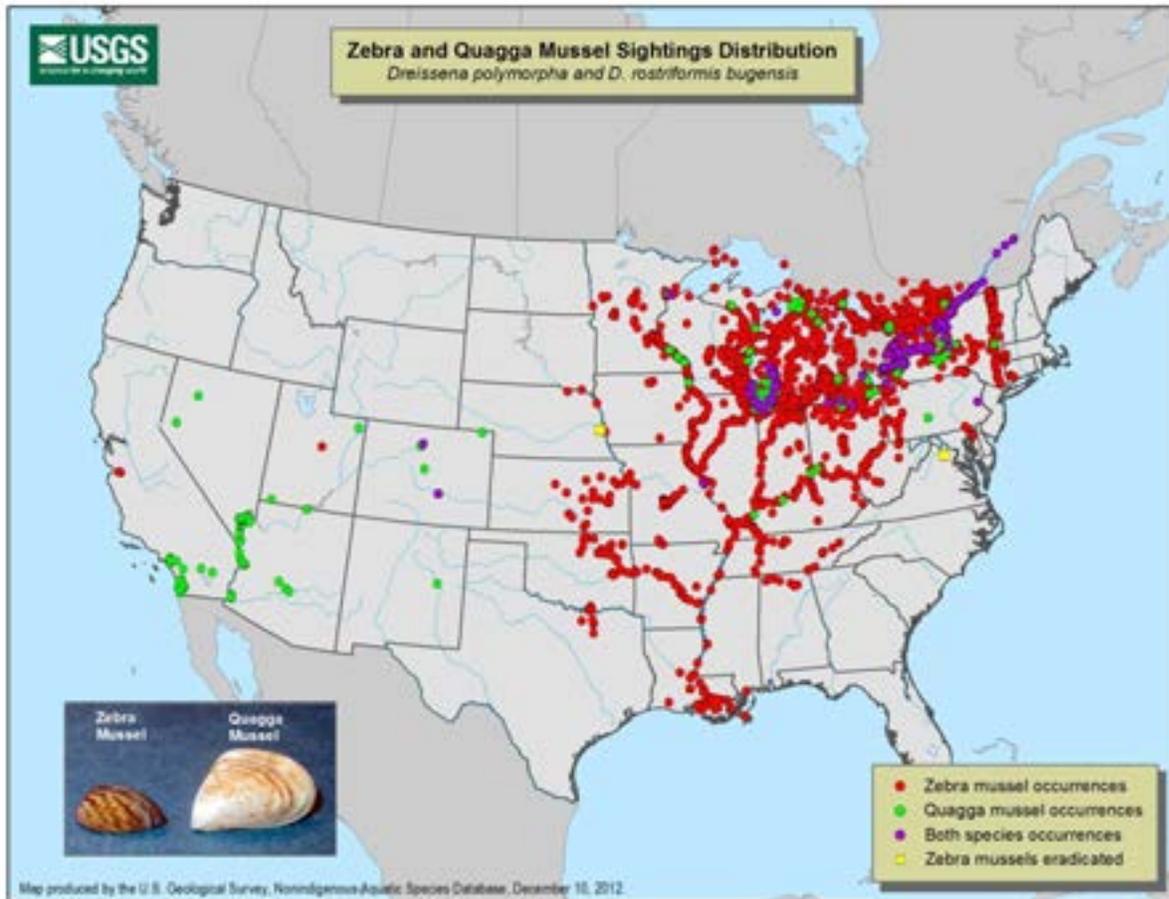


Zebra and Quagga Mussels



The zebra and quagga mussel are closely related species in the genus *Dreissena*. They originated from the Black and Caspian seas in Eurasia. They were introduced into the Great Lakes region of the U.S. in the early 1980's and have since spread rapidly throughout the eastern U.S. In 2007, quagga mussels were found in Lake Mead, NV and have since spread to several western waters. Since 2010, the Wyoming Game and Fish Department has sampled yearly for the larval form of the mussel. To date, neither species have been detected in any Wyoming waters. These mussels carry with them devastating impacts. They are very prolific and can completely infiltrate waters very rapidly. They remove nutrients from water, clog pipes and waterways, damage boats, and out-compete native mussels.

Zebra and quagga mussel are transported in water on boats and other equipment as microscopic larvae or they attach to the hull, motor, or other hard surface of a boat as juveniles or adults. If you have recently (within 30 days) used equipment in mussel-infested waters it is required that you contact the Wyoming Game and Fish Department to have your equipment inspected before you launch in any Wyoming water.

