$4.95

HAWAII landscape

November/December 2022

THE VOICE OF HAWAII'S GREEN INDUSTRY

HAWAIISLANDS.COM

INVASIVE TREE PESTS

EXPOSING THE ROOT ISSUES

TREE INVENTORY

It's waterproof

FERROXX® SLUG AND SNAIL BAIT AQ




Ferroxx AQ stops snails and slugs which can spread rat lungworm disease.

These highly waterproof micropellets can be used around pets and wildlife.

For use in and around taro, nurseries, landscape and most agriculture crops grown in Hawaii. Residue exempt.

NEUDORFF®
Neudorff North America

250-652-5888 • **Neudorff**Pro.org

Proudly self published by

LICH
Landscape Industry Council of Hawai'i

Formed in June 1986, the Landscape Industry Council of Hawai'i is a state wide alliance representing Hawaii's landscape associations: Aloha Arborist Association, American Society of Landscape Architects Hawaii Chapter, Hawaii Association of Nurserymen, Hawaii Island Landscape Association, Hawaii Landscape and Irrigation Contractors, Hawaii Society of Urban Forestry Professionals, Kauai Landscape Industry Council, Maui Association of Landscape Professionals, Professional Grounds Management Society, Big Island Association of Nurserymen, and the Hawaii Professional Gardeners Association.

Hawaii Landscape November/December No. 69 is published bi-monthly by Landscape Industry Council-Foundation, 73-1110 Ahikawa Street, Kailua-Kona, HI 96740

Editors
Russell Galanti
Hannah Lutgen

Advertising Sales
Michael Roth
rothcomm@gmail.com

Executive Director
Karen Smith

Designer
Roann Gatdula

contents

DEPARTMENTS

FEATURES

COVER

PRESIDENT'S LETTER

BY KATY DESHOTELS-MOORE

ALOHA LICH!

It's hard to believe we are closing in on the final months of 2022! It seems like just yesterday that I sat here writing my first "President's Letter," thanking you for the opportunity to serve on the LICH Board, comprised of dedicated leaders within our trade that work to ensure LICH continues to be the voice of the landscape industry. We've recently given the LICH website a fresh new look, so please take some time to check it out and find out what's happening in your industry.

You can find us at Hawaiiscape.com

In this issue we are excited to share articles related to arboriculture and landscape contracting in Hawaii. Tree assessment and proper tree care are a vital part of our trade and can cause great liability if done poorly. If you're a landscape contractor offering tree care as part of your services, ensure your staff is well-trained and understands issues related to proper arbor care; otherwise hire a certified Arborist to assist you when needed. It's important to remember the results of your work will reflect on the industry as a whole. I hope you enjoy the publication and learn something valuable that can be applied to your business. Wishing you all the best in the coming year.

A Hui Hou!

Katy Deshotels-Moore, LICH President

Arborist Certification Prep Course Well Underway

By: Jolie Dollar and Nicolette van der Lee

A new, free hybrid (mix of online and in-person) training program launched this fall for Hawai'i residents interested in pursuing the International Society of Arboriculture (ISA) Certified Arborist® credential for upskilling and career advancement. This is a great opportunity to add a "feather in your cap" for professionals in the landscape, natural resources management, and agriculture industries.

"Arboriculture is the science and art of tree care in developed landscapes. The course covers topics including soil management, identification and selection of woody plants, installation and establishment of woody plants, safe work practices, tree biology, pruning, diagnosis and treatment, urban forestry, tree protection, and tree risk management, with an emphasis on practical knowledge for those working in Hawai'i," said Jolie Dollar, instructor at Windward Community College.

Tuition sponsorships for employed, unemployed, and underemployed Hawai'i residents is sponsored by Hana Career Pathways, a statewide program through the University of Hawai'i Community Colleges offering short-term trainings that lead to industry credentials. Funding includes covering tuition, books, and the exam fee costs for the International Society of Arboriculture Certified Arborist® credential. Qualified applicants must show evidence of at least 3 years full time experience in aboriculture, or a combination of 3 years of education and practical experience.

An arborist working in a monkeypod tree.
Photo by: Will Loomis

An arborist air-layering an 'ulu tree.
Photo by: Jolie Dollar

"This new training program is an exciting opportunity for local tree care professionals to attain the highly valued ISA Certified Arborist® credential," said Heather McMillen, Kaulunani Urban & Community Forestry Program Coordinator, an industry partner supporting the training development. "Adding this credential to your toolkit will support advancement in arboriculture careers and is a great way to upskill and validate your knowledge."

The hybrid course structure allows participants to learn and study at their own pace and schedule. Weekly virtual office hours provide additional support and the program is capped with a full day of in person instruction. The online training is being offered from October 3 – November 20, 2022, and in-person labs will meet on one Saturday on each island.

Hana Career Pathways and Windward Community College are planning to offer future training opportunities for those wishing to enter and upskill within the tree care industry, so please stay tuned and check out the Hana Career Pathways website regularly for new training opportunities.

Visit uhcc.hawaii.edu/training to learn more and apply directly online.

CONTACTS:

Nicolette van der Lee, Program Manager
University of Hawai'i Community Colleges
Phone: 808-984-3300 Email: nhv@hawaii.edu

Jolie Dollar, Sustainable Agriculture Instructor,
Windward Community College
Email: jolied@hawaii.edu

Canopy of the shower tree in good health with normal foliage cover.

LOOKING INWARDS:

Using diagonstic tools for advanced arboricultural assesements

By: Ilana Nimz

Arborists are tree specialists who use their education, knowledge, training and experience to examine trees, recommend measures to enhance the beauty and health of trees, and apply measures to reduce the risk of tree failures. A major role of an arborist is to assess the health and structure of trees, to determine if they are at an elevated risk of failure. Arborists use a variety of approaches to identify structural defects, and assess the likelihood of failure based on the exposure to the targets.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Conditions are often hidden within trees and below ground, and since trees are living organisms, they may fail in ways arborists do not fully understand. Even though arborists cannot see inside of trees, they have many diagnostic tools that can be used to identify internal structural defects, which help to provide a reasonable assessment of risk based on scientifically-based analyses.

An arboricultural assessment begins with a basic visual examination of the tree from the ground. Arborists are trained to look for several common tree defects, including dead wood, cracks, weak branch unions, cankers, root problems, poor tree form and decay. Using tools such as a probe, mallet or binoculars, arborists can further assess defects detected in a visual survey. A probe, or a long solid rod, can be used to prod soft tissue and measure the depth of cavities. A mallet is used to "sound" trees to listen for hollow areas. Binoculars can help identify defects within the canopies, such as high cavities or insect infestations, without leaving the ground.

A defect identified with a visual survey may require a more comprehensive evaluation, or an "advanced assessment." This approach can involve a climbing or aerial lift inspection, root excavation, or an internal structural assessment with a diagnostic tool. Advanced technical tools allow arborists to assess the strength of a tree's structural wood, enabling them to "see" inside of a tree and measure internal decay. One tool is called a Resistograph®, which is a precision drilling instrument with a pencil-lead sized drill that measures resistance as it drills through wood. In simplistic terms, the drill moves though solid wood slowly, and weak wood quickly, and produces a graph that measures and identifies areas of solid and weak wood. Another advanced tool is sonic tomography, which assesses how sound waves move throughout the tree to identify cavities, weak wood, cracks and decay. Sound-wave sensors are attached around the tree's trunk at a consistent height. When tapped, the sensors transmit sound-wave data to a computer program, which interprets the sound movement between sensors and produces a visual representation of the tree's internal condition. Both tools are minimally invasive to the trees. These instruments are expensive, and takes time and training to interpret the results. The trained arborist can then provide recommended mitigation based on the findings.

