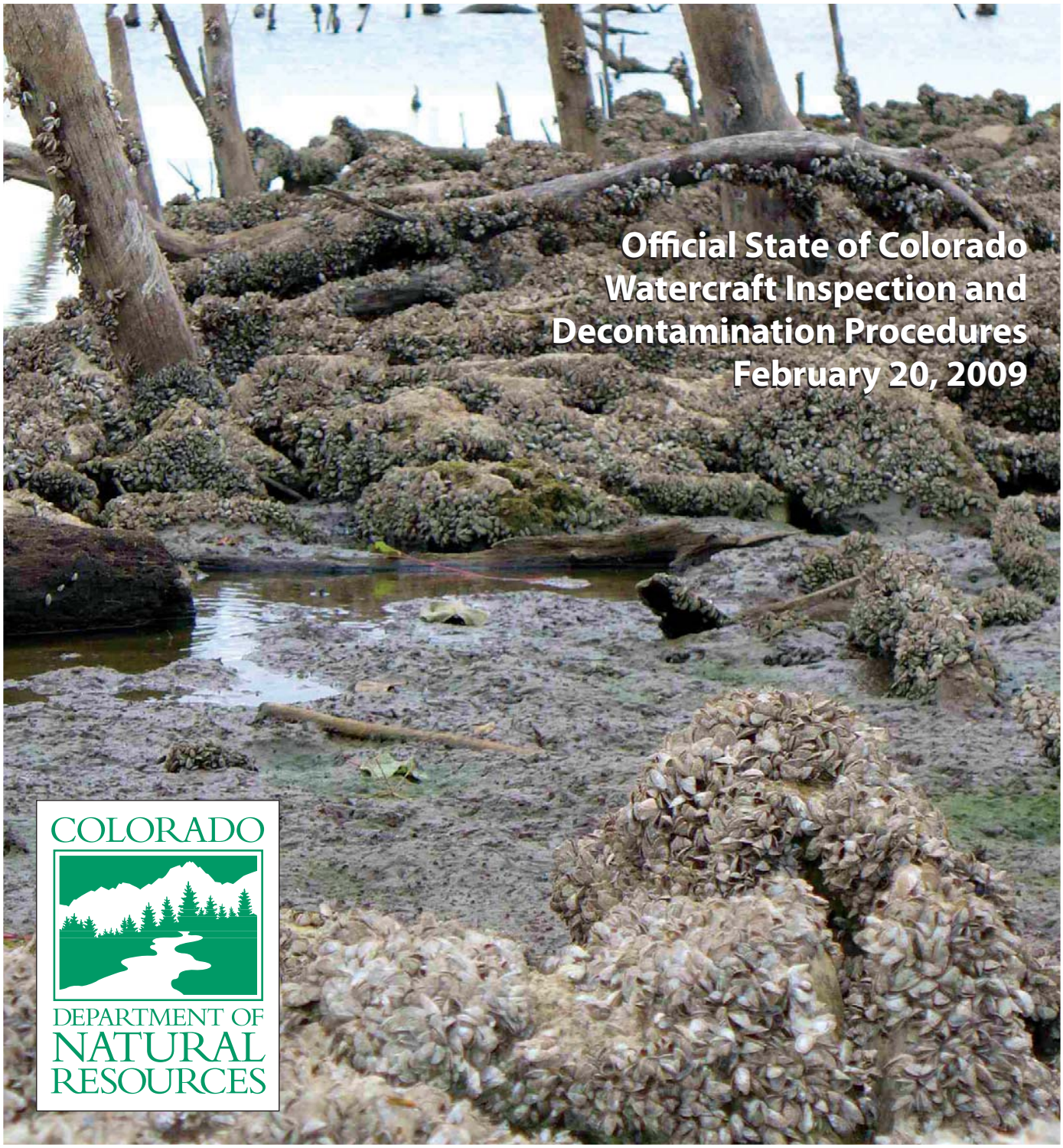
COLORADO DEPARTMENT OF NATURAL RESOURCES

Aquatic Nuisance Species (ANS) Watercraft Inspection Handbook



Official State of Colorado Watercraft Inspection and Decontamination Procedures
February 20, 2009

COLORADO DEPARTMENT OF NATURAL RESOURCES

COLORADO DIVISION OF WILDLIFE • 6060 Broadway • Denver, CO 80216 • (303) 297-1192 • www.colorado.gov/wildlife

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What are Aquatic Nuisance Species (ANS) or Aquatic Invasive Species (AIS)?

"A species that is: 1.) non-native (or alien) to the ecosystem under consideration and 2.) whose introduction causes or is likely to cause economic or environmental harm or harm to human health."

[Executive Order 13112 signed by President William Clinton on February 3, 1999 ("Invasive Species Act")]

Aquatic invasive species (AIS) and aquatic nuisance species (ANS) are also called non-native species, exotic species, non-indigenous species, weeds or pests. ANS can be plants or animals. Invasive aquatic plants are introduced plants that have adapted to living in, on, or next to water, and that can grow either submerged or partially submerged in water. Invasive aquatic animals require a watery habitat, but do not necessarily have to live entirely in water.

ANS plants and animals threaten native species and interfere with municipal, commercial, and agricultural water supply and distribution, and recreational activities. In their native environments, ANS populations are typically held in check and controlled by predators, parasites, pathogens, or competitors. However, when they are transported to a new environment, the natural checks are usually left behind. This gives invasive plants and animals an advantage over native species and makes them very difficult to control.

What is the purpose of this Aquatic Nuisance Species (ANS) Watercraft Inspection Handbook?

This handbook outlines standard watercraft inspection and decontamination procedures to prevent the spread of aquatic nuisance species in Colorado. While this handbook puts special emphasis on two species recently discovered in Colorado—zebra and quagga mussels—the procedures apply to all aquatic nuisance species, both plant and animal. A comprehensive list and description of non-native species that could negatively impact native species, recreation, or water resources in our state is provided at the end of this handbook.

The procedures in this handbook apply to trailered watercraft of any and all kinds. It includes their motors, trailers, compartments and any other associated equipment or containers that routinely or reasonably could be expected to contain or have come into contact with water.

Zebra Mussel

PHOTO BY LAUREN LIVO AND STEVE WILCOX

What are zebra and quagga mussels?

Zebra and quagga mussels are freshwater bivalve mollusks—animals with two shells. They are relatives of clams and oysters. It is very difficult for a non-expert to tell the two species apart. The shell color of both mussels alternates between a yellowish and darker brown, often forming stripes. They range in size from microscopic up to about two inches long. The zebra mussel is nearly triangular in shape and the quagga mussel is more rounded. Unlike native North American

Zebra Mussel
(Actual size is 15 mm)

- Sits flat on ventral side
- Triangular in shape
- Color patterns vary

Quagga Mussel
(Actual size is 20 mm)

- Topples over, will not sit flat on ventral side
- Rounder in shape
- Usually have dark concentric rings on shell
- Paler in color near the hinge

PHOTO BY U.S. GEOLOGICAL SURVEY

PHOTO BY U.S. GEOLOGICAL SURVEY

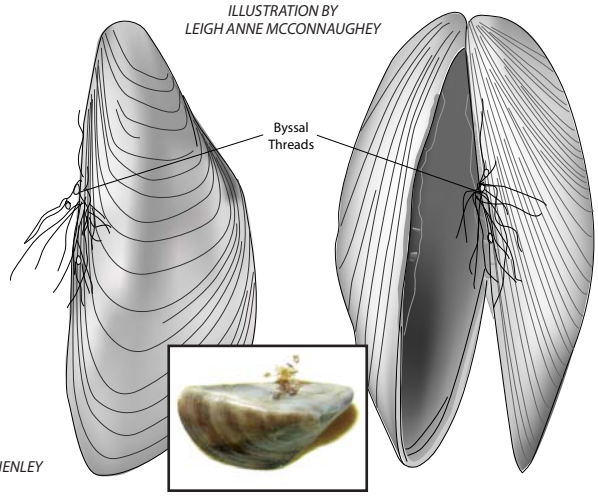


ILLUSTRATION BY
LEIGH ANNE MCCONNAUGHEY

INSET PHOTO BY BRAD HENLEY

freshwater mussels, which burrow in soft sediment, adult zebra and quagga mussels can attach via tiny threads—byssal threads—to hard surfaces.

Both zebra and quagga mussels can survive cold waters, but cannot tolerate freezing. They can endure temperatures between 1°–30°C (33°–86°F). Zebra mussels need waters above 12°C (54°F) to reproduce while quagga mussels can reproduce in waters as cold as 9°C (48°F). The embryos are microscopic. The larvae, called veligers, are **planktonic**—free-floating. The veligers float in the water column or are carried in the current for about four to eight weeks. Then the larvae develop shells and settle onto any solid surface, including the skin or shells of native aquatic species.

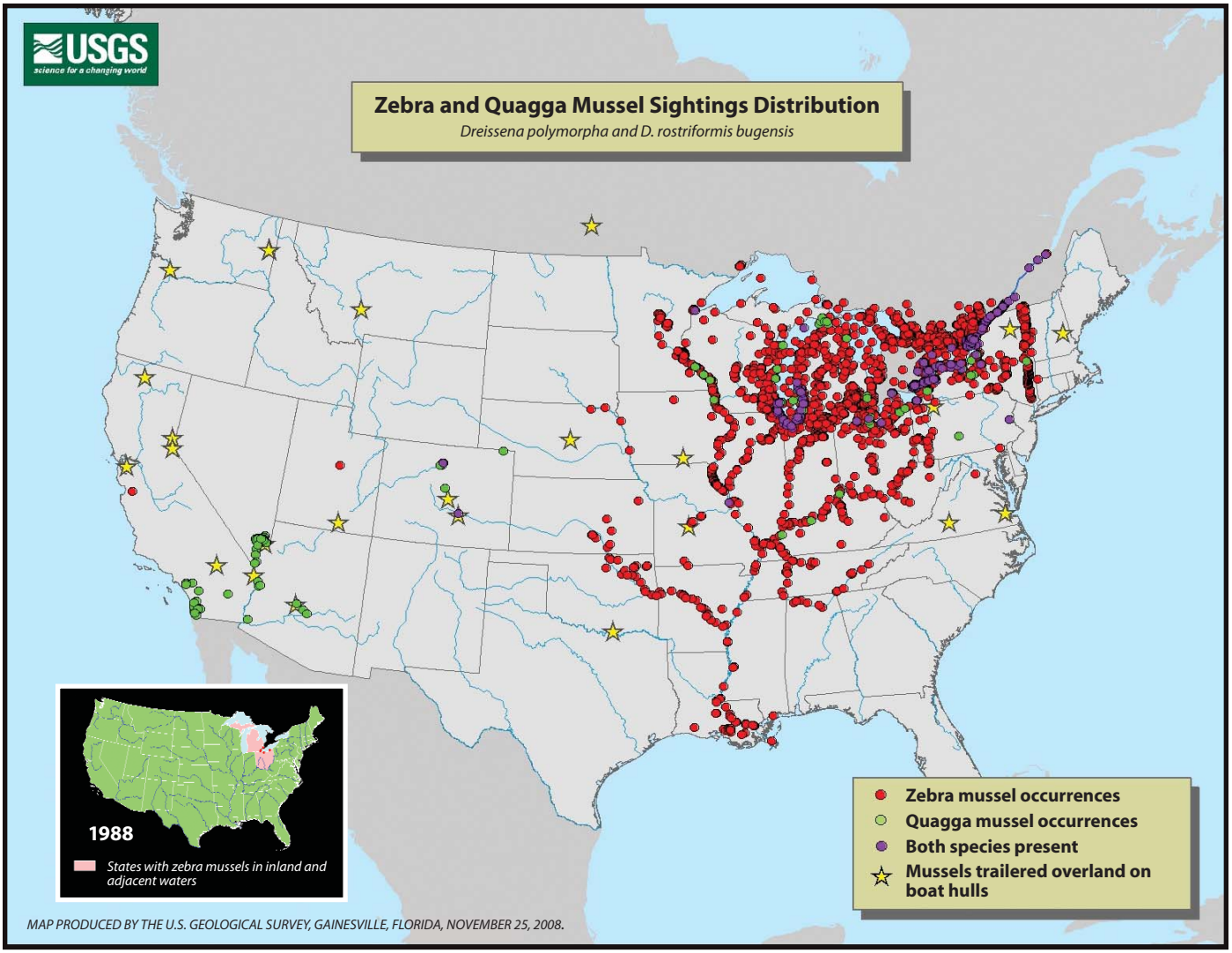
Actual size

Zebra mussels are native to the Black and Caspian Seas. They were discovered in the Great Lakes in 1988 and have since spread to 26 states in the United States. Quagga mussels are native to the Dnieper River Drainage in the Ukraine, and were first found in the Great Lakes in 1989.

How did the mussels get to Colorado?

Many aquatic nuisance species, including zebra and quagga mussels, have first been introduced into the Great Lakes in the discharged ballast water of ocean-going ships. Once in North American waters and wetlands, aquatic nuisance species often hitch rides to other bodies of water on the boats, trailers, and equipment that people transport from place to place. Boaters and anglers can inadvertently transport ANS on waders and in bait buckets and live wells.

