Minnesota Department of Natural Resources
Division of Parks and Trails

Aquatic Invasive Species Best Management Practices for Water Access

6/26/2012

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Introduction

These Best Management Practices (BMPs) are suggested ways to improve the function of water access sites to address the spread of aquatic invasive species (AIS). In 2010 and 2011 the Minnesota Department of Natural Resources (DNR) held a series of stakeholder meetings to discuss strategies that would increase the DNR's overall efforts to control the spread of AIS. One of the new initiatives suggested was to improve the function of water access sites to better accommodate aquatic invasive species prevention methods required of boaters by law.

Values:

- Stakeholders strongly supported the idea of having designated AIS activity areas at water access sites.
- Stakeholders wanted to see all boaters completing as many AIS prevention activities as possible before leaving the access.
- State statute requires specific AIS activities be complete before leaving the access.

It is the personal responsibility of boat operators to properly complete the AIS actions required in state statute.

Assumptions:

- The spread of AIS can be prevented if boaters perform the AIS activities required in Minnesota State Statutes.
- It is the personal responsibility of boat operators to properly complete the AIS actions required in state statute.
- Boaters gain access to and leave public waters through three primary means:

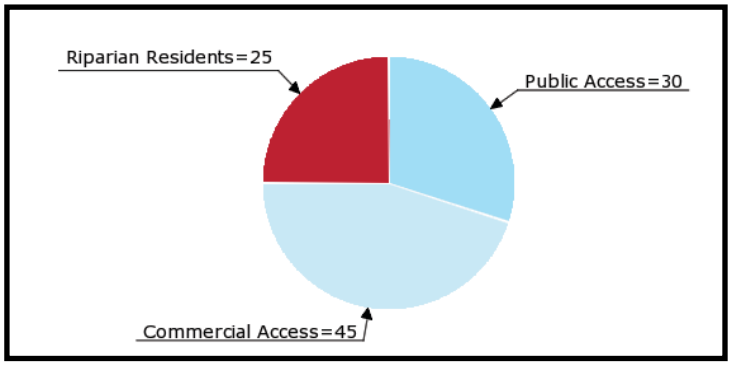
  1) Public access—free public boat launches and associated parking areas.

  2) Commercial access—resorts, campgrounds, marinas, for-fee private accesses and municipal docks provided by lakeshore municipalities for rent by city residents.

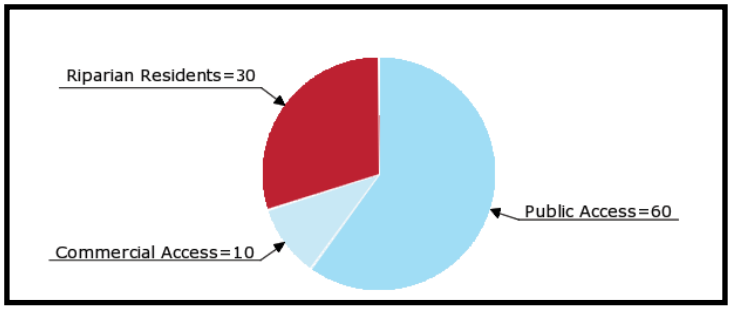
  3) Riparian residences—waterfront property owners and homeowner associations with riparian access.

Example 1:
Depending upon the lake, the percentages of boaters using each of the primary means of access vary.

Lake Minnetonka



Twin Cities Lakes *(other than Minnetonka)*



Source: Boating in the Twin Cities Metropolitan Area — Status in 2009 and Trends since 1984

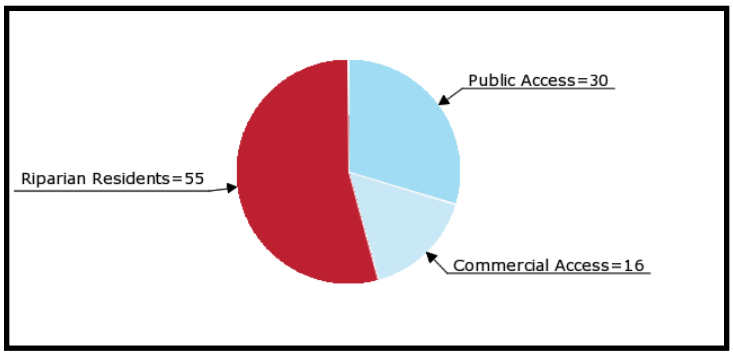
- AIS are harmful to lakes and ecosystems including angling and recreation.
- Boats and other water related equipment are one of the leading vectors for AIS movement.
- A water access site is a place to transition from land to water and vice versa. It is also a parking area. Therefore, people do not spend much time at the public access.
- The average length of a boating trip for users of public access is three to five hours.

Goals

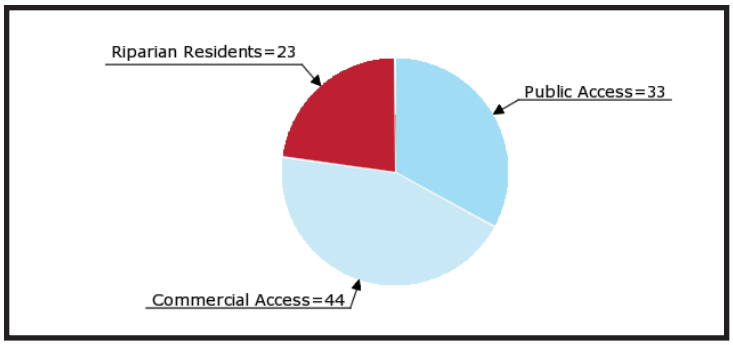
- Create a suite of BMPs that can be shared with all providers of boat access.
- Maintain consistency in the development of AIS activity areas so boaters will benefit.
- Maintain and/or improve safety, increase AIS awareness, and simplify required actions.
- Develop additional tools to supplement Minnesota's invasive species program that includes watercraft inspections, watercraft decontamination, enforcement, and public awareness campaigns.

Example 2:

Lakes other than Mille Lacs



Mille Lacs



Source: Boating in the North Central Minnesota: Status in 2008 and Trends since 1985

A water access site is a place to transition from land to water and vice versa. It is also a parking area. Therefore, people do not spend much time at the public access.

Aquatic Invasive Species Prevention Legislation Summary

This is a summary of how the laws related to prevention and management of aquatic invasive species (AIS) applies to boaters and others involved with the transportation of water-related equipment. For further information, consult the Laws of Minnesota 2011, Chapter 84.D.

Definition of water-related equipment
A motor vehicle, boat, watercraft, dock, boat lift, raft, vessel, trailer, tool, implement, device, or any other associated equipment or container, including but not limited to portable bait containers, live wells, ballast tanks (except those with a MPCA permit), bilge areas, and water-hauling equipment that is capable of containing or transporting AIS, aquatic macrophytes (plants), or water.

This definition replaces and expands previous references to watercraft, trailers, plant harvesting equipment, and portable bait containers.

Conservation officer checks for compliance with AIS inspection requirements

Inspections

- Compliance with AIS inspection requirements is an express condition of operating or transporting water-related equipment.
- Conservation Officers or Licensed Peace Officers may set up check stations at or near water access sites.
- Authorized inspectors can visually and tactilely (hands-on) inspect water related equipment.
- Inspections include the removal, drainage, decontamination, or treatment to prevent the transportation and spread of AIS, aquatic macrophytes (plants), and water.
- Protocols for decontamination of water-related equipment will be developed utilizing recommendations outlined in the legislation.

Watercraft Inspector helping boater check for AIS

- Authorized inspectors may prohibit the launching or operation of water-related equipment if a person refuses to allow an inspection or does not remove and dispose of AIS, aquatic macrophytes (plants), and water.
- Refusing to allow an inspection or follow a removal order may result in a civil citation and a one year suspension of the watercraft license.

Boating

- All water-related equipment must be drained before leaving any water access area or riparian property. This includes portable bait containers and live wells.
- Transportation of aquatic macrophytes (plants) on all roads is prohibited except as specifically exempted.
- The legislative changes allow for a civil or criminal citation option for violations involving the transportation of aquatic macrophytes (plants), prohibited invasive species (e.g. zebra mussels), water and non-compliance with drain plug removal.
- Emergency response vehicles and equipment may be transported on a public road with the drain plug or other similar device replaced only after all water has been drained from the equipment upon leaving the water body.

Shore access on Lake Bemidji

AIS Prevention Activities (To be done by boaters at AIS Activity Areas)

Boaters are **required** to complete three main actions before leaving the access or riparian property. The AIS Activity Areas described in the next chapters were developed for these AIS prevention activities that are required in MN State Statute.

1. **Clean off** the boat by removing all **plants, mud, debris and organisms** from the exterior and interior of the boat (including angling equipment and the anchor).
2. **Drain all water** from the boat and other water related equipment, including bait water.
3. **Pull the plug** (it must remain out during transport).

If a watercraft inspector is present, boaters must comply with the inspector's AIS inspection requirements before and after launching, which can include:

1. **Visual** inspection of watercraft and equipment.
2. **Tactile i**nspection of watercraft and equipment.
3. **Decontamination** of watercraft and/or equipment.

Failure to complete or comply with any of the above may result in a civil citation.

Before going to another waterbody, boaters should complete one of the following recommended actions. These are not mandatory unless an authorized watercraft inspector or conservation officer has ordered the action.

1. **Dry** the boat and all water related equipment for a minimum of 5 days , or

2. **Wash**/power spray the boat (preferably with hot water) to remove and kill all plants and organisms.

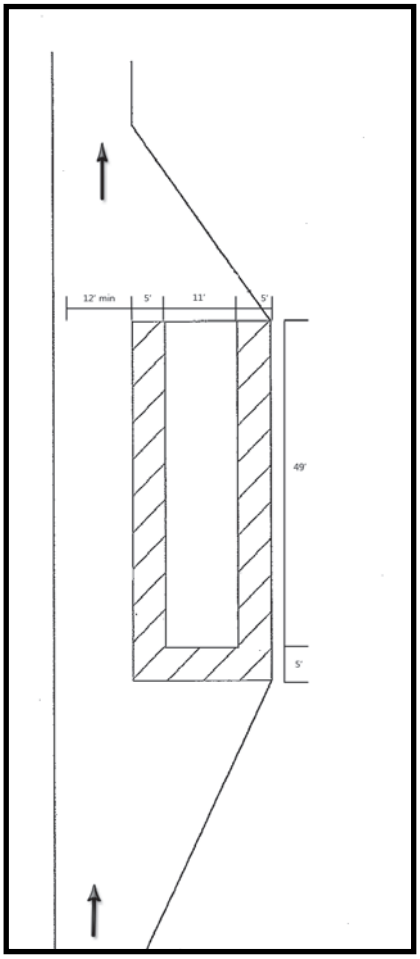
Creating AIS Activity Areas
Make Ready and Tie Down Lanes

"Make ready" lanes are designated areas before the ramp where boaters can safely stop and "make" their boat ready to launch. Not all water access sites will have this accommodation. Proper access etiquette states that the launch ramp should not be blocked while boaters get their boats ready to launch. The "Make Ready" lane is typically sloped toward the water body, so it is not a good place to drain water. Boats coming into the access should already be cleaned, drained, and dry. An AIS sign or pavement stencil in this area can serve as a reminder to boaters to ensure they have a clean boat before they launch and that their drain plug is in.

"Tie Down" lanes are designated areas between the ramp and the exit where boaters can safely stop and make sure their boats and equipment are secured and safe to tow on the road. This is the perfect place to create an "AIS Activity Area".

An "AIS Activity Area" will be a designated space at an access that can contain all, some, or none of the suggested BMPs in these guidelines. The site manager and the size of the space will determine how many of the suggested guidelines can be implemented.

A tie down/AIS activity area should be designed and developed for sites that do not already have a designated area. Access sites with existing tie down lanes can be easily modified with some or all BMPs in this guidebook.