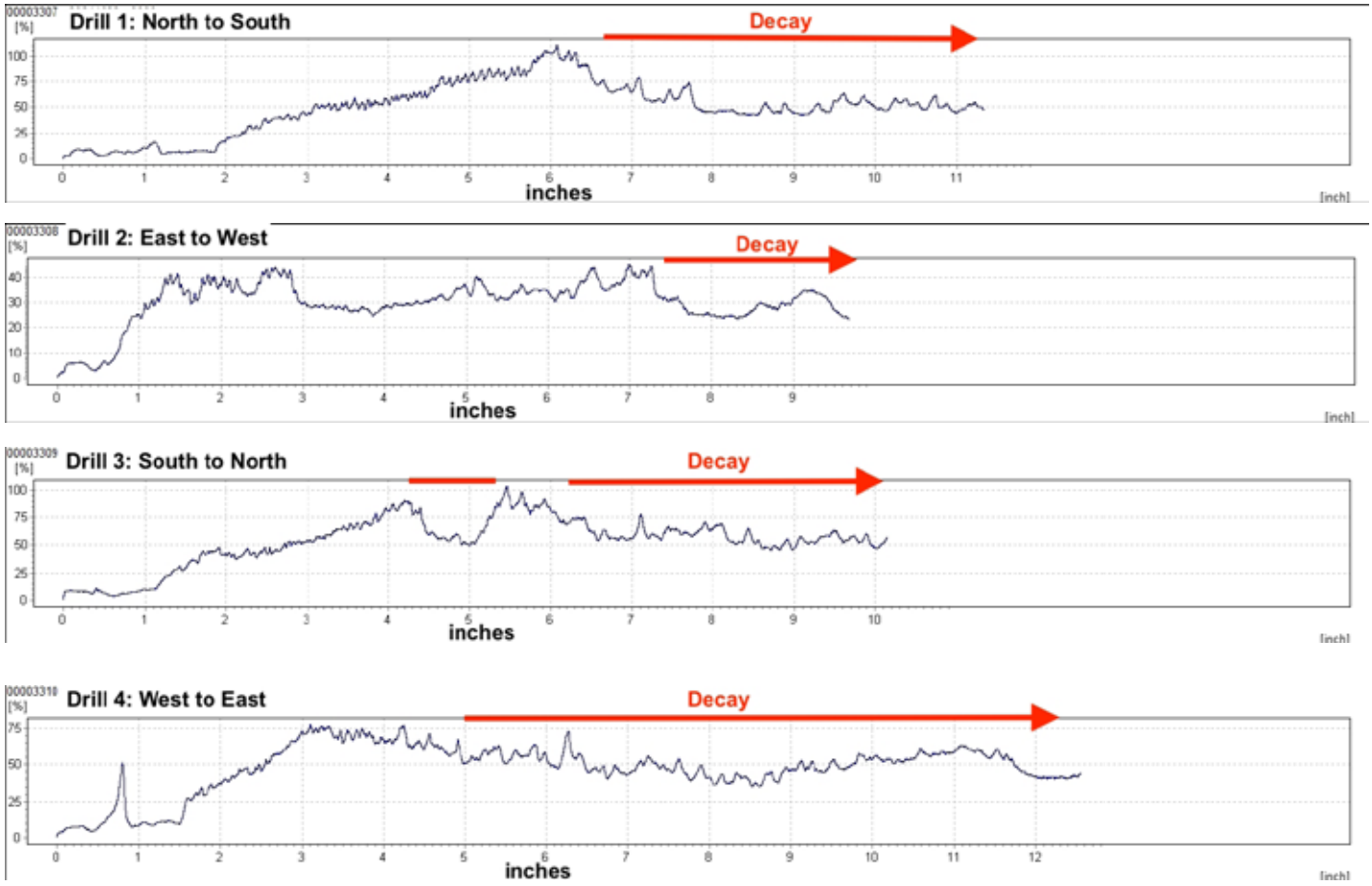
Case study: Shower tree

The following case study follows an assessment procedure and discusses the diagnostic tools an arborist used to assess a tree on O'ahu. The arborist was tasked to assess the health and structure of a rainbow shower tree (*Cassia javanica*), and to provide recommended mitigation based on the assessment. The shower tree was in a landscaped area in Waikiki. The tree received annual maintenance pruning and was irrigated regularly. The tree was 46-inches in diameter, 30 feet tall, and had a 30-foot crown spread. The tree had normal canopy density, normal foliage color, and was flowering. The health of the tree appeared to be good. The tree had a moderate lean, with a symmetrical canopy. No open cavities were observed. The tree was sounded, and no hollow areas were audibly detected. The arborist noted several fungal fruiting bodies at the base of the tree, amongst the root flare. Fungal fruiting bodies are reproductive structures of wood decay fungi, and are indications that the tree has some degree of internal decay.

The visual identification of the fruiting body prompted the arborist to conduct an advanced assessment of the tree, using a diagnostic tool to quantify the amount of decay present. The arborist used a Resistograph® to measure the proportion of solid wood to decayed wood at four locations near the tree's base at the fungal fruiting bodies. The results of the Resistograph® drill tests identified the tree had a shell wall (outer living tissue) of 3 to 6 inches thick, and internal decay of 32-36 inches across. The measurement suggested that approximately 70% of the tree's internal structure was weak wood.

The International Society of Arboriculture (ISA), and other recognized arborists have developed guidelines to evaluate the risk of stem or branch failure, relative to proportion of decay. These formulas and guidelines are useful, but they are limited. A tree's capacity to bear a load on sound wood and on a defect is dependent on many factors such as tree species, wind loading, heavy crop of fruit and seeds, and decay location. One guideline uses a rule-of-thumb ratio to assess likelihood of failure, following 1inch of sound wood for every 6 inches of stem diameter ("Evaluating Tree Defects" field guide).

Fungal fruiting body at the base of the shower tree amongst the root flare



Results from the Resistograph® drill tests conducted in four locations around the base of the tree. The bottom axis is drill depth in inches, and the y-axis is amplitude (%) or a measure of drill resistance.

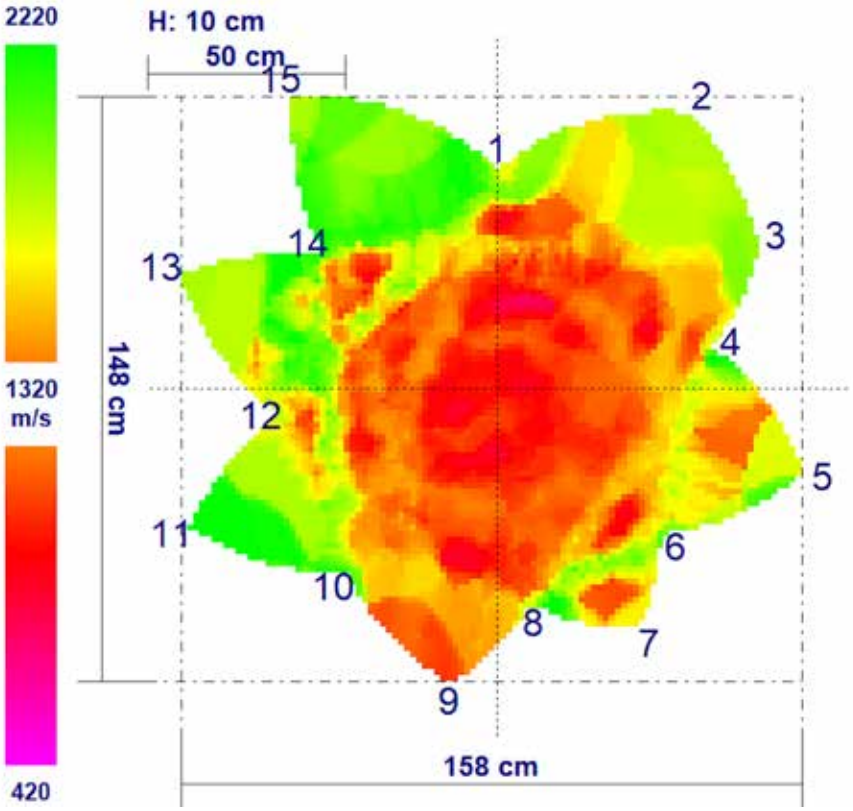
The ISA Tree Risk Assessment Manual has a similar guideline, suggesting the tree is not likely to fail under normal weather conditions if the cavity is up to 2/3 the diameter of the stem. Following these guidelines, the shower tree would require a shell wall diameter of 7.5 inches to have a low likelihood of failure under normal weather conditions.

To corroborate the results from the Resistograph® tests, the arborist an Arbotom® sonic tomography device to visualize the extent of the internal decay. The tomogaph sensors were placed around the tree at the same height on the trunk that the drill tests were conducted. The results from the sonic tomography tests identified similar results to the drill test, again indicating a shell wall thickness of 3 to 6 inches, and approximately 70% decay. Due to the extent of decay at the base of the tree, the tree's location in a high-target area frequently occupied by people, and the high likelihood of impact if the tree were to fail, the arborist recommended the tree for removal.

The tree was removed 5 months after the advanced assessment tests. Based on the advanced assessment results, the arborist had expected to see a large cavity. The tree care contractor reported that the tree looked solid, and there was no major cavity. The contractor commented that their chainsaw moved through the middle of the tree much easier than the outer shell, but the inside was still "solid". To the untrained eye, the arborist condemned a tree that was solid, even though the advanced assessments told another story.

A cross-section of the trunk was submitted to a plant pathologist for further analysis. The pathologist confirmed the presence of "white rot," a fungus that breaks down lignin, or the main structure of the wood. The advanced diagnostic tools were able to measure the degradation of the lignin and cellulose within the internal structure of the tree, and accurately detect the advanced decay. While the center visually appeared solid, the wood was indeed compromised, providing limited strength to the tree.

