

NAPLES
BOTANICAL
GARDEN

Conserve





Conservation Horticulture Manager Dan Agis and Natural Resources Associate James Pancirolli survey plants at Railhead Scrub Preserve in North Naples. Later, they will collect seeds for an eventual restoration project with Conservation Collier. *Photo by John Eder*

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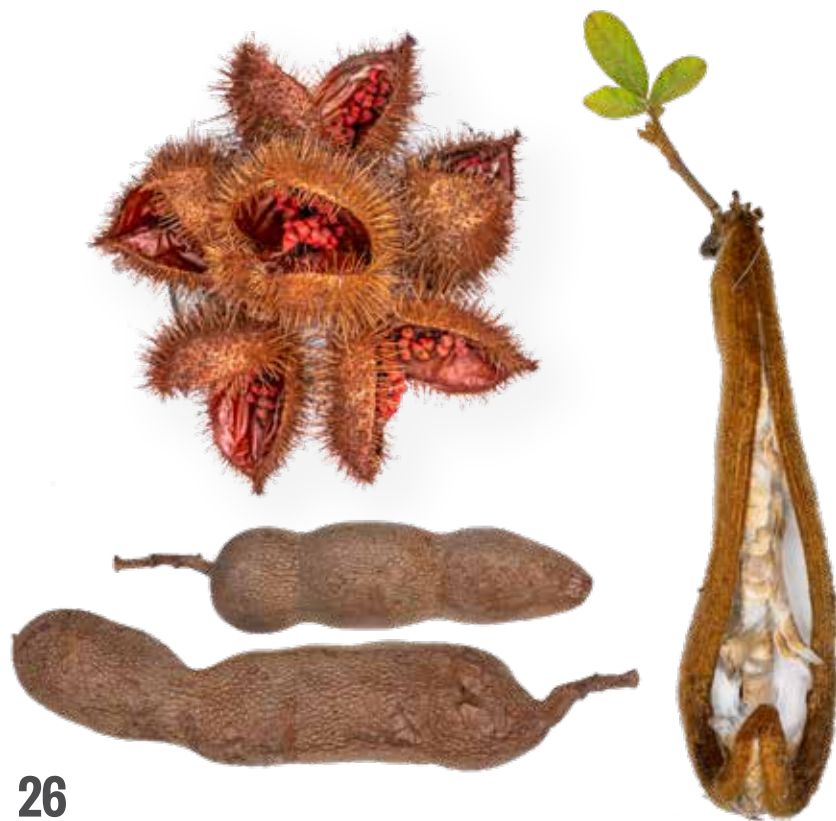
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From Our Leadership

One of the greatest rewards for me as CEO is to see my team tapped for projects that contribute to plant conservation at state, national, and even international levels.

We're helping monitor the impacts of Everglades restoration. We're sharing data that may help determine whether the ghost orchid (*Dendrophylax lindenii*) receives federal Endangered Species Act protection. A Costa Rican partner recently asked us to help protect the genetics of some of that country's rarest trees, while two of our horticulturists traveled to an island off Africa's coast to save trees that are among the last of their kind.

We're active contributors to the Florida Plant Rescue, working to find and protect the state's most imperiled species. We're among a handful of botanical gardens nationally developing new models for climate education, in the hopes of inspiring understanding and change. And, critically, we've joined a fledgling group addressing one of the biggest barriers to ecosystem restoration: a shortage of native plant seeds. The challenges are complex, but some of the nation's top restoration and conservation experts are working toward solutions. Two members of our staff are among them.

Conserve is a once-a-year publication, but between issues, you can keep up with our many endeavors via our Notes from the Garden blog, social media accounts, and our Member magazine, *Cultivate*.

These important initiatives are made possible by our Members, donors, and guests. Thank you for helping us save plants!



Donna McGinnis
President & CEO
Naples Botanical Garden



Chad Washburn
Vice President of Conservation
Naples Botanical Garden

On a recent visit to my childhood farm in northern Indiana, I shared a family tradition with my daughter, Cora. Each spring, my mom and I would drive around to look at different yards and see what new annuals and perennials we might want to include in our landscape. We generally based our choices on color and form. This year, I decided to adapt this annual activity into an ecosystem lesson for Cora. We decided to incorporate native plants from our property's prairie into our garden beds, adding both a splash of color and an environmental lift.

We settled on three species of rosinweeds. The flowers of these native sunflower relatives attract pollinators, their seeds nourish birds, and their deep taproots break apart heavy clay soils and store carbon. However, we could not find a local nursery that carried these beautiful and functional native species. Our only choice was to wait until the fall to collect their seeds and grow them ourselves.

This limited availability of native plants is a problem that extends well beyond my yard. In the face of a changing climate, large quantities of locally collected plant species are needed to restore and support ecosystems after catastrophes like freezes, floods, and storms. Along Florida's Gulf Coast alone, we'll need millions of native plants to revegetate beaches after recent hurricanes.

Naples Botanical Garden is collaborating with regional partners to identify, collect, study, seed bank, and propagate the plants needed for restoration. For me, collecting rosinweed seeds will become a treasured family memory. But for the sake of our environment, I long for a day when we have a robust supply of the native plants needed to create resilient communities and heal our land.

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ON THE COVER

Like fireworks, buttonbush (*Cephalanthus occidentalis*) bursts into springtime bloom in the Garden's Preserve. *Photo by John Eder*



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Questions and letters to the editor may be sent to email@naplesgarden.org.



Photos by John Eder

Conservation Horticulture Manager Dan Agis (left) and former Conservation Associate Jaycie Newton plant seeds of endangered and vulnerable native Costa Rican trees.

In Brief

Federal grant spurs research and conservation progress

THE GARDEN RECEIVED its first federal Institute of Museum and Library Services (IMLS) grant in 2021, allowing it to purchase equipment for long-term seed conservation. The award came with multiple targets pertaining to the number of seeds conserved, the sharing of data, and the development of protocols for seed storage and plant propagation, as

there is little pre-existing information on Southwest Florida's native species. Among the accomplishments, the Garden:

- Seed banked 40,000 seeds in the grant's first year—that's 35,000 more than the grant required.
- Developed propagation protocols for 122 species by the end of the grant's second year; only 18 were required.
- Added information about 58 native species to global conservation databases, 18 more than required.

The grant ends in August 2024. Conservation specialists



are working to meet remaining objectives, including publishing propagation and seed-saving protocols. A gift from Naples philanthropists Tanya and Denny Glass augmented the federal grant and accelerated the staff's progress.



Partnership yields unique opportunity to safeguard Costa Rican trees

IN MAY 2024, THE GARDEN received some 350 tree seeds from Costa Rica, the start of a new collection to reinforce the work of Osa Conservation, a nonprofit in that country dedicated to preserving its biodiversity.

Osa Conservation has embarked on a novel project to reforest land, increase native tree populations, and create a wildlife corridor. The pathway would allow animals, plants, and insects a migration pathway from the low-lying Osa Peninsula to higher, cooler regions as the climate warms. The Osa Peninsula harbors nearly 5% of the world's biodiversity.

In Naples, conservationists will grow some tree species in the Garden's nursery and store the seeds of other species in its seed bank. Of the eight contributed species, two are listed as "Endangered" and one as "Vulnerable" on the International Union for Conservation of Nature's Red List. The backup holdings

in Naples provide additional protection in case the primary collection in Costa Rica is lost or damaged.

Garden conservationists also will contribute to ongoing research into the best practices for propagating and growing each of the species. The Garden is seeking more such opportunities to exchange plant genetics and establish backup collections, enhancing conservation efforts throughout Florida, the Caribbean, and Latin America.



