



DEEP CREEK DISPATCH

Newsletter of the
Property Owners' Association
of Deep Creek Lake, Inc.

Potential Danger of Aquatic Invasion at Deep Creek Lake

You may recall hearing horror stories of a voracious fish from Asia called the northern snakehead, invading the Chesapeake Bay, or the asian swamp eel showing up in the Florida Everglades but probably the most nationally feared of all aquatic invaders is a much smaller animal that lacks teeth altogether and simply filters plankton out of the water column, the zebra mussel or *Dreissena polymorpha*. Zebra mussels have become the poster child for Aquatic Invasive Species or AIS. According to the US Geological Survey (USGS), who tracks the national spread of AIS, the introduction of zebra mussels represents "one of the most important biological invasions into North America, having profoundly affected the science of Invasion Biology, public perception, and policy." Native to the Black and Caspian Seas, zebra mussels were first found in North America in a water body connecting Lake Huron to Lake Erie in 1988. Just two years later, they had been found in all the Great Lakes and were working their way into the Mississippi River and up into the Hudson River. They have since spread throughout most of the eastern United States (see above map) and threaten

SPECIAL EDITION

This is a special edition of the Dispatch designed to educate our membership about the serious dangers posed by AIS (Aquatic Invasive Species) to Deep Creek Lake. This edition was compiled with the help of MDNR Natural Resource Biologists Julie Bortz and Mark Lewandowski. We thank them both for providing their knowledge and expertise in educating our membership on this critical topic.



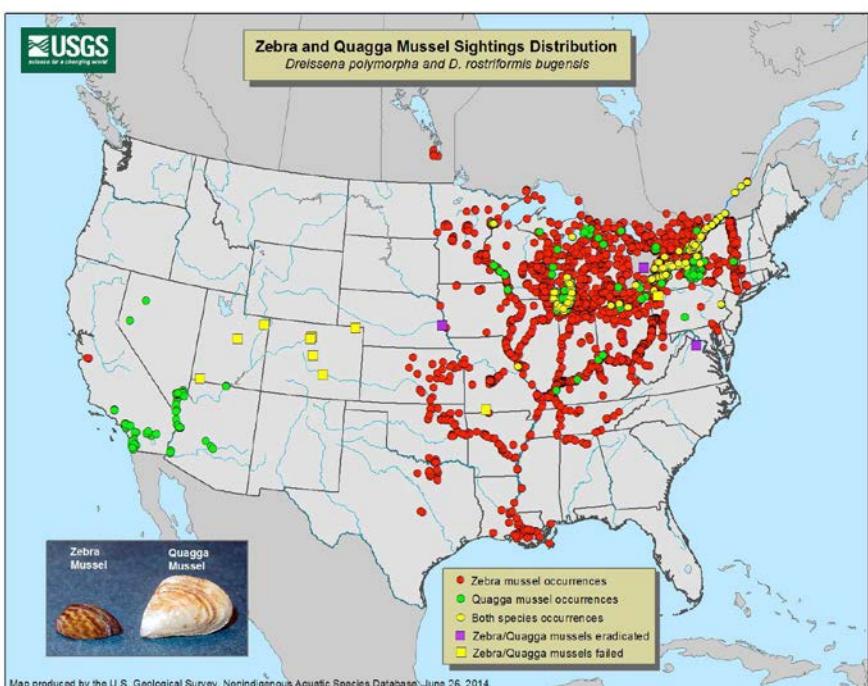
Zebra mussels found on boat attempting to launch on DCL June 4, 2016.

the western U.S. as well. These tiny, predominately fresh water invaders are generally not much larger than an adult fingernail (<5cm) but are estimated to cost the U.S. over \$500 million dollars annually in remediation and control costs in the Great Lakes alone. Zebra mussels are notorious for their ability to foul water intake systems and industrial facilities with reports of densities exceeding 700,000 mussels per square meter found in one Michigan power plant. But their damage doesn't stop there; they can impede navigational and recreational boating by attaching to the hulls of boats and slowing their drag. Small mussels can get into engine cooling systems, blocking water movement and causing engines to overheat. Navigational buoys have been so

heavily fouled that they have sunk due to over-abundance of mussels. Docks and other infrastructures have been structurally damaged by their repeated colonization. None of this takes into account their impact on the ecology of a water body. As filter feeders, they consume plankton out of the water column, thereby reducing food availability to other native mussels and fish species. This can have cascading impacts on the food web, altering water quality and disrupting the overall ecological balance of a water body. Their capacity to filter plankton out of the water can increase the depth at which light penetrates, thus increasing temperatures and promoting macrophyte growth. Additionally, they can change the cycling of toxins and in the system, not to mention the altering the fish community size and diversity due to reduced food availability. These small shellfish will attach to anything hard: rocks, pilings, boat hulls, anchor lines, buoys and even fishing gear if left in the water long enough. Their introduction into new water bodies is so alarming because of their ability to