Zebra and quagga mussels likely made their way into Colorado on trailered watercraft. Preliminary monitoring was conducted by Division of Wildlife and State Parks from 2004–2008. In January 2008, the first confirmation of mussel larvae occurred in Colorado in samples from Lake Pueblo. Monitoring was then intensified by the Division of Wildlife in cooperation with the Bureau of Reclamation in the summer of 2008. Mussel larvae were positively identified in several lakes in July of 2008 in Grand County including Grand Lake, Granby, Shadow Mountain, and Willow Creek. In October of 2008, mussel larvae were also confirmed in Jumbo Reservoir in Logan County and Tarryall Reservoir in Park County. There is no way to determine where or when mussels first



entered the state of Colorado, but it is believed they entered in the last few years on probably more than one boat. The U.S. Geological Survey (USGS) updates a sightings map for both species daily at http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/.

PHOTO BY DAVID K. BRITTON, PHD, U.S. FISH AND WILDLIFE SERVICE

Why should we be concerned about zebra and quagga mussels?

Zebra and quagga mussels pose a great ecological and financial threat to the state. The invasion of these mussels can affect every Coloradan in some way. The impacts could be devastating:

- **They grow and reproduce quickly.**

Zebra and quagga mussels reproduce *exponentially*. They can spawn year-round if conditions are favorable. A single female mussel can produce up to one million eggs a year! Even if only ten percent of the offspring survive, there would be 10 septillion mussels in the waterway at the end of five years! As the mussel population explodes, they cover the bottom and sides of the waterway.

PHOTO BY BRAD HENLEY

PHOTO BY PHILIP MYERS, ANIMAL DIVERSITY WEB (http://animaldiversity.org)

- **They clog water infrastructure, impacting water supply and quality.**

PHOTO BY PETER YATES

As mentioned before, zebra and quagga mussels can attach via byssal threads to hard surfaces. They attach to most underwater structures and can form dense clusters that impair facilities and impede the flow of water. They clog intake pipes and trash screens, canals, aqueducts, and dams—disrupting water supply to homes, farms, factories, and power plants. Zebra and quagga mussels also degrade water quality and can alter the taste and smell of drinking water.

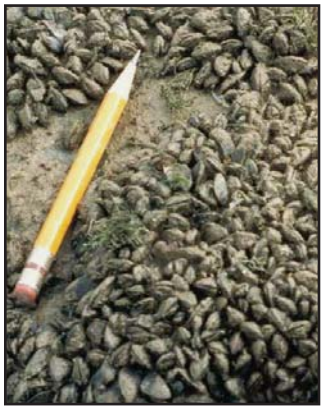


PHOTO BY RON DERMOTT

- **They have significant ecological impact.**

Invasive species have the ability to change aquatic ecosystems and native plant and animal communities. The amount of food the mussels eat and the waste they produce has life-altering effects on the ecosystem and can harm fisheries. As filter feeders, these species remove large amounts of microscopic plants and animals that form the base of the food chain, leaving little or nothing for native aquatic species. Zebra mussels attach to and encrust native organisms, essentially smothering them and removing more animals from the food chain.

- **They have recreational impacts.**

These mussels encrust docks and boats. Attached mussels increase drag on boats. Small mussels can get into engine cooling systems causing overheating and damage. Increased hull and motor fouling will result in increased maintenance costs on vessels moored for long periods of time. The weight of attached mussels can sink navigational buoys. Zebra and quagga mussels also impact fish populations and reduce sport-fishing opportunities. Their sharp shells can cut the feet of unsuspecting swimmers and beach goers.

PHOTO BY GREAT LAKES ENVIRONMENTAL RESEARCH LABORATORY

PHOTO BY BRAD HENLEY

- **They have significant economic impact.**

As maintenance costs for power plants, water treatment facilities and water delivery infrastructures increase, so does the cost of food and utilities. In the Great Lakes area, maintenance costs in water treatment plants, power plant intakes and dams have been in the billions of dollars. The destruction of native fisheries also has a wider economic impact in terms of tourism and recreation dollars not spent. Marinas and watercraft dealers could suffer business declines.

PHOTO BY JASON GOEKLER, KDWP

- **They are very difficult to kill.**

In only one instance have managers been able to eradicate zebra mussels and that was an isolated 12-acre quarry in Virginia. A large volume of chemical was used to treat the water and kill the adults and larvae. Eradicating or treating zebra or quagga mussels in large water bodies and/or connected waterways may not be possible, so prevention is very important. *If watercrafts are cleaned, drained, and dried in between water bodies, any attached mussels or other ANS will be killed.*

PHOTO BY GREAT LAKES ENVIRONMENTAL RESEARCH LABORATORY

- **They spread quickly to other water bodies.**

Mussels can spread to other bodies of water by attaching to boat hulls and anchors, trailers, and fishing equipment. Larvae can be transported in bilge water, ballast water or live bait wells. Mussel larvae also disperse naturally, and can be carried by water currents to other lakes or reservoirs downstream or through water diversions.

What can we do?

- **Educating the public is your most important task.**

As a boat inspector, your most important task is educating the public. Many lakes and reservoirs in the state will not have inspections, therefore it is essential that you:

1—Show the boaters how to inspect their boats themselves.

2—Explain why inspection is critical to find mussel settlers and other ANS.

3—Impress on the boater how zebra and quagga mussels damage boats, ruin fishing opportunities, harm the environment and impair water infrastructure.

You need to drive home the primary education message to **Clean/Drain/Dry** and explain why boaters need to do it ***each time*** they use their craft.

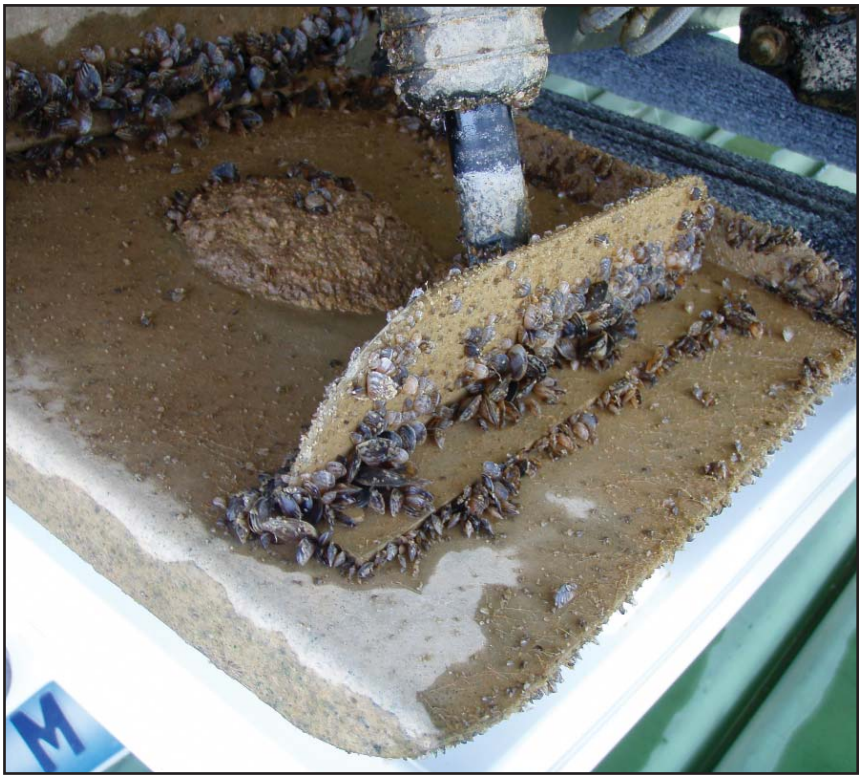


PHOTO BY BRAD HENLEY

Working with the public—FAQ

PHOTO BY ELIZABETH BROWN, CDOW

Most boaters have heard something about zebra and quagga mussels and there have been few complaints about the inspection program. The boating public is more likely to comply with and be supportive of the inspection program if they understand how important it is to control these species. That is why **education is the most important component of your efforts** as a boat inspector. It may also be helpful to remind boaters that some lakes and reservoirs have been closed to watercraft to prevent the spread of ANS. When visitors realize that the inspection takes little time and protects Colorado's waters, they usually are more than happy to comply. You may be asked many questions during the short time you are interacting with boaters during the inspection. Here are some of the most frequently asked questions:

Q: *Is this just a way for the government to charge additional fees?*

A: No, right now all state inspections of boats and any decontamination processes that are required will be free, but private entities also offer inspection and decontamination services and may charge for them.

Q: *Is this an excuse to do inspections for all sorts of things beyond just ANS?*

A: No, inspectors are usually not law enforcement officers and they are looking for ANS only. They are looking in areas of the boat that could contain water or come into contact with the water for possible ANS. If rangers or other law enforcement officers perform the inspections, they will be required to deal with public safety issues that they come across even though their primary focus will be ANS.

Q: *Do the inspections take a long time or cause big traffic back-ups?*

A: No, most inspections are quick and can be completed in less than three minutes.

Q: *Why are watercraft inspected at some locations but not others?*

A: Inspectors will be phased in at a number of locations across the state based on risk, but there will never be enough money to have inspectors everywhere. That is why it is **key** that the boaters themselves practice **Clean, Drain,** and **Dry** and that they inspect their own boats and report findings to the appropriate persons.

Q: *Isn't the spread of zebra and quagga mussels inevitable anyway?*

A: No, states that have implemented education and inspection programs have significantly slowed or even stopped the spread of these species. Even if we only slow the spread of mussels, each year they are contained could save us tens to hundreds of millions of dollars of taxpayer money. Preventing the spread of zebra and quagga mussels will protect native wildlife and fish for that many more years while ongoing research develops tools to control these species.

Q: *Aren't zebra and quagga mussels actually good for fishing?*

A: No. They significantly impact many fish species by removing most of the nutrient base. Zebra and quagga mussels are filter feeders that strain small planktonic organisms, which are the basis of the aquatic food web, from the water column. Some fish species are less affected if they don't depend on those nutrients. A few species may do better, but in most cases, game fish and commercial fish decline very significantly after zebra and quagga mussel invasions.

Q: *Don't zebra and quagga mussels improve water quality?*

A: They do clear the water significantly, but that is not necessarily a good thing. These mussels eat the good algae and leave behind problematic algae. Clear water also provides better habitat for water weeds to grow, which, along with problem algae, impacts water quality, causing taste and odor problems in drinking water.

Q: *Isn't there anything that eats these mussels?*

A: These mussels are controlled by natural predators in their native environment, but so far no biological controls have been effective on this continent. Some predatory fish from their native waters were introduced to the Great Lakes, but they did not control the zebra mussels there. In fact, these species had major negative impacts to other fish species such as small mouth bass. The public should never introduce new fish predators. A new bacterial biological control is showing promise and may be available in a few years.

Q: *Can zebra and quagga mussels be spread by birds?*

A: No, birds have not been a very significant factor in transferring these species to new watersheds. Most of the new locations where zebra and quagga mussels have been found are high-use boating areas, not wildlife refuges. Recreational boating is the primarily method of spreading these species in the Western U.S. and it is the one factor we can control.

Q: *Is this an over-reaction to the discovery of a few mussels? Shouldn't officials wait and see what will happen in the next few years?*

A: No, states that have waited to act have found that zebra and quagga mussels have spread significantly while they waited. Zebra and quagga mussels are nearly impossible to get rid of once they are in a water system (see next question).

Q: *Can we get rid of the zebra and quagga mussels that have been found in Colorado lakes and reservoirs?*

A: It's not very likely. Only one water body in the entire country got rid of them. That was a 12 acre isolated quarry where a huge amount of potassium chloride was used to eradicate them. No larger bodies of water have been able to get rid of them, even with a drawdown.

Q: *Should I stop boating in Colorado lakes and reservoirs infested with zebra or quagga mussels?*

A: No, you just need to take extra precautions to **Clean, Drain,** and **Dry** your watercraft completely between infested waters and other places where you like to boat. Right now some lakes in the state may refuse to admit watercraft that have recently been in infested waters, but agencies are working together to communicate and coordinate their management efforts and make sure that boaters are not turned away. If you properly **Clean, Drain,** and **Dry** your boat, you can safely move your boat between waters.

Q: *How are you going to decontaminate thousands of boats?*

A: Each state-certified location will inspect all vessels entering from out of state and those that have been out of infested waters less than 30 days. Only boats with obvious signs of aquatic nuisance species—plants, mud, debris, or higher risk standing water, will be decontaminated. On the whole, a relatively small number of boats will be decontaminated.

Q: *Will agencies ticket and fine anyone found with mussels on their boats?*

A: No, the idea of the ANS law is only to fine or prosecute people who don't comply with inspections and decontamination. If the boater is making a good faith effort, then Colorado Law Enforcement Officers are there to help you.

