

PROTECT YOUR BOAT! **FIGHT ZEBRA MUSSELS**

A GUIDE TO CLEANING BOATS AND PREVENTING MUSSEL DAMAGE



DON'T MOVE A MUSSEL
2012

What is being done to contain the zebra mussel?

Local, state and federal agencies have joined forces to avert further infestations of zebra mussels and are urging boaters to help stop the spread of zebra mussels in Connecticut.

A multi-agency task force including the Connecticut Department of Energy and Environmental Protection, Candlewood Lake Authority, Friends of the Lake, Lake Lillinonah Authority, Lake Zoar Authority, FirstLight Power Resources, Housatonic Valley Association, Western Connecticut State University, CT BASS Federation Nation as well as local waterfront residents and others, has launched an outreach campaign to alert the public – and particularly boat owners – about the zebra mussel threat.

Boaters should be aware that some state and federal laws now make it illegal to transport invasive species. Boats found with evidence of the mussels may be quarantined and boat owners may face fines in some states. Some local authorities have instituted inspection programs at their lakes and reservoirs where contaminated or suspect boats are being turned away.



Lake Lillinonah Authority



***For more information about this publication please
contact the Candlewood Lake Authority at
860-354-6928 or clainfo@earthlink.net***

Thank you to the California Department of Fish & Game for permission to adapt their guide for our needs and to Utah State Parks for their photographic contributions.

Protect Your Boat!

Keep Freshwaters Open to Boating and Fishing!

How can you help fight the zebra mussel invasion?

Boaters and watercraft users can stop the mussels from spreading.

This guide was compiled specifically for boat owners and watercraft users. The information contains general guidelines for all boaters and a basic checklist for inspecting and cleaning boats and recreational equipment for zebra mussels. There are also additional inspection and cleaning checklists for specific types of boats and equipment. By taking the time to inspect and clean your boat, you can:

- Protect your boat, the aquatic environment, and the boating facilities you use (marinas, gas docks, piers).
- Keep waterways open for recreational boating and fishing.
- Prevent an economic disaster resulting in millions of dollars in damage to water transport facilities.
- Comply with state and federal laws regarding the spread of zebra mussels.

Zebra mussels have spread further into Connecticut!

Connecticut's waterways face an enormous challenge: invasion by zebra mussels (*Dreissena polymorpha*) and other invasive plant and animal species. Zebra mussels, a native species of Eastern Europe, were first introduced in the United States through ballast water released into the Great Lakes in the late-1980s.

Great efforts have been made to prevent the spread of these fresh water mollusks into additional waters, including those of Connecticut. In 1998, zebra mussels were discovered in East Twin Lake in Salisbury, CT and soon after they were found in neighboring West Twin Lake. In October 2010 they were discovered in the waters of the Housatonic River, specifically Lakes Zoar and Lillinonah. They have been found in bordering state lakes and rivers including the Hudson River, Lake George and Lake Champlain. The spread of these mussels to additional area waters may seriously impact the aquatic environment, recreational boating and fishing.

Use this guide to prevent other invasive species spread!

Being aware of the threat that ALL invasive species present is important. Ensuring you don't inadvertently transport any invasive aquatic plant or animal, including zebra mussels, with your boat or trailer, is critical to the well-being of our State's inland waters and our use of them. Many of the cleaning guidelines and principles presented in this guide to prevent the spread of zebra mussels will also help prevent the spread of other types of aquatic invasive species. Care must also be taken in brackish and salt water environments.

What do they look like?

Zebra mussels vary in color and often have dark and light stripes on their shells. They differ in size, from microscopic young to adults an inch or two in length. These invasive mussels cluster in huge colonies.



Zebra mussels next to dime.

Zebra mussels at San Justo Reservoir (right/below)



Photos San Benito County Water District



Various sizes of zebra mussels.



Zebra mussels could affect recreational boating and fishing activities if our waters become infested.

Zebra mussels pose serious threats...

