

NAPLES
BOTANICAL
GARDEN

Conserve



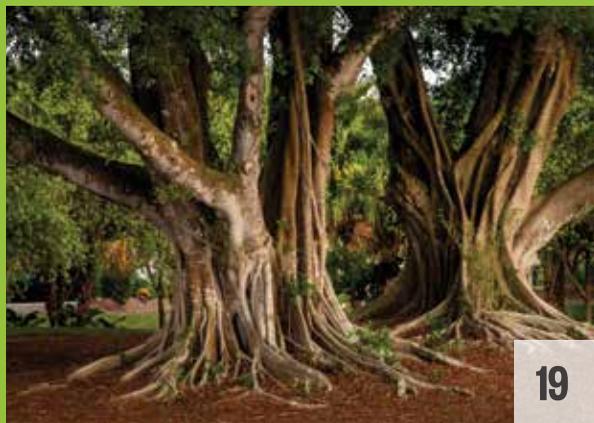


The Garden works throughout Southwest Florida and beyond, but our home base and living laboratory is our 90 acres of native Florida habitat, including lakes, living shorelines, and the rare coastal scrub that guests can access from the lakeside path.

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ON THE COVER

A Florida sunset shines through a slash pine on Marco Island. Photo: David Leaser, fine art photographer and Marco Island Beautification Advisory Committee member

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CONSERVE 2022

Editor	Jennifer Reed
Graphic Designers	Kristen Camisa, Ashley McGowan, Victoria Franklin
Senior Content Manager	Jenny Fuentes
Director, Communications & Marketing	Renée Waller
Vice President, Development & Marketing	Andrea Nickrent

From Our Leadership

Five years ago this September, we faced devastation. Hurricane Irma struck Southwest Florida and roared through the Garden, leaving uprooted trees, denuded branches, and sun-exposed plants in its wake.

But Irma gave birth to many things, too, including a new focus on plant conservation, urban landscaping, and ecosystem restoration. You see, we pledged to build a better, more mission-based Garden as we cleaned up the storm's mess.

This issue of *Conserve* takes you inside those efforts. Our staff has taken on community restoration projects, such as rehabilitating one of the region's last remaining coastal scrubs with Conservation Collier and rebuilding beach dunes with the City of Naples. We're partnering with the South Florida Water Management District on a pilot project to improve water quality. And we're part of large-scale, multi-garden conservation efforts, such as the Florida Plant Rescue and a national push to protect wild plants that could strengthen the nation's food supply.

The Garden rebuilt and reopened quickly after Hurricane Irma. But our contributions to plant conservation and environmental health are only beginning. Your support helps us fulfill this critical mission. Thank you.



Donna McGinnis
President & CEO
Naples Botanical Garden

When I'm not in my office or the field, you can usually find me fishing on the beach with my son, Sam. He is in love with fishing in the same way that I was enamored with plants at his age. The hours we spend together on South Florida's beaches teach me as much about fishing as about our changing coastlines. I've learned firsthand that beaches can change in drastic ways over short periods of time, but they are incredibly resilient.

Last Thanksgiving, we fished in the backwaters off Murdock Point in Cayo Costa State Park and watched as large game fish followed the rush of tidal waters through an inlet. On a return trip just five months later, the inlet was gone. Shifting sands had not only closed off the pass but also had begun the process of forming a dune ecosystem.

Perennial sea-purslane (*Sesuvium portulacastrum*) was the first plant to sprout. Small clumps of this the low-growing beach stabilizer had begun to spread across the bare sand. Saltgrass (*Distichlis spicata*), another pioneer species, was taking hold and had already produced its first flowers. These two species were just the beginning. Over time, these plants will trap sand that blows in from Gulf waters, laying the foundation for a dune ecosystem that features an array of plant species. It is this plant diversity that makes the dunes so resilient.

The hours on the beach are priceless for father-son bonding and equally valuable for helping me understand the workings of our dynamic coastlines. These observations inform the Garden's beach dune restoration work and help us to be better stewards of this precious resource.



Chad Washburn
Vice President
of Conservation
Naples Botanical Garden

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



In Brief

Better grass (hopefully) equals better water

THINK MAINTAINING a yard is hard work? Try keeping up with the grass along the South Florida Water Management District's massive network of canals. Not only are the demands labor-intensive, they are environmentally problematic. Routine mowing spews exhaust into the air and deposits nutrient-rich grass clippings into the canals, degrading water quality.

The Garden is partnering with the district's Big Cypress Basin in Collier County to develop a better management



Natural Resources Associate Emily Hosea (top) and Natural Resources Manager Ian Talty plant grass along Freedom Park canal. Photos: Jennifer Reed

practice. Our experts have teamed up with water managers on a pilot project that swaps traditional *Zoysia* sod with three species of low-maintenance, low-growing native grasses along a newly widened bypass ditch at Fred

W. Coyle Freedom Park in Naples. The grasses (*Distichlis spicata*, *Paspalum vaginatum*, *Sporobolus virginicus*) tolerate a wide range of environmental conditions, including drought, flooding, and salinity. They also absorb nutrients such as nitrogen and phosphorus that might otherwise infiltrate water. The grasses will be evaluated to identify the best species to reduce or eliminate mowing, improve soil stabilization, and reduce the volume of grass clippings entering the canals, thereby lessening the amount of organic matter and nutrients afflicting the water. If successful, this project may be replicated at other Water Management District canals.

Agencies save important wetland species

GRASS MAY SEEM ubiquitous, but finding and amassing the *right* grass for stormwater ponds and wetland restoration projects is a challenge. One important species, *Spartina bakeri*, or sand cordgrass, grows at Picayune Strand Preserve State Forest. But large roadside patches were in the way of a restoration project. The Picayune Strand Restoration Project is part of the Comprehensive Everglades Restoration Plan, the largest hydrological restoration project ever undertaken in the United States. Rehabilitating the forest involves leveling old roads, plugging canals, and re-establishing the flow of water across 74,000 acres, which had been drained in the 1960s for a housing development that never came to be.