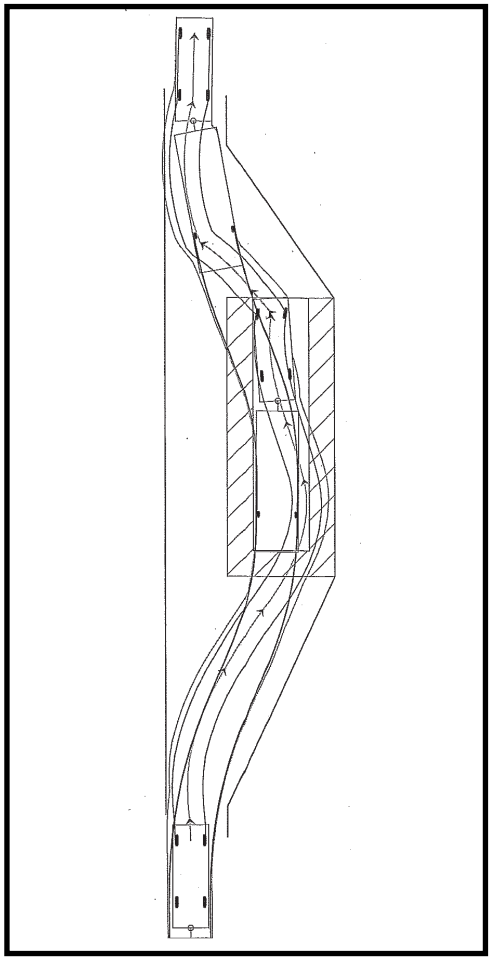
AIS activity area
tie down area with ADA modifications

Total AIS Activity Area Dimensions:
1. Length: 54'
2. Width: 21'

Inner Dimensions:
1. 12' x 46'

To Make This Area ADA Accessible:
1. Walkway Around 3 Sides
2. 5' Wide Minimum for Walkway
3. Maximum 2% Cross Slope

If there is adequate space at the access, a tie down/ AIS activity area should be designed and developed for the site.



Typical existing tie down area
shown with AIS activity area added

Benefits of AIS Activity Areas

- Costs are minimal if using existing access "make ready" and "tie down" lanes
- Creates a visible place at the access site for boaters/anglers to complete AIS activities

Concerns

- May be difficult and/or more expensive to place at small sites (less than 10 parking spaces) that do not have defined parking areas and tie down lanes

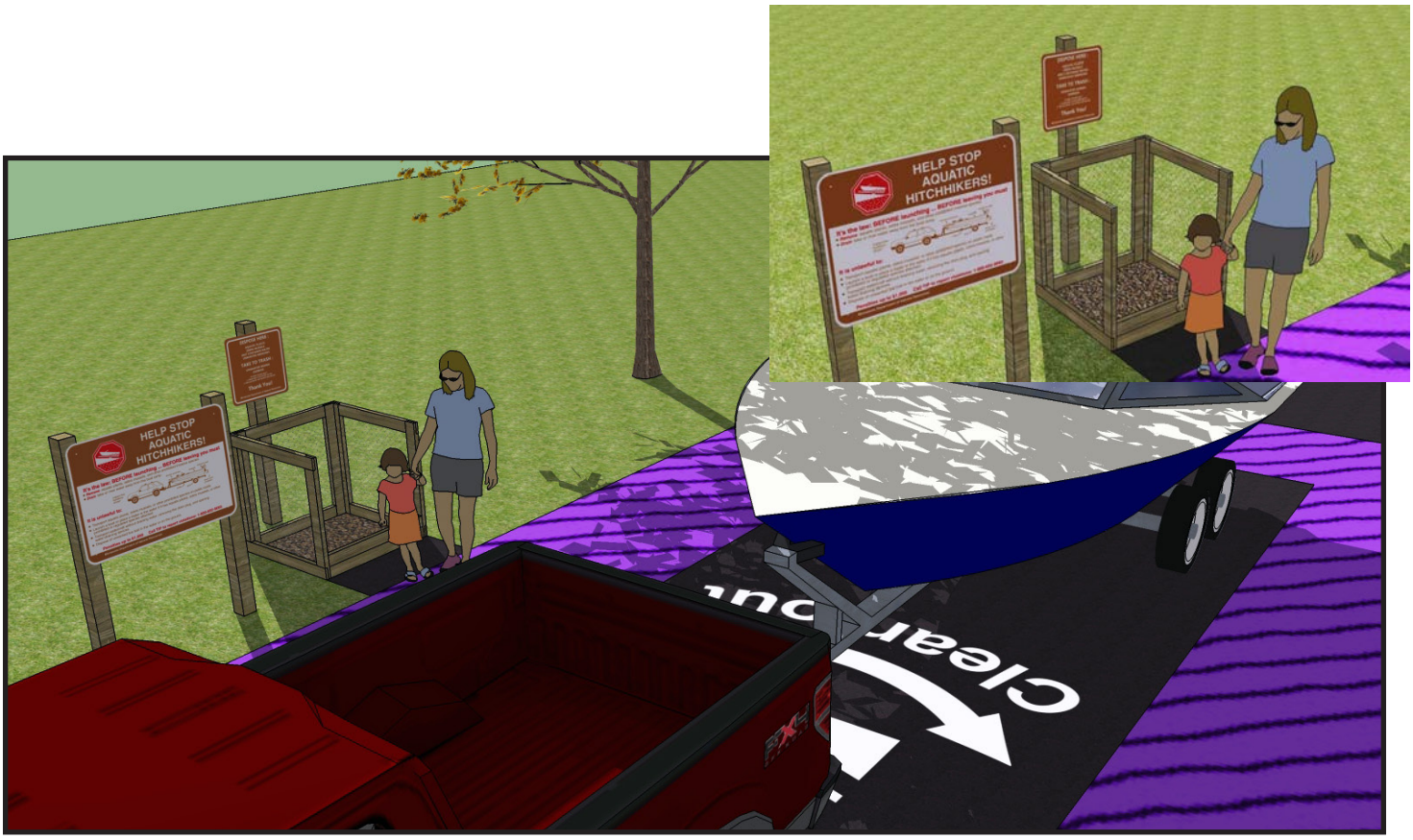
Tie down lane at Leech Lake, Walker, MN

Compost Bins

Purpose of Supplying a Compost Bin

A modified compost bin can be placed at the tie down/AIS activity area of the access site. The compost bin will be a visible reminder for boaters to stop and take time to complete AIS activities. Bins were tried at two sites during the 2010 season. At one site it was working very well, boaters regularly pull up to it after they have retrieved their boat. At another site the bin tended to attract garbage. However, it is a site without a defined tie down/AIS activity area. In both cases, volunteers were checking the bins on a regular basis.

The compost bins are best suited for access sites on lakes infested with Eurasian Water Milfoil (EWM) and Curly Leaf Pondweed (CLP). These sites will have a higher rate of vegetation removal from boats and trailers and other water related equipment. For those without EWM and CLP, a bin may still be a good option for bait water disposal, especially if the main use of the lake is for fishing.



Compost bin at tie down area

The compost bin will be a visible reminder for boaters to stop and take time to complete AIS activities.

Design

A three sided compost bin design is included in this guidebook's appendix. A 3' x 3' x 3' wire and wood design is suggested. The benefits of this design are:

- Looks like a compost bin (not a trash bin)
- Open to the front so it is easy to place plants and clean out
- See through screening makes it easier to monitor for misuse (garbage)
- Durable
- Easy to make
- Relatively inexpensive
- Easy to anchor

Designs for this compost bin are included in Appendix E

A sign should be posted on or near the compost bin stating:

- Place aquatic plants and Zebra Mussels here
- Dispose of unwanted baitfish and bait water here
- Dispose of unwanted worms in trash

Benefits

- Creates a visible place at the access site for boaters/anglers to complete AIS activities
- Best for lakes with Zebra Mussels and vegetation issues such as Eurasian Water Milfoil and Curly Leaf Pondweed
- Creates a place for anglers to dump bait water and aquatic plants and organisms
- Inexpensive, materials cost is approximately $50 (with sign) per box
- Easy to construct and place at site

Concerns

- Could be misused for garbage or yard compost, especially at remote sites and/or in the spring and fall when sites are not as busy
- Bait dumped in the bin may attract animals, creating potential issues in nearby neighborhoods
- Requires regular monitoring and maintenance. Plants in the bin may need to be spread on site when the bin becomes too full to be effective. Garbage will need to be removed
- May be difficult to find a suitable location at small sites without defined parking areas and tie down lanes
- Theft

Water Sources

Purpose of Supplying Water

Providing a source of water enables boaters to rinse equipment, flush live wells, and possibly save their bait. High pressure hot water has been recommended for killing and removing adult attached Zebra Mussels. However, simply rinsing a watercraft and all related equipment with cold water is effective for removing Zebra Mussel veligers (larva) and spiny water flea, especially from bilges and live wells. After rinsing, drying greatly reduces the likelihood of veliger presence.

The best sites to provide rinse water will have access to municipal water supplies or an existing water source at the access site. Remote sites require a water tank or a well installed, which greatly increases the cost of providing water. Lakes infested with zebra mussels and spiny water flies would be the highest priority. If a water source is provided, stormwater BMPs are imperative.

Bait Management

Type of Bait	Concern	Required Actions
Minnows and Leeches	Live minnows have a high risk of spreading AIS due to the use of water to transport and keep bait alive.	Drain water from portable bait containers. If you want to save your bait, plan ahead. Bring suitable water along to rinse bait and replace water in portable bait buckets. Do not release live bait into the waterbody. Do not release aquatic animals from one waterbody into another.
Night Crawlers and Angle worms	All earth worms are non-native to Minnesota and have harmful effects on forests.	Keep your worms and reuse them on your next fishing outing. Dispose of unwanted bait in the trash. Please do not dump your worms and/or containers on the ground or in the compost bins, as this is considered littering.

Live shiners

Bait buckets

earthworms

Well Installation

Below is some general information regarding installing a well at an access. When choosing this option, it will be best to talk with local well drillers and licensed contractors, as well as staff from the Minnesota Department of Health (MDH).

The Well Owners Handbook from the website, health.state.mn.us provides good introductory information on wells in general.

MDH-Well Management and Drinking Water Protection Division is required to review all public plans/ proposals. Private plans may be required by the the Department of Labor and Industry (DLI) for review. The state-wide plumbing codes that are created by the DLI, regulates these water sources and is available http://www.dli.mn.gov/main.asp

- Recognizing whether or not your well will need a back flow prevention device to prevent contamination of the water supply is important. It may not be required depending on the water system. Typically this is not an issue with a hand pump, as there is a check valve located in the pump. However, not all pumps have check valves, and in some instances, not all check valves provide sufficient backflow protection.
- Wells need to meet minimum setback or isolation distances from various contamination sources, which varies by location. A list of these setbacks, including lake setback, can be obtained from MDH.
- All of the information pertaining to marking non-potable pipes is covered under the Plumbing Code. There are no signing requirements associated with buildings, although identifying the source as non-potable is highly recommended.

Some additional things to consider:

- Housing the pump (if electric) for theft protection.
- Flood protection.
- Winterization.
- Additional well regulations can be found in Minnesota Rules Chapter 4725 or on the MDH website, health.state.mn.us click Environmental Health then Drinking Water (Well Mgmt. Program).

Expected Costs

The approximate cost to install a sand point well can vary from $1,200 to $2,000 depending on the type of pump (hand or electric) that is installed. These types of wells are most often installed for irrigation.