Q: *Why do some waters require a drying time prior to launch and not others?*

A: Some waters do not have a decontamination station available and the drying period ensures that any possible ANS on the boat is killed. This handbook refers to the state standard protocol. It is used at all state-managed waters, but some non-state managers may still use different methods. The state is encouraging others to adopt this standard protocol. The state protocol puts the responsibility on the boater to dry out their boat between reservoirs and minimizes the risk of spread of ANS through education, inspections, draining and decontamination of boats with possible ANS.

Q: *Are you going to impound a lot of boats?*

A: Boats will only be impounded as an option of last resort. If a boat is entering the management area for a water body and the operator refuses an inspection, the boat will be turned away but not impounded. If a boater is leaving an infested water body and refuses an inspection, then state laws and regulations require that the boat be impounded until proper inspection and/or decontamination can be performed. If possible ANS are found, and if the owner will not consent to decontamination or if decontamination equipment is not available then the boat will be impounded until decontamination can be performed.

Q: *Are zebra and quagga mussels harmful to humans?*

A: Not directly. They do not represent any direct health risks to humans when they are in a waterway. If there is a large population of mussels in a lake, then the shoreline can be littered with sharp shells.

Q: *Can you eat zebra and quagga mussels?*

A: No, you shouldn't. As the mussels filter in food and water, they accumulate heavy metals in their bodies. The high heavy metal content has been toxic to some birds that eat them. Because these metals are toxic, we can't harvest these mussels for human consumption in order to get rid of them. They aren't the kind of mussels one would steam and eat with butter.

PHOTO BY BRAD HENLEY

What types of inspections will I do?

The inspections in this handbook apply to waters not known to be infested with ANS.

These inspections will prevent the spread of ANS. Different types of inspections apply to infested waters where containment of ANS is necessary. Those protocols are found in the *Supplement for Containment Waters*.

You will be doing three types of inspections, depending upon the situation. Each of these types of inspections will be described in detail later in this handbook.

PHOTO BY BRAD HENLEY

- **Standard Inspection**

This inspection procedure applies to **all trailered watercraft** before **entering** the water. The procedure should take about two to three minutes.

- **High Risk Inspection**

This protocol is used on boats found to have a combination of high risk factors including: use out of state, use in infested waters, complex boat structure, or standing water. This is intended to be a very thorough inspection that may take 10–30 minutes depending on the type or size of the boat.

- **Clean, Drain, Dry Checks**

This is a quick procedure for checking **boats leaving** the water. This one minute inspection ensures that contact has been made with the boater before he/she leaves the boat ramp and verifies that the boat is **clean** and **drained** prior to leaving. Make sure the owner pulls all plugs and live wells are empty.

What are my priorities as a watercraft inspector?

As a boat inspector, you need to do **five** things:

- **Ensure Personal and Public Safety**

Your safety and the safety of the public is your top priority at all times. Many vehicles and boats will be moving around the inspection area. People will be looking under wheels and through watercraft. You will need to make sure all efforts are made to ensure the safety of all involved.

- **Educate Boaters**

Every contact you make with boaters must educate them about the importance of controlling zebra and quagga mussels and other ANS. Boaters must realize that ANS are spread by their actions (or inaction). They must understand that they have a lot to lose, in terms of access and recreational opportunities, if they do not help in this effort. The primary education message is **Clean/Drain/Dry**:

Clean—Remove all plants, animals, and mud. Thoroughly wash everything.

Drain—Drain every space or item that can hold water.

Dry—Allow time for your boat to completely dry before launching in other waters.

- **Perform Standard Inspections**

You must be able to inspect a large number of boats quickly. Work quickly to avoid traffic build-up and boater frustration at the inspection site, but you must perform inspections the same way each time and be thorough enough to assess the risk of all trailered watercraft. The Standard Inspection Checklist should help you move through each watercraft efficiently.

- **Identify High Risk Watercraft and Perform High Risk Inspections if Necessary**

If a combination of high risk factors are identified, you will need to switch to a *High Risk (ANS) Inspection Form* (see page 24) and document a more thorough inspection.

- **Decontaminate (Possibly Impound)**

If you find evidence of mussels or other ANS or have reasonable belief that the vessel may have ANS, the vessel must be decontaminated. First, you must collect samples of the suspected ANS, and then complete the *(ANS) Documentation and Vessel Decontamination Form* (see page 25–28). In rare instances, you may require the assistance of law enforcement personnel to decontaminate or impound a boat.

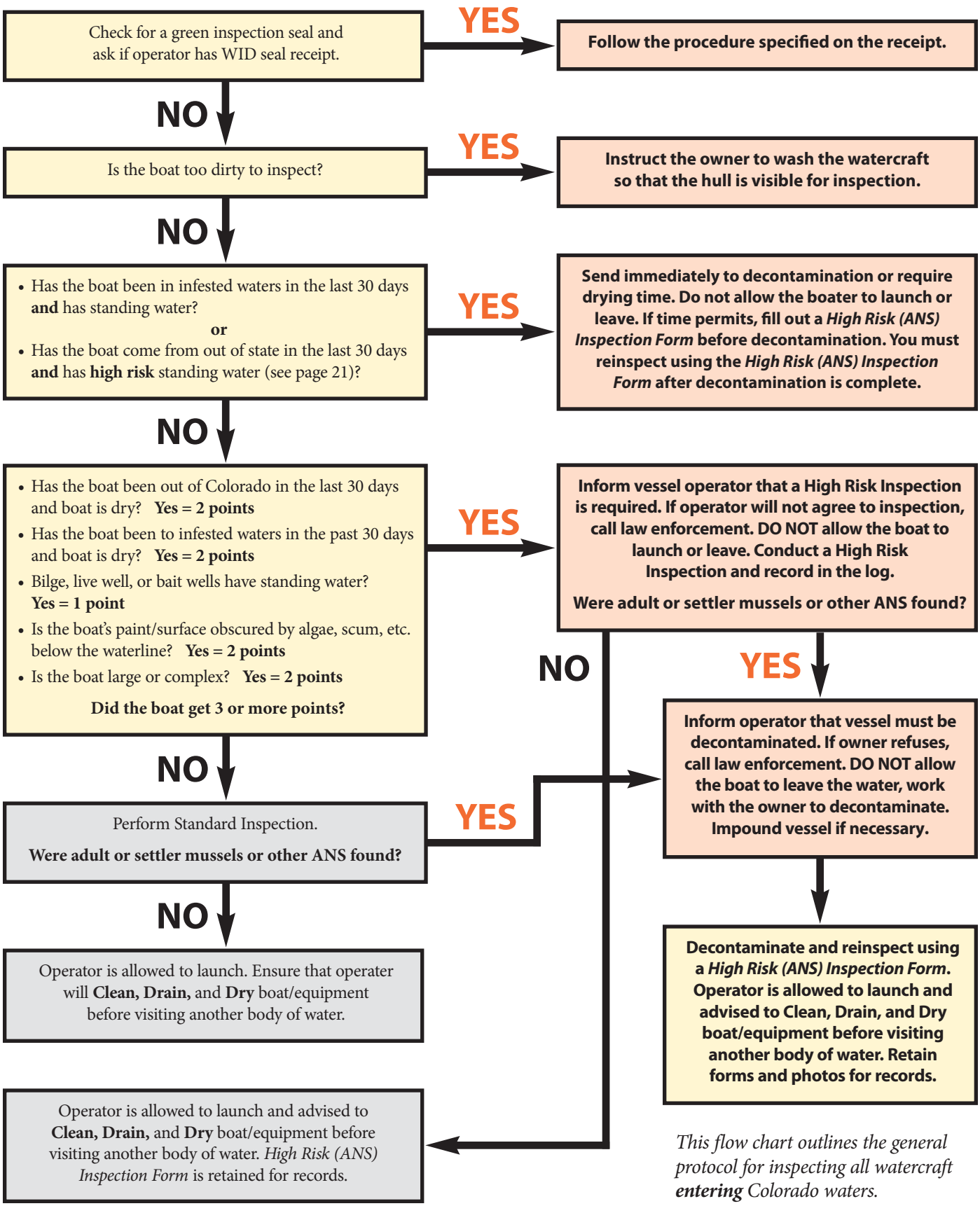
Which watercraft are the highest risks for transporting mussels and other ANS?

While all boats and floating devices (including their content, motors, anchors, wells, trailers, and other associated equipment) must be inspected for ANS prior to leaving or entering an infested water, marina boats are the highest risk, especially commercially hauled boats. Hand-launch craft have very low biological risk. Different risk levels will require different inspection procedures.

Watercraft Type	Risk Level
House Boats, Cabin Cruisers	High Biological Risk—Requires thorough inspection
Ski Boats with Ballast Tanks Large Open Boats Sail Boats Wake Board Boats	Medium to High Biological Risk—May need high risk inspection. Verify that no mussels or other ANS can be found on hull, engine, or trailer and that ballast, bilge, and live wells are drained. There should be no mud or plants on craft.
Smaller Open Boats with Outboard Motors (No Live Wells, No Bilge Tanks) Personal Watercraft (PWC, Jet Skis)	Low Biological Risk—Verify that there are no mussels on the hull or trailer and that ballast and engine water is kicked out. If the boats or personal watercraft are very dirty, request that they be cleaned prior to launch.
Hand-launched Craft: Canoes, Kayaks, Belly Boats, Inflatables	Very Low Biological Risk—Educate the public to clean and dry between launches. If the watercraft are very dirty, request that they be cleaned prior to launch.

Pets and personal equipment such as waders, fishing gear, and decoys can transport mussels, but usually pose very low biological risk for mussels. However, there is still a high possibility that pets and equipment will transport other ANS, such as New Zealand mudsnails. Educate the public to clean and dry personal equipment and pets, especially if leaving an infested body of water.

What is the protocol for inspecting watercraft entering uninfested Colorado waters?



This flow chart outlines the general protocol for inspecting all watercraft ***entering*** *Colorado waters.*

What equipment do I need for inspections?

A designated inspection area should have been identified, with signage identifying its location. Inspectors will need to be sure the following equipment and materials are available:

Safety Equipment

- ❏ Traffic cones
- ❏ Orange traffic safety vests
- ❏ Chocks for the trailer (optional)
- ❏ Rolling stepladder for boat access (optional)
- ❏ First Aid Kit

Inspection Equipment

- ❏ State of Colorado Standard Inspection Checklists, High Risk Inspection Forms, Vessel Decontamination Forms, Clean/Drain/Dry Checklists
- ❏ Wire seals and seal receipts
- ❏ Crescent wrench to take out bilge plugs (9⁄16" socket also handy)
- ❏ Digital camera
- ❏ Hand wipes
- ❏ Hand sanitizer
- ❏ Paper towels
- ❏ Inspection mirrors
- ❏ Flashlights
- ❏ Magnifying glass
- ❏ Sample collection kit (bags, checklist, etc.)
- ❏ Work lights for night inspections and associated utilities or generator if needed
- ❏ Radios
- ❏ Clipboards
- ❏ Pens/pencils
- ❏ Hand counter to keep track of inspections
- ❏ Wire cutters
- ❏ Vise grips
- ❏ Pry bar
- ❏ Buckets
- ❏ Nets
- ❏ Small battery powered bilge pump

Inspection Staff Equipment

- ❏ Staff identification: shirts, badges, name tags, hats, etc.
- ❏ Chairs
- ❏ Access to drinking water
- ❏ Access to restrooms
- ❏ Access to shelter in case of weather
- ❏ Sun block
- ❏ Trash can

Educational Materials

- ❏ Mussel education brochures
- ❏ Boating regulation brochures
- ❏ Fishing regulation brochures
- ❏ Maps of reservoir/lake/etc.
- ❏ Supply of voluntary statement forms for complaints (none needed so far)

PHOTO BY ELIZABETH BROWN, CDOW

Where should watercraft inspections, draining, and decontamination stations be located?

Ideally, watercraft inspections, draining, and decontamination should be located in the same general area. There should be clear control points so that boats can be prevented from launching until they have been through the inspection and/or decontamination.

The location should be far enough from the water or boat ramp that drained bilge/ballast/well water cannot flow into the water body. Decontamination should be conducted "high and dry"—away from the water. If a water collection system is not available, the station should be on a semi-permeable dirt or gravel site. If there is no suitable location for draining boats with large ballast tanks, those watercraft that are full may need to be turned away to drain elsewhere.

PHOTOS BY ELIZABETH BROWN, CDOW

What is the protocol for Standard ANS Inspections?

Standard inspections are required for all boats **entering** high risk waters and all boats **coming** into Colorado from out of state, regardless of residency. In addition, all boats that are leaving mussel infested waters must be inspected (see *Supplement for Containment Waters*). High risk waters are identified by looking at four criteria:

1—Probability of an introduction due to recreational pressures or geographic proximity to infested water.

2—If zebra and quagga mussels were introduced, the probability of them being able to sustain a population based on water chemistry parameters.

3—Risk of impacts to facilities, location in watershed and impact to municipal, industrial and agricultural water storage and supply.

4—Risk of impact to fisheries.