The subject of the ill-fated *Spartina* came up during a monthly gathering for area environmental organizations hosted by the Garden, and following that, a plan to save it.

In a collaboration involving the Garden, Florida Panther National Wildlife Refuge/U.S. Fish and Wildlife Service, Florida Forest Service, U.S.



Members of the Garden team save sand cordgrass (*Spartina bakeri*). Photo: Florida Panther Refuge

Army Corps of Engineers, and South Florida Water Management District, about 450 clumps of grass were harvested and replanted at the Garden's Lipman Family Farms Greenhouse.

"Harvesting this *Spartina* not only prevented it from getting demolished but will also likely contribute to native *Spartina* plantings throughout Southwest Florida for years to come," says Mark Danaher, a wildlife biologist at the Florida Panther Refuge, who initiated the plant rescue. That's because the Garden will be able to multiply the

grass, infusing area restoration projects with native genetics. "Most *Spartina* that is sold commercially has very little genetic diversity," Danaher explains.

The project shows the power of regional collaborations, says Chad Washburn, the Garden's Vice President of Conservation.

"This plant rescue was a solid example of conservation organizations working together to make Southwest Florida a better place to live," he says.

Haitian garden gets a boost from FGCU students

A SUITE OF Florida Gulf Coast University student projects conducted during the 2022 spring semester will help advance Jardin Botanique des Cayes, a botanical garden in Haiti and one of Naples Botanical Garden's regional conservation partners.

Professor Brian Bovard assigned his plant ecology students three tasks to assist with the Haitian garden's plant conservation, community outreach, and long-term development. They communicated regularly with William Cinea, the garden's founder, via remote meetings and an in-person appearance (Cinea spends much of his time in the United States). Bovard's class meets at the Harvey Kapnick Education and Research Center, located at the Garden.



William Cinea (center) with FGCU Professor Brian Bovard's plant ecology class. Photo: Brian Bovard

The projects required students to:

1. Research two endemic Haitian plants, *Hernandia obovata*, a tree, and *Clavija domingensis*, a palm-like shrub dubbed "cow's tongue" for the shape of its leaves. Both species are on the verge of extinction on the Haitian side of Hispaniola. Cinea and his team collect seeds for conservation, but there's little information on how to grow them. Students dug through everything from scientific literature to plant enthusiast blogs to glean insight. Bovard says they learned more from lay accounts than they did from scientific studies, a finding that reinforced his tenet: "Everybody is a scientist. We all learn from our everyday experiences."

2. Develop literature on urban forest concepts targeted to government officials and civic groups. Haiti has lost much of its tree cover to agriculture and fuel consumption. Students developed a brochure that explains the importance of urban green space and highlights species that suit Haiti's climate and growing conditions, attract pollinators, and withstand storms, among other attributes.

3. Redesign Jardin Botanique des Cayes. The garden's founders used a traditional model that exhibits plants by families. Cinea wishes to create something more visually alluring and visitor friendly. Bovard's students—who have no training in landscape architecture—plunged into research on the subject, including a study of Naples Botanical Garden's design philosophy. They proposed a thematic concept that divides the Haitian garden into six "rooms," devised around ecosystems, native plant beds, and the like.

"They really appreciated being able to work on a real-world project," Bovard says of his students. One key lesson: an understanding of the constraints that specialists like Cinea face in the developing world.

"It gave them a new appreciation of the resources they have on hand and how they can use those to benefit people in other parts of the world," Bovard says.



Plants from the Garden are now among the botanical collections at England's Eden Project, which features these massive biodomes. Photo: Hufton + Crow

Garden contributes plant genetics to English biodomes

ENGLAND'S EDEN PROJECT looks otherworldly with its giant domes emerging from the countryside, but the organization is grounded in a very Earthly mission: collecting and celebrating our planet's botanical wonders.

Built within a derelict clay pit, the project is an architectural and horticultural feat. It features approximately 5.6 acres worth of biomes and 27 acres of outdoor gardens in which plants from around the world are on display. That collection will now include some specimens from Naples Botanical Garden.

A few months ago, Lewis Barrett, a former Garden employee who now works in the Eden Project's Rainforest Biome, visited. He was armed with legal permits—and our permission—to take seeds from Florida and Caribbean native plants that are underrepresented at Eden.

"The main goal of the Rainforest Biome is to introduce tropical plants to people who might not have seen them before and make people realize what an important role they do play in our lives," Barrett explained as he toured the Garden with our staff, seeking species on his target list.

The Eden Project's overall mission is to connect people to the natural world and inspire its protection. It also serves

a conservation purpose by housing species, ensuring their genetics persist if their native habitats are destroyed.

"This is not only important for species currently threatened with extinction, but also for currently abundant species, which may decline rapidly in the future due to climate change, habitat loss, etc.," he says.



Lewis Barrett collects seeds while visiting the Garden.

Photo: Jennifer Reed

Going Beyond the Home Improvement Store

Jessica DeYoung explains why she collects native plant seeds for our seed bank and, someday, your yard



Photo: Jennifer Reed

I'm wandering down an animal trail, weaving between shrubs and immersed in vegetation until I step into a field,

allowing me a panoramic view of my surroundings. The scrub habitat of our Garden's Preserve is known for its open sandy patches and intriguing plant diversity. During my first year of seed collections, I don't see the environment for what it is; in fact, I'm not seeing a field at all.

As the Garden's Conservation Horticulture Manager, I'm blinded by the excitement of looking for native plant species to collect, grow, and conserve

for long-term safekeeping. Unfortunately, much of the public is oblivious to our native plants in general. My hope: that through plant conservation, I can make these species visible.

