Appendix E: Sample Decontamination Procedures

From MASS Zebra Mussel Interim Action Plan:

A. Follow the basic steps of CLEAN, DRAIN, and DRY.

1. Inspect and clean your boat after removing it from the water and away from the launch ramp.
2. Thoroughly inspect all exposed surfaces on your vessel and trailer. If you find any mussels, scrape them off and kill them by crushing them. Dispose of the remains in the trash.
3. Remove all plants and mud from your boat, trailer, and all equipment. Dispose of all material in the trash.
4. 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.
5. Carefully feel your boat's hull for rough or gritty spots, which may be young mussels too small to be seen that have settled on your vessel. Microscopic Quagga/Zebra mussels will feel like sandpaper.
6. Away from the waterway, 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.
7. Keep your watercraft dry for at least 1 week (during hot, dry weather) and at least 18 days (during cool, wet weather) before launching into any freshwater lake or pond. Drying is the only way to prevent the spread of zebra mussels.
8. Thoroughly clean all fishing and recreational equipment (fishing nets, etc).
9. Inspect, clean and dry all life jackets, water skis or other items that have been in the water, including anchors, ropes, etc.
10. Clean and dry personal belongings, clothing, and footwear that have come in contact with the water
11. Wash, dry, and brush pets that have been in the water.
12. Divers must thoroughly clean all regulators, BCDs (inside and outside), wetsuits, and any other dive gear. Use a commercially available dive equipment-cleaning compound that contains ammonia, vinegar, or chlorine. Allow gear, suit, and other equipment to dry before diving in different waters (veligers can survive on a wetsuit if left damp)

B. If you can't keep your watercraft dry (per step 7 above), follow these decontamination procedures:

1. Wash your boat's hull, trailer, equipment, and any other exposed surfaces, and the inside of your bilge area, livewell, and engine cooling system with high pressure, hot water AND either household bleach, 100% vinegar, or a 1% salt bath. See additional decontamination procedures in **Attachment D**, including directions for using household bleach, vinegar, or a salt bath.

C. General Decontamination Procedures for AIS (other than zebra and quagga mussels)

1. Remove all plants and animals from your boat motor, trailer, anchors, fishing gear and dive gear and dispose of them on dry land, away from the water or in a trash can.
2. Flush engines and dispose of livewell, bait bucket, and cooling water away from the shore after each use.

Note: Professional washing or use of a commercial wash is a decontamination option if a boater is unable to follow the basic steps of clean, drain and dry (especially during wet weather when it is difficult to ensure that a boat is completely dry). However, based on the Boat Wash Station Feasibility Study funded by the DCR for Otis Reservoir in 2002, DCR does not consider the construction of new boat wash stations at public access points to water bodies practical due to site constraints, wash water disposal, and other issues.

Decontamination Procedures

CLA ZMT RECCOMMENDED BOAT AND EQUIPMENT CLEANING AND DECONTAMINATION PROCEDURES

REFERENCE Sources: Missouri Dept. of Conservation – Zebra Mussel Prevention, MASS Zebra Mussel Interim Action Plan, Protect Our Waters: ttp://www.protectyourwaters.net/prevention/prevention_generic.php.
Note: Subject to Revisions made in Final Document

General Prevention Procedures for Stopping Aquatic Hitchhikers: *A must read for all recreational users*

Follow a general set of procedures every time you come in contact with any body of water. By doing so, you can protect your waters from harmful aquatic hitchhikers, because you never know where a nuisance species has been introduced, but has yet to be discovered. So, it is important to follow this general procedure every time you leave any body of water.

There are hundreds of different harmful species ranging from plants, fish, amphibians, crustaceans, mollusks, diseases or pathogens. Some organisms are so small, you may not even realize they are hitching a ride with you.
Appropriate safeguards to prevent the transfer of zebra mussels from one waterbody to another are critical. The following steps detail equipment decontamination procedures:

1. INSPECT-Thoroughly inspect boats (hulls, drive units, trim plates, transducers), trailers and components (rollers, bunk boards, axles, etc.), equipment (i.e., water pumps, hatchery equipment, siphons, nets, ropes, traps, etc.), and machinery (tractors, bulldozers, etc.) for adult zebra mussels. Pay close attention to nooks, crannies and other inconspicuous places (i.e., around the motor housing, trim tabs, and water intake screens, or pump fittings). All trash, mud, vegetation, and suspected zebra mussels should be removed and properly disposed of in the trash.