PHOTO BY ELIZABETH BROWN, CDOW

State regulations require all vessels and floating devices (including their content, motors, trailers, and other associated equipment and compartments that could routinely or reasonably contain or come into contact with water) to be inspected for ANS prior to launch. The procedure will take two to three minutes. The *Standard Aquatic Nuisance Species (ANS) Inspection Checklist/ Prevention Waters* provided in this handbook (see page 19) is not a required form to fill out, but will assist you in performing the inspection quickly and efficiently.

- **Direct Boats to Inspection Site and Initiate Contact**

The importance of education cannot be overemphasized! Not every reservoir or lake in Colorado will be able to put inspectors in place, so it is **essential** to **show** boaters **how to inspect** their own boats and explain *why* we are doing this. Impress on the boater how mussels damage boats, gear, fisheries, and water infrastructure. Provide brochures or other information. **Share** the primary education message, **Clean/Drain/Dry**, and explain why it is important to **always** show up with their watercraft and gear clean, drained and dry. **Emphasize to boaters that they will need to empty all their water (bilge, ballast, live well, and bait well) from their boat between waters.**

PHOTO BY ELIZABETH BROWN, CDOW

- **Ensure Personal and Public Safety**

Inspection points should be designed to handle a lot of traffic and should have clear signs and unambiguous lane designations. You **must** ask the driver to turn off the engine, put on the parking brake and step out of the vehicle. Then, consider **putting chocks** under the wheels of the vehicle and the trailer. You will have to climb on the boat and look under the trailer, so it is important to prevent boats or trailers from rolling.

- **Initial Assessment**

In order to reduce the time for inspections at busy reservoirs and to provide a reasonable way to communicate risk between reservoirs, state and municipal agencies, and the private sector, Colorado is using a wire seal system. Inspected Boat Wire Seals are applied to boats that have been inspected at a state-certified location (see page 32 for more information). If the boat has a **green** WID wire seal, follow the protocol outlined on page 31.

PHOTO BY ELIZABETH BROWN, CDOW

- **Determine Risk Factors**

This is like airport security—you are screening for rare events. You will need to look at a lot of boats quickly and determine if there is a high risk. You will be able to move low risk watercraft through an inspection very quickly. Situations that pose higher risk include vessels that have been in infected waters recently (within the last 30 days), watercraft coming in from another state (especially commercially-hauled boats), boats which show a lot of dirt, grime, or slime below a clear waterline, or boats which have standing water on board.

PHOTO BY ELIZABETH BROWN, CDOW

If you determine that you have a high risk boat, you will need to proceed with the High Risk Inspection protocol. If the vessel is low risk, continue with the Standard Inspection protocol.

If the vessel is too dirty or muddy to inspect, instruct the operator to go wash the boat and then return for an inspection.

- **Rapid Exterior Inspection**

Again, it is important to explain what you are looking for and educate boaters so that they can inspect their own boats. It is important to start and end inspection at the same place on each boat. Look the boat over and feel the hull with the boater. Both you and the owner should feel the ridges, seams, and recessed bolts of the craft. The young mussels may feel like bumps or sandpaper on the craft. If you or the owner feels a rough spot, look for attached mussels. Carefully check the rear of the boat, including intakes, upper and lower motor areas, and the propeller. Trailers can pose as high a risk as boats, so carefully check trailer rails, lights and electrical wires, as well as the license plate and trailer pads.

PHOTO BY ELIZABETH BROWN, CDOW

If plants, mussels, or sandpapery bumps are found on either the boat or the trailer, complete a *High Risk (ANS) Inspection Form* (see page 24), then send the vessel and trailer to decontamination! Do not allow the boat to launch.

- **Ensure that the Boat is Drained**

On smaller boats, ask the driver to **remove** the **bilge plug** (and other plugs if needed) to show that the craft is drained.

For larger craft, you will need to get into the vessel to look at bait and live wells. Ask for permission and **ask the owner to climb in first**. Follow the owner into the boat in the same way they entered. Be careful to prevent either the boater(s) or inspection staff falling or getting hurt. Then, **ask** other inspectors to **stand clear** so that the driver can **activate** the **bilge pump** to show that the boat contains little or no water. Then, ask to see **all bait wells, live wells,** and **ballast tanks**. If the boat has bait and standing water in the bait well or in any container, follow the procedures outlined on page 21 of this handbook. Ensure that the boater has fully drained the live wells, ballast tanks, and any other containers or compartments that could reasonably hold water. Using the guidelines on a page 21, determine the risk of any standing water still present and determine if a *High Risk (ANS) Inspection Form* and decontamination is necessary or if the boat has been drained sufficiently and presents low risk.

- **Closeout**

When the inspection is completed, ask the owner to replace the bilge plug. The owners are responsible for ensuring that his/her craft is water-tight. Keeping safety of all staff and boaters in mind, clear the area of all inspectors (yell **"stand clear"**) and only after you have made sure the area is clear, **remove** any chocks that may have been used from the vehicle and trailer. **Thank** the boat owner for keeping their boat **Clean, Drain,** and **Dry** and tell them they can launch. Be sure to **complete** the *(ANS) Log for Monthly Reports* entry.

PHOTOS BY ELIZABETH BROWN, CDOW

State of Colorado

STANDARD AQUATIC NUISANCE SPECIES (ANS) INSPECTION CHECKLIST/PREVENTION WATERS

For use inspecting Trailered Watercraft **entering** uninfested water

These are instructions. This checklist is not a form to fill out. This protocol should take 2–3 minutes to complete.

1. Initial Contact

- ❏ **Record CL#** (or other registration information) on *(ANS) Log for Monthly Reports*.
- ❏ **Introduce yourself** and explain that you will be **inspecting for mussels** and other ANS.
- ❏ **Explain** that zebra and quagga mussels have been found in Colorado and other states.
- ❏ **Explain** why it is important to **Clean/Drain/Dry**.
- ❏ **Give** boaters mussel information.
- ❏ Ask the driver to **turn off engine, set parking brake,** and **step out**. (Required Safety Procedure)

2. Initial Assessment

- ❏ Check for green **Inspected Boat Wire Seal**.
- ❏ If a wire seal is present, **ask for the wire seal receipt** and follow procedures on page 31.
- ❏ **Check if boat is too dirty/muddy to inspect.** If so, tell boater it cannot be inspected and they need to wash and then return for inspection.

3. Determine Risk Factors

- ❏ Based on license tags and registration number, ask if the boat has been **outside of Colorado in the last 30 days?** . . . . . ❏ 2 points
- ❏ Has the boat been in **infested waters** in last 30 days? (updated lists can be found at http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/) . . . . . ❏ 2 points
- ❏ Is the boat **dirty, crusty,** or **slimy below the waterline**? . . . . . ❏ 2 points
- ❏ Is craft a **big, complex boat**? . . . . . ❏ 2 points
- ❏ Look for water on board. Is there **standing water** (water in tanks/wells/bait wells)? . . . . . ❏ 1 point

*If watercraft risk factors total 3 or **more** points, **STOP** and switch to High Risk (ANS) Inspection Form!*

- *If the boat has been in infested waters in the last 30 days **and** has standing water*

or

- *If the boat has come from out of state in the last 30 days **and** has **high risk** standing water (see page 21), **send to decontamination!***

4. Rapid Exterior Inspection

- ❏ Explain/educate about what you're looking for.
- ❏ Look boat over/Feel hull—feel ridges, seams, and recessed bolts for attached mussels.
- ❏ Carefully check the rear of boat—intakes, motor, and lower motor areas, propeller.
- ❏ Carefully check trailer lights/electrical, license plate and trailer pads.

*If plants, mussels, or sandpapery bumps are found, **STOP**, **send to decontamination** and if time permits, fill out a High Risk (ANS) Inspection Form.*

5. Ensure Boat Drained

- ❏ On smaller boats, **ask** the driver to **remove bilge plug** (and other plugs if needed) to show that craft is drained.
- ❏ On large boats, **ask** the inspectors to **stand clear**, then **ask** driver to climb in and **activate bilge pump** to show that boat contains little or no water.
- ❏ **Inspect** and **drain all wells, ballast tanks, compartments,** and **containers** with standing water.
- ❏ If the boat has standing water in the bait well, **ask** the boater **where they got the bait**.
- ❏ If boater claims that the bait came from a Colorado dealer and was purchased in the past 7 days, ask for the receipt.
- ❏ If boater cannot verify the origin of the bait, or if the Colorado receipt is more than 7 days old, have boater remove bait and drain bait well.

*If standing water cannot be completely drained and presents a **high risk** (see page 21), **STOP**, and **send to decontamination!***

6. Closeout

- ❏ **Ask owner to replace bilge plug**. **Owner is responsible to ensure it is water-tight.**
- ❏ Ensure all the inspectors are **finished** looking at the craft and that nothing was found.
- ❏ Yell "**stand clear**."
- ❏ **Thank** boat owner for keeping their boat **Clean, Drain,** and **Dry** and allow them to launch.
- ❏ **Ensure** *(ANS) Log for Monthly Reports* entry is completed.

State of Colorado

(ANS) LOG FOR MONTHLY REPORTS

Date: _____ Location: _____

Shift Times: _____ Inspector Name(s): _____

Boat Registration (CL#)	Trailer License Plate	Green Strap Removed	Green Strap Applied	Standard Inspection	High Risk Inspection	Clean/Drain/Dry Check	Decontamination (Standing Water only)	Verified ANS Decontamination (Mussels Found)	Impounded	Other/Comment (Refused Inspection, etc.)	Boat Had Standing Water & Was Drained

How do we deal with bait?

If a vessel has bait in a container or in a well with standing water, then ask the boater for a bait receipt. If the bait receipt is from a Colorado bait dealer, is dated no older than 7 days, **and** matches up with the bait in question, then you may allow the boater to proceed and launch with the bait as is.

If the boater does not have a receipt or if the receipt is older than 7 days (regardless of whether from a Colorado or out-of-state bait dealer), then the boat owner or operator will be required to transfer the bait into a temporary holding container. The live bait must be removed from the vessel's live well or container and placed into the holding container using a net. As much as possible, **minimize transferring water to the holding container**. The live well or container must be drained and decontaminated using proper procedures (hot water from decontamination unit) before the bait is restocked. Whenever possible, water from the water body that the vessel is going to be launched into should be used for restocking the bait. Do not use tap water, as chlorinated water can kill live bait.

When the boater leaves your waters, encourage them to properly dispose of bait in the trash, not in the water, and completely drain the live bait well and any other containers.

What if a boat contains standing water?

You must pay careful attention to all trailered watercraft that cannot be completely drained and therefore, contain standing water. Zebra and quagga mussel larvae or veligers are microscopic and can be transported in water. Usually, the larvae are much less hardy than shelled adults and die more quickly and easily. It is difficult to pinpoint the exact amount of standing water necessary for larvae to survive. More research is needed in this area. You will have to use a degree of common sense and knowledge of the zebra mussel biology to evaluate the risk.

Experts believe that small amounts of standing water present lower risk if:

- Water temperature is over 90ºF.
- Water is oily.
- Compartments with small amounts of water have been closed up and have little or no airflow or oxygen.

If entering vessels have been drained to the fullest extent possible and still contain standing water in the bilge, ballast tanks or engines, then you will need to use these facts as a guideline to assess the risks of associated with different amounts of remaining standing water.

If the vessel has been in infested waters in the last 30 days and has any standing water, it is mandatory to send the vessel to decontamination. Even in cases where boats have a lower unit of an engine or a ballast tank that cannot be drained completely, it is mandatory to send the vessel to decontamination and thoroughly flush those compartments for a minimum of 3–5 minutes. If there is no decontamination equipment at your location, then the boat should be impounded until arrangements can be made to escort the boat to a decontamination location or bring decontamination equipment to the boat.

If the vessel contains 5 gallons or more of standing water, then you must send the boat to decontamination, even if there is NO evidence that the boat has been in infested waters. If there is no decontamination equipment at your location, you must deny launch, and direct the operator to the nearest decontamination location.

Be extremely cautious with out of state boats because most other states do not have extensive sampling programs focused on early detection, and we do not know which lakes are or are not infested in those states.

If the vessel has small amounts of standing water (must be less than 5 gallons) and the vessel has NOT been in infested waters, you must determine the risk and appropriate course of action. If you believe the risk associated with the small amount of water on the vessel to be very low, you must ask the operator to drain the vessel as best they can and allow it to launch. You should have a small bilge pump and hose available at the inspection point to assist with draining of vessels that have ballast or bilge areas that were not designed to drain fully. **If you believe the standing water is likely to harbor live organisms and presents a higher risk, even if it is less than 5 gallons, then you have the authority to err on the side of caution and send the vessel to decontamination.**

What is the protocol for High Risk ANS Inspections?

