Final Report for AEPP81025:

Vilas County 2025 Priority AIS Prevention Project

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February 25, 2026

Hot Pressure Washer Boat Decontamination

A trailered hot pressure washer was used at Big Muskellunge Lake, Plum Lake, Star Lake, and Trout Lake boat landings to decontaminate boats. Vilas County Land & Water LTE staff spent 100 hours with the washer at boat landings and decontaminated 20 boats. Data were entered into SWIMS. See Appendix 1 for more in-depth report and analysis of the 2025 boat decontamination program.

Outreach Events for Spiny Waterflea AIS Prevention

Several outreach campaigns were held in 2024 to bring awareness to prohibited & priority invasive species:

- **Boulder Junction Library Event:** LTE staff presented "Aquatic Invasive Species in the Boulder Junction Area" for the public on June 19, 2025. Spiny waterflea prevention was one of the main topics addressed. Attendance was ~10 members of the public.
- **Wacky Water Critters & Plants - A Touch and Feel Event:** On June 24, 2025 LTE staff partnered with the Olson Memorial Library in Eagle River to offer this tactile event that was open to the public, but targeted youth. Aquatic macroinvertebrates were collected from (and later returned to) Plum Creek; and aquatic plants were collected from various lakes. No crayfish or fish were used in this event; and water from different waterbodies stayed separate. This event was quite popular, drawing over 40 attendees. Several adults with disabilities also came to this event with their caregivers.
- **Lowenwood 4th Grade Lake Ecology Day:** On October 1, 2025 LTE staff presented to 48 4th grade students from Eagle River Elementary School on what spiny waterfleas are and how to clean boats (canoes) to prevent the spread of AIS. Several parent chaperones, paraprofessionals, and 3 teachers were also present.

Students pass around a vial of preserved spiny waterfleas while learning about preventing their spread at the Northland Pines 4th Grade Lake Ecology Day on Oct 1, 2025 at Lowenwood in Land O'Lakes.

Volunteer Outreach: Volunteers from the Towns of Plum Lake (3 individuals) and Boulder Junction (1 individual) helped to spread the word about boat decontamination for spiny waterflea prevention. Venues where they either talked about this to groups and/or individuals included: Lake Laura Lands meeting; Star Lakes Picnic; Sayner Makers Market; Ballard-Irving-White Birch Lakes Association board meeting, annual meeting, and new property owners meeting; and meeting with additional UW-Oshkosh CBCW interns to provide them additional info on AIS/Spiny

waterflea prevention. In addition, these volunteers also spent extra time posting flyers for the program where they got permission; offering flyers to the Boulder Junction Chamber of Commerce and Town office; assisting LTE's with training on the unit; and helping to check proper unit function during shifts when convenient.

WHIP Outreach on Wetland Invasive Species Prevention:

- On May 28, 2025 WHIP held a virtual invasive species workshop for landowners including wetland invasives prevention.
- On May 29, 2025 WHIP met with 4 landowners from Natural Lakes to answer questions on purple loosestrife, marsh thistle, knotweed, and goutweed prevention.
- On June 28, 2025 WHIP presented at the Frontier Lakes Owners' Association Annual meeting on wetland invasive species prevention. Attendance was 19 people.
- On July 29, 2025 WHIP met with 6 landowners on purple loosestrife and Phragmites prevention on Twin Island Lake.
- On September 1, 2025 WHIP met with 2 landowners on how to prevent wetland invasives and how to monitor shorelines for wetland invasives on Little Presque Isle Lake.
- On September 30, 2025 WHIP did a site visit to High Lake on Phragmites and knotweed prevention and detection with 2 landowners.

Vilas County Highway Dept., Town Road Crews, and Elected Official Wetland Invasive Species Prevention Training:

- On May 1, 2025 Vilas County Land & Water Staff and the WHIP Coordinator presented at the Vilas County Highway Dept. mandatory training day for their staff working on roads & rights-of-way in the summer. An overview of wetland invasive species prevention and ways for staff to contact Land & Water or WHIP for follow ups on suspicious plants were offered. Roughly 30 people attended.
- On June 5, 2025 WHIP met with 2 landowners and 1 town supervisor from Presque Isle on wetland invasive prevention.
- On June 16, 2025 a training very similar to the County Highway Dept. training above on wetland invasive species prevention was given to the Conover town road crew. All three road crew employees attended. This training was key due to a verified invasive Phragmites patch occurring near a town road in Conover.
- On Sep 1 and Oct 27, 2025 an abbreviated version of the wetland invasive species prevention training was given to the Town of Phelps publics works and road crew staff, focusing on knotweed and Phragmites prevention.

