



Wisconsin DNR Decontamination and Disinfection Manual Code

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Wisconsin Lakes Partnership Convention
Wednesday April 5, 2017



Prevention

**PREVENT THE SPREAD OF
INVASIVE SPECIES
IT'S THE LAW**

PENALTIES MAY EXCEED \$2000

Before *launching* and before *leaving* ***YOU MUST:***

- ✓ **INSPECT** boats, trailers, and equipment.
- ✓ **REMOVE** all attached aquatic plants and animals.
- ✓ **DRAIN** all water from boats, vehicles, and equipment.
- ✓ **NEVER MOVE** plants or live fish away from a waterbody.*

 **STOP AQUATIC HITCHHIKERS!**
Prevent the spread of invasive species, it's the law

 *Limited exceptions apply. Visit WWW.DNR.WI.GOV and search for "BAIT LAWS."



**STOP AQUATIC
HITCHHIKERS!™**

Prevent the transport of nuisance species.
Clean all recreational equipment.

www.ProtectYourWaters.net



Prevention



However...





Manual Code 9183.1

- Prepared in 2007; updated in 2016
- Inspect & remove, drain, dispose
- **DISINFECT** by either:
 - Dry 5 days,
 - Steam,
 - Chlorine, or
 - Virkon



Manual Code 9183.1

- Revision needed
 - New species
 - Research gaps





Revisions from 2010 to 2016

- Definitions
- Upstream crossing barrier
- Added hot water ($\geq 140^{\circ}$ F)
- Virkon increased 1% to 2%
- Chlorine increased 200 to 500 ppm
- Rinse water from clean source
- Updated safety
- **Condition of grants & permits**



Manual Code

- Therefore, Counties or Lake Associations that receive DNR funding or permits must follow MC and also make any subcontractors working under DNR funding of permits must disinfect per MC when moving between waters.



Preparing to sample

1. Review manual code
2. Review best management practices
3. Check for known AIS
4. Select best disinfection for species



dnr.wi.gov search "disinfection"

Boat, gear and equipment decontamination and disinfection manual code

This page outlines best management practices (BMP) for the decontamination of boats, equipment and gear to prevent the spread of aquatic invasive species (AIS) between waters. It is

1. Review the Manual Code

equipment when transporting equipment. Members of the general public who use boats and/or participate in water recreation are required to follow the decontamination procedures in s. NR

40.02(44). Following the general public permit if you are required permit or [the invas](#)

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about invasive species in Wisconsin.

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Order

- [MC 9183.1 memo \[PDF\]](#)
- [MC 9183.1 21 day review public comments and responses](#)
- [Manual Code #9183.1 \[PDF\]](#)
- [Full BMPs for boat, gear and equipment decontamination \[PDF\]](#)
- [Questions and answers \[PDF\]](#)
- [Implementation chart \[PDF\]](#)
- [AIS prevention for the general public](#)
- [Species specific tables \[PDF\]](#)
- [Where to find aquatic invasive species records \[PDF\]](#)


- [MC 9183.1 me](#)
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- [Where to find](#)

BMPs are the current Manual Code #9183.1. They represent the most stringent actions water users can take to ensure they are not being moved by them, and will be periodically updated to reflect the latest scientific findings for decontamination. The guidelines outlined in this document cover many gear types, but do not cover all gear types. Boats, gear and equipment not expressly mentioned in this document that come in contact with surface waters are still subject to Manual Code #9183.1.



Manual Code

- Scope
- Policy
- Definitions
- Procedure
 - Decontamination & disinfection steps
 - Safety
 - Special instructions
 - Disinfectant sources
 - More information

State of Wisconsin Department of Natural Resources Manual Code # 9183.1 Boat, Gear, and Equipment Decontamination and Disinfection Protocol	
 Ed Eberle, Assistant Deputy Secretary	<u>06/16/2016</u> Date
Rescinds and replaces: 9183.1 Date 04-10-2015	Approved by OMT: 04-10-2015

I. SCOPE

This manual code applies to all Department of Natural Resources employees moving boats, gear, and equipment between waterbodies and/or crossing a barrier while moving from downstream to upstream on the same waterbody or a connected waterbody, whether or not the presence of aquatic invasive species is known. This manual code outlines the minimum requirements to be followed by employees, and does not preclude employees from taking additional actions.