US Geological Survey (USGS) map showing the current known distribution of both Quagga and Zebra Mussels (in red) in U.S. For an animated map showing their invasion into N. America, click on <http://nas.er.usgs.gov/queries/>

rapidly reproduce and spread expeditiously. Like other AIS, they are not native to the area and thus don't have natural predators, so their growth and expansion can proceed basically unchecked. Unfortunately zebra mussels are among the long list of AIS that include the northern snakehead, didymo (an aquatic algae), and water chestnut, to name a few AIS that threaten the waters of Deep Creek Lake. All of which are found in water bodies within a 250 mile drive of Deep Creek Lake, making their inadvertent introduction into Deep Creek Lake a scary but plausible possibility.



What are AIS and why should we be concerned?

Aquatic invasive species, or AIS, are plants or animals that are not native to a water body and when introduced, have been shown to create significant economic and/or ecological harm. Some documented effects of AIS introductions include the loss of biodiversity, altered aquatic food webs, reduced water quality, reduced public safety and health, decline in fisheries, damage to infrastructure, reduced boating, fishing, and other recreational opportunities, and a loss of tourism revenue to local communities. Mitigating these impacts can be extremely costly; in the U.S. alone, damage mitigation and control of AIS cost approximately \$8 billion per year.

Some notable AIS that have already been introduced to Maryland waters include the blue catfish, northern snakehead, rusty crayfish, zebra mussel, and the aquatic plant hydrilla. The latter, hydrilla, was most recently discovered in Deep Creek Lake (DCL) in 2013 and another AIS plant species, curly pondweed was just discovered in DCL last year in 2015.

While a species specific herbicide (Fluridone, trade name Sonar) has thus far proven to be successful and halting the spread of hydrilla in DCL, it has not come without sufficient cost. And unfortunately there are not always options for controlling other AIS species, once introduced. For example, should zebra mussels be introduced into DCL, the potential

impacts on recreation, water quality, fisheries and overall infrastructure could be far more costly. Zebra mussels have

been found as close as the Monongahela River in Morgantown, West Virginia and in the summer of 2015 were documented to have spread further south in the Chesapeake Bay, Maryland. Unlike hydrilla, once in a water body, they are far more difficult to control, not to mention preventing their introduction can be more challenging as the larval form of the animal can be remain viable in ballast water and live wells for days and the adult form can close their shells and remain alive days out of water. Once introduced, outside of draining a water body, there is little that can be done to halt their spread. Unfortunately, zebra mussels are not solitary in their threat; there is a growing list of other AIS that pose a significant ecological and economic risk if introduced into Maryland waters, and specifically Deep Creek Lake. For a detailed list of other species that threatened Maryland waters see <http://www.mdinvasivesp.org/>

How are AIS transported?

There are countless 'vectors', or means by which these AIS can be introduced into a water body. However recreational boating is one of the major pathways by which AIS are introduced and spread between waterbodies. AIS can be inadvertently carried into a new water body in bilge water, engine cooling systems, live wells, or attached/entangled to hulls, trailers, or other surfaces. For example, zebra mussels are thought to have been brought to North

