

Observing Boater Actions at Public Water Accesses to Prevent the Spread of Aquatic Invasive Species

Prepared for Minnesota Department of Natural Resources
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Real People. Real Solutions.

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I. EXECUTIVE SUMMARY

Bolton & Menk was hired by the Minnesota Department of Natural Resources (DNR) to assess the use of self-serve cleaning tools by boaters provided at public water accesses in Minnesota to prevent the spread of aquatic invasive species (AIS). DNR staff can use the results of the study to provide information to local site managers and AIS coordinators on tool use, location, and costs that may help them make informed decisions for local boat accesses to help promote adoption of desirable AIS prevention behaviors.

Over the course of two and half months (June-August 2023), field staff conducted boater observations and interviews at twelve access sites in Minnesota: six in the metro area, and six in the north-central area. Each site was visited three to four times for a total of 198 hours of observation. In total, there were 597 boater observations, and 43 interviews conducted. Observations occurred only during times when AIS inspectors were not present, and primarily focused on how boaters exiting the access interacted with the self-serve cleaning tools provided.

Three types of AIS prevention tool stations were observed, 1) Aqua Weed Stick stations: dual or single reel landing station with multi-use weed removal tool designed to remove weeds from watercrafts and trailers, 2) CD3 stations: premade, user-operated equipment station with multiple tools to assist with removal of weeds and watercraft drainage, and 3) Homemade stations: stations assembled by access owners or lake association with individually purchased weed removal tools. The CD3 stations had the highest rate of usage followed by the Aqua Weed Stick stations, with the homemade stations showing a much lower rate of use.

Observations indicate that overall tool use rates were low (35 total uses), and most uses were at accesses in the metro area. Conclusions are based on a small set of data, so should be viewed with caution. The most commonly used tools were the Aqua Weed Stick and Grabber/picker.

Analysis suggests that AIS prevention practices (both hand cleaning and station tool use) occurred more frequently at accesses that had a clear indication to stop at the tool station using signage or pavement markings familiar to motorists (e.g., designated AIS cleaning area), compared to accesses that only had signs that supported AIS education. Accesses with designated AIS cleaning areas saw a 1.4 greater likelihood of boaters stopping at the tool station and completing hand cleaning, at a minimum, and 4.0 greater likelihood of utilizing provided AIS prevention tools.

The presence of aquatic vegetation at the boat ramp influenced use of tools. Tools were used more at accesses with aquatic vegetation present. Floating or rooted vegetation located where a trailer is backed into the water increases the likelihood that vegetation ends up on the trailer or boat.

The biggest factor that boaters interviewed stated as preventing them from using tools was "time." However, observers recorded the amount of time spent loading and cleaning boats as they were departing and found, on average, there was less than a two-minute increase in time for those that used the tool station versus those that did not. For some, it took less time when they used the station.

Boaters listed the grabber as the most preferred tool for vegetation removal and the plug wrench for draining. Observers also rated the tools by effectiveness based on observed uses. The Aqua Weed Stick was rated as the most effective tool for vegetation removal.

The report also includes information on the various AIS prevention tools available to install at boat accesses, as well as approximate costs and sources for tools and stations.

II. STUDY DESIGN AND METHODS

A. Boat Access Observation Site Selection

The Minnesota Department of Natural Resources (DNR) created and dispatched a survey to aquatic invasive species (AIS) partners across Minnesota to gather information on the self-serve tools available at accesses for AIS prevention. Questions included lake accesses with tools, stations and tools provided, signage, power source, costs of installation and maintenance, boat access details, and additional details. Twenty-six completed surveys were received. Bolton & Menk researchers also contacted AIS coordinators for additional information and sites when it was determined that more sites would be needed, and to fill in gaps in site details. This list was used to help select observations sites.

Tools Available

Sites were initially chosen based on tool availability. It was mutually agreed between Bolton & Menk researchers and DNR staff that three types of self-serve tool stations would be observed:

- CD3 Stations: Clean, Dry, Drain, Dispose (CD3) systems are premade, user-operated cleaning equipment stations that include a vacuum, blower system, tethered hand tools, and lights.
- Aqua Weed Stick: Multi-use weed removal tool designed to push, pull, hook, and scrape weeds off boats and trailers. Can be tethered or untethered.
- Homemade station: Station assembled by access owner or lake association that includes cleaning tools purchased individually. Can be tethered or untethered.

For sites to be considered for observations, tool stations needed to be in place for at least one season; this way boaters may be more familiar with the stations and potentially increase researcher's chance of observing tool uses.

Location

DNR staff and Bolton & Menk staff agreed that two general areas in Minnesota would be observed, half of the sites to be in metro area counties and half in north-central area counties.

Available Parking

Available parking was used as an indicator of how busy an access may be. After lakes in the selected areas with the appropriate tool stations were identified LakeFinder was used to determine how many parking spots are available at the access(es) on the lake if this was not provided in the survey. The range of parking spots was kept between 10 to 50 to minimize large variations in data. Discussion with County staff and lake association representatives also helped identify sites that may be busier.

Inspections and Inspection Schedule

Inspectors are often stationed at boat accesses. Site owners or local AIS managers staff AIS inspectors at accesses to ensure boaters are properly checking and cleaning boats. The researchers wanted to avoid conducting observations when inspectors were present as their presence would influence boater behavior. Inspection schedules were verified with the organization in charge of inspections at each access to make sure observations would fit within the various schedules. Some accesses were eliminated as potential sites after discussions with County staff regarding lake use later in the season when aquatic plant growth is very extensive, limiting use of the lake.

AIS Presence

LakeFinder was used to identify invasive species present at each lake. Sites with prohibited invasive species infestations, including the presence of Eurasian watermilfoil, zebra mussels, and starry stonewort, were specifically sought out. It was more difficult to find infested waters in Cass County that also had tool stations, so two sites without AIS were chosen for this area.

Site Proximity

Site proximity to other sites in the selected region was considered to limit researcher travel time to allow for more inspection time.

Safety

Researcher safety was considered based on review of aerial photographs and information provided about sites through LakeFinder and contacts with County staff.

Weediness of Access

The presence of weeds at the boat access ramp was initially considered to identify sites under the assumption that sites more likely to have rooted or floating vegetation at the access would pick them up on the boat or trailer when loading the boat and pulling the boat and trailer out of the water. However, due to limited site options, sites not considered weedy were also chosen.

Site Layout

The location of tool stations within a site was initially reviewed at the request of the DNR with the hope to choose sites that had stations located by the entrance and exit, however no accesses were found that had stations for incoming boats.

The availability of a designated pull-off area next to the station was also considered.

B. Final Boat Access Observation Sites

Twelve access sites were selected for observations, aiming for six in the metro area and six in the central/northern area of the state. After reviewing tool stations in the selected areas, site selection was expanded to include the Metro area plus Meeker County and Northern Minnesota, (Hubbard, Beltrami, and Cass counties), and Central Minnesota (Morrison and Todd Counties). The expansion was needed to find sites that met the identified criteria. Between the six sites chosen in each area, two were selected that had a CD3 station, two that had an Aqua Weed Stick, and two that had a homemade station.

An access site on Coon Lake in Anoka County was originally chosen for observation, however the access had a broken tool station, and it was taking a long time for replacement so Crooked Lake in Anoka County was chosen to replace it since it within the metro area, had an Aqua Weed Stick, and has the same AIS presence as Coon Lake.

Details and photographs of several views for each boat access site and tool station are provided in Appendix A. An aerial photo showing the access layout and location of tool stations, signs and traffic flow is also included. Some example station types and layouts are provided below.

Figure 1. Lake George Aqua Weed Stick Station



Figure 2. Cass Lake CD3 Wayside Solar Station



Figure 3. Lake Wabedo Homemade Station



Figure 4. Long Lake (Hubbard County)

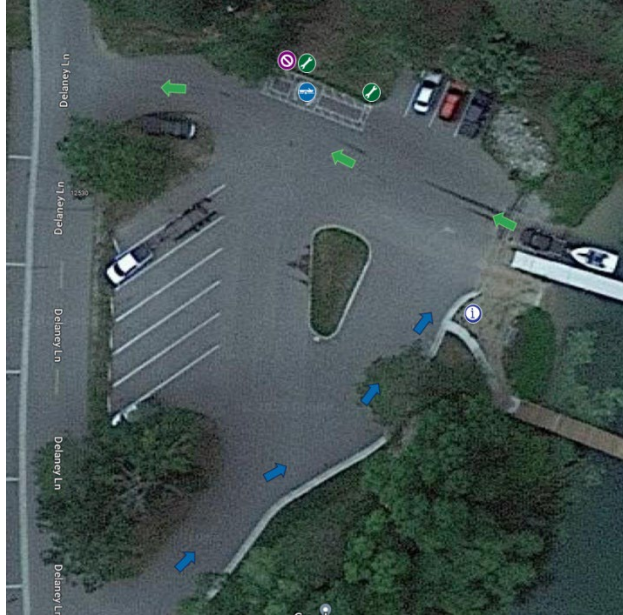
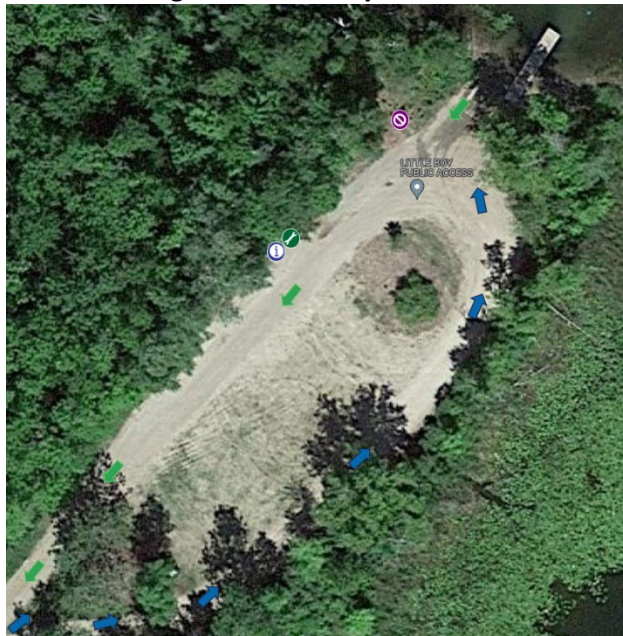


Figure 6. Medicine Lake



Figure 5. Little Boy Lake









-  Traffic Flow: Entering
-  Traffic Flow: Exiting
-  Tool Station
-  Kiosk with AIS Information
-  Pavement Stencil
-  "Stop Aquatic Hitchhikers" Sign

Table 1. Summary of Selected Boat Access Observation Sites: CD3 Station

Access Site	County	Year Installed	Parking	AIS Prevention Tools	Signs Present	AIS Present
Medicine Lake	Hennepin	2020	42 trailer, 50 vehicle	AH, GP, BS, WR, LT, VC	“Stop Here” Exiting Sign, Kiosk with AIS information	Eurasian watermilfoil, Starry stonewort, Zebra mussel
Long Lake	Hennepin	2018	20 trailer, 15 vehicle	AH, GP, BS, WR, LT, VC	“Stop Here” Entering Sign, “Stop Here” Exiting Sign, Kiosk with AIS information, Pavement Stencil	Eurasian watermilfoil
Fish Trap Lake	Morrison	2021	20 trailer, 0 vehicle	AH, GP, BS, WR, LT, VC	“Stop Here” Exiting Sign, Kiosk with AIS information	Zebra mussel
Cass Lake	Beltrami	2022	24 trailer, 0 vehicle	AH, GP, BS, WR, LT, VC	“Stop Aquatic Hitchhikers” Sign	Zebra mussel, Starry stonewort

AH = Air Pressure Hose, GP = Grabber/Picker, BS = Brush, WR = Wrench, LT = Lights, VC = Vacuum

All tools in CD3 stations are tethered and retractable.