Our region abounds with plant diversity, although most people don't know it. I can't really blame them. A typical Southwest Florida residential or community landscape is limited to a handful of tried-and-true ornamental plants. Local home improvement stores and commercial nurseries tend to stock those same familiar species. I understand their reasoning: Most retailers offer hardy, common



Jessica inspects the underside of a leaf for spores. Photo: Jennifer Reed

generalists that can handle a wide variety of conditions, expanding their consumer radius. But the practice limits our exposure to and appreciation of the plants that make Southwest Florida unique.

You won't see Southwest Florida natives adequately represented in botanical gardens, either. That's because, we, too, are limited to what our suppliers carry. The solution is in reach, however. With correct legal permissions, we collect seed from the wild and grow these plants ourselves.

The Garden targets everything from the seeds of tiny wildflowers, like pineland scalypink (*Stipulicida setacea* var. *setacea*), to those of stately hardwoods like Jamaican dogwood (*Pisidia piscipula*). While we prioritize plants that face the greatest risk of loss, we also collect common wild plants. We are proactive, rather than reactive, once a threat becomes apparent. In addition, we conserve seeds sent from our partners in the Caribbean, whose plant palettes and growing conditions are similar to ours.

We're trying to accomplish several things: To save plant genetics before we lose them in

the wild, restore damaged ecosystems, and, eventually, introduce more subtropical and tropical plants to designed landscapes.

Let me explain that last point. Did you know we are closer to the Bahamas here in Naples than we are to the northern tip of Florida? In a state nearly 450 miles long and 360 miles wide, what's native to Tallahassee may not be native to Naples. Bluntly speaking, we often put the wrong plants in the wrong places. This can be an expensive mistake—economically and environmentally. Economically because they often fail to thrive or succumb to disease. Environmentally because a poorly placed plant may require more fertilizer and water to grow. We hope to someday share plants specific to subtropical Southwest Florida and the tropical Caribbean with landscapers and local governments to ensure we're growing the right plants in the right places. (See our new initiative on Marco Island, page 19.)



“If we don’t collect these seeds now, we may not have these plants for the future.”

-Jessica DeYoung, Conservation Horticulture Manager, Naples Botanical Garden



Photo: Jennifer Reed

My work is ever under pressure, underscored by the impacts of climate change. Successfully conserving our native species is a lengthy process that involves researching growing techniques and generating enough seeds for restoration and long-term storage. If we don’t collect these seeds now, we may not have these plants for the future.

I think back to those early days of seed collecting in the scrub. We’ve come such a long way! I’m thankful and proud to see plants

growing and producing a new generation of seeds that we can store long term or use in restoration projects. We give back what we gathered, growing and multiplying generations of new native plants. In time, they will be the foundation for reviving our environment. Stay tuned for the good our Garden can create. I know I will.

Jessica DeYoung is the Garden’s Conservation Horticulture Manager.

Here are a few of the species I collect, and why they matter:



Photo: Bob Peterson

Coastal searocket (*Cakile lanceolata*) is a charming flowering annual that grows directly on the coast. It plays a key role in beach dune stabilization and restoration. It’s also an important pollinator plant for bees and butterflies, even serving as the larval host for the great southern white butterfly (*Ascia monuste*). While it can be a common plant in healthy shorelines, coastal searocket grows along the front of dunes, leaving it vulnerable to wave erosion.



Feay’s Palafox (*Palafoxia feayi*) is a Florida endemic, a plant that can be found only within our state. Until now, this plant has not been conserved in any global back-up collection, existing solely in the wild and susceptible to threats.



The edible hog plum (*Ximenia americana*) produces a berry that promises to be unforgettable—for better or for worse. Catch it at just the right moment, and you can enjoy a wonderful explosion of sweet lemon flavor. Bite into it too soon, and we can imagine the sour look on your face! This South Florida shrub is famously non-fussy. It grows in anything from the driest sands to the wettest mangrove fringes. Its adaptability makes it a great landscape choice, given the chance to be in commercial availability.

RESTORING AN ANCIENT SCRUB

Naples Botanical Garden and Conservation Collier team up to restore a disappearing ecosystem

By Jennifer Reed

In the midst of industrial development in North Naples lies an oasis of sorts: a 135-acre preserve containing some of the region's last remnants of Florida scrub habitat.

The county purchased Railhead Scrub Preserve in the 2000s through Conservation Collier, a land acquisition and management program. The preserve contains several ecosystems, including pine upland and freshwater marsh, but the prize is the 49 acres of xeric oak scrub. This type of habitat once spanned more than 2,200 acres throughout Collier County and today has diminished to a mere 200 acres, mostly in Rookery Bay National Estuarine Research Reserve, according to county records. Real estate development accounts for most of Florida's scrub habitat decline, though that's not the only stressor. Climate change, invasive species, and fire suppression (many scrub plants depend on fire for survival) have also taken a toll.

Having Railhead Scrub Preserve under county protection is an important conservation measure. But the preserve isn't a pristine ecosystem and needs significant human intervention to undo human-induced damage. For decades, all-terrain vehicle riders have accessed the site, trampling plant communities and carving road-like paths throughout much of the preserve. ATV use became illegal once Conservation Collier purchased the land using taxpayer dollars under a voter-approved referendum, but riders continue to trespass despite the county's efforts to secure the property.

Now, Conservation Collier has teamed up with Naples Botanical Garden to revegetate those ATV trails using plants grown from seeds and cuttings collected within the preserve.

The partners hope to not only heal this land but also to increase conservation collections and protect native plant genetics before they disappear.

"This entire ecosystem is under threat of being lost," says Chad Washburn, the Garden's Vice President of Conservation.