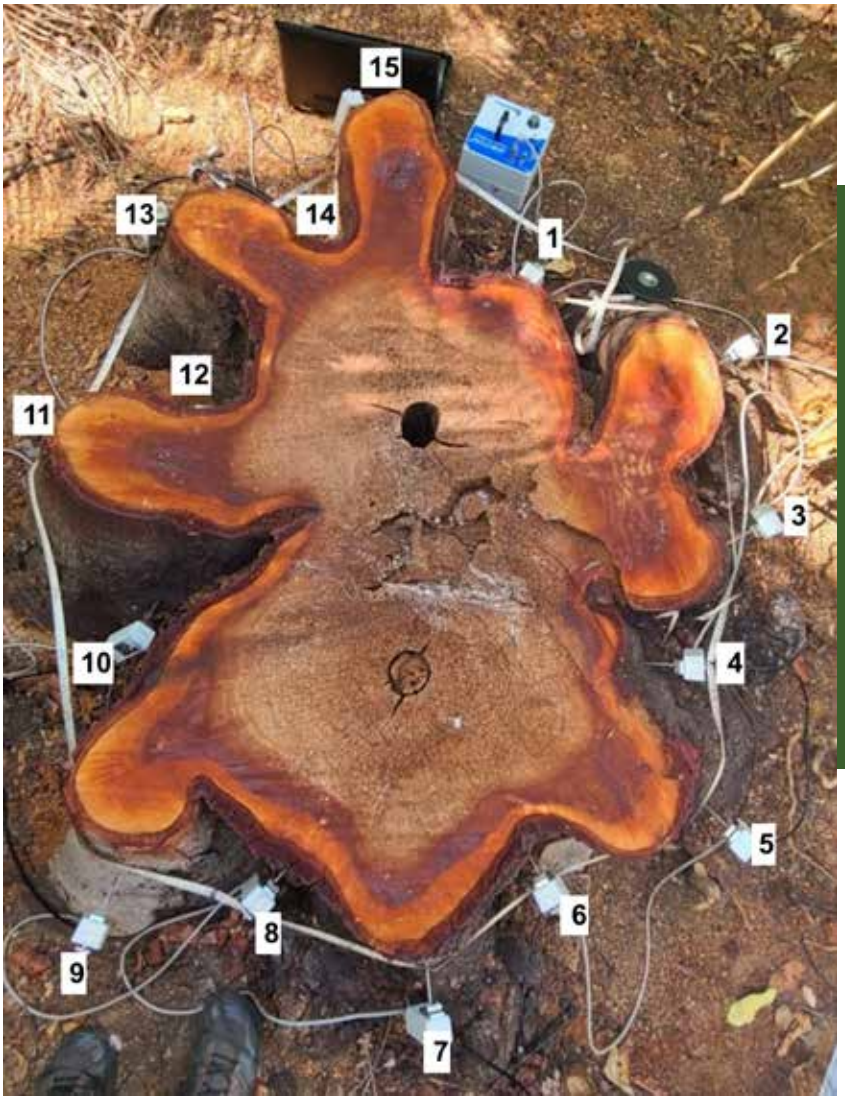
By hiring a qualified Arborist to assess the tree, the property manager took a proactive approach to hazard mitigation. The advanced diagnostic tools provided a detailed and accurate representation of the tree's internal structure, and provided the arborist with a quantifiable measurement of the decay. Post-removal follow-up with a plant pathologist confirmed the presence of a significant fungal issue



within the tree, and further supported the tree's removal. Incorporating the results into the ISA Tree Risk Assessment procedure, the tree was removed before a failure occurred.

For those seeking advanced assessment services, Certified Arborists are here to help. Tree Solutions & Environmental Consulting Services, Inc. is a family run business, with arborists providing services to the Hawaiian Islands for the last 55 years. You can reach them by phone (808) 734-5963 or email steve@stevenimz.com.

Ilana is a Tree Risk Assessment Qualified Arborist for Tree Solutions & Environmental Consulting Services, Inc.



Results from the Arbotom® sonic tomograph next to the tree's cross section. The tomograph sensors were set up on the cross section for visual comparison and orientation. The red area in the tomograph corresponds to weak wood, or the light brown area in the center of the stump. The edge around the light brown decay area shows the amount of solid structural wood.

The New BUSINESS Landscape

By: Matt Lyum

Big businesses are eyeing Hawaii's landscape industry as some already make the leap to plant roots.

Historically, the landscape industry in Hawaii has been overlooked by the national players. "Too far. Too different. Bad business climate. Poor workforce. Too backward." It's actually is hard to argue those points. In 2002, I called US Lawns and asked to buy a license so I could open a franchise here. They cited all those reasons as to why they would not allow an operation of theirs to start in Hawaii.

Yet 20 years later, things are changing, dramatically…..and quickly! Major players in the industry have descended upon Hawaii, primarily through acquisition. And this may just be the beginning of a new trend.

Why? Well there is opportunity here. California Pizza Kitchen's top grossing store in 32 states is in Kahala Mall. Even more impressive is Costco's top producing store out of hundreds nationally is in Iwilei, Honolulu.

Large Landscape Industry Companies Entering Hawaii Recently:

SiteOne Landscape Supply
$2.7 Billion Annual Revenue
2014 acquires Diamond Head Sprinkler

Simplot
$6 Billion Annual Revenue
2017 acquires Hawaii Grower Products and Pacific Agricultural Sales

Sperber Companies
$200 Million Annual Revenue
2018 Formed
2021 acquires He-Man, No Ka Oi Landscape Services
2022 acquires The Maintenance Group

BrightView
$2.6 Billion Annual Revenue
2021 acquires Performance Landscapes
2022 acquires SGS Hawaii Landscape Services

Core and Main
$3.6 Billion Annual Revenue
2021 acquires Pacific Pipe Company

Larry Ellison
$107 Billion Net Worth
2012 acquires 98% of Lanai

But it is about more than just making money. Corporations are now adopting Social Responsibility Platforms. Although it takes a little searching, SiteOne's stance is posted on their website, *"SiteOne is committed to environmental and social responsibility, and we work collaboratively with customers, associates, suppliers and other stakeholders to promote environmentally sustainable and socially responsible business practices."*

Pulama Lanai, who has been a major player in the landscape industry since its inception, puts their obligation front and center on their homepage. *"In Hawaiian, Pulama means to cherish or treasure. Pulama Lanai seeks to cherish the unique beauty and deep spirit of aloha on Lanai by creating sustainable practices, cultural connections and economic opportunities that support our island and community."*

And in the press release issued by Core & Main's Steve LeClair, Chief Executive Officer, he sums up their altruistic position as well, *"Core & Main and Pacific Pipe share a commitment to helping communities with sustainable water infrastructure. We look forward to growing together and learning how we can make a positive impact throughout the local communities in Hawaii."*

And what are these companies looking for specifically in an acquisition? In my recent experience, they go way past your financial statements. They look for your horticultural skill, your organizational structure, corporate culture, and professionalism. Ken Ota (Pacific Pipe) and I spoke about our sales recently. We both credit a lot of developing those positive attributes via the networks and the educational opportunities of organizations like the Landscape Industry Council of Hawaii and others.

These newcomers are not the intruders typified by 19th century Robber Barons, looking to exploit the locals and pillage the environment. They do not want to just set up new branches and force their superior corporate practices down our throats. They would rather acquire local companies who understand the unique qualities of doing business in the Aloha State. And these well-heeled national companies are bringing first-class training, state-of-the art resources, and a new commitment to our industry and community.

Maybe these industry giants are finally seeing what we locals already know. Hawaii has spectacular landscaping and an exceptional community. Sure, we have lots to work and improve on. But those of us who live here think it's worth the effort.

BrightView President and CEO, Andrew Masterman, sums up their awareness in a recent press release. *"Hawaii's landscapes are renowned for their beauty and cultural significance. BrightView is excited to add services to its existing capabilities on the islands."*

Matt Lyum is Founder of Performance Landscapes and a LICH member since 2000.

