



Frequently Asked Questions May 21, 2008

What are zebra and quagga mussels?

The United States has been invaded by two species of freshwater mussels. Their common names are zebra mussel (*Dreissena polymorpha*) and quagga mussel (*Dreissena bugensis*.) Both are small, freshwater bivalve mollusks, relatives of clams and oysters, which are triangular in shape with an obvious ridge between the side and bottom. Lake Mead NRA is currently infested with the quagga mussel, not the zebra mussel. The quagga mussel has been called the zebra mussel's "evil" cousin because it is much more prolific and can survive from the water's surface to 500 ft.

How did quagga mussels get to the Colorado River?

We may never know where the initial Colorado River infestation occurred. Before they spread to the California Aqueduct, the quagga mussels in the Colorado River were about 1,000 miles farther west than any other recorded findings. The primary method of overland dispersal by quagga mussels is through human-related activities. Given their ability to attach to hard surfaces and survive out of water, many infestations have occurred by adults hitching rides on watercraft. The microscopic larvae also can be transported in bilges, ballast water, live wells, thru-hull fittings, or any other equipment that holds water. They have been found on non-watercraft objects that simply came in contact with mussel-infested water.

What can I do to help?

It is up to each of us to take extra precautions to stop the spread of quagga mussels or any other invasive species. The following actions should be taken with any equipment used in potentially infested waters: All equipment (e.g., dive gear, boats, trailers, motors, fishing tackle, etc.) should be visually and tactically (by feel) inspected for the presence of quagga mussels prior to and after use in any water body. Objects such as life vests, seat cushions, rope, and fishing bobbers may foster mussel growth. Additionally, any vegetation or mud attached to this equipment must be removed and left at the site of origin.

Effective ways boaters (including personal watercraft, canoe, kayak, and fisherman float tube users) and fisherman can ensure that their boats, vehicles, trailers and other equipment do not become the means of infecting other waters are listed below.

1. When using any equipment (motorized, unmotorized, fishing gear, dive gear, kayaks, boating gear) within Lake Mead NRA's quagga-infested waters, we strongly recommend the following precautions be taken. When taking your equipment out of the water:

- Drain the water from your motor, live well, and bilge on land *before* leaving the immediate area of the lake.
- Oily or dirty bilge water must be contained and disposed of properly. Ask the closest marina if in doubt of proper disposal location.
- Towel down any areas with standing water. Check all storage areas (anchor/line lockers).
- Do not reuse bait once it has been in the water. If bait was not obtained from the lake, discard in trash.
- Completely inspect your vessel and trailer, removing any visible mussels, but also feel for any rough or gritty spots on the hull. These may be young mussels that can be hard to see.

If you are planning on launching at another body of water or taking your boat out of state:

- Contact any marina in Lake Mead to get a proper inspection and decontamination completed. The updated list of wash station locations is included. The wash stations at any marina have the capabilities to:
 - Wash the hull, external areas of motor, and any other exposed surface with hot, pressurized water ($\geq 140^\circ$).
 - Alert the trained staff to areas of your boat that you know may hold water or may foster animal or

- plant growth. Work with them to ensure that your boat has been cleaned as thoroughly as possible.
 - In addition to the above cleaning, Callville Bay and Katherine's Landing have the capabilities to flush the coolant system, gimbal area, and bilges with hot water ($\geq 140^\circ$).
 - Clean and wash trailer, truck or any other equipment that comes in contact with lake water. Mussels can live in small pockets anywhere water collects.
 - Be sure that you have received two documents: receipt, Watercraft Inspection and Decontamination Report. Take these with you when you cross state line.
 - Before leaving to cross state line or enter another water body, check boat and trailer for vegetation or mussels. Dead mussels may have become detached from tight, small areas. Remove anything visible.
- Remember, you could be cited for transporting mussels, even if they are dead.**

When you return home:

- Air-dry the boat and other equipment for at least five days before launching in any other waterway.
 - Damp, cool weather with adult mussels → dry boat/equipment for 30-45 days
 - Damp, cool weather with veligers/settlers → dry boat/equipment for 10-15 days
 - In southern Nevada under normal seasonal conditions, drying time for summer and winter season is recommended at 5 and 15 days, respectively.
- Allow all fishing tackle to air dry for 5 days before fishing in other lakes and streams.