Benefits

- Provides rinse water on site for equipment
- Supplies replacement water for bait buckets
- Most appropriate for lakes infested with Zebra Mussels and/or Spiny Water Flea
- Best for lakes with a high angling use
- Good for sites of all sizes

Concerns

- Staff time and planning is required for maintenance and to manage installation
- Could be misused for many other things
- Could be vandalized/damaged
- May not be utilized by boaters

Outdoor faucet/city water source

Self service coin-operated boat wash station in Lacrosse, WI

This boat wash station (shown on the left) is a possible option to provide unheated, pressurized water. This particular self-service station is coin-operated, however a timer would provide an automatic shut off without requiring the user to have coins. Even a small fee may discourage some boaters from doing this AIS prevention activity. The installation of this unit was approximately $25,000.

Stormwater Management

Best Management Practices (BMPs) for stormwater management are an important aspect of the development and planning of public water access sites. Best Management Practices focus on dispersing and diverting run-off away from the body of water and do not allow direct drainage into it.

Stormwater Pollution Prevention Plans (SWPPPs), a requirement of the Nation Pollutant Discharged Elimination Stormwater permit (NPDES) for sites larger than 1 acre, are implemented on each development or rehabilitation project regardless of size.

Due to the parameters and uniqueness of each access, sites are designed by engineers and incorporate necessary stormwater practices. Engineers and landscape architects are involved in the specifics of planning, designing, and developing of access sites and all AIS BMPs that are affected by stormwater. Location and design of stormwater BMPs will be influenced by site design and layout. A generic example of a stormwater design plan for an AIS activity area is included in Appendix F.

Regular maintenance of stormwater management systems are paramount if those installations are to be successful over time. The maintenance requirements are discussed below:

- Stormwater management systems divert, contain, and filter run-off effectively
- Site remains clear of aquatic organisms
- Stormwater BMPs are functional and well maintained
- Water at the site does not impair surface or groundwater quality, and is adequately diverted and filtered

Infiltration swale with native grasses

Examples of Stormwater Management BMPs

Grading of impervious surfaces: allows sheet flow into adjacent vegetation, dispersing run-off away from body of water. This works best in conjunction with maintaining a mowed filter strip around the perimeter of the parking lot.

Trench Drains: intercept rapid run-off vertically or perpendicularly across ramp approaches; used in combination with a swale or basin to receive the run-off; must be cleaned periodically of sediment, leaves, etc. to maintain functionality.

On some sites, it is advantageous to build flat curbs and direct storm water run-off into island swales, dispersing it further. In most instances, it will be necessary to place boulders or posts on the corners to discourage vehicles from driving on to the islands.

Infiltration swale with native plants: temporarily stores storm water run-off allowing it to infiltrate the underlying soil. Infiltrated water can recharge groundwater, be cleansed and discharged through an under drain and evapotranspiration. Soil may have to be replaced if not suitable (clay for instance) for infiltration within 48 to 72 hours. Ideally these swales should be planted with native, moisture-loving plants, to aid in the removal of pollutants. A filter strip should be associated with the swale to allow for easy discharge and catching sediment. Infiltration swales must be maintained and cleared of accumulating sediment and unwanted plant species.

Stormwater ponds: are constructed basins designed to be a permanent pool for extended detention storage, allowing sediment and associated pollutants to settle to the bottom.

Aquatic Invasive Species (AIS) filtration catchment: designed as an infiltration swale next to tie-down area to receive all drained boat water, plants, and animals before the boat leaves the site. Should be mowed, monitored, and cleaned as needed.

Messaging

Pavement Stencils and Quick Response (QR) Codes

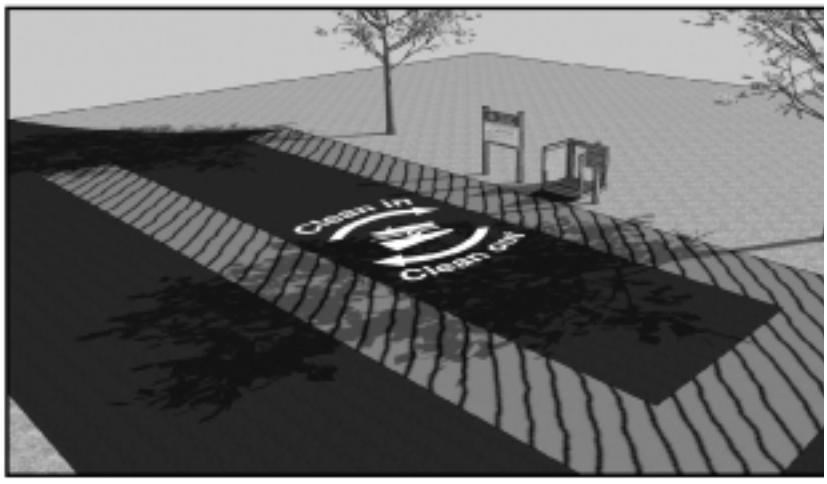
Pavement stencils, QR Codes, and other technology-based messaging options should be explored as alternative communication strategies in addition to tradition signs.

Messages of caution or instruction are often stenciled onto pavement or concrete to quickly and clearly label objects and locations. The key advantage of a stencil is that it can be reproduced cheaply and easily at different sites, making it more cost-effective than signs.

Once developed, the pavement stencil would be used to mark the make-ready areas and/or tie down lanes of access sites with pavement or concrete surfaces.

Digital media also has the appeal of instantaneous web-based information. QR codes could enable users to download a watercraft inspection checklist directly to their smart phones that can be used as they clean and drain their boat or other water-related equipment at the access.

Graphic of AIS activity area



Bird's eye view of AIS activity area

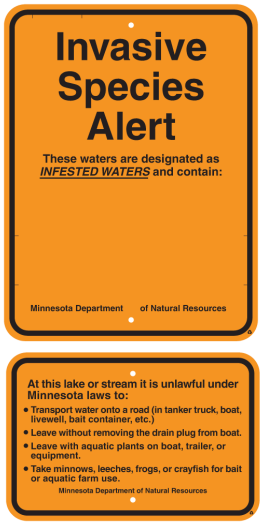
Compost bin sign

Aquatic Invasive Species Signs

This pair of orange invasive species alert signs are to be posted at the ramp on their own post - not on the sign kiosk information/regulation at infested waters only.

The orange "invasive species alert" sign found on the right replaces the "exotic species alert" sign. The "at this lake" sign with 4 bullet points goes below. Invasive species decals are added to the sign to list the specific species found in the water body.

All other signs dealing with invasive species should be removed and recycled by the site manager or designee. "prevent the spread of Eurasian Water Milfoil" and other signs with specific invasive species messages along with old "exotic species advisory" are to be recycled.

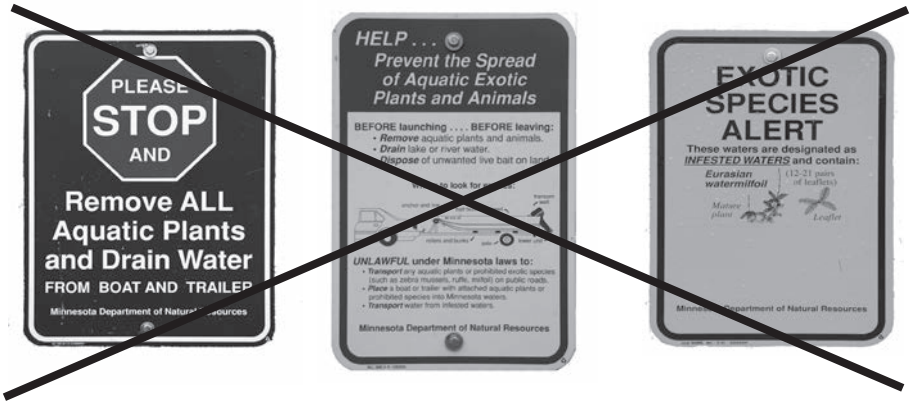


4 bullet example

Help Stop Aquatic Hitchhikers sign

The standard size, (18" x 24") Help Stop Aquatic Hitchhikers sign, as seen to the left, are to be placed at the make ready area and tie down areas of the access. (Large signs see next page 3' x 4')

One, two, or three signs may be needed depending upon the layout of the access. Boaters should see the sign as they come in and before they pull out of the lot. This sign should be put on a post and not on the sign board (unless the sign board is at the prep and tie down area, or the user behavior at the access is not well defined due to lack of site development).



Obsolete signs

A larger (3'x4') Help Stop Aquatic Hitchhiker (HSAH) sign is available for use at all types (public and private) of water accesses throughout the state. This sign is from the DNR Ecological and Water Resources Division. Contact the local area DNR office for information. There are two companion signs to be placed above the large sign — one for infested waters or one for non-infested waters.

1
2
3

1. **This is an Infested Water** – goes above the main sign at the tie down area or exit lanes on lakes that are infested waters.
2. **Protect This Lake** – goes above the main sign at make ready areas on non-infested waters.

Reason for Large Sign Option:

Large signs related to AIS have been requested by stakeholders for use at DNR and non-DNR water accesses. The companion signs provide flexibility for use at either infested or uninfested waters.

<u>At Infested Waters</u>

Large "Help Stop Aquatic Hitchhikers" signs are desired at all high-use accesses on infested waters.

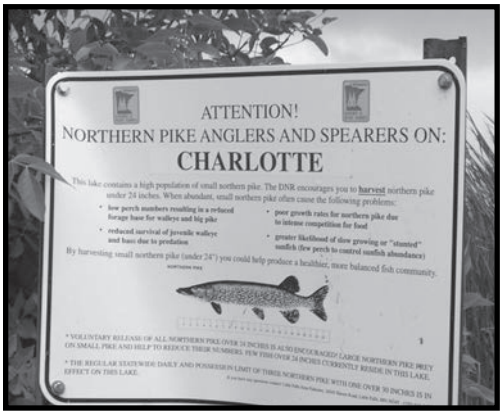
- The Invasive Species Program (ISP) will provide the signs as funding allows.
- The large signs should be posted at the exit or tie-down area as an additional sign or as a replacement for one of the 18x24 size HSAH signs.

<u>At Non-infested Waters</u>

- The large signs can be posted near the ramp or make-ready area as an additional sign or replacement of one of the 18x24 size HSAH sign

* If a standard HSAH sign is removed to install a large HSAH sign, the standard sign should be used at another site or returned to the DNR.