LANDSCAPE HEROES CAN PREVENT NEW INVASIVE SPECIES FROM ENTERING OUR ISLANDS

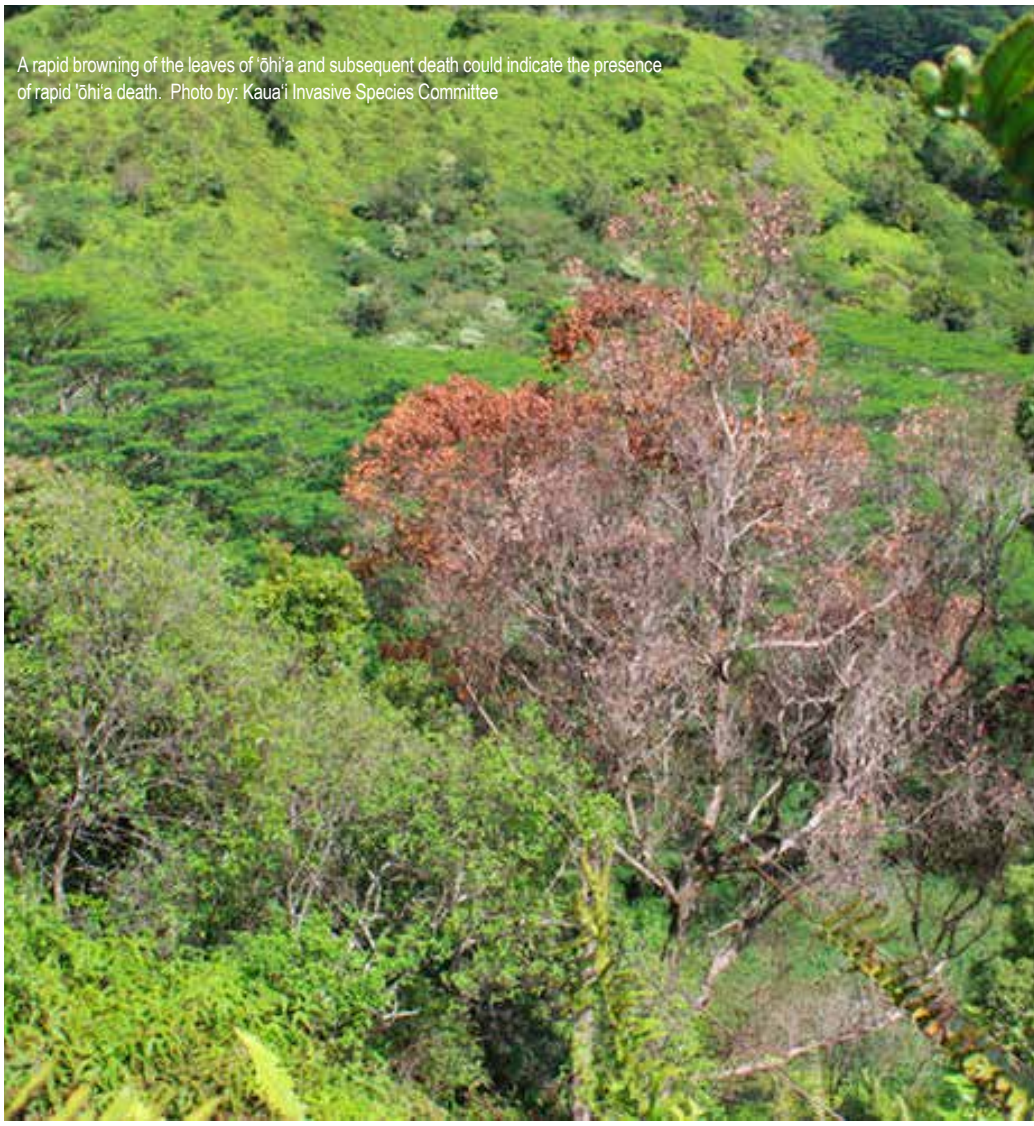
By Serena Fukushima

Photo by: Josh Spalding, Arborist Manager of Imua Landscaping Co. Inc

Hawai‘i is home to plant and animal species found nowhere else. For millions of years, new arrivals would establish in our islands an average of once every three thousand years via makani (wind), moana (ocean currents), or manu (birds, or the seeds hitchhiking in their gut). After they arrived to our isolated island chain, they evolved to live in their new environment, becoming new species. Today, due to globalization, a new plant, animal, or pathogen arrives in Hawai‘i every three days. Some of these new arrivals can become invasive, harming our environment, Hawai‘i's unique biodiversity, agriculture industry, health, cultural practices, and quality of life.

Multiple agencies across the state work every day to address invasive species issues, but it takes more to protect Hawai‘i. Many new species arrive accidentally on nursery materials or may already be here and undetected in our environment. Landscape industry professionals—nursery staff, landscapers, and arborists—can be the heroes on the front line to prevent, detect, and protect Hawai‘ii from invasive species.

Josh Spalding, Maui Arborist Manager for Imua Landscaping Co. Inc., is one of those heroes. In May of 2022, he was pruning a coconut tree in Kahului when he noticed strange-looking cuts on the leaves. Familiar with the damage coconut rhinoceros beetles (CRB) are causing on O‘ahu, such as V-shaped leaf formations and boreholes in the trunks, he immediately e-mailed the Maui Invasive Species Committee to report the suspicious leaves.



A rapid browning of the leaves of ‘ōhi‘a and subsequent death could indicate the presence of rapid ‘ōhi‘a death. Photo by: Kaua‘i Invasive Species Committee

"Arborists, tree workers, and landscapers are on the first line of defense against the fight of invasive species in Hawai‘i," Spalding says. "We are the ones with our eyes on the trees the most. If people in this business know what to look for, they can report pests early and save trees and our livelihoods from being harmed while protecting the ‘āina."

Spalding remembers watching wiliwili trees die across the state when the invasive Erythrina gall wasp arrived in 2005. Trees died quickly as the wasp spread. This made him think about how fast a new pest can impact native species and how long it takes for something to be saved, if it can be saved. "If we can stop a new pest before it spreads, that's important." he says, "With cargo and ships coming in and out daily, Hawai‘i is a hub, so things will keep coming."

Although Spalding's report ended up not being a coconut rhinoceros beetle (they are only on O‘ahu, for now), he doesn't regret sounding the alarm. "It was really good to go through the process of reporting something. It can be easy not to say anything if you see something strange out there, but MISC—and all of the other invasive species committees across the state—are helpful and easy to work with. They

Left photo: Coconut Rhinocerous beetle adults are two inches long, shiny black in color, and bear a single horn from which it gets its name. (USDA Aphis) Right photo: CRB larvae can grow up to three inches longs and are primarily found in decomposing greenwaste or dead palm stumps. Photo by: USDA Aphis

Left: CRB feeding damage is indicated by oval-shaped boreholes typically found in midrib of fronds or in the crown or trunk of the tree. (HDOA)
Right: V-cut frond damage in a coconut tree can indicate CRB presence. Photo by: CRB Response

got back to me right away and had someone visit the site to look at the leaf damage, then consulted their group of experts to determine that it was not CRB. Reporting was easy, and I will do it again if I see something else that looks weird or different out there."

Here are some pests that arborists can be on the lookout for. If you think you've seen these pests, take a photo, note your location, and report immediately to 643pest.org.

Coconut Rhinoceros Beetle

Currently only found on O'ahu). Adults are long (up to two inches), shiny black, with a single horn. CRB are nocturnal and can fly. They are primarily found in decomposing green waste or in the crown of palms, where they leave oval-shaped boreholes midrib of fronds or in the crown or trunk of the tree. Fronds cut in a V-shape pattern are another indication of CRB presence. They have also been found in hala trees and can threaten rare native Hawaiian palm species. Extensive damage can kill trees.

Rapid ʻŌhiʻa Death

Rapid ʻŌhiʻa Death (or ROD) was first detected on Hawai'i Island in 2014. Data from aerial surveys in 2019 report more than 175,000 acres of forest containing ʻōhiʻa are showing signs of the disease. It is present but limited on Kaua'i and O'ahu. One positive tree was detected and destroyed on Maui in 2019, but it is not currently known to be present on any island in Maui County.

ROD is a disease caused by aggressive fungal pathogens, *Ceratocystis lukuohia, and Ceratocystis huliohia*. While both will kill the native ʻōhiʻa tree (*Metrosideros polymorpha*), *C. lukuohia* is more aggressive. ʻŌhiʻa is the keystone tree of the native Hawaiian rainforest, providing essential habitat for bird and insect species, many of which are endangered. ʻŌhiʻa is critical in capturing and sequestering water needed for a healthy watershed and ecosystem.

Although the disease can live in the tree for years before showing signs, typically, a rapid browning of the leaves of ōhiʻa and subsequent death could indicate the presence of the disease. If the tree is cut, the sapwood will have dark vertical

Florida's citrus industry has faced an economic impact of $4.5 billion due to citrus greening. This bacterium affects citrus tree's vascular system, resulting in lopsided, bitter, hard fruit with tiny, dark seeds, blotchy mottling on leaves, and fruit that remains green even when ripe. Although not known in Hawai'i, the primary vector of citrus greening, the Asian citrus psyllid, is present in our islands. Photo by: Lotz

RIFA can cause painful stings and welts, and have occasionally caused severe allergic reactions to sensitive individuals. Similar in size and behavior to the well-established tropical fire ant, members of the public are encouraged to submit samples of any stinging ant to their local invasive species committee. Photo by: Blum

RIFA has resulted in a $1 billion impact in the United States alone. Native to South America, it is a serious pest across the continental U.S. but has not yet been detected in Hawai'i. Photo by: Noble

stains. Definitive confirmation of the disease will require laboratory testing.

