



Aquatic Invasive Species

Background

Aquatic invasive species (AIS) are non-native, harmful aquatic plants, animals, or microscopic organisms whose introduction to riparian ecosystems can have serious long-term negative effects on the ecology of streams, rivers, and lakes. AIS may include plants, fungi, mollusks, algae, and animal species. Like terrestrial exotic invasives, AIS pose a serious threat to the systems they inhabit because of their tendency to rapidly reproduce, outcompete native populations, and disrupt natural food chains. For these reasons, AIS are a major concern for managers of national parks in the Northern Colorado Plateau Network (NCPN).

AIS in and Near NCPN Park Units

Some AIS have been found closely adjacent to or in streams and lakes monitored by the NCPN (see Figure 1). Although the general impacts of AIS on stream biology are known from other parts of the country, the specific effects of infestations in NCPN water bodies are not yet known. Systems whose conditions prove unsuitable for invaders may avoid significant problems. In other cases, invaders could pose serious environmental, ecological, economic, and even human-health threats.

New Zealand mudsnails

The New Zealand mudsnail (*Potamopyrgus antipodarum*; NZMS) is the most common invasive mollusk on the Northern Colorado Plateau, affecting at least 10 counties in Utah alone. Native to New Zealand, these tiny creatures are able to reproduce asexually, meaning it only takes one female to start a new population. Although an individual snail only measures 3/16 of an inch (0.5 cm) long (see Figure 2), one colony may contain as many as 300,000 individuals per square yard, resulting in significant alterations to the food web. NZMS have been found to decrease the densities of other macroinvertebrates and, therefore, reduce the amount of food available to fish. Decreased growth of some fish has been found in areas with dense NZMS populations.¹

New Zealand mudsnail infestations were discovered in Dinosaur National Monument (NM), downstream from Flaming Gorge Dam, in 2001.² AIS may be easily transported across

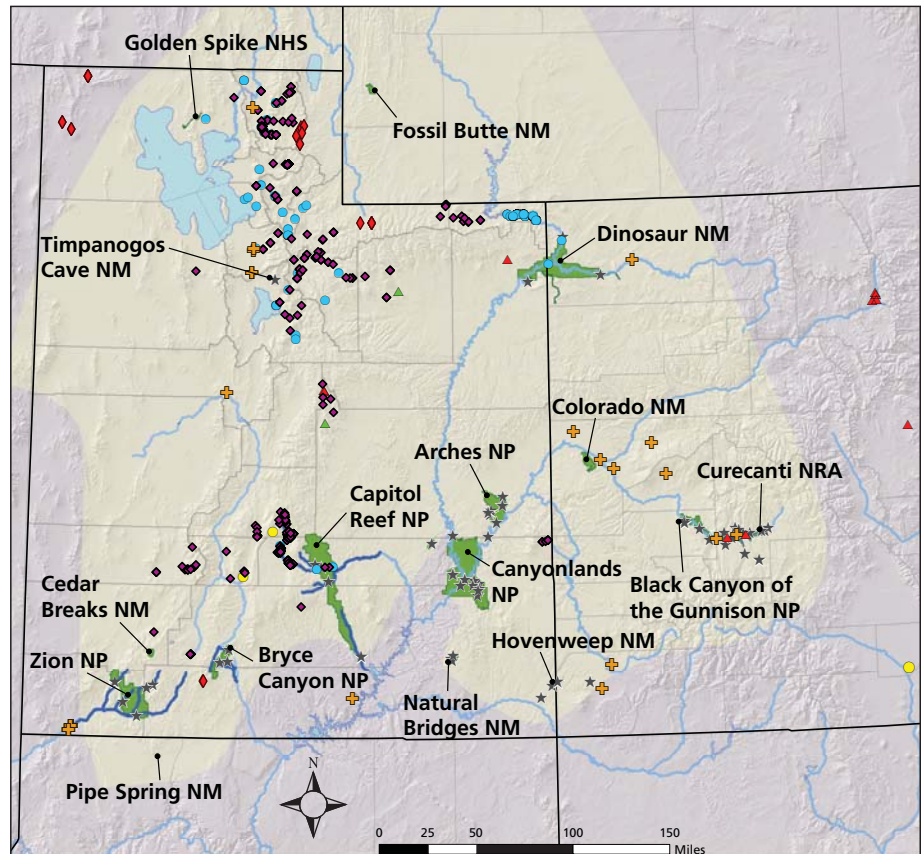


Figure 1. Aquatic Invasive Species in and Near NCPN Park Units.

- ▲ *Didymo* (*Didymosphenia geminata*)*
- New Zealand mudsnails (*Potamopyrgus antipodarum*)
- ▲ Quagga/Zebra mussels (*Dreissena* mussels)
- ◆ Whirling disease (*Myxobolus cerebralis*)*
- Eurasian water milfoil (*Myriophyllum spicatum*)
- Asian clam (*Corbicula fluminea*)
- ◆ Chytrid fungus (*Batrachochytrium dendrobatidis*)
- ★ NCPN cooperative water quality monitoring sites**
- Stream segments with NCPN water quality sites
- Rivers
- NCPN park unit
- County boundary
- NCPN boundary

*Colorado data are not available, but *Didymo* and whirling disease occur in most rivers and streams in western Colorado.