The project promises to break new ground in restoration science. Little is known about Southwest Florida's scrub plants and

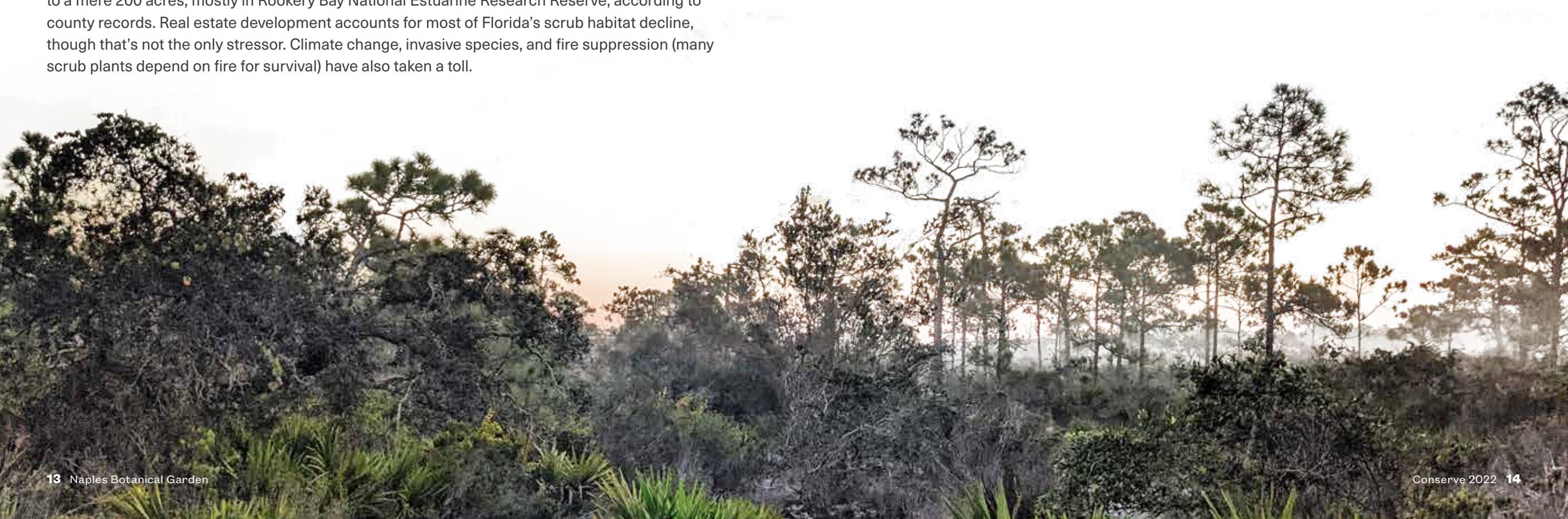
how to put them to use in repopulating an area such as this preserve.

"We're still in the stage of even beginning to figure out the scale of this project," says Molly DuVall, Senior Environmental Specialist for Conservation Collier. The County and Garden experts, quite literally, are writing a playbook.

SCRUB HABITAT

Railhead Scrub Preserve is one of the few remaining habitats of its type in Collier County.

Photo: Conservation Collier





Railhead Scrub Preserve includes:



Nearly 40 species of birds that are believed to breed there.



Close to 400 plant species.



14 species that are categorized as state and/or federal threatened species.

Railhead Scrub is extraordinary for its ability to shelter wildlife amid industrial and residential development.

“There’s a huge diversity of wildlife that uses this preserve, even though it’s urban and surrounded by development on all four sides,” DuVall says.

Camera traps have documented large mammals, including black bear and deer. Nearly 40 species of birds are believed to breed there. Endangered gopher tortoises abound. Close to 400 plant species have been chronicled, including 14 categorized as state and/or federal threatened species.

But the ATV trails disrupt the habitat’s functioning. If you were to combine them into one area, you would have eight acres worth of barren land, DuVall says. They cut into vegetation, interrupt wildlife habitat, and invite the growth of invasive plants, which thrive on the margins of disturbed areas.

“It’s called the edge effect,” says Washburn. “(Roads) not only impact that spot, but the spot next to it. You’re opening up light gaps. You’re creating barriers.” A gopher tortoise may be able to cross a road from one plant “island” to the next, but a small pollinating insect may not, he explains.

This restoration project, among other things, seeks to fill

in those paths with native plants to reconnect the ecosystem.

That’s not as simple as it may sound. The preserve’s restoration will take years—not only for its scale but because a litany of questions must be answered first: What native species grow there now? Are any species missing from the ecosystem? Should they be re-introduced? How do these native species behave? What conditions encourage their growth? In what sequence should species be planted? Should seeds be started in a nursery or planted directly on site? How does water move across the site? What are the soil conditions? The elevation?

Much of the native plant research falls to Jessica DeYoung, the Garden’s Conservation Horticulture Manager. For the past three years, she’s been studying native plants on the Garden’s nine-acre scrub habitat, researching seed germination, optimal growing conditions, and best practices for long-term seed storage. That work is crucial for this project, as plants used in Railhead’s restoration will be grown from seeds collected on site rather than imported from other regions.

The partners are excited to delve into the project, DeYoung says. “There are just so many unknowns we want to figure out.”

What the County and Garden experts learn at Railhead Scrub will be applicable to future restoration projects elsewhere in the region.

DeYoung started with a deep dive of the property’s 384 plants, relying largely on a 2017 floristic inventory. She has chronicled the habitats in which they grow, their bloom cycles, whether they provide food for gopher tortoises, and their potential roles in future restoration efforts.

From that inventory, DeYoung developed a priority list for collecting. She’s going after seeds from plants that will be used to restore this preserve—species such as the sprawling gopher apple plant (*Licania michauxii*) that can stabilize vehicle-churned



Decades of illegal ATV use has carved road-like paths through Railhead Scrub. Photo: Conservation Collier

soil—as well as species that are underrepresented in botanical collections.

The latter point requires explanation. Botanical gardens are genetic repositories for plants. That’s why conservationists collect both rare and common plants, lest the ones that are abundant now decline in the future. On the Railhead Scrub plant list, 176 species—45% of the preserve’s flora—lack sufficient protection in botanical collections.