Strategic Landowner Outreach on Wetland Invasives Prevention:

- WHIP staff created and mailed follow up letters to landowner where there is suspected Phragmites following a 2024 shoreline invasive survey on the Eagle River Chain.
- WHIP was able to secure further funding to support more outreach and assistance to landowners to replace shoreline invasives with native plants on the Eagle River Chain.

Clean Boats Clean Waters Inspections on the Eagle River Chain:

- Between June 1-Aug 31 (with a focus on 4th of July weekend), 36 hours of Clean Boats Clean Waters Inspections were done among three different landings on the Eagle River Chain: Catfish Lake landing; Eagle Lake landing; and Yellow Birch landing (t-docks). During these 36 hours, 171 boats were inspected and 415 people were contacted about the AIS

prevention message. This work was paid for by the Eagle River Chain of Lakes Association (not through a grant). All data was entered into SWIMS.

Efforts to Boosts Clean Boats Clean Waters on the Eagle River Chain:

- Board members from the Eagle River Chain of Lakes Association attended the Dec 2024 Land & Water Committee meeting to start this process. The Committee had given direction to ERCLA to go to the towns of Lincoln and Washington as well as the city of Eagle River to host a CBCW inspector as an employee before the Land & Water Committee would consider adding a position for this work at the county level. Vilas County staff have been attending most ERCLA meetings, but no further progress has been made towards getting more fulltime coverage at their boat launches.

Appendix 1: Decontamination Program Analysis and Report

Figure 1. Grace Maurer, LTE with Vilas County Land & Water, trains at UW-Oshkosh ERIC facility to decontaminate watercraft.

2025 Vilas County Boat Decontamination Program Data Analysis

Prepared by Cathy Higley & Grace Maurer
Vilas County Land & Water Conservation
February 24, 2026

Decontamination Program Data: 2018-2025 Comparison Table

	2018	2019	2020	2021	2024	2025
Number of Hours at Landings	400	400	400	400	152	100
Number of Boats Decontaminated	71	82	139	376	39	20
Boats decontamination per hour annual average	0.18	0.21	0.35	0.94	0.25	0.20
Number of events where lakes were potentially **protected** from spiny waterflea or zebra mussel exposure due to boater **self-initiated** additional AIS prevention steps**	0*	0	1	0***	2	1
Number of events where lakes were potentially **protected** from spiny waterflea or zebra mussel exposure due to **decontamination**	2*	7	16	10	7	5
Number of lakes potentially **exposed** to spiny waterfleas or zebra mussels due to not decontaminating/taking additional steps	2*	7	18	4***	20	2

*sourced from data with a very low number of survey respondents
**high or low pressure washing, chemical treatments, or wiping down
***includes data from only boaters accepting decontamination services upon entering or leaving the landing; boater travel data from boaters not accepting decontamination services are not included

Key Points and Recommendations from 2025

- The trend of 13% of all boaters participating in boat decontamination holds true in 2025. Getting boaters to decontaminate who go from lake to lake within 5 days worked a bit better in 2025.
- Boaters are reporting steps they take on their own to clean their boat more often than past years, with the most common practice being a low pressure wash, such as a garden hose.
- Boats decontaminated per hour had been much higher during covid years 2020-2021.
- A deep dive into getting better social acceptance and compliance may be useful. This effort could be done in partnership with DNR social scientists, and decontamination programs with Discovery Center and the Invasive Species Coalition of Watersmeet.
- Continue to offer tools (like Swedish dish towels) and recommendations on DIY decontamination to boaters to use when no decontamination unit is available.

Program Background

Figure 2. The trailered boat decontamination unit used for this project.

Wisconsin laws that require all watercraft operators follow certain aquatic invasive species (AIS) prevention steps: inspect their boat, trailer, and equipment; remove aquatic plants and animals; drain all lake water (with a few exceptions); and to never move live fish (with a few exceptions); dispose of unwanted bait in the trash; and to buy minnows from a WI bait dealer. The "inspect and remove" steps are very effective at removing AIS that boaters can visually detect. However, small-bodied AIS such spiny waterfleas (SWF) and the planktonic life stage of zebra mussels (ZM) called veligers could easily be overlooked if not drained along with the lake water. Removing these difficult-to-detect AIS is where boat decontamination improves AIS prevention efficacy. The goal of decontamination is to kill AIS rather than to just remove them. The Vilas County Boat Decontamination program is focused on primarily spiny waterflea prevention and is situated near 3 lakes that have verified spiny waterfleas. To a lesser degree, this program also targets zebra mussel prevention. However, most of Vilas County's lakes do not provide suitable habitat for zebra mussels, but do provide ample suitable habitat for spiny waterfleas (Spear et. al.).