**The NCPN works in cooperation with other National Park Service staff as well as other state and federal agencies to monitor water quality on the Northern Colorado Plateau.



Figure 2. New Zealand mudsnails (greatly enlarged and shown on dime for scale).

waters via popular recreational activities, and these mudsnail populations may have been introduced by boating and fishing activities upstream from the monument. New Zealand mudsnails now occur throughout the length of the Green River in Dinosaur NM, to the Colorado/Utah border. It will be important to track the ecological effects of NZMS on both the Green and Yampa rivers over time. In **Capitol Reef National Park**, New Zealand mudsnails were found at a fish hatchery that flows into the Fremont River in 2007.³ As with the Green and Yampa rivers, the Fremont River system bears watching over time. There is no known method for removal of New Zealand mudsnails.

Dreissena mussels

Mussels of the genus *Dreissena*—including the **zebra mussel**, from Russia, and the **quagga mussel**, from the Caspian Sea—have voracious appetites, preying on the microscopic organisms that serve as food for the insects and plankton that are in turn eaten by fish. In addition, *Dreissena* mussels compete with native mussel and clam populations through a behavior called bio-fouling, in which they attach themselves to native mollusks.

Whirling disease

Whirling disease (*Myxobolus cerebralis*), native to Eurasia, affects a fish's spinal growth, turning the tail black and resulting in whirling swimming behavior and premature death. After the host dies, the parasitic spores are released into stream sediment, where they can remain dormant for up to 30 years. Transport of these microscopic spores on fishing boots, car tires, or research equipment can introduce the disease to other waters.

In **Capitol Reef National Park**, the Fremont River was infested with whirling disease in 1991, introduced from fish hatcheries upstream from the park.⁴ Whirling disease is prevalent in Utah, particularly in the Provo River drainage, as well as in western Colorado. In **Curecanti National Recreation Area** and **Black Canyon of the Gunnison National Park**, the reservoir system, the Gunnison River, and some of its tributaries have tested positive for whirling disease.⁵



Figure 3. NCPN water quality monitoring crews follow AIS decontamination procedures after exiting each body of water.

Didymo

Another species of concern that has been found near, but not in, NCPN parks is the invasive algae, *Didymosphenia geminata*, or **Didymo**, native to Eurasia. Didymo has been found in northern Utah and is prevalent throughout Colorado. Once introduced, Didymo has the potential to completely cover a stream bottom with an algae mat up to eight inches thick, drastically decreasing stream biodiversity and habitat for insect species eaten by fish. Didymo also impacts macroinvertebrate species that may prefer vegetation-free surfaces and macroinvertebrate grazer species that do not eat Didymo.

Prevention

Like anglers, water quality monitoring crews may visit multiple streams in one day and use the same equipment in each stream. To prevent the spread of non-native aquatic species, the NCPN implements an AIS decontamination procedure after exiting each body of water (see Figure 3). Crews spray a dilute disinfecting solution on all equipment after use and allow equipment to dry as much as possible between uses.⁶

References

- ¹ Hall et al. (2004) and Cada, C. (2004). Both in: *Potamopyrgus antipodarum* in the Western USA: Minutes of the Third Annual Conference, Montana State University, Bozeman. <http://www.scwa2.com/documents/NZMS/NZMS%20Research%20Findings%2022304.pdf>.
- ² The Bug Lab. 2007. New Zealand mud snails. <http://www1.usu.edu/buglab/projects/NZMS2004.pdf>.
- ³ Utah Division of Wildlife Resources. 2007. New Zealand mud snails found in state fish hatchery. <http://wildlife.utah.gov/news/07-12/nz.php>.
- ⁴ Utah Division of Wildlife Resources Fisheries Experimentation Station. 2008. Whirling disease in Utah. http://wildlife.utah.gov/fes/whirling_dwr.html.
- ⁵ Colorado Division of Wildlife. 2008. Whirling disease investigations. <http://wildlife.state.co.us/NR/rdonlyres/1DC795DF-C761-42E1-AC0D-4875EEF2B121/0/WhirlingDiseaseInvestigations.pdf>.
- ⁶ U.S. Forest Service. 2008. Aquatic invasive species. <http://www.fs.fed.us/r4/resources/aquatic/index.shtml>.

How You Can Help

Visitors to national parks can help prevent the spread of AIS by following these steps each time they come in contact with a body of water:

1. Remove all visible mud, plants, fish, and any tiny animals from boats, trailers, and other equipment, including waders, boots, clothing, and nets.
2. Do not dump any water from one source into another. Drain your boat hull and live well in a safe location (a flat paved, dirt, or gravel area) away from any park surface water.
3. Never empty bait or release fish, other animals, or plants into a body of water unless they came out of it.
4. Clean and dry everything that comes in contact with water before entering a new body of water. It is best to use high-pressure, hot water (available at car washes outside the park) to clean your boat, trailer, and gear.

For more information, visit the ANS Task Force at <http://www.anstaskforce.gov/default.php>