Table 2. Summary of Selected Boat Access Observation Sites: Aqua Weed Stick

Access Site	County	Year Installed	Parking	AIS Prevention Tools	Signs Present	AIS Present
Lake George	Anoka	2021	28 trailer, 12 vehicle	AQ; tethered	“Stop Here” Entering Sign, “Stop Here” Exiting Sign, Kiosk with AIS information, Pavement Stencil, “Stop Aquatic Hitchhikers” Sign	Eurasian watermilfoil
Crooked Lake	Anoka	2021	8 trailer, 0 vehicle	AQ; tethered	Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	Eurasian watermilfoil
Little Birch Lake	Todd	2022	12 trailer, 0 vehicle	AQ x4; tethered, retractable	“Stop Here” Exiting Sign, Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	Eurasian watermilfoil, Zebra mussel
Long Lake	Hubbard	2022	20 trailer, 5 vehicle	AQ x2, WR, BS	Pavement stencil, Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	Zebra mussel, Faucet snail, Starry stonewort

AQ = Aqua Weed Stick, WR = Wrench, BS = Brush

Table 3. Summary of Selected Boat Access Observation Sites: Homemade Station

Access Site	County	Year Installed	Parking Spaces	AIS Prevention Tools	Signs Present	AIS Present
White Bear Lake	Ramsey	2020	40 trailer, 0 vehicle	BS, GP tethered	“Stop Here” Exiting Sign, Kiosk with AIS information	Eurasian watermilfoil, Zebra mussel
Lake Stella	Meeker	2021	24 trailer, 0 vehicle	AQ, GP, BS untethered	Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	Eurasian watermilfoil, Zebra mussel
Little Boy Lake	Cass	2022	10 trailer, 0 vehicle	WR, BS, AQ untethered	Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	None
Wabedo Lake	Cass	2022	12 trailer, 0 vehicle	WR, BS, AQ, GP, SP	Kiosk with AIS information, “Stop Aquatic Hitchhikers” Sign	None

AQ = Aqua Weed Stick, WR = Wrench, BS = Brush, GP = Grabber/Picker, SP = Scrapper

C. Boat Access Observation Research Methodology

The study involved both qualitative and quantitative methodologies.

1. Quantitative

- Observations of AIS prevention behaviors/tool uses and additional information.
- Data collection about tool station information and costs.

2. Qualitative

- Data collection using in-person interviews regarding tool uses.

Some of the work, such as identifying which tool is most effective at removing AIS, involved a mix of qualitative and quantitative approaches.

D. Boat Access Observation Field Staff Training

In order to obtain consistent and accurate data, all project staff were trained. Training initially occurred by watching DNR Watercraft Inspector Online Training videos as specified by the DNR, including:

- Watercraft inspection procedures and decontamination
- Watercraft inspection demonstration
- Aquatic invasive species identification and impacts

An online meeting with DNR and project staff occurred on June 5, 2023, after the online watercraft inspector training was completed. DNR staff covered additional information as well as answered questions.

Internal training of observation staff occurred at the first two sites observed (Medicine Lake, and Lake George) with the two access observer field staff present being trained by the field manager, who is an experienced access observer. Initially, the field manager conducted observations and interviews and discussed them with the two observers. Next, all completed

observation sheets were reviewed and compared for consistency and any differences discussed. For the last 2.5 hours of the observations, the field manager had the observers complete the field sheets, discussed findings, and provided tips and any corrections needed. Findings among observers were consistent. The field manager also observed, and assisted as needed, in the boater interviews. This training occurred for the full 5.5 hours at the access. At the second site, the field manager observed field staff observations and interviews and commented on them to make sure the access observers can complete observations and interviews on their own. The field manager was present for about half of the 5.5 hours. Any questions that came up during observations would be resolved with the field manager or project manager.

Additional resources provided to project staff from the DNR and from the project manager were reviewed, including:

- [DNR Watercraft Inspector Manual](#)
- [CD3 Systems website and CD3 cleaning video](#)
- [DNR Q&A: Boat Draining, Drain Plug, and Bait Container Draining](#)
- Bolton & Menk internal document on different plug types
- [Minnesota Invasive Species Laws](#)
- [DNR AIS webpage](#)
- [Minnehaha Creek Watershed District AIS Early Detectors: A How-to Guide](#)
- [Michigan State University Extension Boat Cleaning Equipment at Launch Sites](#)

E. Boat Access Observations

Observations and interviews were conducted at twelve different sites, six in the metro area and six in north-central Minnesota. A total of 16.5 hours of observations were completed at each site broken up between 3 to 4 observations sessions. Most site visits were 5.5 hours long. When creating the observation schedules, project staff communicated with local AIS Coordinators to obtain monthly inspection schedules and to gain insight on which days the accesses were busiest. Priority during observations was given to those leaving access, and several protocols were followed to avoid affecting boater behavior.

1. Observation Protocol at Accesses

- Field staff set up in a location that was the least obtrusive to boaters but allowed them to clearly see the tool station. Observers used a “decoy” activity so as to not draw attention to their observations. Observers did not identify themselves unless an interview was conducted after the initial observation was completed.
- Photos were taken of the access layout from various viewpoints, tools stations, and signs.
- Observers recorded relevant site information including access location, lake, date, time, types of tools present, location of tools, weediness of access area, weather conditions, as well as notes of other factors that may influence boater behavior.
- Each boat was assigned a number based on the order observed. Time spent cleaning/draining/setting-up or packing boats was recorded.
- Boater use of tools and other AIS prevention behaviors were recorded, including tool use/type, what the tools were used for, if tools were provided on site or owned by the boater, and if tools were effective at removing plants and other organisms.

- If prohibited species or suspected prohibited species were found during observations, observers would use their best judgement to decide whether to discuss any AIS concerns with the boater. Blatant violations or safety concerns were to be reported to park staff or DNR conservation officers.

2. Observation Datasheet Overview

The following data and information were documented on the datasheet. Appendix B is a copy of the observation datasheet.

- Abbreviations were listed at the bottom of datasheet, and include:
 - Weather, boat type, tool types
 - Numerical rankings for inspection and leaving with vegetation
 - Additional Abbreviations include Y (yes), N (no), NA (not applicable), U (unsure)
- Access/Observation Details at top of datasheet: recorded access name, city/county, date, staff initials, start and end time, page number and total pages used for that site and date, access clean or weedy, weather conditions, temperature, and any other notes.
 - Indication for if access was weedy: plants floating and/or growing near/around access, and if they were rooted in the ground, floating fragments, or both
- Boat number: labeled boats with sequential number, in order of arrival/departure
- Time start/stop: recorded boater time of arrival/departure for prepping/cleaning. For boats arriving to the access, arrival time was recorded as the time a watercraft drove into the access. For boats leaving the access, time was recorded from the time the boat was loaded onto the trailer at the ramp until the time they drove out of the access.
- Boat type: recorded type of boat entering/departing
 - Boat types included: cabin cruisers, canoes/kayaks/similar, fishing, Jon boat, lake service provided transport barge, personal watercraft (e.g., jet ski), pontoon, runabout, sailboat, ski/cruiser, wake sport boat, boat dock/similar
 - The Watercraft Inspection Manual was referred to for description of boat types when identifying them
- Commercial (Y/N): boats that are used by a marina or rental company
- Arriving to Access:
 - Recorded if boat stopped at a designated location (ex. marked by pavement markings or sign)
 - Recorded if boat plugs were out/open upon arrival
 - Recorded if vegetation/organism (e.g., zebra mussels) were visible on boat or trailer upon arrival
- Leaving Access:
 - Recorded if boat stopped at a designated location (e.g., by pavement markings, signs, or tool station)
 - Recorded if boater removed plugs before departing
 - Ranked how thoroughly boaters inspected for vegetation and zebra mussels/other organisms. Ranking was as follows:
 - 1 = Thorough – bent over to search/wiped down boat
 - 2 = Looked – quick look/quick feel
 - 3 = Didn't look/Didn't feel
 - 4 = Unsure

- Ranked how successful boaters were at removing all vegetation/organisms. Ranking was as follows:
 - 0 = leaving with no obvious veg/AIS
 - 1 = Leaving with little/hidden/difficult to reach veg/AIS
 - 2 = Leaving with obvious veg/AIS
- Recorded if boater properly dealt with water:
 - Personal watercraft: Ran motor a few seconds on trailer to clear out water, or vacuumed water out with CD3 station; Removed plug (if there was one)
 - Wake sport boats (wake board, wake surf): Drained ballast water
 - Sailboats: Removed ballast tank drain plug if present
 - Outboard and I/O motors: Trimmed engine (e.g., lowered and raised the motor to drain water)
- Used Tool Station
- Recorded if they used tool station, including factors:
 - If the tool station was busy
 - Tool(s) used
 - If tools were used for non-AIS purposes (ex. vacuuming car, inflating floating device)
 - If boaters used their own tools and if so, which types
- Violation (Y/N): a violation was considered:
 - If boat entered or departed with boat plug installed/closed
 - If boat entered or departed with vegetation/organism visible on boat and/or trailer or equipment

F. Boat Access Interviews

Interviews were conducted with a subset of those leaving boat accesses. All interviews were voluntary and were conducted anonymously to reduce bias. The goal was to interview at least 10% of total boaters leaving boat accesses and were conducted when the access was not busy to prevent influencing other boater behavior. Those interviewed were asked a set of predetermined questions with multiple choice answers pertaining to tool use and what might prevent them from using tools. At the end of each interview, it was asked if there were any additional tools or information that would be helpful to prevent the spread of AIS. See Appendix C for a list of the interview questions. Educational materials (DNR postcards) were provided to those interviewed.

1. Interview Datasheet Overview

- Boaters identified boat type and boating activity (fishing, water sports, pleasure boating, etc.)
- Boaters were asked what cleaning and draining tools were used and to distinguish between those brought with them and those provided at the access.
- Boaters were asked why they use cleaning tools, predetermined answers included:
 - To prevent the spread of AIS
 - It's the right thing to do
 - The signs tell you to use them

- You need them to follow the law
- You like a clean boat
- You see other people using them
- Boaters were asked what makes it difficult to use cleaning tools, predetermined answers included:
 - Nothing
 - Time (e.g., waiting in line, it takes too much time)
 - Unsure how to use the tools
 - Unsure of areas on boat to clean
 - Don't want cable/tool to damage boat
 - There is no place to pull-off
 - There is too much traffic
 - I do it at home
- Boaters were asked to pick one preferred tool to remove vegetation
- Boaters were asked to pick one preferred tool to drain equipment
- Boaters were asked if they would use tool stations located by the entrance rather than the exit
- Boaters were asked for any additional tools or information that would be helpful to prevent the spread of AIS

G. Boat Access Data Analysis

Observation data was analyzed to determine the most used and most effective AIS prevention tools, as well as the factors that support their use. The analysis of boater observations and interviews helped determine which tools and their placement characteristics are most useful in promoting AIS prevention best practices. Statistical methods were used to summarize data.