Photo by Renée Waller

Garden to assist with ghost orchid petition

SEVERAL CONSERVATION groups petitioned the federal government to place the ghost orchid (*Dendrophylax lindenii*) under the protection of the Endangered Species Act in 2022. The Garden is among the organizations tapped to provide data that the U.S. Fish and Wildlife Service will use to make its decision. The agency is

seeking information about the orchid's abundance, habitat needs, reproduction, growth, and population trends, among other things. It also wants to understand changes in the orchid's population over time, threats, and management practices that could help this rare species. The Garden will focus on compiling data on ghost orchid populations in Cuba and on filling current information gaps. USFWS is expected to issue its decision by June 1, 2025.

City of Naples includes Garden climate resilience recommendations

IN MAY 2024, THE CITY OF Naples unveiled an ambitious new plan to bolster its resilience against flooding, storms, extreme heat, and other climate-related challenges. The 153-page document includes nature-based projects in which the Garden has been and will continue to be a significant partner. Among them is an effort to cool public spaces and neighborhoods by planting shade trees, relying, in part, on the Garden's extensive research into the species that fare best in Southwest Florida's unique climate conditions. The City expressed a commitment to revegetating beach dunes using the Garden's blueprint, which our staff established



Creative Programs Lead Joe Fagnano teaches residents about the value of beach dunes.



Photos by John Eder

of Conservation Chad Washburn says. “As a leader in nature-based solutions, we are happy to be a significant contributor in this work.”

Educators inspire beach dune protection

THEY MAY NOT BE towering sand hills, but Southwest Florida’s modestly elevated, richly vegetated sand dunes are critical for the region’s storm resilience. And the community can help protect them.

Those are the key lessons shared in the Garden’s new beach dune education tours, which take place on select area beaches. Led by Garden educators, the free tours offer insight into the workings of coastal ecosystems, the importance of dunes, the Garden’s role

in their restoration, and how beachgoers can keep them healthy (Rule 1: Don’t squish the plants!). In the first half of 2024, about 200 community members joined beach talks, which took place at Lowdermilk Park, the Naples Pier, and Marco Island. The talks were supported by a grant from the Collier Community Foundation. Tours are not held during the summer but will resume in fall 2024.

Scan the QR code for tour dates, related Garden programming, and more.



at pilot planting sites along Naples Beach. Finally, the City will tap the Garden’s expertise in devising green solutions to flood-prone areas.

“The City of Naples has identified our most susceptible vulnerabilities to climate hazards and identified truly actionable strategies that will ensure we are resilient in the face of climate change,” Vice President



Photo by Stephen Jurek

Horticulturists save five historic, endangered trees on African island

VICE PRESIDENT OF Horticulture Brian Galligan and Associate Director of Horticulture Maintenance Stephen Jurek ventured around the world to the tiny

island of Rodrigues, about 500 miles off the coast of Madagascar, in May 2024 to save five historic trees that are in the way of an airport expansion project. The species are extremely rare; in the case of *Polyscias rodriguesiana*, just nine trees remain in the wild.

Galligan initially connected with the Mauritian Wildlife

Foundation through Botanic Gardens Conservation International, where representatives knew of our Garden’s proclivity for moving trees. In spring 2023, he flew to Rodrigues to oversee the arduous process of exposing, cutting, and preparing the roots for transplantation.

Jurek, who has a gift for coaxing giant machines to perform delicate tasks, joined him on this trip. He advised the local team on how to rig and lift the trees, secure them to a truck without damaging roots, and replant them on a nearby wildlife preserve. A grant and private donation paid for their expenses.

“For me it was a complete test of our combined knowledge and skills,” Jurek says. “Every obstacle that came our way, we were able to overcome and pull off an amazing tree move.”

The move was unlike any other Galligan and Jurek have performed. Tree roots, seeking water and stability, channeled deeply and asymmetrically into the island's native rock. There were linguistic barriers—a mash-up of English, French, and Creole—and cultural differences, such as an “island time” credo that Galligan and Jurek had to learn to honor. The remote island lacked basics like straps and shovels.

“The team stayed busy, applying ‘MacGyver’ skills on the fly,” Galligan says. “We put in 100% effort, and it’s now up to the trees as to whether they want to live on.”



Photo courtesy of Emily Hosea

Use of native grass may improve water quality

SOUTH FLORIDA HAS more than 2,175 miles of canals, most of which are outlined with grass that requires mowing and other maintenance to comply with government ordinances. Grass clippings, however, introduce nutrients such as nitrogen and phosphorus, common fertilizer ingredients,

to the water. Excessive nutrients can spur the growth of algae.

Naples Botanical Garden, in collaboration with our Research Associate, Emily Hosea, proposed that switching from the commonly used nonnative bahiagrass (*Paspalum notatum*) to one or more native grass species might reduce the frequency of mowing while adding other ecological benefits, such as wildlife habitat. For her master’s thesis at Florida Gulf Coast University, Hosea tested three native grasses at a canal: seashore saltgrass (*Distichlis spicata*), seashore paspalum (*Paspalum vaginatum*), and seashore dropseed (*Sporobolus virginicus*).

Her research, conducted at Freedom Park in Naples, demonstrated that native species performed similarly to bahiagrass in respect to erosion control. The native grasses provided better ground coverage than bahiagrass, deterring weed growth, and maintained a lower height, reducing the need for mowing. Moreover, they did not require irrigation or fertilizer. Hosea intends to publish her findings; in the meantime, scan the QR code to read her thesis:



Hosea is now pursuing a doctorate in plant physiology and soil science at Texas Tech University.



Washburn joins Everglades advisory group

WHAT’S DRIVING ECOLOGICAL change in the Florida Everglades? Vice President of Conservation Chad Washburn joined a multi-agency team of scientists, modelers, planners, and land managers studying human interventions to the system, such as water management strategies, and environmental changes, such as sea-level rise. Their goal is to understand the ecological effects of these factors and to measure the impacts of the Comprehensive Everglades Restoration Plan, the world’s largest ecosystem restoration project.

Can Building Better Boardwalks Keep Water at Bay?

FGCU plant ecology class begins researching theory to boost coastal resilience

By Jeannine Richards



Ecology student Mary Moody uses an instrument that measures photosynthesis and levels of stress in plants. Photos by John Eder

In examining area beaches following Hurricane Ian, Florida Gulf Coast University researchers discovered the worst occurrences of coastal erosion happened in areas devoid of plants.

Where boardwalks and walkways crossed the dunes, water eroded the sand, they found. Conversely, on either side of the walkways, grasses, shrubs, and groundcovers held sand in place and mitigated water intrusion. The findings sparked an idea: What if we could use a boardwalk material that permits some light to pass through it and allows shade-tolerant plants to grow underneath?

Light-transmitting walkway material is primarily used in docks and industrial settings where light or water needs to pass through easily. However, it has not been widely employed in beach dunes. The walkway

material is a fiberglass composite grid that allows 40% – 60% of sunlight to reach the ground through small holes. That amount of light is enough to sustain certain coastal plants.

In pursuit of this idea, students in my Plant Ecology class tested the shade tolerance of several common beach dune species in Naples Botanical Garden’s nursery. Beach plants typically grow in full sun, so knowing which species can tolerate some shade is the first step in determining whether our concept is viable. My students tested plant growth at three levels of sunlight: full sun, 40% shade, and 60% shade. The two shade levels were meant to

mimic the highest and lowest amounts of light possible with the light-transmitting walkways currently available.

We found promising results: Of the three species we tested, two showed some potential to grow in the shade, although they grew more slowly than in full sun. We plan to continue testing with additional species, and we hope to conduct future trials using light-transmitting walkway material on beaches.