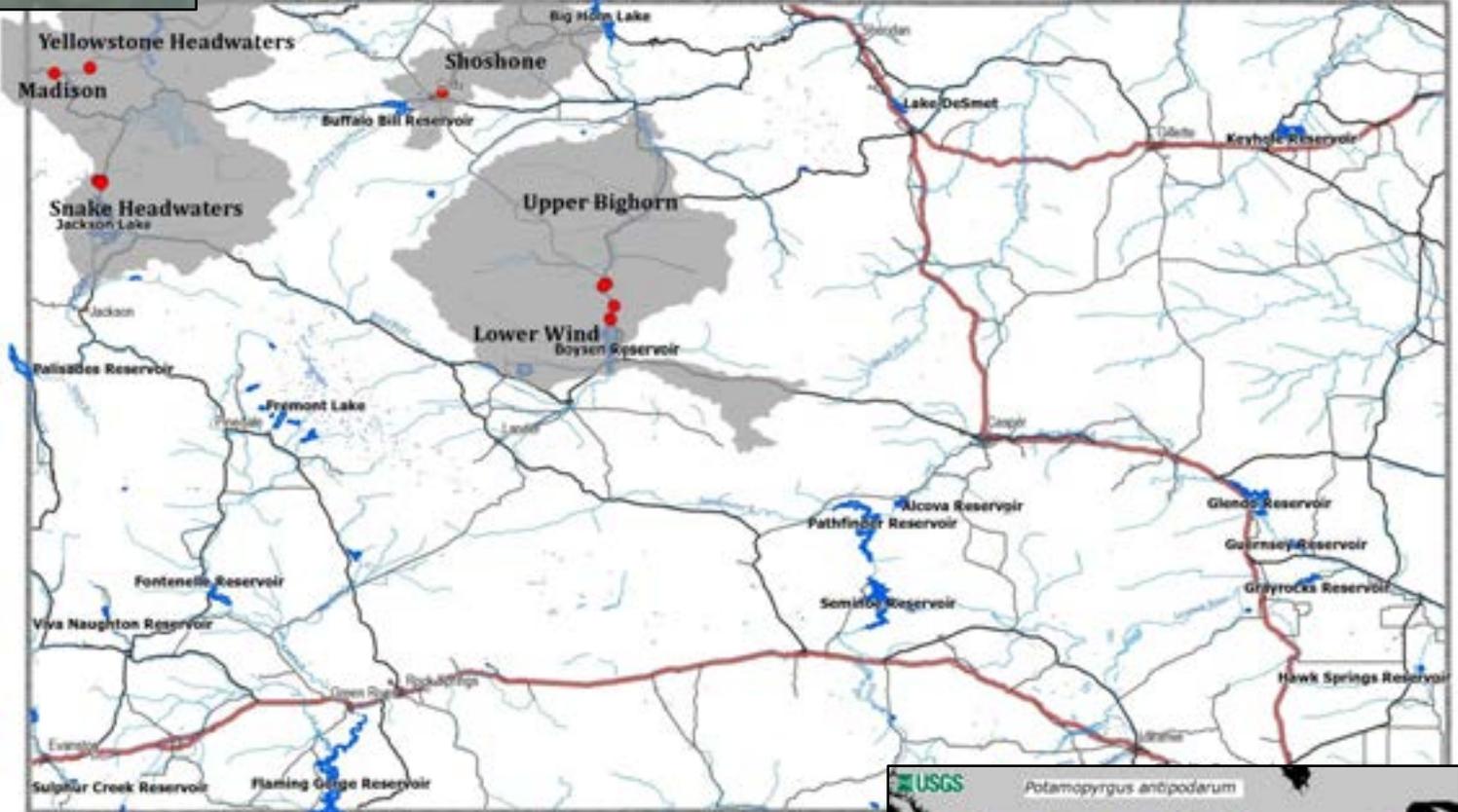
We encourage everyone to help us stop the spread of harmful invasive species like the zebra and quagga mussel by following three simple steps:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



New Zealand Mudsnail Wyoming Distribution

● Known Location ■ Infested Watershed



The New Zealand mudsnail (*Potamopyrgus antipodarum*) is native to mainland New Zealand and adjacent small islands. It was probably introduced into the United States through transoceanic ships or transported with live game fish. The species was first discovered in the Snake River, Idaho in 1987 and has since spread to Oregon, Montana, California, Arizona, Washington, Wyoming, Colorado, and Lake Ontario, Lake Erie, and Lake Superior. The mudsnail is parthenogenic (female clones) and densities have been recorded over 300,000 per square meter. Impacts of introduction include outcompeting native species and altering water chemistry. Currently, populations in Wyoming occur in Yellowstone National Park, Grand Teton National Park and in the Bighorn, Shoshone, and Snake rivers.

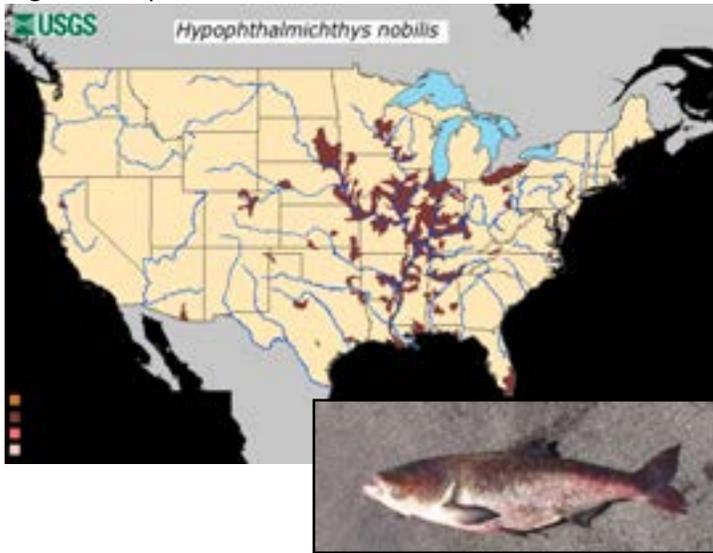
New Zealand mudsnails are spread by fish and birds, natural downstream dispersal, upstream through rheotactic behavior, and by humans on fishing gear.

If you are using New Zealand mudsnail infested waters please remember to:

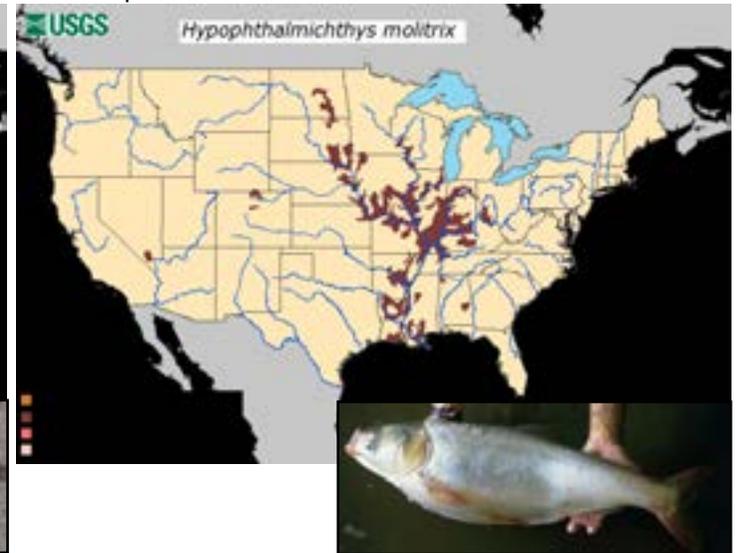
- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.