Employees will require any agents or service providers through the specific contract or agreement conferring that agency status or engaging that service provision to follow this manual code. Compliance with this manual code may be considered reasonable precautions as defined by s. NR 40.02(44), Wis. Adm. Code. Manual Code 9183.1 was developed in 2007 to provide department employees boat and gear disinfection guidelines. Based on new research and discoveries, Manual Code 9183.1 was amended in 2015 to improve the department decontamination/disinfection policy. This manual code will be effective on June 16, 2016.

Employees are advised to include this manual code and associated BMP's requirements in applicable permits where allowed by the underlying regulatory authority or agreed to with the permittee. Each permitting program is subject to its own statutory and code standards that must be assessed when considering decontamination/disinfection requirements.

II. POLICY

It is the department's policy to follow proper protocol for decontamination/disinfection to ensure that employees are minimizing or eliminating the risk of spreading aquatic invasive species and/or pathogens through work activities, and to comply with ch. NR 40, Wis. Adm. Code, s. NR19.055, Wis. Adm. Code, and ch. 23, Wis. Stats.



dnr.wi.gov search "disinfection"

Boat, gear and equipment decontamination and disinfection manual code

This page outlines best management practices (BMP) for the decontamination of boats, equipment and gear to prevent the spread of aquatic invasive species (AIS) between waters. It is supplemental to Manual Code #9183.1 and includes information for employees, contractors, and the general public. Disinfection procedures for boats, gear and equipment when transporting equipment. Members of the general public who use boats and/or participate in water recreation are required to follow the decontamination procedures in s. NR 40.02(44). Following the general public permit process, if you are required to follow the disinfection procedures, you may be required to obtain a permit or [the invasive species](#)

2. Review the BMPs

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- [MC 9183.1 memo \[PDF\]](#)
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- [Species specific tables \[PDF\]](#)
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- [Species specif](#)
- [Where to find](#)

BMPs are the current best management practices for Manual Code #9183.1. They represent the most stringent actions water users can take to ensure they are not being moved by their activities, and will be periodically updated to reflect the latest scientific findings for decontamination. The guidelines outlined in this document cover many gear types, but do not cover all gear types. Boats, gear and equipment not expressly mentioned in this document that come in contact with surface waters are still subject to Manual Code #9183.1.

Best Management Practices for Boat, Gear and Equipment Decontamination

March 2017

Contents

ACKNOWLEDGEMENTS	2
INTRODUCTION	3
GENERAL PRACTICES	3
DISINFECTANT SPECIFIC PRACTICES	3
GEAR SPECIFIC PRACTICES.....	8
APPENDIX: LITERATURE REVIEW ON EFFICACY OF DISINFECTION METHODS BY SPECIES	12
Table 1 Efficacy of treatment methods for macrophytes and algae.....	12
Table 2 Efficacy of treatment methods for invertebrates.	13
Table 3 Efficacy of treatment methods for viruses and diseases.	14
REFERENCES	15



Best Management Practices

- General
 - Before, during and after
- Gear
 - Personal, sampling, nets, boats, heavy
- Method
 - Hot water, drying, virkon, chlorine

dnr.wi.gov search "disinfection"

General practices

Before During After

Before

- Be aware of infestations in your management area. The "[Where to find aquatic invasive species records \[pdf\]](#)" document has been created to assist in finding where species have been documented and verified across the state.

Gear-specific methods

Personal gear Sampling gear Nets Boats Motors Heavy equipment

Personal gear

- To remove debris, scrub personal gear with a stiff-bristle brush and rinse with clean water

Method-specific information

While simple prevention methods, such as hand removal, can reduce the majority of AIS found on gear and equipment, additional decontamination methods are still required to get rid of any elements that may not be seen. The manual code has been developed with this in mind and gives employees a range of effective methods for disinfecting equipment, as well as the ability to choose which options are practical for specific situations. The following section will provide more detail on each disinfection option outlined in the manual code.

Steam Hot water Drying Virkon® Chlorine Freezing



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Boat, gear and equipment decontamination and disinfection manual code

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3. Check for species present

equipment when transporting equipment. Members of the general public who use boats and/or participate in water recreation are required to follow the decontamination procedures in s. NR

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- [AIS preventio](#)
- [Species specif](#)
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Where to Find Aquatic Invasive Species

The following five tools can be used to determine whether a species has been reported to the Wisconsin Department of Natural Resources. They are listed in order of greater information to less information. More information will require a few more steps to access the data, but the easier records are to access, the less information they will have. Additional details on each tool are provided on the following pages.

