

Lake Berryessa Invasive Mussel Inspection Protocol

Boaters visiting Lake Berryessa are required to comply with a screening and inspection protocol to prevent the introduction of invasive zebra or quagga mussels. Boaters will be asked a series of questions by Solano County Water Agency Interns, Reclamation Staff, or concessionaire staff that will help them determine if the boater should be subject to further inspection in order to prevent the introduction of invasive Zebra or Quagga Mussels.



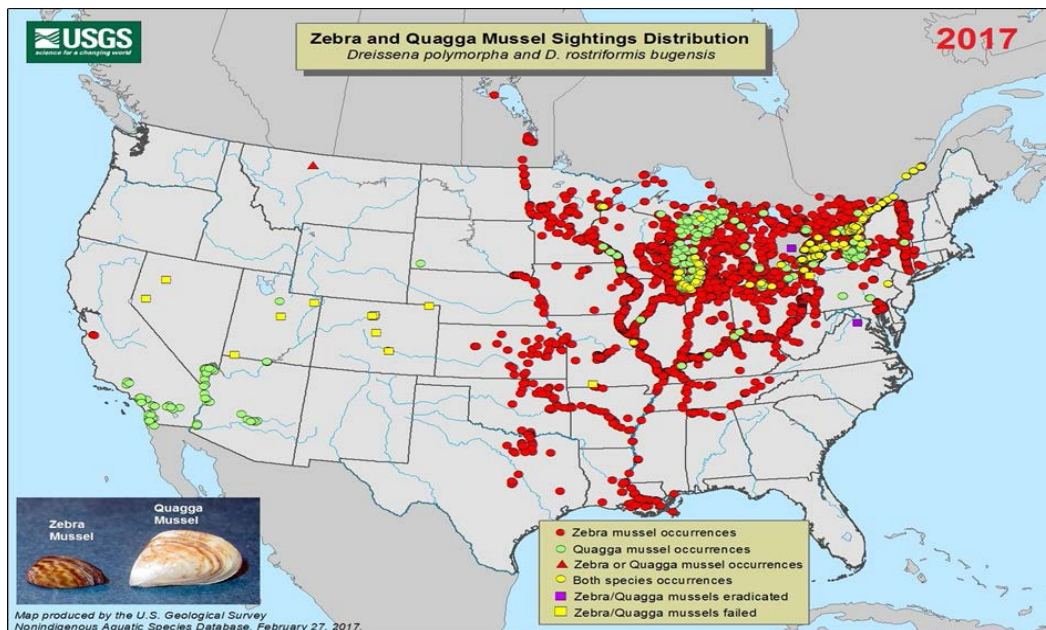
Starting in September 2017

Boaters coming from an infested waterbody:

Please call (707) 455-4450 to schedule a FREE decontamination before launching.

Currently Infested Waterbodies in the U.S

The current USGS map of infested waterbodies is below. Please note any waterbodies in Southern California or out of the State of California are more likely to be infested with zebra or quagga mussels.



Current List of Infested Water Bodies:

http://fi.biology.usgs.gov/Nonindigenous_Species/Zebra_mussel_distribution/zebra_mussel_distribution.html

What to do if you think you have been to an infested waterbody?



Clean. Drain. Dry

- 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 and kill them by crushing them. Alert the CA Department of Fish and Wildlife at (866) 440-9530.
- 3. Remove all plants and mud** from your boat, trailer, and all equipment. Dispose of all material in the appropriate container. Caution should be used to prevent material from entering uninfested waters.
- 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 Quagga/Zebra mussels will feel like sandpaper.
- 5. Away from any waterway, thoroughly CLEAN your boat's:**
 - Hull
 - Trailer
 - Equipment
 - Bilge compartment
 - Any other exposed surfaces

(Clean with high-pressure, hot water. Use water at a temperature of 140° F (60° C) at the hull – or about 155° (68° C) at the nozzle – which will kill the mussels. Dry all surfaces after cleaning)
- 6. DRAIN all water from your boat** (pull all plugs) and **DRY all areas** including:
 - Motor
 - motor cooling system
 - live wells
 - ballast tanks / bladders
 - bilges, and lower outboard units
 - life jackets
 - water skis
 - fishing gear
 - recreation equipment
 - anchors
 - ropes.
- 7. Empty and dry all buckets** and **dispose of all bait** in trash receptacles before you leave. Do not take bait home.
- 8. Clean and dry personal belongings, clothing, and footwear** that have come in contact with the water.
- 9. Wash, dry, and brush pets** that have been in the water.
- 10. Keep your watercraft dry for up to 30 days** before launching into Lake Berryessa.

Zebra and Quagga Mussel Facts



Quagga mussels were discovered in Lake Mead on January 6, 2007. Quagga are an invasive species native to Russia and Ukraine and are thought to have been transported to the Great Lakes region in the ballast water of transoceanic ships.

Quagga mussels were discovered by Metropolitan Water District divers Wednesday, Jan. 17, 2007 at Lake Havasu, and again on Friday, Jan 19, 2007 about 14 miles to the north

Quagga Mussels (*Dreissena rostriformis bugensis*) are a small freshwater mollusk. They have some diagnostic features to identify them from zebra mussels. The quagga's shell has a rounded angle, a convex ventral, and their color varies from black, white, cream, but they are generally paler (U.S.G.S.). The quagga causes problem because they are "water filterers" and are able to remove large amounts of phytoplankton and suspended particulates from lakes and streams (Sea Grant Michigan). This can have a potential to alter the balance of the aquatic food web. The mussels' tissues also trap contaminants, which can be exposed to wildlife if they are eaten. Like zebra mussels, the quagga also clogs water structures that can reduce pumping capabilities for water treatment (Sea Grant Michigan).

Quagga mussels can grow up to 4 cm. These mussels are indigenous to the Dneiper River drainage of the Ukraine.

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. Quagga mussels soon followed.

Great efforts have been made to prevent the spread of these fresh water mollusks west of the 100th Meridian. In January 2007, Quagga mussels were discovered in Lake Mead and later in other reservoirs of the Lower Colorado River. In January 2008, Zebra mussels were discovered in San Justo Reservoir in San Benito County, California. The spread of these mussels to additional California waters will seriously impact the state's aquatic environment and water delivery systems, endangering recreational boating and fishing.

What Makes Zebra and Quagga Mussels So Invasive?

As adult mussels, there are three characteristics that make them incredibly invasive:

- **BYSSAL THREADS** - Both zebra and quagga mussels have byssal threads that allow them to attach to any stable substrate in the water including rocks, plants, fiberglass, plastic, cement, steel, and even onto other mussels creating a thick layer as seen in some of these photos.
- **RAPID REPRODUCTION RATE** – They have a very rapid reproduction rate, spawning year-round (if conditions permit), where 1 single female can produce up to one million eggs in a year.
- **FILTER FEEDERS** - Feeding off of plankton (the foundation of the aquatic food chain). It has been observed that a mussel can filter up to a liter in a day. Anything they have filtered through that they do not eat is rejected as a mucous known as pseudofeces. This pseudofeces is known to decrease DO and increase pH

Invasive mussels are devastating to an ecosystem once introduced. Mussels can cause the following problems once in the waterbody:

- Increase in harmful algal blooms.
- Displacement of native species and decrease gamefish populations through food web disruption.
- Litter beaches with sharp shells.
- Attach to boats and watercrafts, clog cooling systems and affect engine functions.
- Clog intakes to water systems, increase maintenance and operations cost of water conveyance systems.

