



Susan L. Shafer

# Intruders!

## New York's battle to stop the spread of invasive species

By Leslie Surprenant

**I**t was late afternoon last May when the phone in DEC's fisheries office in New Paltz began to ring again. It had already been a busy day full of calls from anglers looking for good spots to fish, but this call was different. The caller, a pond owner from Orange County, said he'd caught two strange fish in his pond and was worried they might be snakehead fish—the recent invader from Asia that has found its way into some of our waters and is known for its ferocity and ability to decimate native fish populations. The owner wanted DEC to check the pond to make sure the local fish would be okay.

the pond really did contain snakeheads, there was work to be done.

Gearing up, DEC biologists quickly prepared to go afield. If they could catch the intruders before they could get established, damage to the local ecosystem could be kept to a minimum. A short time later, it was confirmed—the fish were indeed the predatory northern snakehead fish. To determine the extent of the invasion, DEC surveyed the landowner's entire pond and connecting waters, catching three live snakeheads that ranged in size from finger length to two feet. This was not a good sign.

The presence of young fish confirmed the fish were not only present, but reproducing. And because of the pond's location, biologists realized there was a high risk the fish would quickly move downstream into the Wallkill River, giving them access to the Hudson River and the potential to move through the canal system and into the Great Lakes within a few years.

After looking at a number of possible solutions, DEC determined the best chance of successfully eliminating this aggressive invasive was to treat the pond with rotenone, a piscicide (fish

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It was a call that grabs any biologist's attention, and one that's becoming more common. Another problem invader spotted; another battle about to begin. If

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Amy Benson, USGS



Karin Verschoor



James Clayton



James Clayton



E. Richard Hoebeke



James Clayton



**Top:** zebra mussel, garlic mustard, Japanese knotweed **Bottom:** Chinese mitten crab, Asian longhorned beetle, emerald ash borer

killer) derived from Amazonian plants. A number of concerned local volunteers helped DEC conduct the treatment which yielded a surprisingly large number of snakeheads. In fact, the pond and connecting waters held more than 220 snakeheads, most young-of-the-year, but also 13 adults that ranged in size up to 31 inches and more than 11 pounds. The immediate threat was stopped, but everyone wondered how the fish arrived in this Orange County pond.

A popular Asian food, snakehead fish were commonly available in the live fish market, and sold as aquarium fish until they were prohibited from interstate transport in 2002 as “injurious wildlife” under the federal Lacey Act. In New York, State Environmental Conservation Law prohibits possession of live snakehead fish and their viable eggs. Perhaps someone wanted to establish a fishery here, or simply released an aquarium pet that had grown too large, or become too aggressive. Regardless, it’s clear that these fish were intentionally released into the pond; just one example of the many harmful invasive species that humans introduce into the environment each year. Unfortunately, very few people realize that these introductions can spell disaster to the local ecosystem.

Introducing new species is not a new concept. In fact, it has been going on for a long time. Native American tribes widely



Asian longhorned beetle

James Clayton

traded and cultivated non-native species such as corn, beans and squash. Farmers, anglers, hunters, gardeners, collectors, aquarium owners and animal lovers alike have all brought in new species they felt would provide some benefit or pleasure. In some instances, scientists introduced non-native species to either occupy an

way here by accident, carried in packing or ballast water from a foreign destination. It’s possible that one or more new species arrived 400 years ago, aboard the Halfmoon as Henry Hudson plied the river that would be named for him.

Over time, thousands of non-native plants and animals have arrived and taken

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unused habitat or to control another species considered a pest. Intentions were good. No one realized the actions might be harmful.

Not all non-native species were introduced on purpose. Some found their

hold in New York. Most are harmless. Some, like honey bees, are beneficial. Others, like the snakehead, are harmful. Only 10 - 15% of non-native species are harmful invasives—threatening our environment, agriculture or health.

It’s important to make the distinction between non-native species and invasives. While all invasives are non-natives, not all non-native species are invasives. Officially, invasives are defined as non-native species that cause significant harm to humans or the environment. Simply put, invasive species are biological pollution.

