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A New Weapon in the War on Weeds: Flamethrowers

Long used in agriculture, land managers are now wondering whether cooking weeds to death is better than pesticides



Meghan Fellows sprays flame on a patch of lesser celandine, an invasive weed, while volunteer Jim Anderson looks on. If "flaming" the plants (heating them up but not burning them) kills them reliably, the technique may replace pesticides in vulnerable stream environments. (Courtesy Meghan Fellows)

By [Alison Gillespie](#)
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Meghan Fellows wants people to know that she isn't a pyromaniac. Yes, she's walking around in urban parks with a propane tank roughly the size of a beer keg strapped to her back and a four-foot flame-throwing wand in her gloved hands. But the biologist is out here shooting 400,000 BTUs at weeds to find out if she can cook them to death instead of spraying them with harsh chemicals or pulling them out by hand.

Fellows, who works for the parks system in Montgomery County, Maryland, is one of many charged with the control of weeds in urban parks, and today she's focusing her attention on a small but aggressive invader called lesser celandine. The plant was first identified as a problem in the early 1990s because it crowds out native wildflowers that provide nectar for bees and food for wildlife. Experts have tried almost everything to eradicate the aggressive but pretty, buttercup-like Eurasian flower from U.S. stream banks and hillsides,

lawns and ball fields.

Pulling the tiny weed out by hand can do more harm than good. Each individual plant can produce more than two dozen underground bulblets. Below the bulblets, deep tubers anchor it into a densely matted root system. Break any of those pieces off and they can quickly re-sprout in a new location. Digging the plants out with backhoes and Bobcats destroys delicate stream environments, and still leaves the issue of what to do with the bulblets and tubers.

There is nothing in the North American environment to control or check the lesser celandine's spread. In just a few square feet you can often find thousands of the plants, covering the ground like a glossy green-and-yellow shag rug. No insect or animal here eats it. No diseases afflict it or deter its reproduction. And so it spreads unabated, unless killed by humans.

The Maryland National Parks and Planning Commission, which employs Fellows, often opts for mechanical removal of all weeds wherever and whenever possible, says one of the agency's field ecologists, Carole Bergmann. Bergmann has spearheaded an enormously popular invasive removal initiative known as the Weed Warrior program. Over the last decade or so, she and Fellows have trained more than 1,200 volunteers on the best methods for removing and controlling weeds like lesser celandine, Japanese honeysuckle and a pernicious, fast-growing annual known as the mile-a-minute vine.

But, Bergmann says, she and her colleagues have come to the realization that “there are some plants where you’re just wasting your time” when it comes to mechanical pulling methods, including lesser celandine. Even thousands of volunteer hands really won’t help with this flower.

Chemical controls are equally troublesome. Glyphosate (often sold under the name Round-Up) is the only herbicide known to be effective thus far. But spraying is expensive and needs to be done by a licensed, trained operator, and recent reports from the World Health Organization about glyphosate's possible links with cancer have made this a less attractive option to both land managers and the general public.

There are also concerns about spillover effects of chemicals, even when every precaution is taken. “You can have secondary impact of either killing or harming other things that are out there,” says Jil Swearingen, an invasive species management coordinator for the National Park Service. Like Bergmann, she says herbicides are often the only tools that work, but “obviously if you are a little thin-skinned frog, it is really not going to be great to have Round-Up sprayed on you.”

Which brings us back to Fellows, standing with her flamethrower at the side of Sligo Creek in Silver Spring, Maryland.



It looks pretty, but lesser celandine is considered a noxious weed in the U.S., as it crowds out more beneficial plants. (Flickr/Mrs Gemstone (<https://www.flickr.com/photos/gemstone/>))

A few years back, Fellows and her co-workers noticed that some of their co-workers in the parks department were successfully controlling weeds with propane in ball fields and along fence lines. They also used flame weeding on their organic farms and gardens at home. Could this, Fellows wondered, be a good way to control the invasive lesser celandine in natural areas?

Farmers have been using flame to beat weeds for more than a century. Records show that in the 1940s and '50s, more than 80,000 farmers nationwide primarily controlled weeds with flaming, often with diesel fuel.

But a post-war boom in chemical research produced a tremendous number of new herbicides and pesticides for the farm and garden, and the once-intense interest in flame weeding dropped as farms became industrialized and reliant on those chemical inputs.

Now, only a small percentage of organic farmers regularly use the flaming technique. Modern methods and tools employ cleaner-burning propane instead of diesel. It is clear, most authorities agree, that propane flame is an effective tool for many farm weeds, especially at smaller scales and along tilled crop rows.

But it remains unclear how effective flaming is on weeds that come back year after year from deep or thick

roots anchored in natural areas. To date, there has been almost no research on the topic, save for information showing that perennials are not killed by heating their leaves the same way that many annuals are.

Still intrigued by the possibilities, Fellows began investigating. She established 45 test plots in two stream valleys, each measuring a meter square, full of thousands of celandine plants. She chose locations near some built-in firebreaks, such as a six-foot-wide paved walkway, close to the creeks. Since last year she's been carefully taking down data on how many celandine plants are present there. Often, this has demanded counting tiny stems one by one, on her hands and knees in freezing cold temperatures.

Three times a year, in February, March and April, she has also visited her plots to roast the celandine.

Wearing thick gloves and some seriously tough work boots, she pulls the trigger, causing a large hissing noise and a long tongue of orange flame to erupt from the end of the wand. So she can concentrate completely, a volunteer "spotter"—usually a well-trained Weed Warrior—walks along, too, to keep curious park patrons from getting too close and to assist, should anything other than the targeted weeds unexpectedly catch fire.

"I feel powerful using this thing, but it isn't as fun as it looks," she says. "One wrong move with Round-up and I get a little on my shoe and I have to wipe it off. But a wrong move with this thing and I can lose a toe, or maybe my whole foot in just a few seconds."

There's a smell in the air akin to collard greens being wilted in a skillet. There's also the musty scent of wood smoke, although Fellows wants to make it clear that there's not a full-scale fire involved here. This isn't about putting fire back into the forest ecosystem. That's an entirely different kind of restoration work.

"The goal is to wilt the vegetation," she explains, long after the flame weeding tools have been put away. "So what I'm doing isn't really a prescribed burn. It brings the heat into it, which should be enough to destroy a lot of the plant parts." She's not setting fire to the plants or the stream valley; it's more like she's cooking a few unwanted weeds to a pulp.

So far the results are promising, says Fellows. It seems that to kill the celandine, you need to take more than one or two passes over the course of the season. But it still looks as if the method might prove cheaper than widespread chemical use.

The data is still being gathered, but when botanists like Bergmann have stopped by to look, they say they can see a huge difference in the areas where the plants were flamed. There is visibly less of the lesser celandine.

Andy Pressman, a sustainable agriculture specialist at the National Center for Appropriate Technology who has studied—and practiced—flame weeding for years, says he is very interested to hear about someone focusing on perennials. "This isn't some kind of uncommon equipment," he says of the tank and wand. Over time, he thinks Fellows may learn how to adjust the flaming speed and repetitions to fine tune the method for perennials. "I think it is an excellent idea."

"That's what we need, more people trying new things," says Swearingen from the National Park Service. "And then they can say it works, or it doesn't, or maybe it works a little, but only in this kind of situation. But we need more options."

About Alison Gillespie



Alison Gillespie is a freelance writer who covers stories about the environment from her home in Silver Spring, Maryland.