





A BITTERSWEET STORY

This disarmingly beautiful vine has a stranglehold on our landscape's ecology—but one state park is fighting back.

WRITTEN BY MIKENNA PIEROTTI

JAY CROSS



Oriental bittersweet, shown here, took over Cacapon Resort State Park as its innocent-looking vines grew to 60 feet high in places.

The road into Cacapon Resort State Park is quiet and tree-lined, a gently curving path through a seemingly peaceful sea of green leaves, lush undergrowth, and dappled sunlight. Take a closer look at that thick carpet of green, however, and you might be surprised that nearly all the plants look eerily the same. “For about the first half-mile as you enter the park, you can see the vines right along the roadway. That’s how it starts out,” says Valerie Chaney, activities coordinator at Cacapon Resort State Park.

The vines snake and branch over and around everything in their path, strangle and outcompete less aggressive neighbors like native blackberry, wild rose, and even young rhododendron, until it hits the first tree or shrub in its path. Then it starts to climb. “It can grow over 60 feet high. Sometimes as you look into the canopy, and you can clearly see how that vine started on the ground and now it’s all through the trees.”

Oriental bittersweet, a nonnative invasive, threatens our ecosystems health and outright smothers plants and

trees by overtopping their canopy and blocking sunlight. “It climbs trees, physically choking them,” says Anne Wakeford, coordination biologist with the state West Virginia Division of Natural Resources. “It’s difficult to manage because it often grows in conjunction with native grapevine and poison ivy vines. While both climb trees they do not girdle trees. What makes Oriental bittersweet worse is that it grows such thick and heavy and their increased weight can pull down weakened trees.”

A single record of Oriental bittersweet found in our landscape dates back to 1941, says Donna Ford-Werntz, curator at the West Virginia University herbarium. All other records are from 1977 onward. “In that time, it has been documented to occur in 29 West Virginia counties.” Clearly, this vine is adept at staying under the radar. But how did the invader find its way into our parks and natural spaces at all? To answer that, we need to go back to its humble beginnings.

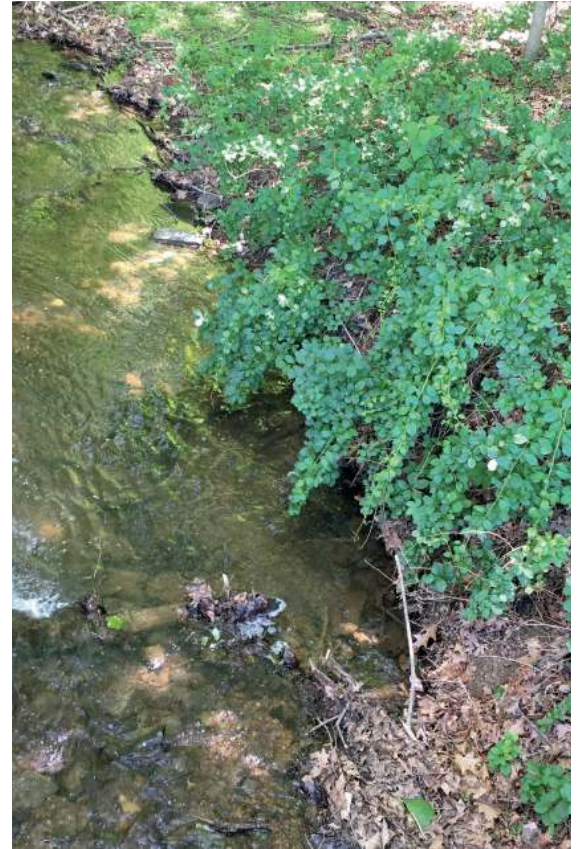
The Twisted Beginning

Oriental bittersweet, *Celastrus orbiculatus*, is native to China. It starts life as a thin, spindly vine with a reddish brown or silvery hue. Its leaves are round and lustrous,



Potomac Valley Master Naturalists volunteers worked with the park staff to understand the bittersweet problem within the park and figure out the best way to tackle it.

CLOCKWISE FROM LEFT Thicket, undergrowth around stream, and climbing vine.



varying in size from 1-4 inches with toothed edges and its flowers are green and delicate.

But in the fall, these relatively inconspicuous vines burst into flame, exhibiting bright yellow seed pods that, when mature split to reveal clusters of festive scarlet berries. And that's why, in the late 1870s, we fell in love with them. "The fall fruits are really beautiful, and the introduced ornamental plant was used for wreath making," Cacapon's Chaney says.

No one knew that, left to its own devices, this vine can easily take over. In just ten years—one plant can completely cover one half acre, with thick, hardened stems reaching 3 or more inches in diameter.

At that point, mowing or hand-pulling isn't enough. The vines can easily girdle a mature tree or weigh it down so heavily that it breaks under the sheer force. Given enough time, the vine can even spread from tree to tree and take down whole groves.

Then, mowing or hand-pulling isn't practical. The vines can easily girdle a stressed/dead tree or weigh it down so heavily that it breaks under the sheer weight. Given enough time, the vine can even spread from tree to tree and take down whole groves.



The Oriental bittersweet vine is cut in two places: Base cut - orange stick is used to measure 6 inches from vine to ground to show the correct location to cut, and the Window cut made at eye level. The middle section of vine is removed to prevent upper part of vine from growing back to the ground and re-rooting.