Zebra mussels may be tiny, but are highly destructive in freshwater systems because they can:

- Reproduce quickly and in very large numbers.
- Colonize on solid surfaces, including boat hulls, propellers, anchors, docks, and boat trailers.
- Coat submerged surfaces such as, rocks, cables, boat ramps, docks, lines and pipes, increasing maintenance costs.
- Infiltrate and damage boat engines, bilges, live wells, and steering components.
- Threaten water treatment plants, hydroelectric plants and reservoirs.
- Clog municipal water intake structures and obstruct the flow of drinking water.
- Wreak havoc on the environment by disrupting the food chain by filtering the water column of phytoplankton and out-competing other species, including sport fish and endangered species.
- Change water conditions, causing heavier aquatic plant growth, oxygen loss, and fish kills.

Once zebra mussels are established, in most cases it is impossible to eradicate them with current technologies.

How can zebra mussels damage boats?

Zebra mussels produce larvae (called veligers) too small to see with the naked eye. Newly settled young feel like sandpaper on smooth surfaces. As they quickly grow larger, zebra mussels can be seen on boat hulls, especially around trim tabs and transducers along keels, and on trailers, anchors and propellers. The mussels can also be found in or on boat bilges, ballast water, live wells, motors, fenders, life jackets, ropes – basically anything that comes into contact with infested water and can serve as a reservoir or “pocket” in which they can survive.

Zebra mussels pose serious risks and costs to you as a boat owner because they can:

- Damage your engine by blocking the cooling system and causing overheating.
- Increase drag on the bottom of your boat, reducing speed, and wasting fuel.
- Jam your boat’s steering equipment.
- Require you to scrape mussels off of your boat’s hull.
- Prevent you from being able to launch into other waters.



Zebra Mussel Locations in Connecticut and Surrounding Waters

- | | |
|-----------------------------|-----------------------|
| 1. Lake Zoar | 9. Hinckley Reservoir |
| 2. Lake Lillinonah | 10. Glen Lake |
| 3. East and West Twin lakes | 11. Lake George |
| 4. Laurel Lake | 12. Barge Canal |
| 5. Ballston Lake | 13. Lake Bomoseen |
| 6. Saratoga Lake | 14. Lake Horton |
| 7. Batten Kill | 15. Lake Dunmore |
| 8. Hedges Lake | 16. Lake Champlain |

- Zebra mussel infested river or lake
- Uninfested river
- Major highway

0 10 20 30 40 50 Miles

Source: U.S. Geological Survey, June 2011

Don't Move a Mussel!

Adapted from CA Dept. of Fish & Game Guide

General Guidelines: All Boaters

It is important for all boaters to cooperate with vessel inspections conducted at Connecticut boat ramps around the state. Remember, you do not want to transport any zebra mussels from an infested water body to another location currently free of zebra mussels. In addition, Connecticut law makes it illegal to liberate aquatic invasive species into our waters.

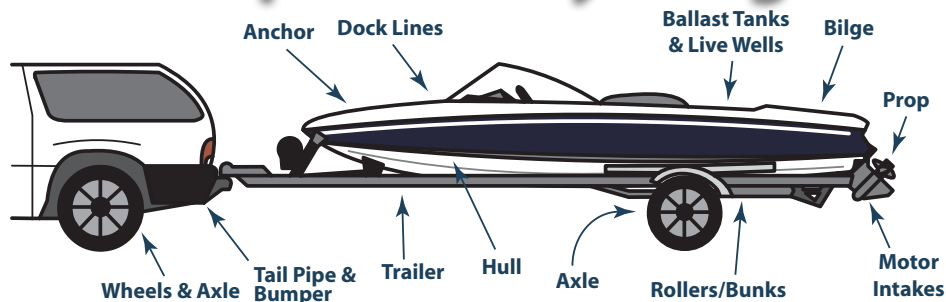
Human activity is the primary way that zebra mussels are introduced to unconnected water bodies.

If traveling between different bodies of water (especially infested waters on the map to the left), please follow the below guidelines and the procedures listed for specific vessels later in this guide.

- 1) **CLEAN** all visible plant, fish and animals as well as mud or other debris from your trailer, tow vehicle and boat before leaving any lake's boat launch.
- 2) **DRAIN** all water from every space and item that may hold water including bilges, ballast tanks, live wells, engine cooling systems, etc. away from any waterway. prior to transporting.
- 3) **DRY** all equipment for at least one week (hot/dry weather) and four weeks (cool/wet weather) before entering a water-body.