Prevention and early detection are crucial to containment and eradication efforts. You can protect ōhi'a by following the Hawai'i State Quarantine rule and not moving 'ōhi'a off Hawai'i Island; clean gear, boots, and vehicles before and after entering any forests; and follow the Hawai'i Department of Agriculture's ban on importing plants in the myrtle family. Report any suspect symptoms of the disease to 643pest.org or by phone at 643-PEST (7378).

Citrus Greening

Citrus greening is caused by a bacterium that affect citrus tree's vascular system and nutrient uptake. The disease has not been detected in Hawai'i, but the primary vector, the Asian citrus psyllid, is present in our islands. Throughout the world, the arrival of the Asian citrus psyllid has been followed by the detection of this disease-causing bacteria. This bacterium is responsible for the loss of millions of acres of citrus in the US and beyond. In Florida, citrus greening resulted in 8,000 lost jobs with an economic impact of $4.5 billion. Today, Florida's citrus industry covers half the acreage it once did. Symptoms include lopsided, bitter, hard fruit with tiny, dark seeds, blotchy mottling on leaves, and fruit that remains green even when ripe.

Red Imported Fire Ant

The red imported fire ant (RIFA) is an aggressive ground-dwelling ant known for its painful stings. RIFA has resulted in a $1 billion impact in the United States alone. Native to South America, it is a serious pest across the continental U.S. but has not yet been detected in Hawai'i. Similar in size and behavior to the well-established tropical fire ant, members of the public are encouraged to submit samples of any stinging ant to their local invasive species committee to prevent an unknown infestation of RIFA from becoming

Lethal palm yellowing is caused by a phytoplasma, a bacterial parasite that lives within the plant phloem or vascular system. This disease affects at least 37 palm species and has wiped out the majority of the tall-type coconut cultivars in Jamaica and Florida. Photo by: Harris

established. Request a free ant collection kit at stoptheant.org.

Lethal Palm Yellowing

Lethal palm yellowing is caused by a bacterial parasite that lives within the plant's vascular system. This disease affects at least 37 palm species and is responsible for wiping out the majority of the tall-type coconut cultivars in Jamaica and Florida. It can take three to nine months before symptoms are apparent, including yellowing of the leaves and premature dropping of fruit. This pest is not known to be present

Top: Red palm weevil boring damage can lead to palms falling over, and adults can vector a nematode which causes red-ring disease of palms. Red palm weevil is not only a threat to landscape palms, but to Hawai'i's native and endemic palm species as well. Photo Courtesy: researchgate.net

Bottom: The red palm weevil is a species of snout beetle that is known as the most destructive palm pest in the world. It is about 1.5 inches long, red to and black with variable patterns, and can fly. Photo Courtesy: Wikicommons

in any of the Hawaiian Islands.

Red Palm Weevil

The red palm weevil (*Rhynchophorus ferrugineus*) is a species of snout beetle that is known as the most destructive palm pest in the world. It particularly targets coconut, date, sage, and oil palms. It is not known to be in Hawai'i; however, if it becomes established, it would also threaten Hawai'i's native and endemic palm species. Adults can fly and average 1.5 inches long. They are red to reddish brown and black with variable patterns. Larvae tunnel and feed from the top of a palm tree through the trunk. Their damage is often undetected until the tree dies and the crown topples. Adults can spread a nematode which causes red-ring disease of palms, another destructive palm pest. Gnawing sounds can be heard within a tree when large numbers of larvae are feeding. Feeding debris (frass) and thick white fluid may also ooze from entry holes, indicating that this pest is present.

Spalding believes education is the first step in detecting pests like the ones listed here. "All landscape professionals should educate themselves on what they're working with, starting with the plant species they are handling. Then, learning about invasive species already here or knocking on our door, and indicators of their presence."

A new training for nurseries and landscapers can help. The Pest Prevention Training Program is supported by a grant from the U.S. Department of Agriculture Animal and Plant Health Inspection Service. The training, offered by the island-based Invasive Species Committees, will feature information about the identification, reporting, and best management practices for some high-risk pests that are either not known to occur in Hawai'i, not known to occur in the United States, or pests that are present but are a high priority for containment (like coconut rhinoceros beetle). Participants of the training can earn HDOA Pesticide, Arborist, and LICT CEU and CET credits, receive educational resources and connect with the staff of their local invasive species committee. Nurseries can learn more about the Pest Prevention Training as well as the full list of pests to be on the lookout for at plantpono.org/pest-training.

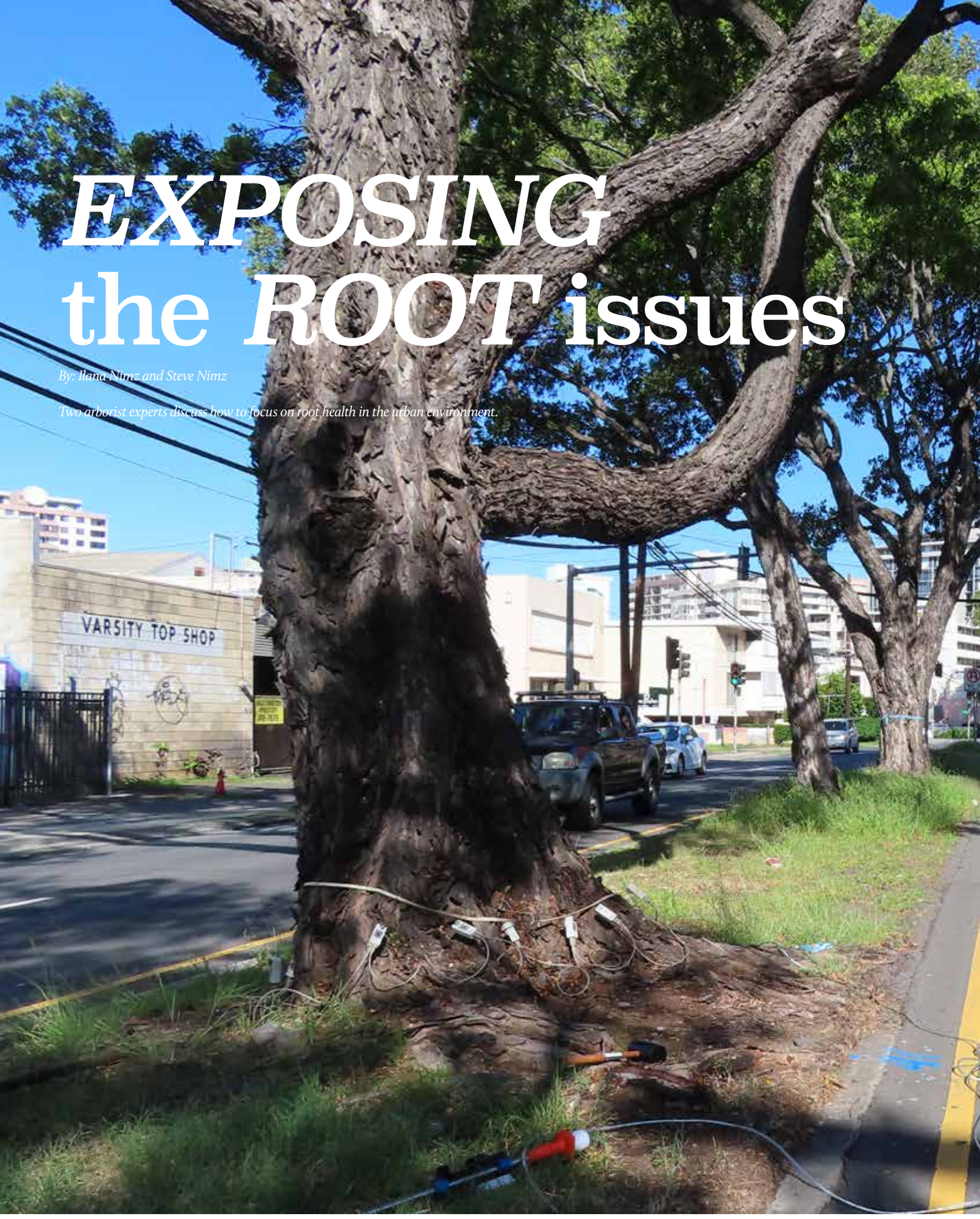
Spalding feels hopeful and is committed to spreading the word about reporting invasive species to his colleagues; "People need to be vocal: we need to work together and not be afraid to speak up. We are the eyes and ears of the landscape—no one else is more involved with trees than us. If you see a plant, animal, or disease that you have never seen before, report it. We can all do our part to protect our island's environment and our industry."

