Hitchhikers Invade

On the Front Lines of the Fight Against Aquatic Invasive Species in Our National Forests

By Greg M. Peters

From thrilling whitewater to placid ponds, the waterways of our National Forests provide us with endless opportunities to fish, paddle and relax. And we take advantage of these opportunities. Each year, these ribbons of blue host 46 million visits for fishing alone and millions more for paddling and other water-based recreation.

Ironically, those who love these places the most are inadvertently imperiling them by introducing non-native organisms to popular recreational waterways. How? As boaters travel to explore new fishing holes, rivers and lakeside campsites, "hitchhikers" in the form of Aquatic Invasive Species or "AIS" catch a ride in boat bilges, on trailers or attached to hulls and other gear.

It's a double-edged sword. More people recreating on our National Forests means more people invested in forest health. But as people move around the country to fish a new lake or paddle a new river, they become vectors for AIS. These accidental introductions wreak havoc on our nation's waterways, especially on the streams, rivers and lakes that dot our National Forests.

Dale Bosworth, a former Forest Service Chief, specifically identified invasive species, both terrestrial and aquatic, in his 2006 declaration about the four major threats facing our National Forests. Bosworth noted that, "Public lands—especially federal lands—have become the last refuge for endangered species—the last place where they can find the habitat they need to survive. If invasives take over, these imperiled animals and plants will have nowhere else to go." By including invasive species with the three other threats: forest fuels, unmanaged recreation and loss of open space, Bosworth raised their profile both inside and outside of the agency.

In the ten years since Bosworth's declaration, invasive species, and AIS in particular, have remained a vexing challenge for the agency despite its laudable efforts to control them.

Boats From Everywhere

"I was totally blown away at how far people were coming," said Steve Shelly, a botanist and invasive species expert in the Forest Service's Region One office. Steve and I were looking at a map of Montana put out by Montana's Fish Wildlife and Parks (FWP) agency that showed the origin of all boats that passed through the state's watercraft inspection stations in 2014. Covered with dots from almost every state in the country, including Alaska and Hawaii, the map highlights one of the most difficult AIS challenges. When these visitors travel with their boats, they can also travel with AIS. If the boats and equipment aren't properly drained and cleaned, those hitchhikers can end up in a new waterbody. Undetected, these invaders pose huge threats to aquatic ecosystems.

Because invasive species evolved elsewhere and "invade" new places (mostly with unintentional human help), there isn't enough existing biological resistance within the ecosystem to prevent their proliferation. Predators and other environmental limitations in the new environment can't keep them in check. So they spread, causing a cascade of negative impacts on local ecosystems by using up resources like food and habitat that are then unavailable for native species. They also affect local economies by damaging infrastructure like docks and boat ramps, intake pipes and irrigation head gates, and they threaten sport fisheries and other water-based recreation opportunities.

Most of the biggest offenders evolved on a completely different continent. Eurasian watermilfoil came from Europe. Quagga mussels are from Ukraine. Zebra mussels are from Russia. Introduced to America in the mid-20th century, likely through the St. Lawrence Seaway that opened up a route for transatlantic ships to travel directly to the Great Lakes, AIS have been steadily making their way around the country on commercial and pleasure craft.

Vested Interest, Complex Problem

The scope of the problem is immense and the management of species within and across state borders is complicated. State agencies oversee species within their respective borders, meaning it's technically up to states to deal with AIS. However, the Forest Service clearly has a vested interest in keeping National Forest System lands and waters healthy. So the agency partners with state fish and game departments, county governments and nonprofits to battle AIS through a wide variety of programs and partnerships.

In the Greater Yellowstone Ecosystem, a landscape that includes five National Forests, two National Parks and other state and federally-managed lands, the partnerships take numerous forms. A history of agency collaboration helps in this area, but it still takes a concerted effort and dedicated funding to make sure all the players are coordinated. Much of that coordination is accomplished through the Greater Yellowstone Coordinating Committee (GYCC).

Clint Sestrich is the Chair of the GYCC's AIS subcommittee. "By far, the bulk of our work is focused on prevention," he explained. "Our eradication toolbox is much smaller for AIS than for terrestrial invasive species. It's very expensive, difficult and often just ineffective to remove AIS once they're established. So we really concentrate on prevention."