“It’s very important that we protect all of this incredible biodiversity that is missing from conservation collections,” Washburn says.

The need for seed collections is both long term and immediate. On a tour of the property, DuVall points out Florida rosemary (*Ceratiola ericoides*) withering in the sand. Further investigation later on will suggest the scrub needs fire to rejuvenate plants like rosemary. She climbs over a small fence and points out a popular off-roading spot where once vegetated land has been denuded.

“This is the best example of how, over time, if you don’t protect it from impact, this is what it turns into,” DuVall says, looking over vast patches of sugar-white sand. “This is what we’re trying to prevent.”

The restoration will include additional barriers to deter riders, as well as public education to explain the importance of the scrub ecosystem and why the county seeks to protect it.

The land’s potential is evident in other portions of the preserve.

“I love this marsh,” DuVall says. This habitat is located in the minimally traversed northern section. Ten years ago, the marsh was a monoculture of melaleuca, an invasive tree introduced to Florida to drain wetlands for development and agriculture. Today, following Conservation Collier’s restoration efforts, the marsh is a grassy expanse that will fill with water during the



Photo: Conservation Collier

rainy season. Nearby, a few young pines offer evidence of renewed growth and expanding biodiversity.

DuVall says the Garden-County restoration work will start on the northern end of the property because it is inaccessible to unauthorized vehicles and less impacted than the southern portion. She, DeYoung, and Washburn intend to start with trial plantings, study the outcomes, and then design larger projects.

More changes are coming to the area surrounding Railhead. The newest Collier County high school

is underway, and Veterans Memorial Boulevard will be expanded to reach it, with further extensions to come. Those developments amplify the imperative for restoration. With ever-shrinking habitat, plants and wildlife depend on preserved land set amid urban development.

“We’re trying to restore this area to the highest quality possible,” DuVall says.

Jennifer Reed is the Garden’s Editorial Director.

RARE PLANTS OF RAILHEAD SCRUB PRESERVE:



NODDING PINWEED
(*Lechea cernua*)

This small shrub is endemic to peninsular Florida, meaning it is found only within the state’s mainland. It has been recorded in 18 counties, where it has declined due to development of scrub and xeric uplands. The species, however, is common in the xeric uplands at Railhead Scrub Preserve.



GATESBY’S LILY
(*Lilium catesbaei*)

This herb is endemic to the U.S. southeastern coastal plain and has been recorded in 50 Florida counties. In Collier County, it has only been found in protected lands: Railhead Scrub Preserve, Big Cypress National Preserve, Collier-Seminole State Park, Florida Panther National Wildlife Refuge, and Picayune Strand State Forest.



**AMERICAN
HALFCHAFF SEDGE**
(*Lipocarpa maculata*)

This small sedge is widespread in the eastern United States but is listed as “critically imperiled” in South Florida by the Institute for Regional Conservation. It has been recorded in only three South Florida counties: Collier, Lee, and Hendry.



**SLENDER
ADDER’S TONGUE**
(*Ophioglossum nudicaule*)

This small terrestrial fern is listed as “critically imperiled” in southern Florida by the Institute for Regional Conservation. It was known to exist at just one site in South Florida in Palm Beach County, until 2006 when it was spotted at Railhead Scrub along the edges of a sandy trail.



CURTISS’ MILKWEED
(*Asclepias curtissii*)

This herb is endemic to peninsular Florida where it has been reported in 21 counties. It is extremely rare in Collier County, only recorded in three places: Railhead Scrub Preserve, Rookery Bay National Estuarine Research Reserve, and Naples Botanical Garden.

Source: Conservation Collier

10,000 Trees in 10 Years?

Marco Island seeks to transform its current landscape into a tropical oasis. Naples Botanical Garden will lead the way.

By Jennifer Reed

Marco Island has amenities that lure residents and visitors alike: beaches, resorts, fishing, boating, parks, cultural and historical centers. But it's short on something. Trees.

The average tree cover in Florida cities is 32%. In the City of Naples, it's about 29%. Across the majority of Marco Island, it is a mere 10%. The reasons for that are many, ranging from the island's history (its original developer was forced to halt operations and went bankrupt before achieving its vision) to a lack of a fully formed green infrastructure plan in

the present day. Regardless of reason, the island's landscape is a patchwork.

Palms and hardwoods line some streets; others have mere hints of foliage. A lush canopy shades the private Hideaway Beach Club, while sunlight scorches public bike paths and sidewalks in other parts of the city.

That is about to change.

The Marco Island City Council in July approved a pilot project to assess the island's existing tree cover, develop a landscape plan, and plant up to 1,000 trees on city-owned land. The city's Beautification Advisory Committee, which brought forth the initiative, intends this pilot project to jumpstart a more ambitious goal: to plant 10,000 trees in 10 years.

Naples Botanical Garden will guide the way. The City has asked our experts to identify the trees best suited for Marco's conditions and environmental needs and outline best practices for their growth, placement, and long-term care.

For the Garden, the project is more than an opportunity to beautify a local community. Marco Island will serve as a laboratory for developing

urban landscaping protocols and showcasing strategies we believe will create a more ecologically healthy, resilient Southwest Florida.

"Botanical gardens and arboretums were created for this very purpose ... there are real-world applications to what we do," says Vice President of Horticulture Brian Galligan. "The Garden is really our original pilot program, and we're taking what we've learned here and applying it to the urban landscape."

"We want to do something that is meaningful and lasting and provides a legacy for the next generation."

—David Leaser, Marco Island Beautification Advisory Committee

The tree initiative grew out of one man's observation and then his determination to do something about it.

David Leaser moved to Marco Island from Naples in 2020. He's a senior executive at IBM and a fine art photographer specializing in botanicals. Leaser noticed the absence of trees immediately.