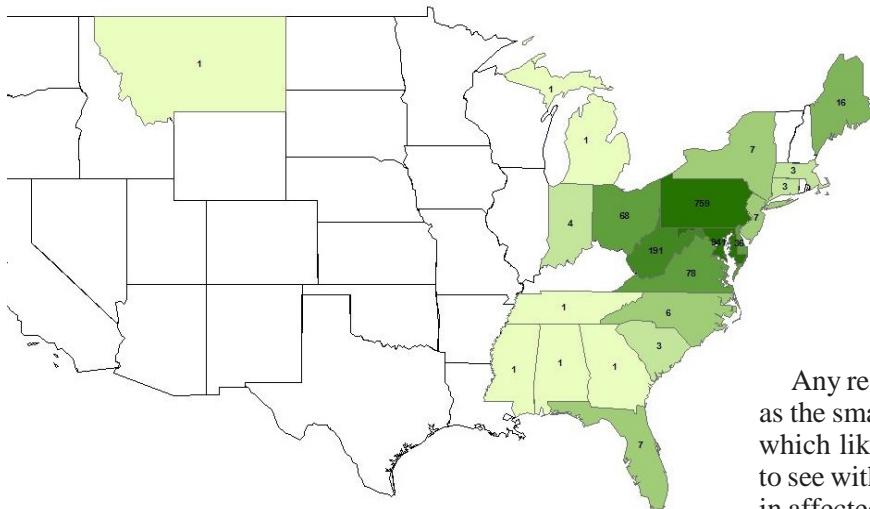


Left: Curly Pondweed found at DCL

Right: Hydrilla

Both AIS plants spread exceptionally well from fragments and reproductive structures called tubers and turions





America via ship ballast water and are most certainly spreading throughout the US largely on recreational and commercial boats. Because recreational boats and associated gear can be transported by trailers over great distances, contaminated watercraft and trailers can be a source of new AIS to a region. Recreational boating is the likely pathway responsible for the introduction of the aquatic plant hydrilla, and other invasive plants like Eurasian water milfoil and curly pondweed, both have which have been found in Deep Creek Lake. Because Deep Creek Lake receives visitors from nearby states and throughout the U.S. (see below map showing boat launch data by state for 2015), the threat of AIS is not confined to that which is present in Maryland but really more accurately AIS found in the Mid-Atlantic region and even the Mid-West.

But it's not just the motorized boats that can transport AIS, any object that has come in contact with waters where AIS are found can be sources to spread AIS. Many AIS plants can reproduce from simple plant fragments caught around a boat propeller, wrapped along an anchor line, or tangled in a life jacket or the rudder of a paddleboard. Additionally, the water itself can contain microscopic forms of AIS, such is the case with the larval form of zebra mussels, which would be tough to spot with the naked eye. Any vessel such as a kayak, canoe or paddleboard can actively transport AIS if not properly

This map shows the number of boats visiting DCL during 2015; Most boats came from Maryland (941 boats) followed by Pennsylvania (759 boats) and West Virginia (191 boats).

cleaned, drained and dried. In addition water ski gear and life jackets should also be cleaned and dried.

Any remaining water can carry microscopic organisms such as the small shrimp like AIS organism called spiny waterfleas, which like zebra mussels in their larval stage, would be hard to see with the naked eye but can devastate recreational fishing in affected waters. While prevention of new AIS introductions is the goal of Maryland DNR, a rapid and decisive response to early AIS detection is often imperative for halting the expansive spread of AIS throughout a water body and to other nearby water bodies. Such was the case when DNR biologists first found hydrilla in Deep Creek Lake in September of 2013. Shortly after hydrilla was discovered at DCL, DNR convened a panel of experts to discuss the possible options for controlling hydrilla. By the spring of 2014, a hydrilla control/eradication plan had been implemented, using a hydrilla targeted herbicide, to help limit the spread of hydrilla within DCL and to other nearby water bodies. While hydrilla has been shown to respond positively to herbicide treatment, the control of other AIS once introduced, is not always that feasible. For example, should zebra mussels be introduced into DCL, little can be done to control the spread within the lake, and even less to eradicate them from DCL. That's in part why the discovery on June 4, 2016 of zebra mussels being found on the motor and hull of a pontoon boat attempting to launch onto DCL was so concerning. Zebra mussels are a type of mollusk, specifically a bi-valve, that will attach themselves to anything hard. They reproduce via the spawning of microscopic larvae. These larvae can be found in ballast water or any standing water in a vessel. Once released into a water body, the larvae will seek out any hard substrate; this may include a dock, boat hull, motor, rocky surface or anything hard to attach to. Once the larvae find a suitable substrate, they will secure themselves to the surface using a byssal thread. Once attached, their removal is very difficult. When the mussel matures, one mussel can release up



At left, a person is shown decontaminating kayaks before launching on a lake. Below, plants attached to boat and trailer.



to 40,000 eggs in a reproductive cycle, which as adults have been documented to fowl intakes of water treatment plants and dams on the larger scale, and on a smaller scale can rapidly colonize a boat hull and motor.

What is DNR doing to protect against new AIS introductions?

