



Bioinvasions: Aliens are invading Chesapeake habitats daily, with little or no resistance, or even notice, on our part

By Karl Blankenship

The nation's land and water are being threatened by alien invaders, and the federal government is ready to map out a plan to fight back.

The "invaders" are nonnative species, which have permanently scarred ecosystems throughout the nation, from the diseases that have ravaged the Bay's oyster populations to insects and fungus that have obliterated major forest species.

Warning that such exotic species threaten ecological, economic and human health, President Clinton in February signed an executive order which, for the first time, requires federal agencies to work together to stem the tide of problem nonnative species.

"This is a unified, all-out battle against unwanted plant and animal visitors that threaten to wreak major economic and environmental havoc," declared U.S. Agriculture Secretary Dan Glickman, who will co-chair a new federal Invasive Species Council.

Though overlooked by many, threats from what some call "biological pollution" pose a major threat to ecosystems. In the Chesapeake region, exotic species have devastated the most ecologically and economically important species in both the water and in the forests.

The microbe MSX has nearly obliterated an oyster population that was once capable of filtering the entire Bay in a matter of days.

In the watershed's forests, a foreign fungus wiped out chestnut trees, which were one of the most important species for both wildlife and timber production.

Nonnative plants, such as purple loosestrife, and foreign animals, such as nutria, probably pose as great a threat to the region's wetlands today as the developer's bulldozer.

Exotic species have entered the continent's land and water since Europeans first arrived, bringing with them the Norway rat, the house mouse and the cats that eat them. Some were intentionally brought to the New World, such as the gypsy moth, which it was thought would create a new silk industry, and many types of garden plants.

Other introductions have been accidental. Large freighters routinely draw in tens of thousands of gallons of water as ballast before going to sea, then release the water — and anything else sucked into the ships — when they reach their destination.

What is new is the rate of nonnative invasions. Expanded world trade gives species more opportunities to hitch rides around the globe. And faster travel times increase the odds that species — whether packed in a crate or swimming in ballast water — will survive the trip.

Once here, many introduced species still won't be able to live in their new climate. But those that do often find a new habitat without the natural predators of their homeland, and can reproduce wildly, sometimes crowding out native species. Next to habitat loss, exotic species are the biggest reason for native species becoming endangered.

Not all exotics are necessarily bad news. An estimated 98 percent of the nation's food supply comes from introduced species such as wheat, rice, domestic cattle and poultry.

But the wrong species at the wrong place can be devastating. Gypsy moths, elm disease, fire ants, zebra mussels and a host of other damaging organisms cost the nation \$123 billion a year according to a recent study by David Pimentel, an ecologist at Cornell University.

To combat this, the Feb. 3 Executive Order called on federal agencies to act to prevent the introduction of invasive species, control the spread of those that are here, and to restore native species. It calls for spending \$29 million next year on exotic species research and management.

It created a federal Invasive Species Council, co-chaired by the secretaries of the Interior, Agriculture and Commerce, and including representatives from the EPA, and the departments of State, Treasury, Defense and Transportation. The council is to complete a plan within 18 months outlining specific actions and goals that agencies can pursue to deal with exotics.

"It's overdue," said Roger Mann, a scientist at the Virginia Institute of Marine Science who has been studying the potential impact of a foreign shellfish-eating species, the rapa whelk, which was recently discovered in the Bay. "It is certainly a step in the right direction. But the enormity of the problem that you have here on a continuing basis will not be solved by \$29 million. Still, we have gone from nothing to \$29 million."

Though it heightens awareness of the issue, the Executive Order doesn't mean any new action will soon be taken to address threats like ballast water.

"It merely sends a signal to the executive branch agencies to put this issue on their radar screen," said Ann Swanson, executive director of the Chesapeake Bay Commission, which represents the legislatures of the three states and which released a report in 1995 warning of the threat of invasions via ballast water to the Bay.

"Otherwise," Swanson said, "it does not appear to trigger any more protection against ballast water than existed prior to the Executive Order, which tells me that if the Bay region wants to protect themselves against ballast water, then the onus is on them to do something about it. I think it is a very real issue, it's a very serious issue, and I think that we in the Bay Program need to spend some more time thinking about it."

Nationwide, 40,000 gallons of foreign ballast water are dumped into U.S. harbors every minute, and the ports of Norfolk and Baltimore are among the largest recipients of ballast water in the nation.

In the Chesapeake, Greg Ruiz, a scientist with the Smithsonian Environmental Research Center, has identified about 150 species in the Bay that originated someplace else.

That number, he noted, comes from looking primarily at clams, worms and larger species. In a truly comprehensive survey that looked for microscopic organisms — everything from algae, to bacteria, to viruses — the number would likely jump dramatically, he said. "We're just looking at the tip of the iceberg, really, and don't have a very good sense of what is out there," Ruiz said.

As is the case with MSX, microscopic organisms pose as much of, or an even greater threat, than more visible species. The pathogen that causes cholera has been found in the ballast-holding tanks of many vessels, and is thought to have led to the infection of oysters and other seafood in Alabama's Mobile Bay. Outbreaks of toxic algae blooms in Australia have been linked to the introduction of nonnative species through ballast water releases.

Ruiz called the executive order a "positive step" but said the effectiveness of the effort hinges on the plan that is developed — and whether there is money to implement it. A good result, he said, would be a process that lists potential ways foreign species enter the country, ranks them based on their threat, and develops both short and long-range strategies for reducing those threats.

More research on exotics is needed, Ruiz said, but that shouldn't "bog down" action on the issue. "That might take decades," he said. "I think you make the best decision with what information you have, and try to improve the quality of information over time. I wouldn't go down the road of saying that we must

have perfect information before we can do a risk analysis and implement any action."

Meanwhile, species continue to arrive. Last year, the rapa whelk was found in Virginia, raising concerns for the Bay's already beleaguered oyster population, as well as for hard clams and other species.

Looming on the edge of the watershed is the zebra mussel, which was imported into the Great Lakes via ballast water in the 1980s from the Black Sea or Caspian Sea, and has since spread throughout the Great Lakes, Mississippi and Hudson watersheds — and recently turned up in California.

In the Great Lakes, it has no natural predators and rapidly multiplied, crowding out native mussel species and filtering so much algae from the water that it is suspected of altering the lakes' food web. After years of nutrient control efforts, some scientists have suggested the lakes now need more nutrients to feed the fish; others say that will only grow more zebra mussels. The rapidly reproducing mussels clog water intake pipes at industries and utilities, forcing them to invest in devices to keep the lines clear. By 2002, the zebra mussel alone is expected to have caused \$5 billion in damage.

Despite such threats, exotic species get far less attention than other forms of pollution. During a recent speech at a conference on marine bioinvasions at the Massachusetts Institute of Technology, Interior Secretary Bruce Babbitt noted that while public attention was riveted by the dramatic spill from the Exxon Valdez in Alaska's Prince William Sound, the "biological spills" taking place in the same location "go virtually unnoticed."

Last year, Babbitt noted, monitoring programs found four new species of zooplankton, apparently imported through ballast water from Asian ports, which have the potential to alter the food web and "change the Sound more extensively and permanently than any oil spill. And no one has a clue — or a dime — to contribute toward a massive 'cleanup.' Were that even possible."

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