"I want to do something meaningful on this island," he thought. An

Photo: David Leaser



The tree planting initiative seeks to address landscape inequities such as the one shown here, with one street nearly devoid of trees and a neighboring one lined with stately palms.

“We are extremely excited to bring even more beauty to Marco Island by adding flowering trees that will provide color at different times of the year throughout the city.”

—Isabel Soto, Project Manager, Naples Botanical Garden

opportunity arose when a seat on the Beautification Advisory Committee opened. Leaser applied.

“Let’s make Marco memorable,” he said during his interview. “We want to do something that is meaningful and lasting and provides a legacy for the next generation.” The City Council appointed him, and he began charting his vision, one in which trees line neighborhood streets and living canopies shade public amenities—as the island’s original developers had once envisioned. Leaser turned to Naples Botanical Garden for guidance.

“The Garden has the skill set and is uniquely qualified to help us define the urban landscape,” he says.

Fellow Beautification Committee members supported the idea; Councilor Becky Irwin became its City Council champion. She and Leaser offered *Conserve* a tour last spring to show the current state of the urban forest. They pointed out one street lined with stately palms and another in which front lawns are devoid of shade. The roads are a block apart. Irwin gestured to a few fruit and specimen trees installed along Calusa Park, a linear greenway, and noted the ample space available for more.

“This could be a botanical garden unto itself,” she says. “That’s my dream.”

Education will be a significant component of the Garden’s involvement, helping residents, landscapers, and city leaders understand our approach to landscape design—one that upends the region’s standard method and focuses on environmental health as much as beauty.

The first step? Introducing more plant species.

“We’ve been using the same 50 plants for the last 50 years,” Galligan says. Growers, landscapers, and developers depend on them because they’re familiar and easy to grow. To be fair, they also don’t have access to much else—many Caribbean and South Florida native plants that the Garden recommends aren’t in the commercial nursery trade. The Garden hopes to address that situation in the future by offering seeds and cuttings to growers who wish to mass produce them.

The limited palette is problematic.

Photos: David Leaser

For one, many of the trees you see all over Southwest Florida—things like crape myrtle (*Lagerstroemia indica*) and southern magnolia (*Magnolia grandiflora*)—are better suited to temperate regions than to Southwest Florida’s sandy, alkaline soils, extreme heat, and wet-dry seasonal weather patterns. Species that are native to South Florida and the neighboring Caribbean islands don’t need as much water, hands-on care, or fertilizer as those adapted to other areas.

Limiting fertilizer is a key to the region’s environmental health. Fertilizer generally contains nitrogen and phosphorus, which in moderate quantities help plants grow but in excessive amounts can taint water and contribute to algae growth.

Garden experts also worry about a lack of plant diversity in public landscapes. Limited species means meager food and habitat for wildlife, a compromised ability to adapt to changing conditions, and a risk of widespread tree loss to diseases that target single species or plant families.

“Biodiversity is one of the key reasons that a natural forest is resilient in the face of climate change,” explains Chad Washburn, the Garden’s Vice President of Conservation. “Plant diversity provides a level of insurance against diseases, natural disasters such as floods

or storms, and other negative impacts to an ecosystem. That biodiversity is a key factor in maintaining a healthy and resilient urban forest.”

A final issue: Municipal plant lists haven’t kept pace with changing climate realities. The Garden’s experts will identify species that can tolerate higher temperatures, stronger storms, and greater saltwater exposure. They’ll use a scientific approach to placing the right species in the right habitats by considering factors such as seasonal flooding, soil types, and saltwater and wind exposure. And they’ll push for planting smaller, younger trees than the norm.

“The quicker you can get them out of the pot and into the ground, the better,” Galligan says. Spending too much time in a pot weakens a tree’s ability to form roots. That’s especially true for fast-growing tropical species. “*Bulnesia arborea* (Verawood) is a really good example. It’s very well adapted (to Southwest Florida), but it overgrows the pot faster than nursery growers can step it up. It’s been put on the ‘naughty list,’ but it should be among the Top 5 to be planted,” Galligan says.



Gumbo limbos thrive in our region.

“We are looking forward to seeing what this pilot year teaches us and laying the groundwork for a beautiful island urban forest for generations to come.”

—Becky Irwin, Marco Island City Councilor

The City and Garden will take incremental steps toward this vision. The City Council approved the pilot project unanimously but posed questions about funding, long-term tree maintenance, logistics, staff time, and whether residents will have any say in the trees planted in city right of ways. The Beautification Advisory Committee is working to set up a mechanism for adopt-a-tree and adopt-a-block donations; the intention is to use donations and grants to pay for the trees and five years’ worth of maintenance.

The Garden will begin its relationship with the City at the new fire station where we will recommend trees and plants for its landscape. Our experts will also oversee a tree planting project along West Elcam Circle, using

surplus budgeted funds from the Beautification Advisory Committee.

“We are extremely excited to bring even more beauty to Marco Island by adding flowering trees that will provide color at different times of the year throughout the city,” says Isabel Soto, the Garden’s Project Manager.

Leaser and Irwin are excited by the prospect of a long-term transformation of Marco Island.

“We have the beginning of a real green infrastructure plan for Marco Island,” Leaser says.

Irwin adds, “We are looking forward to seeing what this pilot year teaches us and laying the groundwork for a beautiful island urban forest for generations to come.”

Jennifer Reed is the Garden’s Editorial Director.

For more information about this project, contact Beautification Advisory Committee member David Leaser at david.leaser@gmail.com.

The benefits of trees

Research shows that trees can do everything from reduce stress to improve air and water quality to slow traffic and compel people to spend time outdoors.