2. **DRAIN and DR**Y -All water should be drained from boats, trailers, motors, live wells, bilges, transom wells, holding tanks and live wells, water pumps, pipes, and other equipment prior to leaving a waterway. Pay particular attention to boat hulls under installed decking. Drain as much water as possible from equipment such as lower motor units and portable pumps. Dry boats, gear and equipment to minimize risk of contamination:5 days in hot sun,18 -30 days for damp, cool weather.

3. **DECONTAMINATE** - Any boat, trailer, tank, equipment, machinery, gear, or net transferred from one body of water into a different body of water or from known infested waters to potentially infested waters must be decontaminated using one of the treatments in Table 1 prior to being used in a new body of water. Equipment decontamination procedures should be completed when moving equipment from infested areas of a water body to uninfested areas of the same water body. Clean boat's entire hull. Feel the hull for rough or gritty surfaces, which could mean that young zebra mussels are present. Rub down these gritty areas and spray again with hot water. Dispose of towels in the garbage.
Scuba Equipment: 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.

Allow gear, suit and other equipment to dry before diving in different waters. ANS can survive for a period of time on wet scuba gear.
Pets that swim in infested waters can also be a source of contamination. Wash your dog with water as warm as possible and brush its coat. Thoroughly air dry.
Single Lake useage-If boats, nets, and other equipment are only used in one body of water, cleaning between uses is not necessary, but these boats, nets, and other equipment MUST be clearly labeled for use in that body of water ONLY. Periodic cleaning and decontamination (i.e., during winterization or other maintenance) should be conducted to prevent costly repairs.

BOAT & EQUIPMENT CLEANING - DECONTAMINATION PROCEDURES

Table 1. Zebra Mussel Disinfectants and Usage Guidelines for Boats and Equipment

Disinfectant	Concentration	Contact Time	Usage Guidelines, Safety Precautions, Drawbacks
Vinegar	100%	20 min Dip/Bath	Dipping equipment into 100% vinegar for 20 minutes will kill harmful aquatic hitchhiker species. MUST Ensure that solution does not run-off directly into waterways.
Chlorine	200 ppm	10 min	Use appropriate PPE and caution. Stay upwind of the spray. Is corrosive to metal and rubber and toxic to fish at this concentration, so neutralize with 800 ppm sodium thiosulfate and rinse thoroughly with tap water or water from the next lake or river. MUST Ensure that solution does not run-off directly into waterways.
Power wash with hot water	>104° F or higher (120° F -140° F) Use hottest water available	20 min	Use appropriate PPE and *caution when using hot water due to possibility of burns/scalding at 120° F to 140° F.* Temperature and contact times are crucial, as efficiency is weather dependent. Most effective when used in conjunction with air drying (see below). Power wash with hot water, including thoroughly flushing lower motor unit.
Freezing	<32° F	24 hrs	Boats, gear, and equipment should be thoroughly frozen. Ambient air temperature should remain below freezing for the entire contact time. No safety precautions.
Air drying	N/A	5 days in hot sun.18 -30 days cool weather. Gear: 48 hrs in hot sun-after power wash.	Must dry completely to be effective. Most effective when used in conjunction with hot water (see above). To be used for small nets, gear, pumps, etc., *ONLY AFTER* power washing with hottest water (>104° F) for appropriate contact time.
Salt Bath	1%	24 hrs Dip/Bath	Due to the long contact time, may only be used as a bath solution and not sprayed. To be used only for pieces of equipment, gear, and nets that can be completely immersed in the solution.

Table 2. Disinfectant Amounts to Make Needed Concentrations					
Disinfectant	**1 gal**	**2 gal**	**5 gal**	**20 gal**	**100 gal**
100% Vinegar	1 gal	2 gal	5 gal	20 gal	100 gal
200 ppm Chlorine (household bleach, 5.25% Chlorine)	0.5 ounce (15 ml)	1.0 ounce (30 ml)	2.5 ounces (75 ml)	11.0 ounces (300 ml)	6 1/3 cups (1.5 L)
200 ppm Chlorine (HTH granular)	0.04 ounce (1.2 g)	0.08 ounce (2.4 g)	0.2 ounce (6 g)	0.8 ounce (24 g)	4.2 ounces (120 g)
800 ppm Sodium Thiosulfate	0.1 ounce (3 g)	0.2 ounce (6 g)	0.5 ounce (15 g)	2.1 ounces (60 g)	10.6 ounces (300 g)
1% Salt Bath (as NaCl)	1/8 cup	1/4 cup	2/3 cup	2 2/3 cups	13 1/3 cups