

Meeting the “Invasive Species” Challenge

Questions on definitions and management practices in the “war on weeds”

Spraying in Cowlitz County, Washington.

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“Invasive species” are frequently given as the reason for dispersing toxic pesticides in the environment. This claim to virtue—the assertion of an environmental benefit to justify the use of toxic pesticides—typically comes with a sense of urgency and indisputable benefit. While an “invasive” species problem may not be fully defined or understood, the short-term pesticide solution too often creates greater ecological imbalance and impedes the adoption of a plan that offers sustained benefits, and protects human health and the environment.

DEFINITIONS—WHY THEY ARE IMPORTANT

Pesticide-intensive programs to control “invasive” species are typically based on a disconnect between the ecological and regulatory meanings of “invasive.” Species that are truly invasive in an ecological sense are capable of invading and persisting in healthy intact ecosystems. In this context, the introduction and spread of species that are truly invasive threaten biodiversity and native ecological communities. The regulatory definition is focused on the plant or insect as a super pest without attention to the context in which it has emerged or exists.

The 2016 Executive Order 13751, entitled *Safeguarding the Nation from the Impacts of Invasive Species*, provides the following definition: “‘Invasive species’ means, with regard to a particular ecosystem, a non-native organism whose introduction causes or is likely to cause economic or environmental harm, or harm to human, animal, or plant health.” This definition is essentially the same as—and is actually broader than in a literal sense—the definition of “pest” (an organism that is “injurious to health or the environment”) in the federal pesticide law, the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA), and does not define the underlying ecology of the unwanted species.

AUTHORITY TO FIGHT THE INVASIVE WAR

In the context of other federal, state, and local laws, the regulatory definition of “invasive species” gives broad authority to agencies to use all means at their disposal to rid the jurisdiction of non-native organisms causing economic harm, or harm to health and the environment. Many local ordinances that ban or restrict pesticide use make an exception for “invasive species” with the assumption that pesticides are needed to protect the environment, thus creating an allowance for pesticides that are understood to be unacceptably toxic. In other contexts, these exceptions are incorporating requirements of specific laws.

UNDERSTANDING THE CAUSE

The use of the term “invasive species” to justify hazardous pesticide use results in otherwise unacceptable means in an attempt to exterminate an unwanted organism that is defined as an economic, environmental, or human health threat. In this sense, the definition of “invasive” is reactive to the presence of a species without requiring an understanding of its ecological context—including the underlying issues or conditions that support or invite that species.

In fact, there are few, if any, species that are truly ecologically invasive—that is, capable of invading and persisting in intact ecosystems. Instead, such situations usually involve species that can take advantage of disturbed habitats (“weeds” or “weedy species”). A plan for a sustained solution, therefore, requires an emphasis on healing the disturbance (to which end, so-called “invasives” may sometimes be helpful), rather than killing the opportunist colonizer.

Removal of such opportunist colonizers may be necessary based on an ecological assessment and an evaluation of the options to ensure a long-term solution compatible with environmental health, but the use of toxic chemicals are rarely, if ever, justified in the process.

REDEFINING INVASIVES

If the definition of “invasive species” is limited to those species that can invade and damage intact ecological communities, then resources will only be directed at those species that legitimately present an ecological threat and prevent chemical strategies that are ecologically destructive.

WHY DISTINGUISH “INVASIVE SPECIES” FROM WEEDS?

Although other organisms, such as insects, are labeled “invasive,” by far the largest attention is devoted to “invasive” plants. “Invasive plants” are sometimes called “non-native plants,” “weeds,” or “noxious weeds.” If invasive plants are labeled simply “non-native plants,” they become confused with the many crop, turf, and horticultural plants that people value—and, in fact, often seek to protect from “invasive plants.”

If “invasives” are labeled “weeds” or even “noxious weeds,” then it will be necessary to treat them like other plants with that label. Land managers employ a number of strategies and tactics to prevent “weeds” from interfering with their land use goals. If they are environmentally conscious, they cultivate, graze, mulch, mow, or harvest the “weeds.” They may plant or encourage competitors or specialist herbivores. Some land managers may use herbicides, and even in these cases, there are situations—as around sensitive areas or in jurisdictions where pesticide bans are in place—where herbicides may not be used.

This is the context, then, in which the label “invasive species” becomes a claim to virtue—because the solution is held as protecting the common good, when, in fact, it causes unnecessary harm. It is a situation in which there is independent scientific consensus that the use of toxic chemicals, including pesticides, is not appropriate or effective. However, land managers facing a challenging problem, are comfortable with the methods they know—spraying herbicides. By definition, herbicides kill plants, so the assumption is that any law restricting the use of pesticides must allow for their use in these difficult situations. However, in practice this challenge is confronted where effective alternatives to chemicals are available. It is not often accompanied by an analysis that evaluates the perceived problem, and, if accepted as a problem, its underlying causes.

If analysis identifies the weed or pest as exceptional—that it can invade intact native ecological communities—then pesticide use is potentially justifiable as protecting the environment. In fact, however, it is almost never the case that such “invasive species” can invade intact ecological communities because those communities do not have available niches for the “invader” to occupy. In those cases in which the analysis does not identify the weed or pest as exceptional,

the “invasive” label has been used as a claim to virtue to allow otherwise unacceptable methods.

IF THE WEED IS NOT AN “INVASIVE SPECIES,” THEN WHAT?