Just two royal palms can absorb 5,850 gallons of rainwater per year, the equivalent of an average swimming pool. Stormwater runoff picks up substances on land that can contaminate water. (i-Tree calculator*)

Four satinleaf trees can save 17,195 kilowatt hours’ worth of energy during their life spans. A kilowatt hour is the amount of energy needed to power a 1,000-watt appliance for an hour. (i-Tree)

A dozen royal poinciana trees will capture and store more than 71 tons of carbon dioxide during a 40-year lifespan. (i-Tree)

One large tree supplies a day’s worth of oxygen for up to four people. (U.S. Department of Agriculture)

Trees lower the temperature in the area under and around their canopy by 5 to 15%. (Environmental Protection Agency)

**i-Tree is a public/private partnership of the USDA Forest Service, private arborists, and nonprofit foundations. The web-based program allows users to calculate the benefits of trees by species and geographic area. The figures cited here are specific to Marco Island.*

Recommended trees

The Garden has planted thousands of trees on its property as well as throughout the community. The trees listed here are based on staff observations and research into the species’ properties and growth habits.



ROYAL POINCIANA
(*Delonix regia*)

These majestic trees add bursts of red, orange, and yellow to the spring and summer landscape. Sunlight can penetrate the trees’ thin foliage, allowing the growth of turf or other groundcover.



PIGEON PLUM
(*Coccoloba diversifolia*)

This tree is well adapted to Southwest Florida and maxes out at 15 feet or less, making it suitable to plant near power lines.



FLORIDA THATCH PALM
(*Thrinax radiata*)

Florida thatch palm (*Thrinax radiata*) and *Coccothrinax* spp. palms provide an important sense of place to Southwest Florida. They withstand wind, making them a good tree to buffer roadways and prevent wind speeds from building. Unlike foxtail palms, these native species require little fertilizer.



DWARF APPLE BLOSSOM
(*Cassia bakeriana*)

Trees in the *Cassia* family, such as the dwarf apple blossom tree (*Cassia bakeriana*) are well adapted to the region and bloom in the fall and winter. The Garden wishes to make sure landscapes include trees with different bloom times to ensure color and interest all year long.



BAHAMAS TRUMPET TREE
(*Tabebuia bahamensis*)

These flowering trees are salt tolerant and grow well in sandy soils.



HORSEFLESH MAHOGANY
(*Lysiloma sabicu*)

These beautiful medium-size shade trees are native to the Bahamas, Cuba, and Hispaniola. The foliage allows light to penetrate, and the small white flower clusters are a great source of food for pollinators.



SATINLEAF
(*Chrysophyllum oliviforme*)

This native tree often gets a bad rap because it is hard to establish if it spends too much time in pots in the nursery stages. But when planted early, these trees prosper and add a lovely luster to an urban landscape with their bronze and dark green foliage.

The Future of Food Security is Found in the Woods

The wild relatives of common crops are a key to climate adaptation. Botanical gardens play a critical role in finding and conserving them.

Photo: Brian Bovard

Among the native species in the Garden's Preserve is a slender, sparse shrub, the kind of plant an untrained eye surely would overlook.

But the unassuming shrub is among a class of plants considered critical for the future of food security. It is netted pawpaw (*Asimina reticulata*), a "crop wild relative" (CWR), or uncultivated cousin of a domesticated crop. Its edible kin is *Asimina triloba*, the pawpaw tree, which grows in temperate regions of the United States and produces a fleshy fruit reminiscent of mangos and bananas.

The world's food supply must expand to feed an estimated 9.3 billion people by 2050, according to the U.S. Census Bureau. But a litany of conditions, including warming temperatures, disease, pests, and insufficient genetic diversity, puts the domesticated crops that nourish us at risk. Introducing desirable genes from wild relatives into vegetables, grains, fruits, and nuts is one important way of helping them resist disease, increase yields, and tolerate climatic changes.

The Garden has joined a new collaboration between botanical gardens and public agricultural genebanks that aims to expand, chronicle, and share their collections of North American crop wild relatives. Now is the time to act. A 2020 analysis, *Crop Wild Relatives of the United States Require Urgent Conservation Action*, estimates that more than half of the 600 species examined are threatened in their natural habitats and a majority require better conservation protection in genebanks, botanical collections, and on the land in which they're found.

Botanic Gardens Conservation International-U.S. (BGCI-US), the United States Botanic Garden, Missouri Botanical Garden, The Morton Arboretum, and San Diego Botanic Garden are leading the charge.

Representatives from more than 50 gardens in the United States and Canada are involved. The partners currently concentrate on fruit and nut tree wild relatives and have targeted about 90 taxa for conservation.

Our Garden conservationists work with the netted pawpaw, swamp bay (*Persea palustris*), and in the future will collect the seed of scrub hickory (*Carya floridana*), which has populations in Charlotte County. Swamp bay is related to avocado (*Persea americana*), and scrub hickory is in the same family and genus as pecans and other commercial hickory nuts.

"We realized we can play an important role in crop wild relative conservation in Florida," says Vice President of Conservation Chad Washburn.

Each institution will gather and conserve targeted species within its geographic area, work with fellow participants to back up collections, and share genetic materials for research, says Abby Meyer, Executive Director of BGCI-US. "We're trying to inspire and facilitate collaborative conservation action," she says.

The use of wild genetics in agriculture is hardly a new phenomenon, Colin Khoury of the San Diego Botanic Garden explains. These untamed plants, after all, are the ancestors of our domesticated crops. When modern plant

breeding emerged a century ago, scientists realized genes from crops and their wild cousins could be mixed in beneficial ways. But the agricultural industry shifted to focus on breeding crops for their yields and ability

"We realized we can play an important role in crop wild relative conservation in Florida,"

**—Chad Washburn,
Vice President of Conservation,
Naples Botanical Garden**

to withstand long shipments. The gene pool waned as a result. Typically, the greater the genetic diversity of a crop, the greater its ability to adapt to new conditions or disease. Faced with climate change and its complications, scientists again are looking to crop wild relatives

to bolster our fruits, vegetables, grains, legumes, and nuts.

