

Alien Invas

Part 1: Virginia's War on Invasive Plants and Animals

by David Hart

They sound like a cast of characters in a B-list horror movie. But Asian tiger mosquitoes, woolly adelgids, phragmites, alligator weed, snakeheads and dozens of other characters aren't fictional monsters. They are non-native alien species that pose an immediate and serious threat to Virginia's scenic landscape and rich ecological diversity. The danger is far more frightening than anything Hollywood could imagine. They are attacking us from the air, from land and from our rivers, lakes and tidal waters, and these alien invaders are wreaking havoc across our state.

None have created so much hype and hysteria as the northern snakehead. The name alone evokes dreadful visions of ghoulish creatures with horrific fangs and slimy skin. The sudden notoriety of northern snakeheads actually spawned a made-for-television movie where swarms of giant man-eating fish slither across lawns and into living rooms and devour able-bodied teenagers. Snakeheads don't eat people, of course, but they do have an impressive set of teeth and a healthy appetite for other fish. That's exactly why Virginia Department of Game and Inland Fisheries (VDGIF) biologist John Odenkirk and other fisheries experts are concerned about the discovery of these fish in the tidal Potomac River, one of the most important



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Below left to right: hydrilla, phragmites, kudzu, Japanese honeysuckle, zebra mussels and snakehead fish.

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and diverse ecosystems in the country. The Potomac is home to a thriving population of largemouth bass and other popular game fish, and snakeheads may have a significant and permanent impact on the fishery.

"We just don't know what the effect will be," says Odenkirk, who, by default, has become the state's snakehead expert. "They may take over as the river's top predator or they may become just another part of the ecosystem."

What is known is that non-native invasive species are having a huge economic impact throughout the United States. The annual estimated cost of alien plants, animals and insects is around \$137 billion, a figure that includes everything from eradication and control costs and crop and timber losses to health-related costs. The impact in Virginia is estimated at around \$1 billion, a price tag that will likely increase as more invasives make their way into our state. The issue is so critical, VDGIF lists invasive species as a crucial statewide conservation issue and is part of a statewide, nine-agency council that includes the Departments of Forestry, Conservation and Recreation, Transportation and Health, among others. Invasive



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Searching the waters of the Potomac, just downriver from Washington D.C., VDGIF fisheries biologist and northern snakehead fish specialist, John Odenkirk, tracks and monitors the spread of this non-native invasive species. Upper right: Multi-flora rose.





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Northern Snakehead

by John Odenkirk

The expansion of the northern snakehead population has been monitored by VDGIF biologists since 2004. Boat electrofishing catch rate increased significantly from 0.2 fish/hr in 2004 to 6.1 fish/hr in 2006; while reported angler catches during 2006 (24) equaled the combined total of the two previous years. Maximum size increased each year suggesting the population was maturing. The largest snakehead seen yet weighed 12 pounds and was 31" long—this female was captured during an electrofishing survey in May, 2006.

The first nest was located in early September, 2006, and data suggested snakeheads had a protracted and/or repeat spawning season that lasted from April to September! Females had an average of 40,786 eggs. Collection patterns suggested snakeheads originated from Dogue Creek and traveled along the Virginia shoreline to colonize creeks to the north (Little Hunting) and south (Pohick and Occoquan). Although some fish crossed the Potomac River and were found along the Maryland shore, they seemed reluctant to enter water that was deep or swift. The radio telemetry study suggested that most snakeheads moved little, apparently content to stay in the abundant, shallow, and heavily-vegetated habitats of Dogue Creek.

Seventeen food items, including 15 fish species, were identified from snakehead stomach contents, and banded killifish was the most common food item. Bluegill, pumpkinseed and white perch were also consumed. The non-fish food items were crayfish and frogs.

Although population size increased, known range did not appear to increase or increased at a slower rate. However, increases in angler catch during 2006 at the northern and southern terminus of the existing distribution suggested range expansion was probably imminent. Look for snakeheads to begin appearing south of the Occoquan River in 2007.

Remember—anglers can keep any northern snakeheads caught provided they kill the fish and notify VDGIF (1-800-770-4951).

species affect everyone, whether they know it or not.

If snakeheads have assumed the starring role in the epic struggle against alien plants and wildlife, that notoriety has helped push the wider issue of non-native invasive species to the front page of major newspapers and magazines everywhere. That's a good thing, says Odenkirk. Since he assumed the role as Virginia's leading snakehead expert, he's fielded dozens of calls from reporters from all over the country and he's had the opportunity to spread the word about the implications of invasive species. Of course, it's the only positive chapter in a story that may have an unhappy ending.

A lingering question that will probably never be answered is: How did a fish from eastern Asia end up in



the Potomac River? Northern snakeheads are prized table fare in Asian households. They sell for top dollar in fish markets in large cities throughout the country, at least until their importation and sale was banned by the U.S. Fish and Wildlife Service in 2002. In many cases, the fish were kept alive in markets until they were purchased. How they

ended up in the Potomac is still a mystery, says Odenkirk, but the possibilities are limited to a few: Either they were released by an aquarium hobbyist, a restaurant or food distributor with a surplus or they were dropped into the river by an angler hoping to add another dimension to the Potomac's fishery.