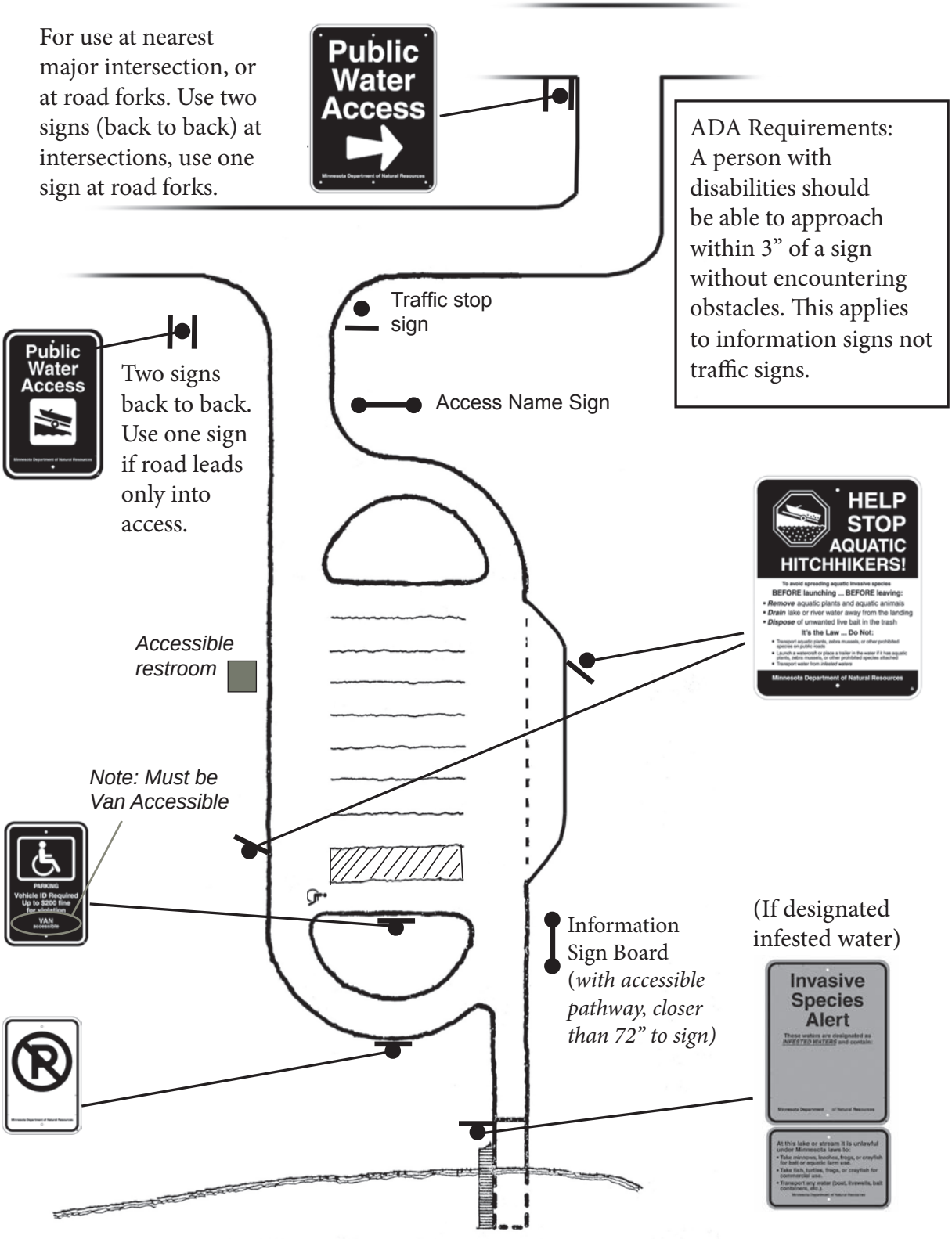
Please Be Aware!



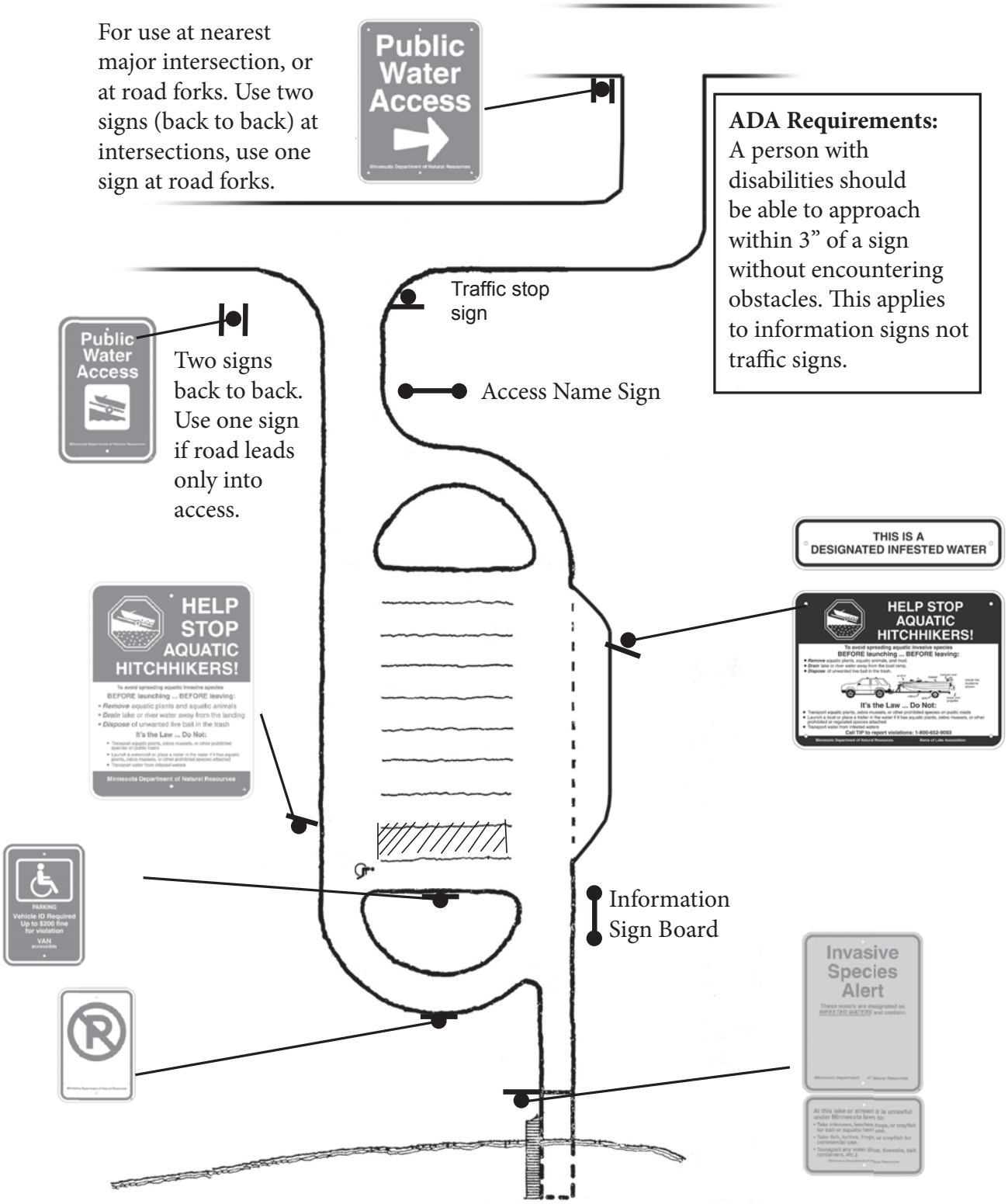
- Gopher State One Call should be notified to mark utilities before sign posts are installed. They can be contacted at www.gopherstateonecall.org or at (800) 252-1166.
- Landowner permission is needed before any signs are posted or re-arranged.
- Some sites are designated as sensitive habitats or cultural areas

Example of a sign requiring 2 posts that is bent and looks unprofessional. Please use two posts and a wood backing to post larger signs to avoid bending of the metal.