Vilas County had partnered with UW-Oshkosh to offer boat decontamination in Vilas County from 2018-2021 with a trailered hot pressure washer, which is one DNR recommended method of decontamination. The program dropped in 2022-2023 because there was a need to restructure to make it more financially sound. This was accomplished, and the boat decontamination program was reinstated in 2024. The number of hours dedicated to boat decontamination at landings was reduced from 400 in previous years to 152 in 2024 and 100 in 2025 due to scheduling and staffing constraints. Vilas County Land & Water staff were stationed at four different boat launches between June-August 2025 to offer voluntary decontamination via hot pressure washing of boat & equipment to any willing boaters.

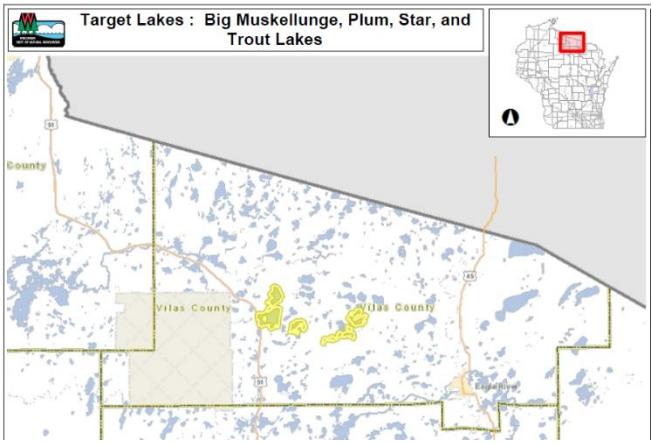

Figure 3. Boats were decontaminated at 4 boat landings on the Northern Highlands State Forest – 3 of the lakes have verified spiny waterfleas, and 1 does not.

The single axle hot pressure washer is a 200-gallon mobile unit on a trailer. Decontamination sites were predetermined from previous program years based on: proximity to other spiny waterflea infestations, location safety, ability for wash water to infiltrate vs. run off into surface waters, boater traffic rates, space available at the launch area, and willingness of launch owners to partner with the program. Target lakes in 2025 were Big Muskellunge Lake (3-12 miles away from the following three spiny waterflea verified lake landings); Plum Lake (verified spiny waterflea in 2019); Star Lake (verified spiny waterflea in 2013); Trout Lake (verified spiny waterflea in 2014).

Boater Transiency

Boater transiency was measured on the "back-end" by asking only boaters if they had used their boat in a different waterbody in the last five days. It was also measured on the "front-end" by asking where they plan to use their boat in the next five days. Future transiency was not verified later, and this should be kept in mind when reviewing this report.

Overall, 32% of travel paths reported by boaters encountered had or were planning to visit another lake within 5 days in 2025. This rate of 32% was the same in 2024. This level of transiency is expected based on the 2018 figure of boaters visiting other lakes within 5 days being at 32% for the Vilas, Oneida, and Lincoln county region from a 2019 University of Wisconsin-Madison Extension Report (Shaw et. al. 2019). Star Lake reported the highest percentage of transient boaters (42% of travel paths in 2025 and 49% of travel paths in 2024).

Additional Self-Initiated Steps Boaters Took

In 2025, some boaters also reported taking extra steps beyond the "inspect, remove, and drain" required steps. Among those reported are low pressure washing (such as a garden hose), high pressure washing (car wash/pressure washer), and chemical treatments. Of the 155 boats encountered, 35 boaters reported using one of these self-initiated steps. This represents 23% of boats in 2025 which was the highest percentage ever reported to this program. In 2024 15% of boaters reported doing extra steps, and in 2021 5.2% of boaters reported doing extra steps.