** If proper drying is not possible, wash with **hot** water (preferably high pressure) or soak in 1% salt solution for 24 hrs (2/3 cup salt per 5 gallons of water) or 100% vinegar for 20 minutes.*

**Before Leaving & Before Launching...
Inspect Everything!**



General Guidelines: All Boaters

Basic Inspection and Cleaning Checklist (over)

Checklist: All Watercraft

Whenever you leave freshwater, take the following actions:

1. **Remove the boat from the water** and **away from the launch ramp** for vessel inspection and cleaning.
2. **Thoroughly inspect all exposed surfaces on your vessel and trailer.** If you find any mussels, scrape them off, save a sample, and kill the rest by crushing them. Dispose of the remains in the trash. Alert the CT Department of Energy and Environmental Protection Dispatch at 860-424-3589 and let them know you have a sample.
3. **Remove all plants and mud** from your boat, trailer, and all equipment. Dispose of all material in the trash.
4. **Carefully feel your boat's hull** for any rough or gritty spots, which may be young mussels that have settled on your vessel and cannot be seen. Microscopic zebra mussels will feel like sandpaper.
5. **Away from the waterway, wash your boat's hull,** trailer, equipment, bilge, and any other exposed surfaces with high-pressure, hot water. Dry the boat as much as possible.
6. **Drain all water from your boat** (pull all plugs) and **dry all areas,** including the motor, motor cooling system, live wells, ballast tanks, bladders, bilges, and lower outboard units. Make sure that all life jackets, water skis or other items that have been in the water, including anchors, ropes, etc., are inspected, cleaned, and dried.
7. **Empty and dry all buckets** and **dispose of all bait** in trash receptacles before you leave. Do not take bait home, or leave it on the ground or dump it in any waterway.
8. **Thoroughly clean all fishing and recreational equipment** (fishing nets, etc).
9. **Clean and dry personal belongings, clothing, and footwear** that have come in contact with the water.
10. **Wash, dry, and brush pets** that have been in the water.
11. **Keep your watercraft dry for at least seven days in hot, dry weather and a minimum of 28 days in cool, wet weather** before launching into a freshwater lake, river etc.

Day boats or those that "come and go" and spend only a few hours in the water are still at risk for picking up and transporting mussels that may be attached to aquatic weeds or young microscopic zebra mussels floating in the water. The basic cleaning steps apply to any and all watercraft.

Additional steps for specific boats follow.

Vessels that are slipped and moored at infested waters run greater risk of having settlers and adult mussels.

General Inspection and Cleaning

Boat Exterior: Entire hull, floor, transom wall, ballast tanks, ropes and lines, anchors, lights, pitot tube, depth sounders, trim tabs, cavitation plates, thru-hull fittings, depth transducers, water intakes and outlets

Motor: Entire exterior housing, propeller, propeller shaft, propeller shaft support, propeller guards, propulsion units, lower unit, gimbal area, water intakes and outlets

Boat Equipment and Contents: All fishing nets and other fishing equipment, lines and ropes, float belts, life jackets, float cushions, water skis and tow ropes, ski gloves, equipment lockers, waterfowl decoys and camouflage blinds, clothing and footwear, floats, fenders, dock guards inner tubes and other inflatable items, downriggers and other fishing equipment, bait containers/buckets and live wells, trolling motors, and internal ballast tanks

Trailer: Trailer frame, axles, license plate and holders, lights and wiring, fenders, hangers, trailer tires and wheels, rollers and bunks, wiring, springs, pockets and hollow spaces



*Photos Utah State Parks
and California Department
of Fish and Game*

Drain the engine, dry the motor well, check the prop and system components, clean trolling motors, make sure everything is drained and dried. Remove all aquatic weeds.



Be sure to check the trailer for aquatic weeds and other areas on the boat like bow lights.

All vessels should be cleaned, drained, and dried!



Photos Utah State Parks



Check all areas listed under general inspection and cleaning. Feel the hull and check the trim tabs to ensure no standing water (veligers) or adults have taken hold. Check for weeds and other material as well.