Asian Carp

Bighead Carp



Silver Carp



Black Carp



All members of the genus *Hypophthalmichthys* which include Bighead carp and Silver carp, and Black carp from the genus *Mylopharyngodon*, are considered aquatic invasive species by the Wyoming Game and Fish Department. Bighead carp are native to China and were introduced into the U.S. in 1970. They now occur in at least 24 states and are naturally reproducing. Silver carp are native to Southeast Asia and east Russia and were intentionally introduced into the United States in 1973. The species now occurs in at least 18 states and is naturally reproducing. Both the Silver and the Bighead carp may deplete zooplankton populations and therefore compete with native

fishes. Black carp are native to Asia and east Russia and were unintentionally introduced in the early 1970s as a stowaway with intentionally introduced grass carp. Black carp now occur in at least 5 states. Black carp may reduce populations of native mussels and snails through predation and negatively affect the aquatic ecosystem. None of these species are currently found in Wyoming.

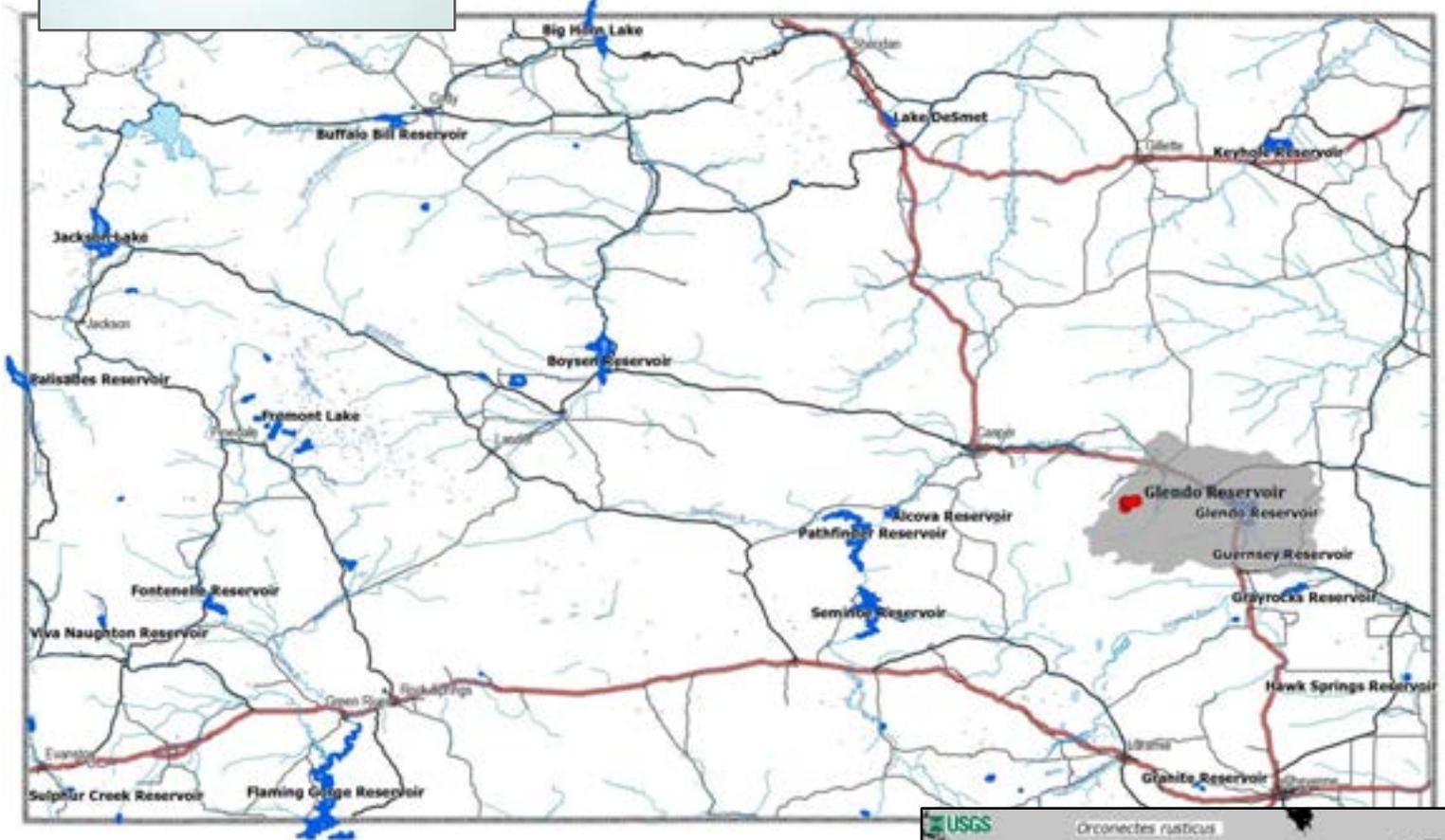
Asian Carp have often been intentionally introduced in an attempt to improve water quality, increase fish production in culture ponds, as biological control and as food fish. They can spread through accidental introductions either as fish or fish eggs and through water currents. If you are using Asian carp infested waters in another state, please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Rusty Crayfish Wyoming Distribution

● Rusty Crayfish ■ Infested Watershed



Rusty crayfish (*Orconectes rusticus*) are native to the Ohio, Tennessee, and Cumberland drainages in eastern United States. The species has been introduced into 14 other states, most likely by baitfish introductions. Rusty crayfish have the potential to outcompete native crayfish and established populations can destroy plant abundance and diversity. Rusty crayfish are currently present in Wyoming in a North Platte River tributary drainage where they had been illegally stocked. Attempts to eradicate the species in 2006 and 2007 were proven unsuccessful when the species was found below the original treatment area in 2012. A further eradication effort is currently underway. No other populations have been found in Wyoming.