Any boats identified as high biological risk during the Standard Inspection should go through the High Risk ANS Inspection. Risk factors include:

- The boat has been out-of-state or to contaminated waters in the last 30 days
- The boat is dirty/crusty/slimy below the waterline
- The boat is large and complex with many attachments or tanks
- The boat has standing water present

A high risk inspection is a very involved and intense inspection of the exterior and the interior parts of the boat that could have come into contact with the water or could hold water. The inspection should include a thorough and **complete visual and tactile inspection** of all portions of the boat, trailer, and any of the equipment or gear, ropes, or anchors. The time it will take to complete a High Risk Inspection may vary greatly depending on the type and complexity of the boat and could range from 10 minutes to 30 or more.

After you have thoroughly checked the exterior of the vessel, **check for standing water and wet gear inside the boat.** Request permission to climb on the boat and, if possible, follow the operator onto the boat using the same approach. Be careful not to scratch or scuff surfaces. Spend time looking in compartments or at gear that could contain or have been immersed in water, especially the anchor and anchor compartment. If possible, ask the boater to open the compartments or pull out the gear rather than doing it yourself to avoid damage. For larger boats, ask the operator to activate bilge pumps but make sure other inspectors are safely away from the propeller and the bilge outlets before pumps are activated. Be sure to check for bait in water and follow the procedures on page 21.

It is very important to **fully complete the *High Risk (ANS) Inspection Form*** as it will provide documentation for a decontamination procedure if that becomes necessary. Be sure you know the names of the parts of the boat and check off the parts after they have been inspected. If sandpapery bumps, mussels, plant material or gelatinous masses are found that you reasonably believe could be potential ANS, then decontamination is then required. Also, using the procedures on page 21, if standing water is identified in the vessel, then decontamination of the tanks or wells could be required

If the craft is dirty, it should be sent to decontamination. All vegetation and mud must be removed since microscopic larvae can imbed in these materials. All vessels that have a large volume of standing water aboard or that have possible ANS of any kind must be sent to a decontamination location.

What do we do if we find zebra or quagga mussels or other possible ANS on the watercraft?

If you find zebra or quagga mussels or other possible aquatic nuisance species not previously known to occur in your waters, it is required that you **Report, Document, Collect,** and **Decontaminate**. Follow these documentation and reporting procedures and **do not allow the boater to leave** with mussels or other ANS attached to the vessel.

- **Report**

Use one of the following three options to report your suspected ANS discovery:

1—Telephone: 1-877-STOP-ANS or 1-303-293-6531

2—Email: ReportANS@state.co.us

3—Website: www.colorado.gov/wildlife

Your initial report can be brief but should include the following essential information:

1—Date/Time

2—Location (Both Current Location of Vessel and Waters Recently Visited)

3—Suspected species of ANS

4—Name of Reporter (Inspector)

- **Document**

You must thoroughly document your findings. You will need to complete an ANS Documentation and Vessel Decontamination Form and collect specimens for identification. You can photocopy the form in this handbook, download forms from www.colorado.gov/wildlife, or request forms for your site.

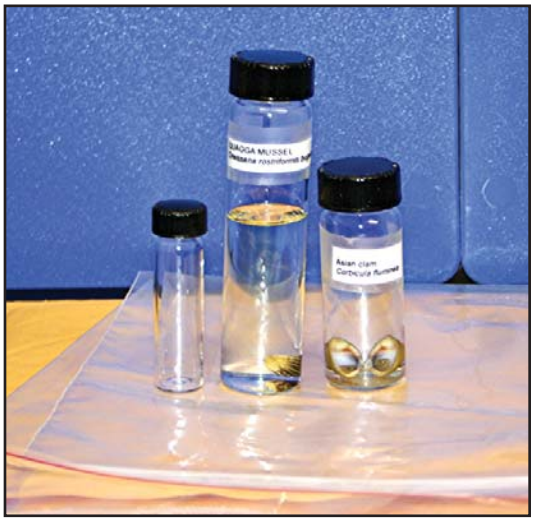
You will need to take digital pictures of the entire boat before, during, and after decontamination. Using the *(ANS) Documentation and Vessel Decontamination Form*, follow page 3 as a guide and photograph an overview of the entire boat, the rear of the boat (to verify the name of the vessel), the registration number, and the area(s) of the boat where the specimen was found.

Next, take digital pictures of the specimen. Take a close-up photo, especially if you can show byssal threads (if specimen is a zebra or quagga mussel). Next, place a common object such as a pencil or penny next to the specimen and photograph the combination to demonstrate the relative size of the specimen.

- **Collect**

Put all Specimens in Sample Vials—Fill the sample vial with 70% ethanol, grain alcohol, not rubbing alcohol. This can be purchased directly or can be made up from 100% grain alcohol such as 190 Proof Everclear diluted with *deionized* or *distilled* water. Even trace amounts of chlorine from tap water, or "de-chlorinated" tap water can completely destroy sample DNA over a few weeks. Remove as many specimens as will fit in the specimen vial without the vial overflowing. Tightly seal the vial. Write the date/location/contact on the vial with a permanent marker. Place the vial in a Ziploc bag.

PHOTO BY PETER WALKER, CDOW



FedEx Samples withing 48 hours to Aquatic Animal Health Lab (AAHL) for Identification—Place the Ziploc bag(s) containing the sample(s) into a FedEx mailer and ship the package to:

CDOW AAHL-ANS
122 E. Edison
Brush, CO 80723

Email ReportANS@state.co.us to notify the lab that the suspected ANS package is on its way.

- **Decontaminate**

Most sites will have a hot water high pressure decontamination system (>140ºF, minimum 250 psi) to decontaminate the boat, motor, trailer, personal gear, and other equipment. The engine, motor, and bilge must be flushed with hot water for at least 3 to 5 minutes. Live wells and other compartments with standing water must be flushed with hot water (>140ºF) as well.

The *(ANS) Documentation and Vessel Decontamination Form* (pages 25–28) **must be completed** for all boats sent for decontamination. Fill out the form completely and photo document the decontamination of the boat before, during, and after decontamination.

Only state-certified agents should operate the high pressure, high temperature decontamination units to **decontaminate** the vessel. Public and staff safety should always be your top priority. Be sure to document all procedures used to decontaminate the craft. You may wish to provide the owner with a liability form.

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code — Date (month, day, year) — CL #

HIGH RISK (ANS) INSPECTION FORM

For use on High Risk Trailered Watercraft

Inspection Location: _____ Date/Time: _____ Water Code: _____

Vessel Registration# (CL#): _____ Vehicle Tag #: _____ Trailer Tag. #: _____

REASON FOR HIGH RISK INSPECTION (check all that apply)

- ❑ Out of state registered or used out of state within last 30 days.
- ❑ Been in infested waters within last 30 days: _____ (Name/State of water). Days since in infested: _____
- ❑ Leaving infested waters after more than 24 hours at an infested reservoir
- ❑ Big/Complex boat ❑ Standing water present ❑ Vol Request ❑ Dirty/Crusty/Slimy below waterline
- ❑ Entering/Leaving marina ❑ Other: _____

VESSEL INSPECTION (inspect very methodically and carefully)

Overall look and feel of the hull (check box):

❑ Clean/Smooth ❑ Bumpy/Sandpaper feel ❑ Other: _____

(if bumpy/sandpaper feel, then look at bumps with magnifying glass to see if mussels)

❑ **Vessel Exterior Checked**

- ❑ Entire hull
- ❑ Transom
- ❑ Anchors and ropes
- ❑ Water holding pockets
- ❑ Motor well
- ❑ Trim tabs (top and bot.)
- ❑ Transducers
- ❑ Depth sounders
- ❑ Recessed bolts
- ❑ Cavitations plate(s)
- ❑ Through hull fittings
- ❑ Pilot tubes
- ❑ Water intakes/Outlets
- ❑ PWC—foot recesses
- ❑ Lights

Sailboats:

- ❑ Centerboard box
- ❑ Rudder and transom
- ❑ Keel
- ❑ Fittings

❑ **Motor Checked**

- ❑ Exterior housings
- ❑ Rudders
- ❑ Propeller and assembly
- ❑ Propulsion system
- ❑ Propeller shaft
- ❑ Lower unit
- ❑ Prop., shaft supports
- ❑ Gimbel area
- ❑ Propeller guards
- ❑ Water intake/Outlets

❑ **Trailer Checked**

- ❑ Rollers, bunks, pads
- ❑ Trailer springs
- ❑ License plate
- ❑ Fenders
- ❑ Trailer lights
- ❑ Pockets and hollows
- ❑ Trailer wiring
- ❑ Wheels and tires
- ❑ Trailer axels
- ❑ Hangers

❑ **Interior/Equipment Checked**

- ❑ Bait and live wells
- ❑ Anchors
- ❑ Internal ballast tanks
- ❑ Waterfowl decoys
- ❑ PFD's
- ❑ Nets
- ❑ Float cushions/belts
- ❑ Water skis and ropes
- ❑ Rope and equipment lockers
- ❑ Other equipment

❑ **Vessel Thoroughly Drained**

- ❑ Bilge plug or pump
- ❑ Bait and live wells
- ❑ Ballast tanks
- ❑ Drain lower unit on outboard
- ❑ Drain inboard motors fully by pulling plugs.
- ❑ Drain water cooled generators, swamp coolers with plugs
- ❑ Large boats, **ask driver to activate bilge pump.**
- ❑ If **entering** a reservoir with **any** standing water and from infested or out-of-state waters in last 30 days, send to decontamination!
- ❑ If **entering** a reservoir with standing water, require draining. If vessel cannot be drained and has more than 5 gallons, send to decontamination. For lesser volumes of water, assess risk to determine whether to decontaminate.
- ❑ If **leaving**, drain and educate about Clean/Drain/Dry.

❑ **Closeout (if nothing is found)**

- ❑ Ask owner to replace bilge or other plugs
- ❑ Yell "stand clear"
- ❑ Thank them for cleaning/draining/drying

VESSEL INSPECTION FINDINGS (check all that apply)

- ❑ **Did not find** any identified or suspected ANS species
- ❑ **Found:** ❑ Large volume of water ❑ Suspected ANS in water ❑ Mussels ❑ Vegetation
- ❑ Other: _____ ❑ Location(s): _____

INSPECTION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

Inspected by (print # and name): _____

Inspected by (signature): _____

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code — Date (month, day, year) — CL #

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg. 1)*

For use on Watercraft with Identified or Suspected ANS

❑ Call Law Enforcement Officer if boat owner is not willing to submit boat to required decontamination

VESSEL/OWNER INFORMATION

Inspection Location: _____ Date/Time: _____

Vessel Registration# (CL#): _____ Vehicle Tag #: _____ Trailer Tag. #: _____

Vessel Owner/Operator Name: _____

Vessel Owner/Operator Date of Birth: _____

Address: _____

City/State/Zip Code _____

REASON FOR DECONTAMINATION

❑ Vegetation Attached—Location(s) on boat _____
❑ Possible Mussels (bumps that look like mussels)—Location(s) on boat _____
❑ Zebra\Quagga Mussels Visible—Location(s) on boat _____
Estimated # of Mussels Present (check box): ❑ <10 ❑ 10–100 ❑ >100
❑ Vessel has recently been in infested water or out-of-state and has standing water present.
❑ Vessel has large volume of ballast/other water that cannot be drained—estimated gallons _____
❑ Other: _____

SPECIMEN COLLECTION AND REPORTING PROCEDURES

❑ **Photos:** Take 3 digital photo closeups of ANS **before** sample is detached from the boat
❑ **Write description** of finding: who, when, where, and how it was found; if the suspected mussels were attached to a surface or not; and all locations the boater has been in the last 6 months.
❑ **Email** photos and description immediately to:
ReportANS@state.co.us
❑ **Sample:** Scrape off suspected ANS or mussels. For adult mussels or living tissue, put them in an ethanol sample jar (70% grain alcohol, not rubbing alcohol).
FedEx all samples to CDOW AAHL-ANS, 122 E. Edison Street, Brush, CO 80723
❑ **Decontaminate** Completely—do not allow the boat to leave until complete.

DECONTAMINATION

Describe any existing damage to vessel: _____

Photos taken (take several for all 3 if possible):

❑ **Before** ❑ **During** ❑ **After** Decontamination Photo #'s/notes _____

METHODS: (check all that apply)

❑ Draining ❑ Potassium Chloride ❑ Bleach Solution ❑ Scrub Brush ❑ Steel Wool
❑ Hot water sprayer (wash and flush) ❑ Impounded (Positive Zebra or Quagga ID Required)

If impounded, comments: _____

Decontamination performed by: ❑ Vessel Owner ❑ State Certified Decontaminator
❑ Other _____

Other Comments: _____

DECONTAMINATION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

(Vessel must be reinspected using the *High Risk (ANS) Inspection Form*)

Decontaminated by (print State Certified Decontaminator # and name): _____

Decontaminated by (signature): _____

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code — Date (month, day, year) — CL #

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg.2)*

Write a description of the Aquatic Nuisance Species discovery: who, when, where, and how it was found; if the suspected mussels (or other ANS) were attached to a surface or not; and all locations the boater has been in the last six months.