What's worse? Nothing eats it. Oriental bittersweet is entirely poisonous—except for its berries—which are a treat for birds and squirrels who spread its progeny for miles. It isn't too picky about its habitat, either, taking to bright sun or shade with ease and can spread within colonies by seeds and root sprouting. All it needs is a little disturbed ground, like along roadways or at old homesites, and it quickly stakes its claim.

The problem at Cacapon Resort State Park started years ago. No one knows exactly when or how it found its way in, but this plant got its roots into the landscape and slowly took over. Until 2019, that is, when conversations around the removal of other invasive species in the park turned into a multi-organizational plan to tame the vine. "We started talking about it in the spring of 2019," Chaney says. "The West Virginia Department of Agriculture (WVDA) is currently conducting management studies on invasive nonnative barberry in the park."

Cacapon also had a long-standing relationship with the Potomac Valley Master Naturalists. "They are always seeking educational opportunities and projects to accrue volunteer hours." The local group of master naturalists had been looking for just such a project to tackle. "They had similar projects and a general email going around asked, 'Who has invasive species and how can we help you tackle them?'"

Wakeford had worked on invasive species projects at North Bend State Park and Blackwater Falls State

Park. Carol Di Salvo, an Integrated Pest Management Specialist/Master Naturalist, along with Wakeford and Chaney prepared an official Memorandum of Understanding between Potomac Valley Master Naturalists and Cacapon State Park addressing invasive species issues.

"We came to the agreement that our natural areas are at serious risk from nonnative invasive species, which can adversely alter the integrity of our ecosystems. That's the main underlying point. Once damaged, these systems lose their ability to recover efficiently. That loss can lead to other outcomes, like fires and floods," Chaney says.

But their goal wasn't just to remove invasive species like Oriental bittersweet from Cacapon. The problem was much bigger than that, and they knew the work they did on the park grounds could resonate throughout the state. "At Cacapon, we can prepare tools for both staff and the public on invasive species education. What we're trying to do is develop protocols for preventing, detecting, monitoring, and managing."

Untangling the Problem

Once Cacapon and the Potomac Valley Master Naturalists had come to an agreement, the next step was to fully understand the problem. One of the biggest hurdles was simply identifying the invasive species itself. You see, Oriental bittersweet isn't the only bittersweet out there. We have an American cousin in at least 37 counties since 1890, according to herbarium records, and



Samples of native bittersweet leaves and berries (left) Oriental bittersweet leaves and berries (right).



the two species are nearly indistinguishable.

"The native look-alike, which is called American bittersweet, *Celastrus scandens*, has six or more berries in a cluster at the end of a stem. The fruits are also lighter colored," Chaney says. In contrast, Oriental bittersweet has smaller clusters of much darker fruit that grow at the base of its leaves. But you have to wait for fall to use this method. If you have both species to closely compare Oriental bittersweet also tends to have more circular leaves, while American bittersweet's leaves are elongated, Ford-Werntz says.

The other issue is with the removal process itself. "You can destroy small vines with hand-pulling," Chaney says. "If you can get to them with a mower or bush hog, that would be ideal. Weekly mowing can prevent fruiting, but if you don't do it frequently enough, the roots can re-sprout."

Unfortunately, Cacapon's rugged landscape didn't allow for either, and most of the infestation was too far gone. "Here we have a lot of standing stone, and it's not in an area where we can't take a mower." Another option, Chaney says, was a weed eater with an attachment blade made for thick vines. But that would only address the ground cover. At Cacapon, many vines had already attached themselves to nearby trees. That called for a prescriptive "window" approach.

Using a pair of loppers or a small saw, the thickest vines could be cut six inches above the ground and another cut made at eye level on the same vine several feet up the tree. "We do that so the top part of the vine can't come down and grow back into the ground," Wakeford says. To ensure the vine was

killed volunteers sprayed a target application of triclopyr, a systemic herbicide to vine's just cut stump six inches from ground level.

Proper training and WV pesticide applicator certification is necessary for all invasive species removal projects on state land. "The problem is that the invasive bittersweet is intermixed with other species. If you use a foliar herbicide on the vine, you can kill nontarget and native species. If you get rid of one invasive species, you leave a gap and an opportunity for another invasive species to come in and take over," Wakeford says.

A Sweeter Future

Weighing all the options, Chaney, Wakeford, and DiSalvo held two Oriental bittersweet weekend events during November 2019 for Potomac Valley volunteer master naturalists. The removal effort has already loosened the vine's grip on the park. "When we went in, we got a lot of it, but we by no means got it all," Wakeford says.

In January 2020, the park hosted WVs Registered Pesticide Technician Training Program for Potomac Valley Master Naturalists and Park staff who wanted to be involved in the project. "It's a robust training program, so everyone is fully aware of what we are tackling and the importance of what we're up against," Chaney says.

Although the 2020 pandemic has put a halt to fieldwork and training for the time being, the program has already yielded results that could help turn the tide against invasive species—in the Mountain State and beyond.

Experimenting with and documenting the success of various methods of control has led to best practices that Wakeford can now share with other parks, agencies, and even the general public. And thanks to their initial GPS mapping of the bittersweet, Wakeford, DiSalvo, and others will soon have a detailed battle plan for the war to come. "Eventually the idea is to give trained volunteers and park staff these maps directing them to certain areas in need of management. We also plan to expand the project to control more invasive species throughout the whole park," Wakeford says.

"These invasive species aren't going away. It's going to take consistent management," Chaney says. "We're just getting started." 🌱