After hydrilla was discovered in September 2013 at DCL, DNR implemented a broad education and outreach campaign to bring awareness to the threat of AIS introductions. Signs were posted at all boat launches in all state and county facilities to inform boaters of their responsibility to clean, drain and dry their vessels so as not to transport AIS into new waterbodies, as well as a hotline to report the finding of invasive species. DNR biologists also developed a step-by-step video that is posted online showing how to properly clean a vessel. Press releases and social media have additionally been utilized to help get the word out as well. One of the most effective tools for intercepting AIS is the Launch Steward program which was started at DCL in 2014 and has been expanded to include Rocky Gap State Park as well in 2016. The Launch Steward program demonstrates a partnership with Garrett Community College, whereby the Maryland Park Service employs stewards (college students) to man the DCL State Park boat launch 7 days a week, and Rocky Gap on weekends between Memorial Day and Labor Day.

It is already illegal to launch a vessel in Maryland waters with AIS onboard. Violators are subject to steep fines for intentionally introducing AIS, however after April 1, 2017, the law protecting against AIS introductions will be strengthened. Additionally, based on the June 4, 2016 find of zebra mussels on an incoming boat to DCL, DNR is working with Natural Resource Police (NRP) and initiating discussions with local marinas as to how best to deal with and clean an AIS contaminated boat so that it no longer poses a threat to DCL waters. In addition, a bill was introduced into the Maryland State legislature called the "State Lakes Invasive Species Law" or HB860 that will go into effect April 1, 2017. HB 860 required the state to form an AIS workgroup to evaluate possible actions to reduce the spread of aquatic invasive species in Maryland. The workgroup provided recommendations to the state to include a statewide push for AIS education at all Maryland State Parks as well as a baseline survey of all state owned lakes to assess the current state of AIS presence. The baseline survey data will be used to guide future management actions and potentially make the case for dedicated AIS state funding.



Launch Steward at DCL conducting voluntary vessel inspections prior to launching at the state ramp. If AIS are discovered, stewards will ask operator to have the boat be cleaned prior to launching. Stewards also collect data on boat type, state and zip code origin, and most recent body of water visited.

What can you do to help prevent new AIS introductions?

No AIS control strategy is 100% effective. That said, AIS education and outreach are the first line of defense in slowing the spread of AIS and preventing future introductions. Research has shown that when education and outreach is done in conjunction with boat steward programs or other monitoring programs like boat decontamination stations, results have been shown to be highly effective at preventing new AIS introductions. As concerned citizens, learning more about AIS, how they spread and how to properly clean or "decontaminate" a vessel can help you protect Maryland's waters from future introductions and educate others to do the same. For more information on how to properly clean a vessel see the Deep Creek Lake Natural Resource Management Area (DCL NRMA) website at [http://dnr2.maryland.gov/publiclands/Pages/western/deepcreeknroma.aspx](http://dnr2.maryland.gov/publiclands/Pages/western/deepcreeknрма.aspx) and click on the video entitled "Stopping the Spread of Invasive Hydrilla"

Unfortunately AIS don't adhere to state boundaries or regional limits, so efforts to protect Maryland's waters from AIS invasions need not be confined to state lines. In an effort to protect Deep Creek Lake and all of Maryland's waters against AIS introductions, DNR is striving to educate all stakeholders, citizens and visitors to our state waters about the threat of AIS and how best to limit the spread of AIS within the state and beyond. Scientists can't be certain what an introduction like zebra mussels into Deep Creek Lake would mean for the



Left: zebra mussel byssal thread, center: outboard motor fouled by zebra mussels, right: shopping cart pulled from zebra mussel infested waters.

economy and ecology of the lake. However, what is certain is the we should err on the side of caution and do our best to protect Deep Creek Lake and the rest of Maryland's waters from future AIS introductions. To learn more about AIS found in Maryland and regionally, please see the additional resources found online at:

Maryland DNR Invasive Species website at <http://dnr2.maryland.gov/Invasives>

MD Invasive Species of Concern website at <http://www.mdinvasivesp.org/>

National Invasive Species website at <https://www.invasivespeciesinfo.gov/index.shtml>

USGS NonIndigenous Aquatic Species website at <http://nas.er.usgs.gov/>

For additional questions or concerns, please call 301-387-4112 or email Julie Bortz at Julie.bortz@maryland.gov



A video created specifically for DCL residents how to properly clean, drain and dry their boats. Watch it on youtube at or watch it on youtube at <https://www.youtube.com/watch?v=vqQ7P4M6Hoc>

Further References:

Benson, A.J. , D. Raikow, J. Larson, A. Fusaro and A.K. Bogdanoff. "Dreissena polymorpha." USGS Nonindigenous Aquatic Species Database, Gainsville, FL. 2016.

This is a photo showing an AIS disposal station along with signage on how best to clean, drain and dry your boat.