Serena Fukushima is the Public Relations and Education Specialist for the Maui Invasive Species Committee. Concerned about new invasive species arriving to Hawai'i, she keeps a small pair of binoculars in her bag in the event she spots a strange leaf formation in a coconut tree or bird that looks out of place and needs a closer look.

EXPOSING the ROOT issues

By: Ilana Nimz and Steve Nimz

Two arborist experts discuss how to focus on root health in the urban environment.



David stands at the edge of the tree root system while operating the ArboradixTM.

Whether it be uplifted sidewalks, cracked foundations or broken pipes, roots have a knack for "wreaking havoc" on our concrete jungles. But are they entirely to blame? Trees have the cards stacked against them the moment they are placed into an urban environment. People take trees that evolved to be in natural areas and open spaces, and expect trees to thrive in confined spaces with insufficient nutrients and water. Amazingly, most trees do quite well within these growing limitations, largely due to their root structures. In fact, the urban infrastructure may be contributing to how trees do so well. While not a comprehensive article on roots, we will debunk a few common misconceptions about roots, and explain approaches we take to preserve trees by working around roots.

The Root of the Problem - Roots seek out resources

Roots are excellent at navigating underground to find resources necessary to sustain the tree. Feeder roots are responsible for absorbing and transporting water, nutrients and minerals to keep trees healthy. Using "hydrotropism", roots grow towards areas with a higher moisture content by responding to a water potential gradient within the substrate. For example, roots are attracted to aging infrastructure that provides a nutrient source, such as hairline cracks in old pipes. As feeder roots grow towards these resources, they expand and can exacerbate

An example of a shower tree planted in a 3 ft. x 3 ft. planter. The tree has outgrown this planter space and its roots have caused sidewalks to crack and uplift.

An example of a Hong Kong Orchid tree planted in a 3 ft. x 4 ft. planter. The tree has outgrown this planter space and its roots have caused sidewalks, curb and gutter to crack and uplift.

the problem. If a cookie jar is left open near a child, can they be expected not to go for an easy treat? Roots act the same way, and are oftentimes caught "red handed", though they were taking advantage of an infrastructure issue that was already present.

Another familiar example is uplifted sidewalks due to subsurface roots. When trees are placed in small planters surrounded by concrete walkways or house foundations, they inevitably outgrow their allotted space and roots expand underneath the concrete, causing cracking and uplifting. The concrete actually creates an ideal environment for tree roots seeking water. Underneath most concrete slabs, the ground is damp, which provides a continuous source of water vapor into the slab. This humid space between the concrete and the ground is a "sweet spot" for roots seeking water. As roots grow and expand, they put pressure on the concrete and leads to the cracks and uplift. While roots are blamed for the uplifting, the infrastructure facilitated ideal growth conditions for the roots.

Rooted in place- Roots are shallow + always growing

While the outward root expansion helps trees absorb essential resources, this also provides the structural support needed to keep trees upright in windy conditions. Generally, tropical trees have lateral roots that grow outwards and shallow, and do not have a deep taproot. The deepest roots are only up to 2.5 ft. deep and typically under the trunk and canopy. Feeder roots can extend to several times the edge of the canopy. Take a closer look at an uprooted tree- only a narrow plate

about 2 ft. deep was holding the tree upright. Because the roots are not deep, digging to install underground utilities often impacts the tree's root zone.

The Root Cause

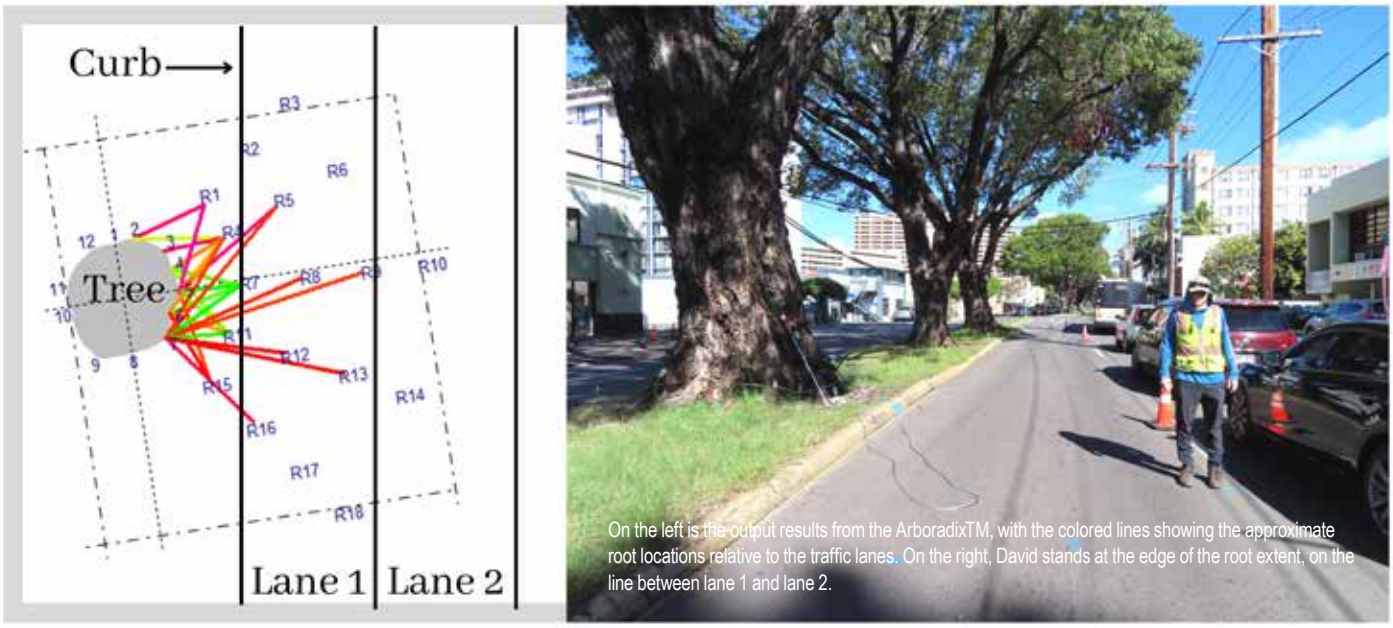
Many root conflicts start at the planning phase- putting the right tree in the right place. Planting a large tree in a small planter is akin to raising a whale in a fishbowl. Eventually, the tree is going to outgrow its space, as it is genetically destined to do so. Engineers and planners are experts on design and construction, but may not be familiar with tree biology. Having a qualified arborist assist in the design phase and choosing appropriate tree species will create a better project in the long term with fewer root conflicts.

Rooting around for solutions

Inevitably, as roots outgrow their allotted spaces, or underground repairs are required, the contractors are called in. Without tree protection measures and an arborist to guide the work, roots are susceptible to damage from large equipment running over roots, improper storage of materials, and operators digging without a "gentle touch". The project arborist establishes "tree protection zones" (TPZ) which encompass the tree's critical root zone to protect roots that are important for the tree's health and stability. The TPZ is a visual barrier, like orange fencing, used to guide contractors to work around the tree to prevent damage to the critical root zone and trunk. The TPZ may be entered under the supervision of a project arborist. The arborist will then guide the contractor in how to work around the roots to accomplish project goals while minimizing impact to the tree.

Clear communication between the arborist and the contractors, including the project supervisor and equipment operators, is key to a successful project. Many operators are accustomed to working with man-made infrastructure, like pipes, that can be repaired. Unfortunately, glue and couplings will not fix a torn or severed root. So, we use examples they are familiar with to explain how to work around roots. For example, we explain they should treat each root like a live gas line, so that they will be careful during excavation. As the arborist, our goal is to help the contractor understand why roots are important preserve, how they can be damaged by working around them, and the best ways to approach them. This helps to change their mentality about working around the roots, and makes the job run smoother.

Working around roots is a challenge, but there are many options in our toolbox to preserve mature trees and repair damaged and aging infrastructure. This spans from working on the planning and design phase, to on-site construction and trenching. While preventing root damage is easier than fixing it, skilled arborists with creative ideas can help engi-



On the left is the output results from the ArboradixTM, with the colored lines showing the approximate root locations relative to the traffic lanes. On the right, David stands at the edge of the root extent, on the line between lane 1 and lane 2.

A skilled operator gently excavated around this root with negligible damage.

A clean-cut root generating growth 1 month after pruning.

neers and construction managers make the right choices for the tree at any point of the project.