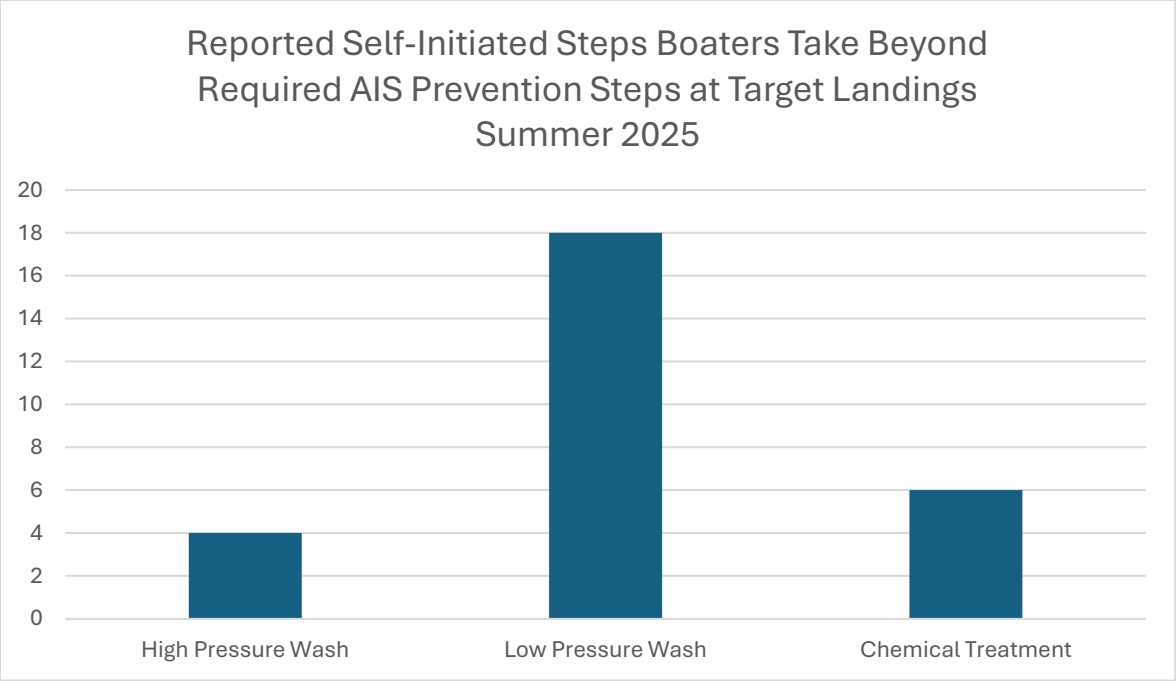

Figure 4. Number of boat travel paths where boaters reported taking extra steps to prevent the spread of AIS. Total boat travel paths documented in summer 2025 was 310.

Decontamination Program Efficacy

The decontamination program can be considered effective if it is preventing potential spiny waterflea and/or zebra mussel exposure in lakes. This analysis considers boater travel within 5 days previous and planned in the future 5 days to be considered "transient". It also considers what AIS are already verified in waterbodies according to Wisconsin DNR publicly available data (*Aquatic Invasive Species Locations*). This analysis does not consider habitat suitability; however, most lakes in Vilas County are considered suitable for spiny waterfleas. Most lakes are considered not suitable, or are borderline suitable for zebra mussels (Spear et. al).

If a boater reported taking any extra steps on their own (high pressure wash, low pressure wash, or chemical treatment), it was assumed that decontamination did nothing extra to remove AIS and was not counted as having an impact. This way the analysis takes into account self-initiated prevention steps targeting small-bodied AIS that might make the Vilas County Boat Decontamination Program not needed to effectively prevent their spread.

Each boat encounter was assigned two "travel paths" – travel from the previous lake up to 5 days prior to arriving at the point of contact; and planned travel to the next lake up to 5 days after arriving at the point of contact. Travel paths were categorized based on whether the boater decontaminated with the hot pressure washer services offered; reported doing extra steps on their own like wiping their boat down, doing a chemical treatment, high pressure wash, or low pressure wash; or if they did nothing beyond the state required removing of aquatic plants & animals, draining lake water. The travel path data was then categorized a second time to see if:

- Spiny waterfleas or zebra mussels were verified in the prior waterbody and not the next waterbody
- Both prior and next waterbodies had verified spiny waterfleas or zebra mussels
- Spiny waterfleas or zebra mussels were not verified in the prior waterbody
- There was no boater transiency within the 5 day period
- There was not enough data to accurately determine any of the above

From there, it was determined if the decontamination or extra steps boaters took had an impact on potential AIS exposure. If a lake was potentially exposed to spiny waterfleas or zebra mussels, but that same species was already verified in the next lake, it was assumed that further exposure to that species would not have any impact.

Table 1. Various impacts of decontamination at target lakes in 2025. This data is based on whether boaters decontaminated, took extra steps to prevent AIS spread, and records of verified AIS at the waterbodies boaters reported visiting.