There are plants and other organisms that invade managed systems. Managed systems include cropland, rangeland, roadsides, turf, gardens, parks, forests, and even “wilderness” areas. Such systems may provide habitat for other species. Appropriate management strategies for unwanted additions to the biota differ according to the setting. Some of these species may be difficult to manage, and it is always appropriate to ask whether their presence indicates a need in the community that the new species could fill. Management strategies for these difficult non-native species are the same as for others, but because of their adaptation to the disturbance, may take more effort to implement. Strategies include cultivation, grazing, mulching, mowing, harvesting the “weeds,” and planting or encouraging competitors. Herbicides, which only reinforce the vacancy in the community, are counterproductive, creating an opening to be filled.

DO YOU HAVE AN “INVASIVE SPECIES” PROBLEM?

When faced with a difficult problem involving an unwanted plant, there are several questions, the land manager should ask:

Is this plant really a problem, or can it fit into my managed landscape?

A “weed” plant may be performing an important function in the landscape—it may be fixing nitrogen or relieving soil compaction, for example—and it may be managed by existing land use or maintenance. A “weed” in one place—even one labeled an “invasive species”—may not be a nuisance in another place.

Is the presence of this plant an indicator that restoration efforts are needed to relieve stresses on the plant community?

If a non-native plant seems especially difficult to remove from your landscape, it may be filling an ecological niche that a native plant once filled. Its presence may reflect stresses on the plant community that can be relieved. For example, dandelions and some other deep-rooted plants in turf are an indicator of soil compaction—and they also help to relieve soil compaction. By addressing soil compaction by other means, the landscape manager can relieve the stress that led to the dandelion problem.

What strategies and tactics have been used by others to control this plant? Do they work? What are possible unintended consequences?

There are many approaches that can be used in the many different situations where vegetation is managed. Mowing

controls most broadleaf plants in managed grass simply because the growing point of broadleaf plants is at the tip, while grasses grow from the base. Grazing can be both a cause of a problem and a solution. Overgrazing by a single species (e.g., cows) reduces the cover by favored plants (grasses), allowing other plants (broadleaved plants) to multiply. Reducing overgrazing by the cows and introducing grazers who prefer broadleaved plants (e.g., sheep or goats) can address the problem.

Why Not Herbicides?

While herbicides are a popular choice, there are several reasons why they are not the most effective approach. Herbicides address the symptom, not the problem. They create a hole in the plant community that must be filled, and if the underlying problems are not addressed, it will likely be filled by some opportunistic species—i.e., a “weed.” Since herbicides are not species-specific, they are likely to kill other plants as well, compounding the problem. Finally, many weeds have become resistant to herbicides through years of selection.

While the likelihood of unintended consequences should be examined for all methods—will those goats eat my oak saplings along with the poison ivy?—the possible consequences of herbicides may extend far from the managed landscape and may have serious effects on the health of humans and ecological systems.

Is this a crisis, or can I take the time to research restoration methods?

Poor decisions arise out of crisis. Crisis encourages herbicide use because it addresses the symptoms and does not involve analysis of underlying causes. However, as described above, herbicide use rarely produces a permanent solution. It is always better to take the time to research the appropriate strategies for your situation.

CONCLUSION

Communities and land managers confront species that are defined by law or in the common parlance as “invasive.” While the solution has been to identify those species and then allow the toxic pesticide use exemption under community land management policies and state law, a sustained solution protective of health and the environment requires a more analytical approach that evaluates the species, the problem it poses, and the underlying causes that has invited and supports the unwanted organism. In this context, the threshold for action, the type of action, and the health of the ecosystem in which the organism lives are factors that require consideration. When confronted with an unwanted plant, consideration must be given to both the short- and long-term solution, ensuring that the immediate action does not create a greater problem in the future. The tools exist to effect a strategy for managing unwanted plants that is protective of health and the environment. It starts with asking the right questions.

Invasive Species Law

The concept of “invasive species” is embodied in federal and state statutes, regulations, and executive orders. Although dating back to the *Lacey Act of 1900*, which was designed to prevent the importation of “injurious wildlife,” the body of regulation has focused largely on “noxious weeds.” Many “noxious weed” laws were, and are, designed to promote chemical control of difficult agricultural weeds.

Plant Protection Act of 2000. This law replaced the *Federal Noxious Weed Act of 1974*, consolidating and updating major statutes pertaining to plant protection and quarantine (*Federal Noxious Weed Act, Plant Quarantine Act*) and permits USDA’s Animal and Plant Health Inspection Service (APHIS) to address all types of weed issues through measures that may include emergency and extraordinary emergency actions to address infestations of noxious weeds.

Other federal laws governing invasive species. These include: *Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, Brown Tree Snake Control and Eradication Act of 2004, Nutria Eradication and Control Act of 2003, and Alien Species Prevention and Enforcement Act of 1992*. In addition, Executive Order 13112, signed by President Bill Clinton on February 3, 1999, creates a National Invasive Species Council (NISC), and Executive Order 13751 of 2016, entitled *Safeguarding the Nation from the Impacts of Invasive Species*, continues and clarifies actions of E.O. 13112 and “incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into Federal efforts to address invasive species.”

Federal Pesticide Law Definitions

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)

2 (t) PEST.—The term “pest” means (1) any insect, rodent, nematode, fungus, weed, or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other micro-organism (except viruses, bacteria, or other micro-organisms on or in living man or other living animals) which the Administrator declares to be a pest under section 25(c)(1).

25(c) OTHER AUTHORITY.—The Administrator, after notice and opportunity for hearing, is authorized—(1) to declare a pest any form of plant or animal life (other than man and other than bacteria, virus, and other micro-organisms on or in living man or other living animals) which is injurious to health or the environment.

2 (j) ENVIRONMENT.—The term “environment” includes water, air, land, and all plants and man and other animals living therein, and the interrelationships which exist among these.