One approach to working around roots is to avoid them, by identifying where roots are before designing a project. Recently, we provided recommendations about where to place a new utility line under a major 2-lane roadway that would minimize impact to the adjacent a row of trees. We used a system called the ArboRadixTM to identify how far the roots extend into the roadway, and create a visual map of the roots. The system works by using stress-wave sensors attached to a tree and a mobile pole. We mapped the roots by moving the mobile sensor in a grid pattern over the roadway. If a root was beneath the mobile sensor, a stress wave signal was transmitted along the roots to the tree sensors, and a pathway was mapped in the computer software. This methodology showed that significant roots were within the lane closest to the trees, but did not extend into the 2nd lane, so installing the utility line there would be the best option for the trees.

Air spading is another tool we to expose roots to see them before finalizing project plans. The air spade pushes air at a very high rate of speed through a hollow tube, which dislodges soil away from the roots. The advantage of air spading is that the soil is moved without damage to the roots. Additionally, this tool does not damage non-porous objects that may be in the area or underground, like adjacent plants, irrigation pipes or utility cables. By planning to circumvent tree roots, we avoided more invasive approaches and can better preserve the health and stability of the trees.

Before pruning roots, we consider alternative options to preserve the root structure. Communicating with the contractor and project manager helps us as arborists to understand the project's goals and limitations, so we can find creative solutions to accomplishing the project while protecting the roots. A recent project involved repairing a water main underneath an Exceptional Tree. We communicated the concerns about root pruning to the contractor in a team meeting, and developed a plan to carefully excavate around the roots and tunnel underneath them to install the water main. The excavator operator was both skilled and contentious, and dug around the tree's roots to expose them with negligible damage.

Root Excavation

Bridging over roots is also an option that should be considered before pruning. This could include raising the grade of the ground, installing a speed bump over a root uplifting a driveway, or creating a keyhole in a wall to allow a root to pass through. All of these options help to preserve the tree for a longer period of time with a lower risk of destabilization.

When we cannot work around the roots, we resort to root pruning. Some trees handle root pruning well, while others are sensitive to it. Each situation should be assessed by a qualified arborist to provide the best recommendations for the tree. Root pruning will often stimulate root growth and increase the density of the root ball, but the roots will be smaller diameter and have a lower contribution to the tree's stability. New roots emerge from the edge of a cut root, so making a clean straight cut is important to facilitating new root generation. When pruning roots, we assess the proportion of roots requiring pruning to the size of the canopy. We often pair a root pruning recommendation with canopy reduction pruning to maintain tree stability. Using the knowledge and experience from a skilled arborist will ensure the best outcome for root pruning.

At the root of it

Trees survive surprisingly well amidst the un-natural concrete and asphalt of our modern jungle. Trees make our communities more livable, even if root issues arise from time to time. Consulting an arborist on urban forestry projects can help to preserve trees well into the future, while resolving tree-related issues. At the root of it, we believe that the benefits of trees outweigh the costs of uplifted sidewalks, and look forward to using creative arboricultural practices to preserve trees.

Steve and Ilana are consulting arborists, and the father-daughter team of Tree Solutions & Environmental Consulting Services, Inc.

A tree assessor uses a tablet and online inventory program to input tree data.

Learn how tree inventory tools can benefit your business

By: David Golden, Tree Risk Assessment Qualified Arborist for Tree Solutions & Environmental Consulting Services, Inc

Hawaii has a year-round growing season, which contributes to the lush appeal and beauty of the islands. But with constant growth comes constant maintenance; Tree maintenance expenses in Hawaii can be almost double compared to costs for similar services on the US mainland. Tree managers across the globe, and in Hawaii, have been adopting tree inventory and management plans to balance liability, costs, and aesthetics of their treescapes.

Tree inventories are a tool that can help entities make informed management decisions about their landscapes. A tree inventory management plan is the combination of a tree inventory (a record of the location, characteristics, and assessment of individual trees within a well-defined group) and an analysis of the tree population (inventory report). While inventory scale and complexity can vary, the inventory is designed to address the manager's specific needs, goals, and resources. By using a tree inventory, managers can be proactive about their landscape, rather than reactive.

In its simplest form, an inventory management plan uses a map from which the user can retrieve information to inform an objective. Tree inventory objectives can include managing risk, characterizing the landscape, creating a maintenance strategy, summarizing ecosystem benefits, and tracking maintenance history. The key to a usable inventory is collecting relevant data to appropriately address the manager's objectives. This can include recording information such as species, size, health and structural condition, defects (dead wood, cracks, weak branch unions, decay, cankers, root problems, and poor tree form, etc.), tree mitigation (an action to compensate for a health or structural defect), and priority (ranking of importance for the mitigation to be completed in reference to the entire population of trees inventoried).

Historically, tree inventories consisted of ledger books and paper maps. Nowadays, many inventories are digital and collected using handheld electronic devices, GPS, and computer software applications. These technological advances have allowed tree data to be analyzed quickly to provide advanced details and analyses to address the tree manager's objectives. A variety of software programs are available at various price points, and can be customized to collect the different

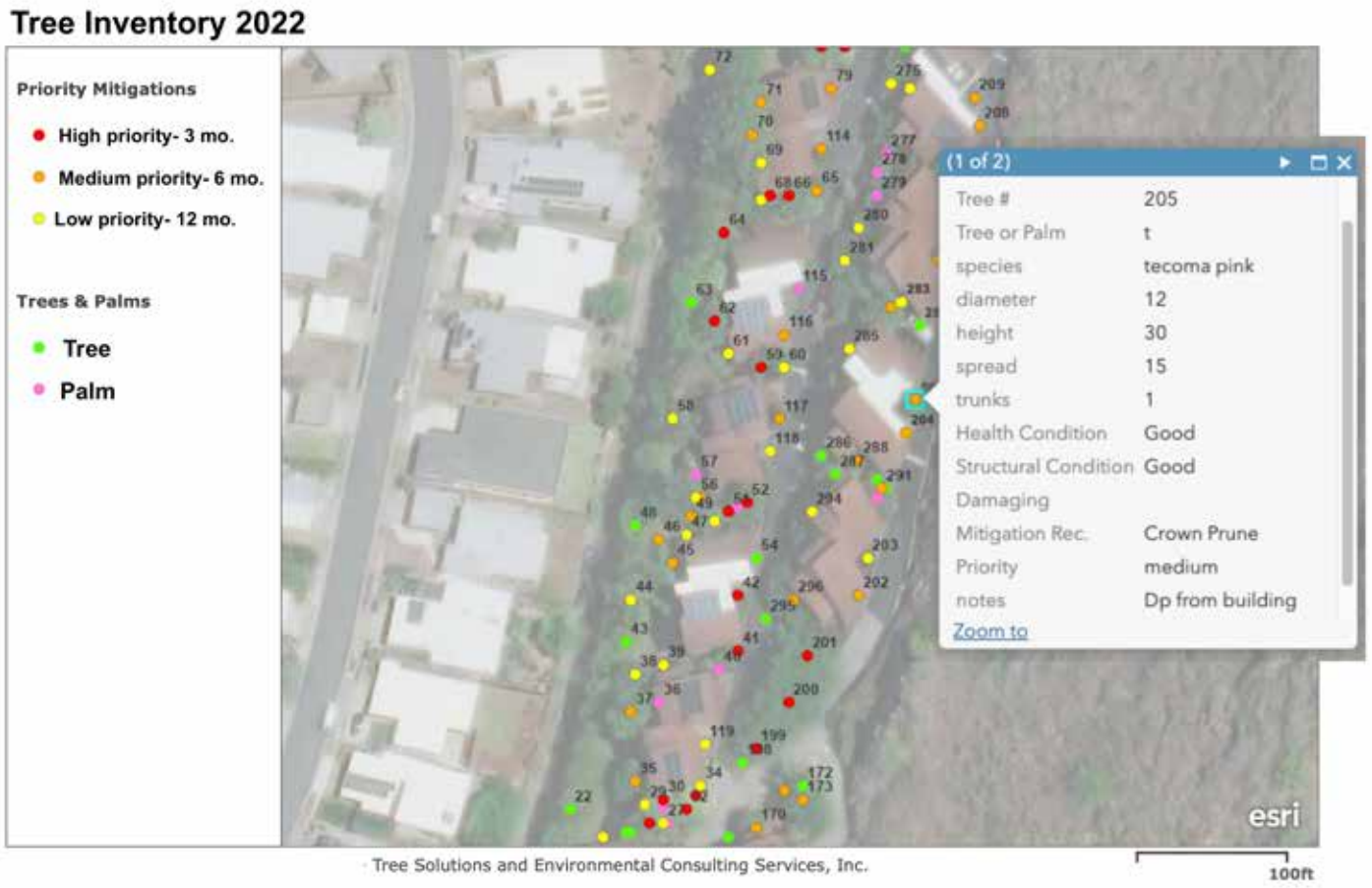
Using roller skates to get between trees can increase the efficiency (and enjoyment factor) of inventories.

attributes required to suit each need.