H. Boat Access Research Limitations

- As detailed in the “Boat Access Observation Site Selection” section, significant effort was made to identify sites with consistent characteristics while at the same time variable for the purpose of the study (e.g., tool use and AIS prevention). However, every boat access is unique in its layout and characteristics. These unique access aspects may influence how likely a boater will stop and use the AIS prevention tool stations.
- The observations included those arriving and leaving the boat access. However, priority was given to those leaving the boat access if it was too busy to observe both at once.
- The number of observations depended on how busy the access was and if boaters were leaving or entering. Attempts to control this were made by choosing accesses with more trailer parking (more likely to be busy) and choosing times of the week and day that are more likely to be busy. Dates and times of day chosen were limited due to local inspection schedules and grouping sites for travel efficiency. Inspectors were often present during the days and times more likely to be busy.
- The number of interviews depended on how busy the access was and if boaters were leaving or entering. Interviews were also only conducted when the access was not busy so as not to expose cover for conducting observations.

- The most important data is a subset of all data collected: Observation data on tool use when boaters are exiting the accesses. Only a percentage of those leaving the boat access will use the tools. This limits the number of observations and amount of data collected, especially on specific tool use. Less data may affect the reliability of statistical analysis and conclusions.
- To stay within the defined budget, observations and interviews will be conducted in north-central Minnesota consecutively to limit travel time. Poor weather conditions may cause delays or cancellations.

I. AIS Tool Information and Cost Methodology

Project staff contacted access owners and local AIS program managers to research tool sources and costs including:

- Initial purchase price
- Installation costs
- Operation and maintenance costs

Through phone calls and email communication, project staff asked these individuals and organizations their opinions about:

- The access they chose to provide tools at and why
- The process to get permission to install tools if they do not own the access
- The tools they provide
- If/how they track tool uses
- Maintenance needs
- Any additional information they have about managing self-serve cleaning tools at boat accesses

Project staff also contacted tool manufacturers and distributors for current costs and other information needed.

Twelve people and organizations were contacted by telephone and often with additional email communications. The contact information was pulled from the DNR list of AIS Prevention Aid: Primary Contacts by County. Non-county organizations' contacts were identified through online searches, recommendations, and/or previously established connections. The information collected was derived in part from the DNR survey administered at the beginning of the project.

The information collected included contact name, organization, phone number, email, and county (if applicable). Each contact then provided information on each AIS prevention tool in their jurisdiction, including the access owner where the tool is located, the permission process of installation, the type(s) of tools provided, reason for tool placement, method to track tool uses, where the tool was purchased from, the price, materials needed for installation, installation cost, operation and maintenance costs, requirements and frequency and other details about the tool such as if it is tethered, if power is required, photos and other additional information.

The tool information and cost data were organized in a spreadsheet and summarized.

III. RESULTS

A. Departing Boat Observations

Observations were completed between June 15 and August 29, 2023. While the original plan was to split the 16.5 hours of observations needed at each site into three 5.5-hour visits, a few sites were visited a fourth time. This was due to weather and timing limitations with coordinating with inspector schedules as well as to ensure that each site was visited once on a weekend.

Table 4. Distribution of Site Visits per Day of Week

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Medicine		2			1		
Long (Hennepin)	1			1	1		1
White Bear			1	1		1	
Stella		1		1	1		
George		2				1	
Crooked	1		1			1	
Cass	1		2				
Fish Trap				1	1		1
Little Boy		2	1				1
Wabedo	1	1	1	1			
Little Birch		1			2		
Long (Hubbard)		2				1	
TOTAL	4	11	6	5	6	4	3

After the first round of observations, the project manager contacted the CD3 company to see if they would provide tool count data for the CD3 station sites observed to help determine what days and times they are busiest. The data was reviewed, and staff worked to choose the busiest times for future visits while working around inspector schedules. This was done to try and increase the number of observations.

Over the total 198.5 hours of site visits, 597 observations were completed. Two hundred ninety-nine (299) observations were arriving boaters, and 298 were departing boaters. Two sites, Long Lake in Hennepin County and White Bear Lake had 16.75 hours of observations rather than 16.5. The data analysis focused on the departing boaters as the goal of this project was to assess the use of self-serve AIS cleaning tools and the majority of tool use was observed from those departing the access. There were a few instances of arriving boaters utilizing tool stations, however, not enough data for analysis.

Of the departing observations, only 35 tool station uses (12% of the 298 boats) were observed. The majority of those (15) were on Medicine Lake in Hennepin County. However, when accounting for any tool use, including both station and self-supplied tools, about a quarter of boaters were observed using tools (24.5%). Self-supplied tools were defined as tools that boaters brought with them to the access and used for the purpose of either removing AIS or cleaning the boat. These included: boater's hands, towels, wrenches, grabbers, and water spray bottles.

Access sites with CD3 stations saw the most tool station uses, with an overall use rate of 17.1% (Table 6). Aqua Weed Stick stations followed with an overall use rate of 14.1%. Homemade stations were observed to have the lowest uses with an overall rate of 1.2%. However, the number of observations were very limited at some sites. Homemade stations had the fewest observations, with the exception of White Bear Lake which had 60 observations but zero tool uses. This site heavily weighted the average. Stella Lake had only one use, but it was 9.1% of the total observations.

Table 5. Summary of AIS Prevention Tool Uses

Access Site	Boat Departures	Observation Hours	Any Tool Used		Self-Supplied Tools Used		Station Tools Used		Tools Provided
			Count	Boater %	Count	Boater %	Count	Boater %	
Cass Lake	6	16.5	0	0.0%	0	0.0%	0	0.0%	AH, GP, BS, WR, LT, VC
Crooked Lake	16	16.5	3	18.8%	3	18.8%	1	6.3%	AQ
Fish Trap Lake	21	16.5	5	23.8%	4	19.0%	2	9.5%	AH, GP, BS, WR, LT, VC
Lake George	64	16.5	24	37.5%	17	26.6%	10	15.6%	AQ
Lake Stella	11	16.5	2	18.2%	1	9.1%	1	9.1%	AQ, GP, BS
Lake Wabedo	4	16.5	0	0.0%	0	0.0%	0	0.0%	WR, BS, AQ, GP, SP
Little Birch Lake	5	16.5	3	60.0%	0	0.0%	3	60.0%	AQ x4
Little Boy Lake	7	16.5	0	0.0%	0	0.0%	0	0.0%	WR, BS, AQ
Long Lake - Hennepin	22	16.75	3	13.6%	1	4.5%	3	13.6%	AH, GP, BS, WR, LT, VC
Long Lake - Hubbard	14	16.5	0	0.0%	0	0.0%	0	0.0%	AQ x2, WR, BS
Medicine Lake	68	16.5	29	42.6%	20	29.4%	15	22.1%	AH, GP, BS, WR, LT, VC
White Bear Lake	60	16.75	4	6.7%	4	6.7%	0	0.0%	BS, GP
Total	298	198.5	73	24.5%	50	16.8%	35	11.7%	

AQ = Aqua Weed Stick, GP = Grabber/Picker, BS = Brush, WR = Wrench, SP = Scrapper, AH = Air Pressure Hose, LT = Light, VC = Vacuum

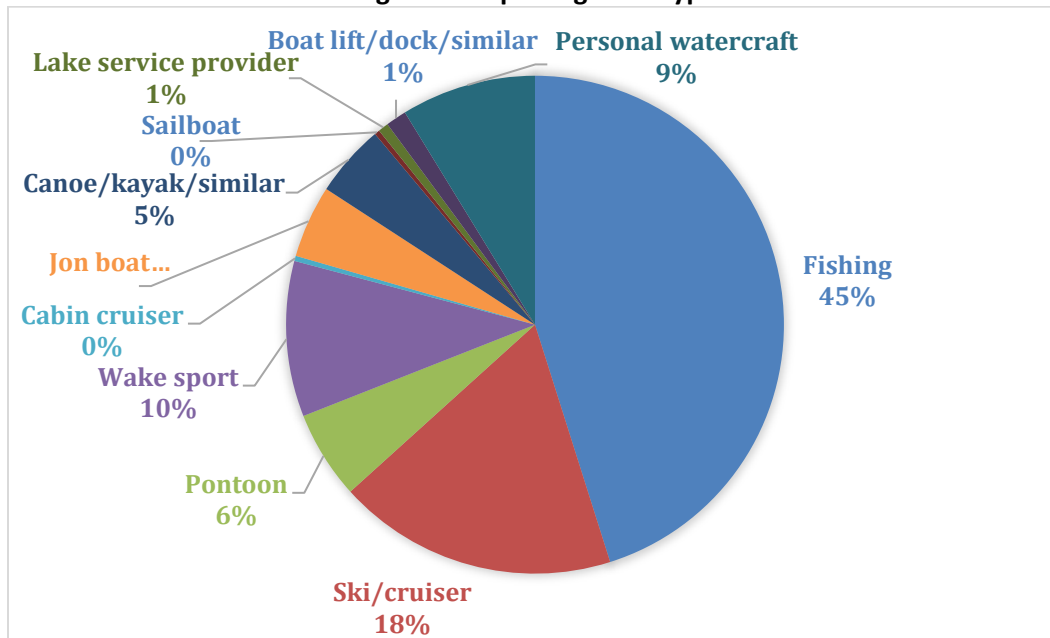
Exceeds Average Tool Use Rate for both Self-Supplied and Station Tools
Exceeds Average Tool Use Rate for Self-Supplied Tools Only
Exceeds Average Tool Use Rate for Station Tools Only

Table 6. AIS Prevention Tool Station Use by Station Type

Access Site	Total Departing Boats	Sum of Tool Station Use	Overall Rate (%)
Aqua Weed Stick	99	14	14.1%
Crooked Lake	16	1	6.3%
Lake George	64	10	15.6%
Little Birch Lake	5	3	60.0%
Long Lake – Hubbard	14	0	0.0%
Homemade	82	1	1.2%
Lake Stella	11	1	9.1%
Lake Wabedo	4	0	0.0%
Little Boy Lake	7	0	0.0%
White Bear Lake	60	0	0.0%
CD3 Station	117	20	17.1%
Cass Lake	6	0	0.0%
Fish Trap Lake	21	2	9.5%
Long Lake – Hennepin	22	3	13.6%
Medicine Lake	68	15	22.1%

Boat types were recorded for the boats observed. The majority of boats observed were fishing boats (45%), followed by ski/cruiser boats (18%). One sailboat was observed.

Figure 7. Departing Boat Type



The average time boaters stopped to clean, inspect and/or prepare their boats for leaving was 7.6 minutes (Table 7). Appendix H compares the stop time for each station type depending on if the boater stopped at the tool station and if the boater used the tool station. There was -0.6 minutes to 1.9 minutes (overall average 1.8 minutes) difference in time for those that used the tool station versus those that did not. A boater stopping at the tool stations in most cases did not result in them using the station.