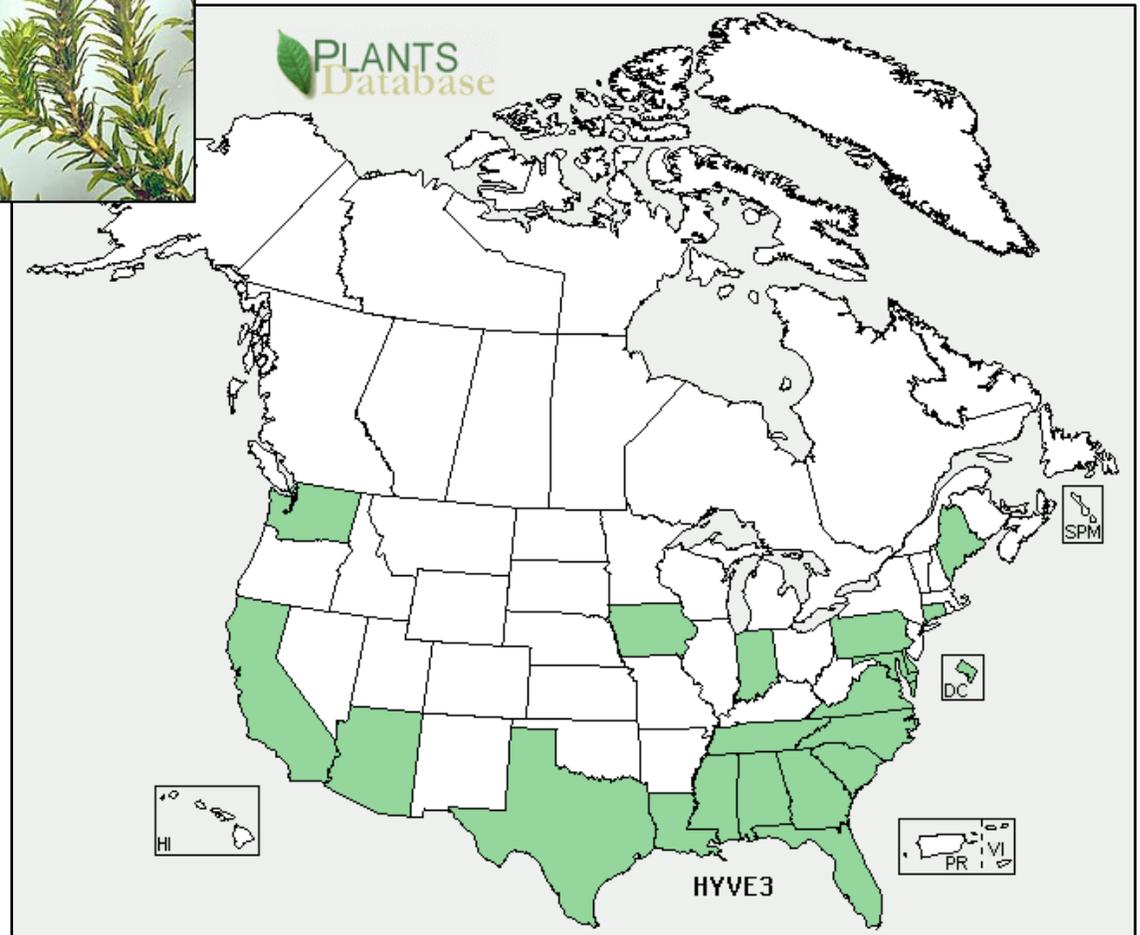
Rusty crayfish have been introduced into new areas by bait or accidental introductions. One female crayfish harboring sperm is capable of starting a new population. While the survivability of fertilized crayfish eggs separated from the female is low, they may be difficult to see and can be transported in standing water.

If you are using rusty crayfish infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Hydrilla U.S. Distribution



Distribution Map: Courtesy of USDA Plants Database. Map may be outdated.