1. **Lake and Aquatic Invasive Species Mapping Tool, pg. 2**
<http://dnr.wi.gov/lakes/viewer/>
2. **AIS by Species List, pg. 4**
<http://dnr.wi.gov/lakes/invasives/BySpecies.aspx>
3. **Lake Page, pg. 5**
<http://dnr.wi.gov/lakes/lakepages/Default.aspx>
4. **AIS by Waterbody List, pg. 6**
<http://dnr.wi.gov/lakes/invasives/AISByWaterbody.aspx>
5. **Map of Distribution of WI Fish Species, pg. 7**
https://cida.usgs.gov/wdnr_fishmap/map/

DISCLAIMER: Aquatic invasive species records are either listed as "verified", "observed", or "no longer observed" based on listing criteria. In general, "verified" populations are established and have been verified by a taxonomic expert. Populations listed as "observed" have not been verified by a taxonomic expert or do not have established populations. Populations that are "no longer observed" include populations where a reproducing population did not establish. Our inventories are not necessarily exhaustive so it is important to report occurrences: <http://dnr.wi.gov/topic/invasives/report.html>.



Select best method for species

- Check!
- Spatial and tabular data available
- Sample from least to most known AIS

Data & Maps

- + Lakes and aquatic invasive species mapping tool
- + Lakes and Rivers with Aquatic Invasives
- + Sign Installation
- + Species Locations
- + Watercraft Inspection Data

dnr.wi.gov search "AIS efforts"

Lakes & AIS Mapping Tool

Bureau of Water Quality, Environment Management Division

Search...