Vessels should be thoroughly cleaned. Those contaminated with mussels should be scraped, washed, drained and dried. Dry time may be between seven days in hot/dry weather and a minimum of 28 days in cool/wet weather.



Photos California Department of Fish and Game



Check, clean, drain and dry live wells, all drains, and any other area where water might collect.

* NOTE: Any power washing should be conducted away from the boat launch and runoff should be directed away from storm drains.

To prevent illegal discharge of oil when draining or flushing the bilge, use oil absorbents where possible. Used absorbent pads should be double bagged to prevent further spills. Oil absorbents should be double bagged and thrown away

Water Ski Boats

1. **After completing the basic checklist, drain water** from every internal ballast tank system as much as possible.
2. **Resume normal ballast system operation** when you go boating again. Be sure to winterize the vessel when boating season ends.



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Ski boat covers open.



Ski boat ballast water lines.



Ballast system water pump, water lines, and caps should all be flushed and cleaned.



Trim tabs on transom.

Follow these actions to stop mussels from growing inside the entire system. Failure to do so could result in restriction of water lines, overheating and pump damage, as well as the increased likelihood of needing to replace expensive system components.

Houseboats, Pontoon Boats, and Other Large Vessels

1. **After completing the basic checklist, completely drain and dry all water systems that use lake water** including air conditioning, personal sanitation, and washdown systems. Note: Vessel sewage must be disposed of at a pump-out facility or dump station. The longer the boat has been in the water, the higher the chance these systems have been contaminated.
2. **Take special care to protect system components** including water supply and discharge lines, filter screens, pumps, valves, and associated parts. Small passages in the air conditioning radiator core are highly susceptible to being plugged by mussels.



Southern California Marine Association

All areas that can hold water should be drained and dried. Pontoons should be inspected for mussels, settlers, and aquatic weeds that may have mussels attached.



Photos Utah State Parks



Vessels should be thoroughly cleaned. Those contaminated with mussels should be washed, scraped, drained and dried. Dry time may be between seven days in hot/dry weather and a minimum of 28 days in cool/wet weather.

Vessels that are slipped and moored at infested waters run greater risk of having settlers and adult mussels.



Hulls should be inspected; all motors, intakes and any equipment that comes into contact with the water should be flushed, washed, drained and dried whether the equipment is attached to the boat (like a slide) or unattached like skis or floatation devices.



Since large vessel water systems are located deep within the hull, they require extra effort to access, clean, and dry to protect them. Failure to properly clean could result in costly replacement of system components if infestation occurs.

Sailboats

1. **After completing the basic checklist, completely drain and dry all water systems that use lake water**, including your air conditioning, personal sanitation, and washdown systems. Note: Vessel sewage must be disposed of at a pump-out facility or dump station. The longer your boat has been in the water, the more likely the chance these systems have been contaminated.
2. **Take special care to protect system components** including water supply and discharge lines, filter screens, pumps, valves, and associated parts. Small passages in the air conditioning radiator core are highly susceptible to being plugged by mussels.
3. **Give special attention to the centerboard trunk**, including the rudder and transom, keel and fittings, which is a major concern.
4. **Of special concern on sailboats is the removal of aquatic weeds.** Remove all vegetation from the vessel.



Vessels that are slipped and moored at infested waters run greater risk of having settlers and adult mussels. Boaters should check their vessels for mussels and vegetation that could carry mussels. Some vegetation is an invasive species as well, like Eurasian watermilfoil.



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High Performance Speed Boats

1. **After completing the basic checklist, make sure that you flush your 'external' cooling system.** Flushing your system when retrieving your boat with fresh water supplied by the marina or boat ramp you use may help eliminate the zebra mussel invasion.
2. **If your boat is not currently equipped with a 'flush kit' visit your local marine service center for details.** It is important for boat owners to recognize that the 'external' system for cooling is the problem area and although many engine suppliers equip new boats with a 'flush system', not all do. Having a 'flush kit' installed correctly (typically by a marine engine service center) would address the problem. Many older boats likely do not have a 'flush kit', but could have one installed.

Closed cooling system.