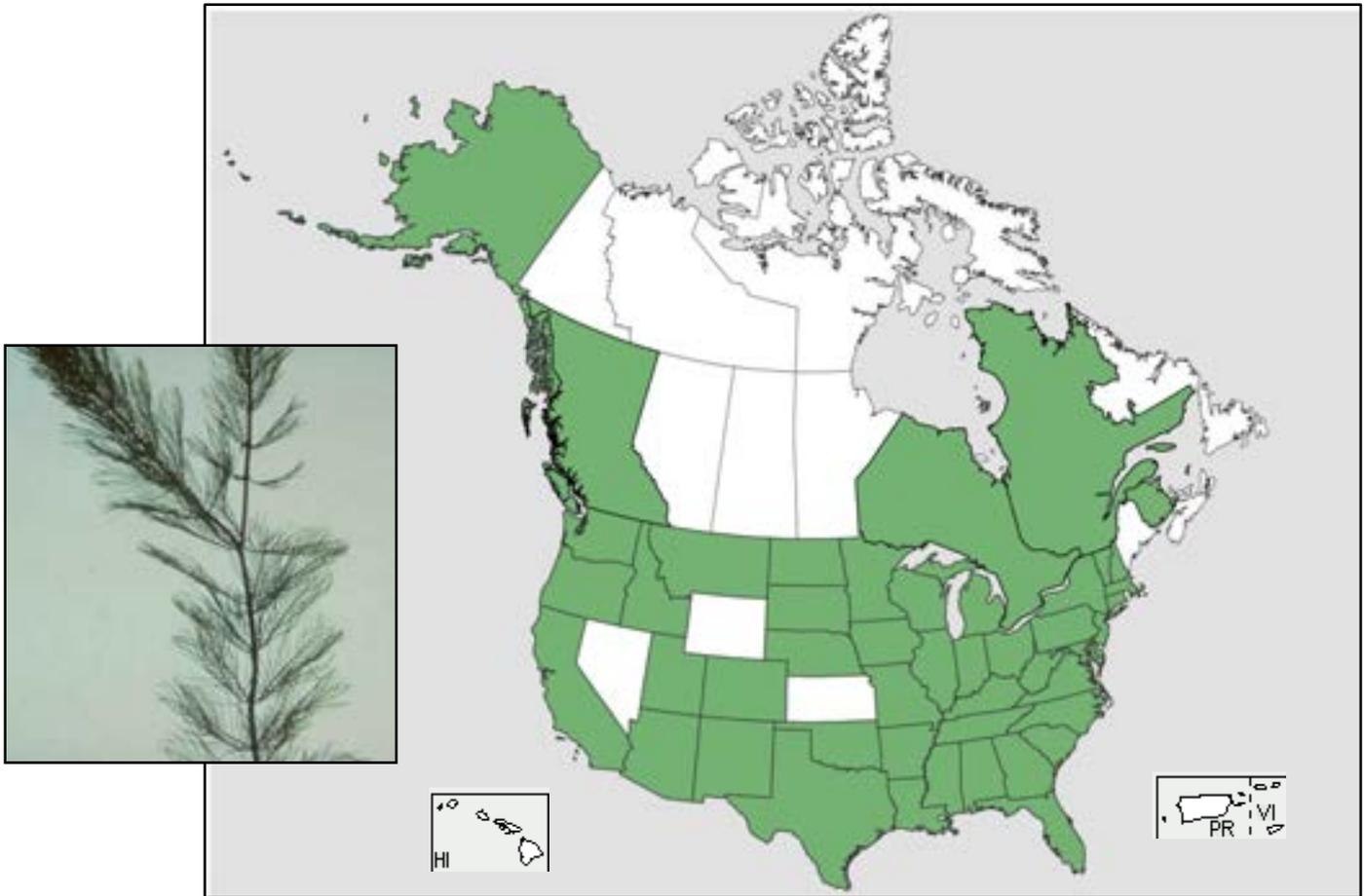
Hydrilla (*Hydrilla verticillata*) is native to Asia and was introduced into the United States in the early 1950's for use in aquariums. The species spread into open water through discarded fragments or by planting in canals. Since its initial introduction, hydrilla has spread to 27 states, most likely transported on trailered watercraft. It has not been documented in any Wyoming waters. Hydrilla displaces native vegetation, changes physical and chemical properties in lakes, reduces the ability of fish to forage for food, obstructs boating, fishing, and swimming, and slows down water delivery.

Hydrilla is spread on trailered watercraft and fragments can spread naturally downstream; one stem or leaf fragment can start a new colony.

If you are using Hydrilla infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.

Eurasian Watermilfoil



Eurasian watermilfoil (*Myriophyllum spicatum*) is native to Europe, Asia, and northern Africa and may have been intentionally introduced into the United States with the aquarium trade. It was first documented in Washington D.C. in 1942, and now occurs in 45 states and Canada. It is an aggressive plant, displacing native plants leading to reduced diversity. Dense beds form canopies and reduce light penetration, invertebrate abundance, and the ability of fish to forage for food. In addition, it degrades water quality and lowers oxygen levels. Dense beds can also hamper recreation by restricting swimming, fishing, and boating. Eurasian watermilfoil has not been documented in any Wyoming waters to date.

Eurasian watermilfoil is spread on trailered watercraft and fragments can spread naturally downstream; one stem or leaf fragment can start a new population.

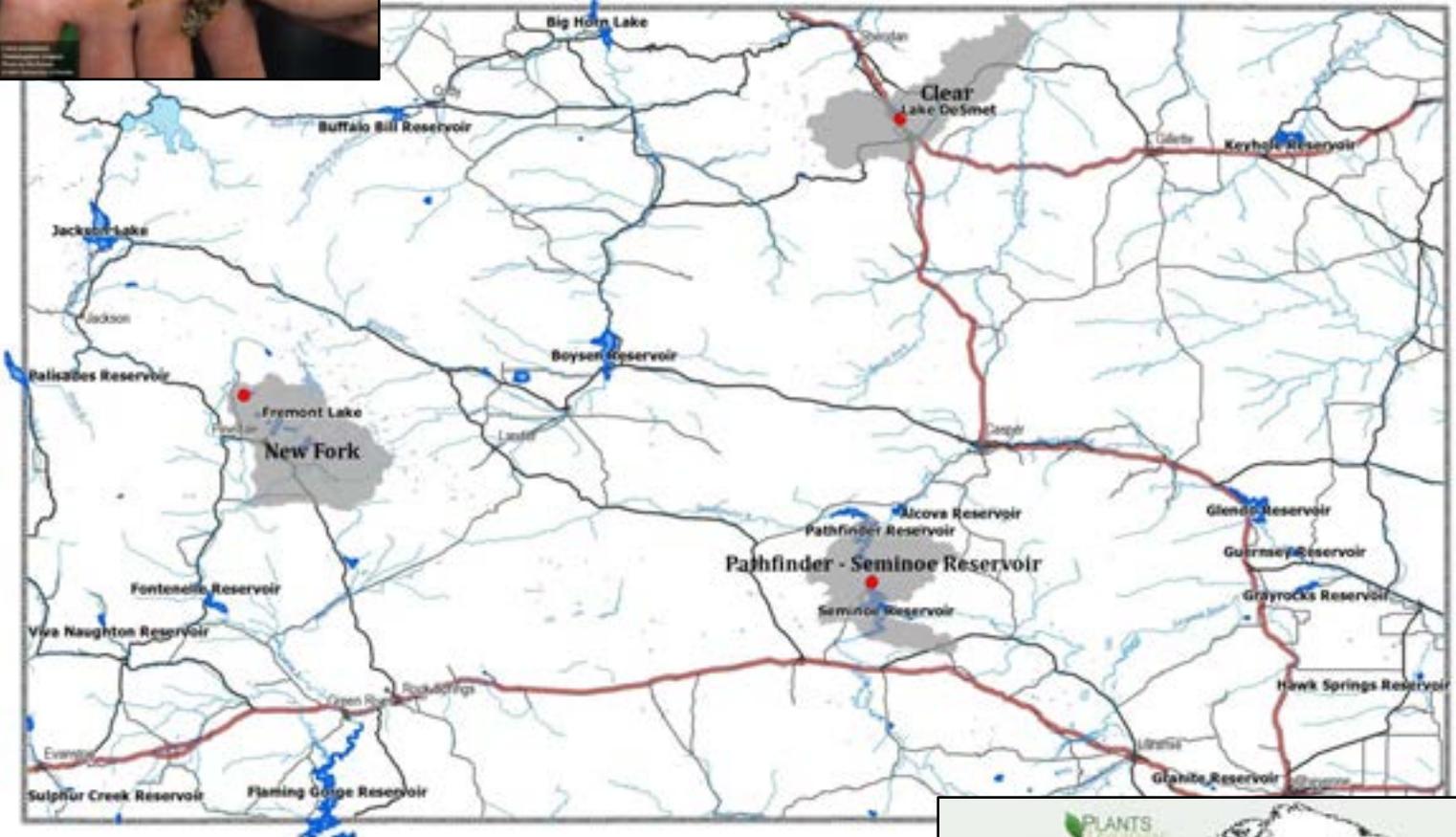
If you are using Eurasian watermilfoil infested waters in another state, please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Curly Pondweed Wyoming Distribution

