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HAWAII'S SUSTAINABLE LIVING MAGAZINE

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Big, Bad Weeds

Stopping the spread of O‘ahu’s most dangerous invasive species, like the miconia tree, before they take root

by Lara Reynolds

The steep ridgeline is slippery after a morning rain in this section of degraded forest in the southern Ko‘olau Mountains on O‘ahu. The ground is mostly bare and there aren’t many trees to hold onto to prevent a fall down the slopes below. A team of six people in brightly colored shirts and camouflage pants line up in search party fashion at the bottom of the ridgeline and will head upslope as they begin another of their daily treks across acres of rough terrain. This team is not looking for a missing person; their target is the miconia tree (*Miconia calvescens*), a plant from Central and South America brought to O‘ahu in the 1960s that escaped cultivation and is now one of the greatest threats to the remaining healthy forests that collect freshwater for the island. If left unchecked and allowed to spread, the invasive miconia tree could easily take over these essential watershed forests that cover the mountain summits.



Miconia is a prime example of an invasive plant: fast growing, fruits at an early age and produces millions of seeds every year that are easily dispersed by birds. Good thing OISC field technicians are working to remove miconia from O'ahu before it becomes established.

Photo: OISC



Miconia grows quick and up to 50 feet tall, forming a thick canopy. A mature miconia forest smothers everything below in its shadow, destroying the natural complexity of a healthy native Hawaiian forest.

Photo: OJSC

The six-person team is the field crew of the O'ahu Invasive Species Committee. OISC is one of five island-based invasive species committees in the state, all of them grassroots organizations that work to protect each island from incipient invasive plants or animals that pose the greatest threat and are the most feasible to control. "We are about prevention and going after invasive species before they become a major problem," explains OISC field coordinator, Susie Iott.

Miconia is an example of the type of invasive species that OISC focuses on; it is a major threat to the island's native species, environment, economy and quality of life, but is not yet widespread. Understanding what the team is protecting helps to understand why they are willing to endure daily exposure to extreme temperature changes, heavy rainfall, swarms of mosquitoes and hazardous terrain.

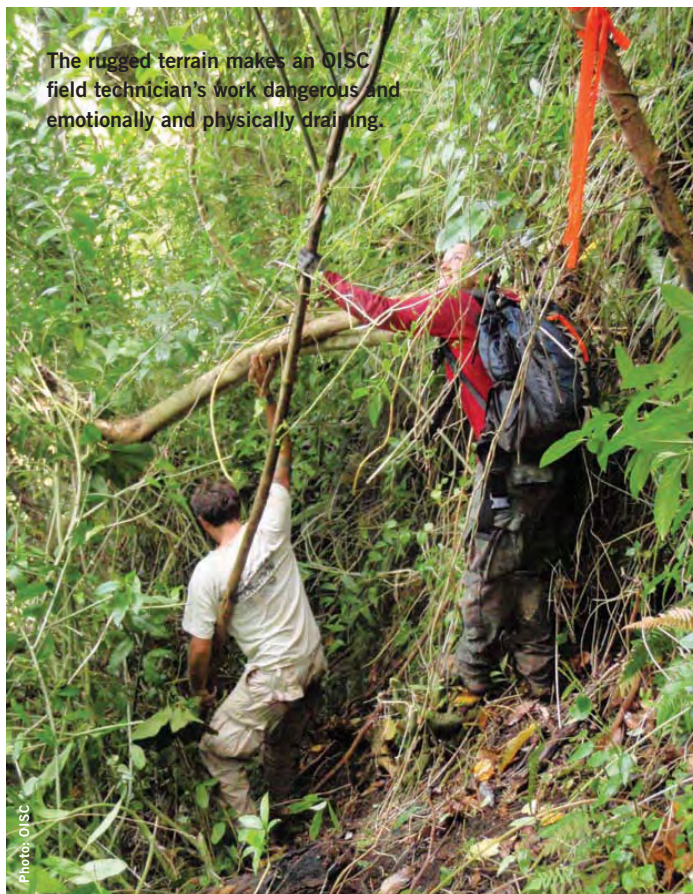
By searching in the degraded landscape, OISC guards the healthy forest above it. A healthy forest is complex, with a diversity of native species and multiple layers of plant life—trees, shrubs and groundcover—that collect water from mist and rain. Water slowly drips down the layers of plants, percolates into the soil and eventually makes its way into O'ahu's homes, businesses and agricultural fields. In this biologically diverse forest, native species live side by side in close association and leave no bare ground exposed; it's a balance they have achieved by living together for thousands upon thousands of years. The natural complexity of O'ahu's native forests is what makes them most efficient at capturing water and holding the soil in place, preventing erosion and runoff onto the fragile reefs of the island's coastal waters. What's more, Hawai'i's native forests, like its language and culture, are totally unique. Ninety percent of Hawai'i's native plants are endemic, meaning the species as well as the forest communities they've formed on the mountain slopes of O'ahu can't be found anywhere else on earth.