Table 7. Average Stop Time by Station Type

Station Type and Stopping Patterns	Count of Boats	Average Stop Time (Minutes)
Aqua Weed Stick	99	7.1
Stopped at Tool Station	73	7.5
Did Not Stop at Tool Station	22	5.4
Homemade	82	7.3
Stopped at Tool Station	43	7.7
Did Not Stop at Tool Station	35	6.2
CD3 Wayside	117	8.2
Stopped at Tool Station	65	7.9
Did Not Stop at Tool Station	42	8.5
TOTAL	298	7.6

The most used tool, either provided at access or brought with boater, observed overall was hands, in other words hand removal of vegetation and debris. The most used tools that were provided at a tool station were the Aqua Weed Stick, Air Pressure Hose, Vacuum, and Grabber/Picker (Table 9).

Table 8. Total AIS Prevention Tool Uses

AIS Prevention Tool	Total Sites Provided	Total Use
Hand Cleaning		53
Wrench	6	24
Aqua Weed Stick	7	15
Air Pressure Hose	4	13
Vacuum	4	9
Grabber/Picker	7	7
Brush	9	3
Lights	4	0

The brush was the most widely available tool for use at access sites. Nine of the twelve sites provided this tool for boater use.

Table 9. Most Used AIS Prevention Tools by Access Site

Access Site where Tool Provided:	Count of Departing Boats	Tool Use: <u>Aqua Weed Stick</u> Count	Rate (%)
Crooked Lake	16	1	6.3%
Lake George	64	10	15.6%
Lake Stella	11	1	9.1%
Lake Wabedo	4	0	0.0%
Little Birch Lake	5	3	60.0%
Little Boy Lake	7	0	0.0%
Long Lake - Hubbard	14	0	0.0%
Total	121	15	12.4%
Access Site where Tool Provided:	Count of Departing Boats	Tool Use: <u>Air Pressure Hose</u> Count	Rate (%)
Cass Lake	6	0	0.0%
Fish Trap Lake	21	1	4.8%
Long Lake - Hennepin	22	1	4.5%
Medicine Lake	68	11	16.2%
Total	117	13	11.1%
Access Site where Tool Provided:	Count of Departing Boats	Tool Use: <u>Grabber/Picker</u> Count	Rate (%)
Cass Lake	6	0	0.0%
Fish Trap Lake	21	2	9.5%
Lake Stella	11	0	0.0%
Lake Wabedo	4	0	0.0%
Long Lake - Hennepin	22	0	0.0%
Medicine Lake	68	3	4.4%
White Bear Lake	60	0	0.0%
Total	192	5	2.6%
Access Site where Tool Provided:	Count of Departing Boats	Tool Use: <u>Vacuum</u> Count	Rate (%)
Cass Lake	6	0	0.0%
Fish Trap Lake	21	1	4.8%
Long Lake - Hennepin	22	2	9.1%
Medicine Lake	68	6	8.8%
Total	117	9	7.7%

A variety of factors were considered when determining what supported or limited the use of tools provided at stations, including: boat type, if tools were tethered vs. untethered, the presence of sign or pavement marker designation to stop near tool station, and the weediness of the ramp at the access site.

1. Boat Type (Table 10)

Lake service providers had the highest percent use of provided tools (50%). However, there were only two observations of lake service providers. Fifteen percent (15%) of ski/cruiser boaters, 14% of fishing boaters, 12% of boaters with pontoon boats, and 12% with personal watercraft used provided tools. Wake sport boaters had 7% tool use. No tool uses were

reported for cabin cruisers, Jon boats, sailboats, boat lift/dock/similar or canoe/kayak/similar boats. Boaters using canoes, kayaks and paddleboards often park in the parking lot and carry their boats to launch and leave. These boats are also easily cleaned by hand. Only one cabin cruiser was observed.

2. Tethered vs. Untethered Tool Stations (Table 11)

More tool uses were observed at sites that had tethered tools. However, tools that were retractable and were able to be extended to a further radius than fixed tethered tools resulted in increased use.

3. Presence of Designated AIS Cleaning Areas (Table 12)

Site accesses that had clear stop indicators and/or pavement markers, had a 1.4 greater likelihood of boaters stopping at the tool station and completing hand cleaning, at a minimum, and 4.0 greater likelihood of utilizing provided AIS prevention tools.

4. Aquatic Vegetation at Access Sites (Table 13)

Access sites were classified as “weedy” if they had rooted vegetation and/or floating vegetation fragments at/around the boat ramp. All sites that had aquatic vegetation present did have some form of cleaning tool used. The four sites that did not have any vegetation present across all observation days were also the four sites that had no tool uses. If an access has a lot of vegetation, it is easier to pick up vegetation on the trailer, prop, and other areas of the boat when backing up and loading the boat onto the trailer.

5. Tool Station Busy

Of the 263 times the tool stations were not used, 38 of these times it was observed that the station was busy, either someone was using it, or there were a few instances of a parked vehicle(s) blocking it, one for an extended period of time while the boater was out on the lake.

6. Tool Station location

Most of the tool stations were located on the right side as you pull out of the access ramp. A few were located on the left side. Stations located on the left (Cass Lake, Fish Trap Lake and Medicine Lake, and Lake Stella) are not as visible to boaters exiting the access and are not located in the normal flow of traffic, therefore may not be used as often because of this placement. Measured tool use percentage showed just slight differences with those located on the left averaging 10.2% and those on the right averaging 11.9%.

7. Age of Tool Station

Stations observed had been in place between one and five years. The Long Lake (Hennepin) CD3 station has been in place the longest and was used at a slightly higher rate (13.6%, 3/22) than those installed for two to three years (11.7-12.5%, 15/128 and 14/112) and higher than the stations that had been in place for only one year (8.3%, 1/36).

Of the 298 departing boaters, 54 were observed leaving with vegetation on their boat or trailer and a majority (49) of them did not use the tool station. Half (27) were rated as having little/hidden/difficult to reach vegetation and the other half (27) were rated as having obvious vegetation. Of the 241 boaters that left with no vegetation on their boat or trailer, 30 used the tool station.

Table 10. Tool Use by Boat Type

Boat Type	Boat Count	Tool Use Count	% Tool Use
Boat lift/dock/similar	4	0	0%
Cabin cruiser	1	0	0%
Canoe/kayak/similar	14	0	0%
Fishing	135	19	14%
Jon boat	14	0	0%
Lake service provider	2	1	50%
Personal watercraft	26	3	12%
Pontoon	17	2	12%
Sailboat	1	0	0%
Ski/cruiser	54	8	15%
Wake sport	30	2	7%
Total	298	35	109%

Table 11. Tethered Vs. Untethered AIS Prevention Tool Uses

	Access Site	Station Type	Tools Available	Boats Observed	Tool Uses	Percent tool use
<i>No Tools Tethered</i>	Lake Stella	Homemade	AQ, GP, BS	11	1	9.1%
	Lake Wabedo	Homemade	WR, BS, AQ, GP, SP	4	0	0%
	Little Boy Lake	Homemade	WR, BS, AQ	7	0	0%
<i>All Tools Tethered</i>	Lake George	Aqua Weed Stick (pre-made)	AQ	64	10	15.6%
	White Bear Lake	Homemade	BS, GP	60	0	0%
<i>Some Tools Tethered</i>	Long Lake - Hubbard	Homemade	AQ, WR, BS	14	0	0%
<i>Retractable and Tethered Tools</i>	Cass Lake	CD3 Wayside Hard-wired Station	AH, GP, BS, WR, LT, VC	6	0	0%
	Crooked Lake	Aqua Weed Stick (pre-made)	AQ	16	1	6.3%
	Fish Trap Lake	CD3 Wayside Hard-wired Station	AH, GP, BS, WR, LT, VC	21	2	9.5%
	Little Birch Lake	Aqua Weed Stick (pre-made)	AQ x4	5	3	60.0%
	Long Lake - Hennepin	CD3 Wayside Hard-wired Station	AH, GP, BS, WR, LT, VC	22	3	13.6%
	Medicine Lake	CD3 Wayside Solar Powered Trailer	AH, GP, BS, WR, LT, VC	68	15	22.1%
Total				298	35	11.7%

AQ = Aqua Weed Stick, GP = Grabber/Picker, BS = Brush, WR = Wrench, SP = Scrapper, AH = Air Pressure Hose, LT = Light, VC = Vacuum

Table 12. Designated AIS Cleaning Areas & Related Tool Use

Clear Stop Indication?	Tool Use (Hand Cleaning)		Tool Use (No Hand Cleaning)	
	Count	Rate (%)	Count	Rate (%)
No	20	34.5%	5	8.6%
Cass Lake	1	16.7%	0	0.0%
Crooked Lake	6	37.5%	3	18.8%
Lake Stella	6	54.5%	2	18.2%
Lake Wabedo	4	100.0%	0	0.0%
Little Boy Lake	1	14.3%	0	0.0%
Long Lake - Hubbard	2	14.3%	0	0.0%
Yes	128	53.3%	90	37.5%
Fish Trap Lake	12	57.1%	7	33.3%
Lake George	32	50.0%	26	40.6%
Little Birch Lake	4	80.0%	3	60.0%
Long Lake - Hennepin	4	18.2%	3	13.6%
Medicine Lake	58	85.3%	46	67.6%
White Bear Lake	18	30.0%	5	8.3%
Total	148	49.7%	95	31.9%

Table 13. Aquatic Vegetation at Accesses

Access Name:	Count of Observation Days	Presence of Rooted Vegetation		Presence of Floating Vegetation	
		Count	Rate (%)	Count	Rate (%)
Cass Lake	3	0	0.0%	0	0.0%
Crooked Lake	3	0	0.0%	3	100.0%
Fish Trap Lake	3	3	100.0%	1	33.3%
Lake George	4	0	0.0%	4	100.0%
Lake Stella	3	0	0.0%	3	100.0%
Lake Wabedo	4	0	0.0%	0	0.0%
Little Birch Lake	3	0	0.0%	3	100.0%
Little Boy Lake	4	0	0.0%	0	0.0%
Long Lake - Hennepin	4	0	0.0%	0	0.0%
Long Lake - Hubbard	3	0	0.0%	0	0.0%
Medicine Lake	3	3	100.0%	3	100.0%
White Bear Lake	3	0	0.0%	2	66.7%
Total	40	6	15.0%	19	47.5%

B. Arriving Boat Observations

Boater behaviors were observed for boaters arriving at the accesses if observers were not busy observing or interviewing those leaving the accesses. Observations included whether boat plugs were removed upon arrival or not and if there was visible vegetation on boats and trailers. Two-hundred ninety-nine boats were observed, 228 used boat plugs. The majority, 78% (178/228) of boaters that had boats with plugs had them removed when they arrived at the access, 178/228. Observers were unsure if plugs were removed on another 38 boats, and 12 boats had boat plugs in when they arrived.

Table 14. Arriving Boaters: Plug was Not in Boat

Lake Access	No	Not Applicable	Unsure	Yes	Total
Cass Lake			1	3	4
Crooked Lake	2	2	1	9	14
Fish Trap Lake		4	1	21	26
Lake George		9	9	19	37
Lake Stella		3		6	9
Lake Wabedo		4		2	6
Little Birch Lake	2			1	3
Little Boy Lake				6	6
Long Lake - Hennepin		10	7	13	30
Long Lake - Hubbard		7		11	18
Medicine Lake		10	6	37	53
White Bear Lake	8	22	13	50	94
Total	12	77	38	178	299

Most boaters, 96.3% (286/297), arrived at the accesses without visible vegetation on their boats or trailers. Two boaters had vegetation on their boat or trailer. Observers were unsure if vegetation was present on boats or trailers in 9 observations.