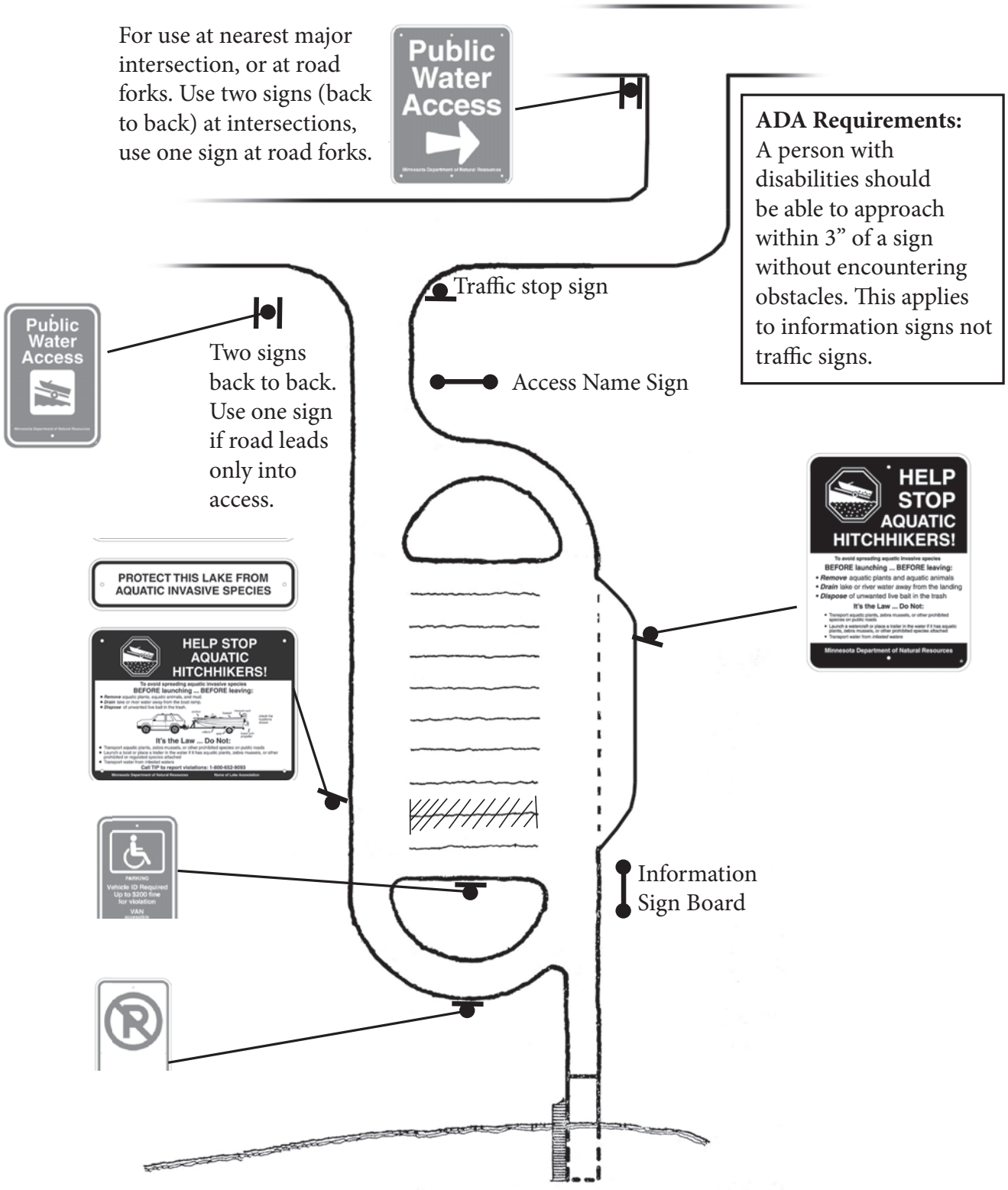
AIS Signs- Example of Typical Site



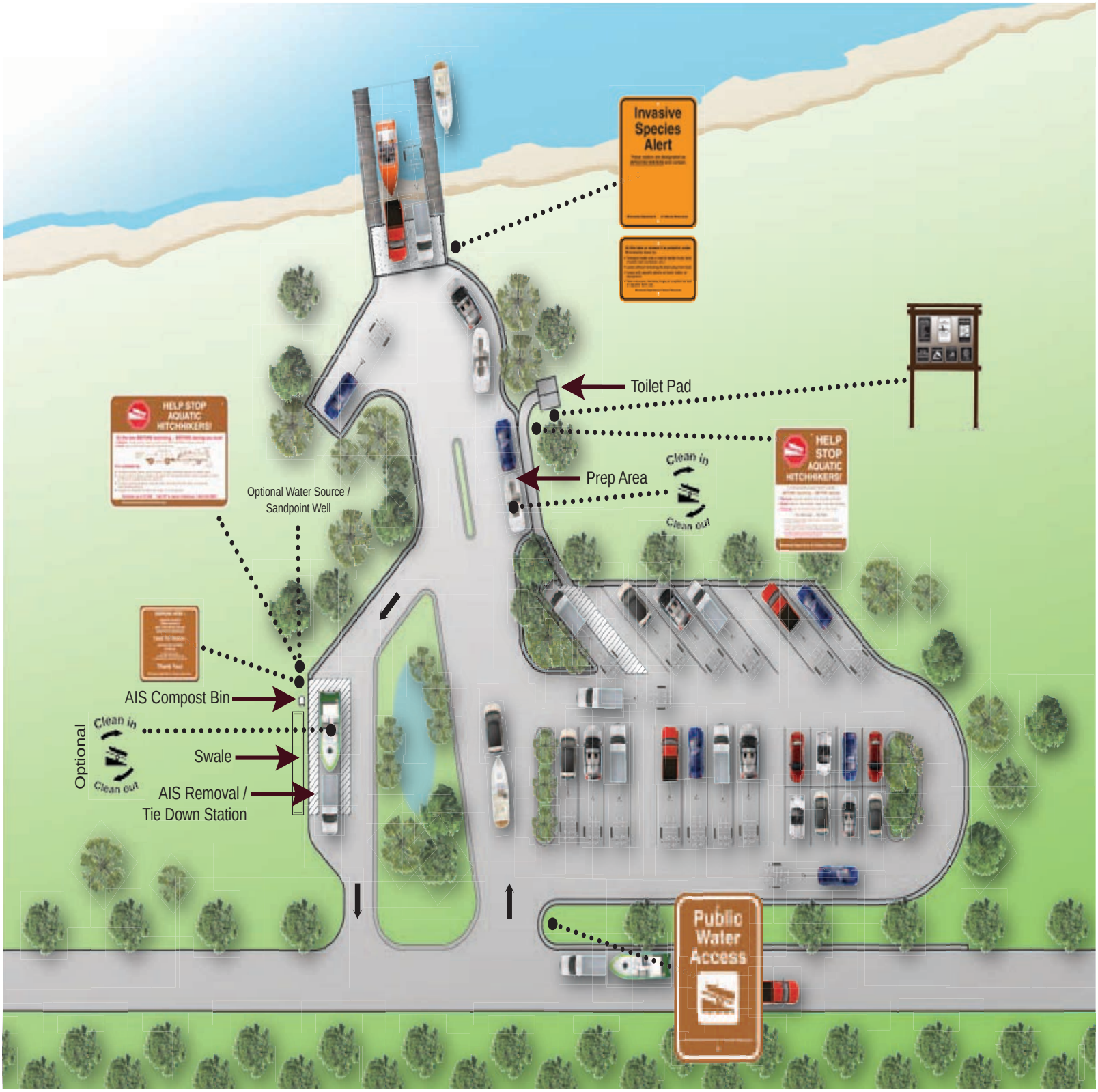
AIS Signs- Example of High Use Site



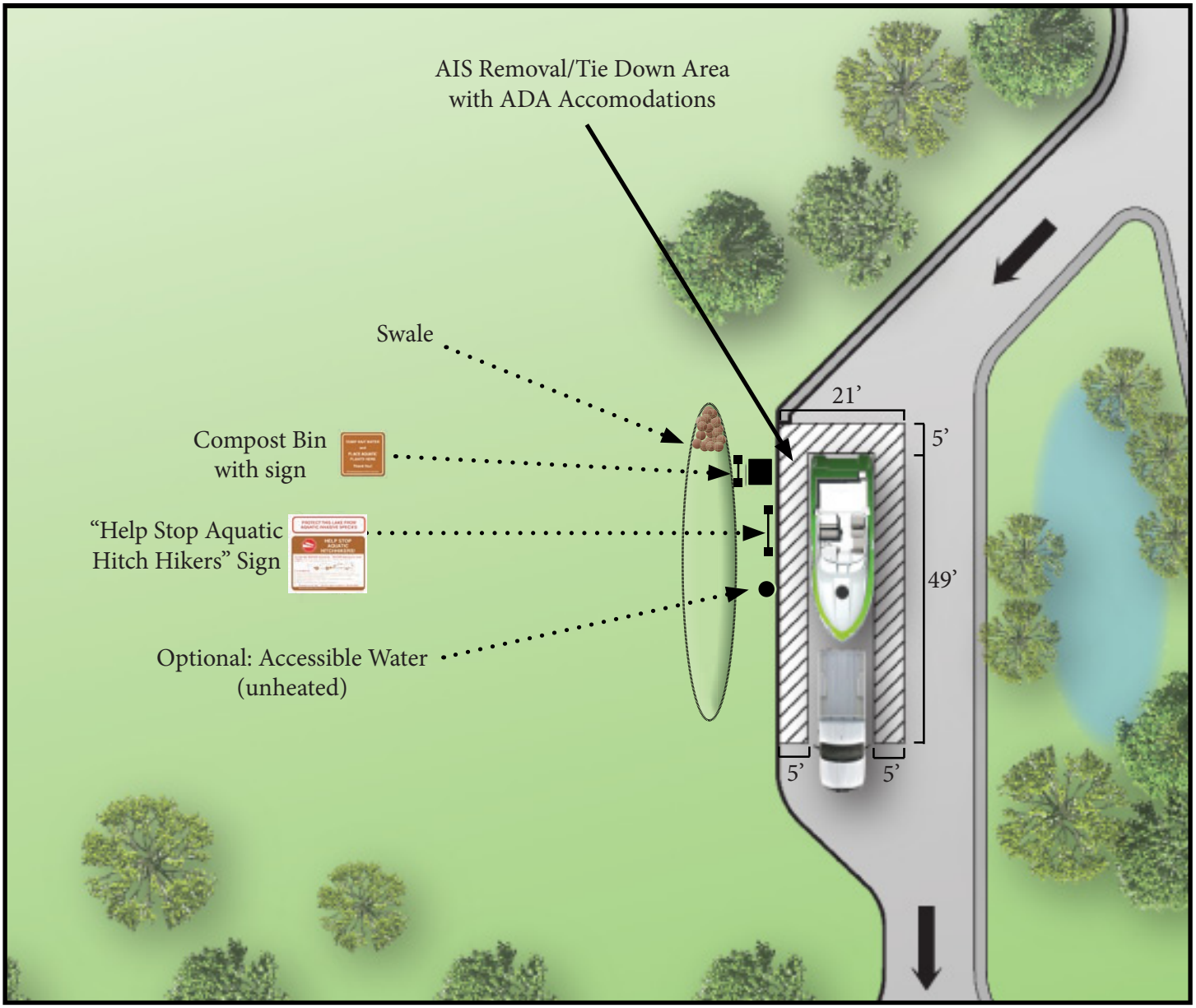
AIS Signs- Example of High Use Site
Non-infested Water



Access Site with All BMP's Added



AIS Removal Area/Tie Down Lane Messaging



AIS Activity Area and BMP Summary

No two access sites are the same. Think of the boaters that use the site and decide what would be the best way to assist them with AIS activities at the access.

- Anglers, recreational boaters, motor boats, paddles, or any combination thereof
- Established parking and pattern of flow vs. irregular parking and pattern of flow
- Infested water body vs. non-infested water body
- If infested, what species
- Proximity to infested water bodies
- Traffic patterns between infested and non-infested waters
- Overnight use of waterbody/boat camping or mooring

BMP Summary Table:

Suggested BMP's to implement by lake and access type
(Above criteria should also be considered)

	Infested Zebra Mussel	**Infested High Use**	**Infested Low Use**	**Un-infested High Use**	**Un-infested Low Use**
Define AIS Activity Area	Yes	Yes	Yes	Yes	Potentially
Compost Bin	Yes	Yes	Yes	If feasible	Potentially
Water Source	If feasible	Yes	No	No	No
Surface Water Management	Yes	Yes	Yes	Yes	Potentially
Improved Messaging	Yes	Yes	Yes	Yes	Yes

APPENDIX

Appendix A: Decontamination Unit (High Pressure/Hot Water)

"Decontamination" is a general terms for the use of hot water at high pressure to spray the exterior of boats, rinse the interior (live wells and bilges), and water related equipment. It is a two-step process: first hot water (approximately 140 degrees Fahrenheit) is applied to an attached adult Zebra Mussel for 10 seconds to kill it. High pressure (typically 3,000 PSI) water is then used to remove attached Zebra Mussels as well as other aquatic plants and animals. It is necessary to set the machine at 160° to get 140° water on the boat's surface.

Decontamination units are not an official part of the BMP recommendations for access sites because the "decontamination" of boats with hot, high-pressured water is not required by state law. Decontamination units are often proposed because decontamination is one of the recommended actions in the boaters AIS checklist.

Providing a decontamination unit sounds simple, however, there are some major concerns with providing them. The DNR has recently purchased a few portable units that will be staffed by certified Level II Inspectors and moved around the state. The DNR is also willing to consider a few permanent decontamination units as pilot projects so that more information on the feasibility and effectiveness of decontamination units can be studied.

Considerations before investing in a Decontamination Unit:

There are numerous factors to consider when setting up portable or permanent decontamination units:

1. At this time, the law does not require all boats or water related equipment to be "decontaminated". Washing is a voluntary option unless the DNR has an Authorized Inspector or Conservation Officer present to determine that decontamination as needed.

2. If placing at or near a water access, sufficient space is needed so that traffic flow in and around the launch ramp and parking area is not impeded.

3. A plan for properly capturing and treating the run-off water must be in place. The Minnesota Pollution Control Agency considers the water to be wastewater. Discharge of vehicle wastewater to the ground could result in contaminating the groundwater due to the amount of oil, chemicals, excess phosphorous, and toxic metals present on vehicles, trailers, tires, and engines.

    a. Reclamation mats and water capture systems should be used whenever possible. The system will capture and filter the water so that it can be reused or drained into a municipal system.

    b. Connection to a municipal sewer system (permits required). It is important to note that filters should used to collect Zebra Mussels and veligers.

4. A water source is needed for permanent units, preferably a municipal water system.

5. An electrical source is needed for permanent units. A certified electrician should be used for design, construction, and maintenance of electrical components.

6. Trained staff supplied with proper safety equipment are needed to operate both portable and permanent units. Burns, slips, trips, or damage to equipment could occur if not used properly.

7. Regular maintenance will be needed on portable and permanent units to keep them operational. There must be the ability to easily winterize equipment for storage in overnight temperatures below freezing.

8. Vandalism is common at water access sites, prevention measures should be considered.

9. Insurance liability coverage in case there is damaged equipment and/or injuries (state requirements must be met on state lands).

10. Only the land owner/access administrator can approve of the installation and/or use of a decontamination unit.

Site Specific Considerations:

The safety of the visitors using access site and of those operating the decontamination unit are of utmost importance. Careful thought should be put into the location and set up of the decontamination unit, keeping in mind a safety perimeter should be left around the unit so that the operator has room to walk around all sides of the boat being washed.

Adequate maneuvering room: Traffic flow at the access should not be adversely affected. The location of the decontamination unit and water reclamation mat should not completely block any of the main aisles, the make ready area, the tie down/AIS activity area or launch ramp. Traffic not waiting for or using the decontamination unit should be able to drive around.

Parking Spaces: At most access sites, especially on weekends and holidays, parking spaces are the most valuable commodity. Setting up the decontamination unit in one or more parking spaces should be the last resort.

Preferable Locations (will vary by site):

1. Entrance/Exit Roads that lead into or out of the access parking area. Steep slopes, sharp curves higher road speeds, or narrow lanes may create unsafe situations.

2. Public or private land adjacent to the access site. Access sites are often near parks or other publically owned lands, alleys or dead end streets, privately owned businesses, and seasonal residents. Ask for adjacent landowners' permission.

3. Medians/green space in the center of the parking area and/or shoulder/buffers strips on the edges of the parking area should be considered. Getting the tow vehicle and decontamination unit trailer off the parking lot and onto the vegetation is ideal. The reclamation mat can be placed on the drive lanes or parking space(s) nearby if necessary for better operator access.

4. Parking spaces and/or overflow parking areas can be used if there is no option for 1 , 2, or 3. Placing the reclamation mat where boaters can pull through going forward is necessary. If boater must back out the operator of the decontamination unit should provide safety and direction to the operator of the vehicle.

Costs:

- Portable units including a water recapture system are $12,000 to $20,000 per unit. The cost of a permanent decontamination unit will depend upon many variables at the access site especially the availability of water and electric, the containment of the wastewater and the type of unit. The DNR estimates costs of design, construction, and all components of a boat wash system would range from $30,000 to $200,000.