A variety of users may benefit from a tree inventory, including managers of public jurisdictions (municipalities and federal governments) and private management groups (i.e. home owner associations, university campuses, cemeteries, military bases, private grounds). While inventory data may be collected by people with diverse backgrounds, tree managers should hire a data collector qualified to assess their desired attributes. The cost, accuracy, and efficiency of the data collection will depend on the level of knowledge and qualifications of the data collectors. For example, managers seeking tree risk assessments for their properties can work with a Tree Risk Assessment Qualified (TRAQ) Arborist to collect the appropriate data. Additionally, tree inventories are a great way to get communities involved with their urban forests, through citizen science or volunteer group.

In Hawaii, tree inventory management plans can provide specific benefits to the managers of tree populations. Here are a few examples of objectives that tree inventories can be used to address:

- Risk Management: A TRAQ Arborist can develop a tree i nventory and management plan with tree-specific maintenance recommendations for reducing risk. The inventory can be used as a communication tool between the arborist and the manager. Then, the manager can provide the list of mitigation actions to a tree pruning contractor to communicate the work required for their property.
- Landscape planning: Up-to-date tree inventories provide the data needed to plan for treescape maintenance in both the short term and long term. With accurate data, the tasks and associated costs can be incorporated into budgets, and realistic yearly goals and maintenance objectives can be created. An inventory is a benefit to tree managers dealing with an unmaintained landscape that needs a significant amount of attention to mitigate risk and/or prune trees to have lower-risk structures.
- Natural Disaster planning: With climate change increasing the number of natural disasters in Hawaii, it is not a matter of if a hurricane or extreme weather will hit, but when. Having a tree inventory pro vides a powerful management tool when a disaster strikes. Having the tree population information readily available allows appropriate allocation of resources without waiting for a complete assessment to be made. Furthermore, knowing what the tree population is before a disaster puts application for restoration funds after the disaster on a sound footing.
- History: A good inventory management plan documents all actions taken on each tree. This documentation can range from work accomplished to contactors used and cost per tree. If litigation involves a tree, an inventory that documents the history of each tree is an effective way of showing due diligence and being proactive



A digital tree assessment map that is interactive. This map displays recommended tasks by priority, with call out boxes describing tree attributes and mitigation tasks.

about maintenance and assessments.

- Ecosystem benefits: Trees contribute to our environment by sequestering carbon, absorbing rainfall, providing food, shade and wildlife habitat, and providing aesthetic and recreational benefits. Inventories can quantify the benefits of trees to communicate their importance to communities, policy makers, shareholders or tree managers.

Examples of analyses can include species distribution of a tree population, total canopy cover percentage of defined area, total value of the population of trees, or recommended tree planting locations. On Oahu, citizen forester groups led by Smart Trees Pacific are currently collecting this information for City street trees.

A tree inventory is an investment in long-term management and planning. As the data collected represents a snapshot in time, updates are required to get the most out of the inventory and to keep the data relevant. While there is no set timeframe for updating an inventory, an arborist can guide tree managers about when the trees require reassessment.

For those seeking to create a tree inventory management plan, help is available. Tree Solutions and Environmental Consulting Services, Inc. led by Steve Nimz who has over 55 years in experience in doing tree assessments and inventories can help with landscape planning. This family business of TRAQ Certified Arborists provides tree services throughout the Hawaiian Islands. Anyone interested in their services is recommended to visit their website (http://treesolutionshi.com/) for more information on tree services and inventory management plans.

Selected References:

International Society of Arboriculture. 2006. Best Management Practices -Tree Inventories.

Department of Forestry and Natural Resources, Purdue University. 2020. URBAN FORESTRY TREE CARE SERIES Tree Defect Identification.

David Golden is a Tree Risk Assessment Qualified Arborist for Tree Solutions & Environmental Consulting Services, Inc. and specializes in tree inventories and assessments.

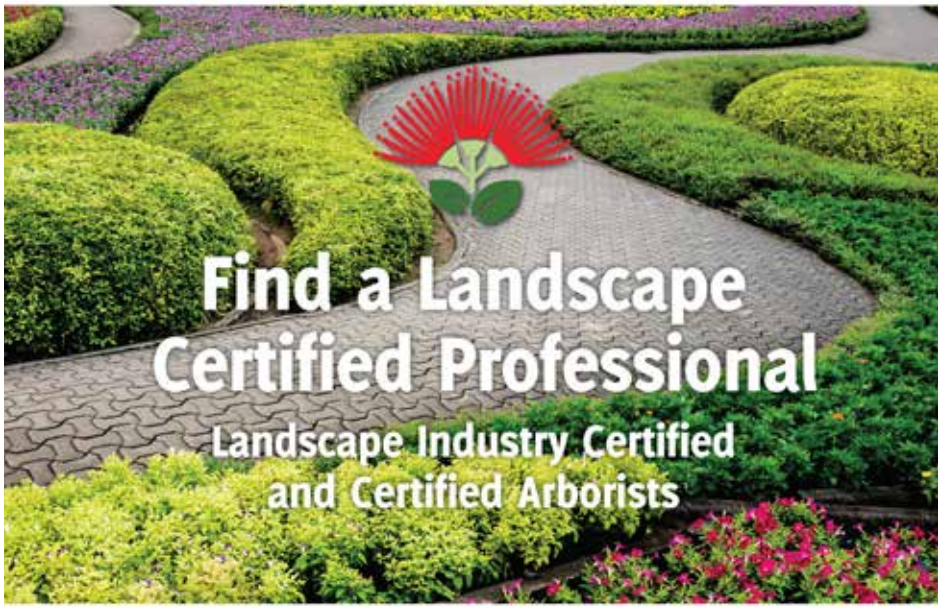
LICH
Landscape Industry Council of Hawai'i

The LICH Board of Directors invites you to be a part of our dynamic state association, Help us expand our programs by becoming a member today. You will be eligible to receive member discounts on our classes, workshops, and Annual Conference and Tradeshow. Corporate Member logos will be displayed on our web site.

When you become a LICH Member you make a contribution to the continued growth of our statewide association.

- Memberships for individuals are **$40 per calendar year**.
- Company Memberships are **$250 per calendar** and include unlimited paid staff.

To become a 2023 Member, we encourage you to join online at: **www.hawaiiscape.com**. You will immediately receive an Invoice and a Welcome Notice that you have become a member. This will help as proof of membership when signing up for HMAA Insurance. It will also help LICH build an Industry Survey which has not been done since 1986.



LICH 2023 CONFERENCE

Hawaii Convention Center,
1801 Kalakaua Ave,
Honolulu, HI 96815.

DATES ARE CHANGING

More info at:
https://www.hawaiiscape.com/conference/

The new **Find a Landscape Certified Professional** on the LICH website has a list of companies having Certified Arborists in Hawaii, provided by the International Society of Arboriculture. If you don't see your Company, let the LICT Hawai'i State Manager, Garrett Webb know by sending your information to: *palmsinkona@yahoo.com.*

If your company is listed, but you want additional information, also let Garrett know. Company information can include; postal address and location, email address, and website. Names of Certified Arborists are **NOT** included.

EXPLORE THE NEW
Hawaiiscape.com

OUR WEBSITE JUST GOT BETTER

New interface

We've streamlined the site so that you can quickly find what you are seeking.

Improved Directory

Quickly find members' information and contact details. Now with an opportunity to display your photo or logo.

Free Job posts

Have an opening you need to fill? We've added Job Posts to serve our members. **During our website launch all job posts are free for members to post.**

VISIT US ONLINE
HAWAIISCAPE.COM

LICH
Landscape Industry Council of Hawai'i

YOUR SUCCESS IS OUR PASSION.

AGRICULTURE

GOLF

IRRIGATION

WATER WORKS

HAWAII'S LARGEST DISTRIBUTOR OF

NETAFIM™ GROW MORE WITH LESS · Hunter® · RAIN BIRD · Weathermatic™ Water Conserving Innovation · Buckner SUPERIOR · TORO.

PACIFICPIPE
A CORE & MAIN COMPANY

O'ahu - Pearl City: 808.455.8700 1255 Kuala St. Pearl City, HI 96782
O'ahu - Kalihi: 808.847.8700 1726 Hart St. Honolulu, HI 96819
Maui: 808.877.5800 82 Pulehu Pl. #101 Kahului, HI 96732
Big Island: 808.747.8100 74-4701 Kamanu St. Kailua-Kona, HI 96740