Do you have a beach boardwalk that needs to be replaced? If you would like to take part in this research, please contact me at: jhrichards@fgcu.edu.

Jeannine Richards is an Assistant Professor of Restoration Ecology at Florida Gulf Coast University.

“There’s nothing about this job I don’t like”

Lifelong Collier County resident gives back to his hometown by protecting the land he cherishes

By Mike Cox

Photos by John Eder

Here’s a typical day at my job: It’s 80-plus degrees at 7 in the morning, and I’m out with a chainsaw clearing vegetation for a firebreak. It’s muggy. It’s muddy. The air is full of bugs. My personal protective equipment is stifling. The saws are loud, and there’s dust flying everywhere.

I love it.

I joined the Garden’s Conservation Team almost two years ago, an unexpected opportunity to restore the land and give it back to my hometown community.

I grew up in Golden Gate Estates, and that’s where I found my passion for the outdoors. I’m an only kid. The closest thing I had to siblings were the kids on my street. All we did was play outside.

We were one of the last generations without screens, one of the last to come home when the streetlamps came on. I feel very fortunate to be part of that generation.

My friends and I had a motto: Winter is for the woods, and summer is for the beach. I still live my life that way.

I’ve always been fascinated with plants and animals. As far back as I can remember, I knew everything had a place and purpose. Bees have a spot. Snakes have a spot. Slash pines, palm trees, alligators, panthers, and bears all have a spot. Even poison ivy and mosquitos have a spot. I was really lucky to have great influences like my dad, my Scoutmaster Chris Lombardo, and former Fakahatchee Strand Preserve State Park

biologist Mike Owen, who all taught me how unique and special this place is.

As a kid, I was fascinated with television wildlife stars like Steve Irwin and Jack Hanna. So that’s what I was doing out in the woods, being a little Steve Irwin with my magnifying glass and my plant and animal ID books. I wasn’t isolated, but I just wasn’t on the same plane as the other kids because they were less into that stuff. That’s *all* I wanted to do.

Golden Gate Estates was much more rural then. I remember when they made Golden Gate Boulevard two lanes and when they made it four. I didn’t really realize it at the time, but that’s when our environment started to change.

You don’t see anywhere near the amount of wildlife you





“The effort we put in is always 100% because ... it’s not just our community—it’s our parents’ community, our kids’ community, it’s *your* community. I’m proud to be able to conserve, restore, and protect our land so that future generations can learn to love it as much as I do.”

used to. I remember seeing bats in the mornings walking to the bus stop. Spotted skunks would set up shop in our garage and occasionally nuke our dogs. It was no big deal to spot a 400-pound bear in your backyard when you were getting ready for school. I still live in Golden Gate Estates. What I see now is development, development, development.

Before I joined the Garden, I was a boat captain. Hurricane Ian rolled through, and the company I worked for

was destroyed overnight. For the first time in a long time, I was terrified. I took a part-time position at Johnsonville Night Lights in the Garden so that I had my days available to put out my résumé. Turns out, I didn’t have to look very far. A position here opened up, and the Garden took me on.

I’ve worked in a lot of industries, but this is the best job I ever had. There’s nothing about this job I don’t like—even those sweaty days clearing firebreaks. I think maybe I was meant to

be here all along, that my fascination with nature, my years in Scouting, and my parents’ decision to settle in the Estates led me to where I am today.

I get to do some amazing things here at the Garden. I look for, treat, and remove invasive plant species. I pilot the boat with our team to places like Keewaydin Island for beach restoration work. After watching our beaches get ripped away by Hurricane Ian, being able to help them heal is really cool. I’m watching

wildlife again, like the gopher tortoises on our 90-acre Preserve, but this time I’m paid for it!

Assisting with prescribed burns is especially meaningful. In addition to conducting them at the Garden, we help with burns in places like Picayune Strand, which is on the border of Golden Gate Estates. My parents on more than one occasion have had wildfire encroach on their home and property. By holding prescribed burns, we reduce pine needles,

leaves, and other debris that can cause wildfires to spread out of control and threaten neighborhoods like mine. Being able to help the community in this way means the world to me.

Being from Collier County makes me even more driven to do these things. There’s a passion and a love for this place that only someone from here can have. The effort we put in is always 100% because it’s *our* community. It’s not just our community—it’s our parents’ community, our

kids’ community, it’s *your* community. I’m proud to be able to conserve, restore, and protect our land so that future generations can learn to love it as much as I do.

Mike Cox is the Garden’s Natural Resources Manager.



Using Plants to Tell the Story of a Changing World

Garden educators pilot new climate curriculum,
test driven by students committed to making a difference

By Jennifer Reed

How do you get kids excited about plants? First, you wrestle them away from screens and cajole them outdoors.

Then, you introduce them to nature's wonders—swamps, forests, lakes. You connect botany to bounty—as in the food they eat—and show them university laboratories where researchers unlock plants' secrets.

And, finally, you wait to see if the lessons embedded within these adventures stick.

In summer 2023, Garden educators adopted a group of 15 Immokalee Community Academy middle schoolers who'd expressed an interest in the environment and a willingness to dedicate a portion of their school vacations and after-school hours to discovering the impacts of climate change through the lens of plants.

The Garden is one of six botanical gardens nationally developing educational programs and new teaching strategies through a United States Botanic Garden initiative called PLACCE, Plants and Climate Change Education. The Naples kids promptly ditched that moniker and renamed themselves "D.R.A.G.O.N. Squad" in honor of their mascot. It stands for, "Dedicated Researchers Adventuring for Greener Outdoors Now."

Each participating garden selected a different target audience and developed programming suitable to it. Our institution took on middle schoolers—historically, the level that's regarded as too old for field trips and too young for research or volunteer endeavors.

"They're that missing middle," said Vice President of Education & Interpretation Britt Patterson-Weber. "This is an opportunity to develop something new."

Garden educators started with basics—How does a plant work? What is an ecosystem?—and worked their way into more advanced concepts pertaining to climate change, and its impacts on plants, ecosystems, and people.

"It's really a dual conversation," said Interpretation Supervisor Em Kless, who led the curriculum development. "It's how are we going to be negatively impacted (by climate change)?



Students learn about the role beach dunes play in protecting shorelines from wind and water damage during a summer 2023 trip to Delnor-Wiggins Pass State Park. Below: Former Garden educator Donnamarie Richmond holds up a mangrove crab so a student can photograph it. *Photos by John Eder*

How will plants be negatively impacted? What does our potential future look like? ... But then, the most important part of the program is the opposite of that. It's talking about nature-based solutions and how if we protect these plants, they will protect us."

Garden educators introduced students to nature-focused community organizations and talked about the role individuals can play in environmental protection. In one exercise, for example, they assigned students roles in an imagined county commission meeting involving a proposed new road through the Everglades. Educators stacked the deck in favor of pro-development advocates, showing students why speaking out for the environment is so important.

"Even just going to visit these places—

that supports the environment," Kless said. "Going to hike at CREW (the CREW Land & Water Trust) or Pepper Ranch Preserve shows everyone else in the community that this is an important place."

The students had been to neither of those places before joining D.R.A.G.O.N. Squad. That's why the field trips became an essential part of their experience.

"No one is going to protect the environment unless they know about it," Patterson-Weber said. "You have to care about it and form a relationship with it first."

