.

Leaders: Dwight Warkentin, Gary Haugen, Jim Graham, Kathy Lovgren

Key targets/objectives: Focus on lake service providers (LSPs) and businesses catering to lake visitors. Add 5 business partnerships, add literature distribution at 10 new businesses, provide one AIS article to an internal newsletters or website at a business.

Activity Summary: Provide AIS educational materials and assistance to LSPs and 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.

2.5 Stewardship Education and Materials for Resort Owners and Guests.

Leaders: Gary Haugen, Jim Graham, Open position, Jeff Lovgren

Key targets/objectives: Provide educational materials and pre-travel messaging as needed.

Activity Summary: Support resort and campground partners by supplying AIS information and educational materials for their guests. Provide AIS identification materials tailored to the resort environment. Cover native and invasive vegetation and invertebrates. Provide front-desk reference materials and signage for their guests. Provide owners with AIS content for their website, email and print communications with their guests. Pre-visit informational materials and mailings, including explanation of inspection and cleaning process upon arrival.

3. Habitat Evaluation and Threat Assessment Project

Habitat evaluation is important to assess risk of establishment. We need to know what to look for and where in Vermilion to look.

While our soft water protects us from many game-changing invasives that plague central Minnesota and much of Wisconsin and Michigan, it can also expose us to other invaders no one is talking about. We are working with the Minnesota AIS Research Center (MAISRC) to help us identify possible threats. We're also looking toward the Canadian Shield lakes to our north for information about AIS that prefer a soft water habitat.

The recent discovery of zebra mussel veligers (larvae) at Muskeg Bay in Lake of the Woods re-opens the question on whether zebras might get a foothold at a calcium "hot spot" at Vermilion. We will watch that development closely.

All activities in the Habitat Evaluation and Threat Assessment project are summarized below.

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
3.1 Habitat Evaluation and Threat Assessment	60	40	\$ 1,460
Total	60	40	\$ 1,460

3.1 Habitat Evaluation and Threat Assessment.

Leaders: Open position, Jeff Lovgren

Key targets/objectives: Assessment threats and prevention of surprises


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.

4. Early Detection of New Infestations Project

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

Vermilion's current top threats are both vegetation: Eurasian/hybrid watermilfoil and starry stonewort. Vegetation almost always is first apparent at the access where it was introduced. In 2019, we extended our "sentry" early detection project to all 17 public accessess. In 2020, the project will be further extended to 20+ private accesses. Support for our access sentries by AIS Detectors as coaches and identification experts.

The recent discovery of zebra mussel veligers (larvae) at Muskeg Bay in Lake of the Woods re-opens the question on whether zebras might get a foothold at a calcium "hot spot" at Vermilion. Two veliger tows are planned outside the mouth of East Two River in 2020.

All activities in the Early Detection of New Infestations project are summarized below. Activities marked with  are new or expanded in 2020.

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
4.1 Early Detection of Invasive Vegetation at Public Accesses	182	8	\$ 1,032
4.2 Early Detection of Invasive Vegetation at Resort, Campground, and Marina Accesses	112	8	532
4.3 Early Detection of Zebra Mussel Veligers near East Two River ↑	40	40	2,030
4.4 AIS Detector Training and AIS Hotline	100	8	1,028
4.5 Support for Early-Detection Research at Vermilion	80	16	664
Total	514	80	\$ 5,286

4.1 Early Detection of Invasive Vegetation at Public Accesses.

Leader: Open position

Key targets/objectives: All public accesses covered 3 times each summer

Activity Summary: Monitor all 17 public accesses for new invasive vegetation infestations. Three total visits at each site in mid-June, mid-July, and mid-August 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 VLA volunteer. AIS Detectors follow up when suspicious vegetation found.

4.2 Early Detection of Invasive Vegetation at Resort, Campground, and Marina Accesses.

Leaders: Bob McNamara, Resort Ambassadors.

Key targets/objectives: All resort and marina accesses covered 3 times each summer.

Activity Summary: Work with our resort partners to monitor all resort accesses for new invasive vegetation infestations. Three total visits at each site in mid-June, mid-July, and mid-August by AIS Detector, volunteer Sentry, or trained resort employee. Focus on vegetation matched to our water chemistry and habitat at access. AIS Detectors follow up when suspicious vegetation found by resort employees.

4.3 Early Detection of Zebra Mussel Veligers near East Two River.

Leader: Open Position. Jeff Lovgren interim.

Key targets/objectives: Check Pike Bay near East Two River twice a year in August for veligers. Additional sentry and calcium monitoring.

Activity Summary: Conduct precautionary veliger tows downstream from East Two River. Increase sentry checks at the Tower harbor and Your Boat Club on East Two. Monitor private docks with samplers. Periodic calcium samples along East Two.

4.4 AIS Detector Training and AIS Hotline.

Leader: Experienced AIS Detector team.

Key targets/objectives: Four AIS Detectors covering Lake Vermilion.

Activity Summary: Maintain a crew of 4 AIS Detectors at Vermilion to respond to hot line calls and cover certain resorts as a sentry. If possible, 2 AIS Detectors on each end of the lake. Maintain an AIS Hotline phone number forwarded to an AIS Detector mobile phone on rotating basis.

4.5 Support for Early-Detection Research at Vermilion.

Leader: Open Position. Jeff Lovgren interim.

Key targets/objectives: Provide local support for early-detection research at Vermilion.

Activity Summary: Provide volunteer support for Minnesota Aquatic Invasive Species Research Center (MAISRC) and DNR research being conducted at Lake Vermilion. Lake guides, boat operators, media interview opportunities, etc, to assist field teams. In 2021, technicians conducting MAISRC-funded eDNA research are expected to visit Vermilion 6-8 times.