What many people don’t realize is that their actions can contribute to the problem. Simple activities such as hiking, camping, boating, fishing, gardening and landscaping can spread invasive species. For example, unsuspecting campers

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Emerald ash borer

David Capparaert, Michigan State (Bugwood.org)

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transporting firewood are believed to have spread the emerald ash borer (EAB) from its original infestation sites into the forests of Michigan’s famed Upper Peninsula. A small, metallic-green beetle native to Asia, the emerald ash borer probably arrived in the U.S. in wooden packing materials brought into the port cities of Chicago, Toronto and Detroit. Since its arrival, the beetle has killed millions of trees in Michigan and Ohio, and is working its way eastward, rapidly approaching New York.

The Asian longhorned beetle is another insect believed to have arrived here in wooden packing crates. Upon reaching New York City from China, this beetle quickly infested several species of local hardwoods, killing thousands of trees. Like EAB, the Asian longhorned is not a strong flier, but can inadvertently be spread via transportation of infested firewood.

Another contributor to the introduction and spread of invasives is the well-meaning person who releases the unwanted pet (i.e., frogs, turtles, fish, or something more exotic like a big cat) into the local pond or woods. While this may seem harmless, the released animal

can upset the delicate biological balance by preying on local species and competing with them for food and shelter. In some cases, like snakehead fish, they can reproduce, quickly taking over an area to the detriment of local species. Such was the case in a number of Adirondack ponds where unknowing anglers released their unused baitfish into the pond they were fishing. The baitfish quickly reproduced, out-competing and decimating prized native brook trout populations.

The difficulty with invasives is that they typically arrive here without their native predators and diseases that normally keep their numbers under control in their countries of origin. This automatically gives them an advantage over native species that have these controls in place. Left unchecked, the introduced species are able to flourish, generally at the expense of our native species.

The introduction of non-native pathogens is another type of biological pollution facing New York. Since our native species often lack resistance to these new invasive pathogens, the results can be disastrous. For instance, West Nile virus, which likely arrived



Zebra mussels

DEC photo

through global travel, has sickened and killed humans and birds. Likewise, viral hemorrhagic septicemia, which probably arrived in ballast water and spread by the live bait trade, has killed tens of thousands of fish in New York and other Great Lakes states.

Ship ballast water is considered the likely vector for a number of other invasive introductions, including zebra and quagga mussels which clogged intake pipes and removed microscopic plankton, the base of the aquatic food web. Zebra and quagga mussels spread quickly, likely carried in boats, bait buckets and live wells. Since first introduced into the Great Lakes, these mussels have spread into the Hudson River and several inland waters.

The Chinese mitten crab is another troublesome invasive, thought to have arrived here via ballast water, or possibly through the international live food trade. Mitten crabs are catadromous, reproducing in the ocean, with their young moving into freshwater tributaries where they remain upstream until adulthood. They burrow into stream banks, causing bank instability and collapse, resulting in lost habitat for native species. Mitten crabs compete with native crabs and other aquatic animals for food, and are able to move tremendous distances along stream bottoms. The first mitten



Chinese mitten crab

James Clayton

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crab reported in New York was an adult caught in a crab pot in the lower Hudson River in June 2007. By autumn 2008, they had spread into many tributaries and were being trapped in crab pots in Catskill, nearly 100 miles upstream. In California, mitten crabs severely harmed commercial and recreational fishing by tearing nets, pinching netted fish and taking anglers' bait. Additionally, these crabs may carry Asian lung fluke, a human parasite.

Our desire to create or duplicate showy exotic gardens and landscapes, or to use and grow new herbs and spices is responsible for introducing a number of non-native plant species to the state. Nurseries and garden centers make it easier by selling these new plants. While many of these introductions have had minimal negative impact, a number of invasive plants have escaped gardens and



landscapes. Garlic mustard, introduced for culinary uses, can rapidly invade hardwood forest understory. Japanese

knotweed, introduced for beauty and ease of cultivation, can spread thickly along stream banks, but offers no erosion control. Giant hogweed was introduced as an ornamental garden plant. An aggressive competitor, its large size and rapid growth enables it to quickly out-compete native plant species. Contact with its sap can result in severe blistering, permanent scarring—even blindness—upon exposure to sunlight (see August 2003 *Conservationist*).