Impacts of Decontamination at Target Lakes Summer 2025			
		Count	**% of travel paths**
Watercraft Decontaminated by Vilas County Staff	**Prevented** spiny waterflea/zebra mussel potential exposure	5	1.61%
	Decontamination not needed to prevent potential spiny waterflea/zebra mussel exposure	14	4.50%
	Not enough data	1	0.32%
Self-initiated extra steps to prevent AIS spread: high pressure wash; low pressure wash; chemical treatment; or wiping down	**Prevented** spiny waterflea/zebra mussel potential exposure	1	0.32%
	Self-initiated extra steps not needed to prevent potential spiny waterflea/zebra mussel exposure	34	10.93%
	Not enough data	0	0.00%
No Decontamination or extra steps	Potential **exposure** to spiny waterflea/zebra mussel documented	2	0.65%
	Choosing to not decontaminate and/or take no extra steps was appropriate	241	77.74%
	Not enough data	12	3.86%
Total Travel Paths		**310**	

On 5 occasions, decontamination prevented spiny waterflea or zebra mussel spread – this accounts for 1.61% of the travel paths documented. On 14 occasions, boaters decontaminated but it would not have been necessary to do so to prevent AIS spread (4.50%). On 2 occasions (0.6%), the boater did not decontaminate or report any extra steps to prevent AIS spread and potential exposure to spiny waterflea or zebra mussels was documented. For 289 of the 310 boat travel paths, decontamination was determined to be not needed (93.2%). This was because: the boater was not transient; the previous waterbody did not have verified spiny waterfleas or zebra mussels; or both the previous waterbody and next waterbody had either spiny waterfleas or zebra mussels verified.

Conversely, 2 (0.6%) of boat travel paths would benefit from decontamination by further preventing potential exposure of spiny waterfleas or zebra mussels. The pie chart below shows how most

travel paths would not require decontamination (green), but there is also a significant percentage where decontamination would be best practice (dark blue).