Describe any existing damage to vessel:

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code — Date (month, day, year) — CL #

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg.3)*

VESSEL EXTERIOR (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Entire Hull	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trim Tabs (top & bottom of hinges)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Through Hull Fittings	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Motor Well	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Transom	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Transducers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Pilot Tubes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Cavitations Plate(s)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Ropes & Lines	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Anchors	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Depth Sounders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Intakes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Outlets	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Lights	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Holding Compartments (pockets, etc.)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Foot Recesses—PWC	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Centerboard Box—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Rudder and Transom—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Keel—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Fittings—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

MOTOR (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Exterior Housings	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller & Assemblies	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Shafts	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Shaft Supports	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Guards	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Rudders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propulsion Systems	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Lower Units	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Gimbal Areas	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Intakes & Outlets	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

TRAILER (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Trailer Rollers & Bunks	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer License Plate	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Lights	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Wiring	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Axles	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Springs	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Fenders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Pockets & Hollow Spaces	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Wheels & Tires	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Hangers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

CONTENTS (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Evaporative Coolers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Pump Systems	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Bait & Live Wells, Internal Ballast Tanks	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Equipment & Rope Lockers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Personal Gear: Ski Gloves, Diving Gear, Clothing & Footwear	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Floats: Float Belts, PFDs, Float Cushions, Water Weenies, Torpedoes, Tubes, Inflatable Pontoons, etc.	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Skis & Ropes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Fishing & Hunting Equipment: Nets, Downriggers, Decoys, Blinds, & other euipment that has entered the water	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code — Date (month, day, year) — CL #

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg. 4)*

Specimen Collection and Shipping Instructions

1. Collect specimen carefully to obtain entire organism. Use clean, sterile tools to prevent contamination.
2. Place specimen in screw-capped sample vials. These vials are available through VWR International (1-800-932-5000 or VRW.com) catalog #66010-448 (small vial) or #66012-044 (larger vial). Similar vials are offered through other scientific supply companies such as Fisher, Falcon, and Corning.
3. Immediately fill vial (with specimen) with 70% ethanol.
   a. Only fill 50% of vial with ethanol to cover specimen and prevent leakage.
   b. Use 70% reagent alcohol, catalog #RC65910 (VWR International), or equivalent, or made it up from 100% reagent alcohol diluted with deionized or distilled water. Trace amounts of chlorine from tap water, or "dechlorinated" tap water can completely destroy sample DNA.
   c. Do **not** use formaldehyde.
4. Write the date and location directly on sample tubes with alcohol resistant permanent sharpie marker.
5. Place sample tubes in Ziploc bags.
6. Place Ziploc bag and the completed form (complete with alcohol resistant permanent sharpie marker) below in bubble mailer or padded box.
7. FedEx to DOW Aquatic Animal Health Lab, 122 E. Edison, Brush, CO 80723—ASAP (within 48 hours).
8. Email ReportANS@state.co.us to notify DOW that the sample is being shipped
9. If you have questions, call 303-293-6531 or email ReportANS@state.co.us.
10. Remember to disinfect all collection tools by storing them in acidic acid or vinegar solution.

▼ *Remove bottom half of page and include in mailer with vials being shipped to DOW for analysis.*

SUSPECTED (ANS) COLLECTION FORM FOR WATERCRAFT INSPECTION STATIONS

Collector's Name: _____

WID Address: _____

Phone: _____ Email: _____

Date of Collection: _____ Time of Collection: _____

REASON FOR COLLECTION (check all that apply)

❑ Visual ID of ANS ❑ Bumps on Boat/Trailer ❑ Plants on Boat/Trailer ❑ Unidentifiable Organic Material

LOCATION OF SUSPECTED ANS PRIOR TO COLLECTION

❑ Watercraft Hull ❑ Motor ❑ Live Well ❑ Anchor ❑ Bilge ❑ Watercraft Interior

❑ In Lake/Reservoir ❑ Other: _____

Date Mailed: _____

▼ *Do Not Write Below Line:* ***For Lab Use Only***

Date Received at AAHL: _____ AAHL ID #: _____

Specimen ID: _____ Date Identified: _____

Technician: _____ Further Analysis Needed: _____

Collector Contacted with Results: _____

What are the standard decontamination protocols for Colorado?

To ensure that zebra and quagga mussels and other ANS are removed and destroyed, all watercraft decontamination protocols **must** include:

1—The removal of all visible mud, plants, and organisms from the exterior of the vessel.

2—Thoroughly spraying the exterior and flushing the interior and water compartments of the watercraft with hot water (minimum 140ºF).

a.) The entire exterior of the watercraft (and trailer) and all intakes must be thoroughly washed with hot water (minimum 140ºF) at high pressure (minimum 250 psi).

b.) All compartments that may hold water, including, but not limited to live wells, ballast, and bilge areas, must be flushed with hot water (minimum 140ºF) but not at high pressure for 3 to 5 minutes.

c.) If a bilge pump is present, then it must be run until the bilge appears to be empty.

d.) The lower unit of the engine will be thoroughly flushed with hot water (minimum 140ºF).

3—If the bait wells contain bait in standing water, and the owner cannot produce a proper receipt (not more than 7 days old), then the boat operator must move the bait to another container with a net and allow the bait well to be flushed with hot water (minimum 140ºF) and filled with your location's water before returning the bait to the live well.

4—After decontamination, the watercraft must be inspected again to ensure that the treatment was successful.

5—Inspectors must report all decontaminations emailing ReportANS@state.co.us and mail a copy of the *(ANS) Documentation and Vessel Decontamination Form* to:

Colorado Division of Wildlife
Attn: Aquatic Nuisance Species Coordinator
6060 Broadway
Denver, CO 80216

6—If the boat leaves your site immediately following the decontamination, apply a green WID wire seal and give the operator an *Inspection and Decontamination Seal Receipt* to document the decontamination.

PHOTO BY BRAD HENLEY

What options does the boater have if our site does not have a watercraft decontamination unit?

The boat cannot be allowed to launch if there is a reasonable belief it has ANS present. Call the nearest District Wildlife Manager or Division of Wildlife roving watercraft inspection and decontamination patrol. Though not preferred you can also direct the owner to the nearest decontamination site. If zebra or quagga mussels are confirmed, do not allow the boat to leave intil law enforcement officials arrive. Watercraft inspection and decontamination stations (WIDS) will be placed at various locations throughout the state. In addition to fixed locations, there will also be mobile WIDS that will travel throughout the state. For the most updated list of these sites, call 303-293-6531 or visit www.colorado.gov/wildlife.

What if the boater will not allow a high risk inspection or decontamination?

Do everything that you can to get the boater's support to inspect the vessel and either decontaminate on site if you have a boat decontamination unit or to take the craft to the closest decontamination site. If the owner is unwilling to cooperate, you may need the assistance of law enforcement officers. Only qualified peace officers can order decontamination or impound a boat when a boater is not cooperative. Guidelines concerning impoundment are:

1—If a boater is entering a water body and the operator refuses an inspection, the boat should be turned away but not impounded.

2—If a boat is leaving an infested water body and the operator refuses an inspection, then state laws and regulations require that the boat be impounded until proper inspection and/or decontamination can be performed.

3—If suspected ANS are present on a boat and the operator will not consent to decontamination or if decontamination equipment is not available, then the boat will be impounded until decontamination can be performed.

What is the protocol for Clean/Drain/Dry Checks for watercraft LEAVING our waters?

The **Clean, Drain,** and **Dry** inspection will ensure that one more education contact has been made with the boater before he/she leaves the boat ramp. It requires a rapid visual and tactile check for ANS, and it verifies that the boater has followed the proper procedures to **clean** off the boat and completely **drain** all compartments prior to leaving. Remind the boater of the negative impacts of zebra and quagga mussels and other ANS. Repeat the primary educational message **Clean/Drain/Dry** and explain why boaters need to do it each time they use their craft.

The *Clean Drain Dry Checklist* (below) is not a required form to fill out, but will assist you in performing the inspection quickly and efficiently.

State of Colorado

CLEAN/DRAIN/DRY CHECKLIST

These are instructions. This is not a form to fill out. This protocol should take 1–2 minutes (or drain time) to complete.

The purpose of this checklist is to:

1—Ensure contact has been made with boater before leaving the boat ramp

2—Verify the boater has **cleaned** and **drained** the boat prior to leaving

1. Educate—Why we Clean, Drain, and Dry

- ❏ **Explain** that zebra and quagga mussels have been found in Colorado waters.
- ❏ Adult mussels and weeds can be transported on boat hull or motor.
- ❏ Larvae can be transported in water.
- ❏ **Remind** that **Clean, Drain,** and **Dry** is the most effective way to stop the spread of mussels.

2. Ensure Boat Hull is Clean

- ❏ **Look** quickly for and remove all plants or mud.
- ❏ **Ask** to see the **anchor** and ensure it is not dirty and does not have plants, mud, or mussels on it.
- ❏ **Feel** along hull and on lower unit, if sandpaper like feel, conduct a **High Risk Inspection**.
- ❏ **If** any mussels or plants are found, conduct a **High Risk Inspection** and send to decontamination.

3. Ensure Boat is Drained

- ❏ **Ask** boat owner to open bilge plug (may need a tool) to show it is drained.
- ❏ **Ask** to see the live bait well, ensure it is drained.
- ❏ **Ask** to see ballast tanks or any other compartment with water and ensure they are drained.
- ❏ **Ask** if bait has been disposed of in trash.

4. Encourage Additional Cleaning, Drying

- ❏ **Encourage** them to **clean boat** with hot water and dry out equipment before next use.
- ❏ **Thank them for protecting our boating and our lakes!**

What is the inspection wire seal system?

Colorado will use a Watercraft Inspection/Decontamination (WID) wire seal that will be placed between the boat and the trailer to document inspections and decontaminations. The state only authorizes green seals to document proper inspection and decontamination procedures. No other colors or types of seals/straps/receipts will be accepted by state-certified locations. It is critical that you understand exactly how these seals are used and what they tell you about the risk level of that boat.

Boats will get a green seal if…

- The boat is from out of state and has undergone and passed an inspection and if needed, decontamination by a state authorized watercraft inspector.
- The boat has left an infested body of water and has undergone and passed an inspection and if needed, decontamination by a state authorized watercraft inspector.
- The boat has left a non-infested body of water and has undergone and passed an inspection and if needed, decontamination by a state authorized watercraft inspector.

Important: *It is critical to attach the seal in a way that it* ***will be broken*** *if the boat is separated from the trailer. Typically the wire seal goes between the eyebolt and part of the winch. Be advised that some winches can be unrolled completely and separated from the seal without breaking it. You may need to find another place to attach the seal to the trailer.*

What makes a WID seal valid?

- Green WID seals will only be valid if the boater has a receipt with the seal with a matching serial number and the seal has not been tampered with.
- To ensure that serial number for receipt cannot be falsified, inspectors must record the application of the seal and the seal's serial number and the watercraft CL number in the daily inspection log.

Important: *On the receipts, be sure to check off the boxes for both the procedures that were performed, as well as those that were* ***not*** *performed. This ensures that boaters do not check boxes for any procedures and falsify their copy.*

When and how to do I apply green WID seals?

These seals will be applied as a boater exits a reservoir, or at a state-certified inspection location. To apply a green seal, you will have to complete a **Standard Inspection at an uninfested reservoir** and may also need to complete a High Risk Inspection if the type of boat or the situation dictates it. At containment reservoirs, a High Risk Inspection will be mandatory.

You must notify the boater that the green seal does not mean immediately launch at another location. The boater will be expected to stop at the next inspection location and have the seal removed by a state-authorized agent. If the agent finds standing water, then the boat may need to go through another inspection or decontamination. Encourage the boaters to DRAIN and DRY out any places with standing water before launching elsewhere. Consider using a small bilge pump to drain as much water as possible before applying the green WID seal.

PHOTO BY ELIZABETH BROWN, CDOW

State of Colorado

INSPECTION AND DECONTAMINATION SEAL RECEIPT

For use when applying Seals to Boats. Provide original to watercraft owner and keep carbon copy.

Reservoir/Location: _____ Date/Time: _____

Seal Serial #: _____ Vessel Reg # (CL#): _____

Trailer Tag. #: _____ Inspectors ID #: _____

SEAL AND INSPECTION TYPE (check inspections performed **and not performed**)

Standard ANS Inspection: ❑ Performed ❑ **or Not Performed**

High Risk Inspection: ❑ Performed ❑ **or Not Performed**
(High Risk is minimum at containment reservoirs)

Decontamination: ❑ Performed ❑ **or Not Performed**

HOW TO TREAT A BOAT WITH GREEN SEALS

Cut off seal and let the boat launch if:

1.) Boat was decontaminated.
2.) Boat was out of the water for more than 30 days.
3.) Boat was from an uninfested reservoir.

If conditions above are not met, then check for standing water.

1.) If found, send to decontamination and if time permits, fill out a *High Risk (ANS) Inspection Form*.
2.) If not found, cut off seal and let launch.