● Known Location ■ Infested Watershed



The curly pondweed (*Potamogeton crispus*) is native to Eurasia, Africa and Australia and was introduced into the United States in the mid 1800's. It is now found in almost every state in the continental U.S. aside from Maine and South Carolina. Curly pondweed has limited distribution in Wyoming. It was found in Lake DeSmet in 2011. In 2012, it was discovered on the North Platte River between Seminoe Reservoir and Pathfinder Reservoir (an area referred to as the "Miracle Mile") and also at New Fork Lake. Curly pondweed competes with native plants reducing plant diversity and forms dense mats that impact water-based recreation.



Curly pondweed reproduces by seed which can be easily transferred in mud or water. It has been introduced into new areas by accidental introductions and as an ornamental plant.

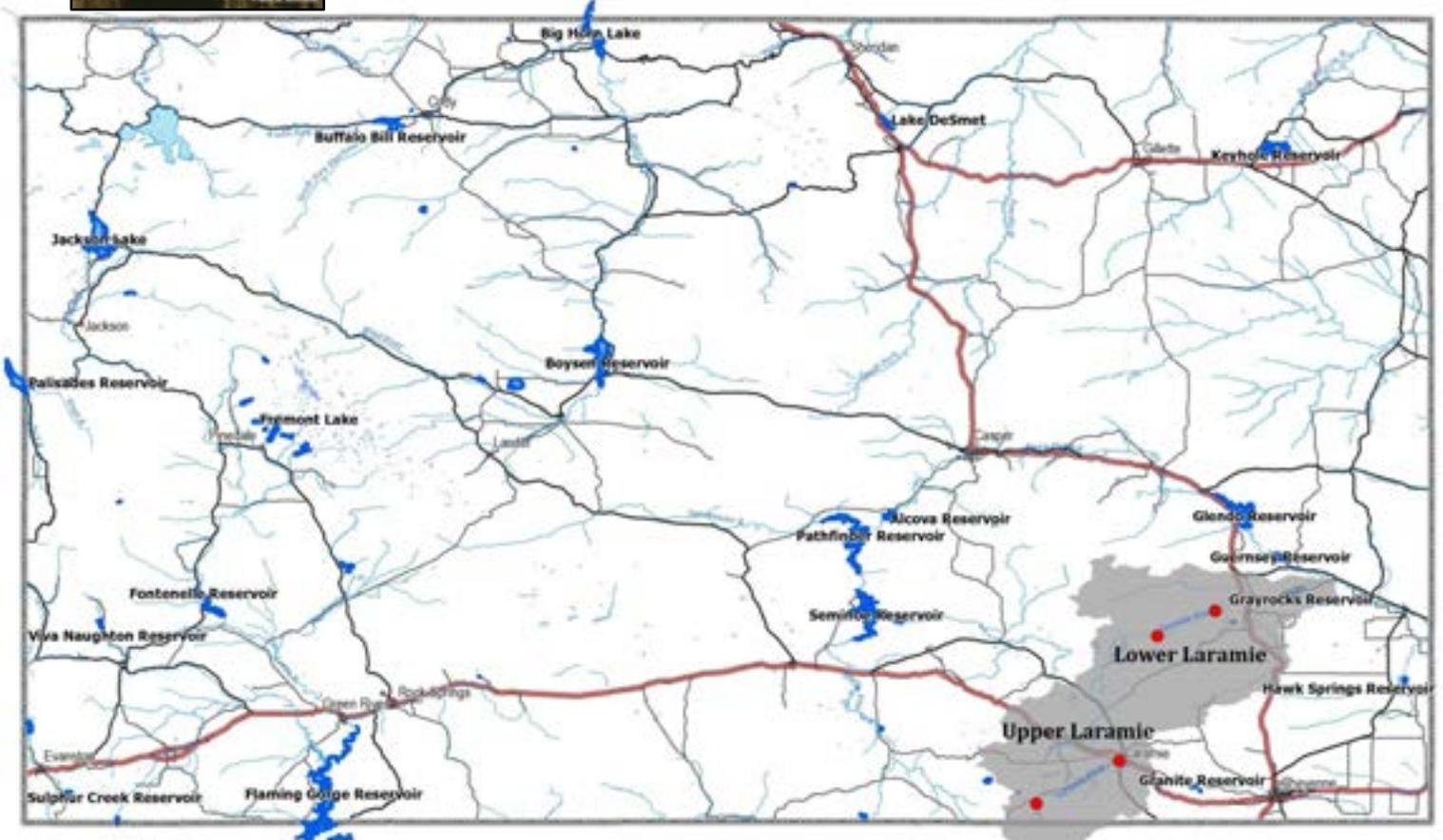
If you are using curly pondweed infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Asian Clam Wyoming Distribution

● Known Location ■ Infested Watershed



The Asian clam (*Corbicula fluminea*) is native to Asia, Africa, the Mediterranean, and Australia and is believed to have been introduced intentionally as food or accidentally imported with the Pacific oyster. It was initially discovered in 1938 in the Columbia River and now occurs in 38 states. Much like zebra and quagga mussels, the Asian clam can clog pipes at power generation and water supply facilities, causing millions of dollars in damage. In 2010, Asian clam were confirmed in the Laramie River near the town of Laramie subsequent sampling has identified populations in the upper and lower Laramie watershed.