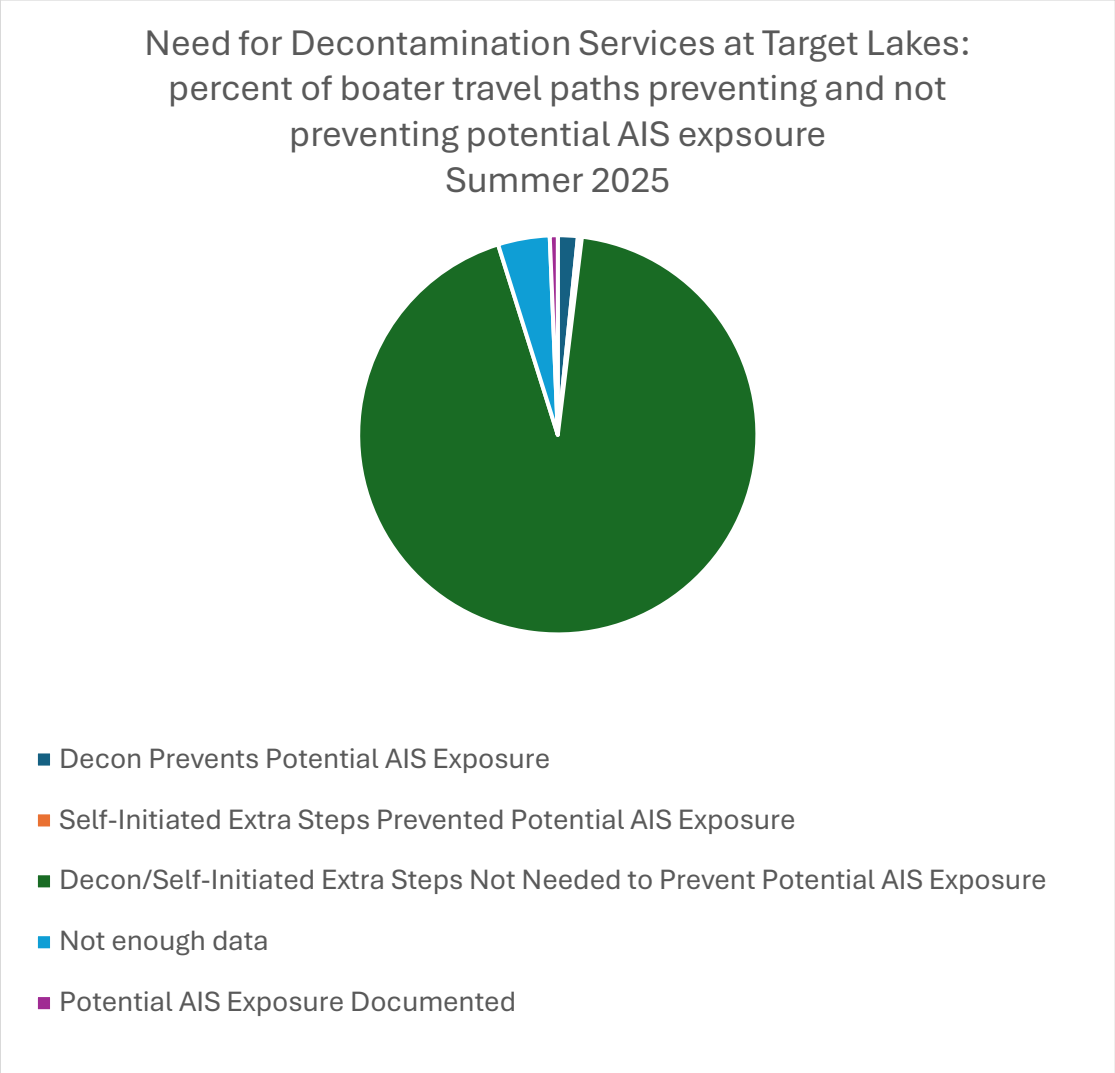

Figure 5. Most boater travel paths do not need decontamination. However, decontamination would be best practice for 4% of all travel paths in 2025. In 2025, the majority of these boaters did decontaminate.

Lakes Where Potential Exposure to Spiny Waterflea/Zebra Mussel Was Prevented

The decontamination program documented preventing 5 lakes from potential exposure to spiny waterfleas or zebra mussels. Boater self-initiated steps likely also helped prevent potential exposure to 1 additional lake.

Table 2. Waterbodies where potential zebra mussel or spiny waterflea exposure was prevented by either the decontamination program or boater self-initiated extra steps like chemical treatments, wiping down, pressure washing, or low pressure washing.

List of Lakes Where ZM/SWF Potential Exposure Was Prevented Summer 2025					
Lake Name Where Potential Exposure Was Prevented	**WBIC**	**County**	**ZM or SWF**	**Previously Visited ZM/SWF Verified Lake**	**Decon or Self-Initiated**
Big Saint Germain Lake	1591100	Vilas	SWF	Plum Lake	Decon
Big Saint Germain Lake	1591100	Vilas	SWF	Star Lake	Decon
Razorback Lake	1013800	Vilas	SWF	Star Lake	Decon
Big Muskellunge Lake	1835300	Vilas	SWF	Plum Lake	Decon
Unknown, Tomahawk area	N/A	Oneida	SWF	Trout Lake	Decon
Big Muskellunge Lake	1835300	Vilas	SWF	Plum Lake	Self-Initiated

Lakes Where Potential Exposure to Spiny Waterfleas or Zebra Mussels Was Not Prevented

Due to boaters not decontaminating or taking extra steps on their own, 2 waterbodies were documented to be potentially exposed to spiny waterfleas. No potential zebra mussel exposure events were documented.

Table 3. Waterbodies where potential zebra mussel or spiny waterflea exposure was documented.

Lakes Where ZM/SWF Potential Exposure Was Documented Summer 2025				
Lake Name Where There Was Potential AIS Exposure	**WBIC**	**County**	**ZM or SWF**	**Previously Visited ZM/SWF Verified Lake**
Lake Alexander	49007900	Morrison, MN	SWF	Star Lake
Birch Lake	2311100	Vilas	SWF	Trout Lake

Discussion and Future Planning

Impact of Decontamination: Even with the decreased hours that staff were available to decontaminate boats (100 hours vs. 400 and 152 hours in past years), 5 potential exposure incidents were documented to be prevented by the decontamination program. This is still more than were prevented by boaters' self-initiated steps. Thus, the program still holds value in preventing small-bodied AIS spread. While more hours to dedicate towards this program would be preferable, the 100 hours is still having an impact.

Targeting Transient Boaters: In 2025, the boaters that decontaminated represented a much better portion of those that would need to decontaminate than in previous years. For 2 years, volunteers from the towns of Boulder Junction and Plum Lake have been working to spread the word about the program through casual conversation, shop-talk, chit-chat at local bars, and with posting flyers. Perhaps their work is helping with social acceptance. To continue to get and maintain social

acceptance and behavior change on boat decontamination, perhaps a deep dive into the social science around this program, and similar programs in the Northwoods would be helpful to gain further buy-in.

Currently there are no laws in Wisconsin or ordinances in Vilas County to mandate boat decontamination of recreational boaters. However, ordinance development may be another option to increasing participation from boaters who would benefit from decontamination.

Boat types and components: Knowing the types of boat encountered at landings, and which ones would benefit from decontamination (ie. transient) will help the program maintain preparedness for specific components on those boats. In 2025, the most common boats encountered were fishing boats (boats equipped with livewells) followed closely by speedboats/motorboats. No wakeboats, paddle boards, or barges or dock/lift work boats were encountered.