Didymo, or rock snot, is a recent invader of New York's waters. It is an unsightly algae, forming dense wavy mats that may harm fisheries habitat in flowing coldwater streams. Because didymo cells are microscopic, it can spread by a single drop of water, easily hitching a ride on felt-soled waders.

Once an invasive species has arrived, successful eradication depends on early detection. As was the case with the snakeheads in the Orange County pond, early detection and quick action may have prevented its spread. Once a species spreads, eradication or control through conventional techniques is difficult. Occasionally a pest or predator of the invasive species is discovered. Often, these "biological control" species are also non-native species



Didymo, or rock snot

## Don't aid the invasion

- **Learn and teach others about invasive species.** Check DEC's website ([www.dec.ny.gov/animals/265.html](http://www.dec.ny.gov/animals/265.html)). New York's Invasive Species Clearinghouse <http://nysis.info/> is a new online library of invasive species information.
- **Always use native or non-invasive plants for gardens, landscapes and ponds.**
- **Check, clean/disinfect and dry boats, live wells, waders, life jackets and fishing equipment.** Quaternary ammonium compounds found in many household disinfectants are effective in controlling many aquatic invasive species, fish viruses and pathogens.
- **Do not move bait or other fish from one water to another,** and don't release unused baitfish and worms. Instead, dispose of them in closed containers.
- **Purchase baitfish from retailers selling certified disease-free fish.** (Refer to DEC's baitfish regulations at [www.dec.ny.gov/outdoor/47282.html](http://www.dec.ny.gov/outdoor/47282.html)).
- **Report plants, animals and insects you recognize as new or out-of-the-ordinary.** You may contact your regional DEC office, the Office of Invasive Species or a Partnership for Regional Invasive Species Management (PRISM).
- **Don't move firewood.** New restrictions to protect our forests from insects and disease prohibit moving firewood more than 50 miles from where it is grown and prohibits importation of untreated firewood from out of state ([www.dec.ny.gov/regs/4079.html#44382](http://www.dec.ny.gov/regs/4079.html#44382)).
- **Don't release any animal, plant or seed into the wild** including reptiles, aquarium plants & fish, and mammals. For more information, go to [www.habitattitude.net](http://www.habitattitude.net).
- **Don't stock ponds with exotic fish, frogs, crayfish, snails or other organisms.** Any fish stocking requires a stocking permit; contact the DEC regional office in which your water is located ([www.dec.ny.gov/about/50230.html](http://www.dec.ny.gov/about/50230.html)).
- **Join a PRISM ([www.dec.ny.gov/animals/47433.html](http://www.dec.ny.gov/animals/47433.html)).** These partnerships are involved with invasive species management, education, early detection and rapid response and are a great way for citizens to get involved.

and so researchers must proceed carefully, demonstrating that the control will not harm similar native species. This uses precious time and is costly.

With new invasive species discovered each year, effectively monitoring and controlling them are difficult tasks. Further complicating and challenging this is climate change. Milder winters, changing precipitation patterns and warmer summers stress our native fauna and flora while favoring many invasive species, diseases and pests. Several New York State agencies are engaged in coordinated state, regional and federal invasive species management and prevention efforts. To aid in early detection, New York has partnered with the New York Natural Heritage Program to develop a reliable, accurate online invasive species database ([iMapInvasives.org](http://iMapInvasives.org)). Available to the public, this will greatly assist tracking and responding to any invasions. With New York's diverse landscapes and wide variety of ecosystems, tackling the issue of invasives is best approached through a coordinated regional effort. Eight Partnerships for Regional Invasive Species Management (PRISM) are being formed across the state to provide volunteers with training in invasive species monitoring, eradication, control, education and outreach. For example, Adirondack Invasive Plant Partnership is a ten-year-old, award-winning PRISM serving the Adirondack region (<http://www.adkinvasives.com>).

Successfully controlling invasives will ultimately require everyone's help. Like the gentleman who called to alert DEC to the presence of snakeheads in his pond, we all need to be responsible in our individual choices and actions. We can start by recognizing how our everyday activities may contribute to the invasion, and then act to prevent or slow the spread. While we will not stop all invasions of harmful non-native species, we can work together to help ensure future generations of New Yorkers will enjoy our forest landscapes, healthy ecosystems and productive agricultural lands.

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