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Using the “Toolbox” to Fight Invasive Species

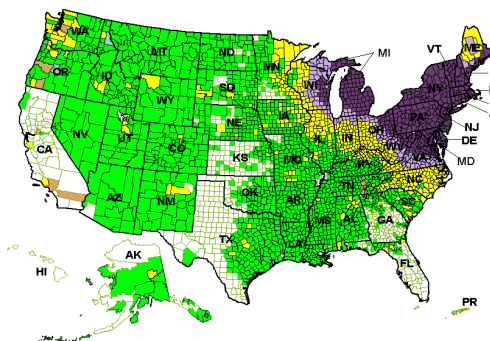
By Lisa A. DeBruyckere

Oregon’s battle with invasive species is serious because of the potential environmental, economic and social consequences of these invaders. Agencies and organizations responsible for keeping invasive species out of Oregon and managing those that enter the state have many tools that can be used—alone, and in combination with one another—to fight invasive species. These tools range from use of biological controls to chemicals, to mechanically removing species by hand. But each time the toolbox is opened to explore potential ways to eradicate an invader, the human dimensions aspect of managing invasive species—the public response to the tool—has to be considered.

A case in point is the gypsy moth. Gypsy moths have the potential to be one of the Pacific Northwest’s most devastating pests, causing extensive defoliation of trees and shrubs when they reach high population densities. Gypsy moths were originally introduced into the eastern United States in 1869 as part of research for the silk-producing industry. They subsequently escaped, and widespread eradication efforts were made beginning as early as 1890. Millions of acres in the eastern United States have been defoliated by gypsy moths.



Gypsy Moth. Photo courtesy of [www.michigannature.org](http://www.michigannature.org)



Established by Consensus	Being Eradicated	Found
Established by Survey	Eradicated	Not Found

Reported status of gypsy moth (European), *Lymantria dispar*.  
Center for Environmental and Regulatory Information Systems.

There are several options to treat and monitor gypsy moth infestations, including:

- *Bacillus thuringiensis* var. *kurstaki* (*Btk*)—a bacteria found in the soil in our backyards.

- Diflubenzuron (Dimilin), an insect growth regulator that has a broader non-target host range than *Btk*. But it can kill many other insects besides moth and butterfly caterpillars, and its use may adversely affect other insect populations, including beneficial ones.

- Gypsy moth virus (Gypchek), a host-specific tool that is not widely available in the market, is still somewhat experimental for eradication programs, and has had mixed reviews in terms of effectiveness.

- Mating disruption, an experimental

method, with variable effects on gypsy moth infestations. This tool has been used more frequently in recent years in slow-the-spread programs in eastern states, but has not been used for eradication in western states.

- Sterile insect releases, an experimental tool with variable effects on gypsy moth suppression. The Oregon Department of Agriculture used this tool in 1992, but failed to eradicate gypsy moths in Portland, and subsequently had to use *Btk* in 1993 to eradicate this population.

- Mass trapping, an eradication tool, but with unreliable results. This method, however, is very useful when used in combination with *Btk*.

From 1985 through 1988 in Lane County, Ore., several hundred thousand acres were treated with *Btk*. No further treatments were required after 1988. Because of the amount of acreage infested by gypsy moths, the total cost of the Lane County eradication program (including detection, eradication and trapping) from 1984 to 1989 was about \$18 million. If the current population of gypsy moths spreads, the cost to Oregon to treat the moths will increase exponentially as additional acres become infested.

And once again, this pest is knocking on Oregon's door, threatening to defoliate large swaths of native and ornamental trees across much of the Pacific Northwest landscape and devastate native fish and wildlife habitat and three of our economic engines—our timber, tourism and nursery industries.

In April and May of 2009, the Oregon Department of Agriculture is planning to aerial spray one-half gallon of *Btk* per acre in southern Eugene, Ore., with a new certified organic formulation of *Foray 48B*. The spray program is intended to eradicate a breeding population of gypsy moths that were found during two consecutive years of surveys (trapping moths using pheromone traps) in southern Eugene.

But even with a certified organic formulation and peer-reviewed scientific studies worldwide documenting lack of any basis to conclude there are adverse health effects to humans from spraying *Btk*, there are concerns about using this tool to eradicate gypsy moths. And many of these concerns are being expressed through the “new media,” an outreach tool that didn't exist 20 years ago.

Today's new media communications provide unprecedented opportunities for individuals and groups to share information. While improved access to information has many positive benefits, anyone can blog and post information to the Internet, regardless of education, experience or knowledge on a topic. Individuals that “experienced it firsthand” can tell their story—oftentimes unsubstantiated—creating a confusing environment for the public to choose between scientific studies and someone that “was there.”

Add mistrust of government to the mix, and it becomes increasingly difficult to filter information—good from bad, false from true, and contrived from real.

That is why it is so important to listen carefully to concerns expressed by people that don't support the best eradication tools available, and provide these individuals with access to factual information.

In the case of gypsy moths, we know they have great potential to establish and spread, affecting the Pacific Northwest economy, native fish and wildlife species, and quality of life that people derive from healthy natural resources. Rural and urban forests as well as our backyards are at risk.

We also know that *Btk*, formulated in the product *Foray 48B*, is naturally occurring, and we are likely exposed to the spores through everyday activities. The Oregon Invasive Species Council asked toxicologist Dr. Dave Stone, assistant professor in the Department of Environmental and Molecular Toxicology at Oregon State University, to provide a review of the scientific literature on adverse health effects of *Btk* or *Foray 48B*. Dr. Stone focused his efforts on relevant scientific peer-reviewed health surveillance and toxicity studies conducted in the United States, Canada and New Zealand. His opinion was that “there is no basis to conclude that adverse health effects in humans are caused by applications of *Btk* or *Foray 48B*.” The inert ingredients used in *Foray 48B* are certified organic food-grade ingredients, contain no petroleum solvents, and are mildly acidic



A helicopter sprays at low altitude. Photo courtesy of USDA Forest Service, Region 8 Archive, Bugwood.com

to help maintain microbial quality and purity.

The bottom line? After sorting through the many tools available, the safest and most effective method to eradicate a known population of gypsy moths is *Btk*.

Nevertheless, there are concerns about helicopters hovering over communities, dispensing pesticides that kill insects. Having a conversation with the public to listen, understand their concerns, and responsibly address those concerns with facts and empathy will further our ability to reach into our invasive species toolbox, consider a number of options for dealing with invaders, and allow our region to react swiftly and responsibly to eradicate threats to our native fish and wildlife populations and the economic engines that fuel our growth and sustainability.

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