PLACCE was conceived a couple years ago after representatives from the U.S. Botanic Garden sought input from colleagues in the public garden community on their needs and





Photo by John Eder

Counterclockwise from top: Students discover Florida habitats by kayak as they paddle the Estero River in March 2024. Florida Gulf Coast University Professor Brian Bovard helps students collect plant material on campus as part of a lesson on wetland plant diversity. Interpretation Supervisor Em Kless leads students on a tour of the Garden's Preserve in March 2024. Conservation Horticulture Manager Dan Agis show students how to map rare plants using a tablet.

interests around climate change education. Few had tackled climate change but many aspired to do so. The national garden launched its own PLACCE program and supported five others through funding and peer-to-peer professional development. Ultimately, the programs they create, for audiences ranging from families to middle schoolers to master gardeners, will be shared with botanical gardens and arboreta across the United States with a goal of spurring climate conversations in places where people are immersed in nature.

“Any garden that wants to use these models can shape them to fit their audience and their region,” said Amy Bolton, USBG’s Director of Learning and Engagement.

Our Garden’s version of PLACCE was—like any new program—a series of hits and misses. Out of both excitement and trepidation, the students were on full alert during a trip to the Fakahatchee Strand Preserve State Park, their first foray into South Florida’s swamps.

“It was a bit scary knowing there were a bunch of alligators in the water,” said Eliana Guerra, once safely back on the bus and smiling at the experience.

Students stayed respectfully attentive during a trek through CREW’s vast trail network, clutching native plant reference cards and scanning the greenery for those species. A pair of deer emerged from the marsh and stood still long enough for the group to admire them.

The kids laughed at their purple-stained fingers and lips after sampling fresh-picked mulberries at Cultivate Abundance, a community garden in Immokalee.

They fell asleep at their desks listening to a flat-voiced narrator talk about fish biology and sustainable harvesting in preparation for an upcoming fishing trip. Garden educators agreed later that learning to pivot was their biggest lesson.

But even in moments in which educators thought the students had checked out, they asked questions or made observations that proved otherwise. In one such case, Kless inflated a balloon and wrote the names of crops the group had seen at Cultivate Abundance. The students had to keep the balloon from



Photo by Em Kless



Photo by Mary Helen Reuter



Photo by Em Kless



Students feel a begonia leaf during a behind-the-scenes tour of Naples Botanical Garden in July 2023.

Photo by John Eder

hitting the ground. Initially, they were allowed to use all body parts, but in each subsequent round, Kless forbade the use of an arm, then a hand, then an elbow, and so on. This symbolized the crippling of farmers as they cope with unpredictable rainfall, lost soil nutrients, increased temperature, and related pressures.

Midway through the game, a student asked, “Can we get something back?” Offer a nature-based solution, Kless challenged the group, and earn the re-use of a limb.

“Preserving habitats with diverse species,” shouted one student, Uri Torres. Kless nodded and allowed players to resume using their left hand.

“Composting waste!” offered another, Rosenberg Cruz.

Bolton, in Naples to observe the program, watched from the back of the room. After the session, she remarked, “The game today showed these kids really are listening. And that’s an important lesson for adults ... The kids will inherit this planet. And they’re paying attention. So, my questions to the adults are: What are we teaching them? What are we leaving them? And what messages are we giving them day to day about climate change?”

Patterson-Weber says the year spent with the D.R.A.G.O.N. Squad will influence

the Garden’s overall programs. For one, she says, educators are more comfortable talking about climate change, an issue that institutions like ours have tended to avoid because of the complexity of the topic and the politics surrounding it. In writing the PLACCE curriculum, educators learned how to talk about the climate in ways that are accessible, engaging, and non-threatening.

“Visitors to our garden or any institution like this are not coming here thinking, ‘I want to learn.’ They’re coming because they want to have fun. We have to find ways to take these hard topics and make them fun or entertaining,” Patterson-Weber said.

Bolton said she believes that botanical gardens provide the perfect backdrop for these conversations. Audiences, she explained, come to botanical gardens out of a love for plants and the outdoors.

“It’s easy to say to them, ‘If you love this, then here are some things we know are going wrong. Let’s have a conversation about what we can do to preserve these things that you love.’”

Jennifer Reed is the Garden’s Editorial Director.

Kids “School” Education VP on Teaching Strategies

Education is a two-way street, and the D.R.A.G.O.N. Squad schooled me this year.

First, middle school students get a bad rap. Are they bundles of conflicting impulses, wrapped in both the energy of elementary kids and the angst of high schoolers? Absolutely.

But they’re also hilarious and shockingly aware of the world around them. Even when you think they’re not listening, they are ... so, what are we saying? Are we adults talking about solutions or are we bemoaning a future full of doom and gloom? Are we including young people in conversations about the future? While the kids are likely to sing songs about cow flatulence as we drive past farms on field trips, they are just as likely to wonder aloud about the impact of methane in the atmosphere. This age group is a lot savvier than they get credit for.

The students also reinforced the importance of local issues in forging emotional connections. At a documentary screening in fall 2023, one student told me he didn’t pay attention until Immokalee was mentioned because he cares about his home. When we talk about environmental issues, especially the big ones, we must start with what’s important to people: their home and community.

Lastly, fun is underrated as an engagement tool. Perhaps the biggest challenge of this pilot was developing *fun* plant-centered climate change curriculum. Another lecture would not have been well received after school or during the summer. We didn’t lose anything with this approach; if anything, prioritizing fun elicited positive emotions and made concepts “sticky.” That’s a lesson we can apply to our visitor programming at the Garden because, let’s face it, very few people come to the Garden to learn. Visitors want to have a good time. Lecturing won’t achieve our educational goals, but engaging, interactive experiences will.

Britt Patterson-Weber is the Garden’s Vice President of Education & Interpretation.



Top left: Britt Patterson-Weber works with students. Above, from the top: A student helps the Conservation Team sort seeds. Students collect material in a petri dish for a nature journaling activity. A student uses a Brix meter to measure sugar content while learning about photosynthesis. Photos by John Eder



coastal groundcherry (*Physalis angustifolia*)

National Native Seed Shortage Inspires Local Collaborative

Garden and growers partner to restore county beaches

By Jennifer Reed
Photos by John Eder



After Hurricane Ian struck Southwest Florida in September 2022, Naples Botanical Garden leaders had hoped they would be helping restore denuded beaches by the next rainy season.

Other recovery projects superseded beach revegetation, and two summers later, the coast remains largely barren. But even if local officials had been ready to tackle shoreline restoration right away, they might have been lacking the essential element: plants.

Across the country, communities like Naples can't purchase the types or quantities of native plants needed to heal their ecosystems after natural disasters. There simply are not enough growers collecting wild-sourced seeds, multiplying them, storing them, and producing plants for restoration projects.

"Of the 18 species we wanted to use in dune restoration, as many as eight of them just were not available for purchase," said Vice President of Conservation Chad Washburn, who searched a database of native plant nursery inventory. Even commonly used dune plants, such as sea oats (*Uniola paniculata*), were hard to find

due to post-hurricane demand. Several large nurseries instructed buyers to check back for new stock.

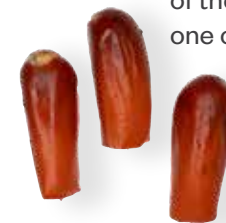
That's how Naples Botanical Garden ended up entering the supply chain.

Since spring 2023, Garden conservationists have been visiting Collier County beaches, collecting seeds and cuttings and multiplying plants as quickly as possible. By summer 2023, our team had grown tens of thousands of plants representing 18 species.

That may sound like a lot, but it doesn't come close to the million-plus plants needed for Collier beach restoration. As a botanical garden, we're not set up for large-scale production, so we've formed business partnerships with commercial growers who can multiply our wild-sourced, native plants to the volume needed.