2. **If you rent a boat slip** in the park and you are planning on taking your boat on a trailer outside of Lake Mead NRA, you are *required*, as is stipulated in your slip rental agreement, to decontaminate at a wash station within the park boundary. Call your nearest marina and schedule an appointment for a vessel inspection and decontamination.

What if I want to take my boat across state line and launch in another body of water?

Neighboring states and bodies of water have become more informed and concerned about the spread of invasive quagga and zebra mussels. In hopes of protecting their waters and the valuable resources they contain, state, federal and private institutions in the southwest and Pacific northwest are creating their own mussel control/prevention programs. If you plan to launch your boat in another body of water, it is advised that you call them in advance and request information about their current rules and regulations. We all have to do our part in minimizing the spread of these highly invasive mussels.

We do not have zebra mussels. Nor do we have invasive species such as Eurasian water milfoil, viral hemorrhagic septicemia (virus), spiny water flea, giant salvinia, New Zealand mudsnail, round goby, etc. Since the invasion of over 180 aquatic nuisance species into Lake Huron, their lake ecosystem has suffered huge changes in the food web and fisheries collapse. We have the ability to prevent the spread of these invasives to our waters by being observant and by spreading the word. If you should see a suspicious watercraft or encounter a hostile or evasive visitor who is reluctant to cooperate with our mussel prevention efforts, please call non-emergency dispatch (702-293-8998).

Where on Lake Mead and Lake Mohave have quagga mussels been found?

Quagga mussels were initially found in the Boulder Basin of Lake Mead on January 6, 2007. As of February 14, 2007, collected mussel samples confirm quagga populations in Lakes Mead, Mohave, and Havasu. Since then divers have found adult quaggas as northward as Echo Bay and at Davis Dam, the southernmost point of Lake Mohave. Plankton tows have verified the presence of larval mussels called veligers throughout Lakes Mead and Mohave including the easternmost portion that connects with Grand Canyon National Park and north of Overton Beach.

What kind of monitoring is Lake Mead NRA doing on the mussels?

We have a variety of presence/absence studies going on around the park that involve collecting plankton tows for veligers and scuba diving for adult mussels. Some of the current studies on the quagga mussel include:

1. Age and Growth Analysis
2. Larval Monitoring
3. Presence/Absence on artificial substrates
4. Permanent Transects to examine colonization and density

5. Temperature Tolerance Tests
6. Studies on Promising Methods on Eradication of Mussels (*still in the testing stage*)
7. Toxic Concentration Level Analysis on Mussel Tissue

Depending on the substrate, quagga mussels will attach at different rates. They are growing on a variety of substrates including duct tape, rope, aluminum, brass, steel, stainless steel, fiberglass, plastic, leather, old antifouling paint, ABS plastic, PVC, etc. Thus far, there is no color or substrate they will not attach to other than effective antifouling paint. We are currently developing recommendations and best management practices for watercraft users at Lake Mead NRA.

Where did quagga mussels come from?

Quagga mussels are native to the Caspian, Black and Azov seas of Eastern Europe. This exotic species was first discovered in the U.S. in Lake Saint Clair, Michigan in 1988 and is believed to have been introduced in 1986 through ballast water discharge from ocean-going ships. Since their initial discovery, quagga mussels have spread rapidly throughout the Great Lakes and Mississippi River Basin states and other watersheds throughout the eastern and central U.S.

Do quagga mussels have any predators?

Quagga mussels have very few natural predators in North America, but it has been documented that several species of fish and diving ducks eat them in limited quantities. In all cases, predators of the mussel have either directly experienced or indirectly caused negative outcomes by bringing these mussels into the food chain. The round goby, one of their predators in the Great Lakes, is highly invasive. Although it will eat the mussels, this fish does not keep mussel populations under control and has negatively impacted the ecosystem of the Great Lakes. We are not aware of any predators capable of inhibiting mussel growth in the Colorado River.

Are there any biological controls on these highly prolific invaders?

There are biological methods for controlling these mussels, however, we will not seriously consider adopting these methods until adequate independent research has been completed on them. Although quaggas exist in the Great Lakes, their effects on Lake Mead's ecosystem and water conditions is incomparable to what has been seen in previous quagga infestations. We are all learning and adjusting to the mussels' impact as quickly as possible.

What do they eat?