Basic Tools

Identify Tools

Drawing & Measuring

Find Location

Maps & Data

Help



Home

Lakes and Aquatic Invasive Species Mapping Tool



Print Map



Help

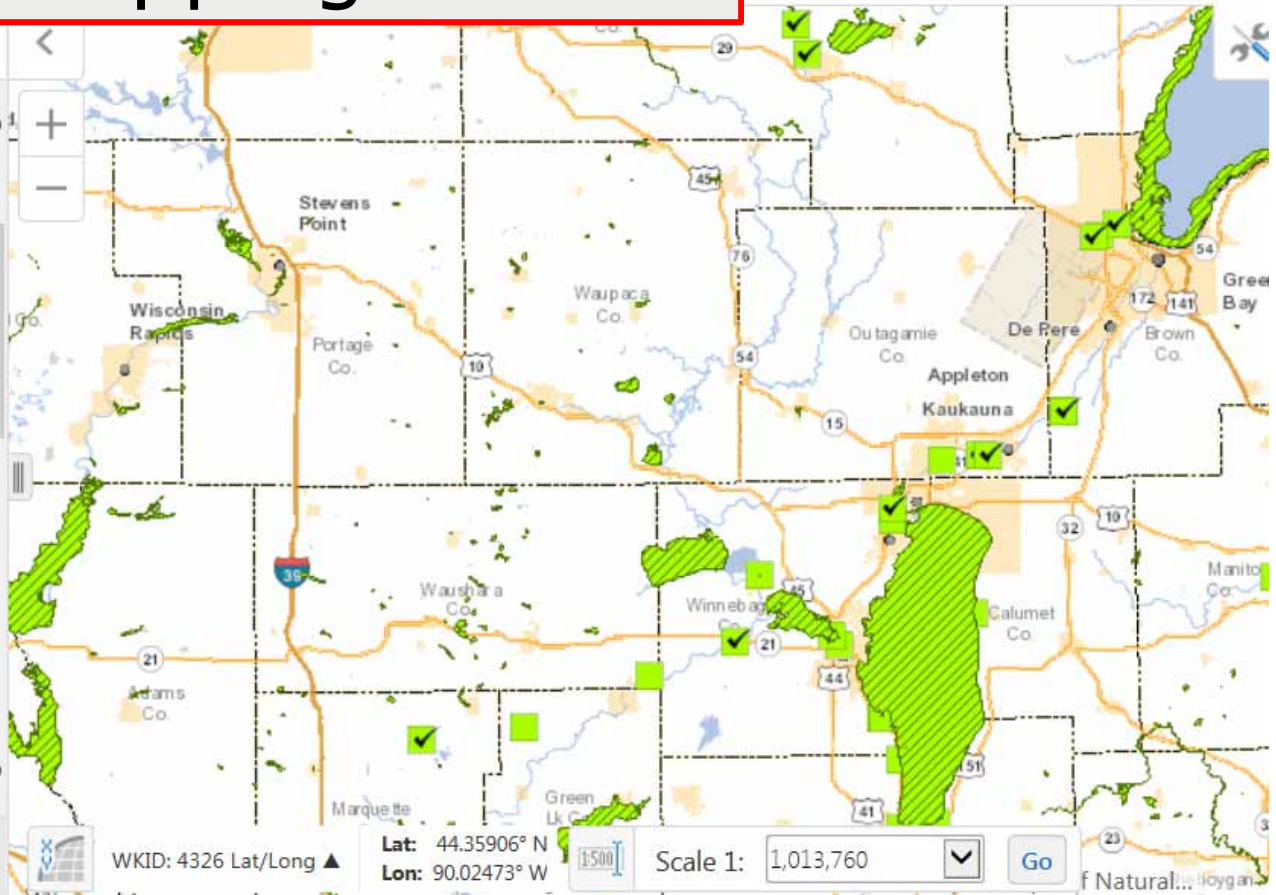


Feedback

Other Tools & Actions

Layers

- Invasive Aquatic Plants
 - Brittle Waterlily (*Najas minor*)
 - Curly-Leaf Pondweed (*Potamogeton crispus*)
 - Eurasian Water-Milfoil (*Myriophyllum spicatum*)
 - Hybrid Water-Milfoil (Eurasian x Northern)
 - Java Water Dropwort (*Oenanthe javanica*)
 - Starry Stonewort (*Nitellopsis obtusa*)
 - Water Hyacinth (*Eichhornia crassipes/azurea*)
 - Water Lettuce (*Pistia stratiotes*)



Lakes & AIS Mapping T...

Layers

WKID: 4326 Lat/Long ▲

Lat: 44.35906° N
Lon: 90.02473° W

1:500

Scale 1: 1,013,760

Go



Aquatic Invasive Species

Location

Aquatic Invasive Species

Guidance.

"observed"

observed"

Lakes, Rivers, and Wetlands with Aquatic Invasive Species

based on AIS Status

ations with the

ns with the "no longer

necessarily exhaustive so

it is important to report occurrences. To report new discoveries visit: <http://dnr.wi.gov/topic/Invasives/report.html>. See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stats.].

To Excel

< First	< Prev	Page 1 of 99	Next >	Last >
Waterbody Name	Waterbody ID Code (WBIC)	Invasive Species		
Adams County (28)				
Arkdale Lake	1374300	Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-Milfoil, Purple Loosestrife, Rusty Crayfish, Water Hyacinth		
Big Roche A Cri Creek	1374100	Japanese Knotweed, Rusty Crayfish, Water Hyacinth, Zebra Mussel		
Bia Roche a Cri	1374800	Chinese Mystery Snail, Curly-Leaf Pondweed, Eurasian Water-		

Co

For

con

[W](#)

[D](#)

[B](#)

[A](#)

[C](#)



Asiatic Clam (Corbicula)

Select Another Location:

Statewide

Total Locations: 22

Total Lakes

Species Locations

Disclaimer: Aquatic Invasive Species (AIS) status is assigned based on AIS Status Guidance. In general, "verified" populations are established and have been verified by a taxonomic expert. Populations with the "observed" status have not been verified by a taxonomic expert or do not have established populations. Populations with the "no longer observed" status include populations where a reproducing population did not establish. Our inventories are not necessarily exhaustive so it is important to report occurrences. To report new discoveries visit: <http://dnr.wi.gov/topic/Invasives/report.html>. See the Aquatic Invasive Species Guidance for information on how statuses are assigned. Personally identifiable information on data collection forms may be provided to requesters to the extent required by Wisconsin's Open Records Law [ss. 19.31-19.39, Wis. Stat. 19.31-19.39].