Table 15. Arriving Boaters: Vegetation Present on Boat or Trailer?

Lake Access	No	Not Applicable	Unsure	Yes	Total
Cass Lake	4				4
Crooked Lake	14				14
Fish Trap Lake	26				26
Lake George	34		3		37
Lake Stella	9				9
Lake Wabedo	6				6
Little Birch Lake	3				3
Little Boy Lake	6				6
Long Lake - Hennepin	28		1	1	30
Long Lake - Hubbard	15	1	2		18
Medicine Lake	52			1	53
White Bear Lake	89	1	3		94
Total	12	2	38	2	299

C. Interviews

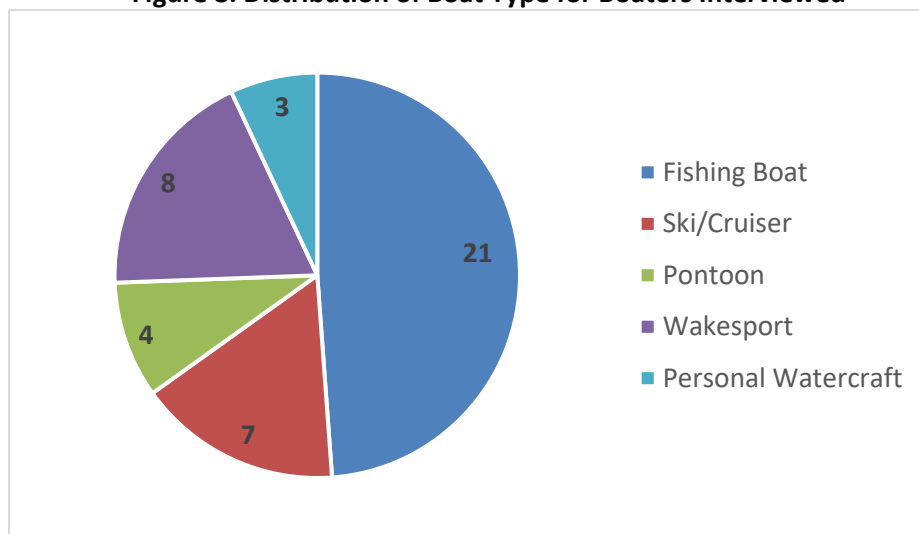
Forty-three interviews of departing boaters (14% of the 298 boats) were completed. Due to the low tool use observed, more than half of the interviews (27 or 63%) were with boaters who did not use the provided AIS prevention tools. However, the majority of boaters interviewed (37 or 86%) did use some form of prevention tool, whether provided or brought with them (Figure 12 and 13). At least one interview was completed at each access site.

Table 16. Total Interviews by Access Site

Site	Interviews
Medicine	11
Long (Hennepin)	3
White Bear	6
Stella	2
George	7
Crooked	3
Cass	1
Fish Trap	4
Little Boy	1
Wabedo	1
Little Birch	1
Long (Hubbard)	3
TOTAL	43

The majority of boaters (49%) interviewed were owners of fishing boats. Boats that fell into the “Personal Watercraft” category were jet skis.

Figure 8. Distribution of Boat Type for Boaters Interviewed



The grabber tool was rated as the preferred tool to remove vegetation (42% of all interviewed). The plug wrench was rated as the preferred tool for aiding in draining equipment (33% of all

interviewed). Among tool station users interviewed, the grabber and air pressure hose were rated as the preferred tools to remove vegetation (both 38%), and the vacuum was rated as the preferred tool for aiding in draining equipment (31%). The air pressure hose and vacuum were only available at four stations whereas the grabber was available at nine stations and the wrench at six. The majority of boaters interviewed (35%) selected “None” when asked about their favorite tool to drain equipment.

Figure 9. Preferred AIS Prevention Tool to Remove Vegetation

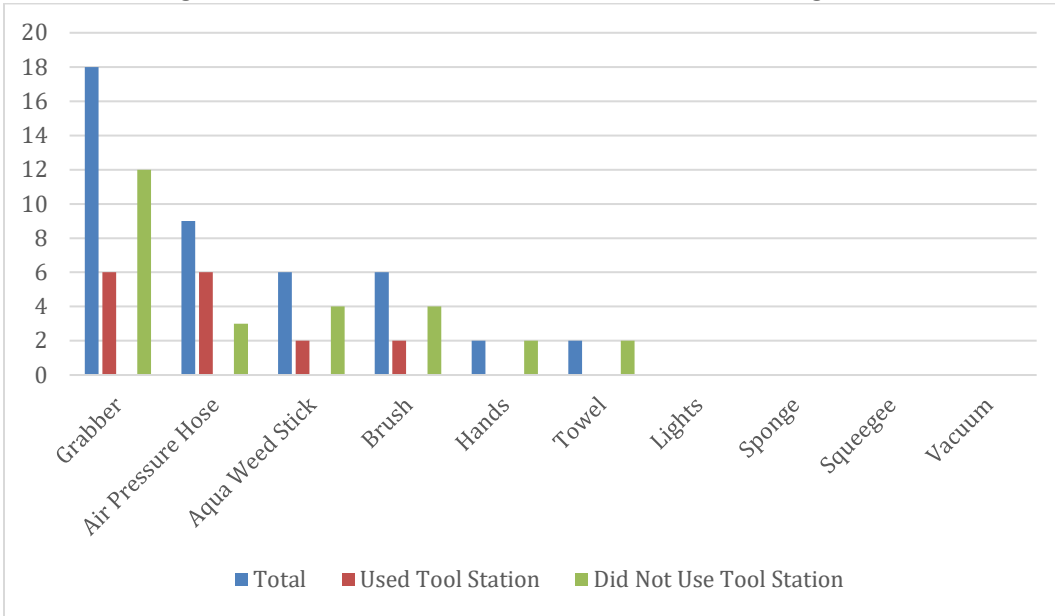
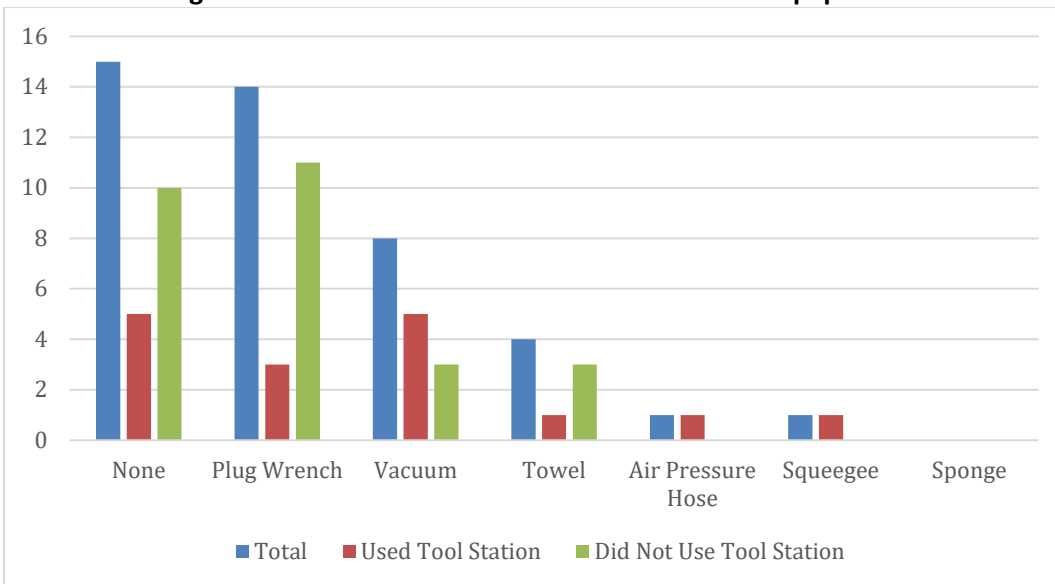


Figure 10. Preferred AIS Prevention Tool to Drain Equipment



While the grabber was rated as the preferred tool, the Aqua Weed Stick was determined to be the most effective tool provided at accesses for removing vegetation by the field staff

conducting observations. This determination was made based on what tool they observed to be the most helpful in removing vegetation from a given watercraft. Observed uses of the grabber showed that it was difficult to remove small pieces of vegetation.

The most used cleaning tool of those interviewed was identified as hands. Of tools provided at accesses, the Aqua Weed Stick was used the most (40% of those who used tools provided at accesses). While the grabber was rated as the preferred tool to use by all and air pressure hose by tool users interviewed, they were not available at the majority of sites. One boater interviewed noted that the Aqua Weed Sticks “are good when you need to use one,” for instance when you need to clean deep underneath a trailer. The grabber is preferred for general removal of vegetation.

Table 17. Observed Vs. Preferred AIS Prevention Tool

Tool	Observed Most Effective	Interview Preferred for Vegetation Removal	Interview Preferred for Draining
Air Pressure Hose	5	9	1
Aqua Weed Stick	14	6	0
Brush	2	6	0
Grabber/Picker	4	18	0
Hand	48	2	0
None	7	0	15
Other*	7	2 (towel)	4
Vacuum	4	0	8
Plug Wrench	4	0	14
Total	95	43	43

*Tools labeled “other” included: towels, sponges, and water spray bottles.