Asian clams are spread through bait bucket introductions, accidental introductions with aquaculture species, illegal introductions for food, and through water currents.

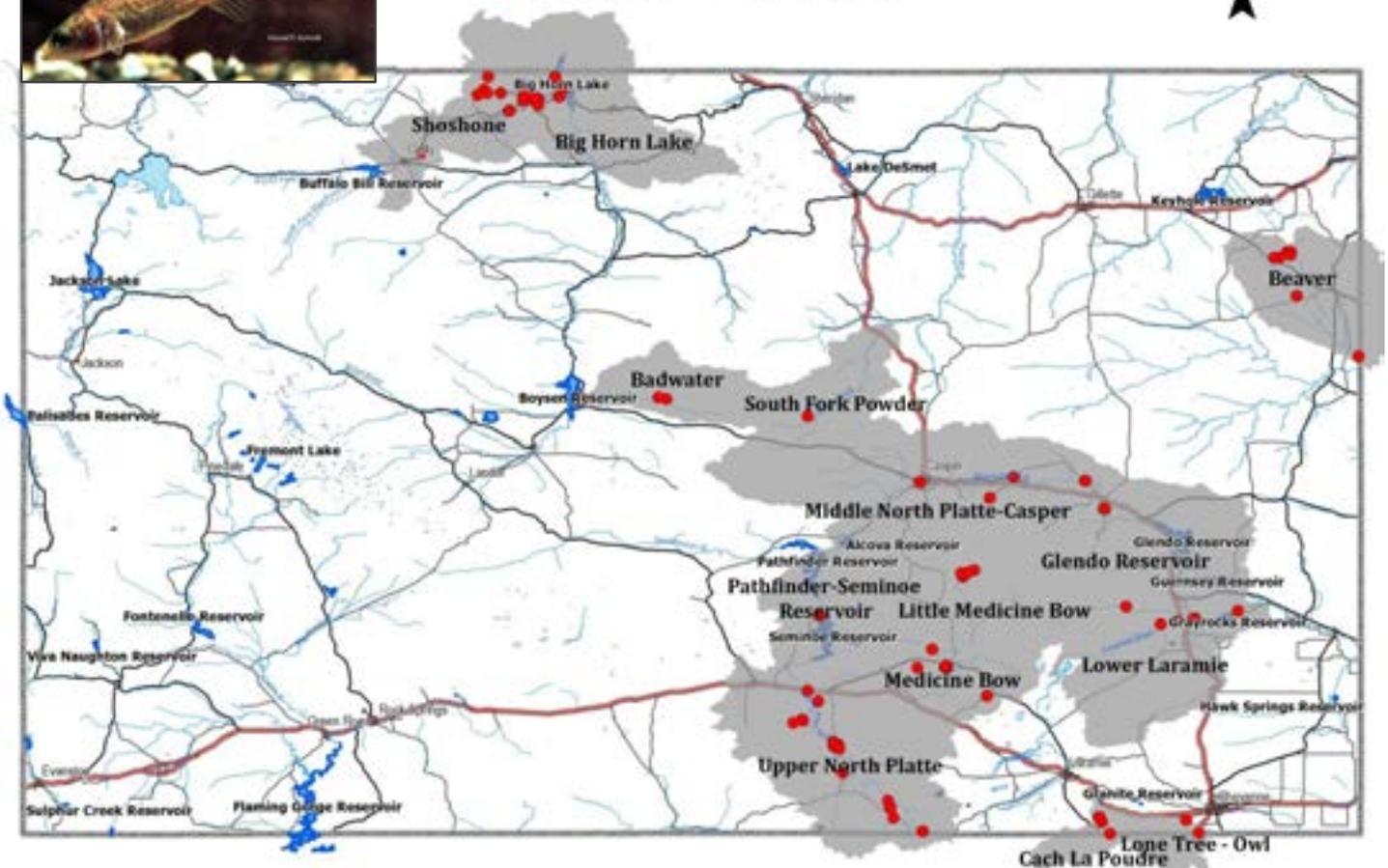
If you are using Asian clam infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Brook Stickleback Wyoming Distribution

● Known Location ■ Infested Watershed



The brook stickleback (*Culaea inconstans*) is native to central North America. It has been introduced into 16 states outside of its native range primarily as a result of baitfish introductions. Brook stickleback have been found in several drainages throughout Wyoming including the Beaver, Badwater, Big Horn Lake, Cach La Poudre, Glendo, Laramie, Lone Tree –Owl, Medicine Bow, North Platte, Pathfinder-Seminole Reservoir, South Fork Powder and Shoshone drainages. Brook stickleback have been shown to compete with and negatively affect other fish species and waterfowl. Studies show that waterfowl may be negatively impacted by brook stickleback due the species' affect on zooplankton biomass and abundance. Brook stickleback are known to forage for other fish species' eggs which may negatively impact fish populations and result in reduced fishing opportunities.



Brook stickleback are spread as a result of bait introductions, accidental introductions with aquaculture species and through water currents. Juvenile fish and fish eggs may be difficult to see and can be unknowingly moved with standing water.

If you are using brook stickleback infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.