Aquatic Invasive Species

Contact information

For information on Lakes in Wisconsin, contact:

[Wisconsin DNR Lakes](#)

Division of Water

Bureau of Water Quality

[Aquatic Invasive Species](#)

[Contacts](#)

[By County](#) | [By Waterbody](#) | [By Species](#) | [By Year](#) | [Open In Excel](#)

Waterbody	Status	Waterbody ID Code (WBIC)	County
Bohners Lake	Verified and Vouchered	750800	Racine
Browns Lake	Verified and Vouchered	750300	Racine
Eagle Spring Lake	Verified and Vouchered	768600	Walworth, Waukesha
Fox River - CTH E	Verified and Vouchered	742500	Waukesha
Lake Andrea	Verified and Vouchered	733850	Kenosha



Business Licenses & Regulations Recreation

Aquatic Invasive Species Locations

- [All - New 2016](#)
- [All - New 2017](#)
- [Asiatic Clam \(Corbicula\)](#)
- [Banded Mystery Snail](#)
- [Bighead Carp](#)
- [Brittle Waternymph](#)
- [Chinese Mystery Snail](#)
- [Curly-Leaf Pondweed](#)
- [Eurasian Water-Milfoil](#)
- [Faucet Snail](#)
- [Fishhook Waterflea](#)
- [Flowering Rush](#)



dnr.wi.gov search "disinfection"

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Literature Review

- 80 scientific publications

<p>Virucidal Activity of Two Iodophors to Salmonid Virus</p> <p>DONALD F. AMEND AND JOHN P. PIETSCH <i>U.S. Bureau of Sport Fisheries and Wildlife Western Fish Disease Laboratory, Seattle, Wash. 98115, USA</i></p> <p>AMEND, D. F., AND J. P. PIETSCH. 1972. Virucidal activity of two iodophors to salmonid viruses. <i>J. Fish. Res. Bd. Canada</i> 29: 61-65.</p>	<p>Viability of Aquatic Plant Fragments following Desiccation</p> <p>Matthew A. Barnes, Christopher L. Jerde, Doug Keller, W. Lindsay Chadderton, Jennifer G. Howeth, and David M. Lodge*</p>	
<p><i>North American Journal of Aquaculture</i> 64:220-223, 2002 © Copyright by the American Fisheries Society 2002</p> <p>Field Testing of Protocols to Prevent the Spread of Zebra Mussels <i>Dreissena polymorpha</i> during Fish Hatchery and Aquaculture Activities</p> <p>WILLIAM J. EDWARDS,* LISA BABCOCK-JACKSON,¹ AND DAVID A. CULVER <i>The Ohio State University, Department of Evolution, Ecology, and Evolutionary Biology.</i></p>	<p>Survival of the exotic Chinese mystery snail (<i>Cipangopaludina chinensis malleata</i>) during air exposure and implications for overland dispersal by boats</p>	
<p>Tolerance of the Asiatic Clam <i>Corbicula</i> spp. to Levels of Toxic Stressors—A Review</p> <p>Francis G. Doherty</p>	<p><i>North American Journal of Fisheries Management</i> 28:1172-1176, 2008 © Copyright by the American Fisheries Society 2008 DOI: 10.1577/M07-028.1</p> <p>Application of Household Disinfectants to Control New Zealand Mudsnails</p> <p>GEORGE J. SCHISLER AND NICOLE K. M. VIEIRA* <i>Colorado Division of Wildlife, Aquatic Research Unit</i></p>	<p><i>Aquatic Botany</i>, 35 (1989) 167-180 Elsevier Science Publishers B.V., Amsterdam — Printed in The Netherlands</p> <p>SEED DISPERSAL OF THREE NYMPHAEID MACROPHYTES</p>
<p>American Fisheries Society Symposium 29:217-225, 2002 © 2002 by the American Fisheries Society</p> <p>Whirling Disease Prevention, Control, and Management: A Review</p> <p>ERIC J. WAGNER Fisheries Experiment Station, 1465 West 200 North, Logan, Utah 84321, USA ewagner@utmsi.com</p>	<p><i>Hydrobiologia</i> (2013) 673:587-574 DOI 10.1007/s10750-011-0804-1</p> <p>PRIMARY RESEARCH PAPER</p> <p>Effects of desiccation on two life stages of an invasive snail and its native cohabitant</p> <p>Allison M. Wood · Cody R. Haro · Roger J. Haro · Gregory J. Sandland</p>	<p><i>Journal of Great Lakes Research</i>, 39(6), 2013, 2171-2184 © 2013, by the Association for the Sciences of Limnology and Oceanography, Inc. doi:10.1016/j.jglr.2013.06.017</p> <p>Effects of chemical and physical conditions on hatching success of <i>Bythotrephes longimanus</i> resting eggs</p> <p>Donn K. Branstrator,* Lyle J. Shannon, Meghan E. Brown,* and Marte T. Kitson* Department of Biology, University of Minnesota Duluth, Duluth, Minnesota</p>



Table 2 Efficacy of treatment methods for invertebrates.