Photo Mercury Marine



Photos Southern California Marine Association



Personal Watercraft

1. **Avoid running craft through aquatic plants** because this may damage the craft, plug water intakes, and increase mussel contamination.
2. **Stop the engine** when water activities cease.
3. **Push or winch craft** onto the trailer, without running the engine.
4. **Remove the craft from the water and away from the launch ramp** for vessel inspection and cleaning.
5. **After completing the basic checklist, inspect and clean** all of the systems and components that apply specifically to the craft.
6. **Start and run the engine** for five to 10 seconds to blow out water and contaminants from the underbody jet drive system.
7. **Stop the engine and remove all plants, mud, and other contaminants** from the steering nozzle and the rest of the hull.
8. **Check underneath the craft for zebra mussels**, especially the water intake area (including the edges of the intake grate).
9. **Dry any pockets** that may be wet or holding water.
10. **Drain any ballasts** on the craft, **rinse with hot water**, and **allow to dry**.



Personal watercraft should be drained of all water, washed, and dried.

The steering nozzle should be inspected for aquatic weeds that might have mussels.



Photos Utah State Parks

Kayaks, Canoes, and Inflatable Rafts

1. **After completing the basic checklist, inspect and clean** any equipment that apply specifically to the craft (dry wells, paddles/oars, gloves, spray skirts etc.).
2. **Allow the craft to dry thoroughly** before using it in any other water body.
3. **Take special care to dry inflatables** before rolling them up.



Photo California State Parks



Photo Utah State Parks

Kayaks, canoes and all inflatables need to be cleaned, drained, and dried.

Any equipment that goes into the water needs to be inspected and cleaned.

Photo California Department of Fish and Game



Dive Gear

1. **Check all gear that could potentially hide any water or veligers** (include regulators, buoyancy compensator (BC), wetsuits, masks, gloves, boots, snorkels, and any other dive gear).
2. **Thoroughly clean all regulators, BC's, wetsuits, masks, snorkels, and any other dive gear**, making sure to clean both the inside and outside of the BC to ensure that no mud or organic matter is present – use a brush to scrub if necessary.
3. **After cleaning, rinse your suit, equipment and inside of BC with hot or salt water (2/3 cup salt/ 5 gallons of water)**. Note, if you use the salt-water solution, it is very important to thoroughly rinse the equipment in freshwater after your cleaning because the salt crystals can harm your equipment. Divers can also use potassium at 100mg/liter at a temperature of $>30^{\circ}\text{C}$, or using commercially available dive equipment cleaning compound that contains ammonia, vinegar, or chlorine.
4. **Allow gear, suit, and other equipment to dry** before diving in different waters. Veligers can survive on a wetsuit if left damp.
5. **If feasible, consider freezing** your equipment overnight to kill any veligers.



Additional Resources

For more information:

- General information on zebra mussels:
www.candlewoodlakeauthority.org
www.ct.gov/dep/invasivespecies
www.protectyourwaters.net
- Boat cleaning tips: www.100thmeridian.org
- General invasive species information:
www.fws.gov/contaminants/Issues/InvasiveSpecies.cfm

You may also contact the following state departments for additional information or assistance:

- CT DEEP Boating Division: 860-434-8638
- CT DEEP Inland Fisheries Division: 860-424-3474

If you discover zebra mussels in a new location, report it to the CT DEEP at 860-424-3000.

Connecticut Codes that Apply to Invasive Species

- ☐ Public Act No. 04-203 (Sect. 22a-381d)
 - An Act Concerning Fines for Banned Invasive Plants
- ☐ Public Act No. 03-136
 - Creation & Guidelines of the Invasive Plant Council
- ☐ Conn. Gen. Stat. § 26-55
 - Permit for Importing, Possessing, or Liberating Live Fish, Wild Birds, Wild Quadrapeds, Reptiles and Amphibians
- ☐ Sec. 15-180
 - Transporting vessel or trailer without inspecting for and properly removing and disposing of vegetation.
- ☐ Public Act 10-20
 - To authorize conservation officers to enforce certain prohibitions concerning invasive plants.

DON'T MOVE A MUSSEL

Enjoy the water and the fishing!



Support voluntary inspections!



Help keep our waters clean!