Figure 11. Interviewee AIS Prevention Tool Uses

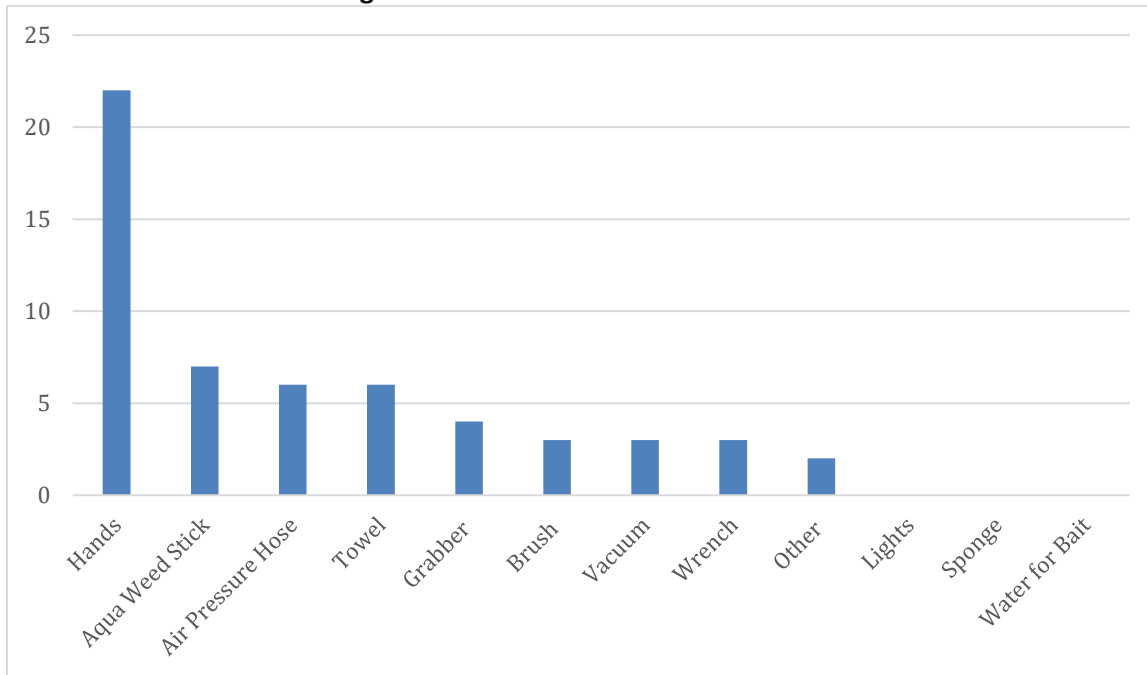


Figure 12. AIS Prevention Tools Used: Provided at Access

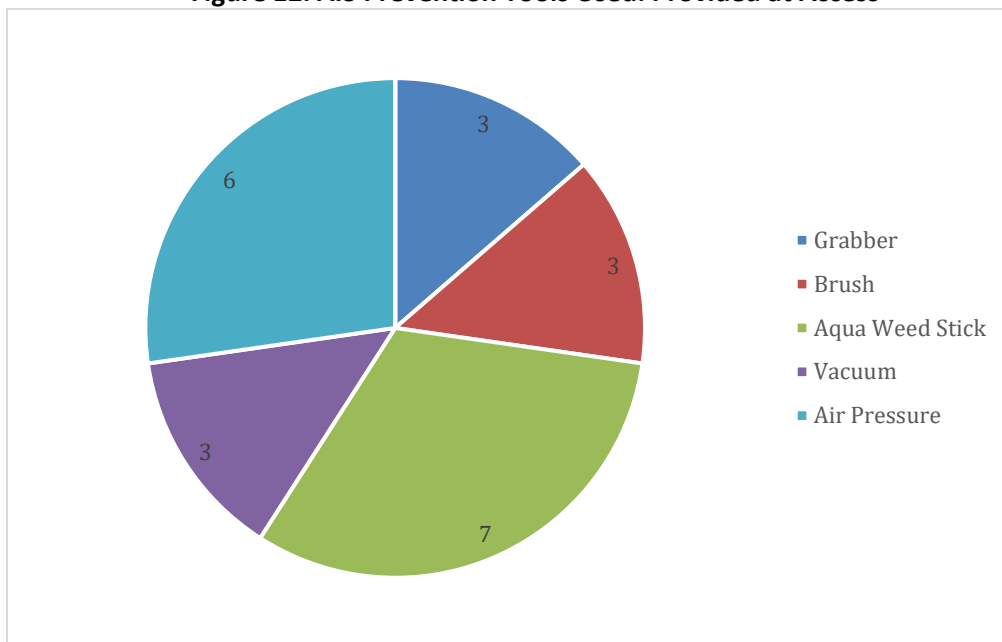
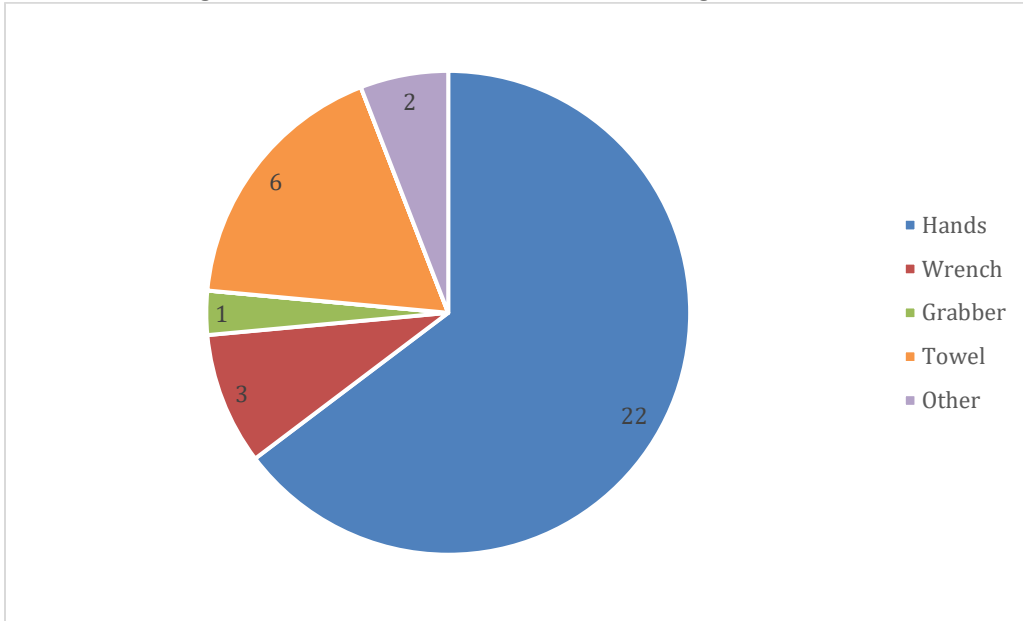


Figure 13. AIS Prevention Tools Used: Brought with Boater



The barriers to using tools stations were time (having to wait in line and/or using the station took too much time) and too much traffic around the station. However, almost half (42%) of those interviewed said that nothing made it difficult to use the tool station. This was supported by additional comments from boaters interviewed. A handful noted that they would like to have more space to stop near a tool station or would like more than one station available for use. There were a few instances of boaters noting that having untethered tools would increase the likelihood of tool use since they would be able to bring the tool to wherever they were able to park in the access. The motivators to using tools were that it prevents the spread of AIS, it is the right thing to do, and they liked a clean boat.

Figure 14. Boaters Responses to: "What Makes it Difficult to Use Tools?"

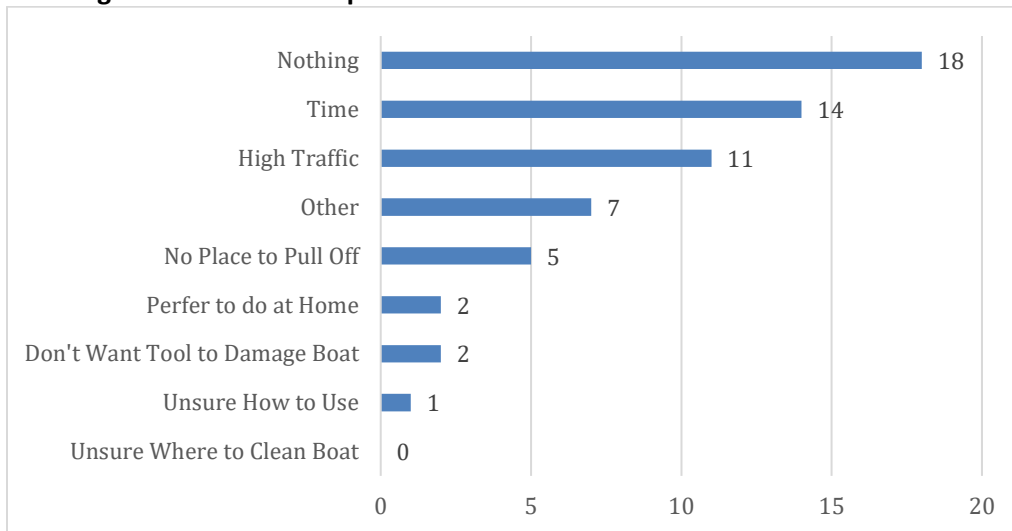
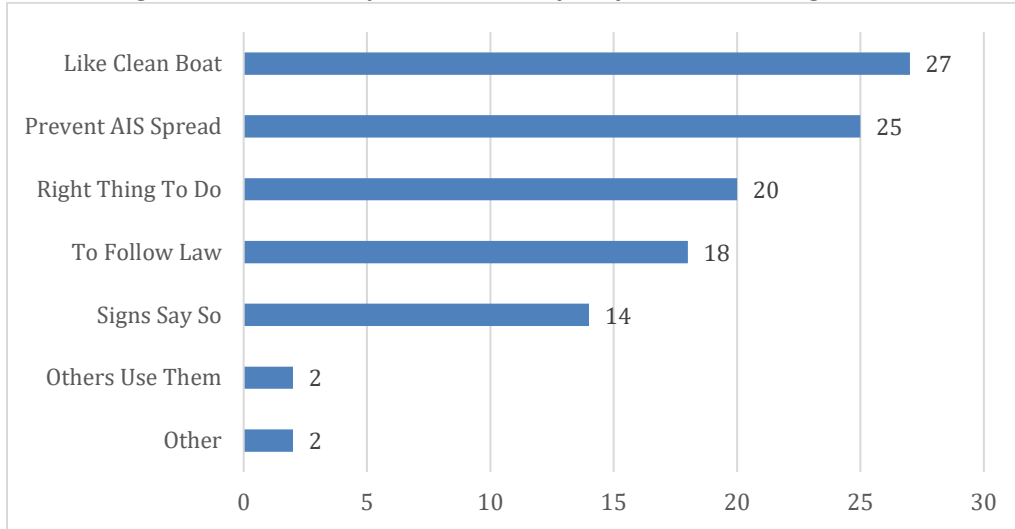


Figure 15. Boater responses to: “Why do you Use Cleaning Tools?”



When boaters were asked about additional tools and/or information they think would be useful to help prevent the spread of AIS, there were a few common answers including:

- Access should provide a high-pressure water hose or washing tool that uses water
- Accesses should have more space to stop near a station or have additional stations available
- Untethered tools may be used more if unable to park near station
- Higher variety of tools available. At sites with only an Aqua Weed Stick available, a grabber and brush were mentioned as preferred tools.

Note that these responses were based off of what those interviewed relayed to observation staff and does not reflect the observed actions of boaters.

D. AIS Prevention Tool Information and Cost Data

Information on AIS prevention tool types, sources and costs were compiled from communication with twelve individuals from AIS tool companies, lake associations, and counties. The list of those contacted is found in Appendix F. Additional cost data was pulled from retail websites that sell a specific tool or hardware item used for maintenance efforts.

Homemade Stations





Tools

Homemade AIS prevention tool stations typically contain 1 to 5 tools from the following: Aqua Weed Stick, boat brush (short or long handle), grabber/picker/reacher, squeegee, and boat drain plug wrench. If a station only had one tool, it was usually an Aqua Weed Stick.

Materials

Additional materials for the installation of a homemade station may include an AIS sign, metal post/U-channel post, wire, paracord or retractable cord to tether tools, hardware, and a foundation. Signs can be designed and produced by the interested organization, the landowner, and/or tool station provider (e.g., Aqua Weed Stick). A new standard “Cleaning Station” sign design is available from the DNR. Often signs and tools will be attached to an existing kiosk or post.

Table 18. AIS Prevention Tool Costs and Suppliers

Tool	Image	Cost	Supplier
Aqua Weed Stick		\$35-\$50	MAJK Solutions, LLC
Boat Brush		\$8-\$55	Amazon, Dick's Sporting Goods, Cabela's, local hardware store
Grabber		\$10-\$17	Amazon, Dick's Sporting Goods. Home Depot, local hardware store
Squeegee		\$11-\$18	Amazon
Plug Wrench		\$8-\$20	Buster Wrench

Installation

Permission from the access owner is required before installation. A special use permit is required for DNR sites. Work with the access owner to determine a feasible, accessible location. Stations can be attached to existing posts or signs in the chosen area, typically in the lane for exiting watercrafts. For installation of new signs/tool stations, contact [Gopher State One Call](#) before digging. Digging may require resource assessments for cultural and rare resources.