"We'll never know," says Odenkirk. "We do know that there is a breeding population of northern snakeheads in the tidal Potomac. Of the 20 that were caught in 2004, one was a young-of-the-year juvenile and seven were females carrying eggs."

Snakeheads may be the latest enemy in the struggle to protect Virginia's native species from the constant assault of exotic plants and animals, but they are far from the first. Some invasive species have been a

Brooklyn, New York in 1851; they quickly spread to all 50 states and now number in the range of 150 million. Starlings were brought to America from Europe in the late 1800s and like house sparrows, are found throughout North America. Ironically, the same man who introduced house sparrows, Eugene Scheiffelin, was responsible for bringing starlings to America. Both birds displace native species and cost millions in maintenance and control efforts.

Japanese honeysuckle, with its easily identifiable creamy white flowers, fragrant aroma and honey-sweet nectar, was imported from east Asia in 1862 as an ornamental vine. It's found virtually everywhere in the east and southeast now, and like so many other non-native invasive plants, few people realize honey-

suckle doesn't belong here. It's adept at strangling native trees with its climbing vines and swallowing valuable edge habitat.

We may have become accustomed to the presence of countless invasive plants and animals, but their impact on our native flora and fauna has been enormous. Thirty-two plants in Virginia have been identified as highly invasive, a label that identifies them as the most ecologically and economically significant; 48 are listed as moderately invasive and two-dozen are occasionally invasive.

More noticeable but no less significant is the rapid spread of such plants as kudzu, phragmites, tree-of-heaven and multi-flora rose. Phragmites, also known as common reed, is rapidly taking over tidal marshland throughout the state. The tall, slender plant grows in dense colonies, choking out native vegetation and creating a homogenous landscape with little value to wildlife. It's been in the United States for a century or more, but the amount of marsh covered by phragmites has increased dramatically in the past few decades for reasons that botanists still aren't sure. Rick Myers, stewardship program manager for the Virginia Department of Conservation and Recreation's natural heritage program, says there seems to be a sort of exponential factor at work. The more that grows, the faster it spreads simply because more seeds and rhizomes—root sections—are released into the environment. Biologists do know that where phragmites thrives, most wild animals and birds don't. Waterfowl numbers decrease dramatically after the native plants are replaced; so do the number and variety of songbirds. It has virtually no value to any wild bird or animal.

Myers says his agency spends about \$50,000 per year on phragmites control and Joe McCauley, manager of the Rappahannock River Valley National Wildlife Refuge, says he has spent at least \$80,000 on phragmites eradication projects on and off the refuge since 2003. That figure doesn't include the cost of labor by refuge employees.



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part of Virginia's landscape for so long they have become ingrained in our culture. We don't even know they don't belong here. English house sparrows, those ubiquitous little birds that hop around urban parking lots picking up scraps of discarded fast food were introduced into the United States over 150 years ago. One hundred sparrows were released in

Left: Phragmites is fast growing and is taking over much of the native vegetation along Virginia's tidal marshes. Above: To date Virginia's only infestation of zebra mussels was found in a 12-acre, 93-foot-deep abandoned quarry outside Warrenton. After extensive eradication efforts by VDGIF, this location is believed to be the first successful eradication of zebra mussels from a large, open body of water in North America, and perhaps the world.

“We work with private landowners because if we don’t control it beyond the refuge, it will continue to be a problem on the refuge,” he says. “By taking a proactive approach, we are able to keep it from overtaking the habitat.”

So far, phragmites covers only about 25 acres, a mere fraction of the refuge’s 7,400 acres. However, Myers says there are at least 2,000 acres on Virginia’s seaside coastal marshes, a number kept in check only through aggressive aerial herbicide application.

So how did we get ourselves into such a deep mess? In some cases, non-native species were unwilling hitchhikers on a long-distance journey from some faraway country. The rapid passage of goods by ship, airplane and possibly, in suitcases and pockets, from faraway lands has been kind to these exotics. Zebra mussels were transported in the ballast of ships from the Caspian Sea. They were first discovered in Michigan’s Lake St. Claire in 1988 and quickly spread throughout the Great Lakes. How they ended up in a 12-acre quarry in Prince William County is anyone’s guess. The pond’s clear water is popular with SCUBA divers, so they might have hitched a ride on some dive equipment. Or, says Brian Watson, wildlife diversity biologist for the VDGIF, the microscopic larvae may have been carried by an unsuspecting duck. Just as with the introduction of snakeheads, no one knows how zebra mussels arrived in Virginia and no one will likely ever know. Watson, however, does know that so far, zebra mussels haven’t found their way into any other waters in the state.

“The concern with zebra mussels is that they spread rapidly and cause all kinds of problems. There was an entire town near Detroit that had its water supply shut down because zebra mussels clogged the intake pipes. They cost millions of dollars in repair and maintenance,” he says.

