

Zebra and quagga mussels - invasive aquatic species

What do invasive mussels do? Mussels are filter feeders that can filter large volumes of water (up to 1 Liter/day). In some cases they can filter the whole volume of a lake in a few months. They remove plankton – tiny plants and animals – from the water. What they eat (and what they don't eat) ultimately ends up on the lake or river bottom. Plankton is an important food source for young fish, native mussels, and other aquatic organisms. Mussels may concentrate this food at the bottom, leaving open water species with less to eat!



Sailboats, canoes, motorboats and all other personal watercraft can carry invasive mussels.

Because they are so good at filtering, zebra and quagga mussels often make water clearer. This may force light-sensitive fish, like salmon and walleye, into deeper water to seek shelter from the sun. Increased light penetration allows aquatic plants to grow in deeper water and spread to a larger area. This may help smaller fish to survive by giving them places to hide, but makes it harder for large, predatory fish to find food. Thicker plant growth may also cause problems for boaters and anglers.

Mature zebra and quagga mussels look like small D-shaped clams. Their yellowish-brown shells have alternating light and dark stripes. Zebra mussels can reach a maximum of two inches in length, though most are smaller than an inch. Quagga mussels can be slightly larger. Both species of invasive mussels are typically found attached to solid objects, often growing in large clusters.

Mussels begin as eggs, then develop into free-swimming larvae (called veligers), which are microscopic. Veligers are spread by currents; after about three weeks, they settle out and firmly attach themselves to hard surfaces, where they grow into adults. Their lifespan is typically three to five years. They begin to reproduce after a year or two - females can release up to one million eggs per year!

Invasive mussels cause people additional problems. They clog water intakes and pipes – large water users on the Great Lakes spent \$120 million from 1989 to 1994 to combat zebra mussels. They also attach to piers, boatlifts, boats, and motors, which can cause damage requiring costly repair and maintenance. Even when they die, their sharp shells wash up on beaches, creating foul odors and cutting the feet of swimmers.



A display of zebra mussels.

Special note of caution for anglers:

Dispose of unwanted bait in the trash - do not transfer bait or water from one waterbody to another. Larval mussels or other invasive species could be present in the water with the bait.



Help prevent aquatic hitchhikers from catching a ride on your boat or equipment:

- ◆ Inspect and remove aquatic plants and animals,
- ◆ Drain water,
- ◆ Dispose of unwanted bait in the trash,
- ◆ Rinse with hot and/or high-pressure water, OR
- ◆ Dry for 5 days.

Clean Boats . . .
Clean Waters

For a list of known mussel infested waters, visit: www.usbr.gov/gp/mussels

To report finding mussels in previously clean waters or for more information contact:

**Bureau of Reclamation (406)247-7744
US Fish and Wildlife Service (303)236-4515**

RECLAMATION
Managing Water in the West

Don't Move A Mussel!
CLEAN, DRAIN AND DRY



**Invasive aquatic species... protect
your boat and our waters!**



Department of the Interior
Bureau of Reclamation

Protect Your Boat

Invasive mussels attach to a variety of materials, including fiberglass, aluminum, wood, and steel and may damage a boat's finish. Mussel larvae are extremely small and can be drawn into engine passages. Inside the engine cooling system, they can grow into adults and may block intake screens, internal passages, hoses, seacocks, and strainers. The best ways for boat owners to avoid these types of damage are:

 **Use a boatlift** to completely remove the watercraft from the water when not in use.

 **Run your boat regularly** if it is moored in zebra or quagga mussel infested waters. Run the engine at least twice a week at slow speeds (about 4-1/2 mph) for 10 to 15 minutes. Monitor engine temperatures – if you notice an increase, it may mean that zebra mussels are clogging your cooling system. Immediately inspect the system and remove any zebra mussels. The end of boating season is also a good time to inspect and clean the cooling system.

 **Lift the motor out of the water between uses if mooring.** Fully discharge any water that may still remain in the lower portion of the cooling system.