Cost of labor to install a tool station varies. Typically, smaller stations are installed with in-house staff or volunteers. Therefore, labor can cost \$0 to several hundred dollars.

Cass County Coalition of Lake Associations partnered with Cass County using AIS Prevention Aid funds to cost share purchase of tools and installation supplies in bulk for lake accesses in the county. Lake associations and resorts could buy the tools and signs including nuts and bolts and paracord for attaching the sign and tools to a post for \$27 a site, with additional cost for posts, if needed.

Table 19. AIS Tool Station Materials Costs and Suppliers

Material	Cost	Supplier
Sign	\$35-\$50	County, Aqua Weed Stick
Metal post/U-channel post	\$0-\$20	County Highway Department, Menards, local hardware store
Hardware (nuts, bolts, hooks, wire, paracord)	\$20	Home Depot, local hardware store

Figure 16. AIS Prevention Tool Station Examples



Polk County

Cass County

Cass County

Kandiyohi County

Management Information

1. Choosing Accesses and Lakes for Tool Station

The placement of stations at a specific lake or access is determined by a variety of factors. A lake may be chosen to have an AIS prevention tool station installed due to an AIS infestation, or it may be chosen due to high traffic. If a site is already undergoing upgrades, it may be a good opportunity to set up a tool station with a designated pull-off area. Access owners who are active partners and/or can help fund the station is another contributing factor in a lake being chosen for a tool station.

2. Maintenance Needs Frequency

The tools at homemade stations are typically removed for the winter and reinstalled in the spring, this helps with the longevity of tools. Tools are often tethered to signs or posts to prevent theft or damage. Sometimes tool replacement from lost or damaged tools is needed. Tools attached with rope or paracord may need detangling.

Stations typically have little to no maintenance, outside of replacing lost or damaged tools, and the seasonal removal and reinstallation. The associated cost of ongoing maintenance is \$0-\$130 per year, depending on what is needed, personnel performing the maintenance, and the frequency of maintenance. Damage or theft of tools is more common in the metro area. Tools at two metro area sites were found to be damaged or missing during the 2023 observations. One tool was missing at a north-central Minnesota site. Cable tethered tools are more difficult to steal, but the cost is higher. Retractable cables may break and require replacement. Cass County Coalition of Lake Associations installed about 50 stations in 2023. Two stations had tools stolen twice. They keep a supply for replacement.

3. Tracking Tool Uses

Most homemade stations do not include equipment to track tool usage, so their actual use

is not known.

4. Permission Processes and Working with Partners




Organizations interested in installing and maintaining tool stations at public water accesses must get permission from the landowner. Accesses owned by the DNR require a special use permit from DNR Parks and Trails Division.






Managers interviewed recommended that if you are looking to establish an AIS prevention tool station at an access that has other ownership, it helps to have a previous relationship with the owners. Be persistent, it helps if the tools can be supplied for free. Respect the management of the site, give owners credit, and say thank you. Some stations are funded by grants or have split costs between a county and lake association.

Aqua Weed Stick Landing Stations

The Aqua Weed Stick is made by MAJK Solutions, LLC. The company supplies the tool with an extendable handle of either 2 to 4 feet or 3 to 6 feet, or a non-extendable 4-foot handle. These are typically used in homemade stations. The company also supplies landing stations which range from \$360 to \$2,340, a tool usage tracker, signage, and additional tool accessories. Tools and accessories can be purchased from the Aqua Weed Stick website or from select outdoor retailers, including Joes Sporting Goods, Miller Marine, and Reeds Family Outdoor Outfitters.

Table 20. Aqua Weed Stick Products and Costs

Product	Image	Costs
Tool Head		\$25
Single Reel Landing Station		\$1,790
Dual Reel Landing Station		\$2,340




Economy Station		\$1,330
Retractable Landing Station Kit		\$860
Landing Station Kit		\$360
Bait Disposal Attachment		\$325
Tool Usage Tracker		\$100



CD3 Systems

CD3 Systems range from \$2,800 to \$40,000. There are several station options and tool configurations. The systems are powered via solar energy or can be powered with electricity. Note that the CD3 station that is solely electric powered was discontinued in 2023. The systems vary in size, and typically include retractable, lockable reels. They can be installed with the purchaser's signage or CD3 signage. The tools provided vary with each station and selection of the purchaser. The tool options include boat plug wrench, grabber/reacher, brush, vacuum hose, and air hose. Powered stations are equipped with lights.

All systems contain software that tracks tool usage and provides automated maintenance alerts, with an annual software maintenance fee of up to \$1,500. CD3 Stations with vacuums typically require annual pump outs at a cost of about \$85 per station. Portable CD3 Stations are typically removed in the winter and reinstalled in the spring. CD3 stations come with a precast concrete base. Tools may get damaged and need replacement with the cost for replacement varying by tool and required labor. Tool damage/missing tools seems to occur more in the metro area than in other areas of Minnesota.

Table 21. CD3 Systems and Costs

System	Image	Tools	Cost
CD3 Mobile Trailer		Air pressure hose, vacuum, brush, grabber, plug wrench, light	\$40,000
CD3 Station		Air pressure hose, vacuum, brush, grabber, plug wrench, light	\$38,000
CD3 Wayside Solar		Air pressure hose, vacuum, brush, grabber, plug wrench, light	\$37,000

CD3 Outpost		Brush, plug wrench, grabber, light	\$15,000
CD3 Roadside		Buyers' choice of two tools	\$2,800

E. Education Efforts

Field staff provided DNR informational postcards, “Attention Anglers” and “Attention Boaters” to the majority of boaters interviewed (Appendix G). Additional postcards were handed out to those at accesses who requested more information or asked questions about why the field staff was present. There were no instances of boaters declining postcards.

IV. RECOMMENDATIONS

Overall, AIS prevention tool use observed was very low. As a result, it may be inappropriate to draw very precise conclusions regarding which tools have the greatest potential to be utilized. Even tools that ranked relatively high compared to the others had limited use where available.

All of the accesses observed were also inspected by AIS inspectors and observers worked around the inspection schedules. To get more data on tool use at stations, it is recommended that for future work, observation schedules are coordinated with County AIS inspector schedules so that observers can be present on the busier access days.

Limitations to this research were the low number of tool uses observed (35) and the inability to observe on the busiest days because inspectors were on duty.

The most successful tool/access pairings for exiting watercraft include: 60% (3/5) boaters using the Aqua Weed Stick at Little Birch Lake, 16.2% (11/68) of boaters using the Air Pressure Hose at Medicine Lake, 15.6% (10/64) of boaters using the Aqua Weed Stick at Lake George, 9.5% (2/21) of boaters using the Grabber/Picker at Fish Trap Lake, 9.1% (2/22) of boaters using the Vacuum at Long Lake (Hennepin), and 8.8% (6/68) of boaters using the Vacuum at Medicine Lake. All of these sites were concluded to have exceeded the average tool use rate for either self-supplied, provided at station, or both (Table 5). A common factor shared between these access sites is that they each had a clear indication to stop at tool station using signage or pavement markings familiar to motorists. Accesses with these designated AIS cleaning areas saw a 1.4 greater likelihood of boaters stopping at the tool station and completing hand cleaning, at a minimum, and 4.0 greater likelihood of utilizing provided AIS prevention tools.

Of the provided tools, the CD3 stations had the highest rate of use (17.1%, 20/117) with the Aqua Weed Stick station (14.1%, 14/99) close behind. The homemade stations had a low rate of use (1.2%, 1/82) but had very few boat observations except for White Bear Lake which had 60 observations but no uses. Observers believe White Bear Lake saw no tool uses due to how busy the access site was. Hands were the most common tool use observed (17.8%, 53/298) overall.

Boaters used provided and self-supplied cleaning tools to remove vegetation, AIS, and water from their boats. However, every access observed had unique characteristics and saw different tool uses and use rates. When considering a tool station for an access, it should also include a designated AIS cleaning area with clear stop indicators.

Tools were more likely to be used if there was floating and/or rooted vegetation at the access. It is more likely that a boat/trailer would end up with vegetation attached if there is floating or rooted vegetation present at the launch. Vegetation on easily accessible areas such as the boat propeller is more easily removed by hand.

A longer tool such as a grabber or Aqua Weed Stick would be needed to more easily reach under the boat to remove vegetation on the trailer.

During our observation times, the presence of signs with AIS information did not seem to have meaningful impact on scores related to boaters leaving with vegetation on their trailer or boaters inspecting their boat/trailer for plants or zebra mussels. Scores for boaters leaving with vegetation on their vehicle were relatively low, however observers believe this was due to the majority of accesses not being weedy. This was also supported based on interviews with boaters. When asked to select reasons why the boater used tools, “because signs say so” was rated on the lower end (Figure 15) as well as when asked to select factors contributing to difficult tool use, unsure where to clean boat and unsure how to use tool were the lowest responses (Figure 14).

Fifty-four vegetation violations were observed on the departing boats, but most of these were from those that did not use the tool stations. The tool stations appear to help lower the number of vegetation violations, but there are still some occurring. Some boaters were not able to fully remove vegetation even after using tools. The boaters that used the tools but still had vegetation on their boat/trailer had only a small amount, it was hidden, or in difficult to reach areas.

If paired with designated AIS cleaning areas, guidance on where to look for and remove vegetation from watercraft may improve compliance with AIS laws.

When comparing the average time boaters stopped to inspect their boats, there was not a significant increase in time for boaters who used the tool stations vs. those who did not (Appendix H).

Increasing public awareness that using a tool station does not take that much time may be a beneficial way to increase tool station uses.

Observation staff believe that specific tools station placement may be a factor contributing to boater uses. At the Medicine Lake access site, the CD3 station was on the left curb, however many people stopped on the right curb. Based on observations, boaters were following the natural flow of traffic which had them following the right curb. At the Fish Trap Lake access, the CD3 station is placed adjacent to a marked parking spot at the back of the parking lot. There were a few occasions during observations that a boater would park their vehicle and trailer in this spot, resulting in the station being unusable. If the station was placed farther from a marked parking spot or if there are pavement stencils or signage used to clearly designate the space is for CD3 use only, there may have been more tool station uses.

The natural flow of traffic should be considered when determining tool station placement.

Tool stations that had been in place longer received more uses than those that were in place for a

shorter period of time. It may take some time for boaters to pay attention to the tool stations, understand their use, and try using them. If they see other boaters using the tools, they may be more influenced to try using them. A couple of interviewed boaters commented that they thought more information on how to use the tool station would be helpful. More advertising of the several types of tool stations through media such as lake association newsletters, lake maps, and boating and fishing regulations, including photos of the tool stations, may help boaters recognize them and understand why they should use them.

Allow time for boaters to recognize and start using the tool stations.

The majority of water bodies around the state are not known to have populations of AIS. The use of stations on the way into the lake access would be most helpful to prevent the introduction of AIS. The two Cass County stations observed did not have AIS. Tool stations available for those arriving to the access, or signage pointing to the tool station may help promote use of the tool stations for arriving boats.

Consider adding stations or signage encouraging use of stations for arriving boats.