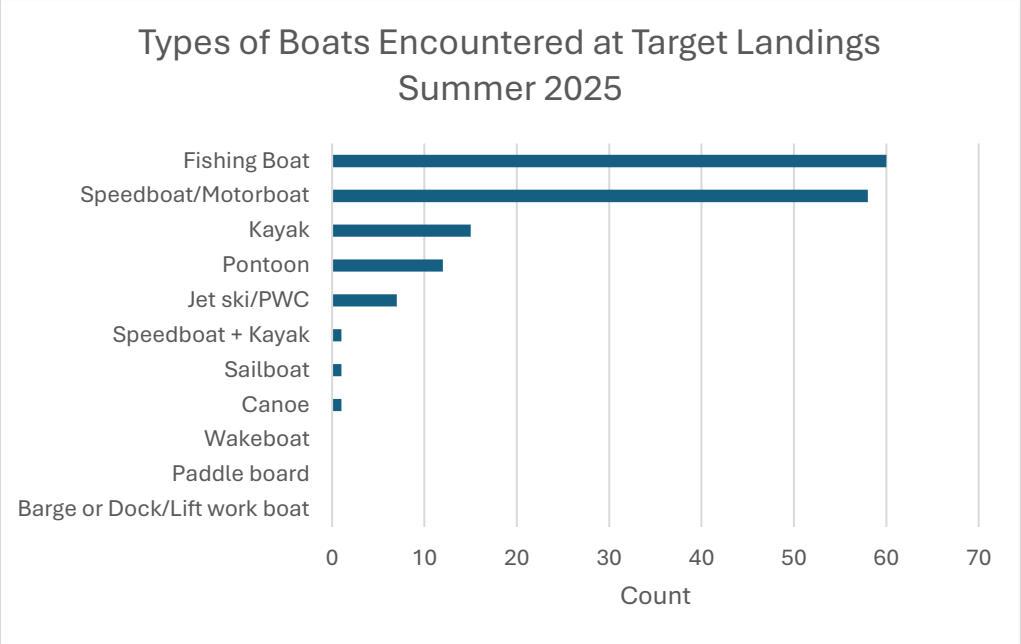

Figure 6. Types of boats encountered at target boat landings, regardless of whether they decontaminated or not.

Fishing boats and speedboats/motorboats had a much higher rate of transiency than other types of boats. It would be important to make sure to keep decontamination attachments functioning that can decontaminate livewells and fishing equipment: primarily the low flow diffuser (perhaps the fake-a-lake if a livewell cannot be accessed without entering the boat) and motor muffs.

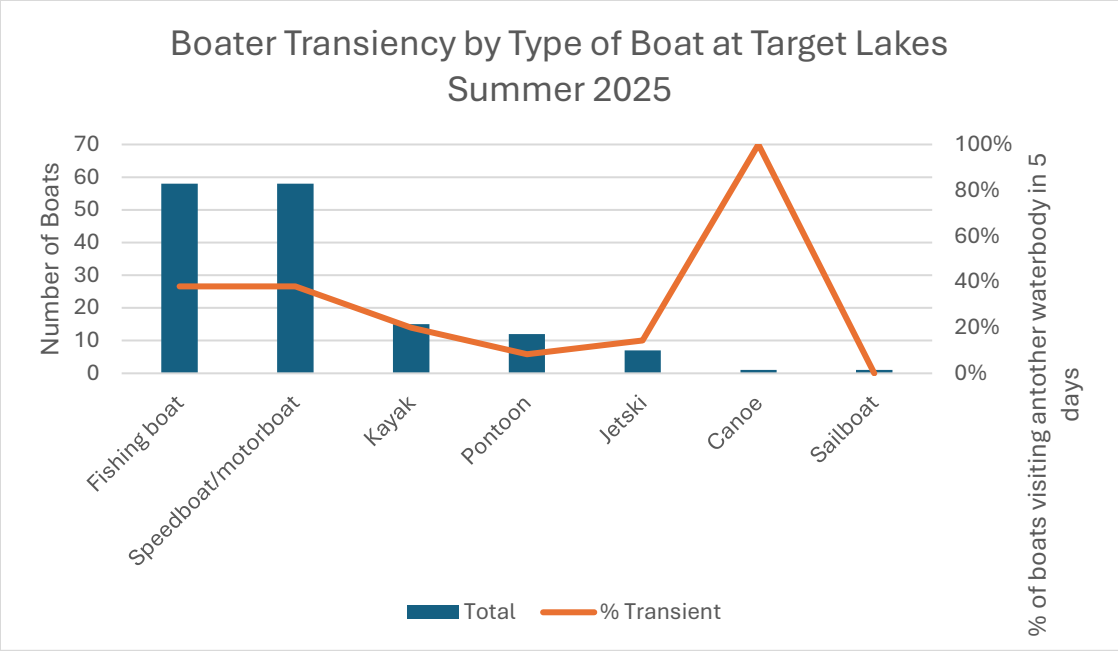

Figure 7. Types of boats encountered at target lakes and their rates of visiting another waterbody within 5 days (past and future planned).