 **Tip down the motor and discharge the water when leaving a waterbody** to reduce the likelihood of transporting zebra or quagga mussels (in water) to another waterbody.



Clean your boat and equipment.

Physically remove (scrape) adult mussels from your boat, trailer, and equipment by hand. Young mussels and veligers may be too small to see. Wash your boat with high-pressure hot water (use water >104°F if possible). Use high-pressure cold water if hot water is not available. (Avoid pressure washing classic wooden boats or others not made of metal.)

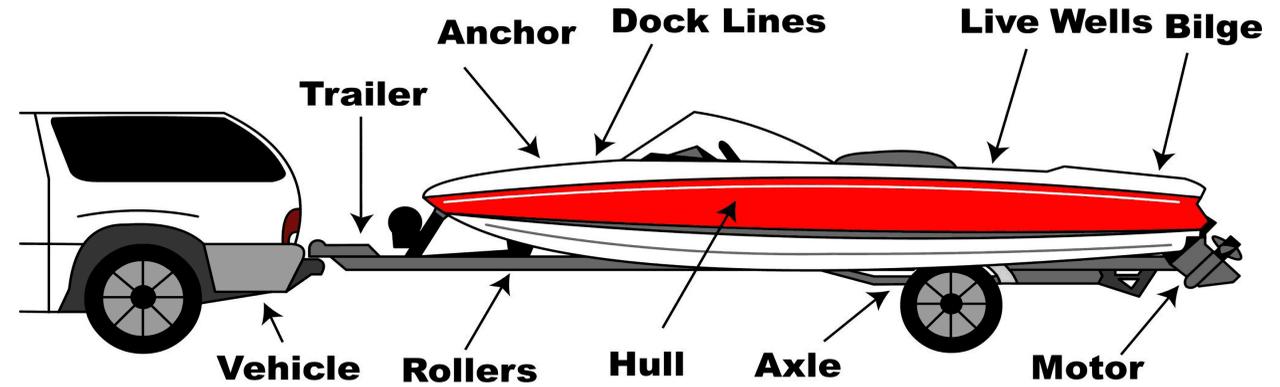


Apply anti-fouling paints or coatings to the hull and the engine's cooling system to prevent zebra mussel attachment. It is best to purchase these from an area boat dealer or your local marina. Anti-fouling paints that are copper based can be used in Wisconsin, and typically need to be reapplied every one to two years. In-line strainers can also be installed in the engine's cooling system.



Use motor "muffs", also known as motor flushers, to remove zebra or quagga mussels and other materials from your boat engine or personal watercraft. Clamp the motor flusher onto the lower unit over the cooling inlets on either side of the motor, and screw the nozzle of your garden hose into it. Run the boat engine for approximately 10 minutes or as suggested by the manufacturer.

Inspect and clean boats and equipment thoroughly



How can I help prevent the spread of invasive mussels?

Microscopic veligers may be carried in live wells, bait buckets, bilge water – any water that's transported to another waterbody. They can also travel in currents to downstream waters. Adults can attach to boats or boating equipment that are moored in the water. They frequently attach to aquatic plants, which themselves may hitch a ride on boats and equipment. For these reasons, it is important to take the following steps to prevent the spread of zebra mussels and other aquatic invasive species while boating:

-  Dispose of unwanted bait in the trash, not in the water,
-  Rinse your boat and equipment with hot (> 104°F) and/or high pressure water, particularly if moored for more than one day, OR
-  Dry your boat and equipment thoroughly (in the sun) for five days.

Before moving your boat from one water body to another:

-  Inspect and remove aquatic plants, animals, and mud from your boat, trailer, and equipment,
-  Drain all water from your equipment (boat, motor, bilges, transom wells, live wells, etc.),

Pressure washing note:

Avoid pressure washing classic and wooden boats, along with canoes and kayaks that are not made of metal. These types of boats should be drained, cleared of all plant and animal materials, and left in the sun to dry completely.