How is a tree that was first brought to O'ahu for its beauty so threatening to the biodiversity and health of the island's watershed forests? Miconia has all the traits that make for a harmful, invasive plant; it grows quickly, starts to fruit at an early age, produces millions of seeds per year that are easily spread over long distances by birds, can outcompete other plants for resources and has no natural enemies here in Hawai'i. It's a ready-made invader for Pacific Islands. In miconia's native range, a forest canopy of multiple tree species blocks sunlight to the plants below it. Miconia's large leaves, quick growth and abundant seeds are all adaptations to deal with the type of forest where the competition for sunlight is fierce. Hawai'i's native forests are more open and sunny by comparison and miconia can easily dominate if it is not stopped early.

What makes miconia worse than other invasive species is its ability to have such a profound effect that it threatens to change a large portion of O'ahu's environment. It forms thick canopies up to fifty feet tall that act like an umbrella over the landscape, blocking sunlight from other plants below it and smothering almost everything in its shadow. In this way, miconia destroys the natural complexity of a healthy forest and simplifies it to a forest dominated by miconia. A miconia forest reduces the amount of water that can percolate into the ground and its shallow root systems promote landslides and erosion.

"Protecting O'ahu from miconia and keeping the island from the devastation that Tahiti has experienced is extremely important," says Taylor Marsh, OISC field technician. Tahitians refer to miconia as the "green cancer." It has invaded approximately 200,000 acres of Tahiti—a little less than half the size of O'ahu—where it has caused severe erosion and landslides and threatens nearly half of the island's native plants with extinction.

Working to defend O'ahu from incipient invasive species isn't as simple as being able to hike for several hours a day. The work is



The rugged terrain makes an OISC field technician's work dangerous and emotionally and physically draining.

off-trail and that means scrambling up crumbly slopes where there are few groundcover plants holding the soil in place, or pushing through impenetrable stands of shrubs or trees. One of the worst obstacles is a particular vine called cat's claw that, as its name suggests, has thorns the same shape and sharpness as an angry feline. "The work can sometimes be very difficult. Hiking over difficult terrain through dense vegetation, having to climb through hau bush and getting drenched with rain and covered in mud, it can be discouraging sometimes," explains OISC field technician Megan Carr. "It helps to keep in mind all the good things about the job. We can see the difference our work can do in an ecosystem."

The crew is also well trained in rappelling and helicopter safety for the aerial surveys they do in areas that are too steep to search on foot. And, of course, they know their plants. They're skilled at spotting miconia mixed in with other vegetation and they are also on the look out for other species making an unwanted advance into the forest from nearby urban areas.

O'ahu residents might not realize that the lower elevation forests of the island are now almost entirely non-native. By the early twentieth century, native forests in these areas had been severely damaged by intentional fires that had been set to locate highly desirable sandalwood trees, and goats, cattle and pigs that had grazed and browsed the forest to stubble. In an attempt to remedy the deforestation problem, early foresters thought they could re-create the water-capturing abilities of the complex native forest by planting fast-growing non-native species. Although these non-native species do form a canopy, there is often bare ground underneath and many of them became invasive and outcompeted native plants. This is why early action for incipient invasive species like miconia is so important. There is not much left of Hawai'i's native forests and they are extremely vulnerable.

One of the simplest reasons for protecting the island's native for-



Hau presents a formidable obstacle as does a notorious vine called cat's claw.

ests is water. Water is an essential requirement for O'ahu's residents, businesses and agriculture. Food security will not be possible without ample, affordable irrigation water. Not everyone recognizes the connection between the green on the mountains above their homes and the water coming out of their taps. Safeguarding native biodiversity by controlling invasive species not only keeps the island's watersheds healthy, it helps preserve unique communities of native plants and animals and ensures that traditional Hawaiian gathering practices in native forests can be perpetuated.

The crew finishes its search for the day and emerges from the forest soaked in sweat and smeared with dirt. A few have bleeding scratches on their skin from pushing through cat's claw and other entangled branches they encountered along the way. They found and removed several immature miconia plants, which means they caught them before they fruited for the first time and added more seeds to the forest. In 2011, the crew removed 3 mature and over 400 immature plants from their search areas. Finding a mature plant in an area is like having to hit a reset button for another 16 to 18 years, the duration a miconia seed stays viable in the soil. That's how much longer OISC's crew would have to keep rechecking that location before it could be declared free of miconia. This longevity means that island-wide eradication won't be achieved for at least another few decades.

A healthy Hawaiian native forest ecosystem, rich and diverse with plant species, is part of the reason for the fresh water that flows from the tap.