North Port-based EarthBalance, a firm specializing in environmental restoration, has applied to manage Collier's shoreline revegetation project. Final approval on its bid is expected in fall 2024. If the project moves forward as anticipated, EarthBalance will use the Garden's recommended species mix, planting strategies, and the native genetics our team collected. Also partnering on the project is Naples-based commercial grower American Farms, which has been working with the Garden to mass produce dune species that are difficult to find in the nursery trade but integral to this project.

The Garden-nursery collaboration is one local solution to the nation's native seed problem. A 2023 National Academies of Sciences, Engineering, and Medicine (NAS) study warned the supply of native seed is "severely insufficient" in the face of intensifying natural disasters. In 2021 alone, the United States saw \$145 billion worth of damage caused by wildfires in the West, floods in California and Louisiana, freezes in Texas, and a spate of tornados, cyclones, and other severe storms. The following year, Hurricane Ian inflicted nearly \$113 billion in damage—the nation's third costliest storm on record.



cycad seeds

Seeking a national solution

The native seed shortage isn't a new problem. To address it, the Bureau of Land Management started a Seeds of Success program in the western U.S. in 2001. A National Seed Strategy was unveiled in 2015. The 2021 Bipartisan Infrastructure Law contains funding for native seed collection. Although those efforts yielded progress, they haven't achieved a unified national agenda and a consistent native seed pipeline.

A new Restoration Seed Bank Association, formed in the wake of the NAS report, aspires to fill in the gaps of earlier efforts. It brings together organizations engaged in native seed collection and banking to foster collaboration and advance common goals. Washburn and Garden Horticulture Manager Dan Agis have joined the fledgling group and are serving on a subcommittee addressing standards and best practices for seed collecting and saving.

The challenges are many. Most commercial nurseries specialize in cultivated seeds for agriculture and landscape design, not wild-sourced ones for restoration. There's often little information available on how to store and grow native plants. There's financial risk as growers can't predict when and where a natural disaster will strike, how much and what types of seeds will be needed, and how much lead time they should allot for production.

"People don't think about getting those plant materials until they're ready to put a shovel in the ground," said Edward Toth, Chair of the Restoration Seed Bank Association and one of the NAS report authors. "But you can't do it that way."

Growers, he explained, need lead time—and a guaranteed return on their investment.

"The demand is increasing, but the



autograph tree (*Clusia rosea*)



yellow necklacepod
(*Sophora tomentosa* var. *truncata*)

supply is not there,” added Toth, who is also Director of the Mid-Atlantic Regional Seed Bank, which focuses on native seeds. “How do you bring the entire supply chain up to that level of functionality—so that it’s equal to the demand and it’s sustainable, and you have growers who have viable businesses?”

Local grower steps up

There are growers interested in addressing the challenge. Among them is American Farms, one of the state’s largest producers of annual and perennial plants. The company is the Garden’s source for rotational blooms.

Like most commercial plant producers, Jim Pugh, an American Farms partner and its Director of Horticulture, had little experience with natives. After Washburn and Garden President & CEO Donna McGinnis approached him about partnering, he agreed to take a small batch of dune plants to experiment. They flourished. With Garden staff collecting the starter seeds and cuttings, Pugh knew his team could take over the rest.

“We had the wherewithal to scale,” he said. His staff propagates as many as 700,000 plants a week for its overall operations.

Pugh acknowledged the supply-and-demand issue for native plants is a “major concern” for any grower. But in the case of

Southwest Florida beach restoration, the need was abundantly clear, as was his company’s interest in helping heal the community.

“Doing this is a good thing. We definitely need to do something about our beaches. They’ve been obliterated up and down the coast,” he said.

The long road to a national strategy

While this Southwest Florida collaboration takes shape, other regional and national efforts such as the Restoration Seed Bank Association are just getting underway.

“All of this is new. There’s no pathway on how you do any of it,” Washburn said. There’s not even a working definition on what is a restoration seed bank, he added.

The issue is gaining traction. Among many upstart initiatives, a Northeast Seed Network launched in 2023. Out of that group sprung the Restorative Landscape Coalition, dedicated to enhancing native seed supply in the Northeast. Still, an overriding challenge remains: how to scale regional ventures into a sustainable supply chain, Toth said. He would like to see the government invest in the creation of a comprehensive industry.

“Otherwise,” he cautioned, “we will continue to chase our tails as we have for decades.”

In the meantime, botanical gardens are certain to play a key role in advancing native seed saving thanks to their expertise in conservation, horticulture, and community engagement.

“Naples Botanical Garden is one of many public gardens across the country working with land managers, commercial nurseries, and others in the plant industry to address these issues,” Washburn said. “In our case, we hope that starting at a local level will make a difference for the Southwest Florida community.”

Jennifer Reed is the Garden’s Editorial Director.

How much seed does the United States use?

As an example, the Bureau of Land Management (BLM) purchased 1.5 million pounds of seed in 2020, two-thirds of which went to manage the restoration of 422,000 acres burned in a wildfire, according to the National Academy of Sciences (NAS) report on the native seed shortage. To restore Collier’s beaches, upward of a million plants will be needed.

Where do seeds for restoration come from?

The initial collections originate in the wild and are then bulked up in a nursery. But to date, funding for this labor-intensive process has been inadequate. “How do you get the funding to collect for something that isn’t needed right now?” asked Garden Vice President of Conservation Chad Washburn. In the Garden’s case, grants from the Collier Community Foundation and the Second Chance Foundation supported the effort.

Why the emphasis on local collections?

Plants are adapted to their region’s unique conditions—the weather, the soil, the other species that surround them. A sea oat from the Carolinas is not the same as a sea oat from Florida, even if they are both *Uniola paniculata*. Amassing enough seed from any given region is a significant challenge. In 2020, for example, only an eighth of the grasses the BLM used in restoration projects originated in the areas in which they were planted, the NAS reported. The rest were native plants sourced elsewhere and used with the hope that they could adapt to their “mismatched” new environments.

Why are so many species types needed in ecosystem restoration?

Government agencies like the BLM have gotten away from stabilizing soils with monocultures of grasses—native or not—and instead seek to replicate nature’s diversity. That’s what makes Collier County’s adoption of the Garden’s recommendations unique; beach restoration generally relies on sea oats alone. A diverse plant palette is critical for biodiversity, wildlife habitat, and coastal resilience.



cocoplum (*Chrysobalanus icaco*)

Plumeria

Jacaranda (*Jacaranda mimosifolia*)

Coralbean (*Erythrina herbacea*)

saw palmetto (*Serenoa repens*)

trumpet tree (*Tabebuia* sp.)



Racing to Protect Florida's 200 Most Imperiled Native Species

Florida Plant Rescue collaborators comb the wild to find and collect these rare plants before it's too late

By Jennifer Reed

With some 3,200 native plant species, Florida is a hotbed of biodiversity. But hundreds of rare plants have been pushed to the brink of extinction because of habitat loss, climate change, storms, sea-level rise, and related pressures.

A race is on to protect them.

About three years ago, the California-based Center for Plant Conservation (CPC) launched the Florida Plant Rescue, a multiyear effort to protect 200 of the state's most imperiled native plants in seed banks or living collections, ensuring they persist even if lost in the wild. Naples Botanical Garden is among 10 participating conservation organizations.

The groups started their work with a solid foundation—69 of the 200 rare species were already safeguarded in botanical collections. Since then, they've added 33 others, pushing the project past the halfway mark with 102 imperiled species now secure.