File Copy

Inspection Location Copy

Reservoir/Location: _____ Date/Time: _____

Seal Serial #: _____ Vessel Reg # (CL#): _____

Trailer Tag. #: _____ Inspectors ID #: _____

SEAL AND INSPECTION TYPE (check inspections performed **and not performed**)

Standard ANS Inspection: ❑ Performed ❑ **or Not Performed**

High Risk Inspection: ❑ Performed ❑ **or Not Performed**
(High Risk is minimum at containment reservoirs)

Decontamination: ❑ Performed ❑ **or Not Performed**

HOW TO TREAT A BOAT WITH GREEN SEALS

Cut off seal and let the boat launch if:

1.) Boat was decontaminated.
2.) Boat was out of the water for more than 30 days.
3.) Boat was from an uninfested reservoir.

If conditions above are not met, then check for standing water.

1.) If found, send to decontamination and if time permits, fill out a *High Risk (ANS) Inspection Form*.
2.) If not found, cut off seal and let launch.

Thanks—Please Save this Receipt and Dry Your Boat.

Owner/Operater Copy

How do I treat an incoming boat with a green WID seal?

A boat entering a water body with a green seal is **not** allowed to launch immediately. You must verify that the serial numbers on the green WID seal and receipt match and that there is no evidence of tampering on the seal.

You can cut off the seal and let the boat launch if:

1—The boat was decontaminated

2—The boat was out of the water for more than 30 days

3—The boat is from an uninfested reservoir and was drained as much as possible

If the conditions above not met, then check for standing water.

1—If standing water is found, send to decontamination and if time permits, fill out a *High Risk (ANS) Inspection Form*.

2—If no standing water is found, cut off the seal and let the boat launch.

Some locations may use other color seals, but those will only be valid for that location and are not recognized by state-certified agents. The state only authorizes green seals to document proper inspection and decontamination procedures.

What are recommended drying times for watercraft coming from infested waters?

If a boat coming from out of state or from a zebra or quagga mussel infested waters is planning to launch, the general recommendation is to keep the boat out of water and let it dry for a minimum of 30 days after cleaning all equipment and draining all possible sources of standing water. However, such drying times may be reduced depending on local temperature and relative humidity.

In general, zebra and quagga mussels can survive longer out of water if local conditions are cold and humid than if conditions are hot and dry. The 100th Meridian Initiative has developed an **Quarantine Estimator for Zebra-Mussel Contaminated Boats** that estimates recommended drying times based on average humidity and temperature zones in the 48 contiguous United States. To use this tool, go to their website: http://100thmeridian.org/emersion.asp

If a boat has been in zebra or quagga-mussel waters, please use this tool to estimate the minimum time it should remain out of water (after being cleaned thoroughly), before launching in uninfested waters. Recommendations are only guidelines for average conditions and are based on evidence from laboratory experiments where other factors are held constant. Thus, recommended drying times may not produce 100% mussel mortality under real-world conditions where unidentified, and contributing factors may vary. This tool will provide a minimum drying time that you may need to adjust upward if your situation includes additional contributing factors that may be important.

Along with this tool, please use your best judgment before launching a potentially contaminated boat in uninfested waters.

PHOTO BY JASON GOEKLER, KDWP

What are the other ANS that Colorado is concerned about?

The Colorado Division of Wildlife is monitoring the state's waters for the introduction of aquatic nuisance species and pathogens that have been determined to pose a significant threat to the aquatic resources or water infrastructure of the state, including, but not limited to, the following:

Animals:

Common Name	Scientific Name
Crayfish, rusty	*Orconectes rusticus*
Mussel, quagga	*Dreissena bugensis*
Mussel, zebra	*Dreissena polymorpha*
New Zealand mudsnail	*Potamopyrgus antipodarum*
Waterflea	*Daphnia lumholtzii*
Waterflea, fishhook	*Cercopagis pengoi*
Waterflea, spiny	*Bythotrephes longimanus* (also known as *Bythotrephes cederstroemi*)

Plants:

Common Name	Scientific Name
African elodea	*Lagarosiphon major*
Brazilian elodea	*Egeria densa*
Eurasian watermilfoil	*Myriophyllum spicatum*
Giant salvinia	*Salvinia molesta*
Hyacinth, water	*Eichornia crassipes*
Hydrilla	*Hydrilla verticillata*
Parrotfeather	*Myriophyllum aquaticum*
Yellow floating heart	*Nymphoides peltata*
Purple loosestrife*	*Lythrum salicaria*

Pathogens:

Common Name	Scientific Name
Whirling Disease*	*Myxobolus cerbralis*
Viral Hemorrhagic Septicemia Virus*	

** These species are not included in the regulations adopted by the Colorado Board of Parks and Outdoor Recreation, but are regulated by the Colorado Division of Wildlife or Colorado Department of Agriculture.*

Species Descriptions—Animals

Rusty Crayfish (*Orconectes rusticus*)

This species, which is native to the Ohio River basin, can often be identified by two rust colored marks on its mid-back area, near the area where one would place a thumb and finger to pick the animal up. Adults reach a maximum length of four inches. Original spread was by anglers using rusty crayfish as bait, but the crayfish were also harvested for regional bait markets and for biological supply companies, activities which probably helped spread the species further.

Rusty crayfish inhabit lakes, ponds, and both pool and fast-water areas of streams, which makes many areas in Colorado potentially suitable habitat. They are opportunistic feeders and will eat a variety of aquatic plants, benthic invertebrates (like aquatic worms, snails, leeches, clams, and aquatic insects), decaying plants and animals, bacteria and fungi, fish eggs, and small fish. Rusty crayfish cause a variety of negative impacts when introduced to new waters, including displacing native animals and plants.

PHOTO BY U.S. ENVIRONMENTAL PROTECTION AGENCY

PHOTO BY MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

New Zealand mudsnail (*Potamopyrgus antipodarum*)

This small aquatic snail is native to freshwater lakes and streams of New Zealand. In the United States, this snail was first detected in the mid-1980s in the Snake River region of Idaho. Since then, it has spread to waters of Montana, Wyoming, Colorado, California, Arizona, Oregon, and Utah. Mature New Zealand mudsnails average ⅛ inch in length and have brown or black cone-shaped shells with five whorls. One way to identify this species is hold the point of the shell upward. Unlike snails native to Colorado, when the point of the shell is facing up, the shell's opening is on the right.

The mudsnail attaches to fishing gear, boats, trailers, or even fish and bait, and then comes off in the next stream or river where these things are used or discarded. Mudsnails are able to close their openings to withstand dry conditions and a variety of temperatures. They can survive out of water for several days, so it's easy to see how they can move about and survive on recreational gear. Mudsnails consume aquatic vegetation, upsetting the balance of the aquatic environment. They reproduce asexually; it only takes **one** to start a whole new population! Eradicating established infestations is impossible.

Spiny Water Flea (*Daphnia lumholtzii*) and Fishhook Water Flea (*Cercopagis pengoi*)

Spiny and fishhook water fleas are small predacious crustaceans—a group of animals that includes crabs, shrimp, crayfish, and lobsters. Unlike these other crustaceans, the spiny and fishhook water fleas are very small creatures known as zooplankton. Both arrived in ship's ballast water from Eurasia.

Water fleas threaten aquatic ecosystems and fishing by competing with native fish for food and fouling gear. Both water fleas eat smaller zooplankton that is important food for juvenile fish. With less zooplankton to feed on algae, algal populations can bloom, making lake water less clear. Even though these waterfleas can be eaten by fish, their spine deters most small fish, which experience great difficulty swallowing the water fleas.

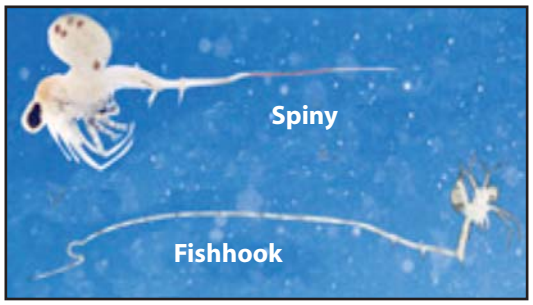
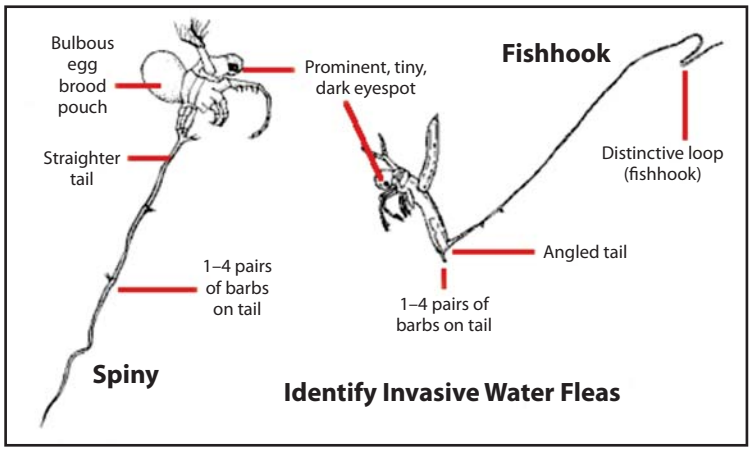


PHOTO BY MINNESOTA SEA GRANT

Waterfleas collect in masses on fishing lines and downrigger cables. The buildup is so heavy that it becomes nearly impossible to fish with any degree of enjoyment.

Water fleas can spread to inland waters when recreational gear is contaminated with egg-laden females. While females die out of water, under certain conditions they produce eggs that resist drying, remain viable, and can establish a new population. Eradicating established infestations is impossible.



MICHIGAN SEA GRANT PROGRAM, ONTARIO FEDERATION OF ANGLERS AND HUNTERS

Species Descriptions—Plants

PHOTO BY WASHINGTON STATE NOXIOUS WEED CONTROL BOARD

Brazilian elodea (*Egeria densa*)

Native to Brazil and Argentina, Brazilian elodea is a popular aquarium plant often sold in pet stores and available in school science kits under the name *Anacharis*. When it is introduced into freshwater, it forms dense beds that reduce water quality, disrupt wildlife habitat, slow the flow of water, and impede recreational activities.

This noxious weed is a submerged, freshwater perennial plant found in both still and flowing waters including lakes, ponds and quiet streams. It prefers low light and tolerates variable water quality (turbidity, pollution, etc.) and can survive under ice for short periods—but not prolonged freezing. The plant grows mostly underwater but forms dense mats along the surface that can cover hundreds of acres. Leaves grow in whorls of three to six around the stem making a cylindrical shape, and the stems are very leafy compared to the native elodea. The leaf edges appear smooth to the naked eye but the margins are minutely toothed, visible with low magnification. A distinguishing characteristic is the smooth midvein on the underside of the leaf. Small white flowers appear from June through October. They have three glossy petals that appear wrinkled, and float on or rise above the water's surface on thread-like stems.

Brazilian egeria is commonly mistaken for the native elodea (*Elodea canadensis*) or common waterweed, as well as the exotic hydrilla (*Hydrilla verticillata*). Use the table below to distinguish between the species or contact the Colorado Division of Wildlife for assistance with identification.

PHOTO BY MONTANA DEPARTMENT OF AGRICULTURE

Hydrilla (*Hydrilla verticillata*)

Hydrilla is native to Europe, Asia, and central Africa. It was first introduced in Florida in 1958 for use in the aquarium industry. Hydrilla is a submerged, rooted, perennial plant that forms dense colonies. Leaves are blade-like, about ⅛ inch and ⅜ inch long with small tooth margins. The underside of the leaf has a red midrib with one to four spines or conical bumps, making them feel rough. Leaves are usually four to eight in a whorl. Hydrilla produces tiny, translucent, white to reddish flowers on long stalks. Plants flower from June through October.

Hydrilla is able to establish itself in low-light waters over 20 feet deep and then grow towards the shallow banks. It branches profusely after reaching the surface and forms thick mats that hinder recreation, navigation, and water intakes. It grows quickly and outcompetes and eliminates native species. Hydrilla can grow in almost any freshwater—in variable conditions with either low or high nutrient amounts, or a wide temperature tolerance (68–86 °F).

Hydrilla reproduces rapidly—by fragmentation, from seeds, and it also produces ¼ inch turions at the leaf axils and potato-like tubers attached to the roots in the mud. Hydrilla is a List A noxious weed in Colorado, so eradication is mandatory.

Plant Characteristics:	Brazilian elodea (exotic)	Common elodea (native)	Hydrilla (exotic)
Leave in whorl:	3–6	3–5	5–8
Leaf margins toothed:	Minutely, need magnification	No teeth	Coarse visible teeth
Midvein:	Smooth	Smooth	1–4 conical bumps, midvein red
Flowers:	Glossy white	White	Petals translucent, white to reddish
Reproduction:	Stolons, fragments	Seeds, fragments, stolons	Turions, stolons, fragments

African elodea (*Lagarosiphon major*)

African elodea does not yet occur in the wild in the United States, as 2008, so far as is known. However, experts have reason to believe that should this plant be introduced to the U.S., the resulting problems could be as consequential as those caused by hydrilla.