Only 3 types of boats had owners that allowed decontamination in 2025: fishing boats, speedboats/motorboats, and kayaks. No pontoons, jet skis/PWC's, sailboats, canoes, wakeboats, paddle boards, or barges or dock/lift work boats were decontaminated.

Most boaters who wanted to decontaminate their boat allowed staff access to their hulls and livewells. Most boaters did not allow access to their boat motors. It is assumed that most boaters are concerned with damaging their motors, but asking this question in future years could help understand how to get better compliance with decontaminating motors.

Table 4. Of boaters that chose to decontaminate their boat, these are the boat components that boaters allowed and did not allow to be decontaminated.

Voluntary Decontamination of Boat Components, Summer 2025			
	Count of boats where component should be decon'd	**Boater Agreed to Decon**	**Boater Refused to Decon**
Hull	20	20	0
Livewell	20	20	0
Motor	18	6	12
Pontoons	0	0	0
Bilge	0	0	0
Ballast tanks/bladders	0	0	0
Other	0	0	0

Barriers & Motivators to Decontamination: Transient boaters who did not want to decontaminate their boat were asked why they did not want to do so. Not all boaters refusing decontamination answered this question, and those that did answer sometimes offered more than one reason.

Table 5. Categorized boaters' reasons for not decontaminating their boat. Only boaters that visited another body of water within the last 5 days, or planned to within 5 days in the future, AND had declined decontamination were asked these questions.

Barriers to Decontamination		
Reason	**Count**	**Percent**
My boat is already clean	50	60%
Not enough time	27	33%
Fear of equipment damage	4	5%
Will decontaminate on their own later	2	2%
TOTAL	**83**	

Most boaters that declined decontamination indicated that they feel their boat is already clean. The other major reason they refuse decontamination is time constraints. Only 4 of 83 answers included elements of fearing the decontamination process would damage their boat or equipment.

These boaters were also asked what, if anything, would motivate them to decontaminate their boat. Not all responded, and some provided more than one answer.

Table 6. Categorized boaters' possible motivators to decontaminate their boat. Only boaters that visited another body of water within the last 5 days, or planned to within 5 days in the future, AND had declined decontamination were asked these questions.

Motivators to Decontaminate		
Reason	**Count**	**Percent**
If dirty boat	18	51%
If more time	15	43%
If decon process wouldn't get inside of boat wet	1	3%
If decon unit were available when I should use it	1	3%
TOTAL	**35**	

Most boaters felt that if their boat was "dirty" they would be motivated to clean their boat, followed by if they had more time.

Perhaps more of an effort needs to be in place to show boaters that their boat would not need to be visibly "dirty" to spread spiny waterflea or zebra mussels, and that just being in lake water is enough to spread them. And educational campaign along these lines could help further this idea.

Allowing boaters to spend the time it takes to decontaminate a boat while doing something enjoyable could also help boost decontamination buy-in. Input from social scientists for these

issues would be helpful to tease out attainable ways boaters can "enjoy" the time it takes to decontaminate a boat.

Encourage Decontamination: Researchers agree there is a likely a significant lag time between spiny waterflea establishment and detection (Vander Zanden). This factor makes it even more important that the program not deny decontamination to a willing participant just because spiny waterfleas were not yet verified in their previous waterbody. This analysis on potential AIS exposure relies on verified data, and decontamination of boats coming from waters that do not have spiny waterfleas verified may actually be doing more for AIS prevention than is being detected.

Lines in the Water: Recent research from Donn Branstrator, a spiny waterflea researcher, has indicated that spiny waterfleas most often adhere to lines in the water – primarily fishing line and anchor line. Branstrator proposes these can be wiped off and suggests offering compostable Swedish dish towels to boaters for this purpose (Branstrator). This type of cloth will not tend to entangle the spiny waterfleas like other terry cloth weaves. The decontamination program offered these in 2025 and hopes to continue this in future years to promote tools for effective spiny waterflea removal when decontamination services are not available.

Outreach Product: Printed Swedish Dishcloth

Figure 8. Example of Swedish dishcloth design from the Minnesota AIS Research Center.

Program Continuation: Vilas County and its partners are poised to offer 100+ hours voluntary boat decontamination again in 2026, pending grant funding.

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