AIS	Steam Cleaning (212°F)	Hot Water (140°F, ≤10 min)	Drying (5 days)	Chlorine (500 ppm, ≤10 min)	Virkon (2:100 solution, ≤20 min)	Freezing (26°F, ≤24hrs)
Faucet Snail	✓	✓ ^{18*}	⊗ ^{18,35}	⊗ ¹⁸	Ⓡ ¹⁸	✓
New Zealand mud snail	✓	✓ ^{4,65*}	✓ ^{6*,66*}	⊗ ^{21, 78*}	✓ ^{10*, 76, 77}	✓ ^{4,6*}
Quagga Mussel (Adults)	✓ [†]	✓ ^{7*,16*}	✓ ^{14*,67}	✓	✓ ⁹	✓
Quagga Mussel (Veligers)	✓ [†]	✓ ^{4,17}	✓ ^{69*, 79*}	✓	✓ ⁹	✓
Zebra Mussel (Adult)	✓ [†]	✓ ^{7*,8*,54,67}	✓ ^{14*,25*,67}	✓ ^{11,19,22}	Ⓡ	✓ ^{25,27,67,68}
Zebra Mussel (Veligers)	✓ [†]	✓ ⁴	Ⓡ	✓	Ⓡ	✓
Asian Clam	✓	✓ ^{4,37,41,42,43}	⊗ ^{4,44*,45}	⊗ ^{36*,37*,38*,39*,40}	✓ ²³	✓ ^{46*}
Spiny Water Flea (Adult)	✓	✓ ^{7*,47*}	✓ ⁴	✓ ⁷⁸	✓ ⁷⁸	✓ ⁷⁸
Spiny Water Flea (Resting Eggs)	✓	✓ ^{2*}	✓ ^{2*}	⊗ ^{2, 78*}	✓ ⁷⁸	✓ ^{2*}
Bloody Red Shrimp	Ⓡ	Ⓡ	Ⓡ	Ⓡ	Ⓡ	Ⓡ
Rusty Crayfish	?	?	?	?	?	?

*Additional details:

² Frozen in water, not just in air; Hot water: 50°C (122°F) for >5 min (or 1 min at >50°C); Drying: ≥ 6 hr @ 17°C (63°F)

⁶ Drying: Must ensure hot and dry environment (>94°F for 24hrs; >104°F (40°C) for >2 hours); Freezing: < 27°F /





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Decontaminate

- Inspect
- Remove
- Drain





Disinfect

- Pick one of 4 options:
 - Dry five days
 - $\geq 140^{\circ}\text{F}$
 - 500 ppm chlorine (bleach solution)
 - 2% Virkon Aquatic

Drying

- Soap and water or pressure wash, then store for 5 days
- Safety
 - No PPE required



Hot Water or Steam

- Remove organic debris
- ≥ 140 ° F
(car washes are not hot enough)
- Safety
 - Heat resistant gloves & clothing



Hot Water or Steam





Chlorine Solution

- Consider shelf life (24 hours!)
- 500 ppm solution ~ 2.5 tbsp/gal
- Check label concentration
- Soak 10 min
- Sodium thiosulfate (neutralize bleach)
- Rinse with tap water
- Safety:
 - Emergency eyewash station, eye protection, and nitrile gloves
 - Stay upwind of spray

Virkon Aquatic

- Consider shelf life
- 2:100 solution ~5.4 tbsp/gal
- Soak 20 min
- Safety:
 - Emergency eyewash station, eye protection, and nitrile gloves
 - Splash goggles and/or face shield
 - Respirators advised
 - Stay upwind of spray



Disinfect Everything!

- Make sure to disinfect waders/sandals/boots used for early spring launching, or work in wetlands or streams.





Where is Decontamination Required?

- Lakes, ponds, streams, or wetlands.
- Applies to gear, machinery, footwear, everything that could pick up a seed, plant fragment, or a disease organism



When is Manual Code Level Disinfection Required?

- Minimally, you must always inspect, remove, and drain per NR 40, even if there is no grant or permit.
- If you're working under DNR grants or permits, you must ALSO disinfect per the Manual Code.