PHOTO BY UNIVERSITY OF FLORIDA CENTER FOR AQUATIC AND INVASIVE PLANTS

PHOTO BY ELIZABETH BROWN, CDOW

Eurasian watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil, also called spike watermilfoil, is a submerged, herbaceous aquatic plant. Native to Europe, Asia and Northern Africa, it was introduced into the USA in the 1940s and is one of the most destructive aquatic plants known. This highly aggressive species colonizes a variety of habitats, including both moving and standing waters. It grows rapidly—about one foot per week—and forms extremely dense mats. The mats crowd out native species, disrupt the food chain, displace wildlife habitat and clog waterways, stopping or slowing the flow of water. Eurasian watermilfoil also seriously alters the physical and chemical characteristics of lakes and streams. Its infestations alter aquatic ecosystems by shading out native species and providing choice mosquito larvae habitat. Dense mats impair all forms of water based recreation.

Pink or olive green stems grow to the water surface, usually extending 3 to 10, but as much as 33, feet in length and frequently forming dense mats. Stems of Eurasian watermilfoil are long, slender, branching, hairless, and become leafless toward the base. New plants may emerge from each node (joint) on a stem, and root upon contact with mud. The feathery dark green leaves of Eurasian watermilfoil are finely divided and occur in whorls of 3 or 4 along the stem, with 12–20 pairs of fine, thin leaflets about ½ to 2 inches long. These leaflets give milfoil a feathery appearance that is a distinguishing feature of the genus. Eurasian watermilfoil produces small yellow, 4 parted flowers on a spike that projects 2 to 4 inches above the water surface from June to September. The fruit is a hard, segmented capsule containing four seeds.

Native watermilfoil, Northern watermilfoil, also called Shortspike watermilfoil, (*Myriophyllym sibiricum*) and Parrotfeather (*Myriophyllum aquaticum*) are very difficult to distinguish from Eurasian watermilfoil. Use the table on page 36 to help tell the difference between the two species or contact the Colorado Division of Wildlife for assistance with identification. Eurasian watermilfoil is a List B noxious weed.

Parrotfeather (*Myriophyllum aquaticum*)

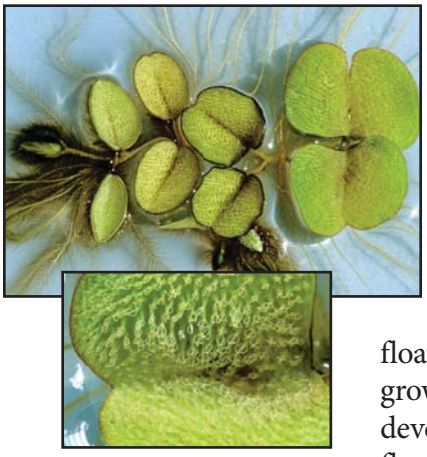
Parrotfeather is native to the Amazon River in South America, but is now found worldwide. This plant was probably introduced to North America around the 1800s as an ornamental species. It prefers a warmer climate and is chiefly found in the southern parts of the United States. Parrotfeather is a freshwater plant which prefers shallow waters less than 5 feet; it can be found in lakes, ponds, and streams. Parrotfeather seriously alters the physical and chemical characteristics of lakes and streams. Its infestations alter aquatic ecosystems by shading out algae and providing choice mosquito larvae habitat. Dense infestations also cause flooding and drainage problems, and its mats restrict recreational activities.

PHOTO BY DR. BRUCE W. HOAGLAND, OKLAHOMA BIOLOGICAL SURVEY

Parrotfeather gets its name from its feather-like leaves which are arranged around the stem in whorls of four to six. Submersed leaves are 0.6 to 1.4 inches long and have 20 to 30 divisions per leaf. The emergent leaves are 0.8 to 2 inches long and have 6 to 18 divisions per leaf. The bright green emergent leaves can be very stiff and a darker green than the

Plant Characteristics:	Eurasian watermilfoil (exotic)	Northern watermilfoil (native)	Parrotfeather (exotic)
Number of Pairs of Leaflets:	Pairs of 12–20	Pairs of 10 or less	Pairs of 20–30
Submerged Leaves…	Submerged leaves 0.5 to 2.0 inches long (longer than wide)	Leaves 10–25mm long, 15–35 mm wide (wider than long)	Submerged leaves 0.6 to 1.4 inches long (longer than wide)
Emergent Leaves…	None	None	Emergent leaves 0.8 to 2 inches long with 16 to 18 leaflets per leaf
Leaf Whorls…	3–5 leaves per whorl (typically 4)	3–5 leaves per whorl (typically 4)	5–6 leaves per whorl
Leaf Stiffness…	Leaves limp out of water	Leaves stiff out of water	Leaves stiff out of water
Leaf Color…	Olive green	Green	Blue green
Stem Color…	Pink, peach, light green	White, light green	Green
Flower Spike…	Emerged	Emerged	Emerged
Flowering Times…	June through September	July through September	April through July
Fruits…	Hard, segmented capsule	Hard, segmented capsule	Not known to fruit outside native range

submersed leaves. The emergent stems and leaves can grow up to a foot above the water surface and look almost like small fir trees. Parrotfeather has both submersed and emergent leaves, with the submersed form being easily mistaken for Eurasian waterfilfoil (*Myriophyllum spicatum*). Use the table above to help distinguish between Eurasian watermilfoil and parrotfeather.



PHOTOS ©BARRY A. RICE, THE NATURE CONSERVANCY

Giant Salvinia (*Salvinia molesta*)

Giant salvinia is native to Southeastern Brazil. It is a small free-floating fern that grows in clusters and develops into dense floating mats or colonies in quiet water, undisturbed by wave action. It can clog irrigations canals and drinking water lines, and foul hydroelectric plants. This species impairs all forms of water-based recreation and has disastrous effects on the natural communities. Giant salvinia can completely cover waterways preventing the passage of sunlight and oxygen that native plants, fish, insects, and other species require, as well as covering open water that migrating waterfowl need to survive.

The floating leaves of giant salvinia are oblong (½ to 1½ inches long) with a distinct midrib along which the leaf may fold forming a compressed chain-like appearance. Leaves occur in whorls of three with two floating leaves and one submerged leaf. Young plants have leaves that lie flat on the surface, whereas older plant leaves become thick and curled at edges forming upright chains that become dense mats of floating plants. Giant salvinia has rows of leaf hairs that have a single stalk that divides into four branches that reconnect at the tip, giving the hair a cage-like or egg-beater appearance when magnified. Underwater, the leaves are modified into small root-like structures that support chains of egg-shaped spore-bearing structures. The entire plant is only about 1 to 2 inches in depth. Giant salvinia is thought to reproduce only by fragmentation. Fragments and s dormant buds that break off existing plants form new plants. Giant salvinia can double in size in 4 to 10 days under good conditions is an aggressive invader species. Giant salvinia is a List A noxious weed and eradication is mandatory.

Water Hyacinth (*Eichornia crassipes*)

Water hyacinth is native to Brazil and was introduced as an ornamental. It is still commonly used for water gardening and home ponds. Water hyacinth is a very aggressive invader and can form thick mats that cover the entire surface of the water and can cause oxygen depletion and fish kills. This species is notorious for clogging transportation systems and can colonize a wide variety of habitats.

Water hyacinth is a free-floating perennial plant that can grow to a height of 3 feet. The smooth, dark green succulent leave blades are circular to elliptical. The flowers are large (2 to 3 inches) and attractive. They can be pale blue, lilac, or white and bloom from June through October.

PHOTO ©USDA—Agricultural Research Center

A thick, heavily branched, dark fibrous root system forms underneath the water. The roots are feathery and typically more than 3 feet in length. The mature plants are linked together by underwater stolons, which form daughter plants. Water hyacinth reproduces may also reproduce via seeds. Seedlings root in mud and then break free and float once mature. The water hyacinth is a vigorous grower known to double its population in two weeks.

PHOTO ©BARRY A. RICE, THE NATURE CONSERVANCY

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife is native to Europe and Asia, and was initially introduced to the northeastern seaboard of the United States in the ballast of ships in the 1800s. It has been repeatedly and continually introduced as a garden plant. Purple loosestrife invades marshes and lakeshores, replacing cattails and other wetland plants. In some locations, natural cattail marshes have been completely overtaken by loosestrife. The plant forms dense, impenetrable stands that are unsuitable as cover, food, or nesting sites for a wide range of native wetland animals. Loosestrife tolerates a wide range of environmental conditions. It favors fluctuating water levels and other conditions often associated with disturbed sites. It is shade intolerant and is apparently unable to invade saline wetlands.

Purple loosestrife is a perennial with long showy spikes of magenta flowers and a square stem. Usually under 4 feet in height, the plant may reach up to 10 feet tall in nutrient-rich habitats. The flowers have five to seven petals and bloom from June to September. The leaves are usually opposite, usually in pairs, or in whorls of 3. Leaves are lance-shaped, without teeth, and the venation has a peripheral margin which distinguishes it from other square stem mint species prior to flowering. Purple loosestrife is a List A noxious weed and eradication is mandatory.

Yellow Floating Heart (*Nymphoides peltata*)

Yellow floating heart is a perennial, waterlily-like plant that carpets the water surface with long-stalked heart-shaped leaves. The showy five-petaled yellow flowers occur on long stalks and rise a few inches above the water. Yellow floating heart is a native of Eurasia. Like other floating leaved plants, yellow floating heart grows in dense patches, excluding native species and creating stagnant areas with low oxygen levels underneath the floating mats. These mats make it difficult to fish, water ski, swim, or boat. Yellow floating heart prefers to grow in slow moving rivers, lakes, reservoirs, and ponds. It reproduces by water dispersed seeds and by new stolens. Broken off leaves with part of a stem will also form new plants.

PHOTO BY OREGON DEPARTMENT OF AGRICULTURE

Viral Hemorrhagic Septicemia Virus (*VHSV*)

Viral hemorrhagic septicemia virus is a serious pathogen of fresh and saltwater fish. VHSV virus is a rhabdovirus (rod shaped virus) that affects fish of all size and age ranges. It does not pose any threat to human health. VHSV can cause hemorrhaging of fish tissue, including internal organs, and can cause the death of infected fish. Once a fish is infected with VHSV, there is no known cure. The clinical signs of VHSV may include tissue hemorrhaging (bleeding), unusual behavior, anemia, bulging eyes, bloated abdomens, and the rapid onset of death; however, these symptoms could apply to many different fish diseases. There is no clear visual diagnostic to confirm VHS. Not all infected fish show signs and may become carriers of the disease. The only way to confirm VHSV is to test the fish in a lab.

VHSV can be spread from one waterbody to the next through a variety of means, not all of which are known at this time. One known method of spreading VHSV is moving fish from one waterbody to another. This can be done by importation, stocking, or the use of bait fish. Other potential sources of VHSV spreading are natural fish movements, recreational boating/angling, bird assistance, ballast water discharge, and sampling activities.

PHOTOS BY VERMONT FISH AND WILDLIFE

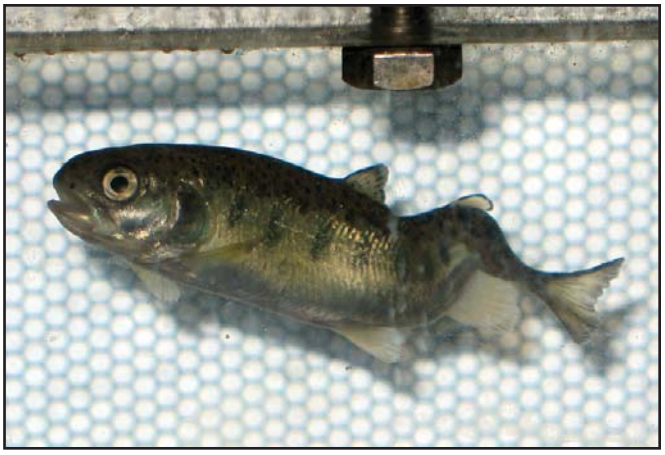


PHOTO BY ERIC FETHERMAN

Whirling Disease (*Myxobolus cerebralis*)

Whirling disease is caused by a microscopic parasite that was introduced to the United States from Europe in the 1950s and has spread to many streams across the United States. Whirling disease attacks juvenile trout and salmon, but does not infect warm water species. Rainbow trout and cutthroat trout appear to be more susceptible than other trout species. Brown trout become infected with the parasite, but they appear to have immunity to the infection and have not been as greatly impacted as rainbow trout. By damaging cartilage, whirling disease can kill young fish directly, or cause infected fish to swim in an uncontrolled whirling motion. This can make it impossible for them to escape predators or to effectively seek food.

The whirling disease parasite has been found in wild fish and fish hatcheries in 25 states. Once established in a stream, the parasite cannot be eradicated, nor can its worm host, without significantly damaging the ecosystem. Whirling disease has no known human health effects.

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Colorado State Parks
50th Anniversary
1959 ~ 2009

COLORADO DIVISION OF WILDLIFE

Keeping Colorado Wild

This handbook was cooperatively produced by
the Division of Wildlife and Colorado State Parks with input
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