The AIS subcommittee recommends various projects for funding from dollars pooled by the participating agencies. Much of the funding is granted out to local groups, like the Livingston, Montana-based Invasive Species Action Network. This group received GYCC funding along with funding from Trout Unlimited and other sources, to install wader washing stations in all of the fly-fishing shops that surround the Yellowstone region. These wash stations allow anglers to clean their gear after each fishing excursion and provide messaging about the importance of preventing the spread of AIS.

The subcommittee also supports other innovative programs like training agency officials to visit area schools and teach young people about AIS and their harmful effects. Additional support is dedicated to an effort to analyze various state-run watercraft inspection and washing stations to see where each state has gaps, to share lessons learned, and ensure that each state has the most robust program it can.

Great Lakes, Great Problems

In the Midwest, AIS are a huge problem. When the St. Lawrence Seaway opened to trans-Atlantic ship traffic in 1957, it opened the flood gates for AIS. Since that time, there have been at least 53 AIS introduced to the Great Lakes via shipping, including two of the most damaging species: quagga and zebra mussels. These two small, seemingly innocuous mussels have caused billions of dollars in damage to power plants, municipal water systems, docks, recreation facilities, marinas and more.

"We have worked with the Shedd Aquarium in Chicago to build a display that tells people about AIS and also lists things they can do to be part of the solution," explained John Rothlisberger, aquatic ecologist and AIS specialist for the Forest Service in Milwaukee. This collaboration is part of the Forest Service's broad public education efforts that also included working with Discovery World, a science and technology center in Milwaukee to develop a similar display.

"We also partner with Wildlife Forever, a nonprofit associated with the North American Media Group, to develop billboards and PSAs, insert snippets into popular angling shows and other efforts to get the word out to the public about these threats," he explained. "In the Great Lakes area alone, we've achieved more than one billion impressions through these partnerships." These efforts are augmented by agency support of watercraft inspection and washing stations as well.

Fighting Fire With AIS-Free Water

One area where the Forest Service does have more control over the spread of AIS is wildland firefighting. While the idea of dealing with AIS in fighting forest fires may seem odd, it's a critical issue for the agency. Cynthia Tait, a Utah-based AIS coordinator with the Forest Service, is spearheading an interagency effort to prevent the spread of AIS during wildland fire-fighting efforts. While this may seem like an easy challenge to solve, it's actually pretty complicated.

First, wildland fires are just that, wild. No fire hydrants offer clean water sources for fire-fighters to use. Instead, they pull water from local water bodies that may harbor AIS. This means fire fighters need quick access to maps that detail where AIS populations exist, so they can do their best to avoid pulling water from those sources. Tait's team has developed GIS maps that provide this information to the folks in the field.

Second, the Forest Service moves equipment around the country to respond to fires when and where they happen, which means trucks, dip buckets and other fire-fighting equipment used in Florida might end up in California. In order to prevent the spread of AIS from one state to another, this equipment needs to be cleaned.

This too is no small task, as the cleaning often happens in the field, meaning protocols need to be efficient, effective and available to the fire fighters working in remote terrain. Massive 500-gallon fire engines are especially hard to clean, and Tait's team is working to develop methods that adequately decontaminate these machines with hot water as opposed to caustic pesticides. "We've learned that we need to circulate 140 degree water through the tanks for at least ten minutes to achieve decontamination," Tait explained. "We're investigating ways to do that in the field that work for the fire fighters." All of these tactics are being included in a guidebook Tait is developing for fire-fighters to use in the field.

Just like in other parts of the country, Tait also works with state agencies in Wyoming, Utah and Idaho to control AIS. These partnerships help keep National Forest lakes, rivers and streams free of AIS.

Tough Decisions, Real World Impacts

Early indications suggest the Forest Service's hard work is paying off. A Montana FWP report on watercraft inspection stations showed that 40 boats entering the state's waterways, many of which are on National Forest lands, had AIS hitchhikers. Fortunately, there were no recorded infestations of AIS in the state during 2014, showing that the watercraft inspection stations seem to be working. But AIS mitigation efforts can have real ramifications for the millions of boaters who use National Forest waterways. John Rothlisberger, the AIS expert from Milwaukee, recounted an example on the Ottawa National Forest in Michigan's Upper Peninsula that highlights these real-world impacts:

"We have a lake that's half in the Sylvania Wilderness and half out. For years it was the only lake in the Wilderness that allowed motorized craft, and it was the only lake in that Wilderness Area where we detected a Eurasian watermilfoil infestation. A rapid response allowed us to control the infestation before it spread to other lakes in the Wilderness, many of which are interconnected through streams. But the District Ranger eventually had to make the tough decision to close the boat launch to motorized boats, which are generally more prone than canoes or kayaks to harbor and introduce AIS. Many folks were disappointed, while others felt that it should have been closed to motor boats much sooner."