This year could see an even bigger milestone. The National Park Service for the first time has authorized Florida Plant Rescue participants to gather seeds on its lands, opening Everglades National Park and Big Cypress National Preserve for plant conservation. Everglades National Park spans 1.5 million acres and harbors nearly 800 native species, about one in

Fringeleaf tickseed (*Coreopsis integrifolia*)
Photo by Hanna Rosner-Katz

four of which are endangered, threatened, or commercially exploited. Big Cypress National Preserve encompasses 729,000 acres and similarly hosts hundreds of native plant species.

Naples Botanical Garden and Fairchild Tropical Botanic Garden will lead collecting efforts on those lands. Targeted species include the thicket wild petunia (*Ruellia succulenta*); West Indian tufted air plant (*Guzmania monostachia*); and Simpson's rain lily (*Zephyranthes simpsonii*).

"Our team is grateful for the opportunity to visit these lands with the intention of further protecting the rare flora," said Conservation Horticulture Manager Dan Agis. "We hope to learn a lot in the process and make a significant contribution to conservation in our state."

The CPC is also working with the U.S. Forest Service to secure permission to collect rare plants on its properties.

"Florida has this amazing geography that makes it so special floristically, but it also makes it just so vulnerable in terms of sea-level rise and development threats in the inland areas," said former CPC interim CEO and Vice President of Science and Conservation Katie Heineman, who oversaw the inception of the plant rescue. "That's why the CPC felt it was really urgent and important to give special attention to Florida."

Previously, the CPC organized a California Plant Rescue in its home state, which served as the model for the Florida project. That initiative aims to protect 1,166 endangered native species.

The Naples Botanical Garden team thus far has contributed collections of four species. One was the attention-grabbing Punta Gorda spider lily (*Hymenocallis puntagordensis*), a delicate white flower known to exist only in Charlotte County. Jaycie Newton, a former Conservation Associate who contributed to this project during her tenure, had steered her Garden colleagues to a spider lily population at the Fred C. Babcock/Cecil M. Webb Wildlife Management Area, where she'd once worked and observed the plant. Over five trips, they collected 47 seeds, a significant victory for the state's botanical community, which had virtually no information on that flower.

Other rare plants are not quite as showstopping, like the sand-dune spurge (*Euphorbia cumulicola*), a tuft of a plant not even as high as a shoe sole. Still, Newton noted, each plant plays a role in its ecosystem, and its absence could trigger unknown effects.

"You could argue it's just a little baby euphorb, but it also holds sand in the event of storms," she said, using an abbreviated term for "euphorbia."

The project is about to get more challenging. Most participants—including those from our Garden—started with familiar plants in known locations. Now, they are beginning to delve into new territory.

Our next contributions, for example, will take Garden conservationists deep into Fakahatchee Strand Preserve State Park, an 85,000-acre wilderness dubbed "the Amazon of North America," and the 13,000-acre Corkscrew Swamp Sanctuary, North America's largest old-growth cypress forest. The team will seek royal palm (*Roystonea regia*) and the Florida star orchid (*Epidendrum floridense*). (Learn more about a regional effort to find rare native orchids and epiphytes on page 36.)

The decision to prioritize royal palms may strike Southwest Floridians as odd, given their prevalence. "Most of the royal palms we see on the roadside and in landscapes are actually from Cuba," Agis explained. "Those seeds were sourced from Cuba and then just continually propagated."

The team also plans to continue searching for the giant orchid (*Eulophia ecristata*) (see pg. 34), which Vice President of Conservation Chad Washburn spotted and photographed years ago at Corkscrew Swamp. Conservationists will return to that location to search for the elusive plant, which has not been seen in its previously known habitat, Rookery Bay National Estuarine Research Reserve, since Hurricane Ian.

Resources permitting, the team hopes to target two additional species found in Fakahatchee Strand and Corkscrew Swamp Sanctuary. In 2025, they hope to collect the beautiful pawpaw (*Deeringothamnus pulchellus*) on Lee County's Pine Island. That plant is protected under the federal Endangered Species Act, requiring special permits to gather its seeds.

FLORIDA PLANT RESCUE SUCCESSES

Hanna Rosner-Katz, a research scientist at the Florida Natural Areas Inventory, coordinates the Florida Plant Rescue. She singled out a few major finds and victories:



Photo by Jaycie Newton

Punta Gorda spiderlily (*Hymenocallis puntagordensis*)

Florida conservation organizations had almost no information pertaining to this species of spider lily, first described in scientific literature in the 1960s—a relatively recent find for botany.

"The Naples staff really contributed to our knowledge of where these species occur," Rosner-Katz said. "That species is as rare as we thought. It's only located in such a small range and found nowhere else in the United States—actually, nowhere else in the world."



Photo by Hanna Rosner-Katz

Fringeleaf tickseed (*Coreopsis integrifolia*)

Plants in the *Coreopsis* genus are considered Florida's official state wildflowers, but this particular species is known to exist in only five counties in North Florida. The U.S. Fish and Wildlife Service is considering adding it to the list of species federally protected under the Endangered Species Act. "We found—and 'refound'—populations all along the Chipola River," said Rosner-Katz, who was part of the team scouting out potential populations for seed collection with Atlanta Botanical Garden representatives. "It had not been seen in over 20 years."



Photo by Amy Jenkins

Tiny purslane (*Portulaca minuta*)

This species was not known to exist in Florida until about 2012, Rosner-Katz said. "It is imperiled at both the global and state levels. In Florida, it occurs in the Keys on three islands, which, of course, are highly threatened by sea-level rise."

Fairchild Tropical Botanic Garden in Miami is working to conserve this plant. It is tiny—a mere inch across—and located in some of the state's rarest habitat, pine rockland, 90% of which has been lost to development.



Fred C. Babcock/Cecil M. Webb
Wildlife Management Area



Photo by Jennifer Reed

A Garden conservationist examines a sprouting plant hoping it will be a rare giant orchid (*Eulophia ecristata*). It proves, instead, to be a palm.

Collecting seeds is only part of the challenge. These rare plants can be finicky to propagate and difficult to grow outside their habitats.

“If you have them in the seed bank, it’s really important to know how to grow them once you remove them. Otherwise, you can’t really do anything with those plants,” Agis said. Additionally, some targeted species cannot survive cold storage and must be tended as live plants, requiring conservationists to determine nursery conditions that replicate wild habitats.

Eventually, Heineman said, these plants may be used to restore damaged ecosystems.

Make no mistake: Even though the Florida Plant Rescue partners are making strides in saving vulnerable plants, this effort alone won’t save the state’s shrinking wildlands and the plants, fungi, animals, and insects that call them home.

“We don’t want the public to be confused by the outcomes of this,” Agis said. By the project’s end, people may feel the job is done and plants are safe,” he explained. But conserving 200 rare native species “doesn’t mean the ecosystems are protected.”

Agis hopes, instead, that these plants will shine a spotlight on the bigger picture. “We’re losing all these ecosystems every day to development and habitat destruction and other things. These are plants that we’re losing, and maybe that will make people more inspired to protect things at the ecosystem level.”

Jennifer Reed is the Garden’s Editorial Director.



Above: Rookery Bay’s Jared Franklin leads Garden conservationists on a search for the giant orchid (*Eulophia ecristata*) for the Florida Plant Rescue. *Photo by Jennifer Reed.*
Right: Giant orchid (*Eulophia ecristata*). *Photo by Valerie Anderson (via iNaturalist.org).*



WHAT IT TAKES TO “RESCUE” A PLANT

On a May morning in 2022, Naples Botanical Garden conservationists and Jared Franklin of Rookery Bay National Estuarine Research Reserve walked a commonly traversed trail and found an uncommon plant: the pineland twinflower (*Dyschoriste angusta*).