Benefits:

- Decontaminating boats as they leave infested waters is an additional measure that will help prevent the spread of Zebra Mussels and aquatic organisms

Portable boat decontamination unit and mat

Concerns:

- High cost: expensive to buy, design, operate, and maintain
- Facility could take up a large amount of space (which is often at a premium at a water access)
- Boaters are often in a hurry at accesses and may be unwilling to have their boat washed unless it is required by an authorized inspector
- May deter boaters from using a particular access or route in order to avoid decontamination units, and it could cause back-ups and traffic flow problems at already busy and crowded access sites
- Decontamination units my disturb neighbors with additional sights and sounds. The type of unit, placement at the site, and hours of use should be carefully considered.

Powerwashing and Vessel Wash Wastewater

Vessel wash wastewater, due to the activity of powerwashing, can carry various particulates including: dissolved metals, paint chips, organic materials, oils, and other chemicals. Furthermore, releasing of water onsite may induce erosion and release water with high sediment loads. The U.S. Environmental Protection Agency is in the process of administering state assessments and addressing the discharge of vessel wash wastewater nationwide.

To manage vessel wash wastewater for mobile onsite decontamination units, these are the following requirements:

- A reclamation mat that is impervious and temporary
- The reclamation mat should be large enough for the boat and major overspray
- The reclamation mat and/or decontamination unit system contains and directs the wastewater into a sump pump and back into the decontamination unit tank
- Disposal of water offsite from the public water access site. Required disposal methods include water collection into decontamination unit tanks and water treatment through filtering to remove solids and contaminants with transport to and disposal into city sewer
- Evidence of gas/petroleum sheen or odor during the use of mobile decontamination unit would require immediate transport and disposal of water offsite according to the required water disposal methods

Appendix B:
Boater Activity Guide

When at a public access, motor boat users follow a very detail-oriented, yet quick process to successfully launch/load their boats without causing conflicts with other users. Procedures to comply with AIS laws are integrated with activities.

Courtesy on the Boat Ramp

Courtesy at a boat ramp can go a long way in making everyone's day on the water enjoyable. Space is very limited at most sites and there is the possibility that a boater will be required to find another facility to use.

- The boat ramp and parking area is first come, first served.
- There may be a line on land and in the water as boats are putting in and coming out. The line on land determines the order of boats at the ramp/dock.
- Prepare your boat while away from the ramp.
- Non-boaters using the public access for angling, swimming (when allowed), dog training, or other water recreation activities must yield to the boaters using the ramp or dock. Reel in lines, move self and equipment off dock or ramp, and maintain control of animals and children.

Clear Lake public access

Bring extra water if using minnows or leeches to complete a water exchange before leaving to transport live bait.

Pre-Launch Preparations

Prepare your boat while at the make ready area. Take your time, be calm, and mentally go over everything you need to do before putting the boat in the water. This includes:

- Inspect your boat trailer and equipment for plants, animals, mud and water. Remove if found.
- Install your drain plug.
- Load all equipment from the vehicle to the boat. This includes fishing gear, coolers, life jackets, and anything you will use that needs to be loaded onto the boat prior to the boat getting on the ramp.
- Remove the tie-downs that secure the boat to the trailer. Do not remove the winch line from the bow eye.
- Unplug your trailer lights if they are not sealed and waterproof.
- Place fenders.
- Ready dock lines.
- Turn on battery switch.
- Pump the fuel primer bulb if you have one.
- Put the key in the ignition and check the battery.
- Once you are 100% ready, get your vehicle in line to use the ramp.

Launching

Your time on the ramp should be only a few minutes. If you experience problems, ask for help. If you are not experienced towing and backing a boat, practice during off-peak hours before going to a busy ramp.

Loading a boat on an access

If launching with more than one person:

- Put one person in the boat and one in the vehicle.
- Carefully back the boat into the water.
- The person in the boat unhooks the winch line from the bow eye and drives the boat off the trailer.
- The person in the boat should operate the boat away from the ramp and dock.
- The person in the tow vehicle should drive off the ramp to a parking space.
- The person in the boat returns to the dock to pick up the tow vehicle driver.

If launching with only one person (or with people that are not licensed to drive a motor vehicle):

- Attach the bow or docking line to the trailer or vehicle. This will keep the boat from floating away if the trailer is backed in too far.
- Carefully back the boat into the water.
- Unhook the winch line from the bow eye. Move the boat to the dock or shoreline (guide with bow line or climb aboard to operate boat) and secure.
- Move vehicle to a parking stall.

Loading

The line is formed by vehicles with trailers, not by vessels in the water.

- When loading with a partner, one person drives the boat up to the dock and drops off the vehicle driver. The boat driver then backs the boat away from the dock and waits for the driver to return with the vehicle. Only tie up to a dock if you are alone or with companions that are not licensed to drive a motor vehicle.
- When the vehicle arrives, the driver backs the trailer into the water and the boat driver gently drives the boat onto the trailer. Do not throttle above idle speed to move the boat farther up the trailer, this washes out the launch ramp.
- When the boat is on the trailer, the boat driver connects the winch strap and winches the boat the rest of the way up the trailer.
- The vehicle driver can also back in a little bit farther if needed to make cranking the boat up easier.
- When boat is all the way up and onto the trailer the vehicle driver can pull the boat out of the water and drive away from the ramp to the AIS Activity area/tie down lane. (Do not just pull up a few feet onto the ramp with the boat out of the water; this can create a back up to launch and load.)

Complete the Invasive Species Checklist:

- **CLEAN** your boat, trailer, and equipment.
- **REMOVE** aquatic plants, animals, and mud before leaving the water access.
- **DRAIN** water from your boat, motor, bilge, live wells, and bait containers before leaving the water access.
- **DUMP** BAIT WATER of unwanted bait as well as aquatic plants and animals

Loading Continued...

- Remove the key from the ignition
- Turn off equipment and battery switch
- Remove dock lines and fenders
- Plug in and check trailer lights
- Attach tie downs that secure boat to the trailer
- Load equipment from boat to vehicle
- Before using another water body, clean boat, and recreational equipment to remove or kill species that were not visible when leaving a waterbody
- SPRAY/RINSE with water, especially if moored for more than two days and/or DRY for at least five days
- Courtesy and boat ramp etiquette are the responsibility of everyone who uses the numerous ramps on Minnesota's waterways

Extra supply of water for bait bucket

Exchanging bait water

Dumping bait water into compost bin

Use compost bins to dump bait water/bait and/or exchange bait water. Preparation for the day includes extra water to use for exchanging bait water.

Additional Steps Are Recommended for the Following Activities:

Shore and fly-fishing
- Remove aquatic plants, animals, and mud from waders and hip boots.
- Drain water from bait containers.

Personal watercraft
- Avoid running engine through aquatic plants.
- Run engine for 5-10 seconds on the trailer to blow out excess water and vegetation from internal drive, then turn off engine.
- Remove aquatic plants and animals from water intake grate, steering nozzle, watercraft hull, and trailer.

Sailing
- Remove aquatic plants and animals from hull, centerboard or bilgeboard wells, rudderpost area, and trailer.

Scuba diving
- Remove aquatic plants, animals, and mud from equipment.
- Drain water from buoyancy compensator (bc), regulator, tank boot, and other containers.
- Rinse suit and inside of bc with hot water.

Waterfowl hunting
- Remove aquatic plants, animals, and mud from boat, motor, trailer, waders or hip boots, decoy lines, and anchors (elliptical and bulb-shaped anchors can help reduce snagging aquatic plants).
- Cut cattails or other plants above the waterline when they are used for camouflage or blinds.

MN DNR "Stop Aquatic Hitchhiker" sign

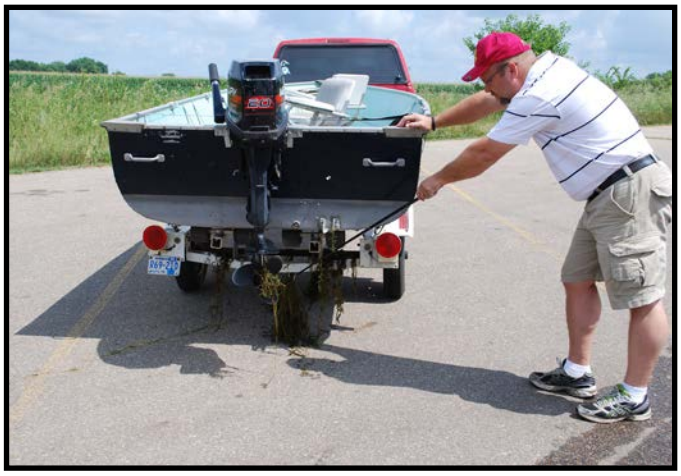
Appendix C:
Aquatic Plant Removal Tool

For many boaters, reaching or crawling under their boat to remove aquatic vegetation is quite difficult. Having a tool available that can reach underneath the boat trailer could improve AIS efforts for many boaters. This homemade version is less expensive than traditional litter picking tools which can cost anywhere from $15 to $40. This idea is in the appendix because it is not a modification to access sites but a potential accessory.

The tools could be supplied in combination with the compost bins at access sites. It would especially helpful at sites on lakes infested with Eurasian Water Milfoil and Curly Leaf Pondweed. These sites will naturally have a higher rate of vegetation removal from boats and trailers and other water-related equipment.

The aquatic plant removal tool will probably be more successful if it belongs to individual boaters rather than be a part of the AIS activity area. It has potential to be a future promotional item that could be given away at boating events or individuals could be encouraged to buy and build the tool themselves.

Aquatic plant removal tool in use



Aquatic plant removal tool in use

Tool Design

A 5/8 inch x 4' dowel is recommended for the handle. A rubber coated screw in hook is recommended for the end. The benefits of this design are:

- Inexpensive (less than $5 for parts).
- Easy to make yourself, or mass build and give away.
- Rubber coated hook (with wood screw end) will not scratch boats and equipment.
- The 5/8 inch diameter dowel makes it lightweight yet durable.
- Pre-drill the hole for the hook.
- Able to attach message decal or mark lengths on the dowel so it can double as a fish ruler.

Benefits

- Provides a way to reach under your boat and trailer to remove aquatic vegetation
- Best for lakes with vegetation issues, Eurasian Water Milfoil and Curly Leaf Pondweed
- Inexpensive, materials cost estimated at $5
- Can be kept in the boat or in the back of your vehicle
- Message decals can be placed on the dowel, especially AIS messages and sponsor information for free giveaways at public awareness events

Concerns

- If left unattended at access sites, it could be misused or stolen

Recommendations

The usefulness of this tool to each boater will vary based on the type of boat and style of boat trailer, and possibly age and physical ability of people in the boat. Vegetation removal is a great job for kids. Teach your kids this is part of the routine. The tool will supplement plant removal efforts and will work well in combination with the compost bins.