They also have a profound effect on entire ecosystems, adds Watson. Zebra mussels are highly efficient at filtering water, removing vital nutrients that native and naturalized fish



The mute swan, a native of Eurasia, is an exotic species which was introduced into North America 60-70 years ago.



Honeysuckle is extremely invasive and can easily spread, taking over native plant species. Below right: Hemlock seedling.

and other aquatic organisms need to survive. They also grow on native mollusks and smother them. A handful of diving ducks eat zebra mussels, but they offer no real benefit to Virginia’s waterways and wildlife. They cause far more harm than good.

Other invasives ended up here much the same way: as unknowing hitchhikers attached to a product from a foreign shore. Asian tiger mosquitoes rode in used tires from Japan. Hemlock woolly adelgid, a tiny beetle that injects a poison into hemlock twigs as it sucks out the sap, probably arrived with ornamental plants brought over from Asia to the west coast in the early 1900s. They are

rapidly spreading throughout eastern hemlock forests, killing vast stands of what is possibly the most important tree in Appalachian forests. Already, an estimated 85 percent of the Shenandoah National Park’s hemlocks have been affected by woolly adelgids. Hemlocks create vital shade for native trout streams and control stream bank erosion. Without them, many of our wild trout streams might become too warm to support brook trout.

Ironically, experts for years praised the benefits of some plants and animals that are now labeled as invasive. Autumn olive was recommended by biologists as an excellent forage plant for birds and animals and numerous state fish and wildlife agencies, even federal agencies, planted it on public property for the benefit of wildlife. A variety of birds eat the berries and deer relish the tender leaves and shoots. But autumn olive out-competes native vegetation, a characteristic that defines countless other invasive plants and animals. Even kudzu, brought to the United States from Japan in 1876, was promoted as a livestock forage crop and as an excellent way to control erosion. Drive through Virginia's countryside in the summer and you'll see why it was eventually removed from the U.S. Department of Agriculture's list of permissible plants. You'll also notice why it's been dubbed "the plant that ate the south." It climbs trees, swallows houses and smothers everything in its path. Invasives have a unique ability to overtake existing, native plant growth and that's exactly why they are held in such low regard and so much money is spent on efforts to control them.

If the war on invasive plants and animals seems like a war that's destined for failure, experts agree that it's a fight that must be fought. Despite the rampant spread of such plants as kudzu and honeysuckle,

other invaders can be stopped or at least controlled. Gypsy moths devastated large stands of eastern hardwood forests until aggressive measures were taken to control their numbers. They are still around, but the damage they cause annually has been reduced dramatically.

One of the most significant threats that hasn't reached Virginia's borders is sudden oak death, a fungus that kills oak trees. Virginia's landscape would be drastically altered if it reaches our forests. That's why it must be stopped.

Researchers are working diligently to find a natural control for woolly adelgids and numerous state and federal agencies are working to control phragmites and mute swans. Those graceful white birds may add a fancy dressing to a neighborhood pond or tidal creek, but they are aggressive, destructive and a bane to native plants and animals. Mute swans devour critical aquatic grasses, including the roots, and they willingly trample eggs of threatened black skimmers and terns. They may also be responsible for the decline in the number of tundra swans, a native species, wintering in the Chesapeake Bay. Gary Costanzo, waterfowl project leader for the VDGIF, says the bird was recently placed on the nuisance species list, allowing wildlife managers the ability to take critical actions before swan numbers explode. We already have as many as 800 in Virginia.

How You Can Help

We are all soldiers in the war on invasive species and we each have an obligation to do as much as we can to prevent the introduction and spread of unwanted plants and animals. State and federal agencies can provide help, but in most cases they can't offer hands-on assistance for eradication efforts. That's up to each one of us.

"Our job is to provide information about invasive species and the best ways to control the ones that are established," says Department of Conservation and Recreation's Rick Myers. "We work on lands owned by the DCR, but we just don't have the resources to treat private property, as well."

First, learn to identify the most dangerous and destructive invasives. There's not much anyone can do about English house sparrows or Japanese honeysuckle, but we can all help prevent the spread of zebra mussels and hydrilla by taking a few minutes to examine boat hulls and trailers for unwanted passengers as we leave the water. We can also take aggressive action when we discover tree-of-heaven or Chinese privet growing in our backyards by killing the plants before they spread.

Above all, don't bring invasive plants or animals into Virginia, even if your intentions are good. We learned long ago that no matter how beautiful or how harmless a plant, a fish or a tiny insect might seem; it could turn out to be the next starring creature in a real-life horror story. □

David Hart is a freelance writer from Farmville. He is a regular contributor to Bassmaster, American Angler, Bass Pro Shops Outdoor World and many other national and regional publications. He is the author of Fly Fisher's Guide to Virginia, Including West Virginia's Top Waters (www.wildadv.com).

More Information

For a full list of invasive species, visit www.invasivespeciesinfo.gov, a Web site that has photos and information on dozens of plants, insects and animals.



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