Tools stations should be checked weekly, if possible, to ensure tools are in place and not broken or tangled. Some sites had broken or missing tools. Observers also noted that cables were tangled at sites with non-retractable cables which could limit tool use. Maintenance of the tool stations is necessary, especially where access is highly used. Site owners or AIS staff may not get out to check on stations frequently. However, inspectors are present frequently at many accesses. Inspectors should be encouraged to report maintenance needs to the AIS coordinator.

Encourage inspectors to report tool station maintenance needs.

All of the access in this study were inspected by hired inspectors. One possible way to increase tool usage is to have the inspectors point out the tools and encourage their use. Lake association members could also be encouraged to spend some time at their lake access to point out the tool station and encourage its use.

Inspector and volunteer encouragement of tool use may increase use of tool stations.

Boaters want to take action to prevent the spread of AIS and protect Minnesota waters. Even though every access is unique, the baseline data collected through this study outlines key considerations and strategies for organizations interested in providing tool stations at public water accesses in Minnesota.

Appendix A: Boat Access Observation Sites

Boat access observation site summaries is included as separate PDF document.

Appendix B: Access Observation Field Sheet

Appendix C: Interview Field Sheet

Minnesota Department of Natural Resources Survey

AIS Prevention Tool Use

Access Name _____ County _____ Date _____ Time _____

Staff _____

Boat Type: Fishing Boat Runabout Pontoon Wake sport Boat (ballast) Personal Watercraft

Jon Boat Cabin Cruiser Sailboat Canoe/Kayak/similar

1. What boating activity did you do today? (Read options, circle all that apply)

Fishing Pleasure boating Other (describe): _____

Water sports (water skiing, wakeboarding/surfing, jet skiing, sailing, paddling)

2. What cleaning and draining tools did you use today? (Read options, circle all that apply) None (skip to #6)

Plug wrench Grabber Brush Aqua Weed Stick Towel Sponge Water to reuse bait

Lights Air pressure Vacuum Squeegee

3. Tools that your brought with you: My hands Plug wrench Grabber Brush Aqua Weed Stick

Towel Sponge Water to reuse bait Lights Other (describe): _____

Tools Provided at the Access: Grabber Brush Aqua Weed Stick Vacuum Air pressure
Squeegee Wrench

4. Why do you use cleaning tools? (Read options, circle all that apply)

To prevent the spread of AIS It's the right thing to do The signs tell you to use them

You need them to follow the law You like a clean boat You see other people using them

Other _____

5. What, if anything, makes it difficult to use cleaning tools?

Nothing Time (e.g. waiting in line, it takes too much time) Unsure how to use the tools

Unsure of areas on my boat to clean Don't want cable/tool to damage my boat

There is no place to pull-off There is too much traffic I don't want to use them here, I do it at home

Other _____

6. If you had to pick one tool to remove vegetation, what would it be? (Circle one)

Grabber Brush Aqua Weed Stick Towel Sponge Vacuum Air pressure Squeegee
Lights

7. If you had to pick one tool to drain your equipment, what would it be? (Circle one)

Plug Wrench Vacuum Air pressure Squeegee Towel Sponge

8. If tools stations were located by the entrance rather than the exit, would you use them?

I would only use them when entering I would use them entering and exiting

I would only use them when exiting Unsure

9. What, if any, additional tools or information do you think would be helpful to you to prevent the spread of aquatic invasive species?

10. Do you have any other comments to share with the Department of Natural Resources to help them provide the information and tools you need to prevent the introduction and spread of aquatic invasive species?

Appendix D: Observation Data

The observation data is included as a separate Excel Workbook

Appendix E: Interview Data

The interview data is included as a separate file.

Appendix F: AIS Tool Data

The tool data is included as a separate Excel Workbook

Appendix G: Educational Materials Distributed

ATTENTION ANGLER

Do your part to protect Minnesota waters

The majority of Minnesota anglers take action to prevent the spread of invasive species.

Before leaving a water access or shoreland, take these steps:



Clean your gear to remove plants, small animals and debris.



Drain all water on shore away from the water body, including from livewells and bait containers.



Dispose of unwanted bait in the trash.



To Keep leftover live baitfish: (1) bring extra bottled or dechlorinated tap water with you and (2) on shore before leaving, drain your bait container and refill it with the extra water.



Never Release Bait.

Releasing bait is illegal because it threatens Minnesota's fisheries. Bait and bait water can harbor fish diseases and invasive species. All earthworms are non-native to Minnesota and damage forests if released.

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Know the laws

- It is illegal to release bait in Minnesota.
- It is illegal to transport water away from a lake or river.
- It is illegal to bring live minnows and leeches into Minnesota from out of state.
- With few exceptions, bait cannot be harvested from lakes and rivers listed as infested with aquatic invasive species (AIS).
- Violating AIS laws may result in fines up to \$1,000.

Additional best practices

- Keep a cooler with ice in your vehicle, to keep your catch fresh.
- Bring extra dechlorinated water with you or get extra water where you purchase live bait.
- Be prepared to bring unwanted bait with you when you leave, since most fishing and boating access points do not have trash cans.

Learn more about AIS prevention best practices and fishing regulations here:



mndnr.gov/AIS



mndnr.gov/fishingregs

 **DEPARTMENT OF NATURAL RESOURCES**

EWB_0041_22

Aquatic Invasive Species (AIS)

AIS are non-native plants, animals and diseases that harm local fish populations, water quality and water recreation.



Zebra mussel



Eurasian watermilfoil



A fish infected with Viral Hemorrhagic Septicemia (VHS) virus.
Photo Credit: Wisconsin Department of Natural Resources

ATTENTION BOATER

Do your part to protect Minnesota waters

The majority of boaters visiting public water accesses on Minnesota lakes and rivers take action to prevent the spread of aquatic invasive species.

Before leaving a water access or shoreland, take these steps:



Clean your boat, trailer and gear.



Drain all water (bilge, ballasts, livewells, bait containers, etc.) and keep drain plugs out during transport.



Dispose of unwanted bait in the trash.

Violating these laws may result in fines up to \$1,000.

Go above and beyond:

Rinse your boat and gear with cold water.

Dry your boat and gear for 5 days.



Decontaminate your boat: Rinse with hot water at 120°F for 2 minutes or 140°F for 10 seconds. If needed, spray with high pressure to remove attached debris.

Find FREE decontamination locations here: mndnr.gov/decon



Aquatic Invasive Species (AIS)

AIS are non-native plants, animals and diseases that harm local fish populations, water quality and water recreation.

Watercraft inspectors are here to help!

Inspectors will inform you about AIS and will physically inspect your boat, trailer, other water-related equipment and compartments that hold water. Be prepared:

- **When entering:** Arrive cleaned and drained. Open the lids of closed compartments that could hold water, like live wells, so the inspector can see they are drained.
- **When exiting:** Pull all drain plugs. Clean off any plants, mud and invasive animals.

Tell us how we are doing at wip.dnr@state.mn.us

To reach a conservation officer to report a potential violation, to contact an AIS expert, or for more information: call the DNR Information Center at 888-MINNDNR or (651) 296-6157 or email info.dnr@state.mn.us

Learn more at mndnr.gov/AIS



Trained watercraft inspectors offer FREE decontamination services. If a unit is not present at the public water access you are at, you can find locations here:

mndnr.gov/decon

EWR_0004_22

Appendix H: General Stop Time by Station Type

Station Type: Aqua Weed Stick (pre-made) – Group Overall

Station Type, Access, Stopping Patterns, and Tool Use		Count of Boats	Total Access Time (Minutes)
Aqua Weed Stick (pre-made) – Group Overall		99	7.1
Stopped at Designated Position?	No	22	5.4
	Not Applicable	2	6.5
	Unsure	2	10.0
	Yes, Didn't Use Tool Station	59	7.4
	Yes, Used Tool Station	14	8.1
Crooked Lake		16	5.3
Stopped at Designated Position?	No	8	3.9
	Not Applicable	1	8.0
	Yes, Didn't Use Tool Station	6	6.5
	Yes, Used Tool Station	1	7.0
Lake George		64	7.5
Stopped at Designated Position?	No	7	7.3
	Not Applicable	2	10.0
	Yes, Didn't Use Tool Station	45	7.3
	Yes, Used Tool Station	10	7.8
Little Birch Lake		5	10.6
Stopped at Designated Position?	Yes, Didn't Use Tool Station	2	12.5
	Yes, Used Tool Station	3	9.3
Long Lake - Hubbard		14	6.2
Stopped at Designated Position?	No	7	5.3
	Not Applicable	1	5.0
	Yes, Didn't Use Tool Station	6	7.6

Station Type: CD3 Wayside – Group Overall

Station Type, Access, Stopping Patterns, and Tool Use		Count of Boats	Total Access Time (Minutes)
CD3 Wayside – Group Overall		117	8.2
Stopped at Designated Position?	No	42	8.5
	Not Applicable	3	8.0
	Unsure	7	8.1
	Yes, Didn't Use Tool Station	45	7.2
	Yes, Used Tool Station	20	9.7
Cass Lake		6	6.2
Stopped at Designated Position?	No	3	7.7
	Yes, Didn't Use Tool Station	3	4.7
Fish Trap Lake		21	10.9
Stopped at Designated Position?	No	17	11.1
	Yes, Didn't Use Tool Station	2	5.5
	Yes, Used Tool Station	2	15.0
Long Lake - Hennepin County		22	7.1
Stopped at Designated Position?	No	4	5.3
	Not Applicable	2	5.0
	Yes, Didn't Use Tool Station	13	7.7
	Yes, Used Tool Station	3	8.3
Medicine Lake		68	7.8
Stopped at Designated Position?	No	18	6.9
	Not Applicable	1	14.0
	Unsure	7	8.1
	Yes, Didn't Use Tool Station	27	7.3
	Yes, Used Tool Station	15	9.2

Station Type: Homemade – Group Overall

Station Type, Access, Stopping Patterns, and Tool Use		Count of Boats	Total Access Time (Minutes)
Homemade – Group Overall		82	7.3
Stopped at Designated Position?	No	35	6.2
	Not Applicable	2	20.0
	Unsure	2	5.5
	Yes, Didn't Use Tool Station	42	7.5
	Yes, Used Tool Station	1	17.0
Lake Stella		11	10.3
Stopped at Designated Position?	No	4	5.5
	Not Applicable	2	20.0
	Yes, Didn't Use Tool Station	4	8.5
	Yes, Used Tool Station	1	17.0
Lake Wabedo		4	7.3
Stopped at Designated Position?	No	3	8.3
	Yes, Didn't Use Tool Station	1	4.0
Little Boy Lake		7	7.7
Stopped at Designated Position?	No	2	3.5
	Unsure	1	7.0
	Yes, Didn't Use Tool Station	4	10.0
White Bear Lake		60	6.7
Stopped at Designated Position?	No	26	6.3
	Unsure	1	4.0
	Yes, Didn't Use Tool Station	33	7.1

All Station Types

Station Type, Access, Stopping Patterns, and Tool Use		Count of Boats	Total Access Time (Minutes)
Grand Total		298	7.6
Stopped at Designated Position?	No	99	7.0
	Not Applicable	7	11.0
	Unsure	10	8.1
	Yes, Did Not Use Tool Station	146	7.4
	Yes, Used Tool Station	35	9.2