5. Management of Existing Infestations Project

With help from DNR’s Rich Rezanka, RMB Environmental Labs, and technicians from 1854 Treaty Authority, we will continue to monitor existing infestations of curly-leaf pondweed in Everett Bay and spiny waterfleas throughout the lake. Vegetation in Everett Bay, a soft-bottom bay which has proven to be very weed-friendly, will receive special focus.

All activities in the Management of Existing Infestations project are summarized below.

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
5.1 Annual Evaluation of Existing Invasive Vegetation and High-Risk Habitats	20	24	\$ 6,196
Total	20	24	\$ 6,196

5.1 Annual Evaluation of Existing Invasive Vegetation and High-Risk Habitats.

Leader: Open position, Jeff Lovgren

Key targets/objectives: One 4-day visit by RMB team, one visit by Rich Rezanka.

Activity Summary: DNR AIS Specialist Rich Rezanka continues to visit Everett Bay and, perhaps, Stuntz Bay, each June to evaluate our curly-leaf pondweed infestation. No treatment is expected. RMB Environmental Labs visits Vermilion for 2 days to look at high-risk bays and accesses from the water. 1854 Treaty Authority technician and VLA volunteer assist RMB in the boat.

6. Growing Capacity to Handle AIS Threat Project

The Vermilion Lake Association will work with nearby AIS partners and 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 develop our own AIS leadership team and volunteer corps, recruiting volunteers to fill specific needs and building the skills of our team to better protect Lake Vermilion.

All activities in the Growing Capacity to Handle AIS Threat project are summarized below.

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
6.1 Building Local AIS Team	100	24	\$ 1,396
6.2 Statewide Information Sharing and Involvement	40	16	1,614
Total	140	40	\$ 3,010

6.1 Building Local AIS Team.

Leaders: Jeff Lovgren, Pat Michaelson

Key targets/objectives: Add volunteer leaders as needed, new and current volunteer leaders attend one collaborative meeting with other counties.

Activity Summary: Develop the volunteer corps, leadership team, skills, and other resources to better protect Lake Vermilion. Recruit volunteers to cover specific AIS needs. Build AIS knowledge, skills, and relationships by attending conferences like MAISRC Showcase, Lake of Woods – Rainy Lake Conference, DNR seminars and webinars. Encourage one-on-one collaboration with person doing same work in other counties. Some overnight travel possible.

6.2 Statewide Information Sharing and Involvement.

Leaders: Jeff Lovgren, VLA AIS Team

Key targets/objectives: 3 collaborative meetings, 1 major conference.

Activity 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. MAISRC Advisory Board, Aquatic Invaders Summit, etc. Estimate 3 collaborative meetings and presentations annually. Estimate 1 major conference annually. Some overnight travel.

7. Indirect Expense Allocations to Support AIS Prevention Activities

Certain indirect expenses are required to support the Vermilion Lake Association's AIS prevention activities. When it is not practical to assign these expenses to a specific AIS project, they are included here.

Indirect Expense Allocations are summarized below:

Description of Activities	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
7.1 Liability Insurance Allocation			\$ 2,602
7.2 Additional Insurance Required by St Louis County			1,068
7.3 Workers Compensation Insurance Allocation			380
7.4 Financial Services Allocation			1,575
7.5 General Office and Equipment			200
Total			\$ 5,825

7.1 Liability Insurance Allocation.

Budget Detail: Based on 2020 premiums, general liability, boat size liability, employment practices liability, directors & officers (D&O) liability, and mandatory terrorism adder \$4010. Assume 3% year-to-year increase. Allocation 63% to AIS based on approximate 63% AIS paid and volunteer hours vs total. AIS total: Cash expense \$2602.

7.2 Additional Insurance Required by St Louis County.

Budget Detail: Named insured, business auto, and increased commercial liability coverage \$1037 based on 2020 premium. Add 3% year-to-year increase. Allocation 100% to St Louis County. Total: Cash \$1068.

7.3 Workers Compensation Insurance Allocation.

Budget Detail: Workers comp coverage \$380 in 2020. No year-to-year increase. Allocation 100% to St Louis County since only employee is AIS Prevention Plan leader. Total: Cash \$380.

7.4 Financial Services Allocation.

Budget Detail: Based on 2020 data, volunteer VLA treasurer 290 hours at \$20/hr = \$5800 in-kind. Quote from Walker, Giroux and Hahne for 2020 taxes and audit = \$3150. Allocation between VLA (50%) and St Louis County (50%) based on AIS grant approximately doubling the complexity of accounting activities. AIS total: Cash expense \$1575 + \$2900 in-kind = \$4475.

7.5 General Office and Equipment

Budget Detail: Average expenses for stamps, ink, toner, paper, envelopes, etc. \$50/mo or \$600 annually. Since it's difficult to manage and submit small purchases, the majority will be handled as VLA match. Cash \$200, in-kind match \$400.

Summary of Required Resources

Description of Projects	Resources Required		
	Volunteer Hours	AIS Coordinator Hours	Salary, Contracts and Other Cash Expenses
1 Watercraft Inspection and Decontamination	560	124	\$ 6,496
2 Public Education	216	112	13,918
3 Habitat Evaluation and Threat Assessment	60	40	1,460
4 Early Detection of New Infestations	514	80	5,286
5 Management of Existing Infestations	20	24	6,196
6 Growing Capacity to Handle AIS Threat	140	40	3,010
7 Indirect Expense Allocation to Support AIS Activities			5,825
Total	1,510	420	\$ 42,191