It was among the team’s first target species for the Florida Plant Rescue, and what an auspicious way to start! Although listed as “Globally Imperiled” by NatureServe, a network that tracks biodiversity in the Americas, Garden conservationists found them by the thousands, flourishing in the sandy, pine-shaded woodland.

But they soon tempered their excitement. These plants, they discovered, flower and seed



Pineland twinflower (*Dyschoriste angusta*)
Photo by Brandon Corder (via iNaturalist.org)

only a few individuals at a time, requiring them to revisit the site on multiple occasions. For species on the Florida Plant Rescue list, this is not an unusual occurrence.

“You have to constantly go back and monitor to get the different genetics and add more seeds to your collection,” said Jessica DeYoung, the former Conservation Horticulture Manager who oversaw the Garden’s Florida Plant Rescue collections from its inception through spring 2024. It’s important to gather seeds from multiple plants to achieve genetic diversity in your collection, she explained.

But at least they found the twinflower. Other targets have proven more elusive.

In fall 2023, Franklin and the Garden team set out to explore another portion of Rookery Bay’s 110,000-acre preserve, this time a rugged, arid habitat that teems with bugs on wet days and bakes in the South Florida sun on clear

ones. They were searching for the giant orchid, (*Eulophia ecristata*), a terrestrial orchid that produces yellowish-maroon flowers and can grow as tall as 5 feet.

When not in bloom, though, a giant orchid looks like a palm seedling. In a landscape of endless saw palmetto, identifying the orchids—if they existed—seemed impossible. The team concentrated their efforts at the juncture of coastal scrub and pine flatwoods, the orchid’s preferred habitat, and within a roughly 500-square-yard region where land managers have spotted them before.

“I’m sure we have it growing, but it’s a game of cat and mouse,” Franklin said, scanning the area. “They’re ephemeral. They spring up, they seed, they die back.”


A Garden conservation associate crouched beside a tiny plant that could be a young orchid. Franklin joined him and gently touched the sprigs.

“(The orchids) tend to be a little softer, a little more flexible,” Franklin said. “I’m leaning toward palmetto.”

Franklin hasn’t seen any sign of the orchid since Hurricane Ian flooded the region in 2022. Garden conservationists made four trips to that section of Rookery Bay and returned empty-handed each time. They are now turning their attention to Corkscrew Swamp Sanctuary where the plant may exist.

The flood and the missing orchid underscores why these rare plants need to be “rescued,” said Chad Washburn, the Garden’s Vice President of Conservation.

“Naples Botanical Garden, the Center for Plant Conservation, and the rest of the Florida Plant Rescue organizations are working to ensure that we can conserve our state’s most imperiled species before they are lost,” he said. “These collections allow us to study and learn more about the requirements of each of the species in the hopes that we can not only ensure their survival into the future, but that we can one day restore them to their original habitat.”

A group of people, including a man in the foreground wearing a wide-brimmed hat and a backpack, are walking through a dense forest. They appear to be searching for plants, with one man in the foreground looking up and another in the background looking towards the camera. The forest is lush with green vegetation and tall trees under a blue sky with white clouds.

Like a Botanical Game of “Where’s Waldo?”

Plant experts hope to learn more about the state’s rare orchids. First, they have to find them.

By Jennifer Reed
Photos by John Eder

Natural Resources Associate James Panciroli scans the forest for rare orchids and epiphytes.



Surveyors must hone their ability to spot rare orchids and epiphytes amid dense forests. Bottom right: Director of Collections Nick Ewy points out his latest find, documented with a photo and a notebook entry.

The boardwalk through Audubon's Corkscrew Swamp Sanctuary attracts more than 100,000 guests a year, but the backcountry portions of the 13,000-acre property, accessible only to staff and visiting researchers, is rarely traversed and maintains the same mystique that the explorers of yesteryear must have encountered.

On a mild April morning, a dozen hikers set out to investigate one enigma of these woods—the presence of rare orchids and other epiphytes. South Florida's wildlands harbor some of the state's most charismatic and imperiled species, including the ghost orchid (*Dendrophylax lindenii*) and the cigar orchid (*Cyrtopodium punctatum*). With just over 100 native species, Florida has the richest diversity of native orchids in North America. But much remains unknown about the size, range, and

health of their populations. To find these plants, you must comb places like cypress swamps and hardwood hammocks, guided by GPS and a sense of adventure.

This survey's participants represent three organizations—the Sanctuary, Naples Botanical Garden, and the Florida Fish and Wildlife Conservation Commission—along with independent experts who've joined the excursion out of a love for these plants and desire to protect them. Over the next few hours, they will survey the perimeter of a wetland, tallying every state-listed endangered, threatened, and commercially exploited orchid and epiphyte they see. They'll also note other relevant finds, such as the presence of wildlife—a sign of ecosystem health—and that of invasive plants, an ever-looming threat.

The group steps into the forest's dappled

sunlight, boots squishing in mud. The understory is sparse, allowing them to pick their way through the cypress relatively unencumbered. The unofficial ringleader is Mike Owen, a biologist who recently retired from Fakahatchee Strand Preserve State Park, where he spent 30 years conducting such surveys in the 85,000-acre forest. In late 2023, he began examining some of South Florida's other vast conservation lands—Big Cypress National Preserve, Corkscrew Swamp Sanctuary, and the Florida Panther National Wildlife Refuge—together with land managers and plant experts such as the ones assembled today.

It does not take long for them to spot their first orchid.

"One *Encyclia tampensis*?" Owen, the notetaker, confirms with the group's "scouters,"





Orchid surveys offer a chance to explore untrodden regions and discover the secrets they hold. Top right: Mike Owen's 3-by-5-inch notebooks contain a trove of data on orchids, epiphytes, other rare plants, and invasive species. Bottom right: Owen surveyed orchids for 30 years as the biologist at Fakahatchee Strand Preserve State Park. Now retired, he's collecting similar data at other regional conservation lands with the help of fellow plant experts, land managers, and volunteers.



recording the butterfly orchid in a 3-by-5-inch notebook using a shorthand code. “At 8 feet (high)? On a cypress? Does it have a new (flower) spike? Woah!”

Owen responds to every find with that infectious, kid-on-Christmas-morning excitement. Fieldwork opportunities with Owen and other experts is one reason why the Garden’s Director of Collections, Nick Ewy, a well-regarded epiphyte expert, attends as many surveys as he can. “You learn something every time you come out,” he says. The group dubs Ewy “eagle eye” for his ability to spot a twig-sized orchid from 30 feet away. Ewy likens the exercise to a botanical version of “Where’s Waldo,” requiring experts to scan the green panorama and focus their vision on the places where the orchids are most likely to “hide.”

There is not one singular research question these surveys seek to answer, but the information feeds lots of projects. A botanist from Marie Selby Botanical Gardens in Sarasota seeks insights into the endangered

Florida star orchid (*Epidendrum floridense*). A researcher at Florida International University is investigating the presence of scale, tiny insects that affix to plants. Ewy uses the excursions to deepen the Garden’s ties with other conservation organizations and better understand orchids in the wild, knowledge that advances his orchid propagation work and creation of realistic displays on our campus. Alex Meinders, a Research Technician at Corkscrew Swamp Sanctuary, says he hopes to see the information logged in conservation databases to aid researchers.

The surveys at the Sanctuary have revealed plants such as Florida star orchid specimens that previously had not been detected. The surveys there also help researchers understand epiphyte growth in an old-growth bald cypress forest, the largest of its kind in North America.

The survey data may contribute to larger regional conservation initiatives, land management decisions, or seed banking efforts. It will also factor into the U.S. Fish and Wildlife

Service’s decision on whether to add the ghost orchid—a prime focus of these excursions—to the federal endangered species list.