Aquatic plant removal tool in use

MATERIALS

1 - 4' hardwood dowel rod 5/8" thick

1 - vinyl coated metal plant hook with shape screw

1 - catch and release vinyl application with
Department of Natural Resources logo

Wood Glue

Optional - lanyard

DETAILS

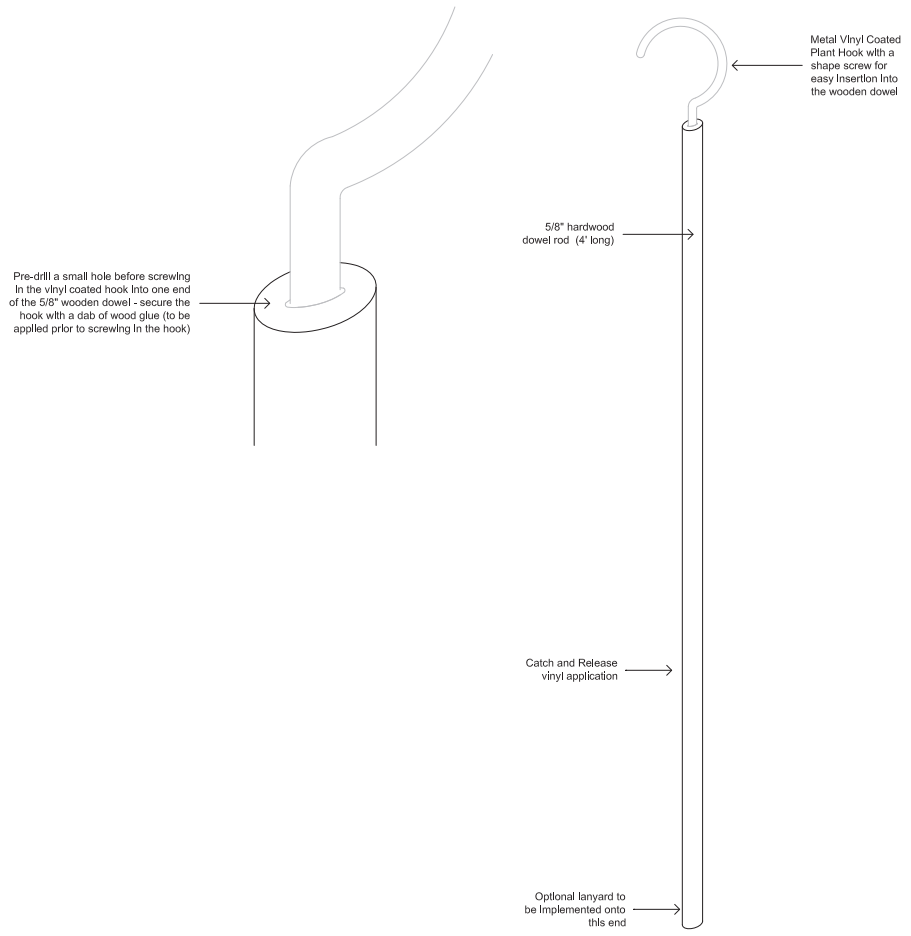
Pre-drill a small hole in one end to aid in the attachment of the vinyl coated metal plant hook

Place a small dab of wood glue into the hole prior to screwing in the plant hook

Screw the plant hook into the wood until the vinyl covered portion is flush with the end of the dowel

Adhere the vinyl Catch and Release information directly to the wooden dowel

If desired attach optional lanyard to the end opposite the plant hook



drawn by Joslyn Wood

N

SCALE IN FEET

Minnesota DEPARTMENT OF NATURAL RESOURCES

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION, AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MINNESOTA

Name: Reg. Number: XXXXX

Name

Date: 5.9.2011

Management Resources
Safety
Facilities
Materials
Equipment
Field Operations
Information Management

DNR Division of Sponsoring Division

Pull Tool

for Aquatic Invasive Species

County Near City

Section: xx Township: xxx N Range: xx W

Revisions

Date	By
04/14/11	JW
05/09/11	JW

Title: Vinyl Coated Pull Tool

Survey:	xx	00/00	Designed:	xx	04/11
Drawn:	xx	00/00	Drawn:	xx	04/11
Checked:	xx	00/00	Checked:	xx	04/11
Horz datum:			Vert datum:		

Sheet: L1

Req. Number: X ##-##

File Number: XXX ####.###.##

Appendix D:
AIS Prevention Ideas for Access Providers

Tasks of concern involve the repair, removal and installation of:

1. Fishing Piers
2. Boarding Docks
3. Launch Ramps
4. Buoys
5. Boat Lifts
6. Swim Rafts
7. Bait and Fish Traps
8. Bait and Fish Containers

Equipment affected:

Vehicles, boats, trailers, backhoes, tractors, excavators, lifting clamps, chains, hand tools, boots and waders, boarding docks, and fishing piers if being moved to a new site, fishing pier components (esp. floats which hold water), silt curtains, etc

Equipment needed:

Portable air compressor, brushes, towels

- The highest risk of spreading AIS is directly related to the movement of plants, animals, earth, and water on equipment.
- Take time to discuss operational procedures and expectations specific to your work area and equipment. Pay attention to areas that may hold water or debris. Share with others the methods that work best.
- Please encourage all staff and partners to be aware of these recommendations:

  1. Visually inspect all equipment to be used on site before leaving work station and before moving to another site. Remove all seeds, plants, and soil with a brush or compressed air. Remove standing water with a towel.

  2. Rental or partner equipment should be inspected before arriving on site or unloaded. If it is not clean, send it to get cleaned, preferably away from the site at a maintenance building.

  3. Power spray, thoroughly clean, and dry equipment at the end of the day so that it is ready for the next day.

  4. As a rule of thumb, treat every water body like it could be infested. Use common sense when planning the sequence of site visits for the day and complete the work on uninfested sites first.

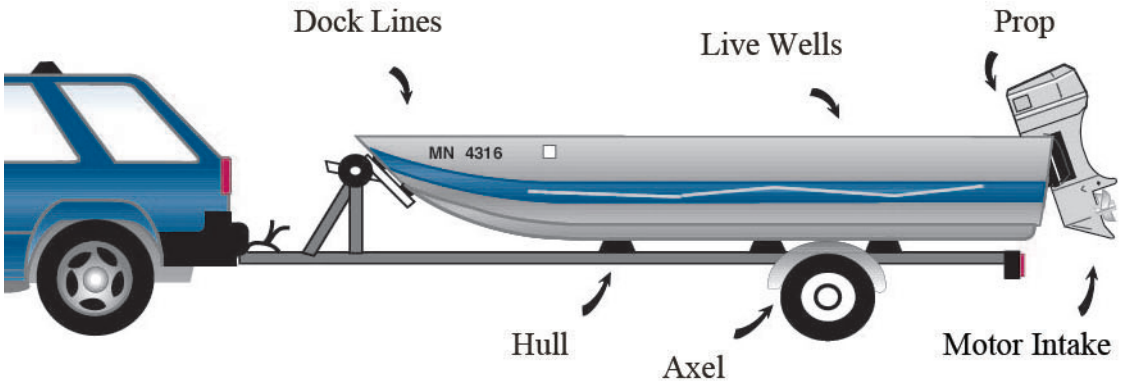
  5. Educate volunteers, contractors, partners, and all staff on the above recommendations and stipulate adherence in everyday work behaviors.

It is your personal responsibility to ensure that all equipment is clean in, clean out!

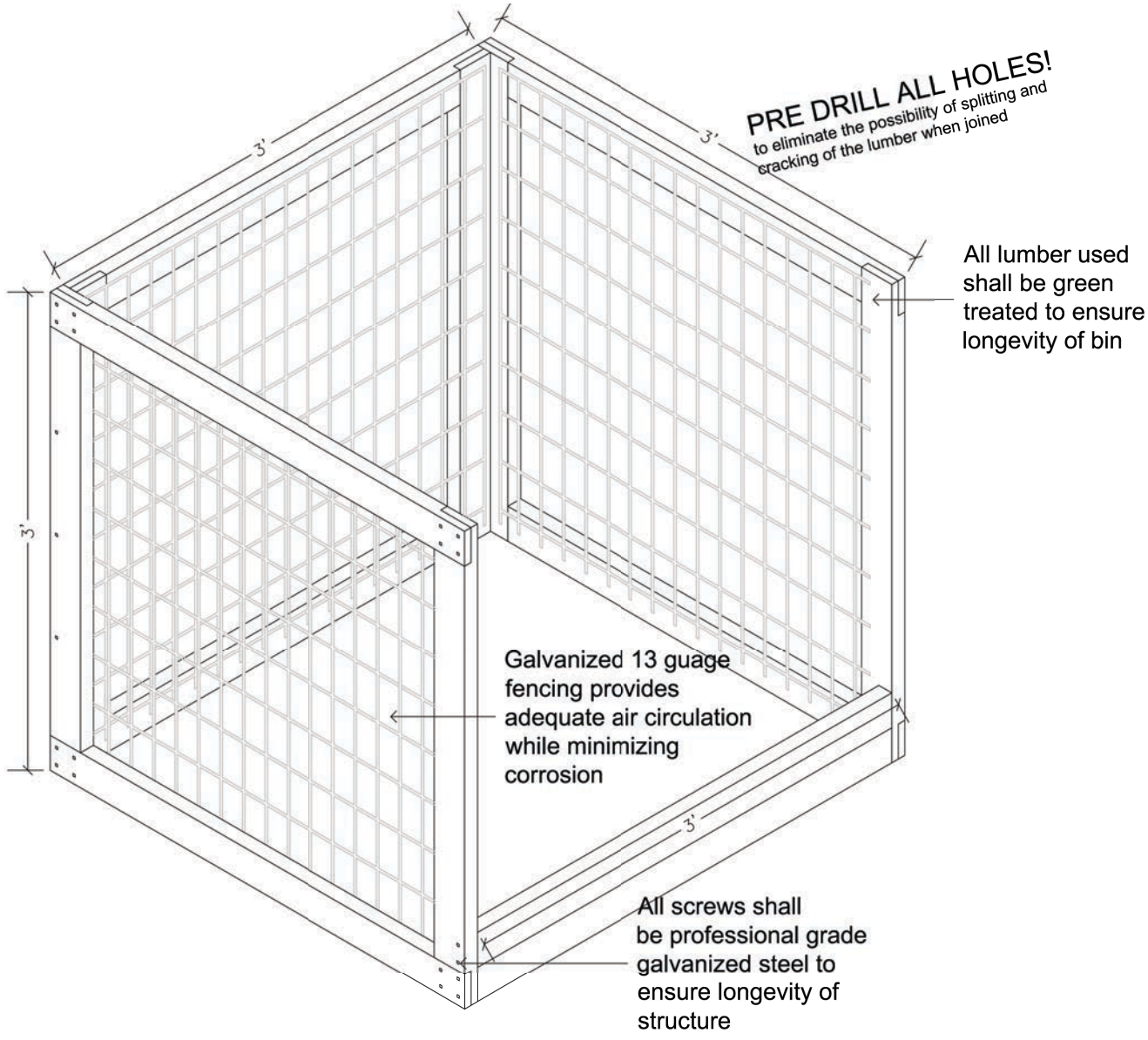
Recommendations to remove or render AIS non-viable

Species	Removal Methods	Drying Period	Wash Temp	Other
Aquatic Plants	Hand pick fragments from equipment. Power spray to remove mud and seeds.	10 days	140 F	Freeze for 1 week
Aquatic Animals	Inspect, power spray or scrape to remove.	Dry 4 days in temps over 65 F. Drying not recommended in cool, wet weather. It is not effective in these conditions.	104 F/4 min 120 F/1 min 140 F/5 sec	Freeze for 2 days

Inspect Everything!