Support

- Website: dnr.wi.gov search “disinfection”
 - Manual Code
 - Best Management Practices
 - **Question and Answer document**
 - **Implementation Chart**
 - Prevention for general public
 - Species specific table
 - Where to find AIS
 - **Training video** [coming soon!](#)



dnr.wi.gov search "disinfection"

Boat, gear and equipment decontamination and disinfection manual code

This page outlines best management practices (BMP) for the decontamination of boats, equipment and gear to prevent the spread of aquatic invasive species (AIS) between waters. It is supplemental to Manual Code #9183.1 Boat, Gear and Equipment Decontamination and Disinfection Protocol, which requires all Wisconsin Department of Natural Resources employees, agents and service providers, and some permittees to take steps to decontaminate boats, gear and equipment when transporting equipment. Members of the general public who use boats and/or participate in water recreation are required to follow the decontamination procedures in s. NR 40.02(44). Following the general public permit if you are required to follow the decontamination procedures in s. NR 40.02(44). Following the general public permit if you are required to follow the decontamination procedures in s. NR 40.02(44).

Learn
about invasive species in Wisconsin.

Subscribe
to the invasive species rules and regulations email list.

Report
an invasive species in your area.

Order

Following the general public permit if you are required to follow the decontamination procedures in s. NR 40.02(44).

- [MC 9183.1 memo \[PDF\]](#)
- [MC 9183.1 21 day review public comments and responses](#)
- [Manual Code #9183.1 \[PDF\]](#)
- [Full BMPs for boat, gear and equipment decontamination \[PDF\]](#)
- [Questions and answers \[PDF\]](#)
- [Implementation chart \[PDF\]](#)
- [AIS prevention for the general public](#)

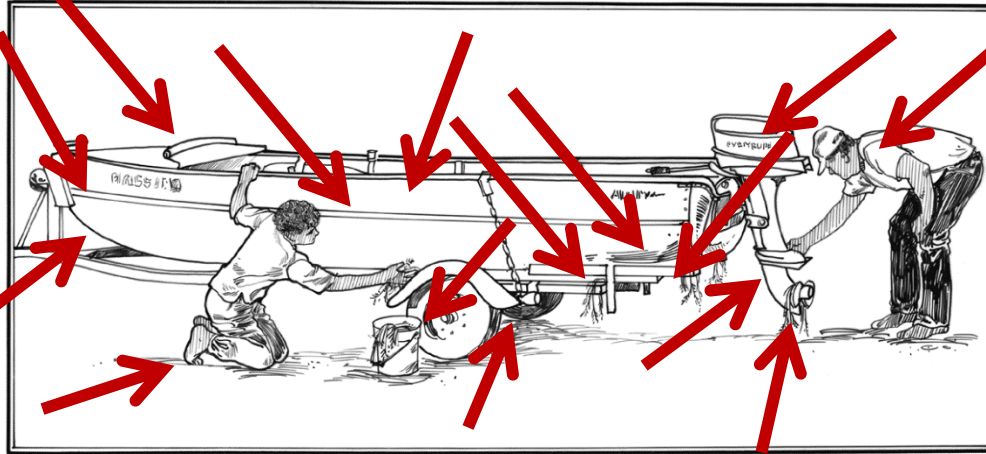
- [MC 9183.1 memo](#)
- [MC 9183.1 21 day review public](#)
- [Manual Code #9183.1](#)
- [Full BMPs for boat, gear and equipment decontamination](#)
- [Questions and answers](#)
- [Implementation chart](#)
- [AIS prevention for the general public](#)
- [Species specific](#)
- [Where to find](#)

Training video coming soon!

BMPs are to be updated to reflect the latest scientific findings for decontamination. The guidelines outlined in this document cover many gear types, but do not cover all gear types. Boats, gear and equipment not expressly mentioned in this document that come in contact with surface waters are still subject to Manual Code #9183.1.

[PDF]

Questions?



Remember, we are the stewards – always disinfect!



Check out the posters on the Handheld Steam Cleaner and the Lakes and AIS Mapping Tool

Learn more at the DNR Doctor Hours booth!

Thursday	8:30-9:00
	10:45-11:15
	11:45-12:15
	1:15-1:45
	3:15-3:45

Friday	8:45-9:15
	10:15-10:45