Snakehead U.S. Distribution

Northern Snakehead



Species from the genus *Channa* or *Parachanna* are referred to as snakeheads. Snakeheads are native to southern and eastern Asia and parts of Africa. They have historically been sold in the U.S. as food in Asian markets and also as pets, and were released via these sources. Snakehead have now been introduced into waters in Arkansas, California, Florida, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusetts, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island, Virginia and Wisconsin. They are able to adapt to a variety of habitats and can live for long periods of time (up to four days) out of water. Snakehead feed primarily on other fish, but also eat insects, plants, crustaceans, reptiles and even small birds and mammals. There are no known natural predators of snakehead in the U.S. Once this species becomes established it is very difficult to eradicate.

Snakehead primarily spread through intentional or unintentional introduction as fish or their eggs and through water currents.

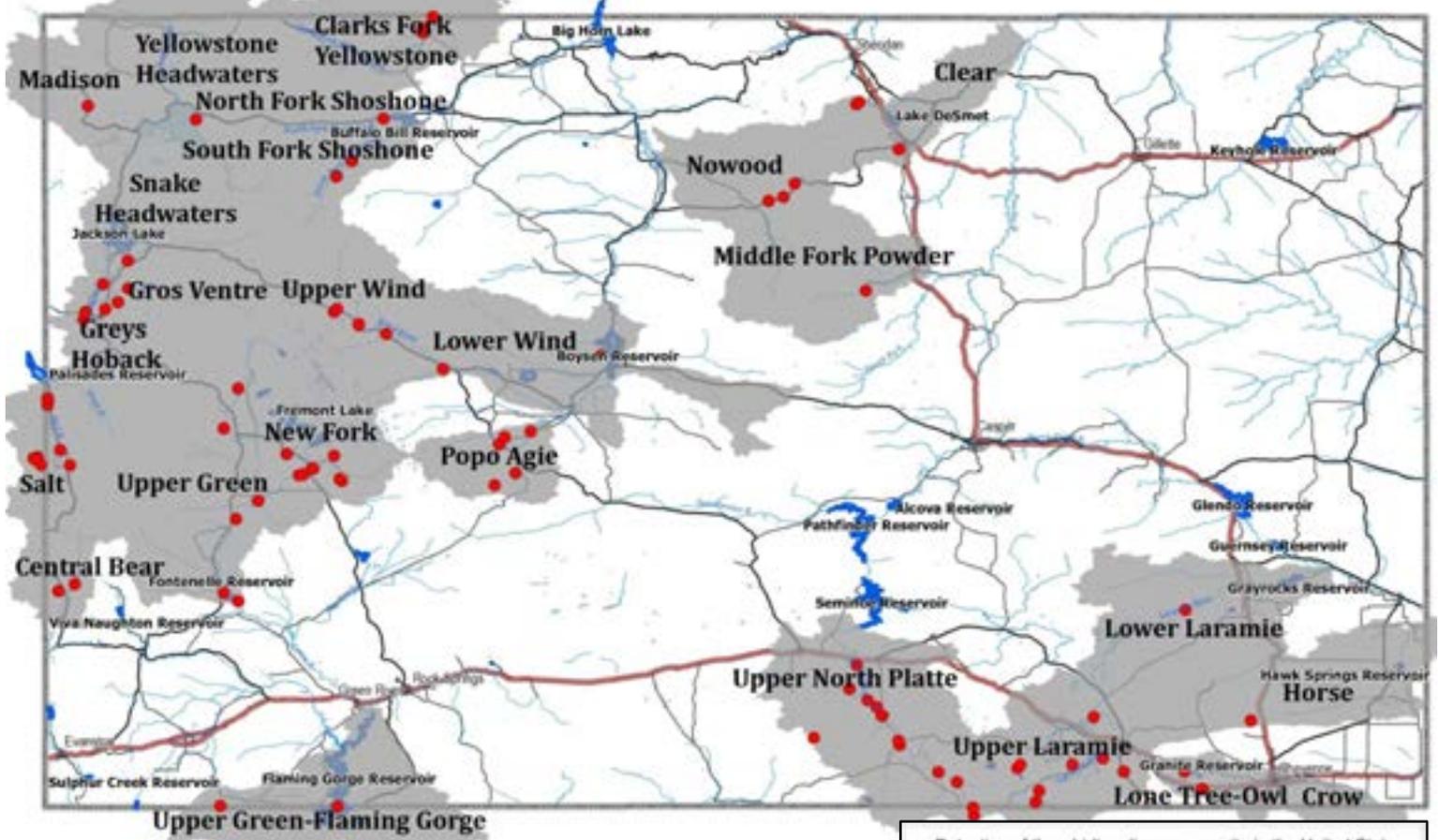
If you are using snakehead infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.



Whirling Disease Wyoming Distribution

● Known Location ■ Infested Watershed



Whirling disease is caused by the microscopic parasite, *Myxobolus cerebralis* and was introduced from Europe in the 1950's. The parasite has a two-host life cycle, infecting both Salmonids and a common aquatic worm, *Tubifex tubifex*. The parasite infects cartilage tissue of Salmonids and may cause a blackened tail, deformities of the head and spine, whirling behavior, and death of the fish. Whirling disease has been associated with fishery losses and high economic costs. The disease is known to occur in 23 states including Wyoming. A fish health inspection report is required for fish importation to help prevent whirling disease spread.



The parasite is spread through movement of infected fish and through water or mud containing the parasite spores.

If you are using whirling disease infested waters please remember to:

- ✓ **DRAIN** all water from your gear and equipment. This includes all types of watercraft, waders, boots, clothing, buckets – anything that comes into contact with the water.
- ✓ **CLEAN** all equipment and gear of plants, mud and debris. *Never move a plant or animal from one location to another.*
- ✓ **DRY** everything thoroughly. In Wyoming we recommend drying for 5 days in the summer, 18 days in the spring or fall, or 3 days at freezing temperatures.