

KANSAS CITY DISTRICT CORPS OF ENGINEERS AQUATIC NUISANCE SPECIES PREVENTION PROTOCOLS

POLICY

The Kansas City District Corps of Engineers will work to prevent the spread of all Aquatic Nuisance Species (ANS) especially zebra and quagga mussels from infested waters to un-infested waters.

RESOURCE THREAT

Zebra and quagga mussels can clog dam gate works, power plants and industrial and public drinking water intakes, foul boat hulls and engines, decimate populations of freshwater mussels and other native aquatic organisms, impact fisheries and disrupt aquatic ecosystem functions. Economic impacts of zebra mussels in North America are estimated to be in the billions of dollars.

Because of the size and ease with which microscopic zebra mussel larva, called veligers may be transported by the public, it could take several years to detect an infestation. In addition, adult mussels hitchhike by attaching to watercraft and submerged equipment then subsequently detach and can start a new mussel population in a different un-infested water body. Avoiding known or suspected infested areas when practical will help prevent the spread of zebra mussels and other ANS. However, if any equipment and supplies including but not limited to boats, trailers, tractors, bulldozers, ROVs, pumps, ropes, nets and PFDs etc. are used in or around infested waters, they must be decontaminated prior to use in another body of water.

EQUIPMENT INSPECTION AND DECONTAMINATION PROCEDURES

Appropriate safeguards must be taken by Corps personnel to prevent the transfer of zebra mussels and other ANS from one water body to another and include equipment inspection, decontamination and if possible, avoidance. The following steps detail equipment inspection and decontamination procedures:

1. Prior to transporting, visually inspect all equipment and supplies for zebra mussels and other ANS. All trash, debris, vegetation, and suspected zebra mussels should be removed, placed in plastic bags and properly disposed of in land-based receptacles. All equipment and supplies must be thoroughly CLEANED, DRAINED and DRIED or otherwise decontaminated as described below prior to arriving at and being used in any different body of water. Immediately report suspected occurrences of zebra mussels or any other ANS to the Invasive Species Coordinator in the District Office, Operations Division.

2. All equipment and supplies intended for use in KCD waters that has been exposed to lake or stream water shall be thoroughly washed with a hot water power washer or shall be CLEANED, DRAINED and allowed to completely DRY or shall be exposed to freezing temperatures for 72 hours. The appropriate length of drying time is dependent upon when the work is scheduled to begin. Use the following link to determine the number of drying days needed;
<http://www.100thmeridian.org/emersion.asp>.
3. Water being used for power washing must be 140 degrees Fahrenheit at point of contact for equipment being decontaminated. Maintain a 10 second contact time for all exposed surfaces. All contaminated runoff must not be allowed to drain to uncontaminated areas and shall be adequately rerouted or contained, treated and disposed of properly.
4. Equipment and supplies including pumps that cannot be thoroughly DRAINED, CLEANED and DRIED shall be treated on all interior and exterior surfaces with 140 degree water for 10 seconds or submerged in vinegar, 100% for 20 minutes or submerged in 200 ppm chlorine for 10 minutes. If chlorine is used, it should be neutralized with 800 ppm sodium thiosulfate and rinsed according to the table below. All vinegar and chlorine runoff and waste must be contained, treated and disposed of properly.
5. All water should be drained from boats, trailers, motors, live wells, bilges, transom wells, holding tanks, 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.
6. Equipment decontamination procedures should be completed when moving equipment from infested areas of a water body to un-infested areas of the same water body, i.e. up river or to a different un-infested arm of the lake etc.
7. If boats, trailers, nets, ropes 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. If management or research activities require this equipment to be moved in the future, acceptable decontamination procedures will be implemented.
8. Carpeted bunks and runners on existing boat trailers should be replaced with poly, plastic or wooden bunks as soon as practical; boat trailers regularly moved between known zebra mussel other ANS infested waters and different water bodies should have carpeted bunks and runners replaced immediately. As available, future boat trailers should be purchased with poly/plastic/wooden bunks.

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

Disinfectant	Concentration	Contact Time	Usage Guidelines, Safety Precautions, Drawbacks
Vinegar	100%	20 min	Use appropriate personal protective equipment (PPE) and caution. Stay upwind of the spray. Is corrosive to metal and toxic to fish at this concentration, so thoroughly rinse with tap water or water from the next lake or river after disinfection. 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. Ensure that solution does not run-off directly into waterways.
Power wash with hot water	>104° F >140° F	20 min 10 sec	Use appropriate PPE and caution when using hot water due to possibility of burns/scalding. 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	72 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	Reference the following web site: http://www.100thmeridian.org/emersion.asp . For appropriate drying time which is dependent on time of year and location.
Salt Bath	1%	24 hrs	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 gallon	2 gallons	5 gallons	20 gallons	100 gallons
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

Notes:

1. Zebra mussel adults can be easily seen, but juveniles, called veligers are microscopic and invisible to the naked eye.
2. Air drying and hot water are most effective when used in conjunction with each other. Their effectiveness is highly dependent upon ambient temperatures and contact times.
3. Household bleach (5.25% chlorine) and vinegar can be purchased from grocery or convenience stores. Sodium thiosulfate can be purchased at pool supply stores or chemical companies.
4. All bilges and hidden areas under boat decks must be thoroughly treated as described above.
5. For instructions on cleaning and decontaminating specific types of equipment use the following link to access the [Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species](http://www.usbr.gov/pps/EquipmentInspectionandCleaningManual_Sept09.pdf);

SAFETY

Safety always takes top priority in any activity. USACE personnel will develop an Activity Hazard Analysis (AHA) to identify hazards and control measures for inspection and each decontamination method. The AHA will address concerns such as but not limited to chemicals, heated water, pressurized spraying, etc. The AHA will require implementation of control measures such as but not limited to using proper Personal Protective Equipment (safety glasses, face shield, gloves, tyvek suit, etc.), restricting access to work area, precautions for fuel for powered sprayer, etc. Identifying hazards and implementing effective controls can ensure that we accomplish this task safely.

INVASIVE SPECIES COORDINATOR'S ROLE

The Corps' Invasive Species Coordinator shall serve as the central point of contact for zebra mussel and other ANS distribution information, prevention, and control. The coordinator shall maintain a KCD zebra mussel distribution map on the Corps' Internet website identifying the location of confirmed sightings of zebra mussel adults and veligers in KCD waters. Any collections, observations, sightings, etc., of zebra mussel adults, veligers or other ANS must be immediately reported to the KCD Invasive Species Coordinator.