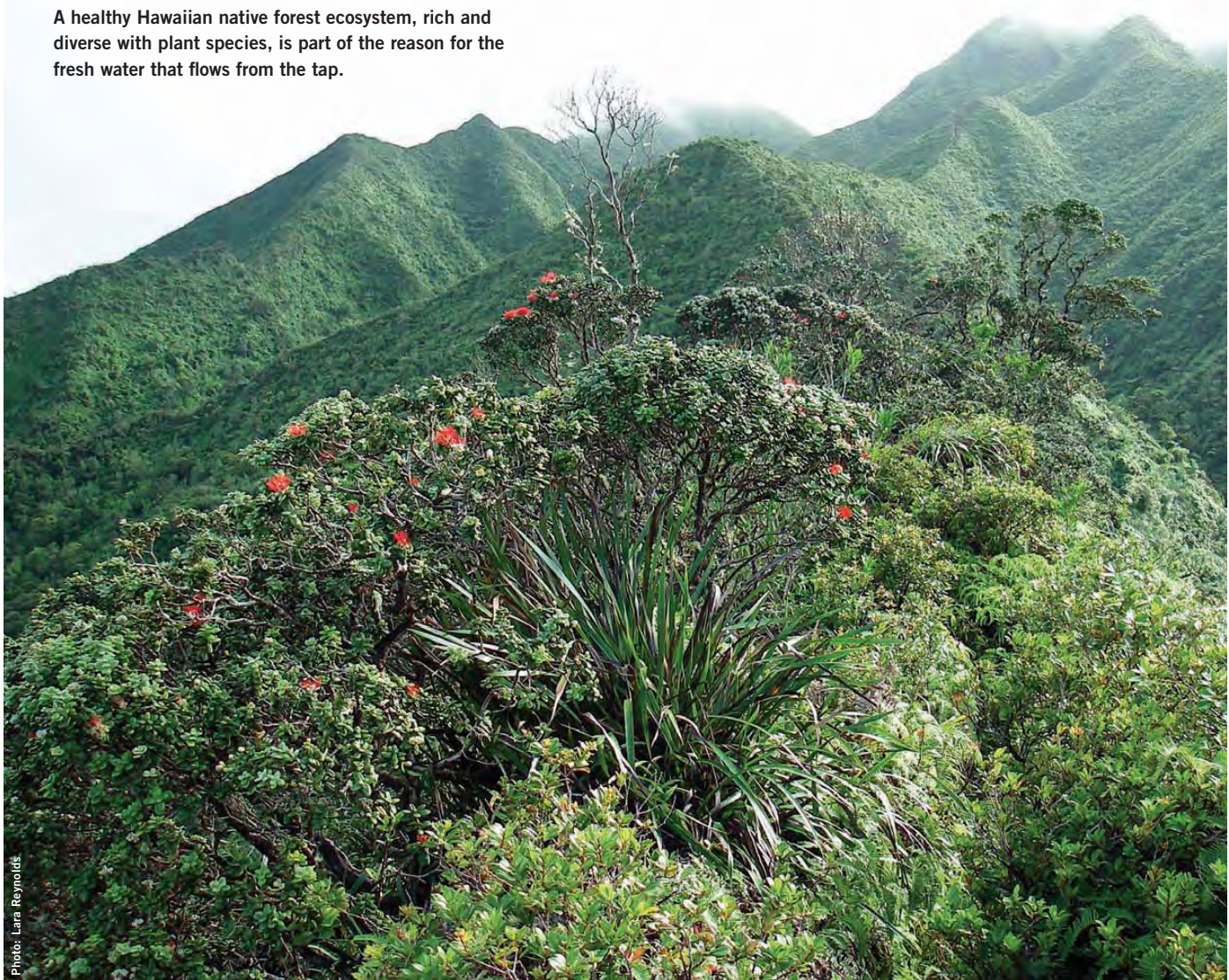


Photo: OISC

Photo: Lara Reynolds

Mature miconia trees are still found on occasion and tend to be those that eluded the crew on previous searches because the plants were located in extremely steep areas and concealed by dense vegetation until they grew taller. Susie Iott says finding a mature tree is daunting and sometimes depressing, “We all work so hard and the work feels never ending.”

OISC is the only group that controls miconia on the island. They work year-round, rotating through every part of the 20,000 acres they search so that none of it is left unchecked for longer than the time that a newly sprouted miconia plant could reach maturity. All of the crew agree that the rigors and danger of the work can be challenging, physically and emotionally. What keeps them going and sustains their passion for what they do is that the total number of miconia plants they find each year is declining. Susie Iott says this gives her a feeling of accomplishment, “We see numbers dropping and our strategy and treatment methods are working. I like knowing that we are preventing the next big, bad weeds from getting a stronghold here on O’ahu.”

Back at the OISC baseyard, the team thoroughly

washes their gear and clothing from the day to make sure it is free of any dirt contaminated with miconia seeds that they wouldn’t want to carry to another search area. Everything is then packed away and made ready for the next miconia hunt.

The efforts and accomplishments of the OISC field crew go unseen by most on O’ahu, and that’s as it should be. If the public started seeing miconia trees, or any of the other invasive plants they target, it would mean the battle is already lost and the plant has spread beyond the point of feasible control. That won’t happen as long as these protectors of the forest are on the ground. The next time you get water from the tap, think of the mountain forests and this team, out there every-day putting themselves at risk to prevent watershed-deestroying weeds from harming O’ahu’s native biodiversity and becoming a permanent part of the island’s ecosystems. 🌱

Lara Reynolds is the outreach specialist for the O’ahu Invasive Species Committee