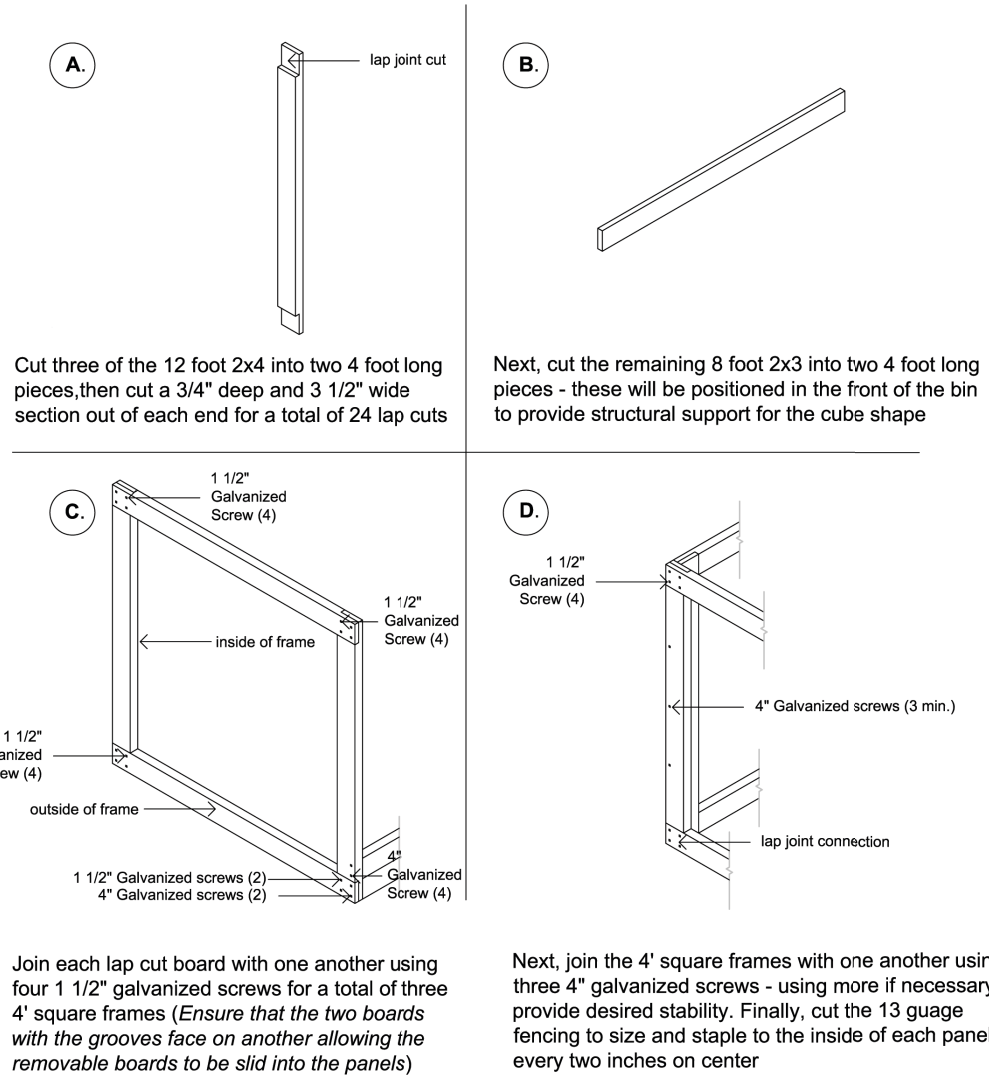
Appendix E:
Compost Bin Construction Plans



Materials

Five- 12 foot green treated 2x4
50+ - 1 1/2" professional grade galvanized screws
14+ - 4" professional grade galvanized screws
150in + x 48 in galvanized wire mesh fencing - 13 gauge minimum, 2x4 mesh size
160+ - Heavy Duty 3/8" Staples

Compost Bin Construction Plans



Details

Compost bin shall be placed directly onto the ground for optimal efficiency, but may be placed on a concrete/ aggregate surface if desired.

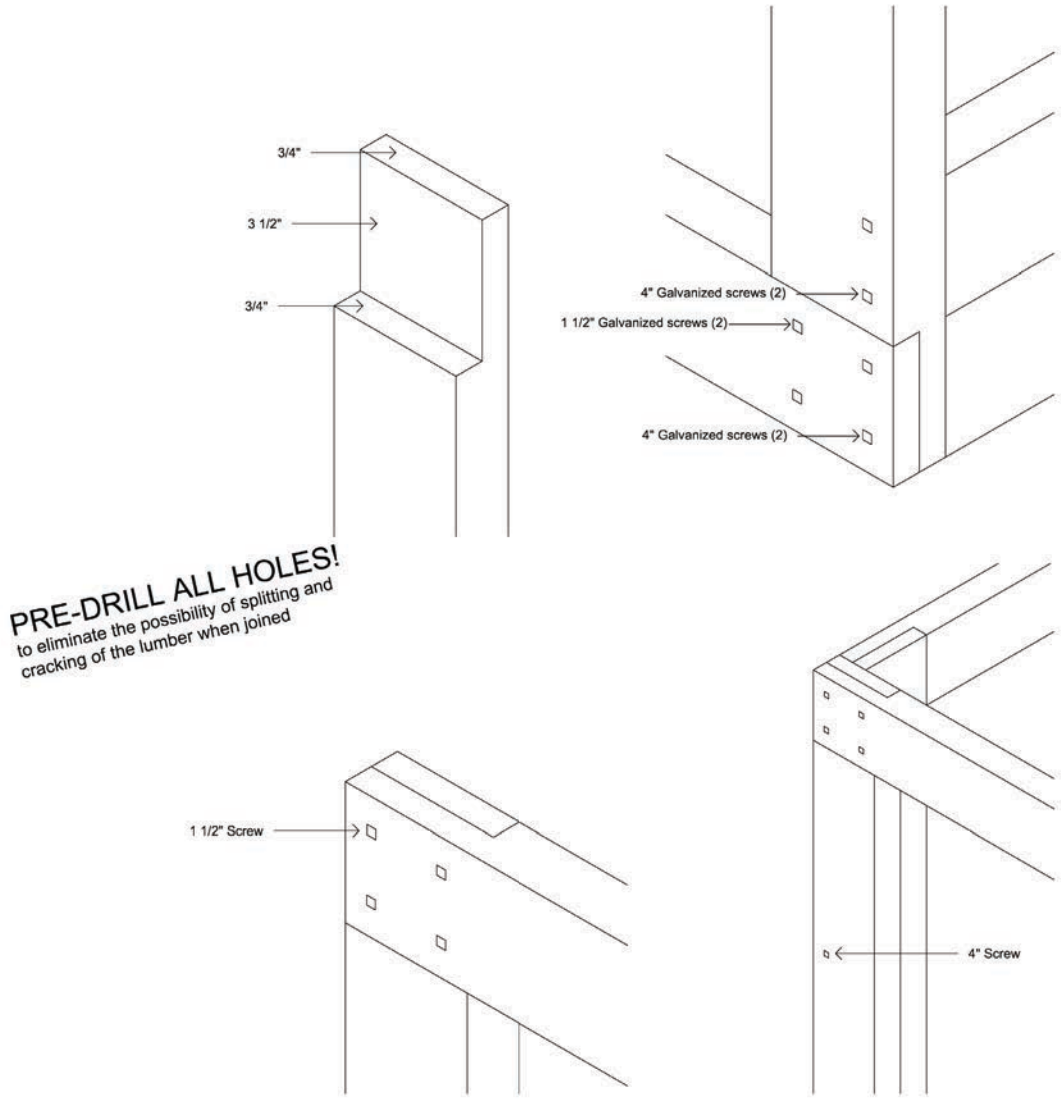
There shall be an ADA accessible path leading up to the compost bin.

All lumber shall be green treated to provide optimal longevity of the structure.

All screws shall be of professional grade galvanized steel to provide optimal longevity of the structure.

All connection holes shall be pre-drilled to minimize cracking and splitting of lumber as boards are joined.

Compost Bin Construction Plans



Suggestions

Attach the bin to the sign post that holds the sign. This will help anchor it and make it harder for someone to steal.

Additional anchors may be needed.

Appendix F: Stormwater References

The Minnesota Pollution Control Agency has developed a manual entitled *Protecting Water Quality in Urban Areas.* The manual addresses an array of Stormwater Best Management Practices.

www.pca.state.mn.us/water/pubs/sw-bmpmanual.html

Available through the Metropolitan Council, The Urban Small Sites Best Management Practices (BMPs) provides detailed information on BMP's aimed at managing stormwater pollution for small urban sites in cold-climate settings.

www.metrocouncil.org/environment/watershed/bmp/manual.htm

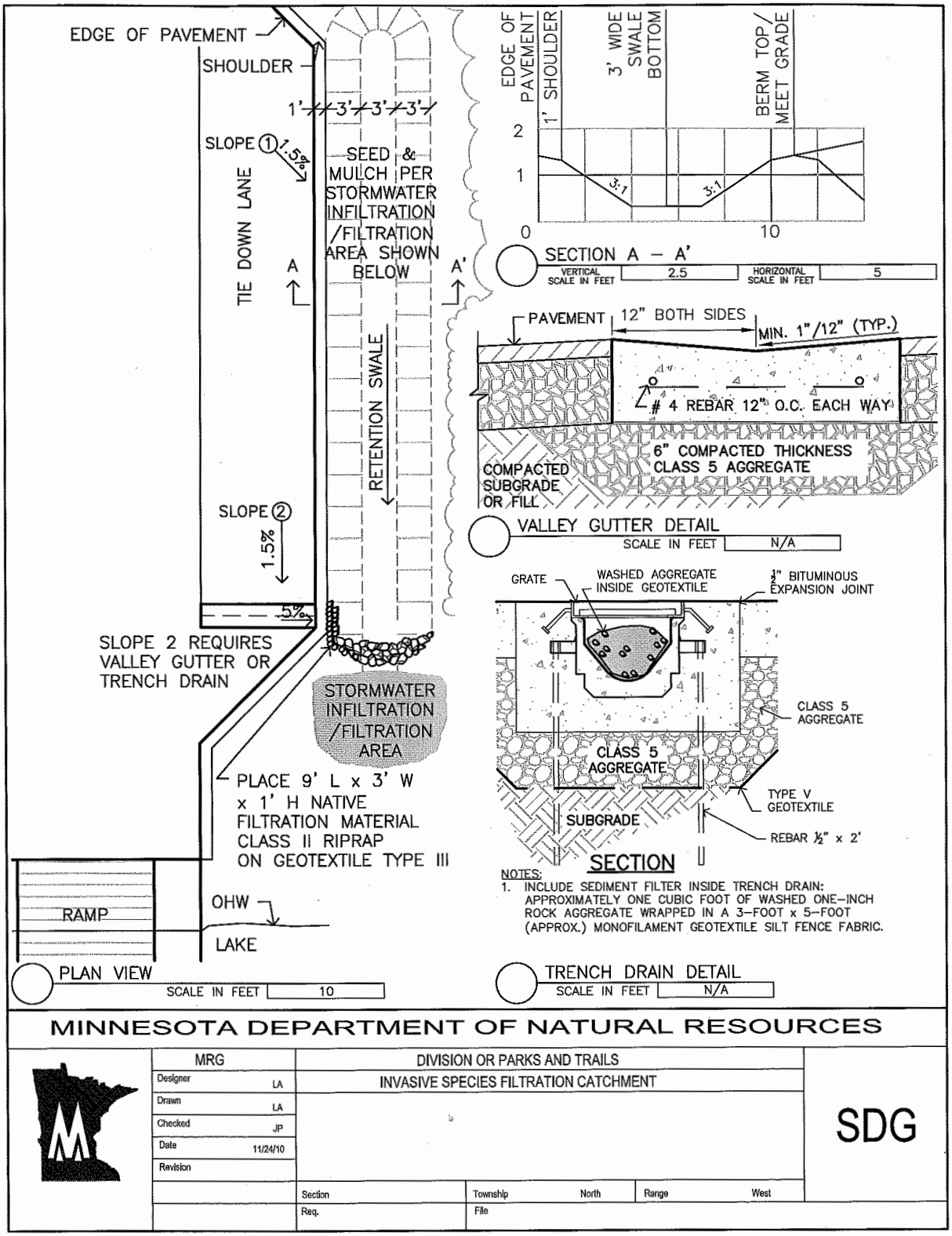
The Minnesota Stormwater Manual is an in-depth, all encompassing manual that is revised every two years and is a great tool for engineers and landscape architects.

http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/minnesota-s-stormwater-manual.html

The Board of Soil and Water Resources provides Native Vegetation Establishment and Enhancement Guidelines that recommend diversity levels, native varieties and seed mixtures.

http://www.bwsr.state.mn.us/native_vegetation/seeding_guidelines.pdf

Example Storm Water Design Plan



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We want your photos!

Send your local DNR contact before and after photos of your improved access AIS activity area.

Minnesota Department of Natural Resources

DNR Administrative Regions