Quagga mussels are primarily plankton feeders. They feed by filtering up to a liter of water per day through their siphons. They can filter out phytoplankton and zooplankton, the microscopic plants and animals that form the base of the food web. Effects of their huge appetite on the zooplankton that feed on the phytoplankton and the shad and juvenile fish that feed on the zooplankton are not yet understood. However, these invasive mussels are essentially taking from the food supply of two trophic levels.

How do we get rid of them?

Once quagga mussels have been established in a water body, there is no economically feasible method of eradication. Preventing spread remains our best course of action. Since quagga mussels have planktonic (free drifting) larvae, preventing spread to water bodies downstream from known infestations may not be possible. However, westward, over land spread is assumed to be largely due to trailered boat traffic. Thus, farther westward spread of quagga mussels is highly preventable.

Now that quagga mussels have been discovered, what happens next?

The best prevention tool is the proper cleaning and drying of boats, trailers and equipment. Federal, state, and private agencies are updating and coordinating public information and policies to develop the most effective prevention measures. These entities will continue meeting to develop management and information plans to help the boating public prevent infestation to other water bodies.

Additional information can be found at the www.protectyourwaters.net and www.100thMeridian.org.

Authorized Boat Decontamination Capacity at Lake Mead National Recreation Area

If you do have your boat decontaminated at one of the listed locations, be sure to request a receipt and a copy of the Watercraft Inspection and Decontamination Form. Take these documents with you when crossing state line with a trailered boat. Prior to traveling out of state, inspect your boat one last time for any invasive species and ensure that your boat is completely dry.

<i>Name</i>	<i>Location</i>	<i>Contact</i>	<i>Additional Capacity</i>	<i>Contact</i>
Lake Mead				
Las Vegas Boat Harbor	Boulder Basin	(702) 293-1191	Have Gloves Will Travel	(702) 378-9289
			McGough Enterprises	(702) 373-0518
			Perfect Image Mobile Detailing	(702) 564-6636
Callville Bay Resort	Boulder Basin	(702) 565-8958	McGough Enterprises	(702) 373-0518
			Have Gloves Will Travel	(702) 378-9289
Echo Bay Resort	Overton Arm	(702) 394-4000	McGough Enterprises	(702) 373-0518
			Have Gloves Will Travel	(702) 378-9289
Temple Bar Resort	East Lake Mead	(928) 767-3211	Have Gloves Will Travel	(702) 378-9289
			McGough Enterprises	(702) 373-0518
Lake Mohave				
Willow Beach Marina	Lake Mohave	(928) 767-4747		
Lake Mohave Resort	Katherine Landing	(928) 754-3245	5 Star Detailing	(928) 758-0044
Cottonwood Cove Resort	Lake Mohave	(702) 297-1464		

Remember: The transportation, possession, introduction or removal of an aquatic nuisance species is prohibited by law.

A Selection of Boat Wash Services in the Surrounding Communities*

*These facilities are not authorized by the National Park Service to provide invasive mussel decontamination, but can be used by day-visitors to wash their vessels. Please contact them directly for available services, rates and appointments.

Remember: If mussels are visible on a vessel, it must be decontaminated prior to exiting from the park.

If the vessel operator refuses to have their vessel decontaminated, call NPS Dispatch @ (702) 293-8998

Location	Name	Contact	Address
Henderson	Las Vegas Boat Harbor	(702) 565-9111	104 S Water St
	Terrible Herbst	(702) 564-9031	1100 E Lake Mead Pkwy
	Terrible Herbst	(702) 564-9272	599 W Lake Mead
	Terrible Herbst	(702) 566-9347	1395 Lake Mead Pkwy
Las Vegas	Offshore Marine	(702) 567-0990	
	Platinum Mobile Detailing	(702) 896-6667	7846 Arden Grove St
	Cal's Boat and RV	(702) 456-0025	5220 E. Russell Road
	Vintage Marine	(702) 258-2628	6325 S Pecos
Boulder City	Self Service Car Wash		Corner of Nevada Way and Boulder
	Dale's Sinclair	(702) 294-1828	1625 Nevada Hwy
Kingman	Airway Avenue Car Wash	(928) 681-3424	3113 Airway Ave
Laughlin	Shine on the River	(702) 420-6336	1650 S. Casino Drive
	Terrible Herbst	(702) 298-3665	2010 S. Casino Drive
Bullhead City	Hacienda Car Wash	(928) 763-1311	1626 Highway 95

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