Challenges like these make this work both difficult and rewarding. Closing a popular site or requiring people to stop and have their boats inspected can be frustrating, but it's necessary. Even though they may be tiny, AIS are a real and significant threat to our public waterways. Fortunately, strong collaborative efforts around the country and innovative public education programs are proving that the challenge can be met.

Greg M. Peters

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Five Invaders To Watch Out For

Zebra/Quagga Mussels

Zebra and Quagga mussels are some of the most notorious aquatic invasive species around. First discovered in the Great Lakes in the late 1980s, these tiny mollusks have made their way across the country and now infest the Mississippi River system, Lake Mead and Lake Powell. Zebra mussels are native to southern Russia while Quagga Mussels are native to Ukraine. They can produce up to one million eggs per year, which hatch into microscopic larvae that "swim" freely for several weeks before attaching themselves to any hard surface they can find. They cause a cascade of negative impacts to the food web because they eat phytoplankton, a critical food source for zooplankton, which is in turn eaten by many native fish and invertebrate species. The mussels clog water intake systems, foul docks and beaches, and damage commercial and recreation fisheries. Ensuring that boats are completely drained, clean and dry helps limit their spread.

Eurasian watermilfoil

Native to Europe, Asia and North Africa, Eurasion watermilfoil is a submerged aquatic plant that grows in still and slow-moving water. First introduced to North America in the 1940s, it's now found throughout the continent. The plant spreads both through flowering and by regrowth of plant fragments, making it especially hard to control, and it's still sold through aquarium supply stores, further frustrating control efforts. It grows in thick mats of dense vegetation that can ruin swimming, fishing, waterskiing and other water-based recreation. It also can clog water intake systems, affecting municipal and agricultural users.

New Zealand Mudsnails

First detected in Idaho's Snake River in 1987, New Zealand mudsnails are tiny freshwater mollusks that cause big problems in aquatic systems. These invaders have spread throughout the West, infesting famous trout streams like the Madison River and other waters around Yellowstone National Park and have recently made their way to the Great Lakes and Mid-western waters. They have no natural predators and outcompete native snails that make up the diets of native fish and birds. They can live for up to 24 hours without water, but can survive for several days on damp clothing and gear. Their small size makes them hard to detect and easy to transport. Mudsnails collect in very high densities; in the Great Lakes they've appeared in colonies of 5,600 individuals per cubic meter of water. Now that's an invasion!

Didymo AKA Rock Snot

Although technically native to cold water streams in North America, the microscopic alga didymo has become a significant threat to aquatic systems in recent years. "Rock snot" smothers stream beds with a thick, brownish-grey mat that feels more like wet cotton than algae and looks like mucus. Didymo prevents fish from nesting, limits invertebrate growth and affects food webs. Because it spreads by cell division, a single drop of infected water can cause a new infestation. It's most often spread through transportation of fishing gear, especially waders and felt-soled fishing boots. Many states have banned felt-soled boots for this reason. Anglers beware! You may be unintentionally spreading this pest. If you've recently fished in didymo affected waters, ensure your gear is completely dry for 48 or more hours before using it in a new stream.

Asian Carp

Asian carp are large, heavy bodied fish native to China and Southeast Asia. "Asian carp" is a general term referring primarily to silver, grass, black and bighead carp. The fish are found throughout the Mississippi River and its tributaries. They are thought to have escaped from commercial catfish operations in the South, where they were introduced to help clean fish ponds. Some species are known for their ability to leap up to ten feet in the air when frightened by boats and personal watercraft. This behavior, while amusing on countless YouTube videos, is dangerous for boaters who can be seriously injured by the fish, which often weigh 100 pounds or more. There is a multi-million dollar effort to prevent Asian Carp from establishing in the Great Lakes where they would significantly damage the area's $7 billion sport and commercial fisheries.