“We’re creating quantitative baseline data,” Owen explains. The information, he hopes, will help future scientists understand how ecosystems change over time and the impact that stressors such as hurricanes, floods, droughts, and fires may have on the rare epiphytes.

Owen has amassed a trove of data that he’s just beginning to analyze. At Fakahatchee, he filled 90 of those 3-by-5-inch notebooks denoting rare epiphytes and other plants of interest—9,000 pages tallying the rare native species, their size, flower and seed production, host trees, and other characteristics that help scientists understand them and their ecosystems.

From several yards away, someone calls out, “Fuzzy-wuzzy!”

“Touchdown!” Owen exclaims, whipping out the notebook and recording the *Tillandsia pruinosa*, an air plant. “That’s a state-listed

endangered epiphyte with the coolest name.”

By the survey’s end, the group recorded numerous other species, including the state-endangered yellow helmet orchid (*Polystachya concreta*), the delicate ionopsis (*Ionopsis utricularioides*), and a state-threatened needleroot orchid (*Dendrophylax porrectus*), which is leafless, like its more famous cousin, the ghost orchid.

“It’s special being out in these kinds of places, especially the places that very few people have experienced,” Ewy says. “You just never know what you’re gonna find.”

Jennifer Reed is the Garden’s Editorial Director.



Forest Hike Yields First-of-its-Kind Sighting

When I'm not at the Garden managing our Preserve, I'm out in the woods learning as much as I can. You learn a lot from just observing. I'll often go to the same spot over and over because you don't see everything in one day. Animals, for instance, are elusive. You'll see different ones at different times. Plants flower at varying times of the year. You learn to look for their changes as seasons shift. I saw an insect the other day that I never knew existed. I documented it and later looked it up. It was a tooth-necked longhorn beetle, I discovered.

I try to take those powers of observation into my work, whether I'm monitoring for invasive plants or joining an epiphyte survey with my Garden colleagues and experts from around Southwest Florida. One particular survey stands out.

It was December 2023, and I had traveled to the Florida Panther National Wildlife Refuge. With me were Nick Ewy, the Garden's Director of Collections, former Fakahatchee Strand Preserve State Park biologist Mike Owen, and Ginny Palmer-Skok and Andy Skok, who have helped Mike with orchid surveys over the years. The area we chose to explore was composed of pine flatwoods, sloughs, and rockland hammocks, which are lush forests with limestone outcrops and multilayered tropical vegetation. This mosaic landscape is a perfect example of what supports a biodiverse ecosystem in Florida. I anticipated lots of discoveries.

During our lunch break, I decided to investigate the rockland hammock where we were resting. It had an allure that I just couldn't ignore.



Speckled ladies' tresses (*Cyclopogon cranichoides*)
Photo by Ryan Horvath

I wandered away from my companions, my eyes downward. Hammocks are ideal habitats for terrestrial orchids. My intuition was right. I glanced upon two rare terrestrial orchid species known as speckled ladies' tresses (*Cyclopogon cranichoides*) and spurred neottia (*Eltroplectris calcarata*). Neither was flowering yet, but I was able to identify and differentiate the plants based off their growth form and leaves.

This was a significant find on its own; only later did I learn what a big deal it really was. Neither of those species had ever been documented at the Panther Refuge. This find meant a lot to me. I was born and raised in Naples. I love exploring and documenting our outdoors and sharing it with others. We idolize Disney, but that magic we all admire and love and appreciate exists in the natural world.



Spurred neottia (*Eltroplectris calcarata*)
Photo by Ryan Horvath

Ryan Horvath is a former Natural Resources Associate at the Garden. Since authoring this piece, he has decided to pursue additional education.



Blazes Spark New Life in Preserve

Garden conservationists and FGCU students track surge in key species following prescribed burns

By Jeannine Richards

Fire used to be a natural phenomenon in our landscape—during the first storms of summer, lightning strikes would ignite grasses and other plants that had withered over the dry season. Without human infrastructure in the way, these fires would burn until they hit a natural barrier, such as a river or swamp.

Ecosystems on high and dry ground, such as pine flatwoods, were the most likely places for fires to occur. They depend on periodic blazes to keep the landscape the same. Without fire, trees overtake these open pine savannas, and many of the specialized species in the understory begin to disappear.

One such example is Curtiss' milkweed (*Asclepias curtissii*). It is listed as “endangered” in Florida because there are so few places left where it grows. Most of its flatwoods ecosystem has been purchased by developers. Much of the remaining habitat has become overgrown due to the lack of fire, prohibiting this milkweed from persisting. As remaining plant populations become disconnected from each other by roads, grassy lawns, and parking lots, the chance that

the populations will disappear altogether increases, too.

Could fire help prevent its loss?

Naples Botanical Garden has begun using prescribed burning in its Preserve as a tool for restoring pine flatwoods to the way it used to be. Prior to reintroducing fire, there were only a few flowering Curtiss' milkweeds documented. It's not clear whether others may have existed; this species can be hard to find because it is relatively small and can remain dormant underneath the soil for years at a time.

A prescribed burn in July 2023 yielded many plant surprises, including an uptick in the Curtiss' milkweed population. Florida Gulf Coast University plant ecology students, whose class was held at the Garden, collected scientific data to pinpoint where this species grows best to help Garden staff know more about conserving it. They documented and mapped 59 Curtiss' milkweed plants and found that they occur only on the Preserve's most elevated, dry spots. This species prefers full sun all day, so it tends to be found in scrub habitat with few trees. Based on these parameters, students used models to predict that Curtiss' milkweed might also be found in another area of the Preserve that has not yet been burned. So perhaps more plant surprises await!

Jeannine Richards is an Assistant Professor of Restoration Ecology at Florida Gulf Coast University.



with netted pawpaw because it is a close wild relative of *Asimina triloba*, the fruit known simply as pawpaw.

In recent years, interest in pawpaw fruit has surged throughout the eastern United States, where the tree grows naturally in forest understories along riverbanks. The fruits are large and green and have a surprising tropical taste reminiscent of mango and banana. This edible pawpaw is not found in Southern Florida, but there are other closely related species, such as netted pawpaw, that grow as small shrubs throughout our state. Although not grown for their fruit, these species have the potential to be bred with the northern pawpaw to produce plants with advantageous qualities like drought resistance.

Native Pawpaw Flourishes After Fire

By Dan Agis

Following the Garden's prescribed fires of 2023, netted pawpaw (*Asimina reticulata*), a native Florida plant that we're tracking and tending as part of a North American agricultural initiative, is suddenly flourishing, producing thousands of delicate white flowers across the Garden's Preserve. The abundance of flowers is also attracting this plant's pollinator, a beetle known as the dark flower scarab, which has not been observed in the natural areas until this year. We're concerned

Because of netted pawpaw's presumed crop-enhancing value, Garden conservationists set out to locate all the specimens they could find in the Smith Uplands Preserve. They hoped to gather fruit and seeds and start growing a collection of these shrubs in the nursery. But unlike the northern pawpaw, the netted pawpaw is a fire-adapted species—flames improve their ability to reproduce in the wild. Before the prescribed fires, none of the Preserve's 158 netted pawpaw produced fruit naturally. The only fruit the team collected was the result of hand pollination.

The combination of increased flowering, pollinator presence, and natural fruit production are indicators of the ecological benefits of managing our natural areas with prescribed burning. With more fruit available, our team hopes to expand our collection for future research and long-term conservation.

Dan Agis is the Garden's Conservation Horticulture Manager.





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Contact Rhea Merrill, Director of Development,
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