There are ample examples of how plant breeding with the use of wild relatives helps mitigate agricultural challenges. In one famous 19th-century case, pest-resistant North American rootstock saved Europe's wine industry from a blight that swept through vineyards, Meyer says. More recently, a wild rice was bred into a domesticated cultivar to change the time of day a flower opens, avoiding the hottest part of the day. Rice flowers show increased sterility at higher temperatures, reducing their grain production and putting one of the world's most important staples at risk. That research was reported in a 2014 paper, *Adapting Agriculture to Climate Change: A Global Initiative to Collect, Conserve, and Use Crop Wild Relatives*, co-authored by Khoury.



Vice President of Conservation Chad Washburn finds and documents netted pawpaw growing at Rookery Bay National Estuarine Research Reserve.

Photo: Jennifer Reed

Scientists estimate 50,000 to 60,000 CWR species exist. About 1,000 are close kin to important food crops, and 10,000 are considered “of high potential value to food security,” according to the paper on adapting agriculture to changing climate conditions.

Their conservation is urgent; models suggest that every 1-degree rise in average growing season temperatures could result in a 6 to 10% reduction in crop yield, the authors note. But much remains unknown.

“Alongside conservation gaps, we also need to fill basic knowledge gaps,” Khoury says. For example, a wild relative for sweet potatoes was found within just the last year. Butternut squash’s ancestral plant remains a mystery.

Meyer hopes this multi-organization collaboration will spur progress in CWR conservation and research.

“We were amazed when we put a call out for a meeting to discuss this group of plants that we got such a large and diverse response,” she says. “I think the community is really poised to get more organized, dynamically collaborate, and put a safety net in place for crop wild relatives.”

Jennifer Reed is the Garden’s Editorial Director.



Conservation Horticulture Manager Jessica DeYoung (right) teaches Natural Resources Associate Jaycie Newton how to hand pollinate netted pawpaw. Photo: Jennifer Reed

Flowering season is nearly over for the Garden’s netted pawpaw (*Asimina reticulata*), but there are enough scattered flowers for Conservation Horticulture Manager Jessica DeYoung to show her colleagues how to hand pollinate the plants in preparation for the next bloom cycle. Garden conservationists hope to produce and collect seeds using netted pawpaw growing in our Preserve and potentially at Rookery Bay National Estuarine Research Reserve, where they recently stumbled upon *Asimina reticulata* while scouting for a rare orchid (see page 36). Florida Gulf Coast University Professor Brian Bovard’s plant ecology students identified 40 netted pawpaw in the Garden’s natural areas during a recent survey, though Bovard says that’s likely an undercount and hopes to further investigate in the near future. The class meets at FGCU’s Harvey Kapnick Education and Research Center, located at the Garden.

Edible pawpaws (*Asimina triloba*) were once a staple of Native American diets and sustained the Lewis and Clark Expedition, records show. But they never gained commercial appeal. Some specialty growers, agricultural agents, food writers, and university researchers think there’s potential for that to change. The University of Kentucky leads a multi-university investigation into pawpaw cultivation. *Food & Wine* magazine has called the fruit “magical.” The website Serious Eats regales its flavor as, “... sunny, electric, and downright tropical: a riot of mango-banana-citrus that’s incongruous with its temperate, deciduous forest origins.”

The fruit’s thin, easy-to-bruise skin limits its marketability. But genes from wild relatives like *Asimina reticulata* may be able to toughen them up and allow growers to re-introduce a historic, native fruit to the American palate.



Above: Swamp bay is a relative of avocado.

“*Persea palustris*, swamp bay” by scadwell is licensed under CC BY-NC 2.0.



Left: The wild genes found in this netted pawpaw may be useful in growing edible, cultivated pawpaw fruit.

Photo: Jennifer Reed

More than 400 swamp bay trees (*Persea palustris*) trees grow in the Garden’s nursery. Our staff started collecting seeds back in 2014 when laurel wilt disease was first detected in Collier County. An invasive beetle originally from Asia carries the fungus that causes laurel wilt disease. It has decimated red bay and swamp bay populations in the Southeast.

We grew the collection hoping to save swamp bay genetics and recover wild populations. But there’s another potential use. Wild-growing swamp bay is a relative of the domesticated avocado (*Persea americana*). Although avocado is not the fungus-bearing beetles’ preferred host, scientists worry that the pest will jump into this important crop if they run out of red bay or swamp bay.

“Avocado is already weakened by several things, and this could weaken it more,” says Vice President of Conservation Chad Washburn. “We need to make every effort to make them as resistant to diseases and climate change as possible.”

More crop wild relatives:



Helianthus paradoxus is a sunflower species that tolerates salt and restores fertility to sunflowers, broadly cultivated for their oil.



Juglans hindsii, a California native walnut that is more tolerant of poor soil conditions and more resistant to soil-borne pests, is used commercially as rootstock for English walnuts.



Vitis aestivalis is a native grape whose range includes Florida. It is one of several wild grape species used as rootstock for cultivated grape vines.

Photo: Erik Danielsen



Tripsacum dactyloides is a Florida native plant and distant corn relative that improves yields and shows resistance to corn leaf blight.

Source: *Crop Science*, April 2013: *An Inventory of Crop Wild Relatives of the United States*



PEST MANAGEMENT 101:
**Target the Problem,
Preserve the Ecosystem**

Our horticulturists share nature-based tactics that they use in the Garden and you can try at home

By Jenny Fuentes

There's a collective mindset here in the Garden: Let plants do their thing. It's at the core of the Garden team's integrated pest management program.

The philosophy is that the more we break down nature with pesticides, herbicides, and fertilizers, the more dependent on such measures it becomes.

Synthetic additives have a detrimental domino effect on the environment, not to mention the purse strings, says Brian Galligan, Vice President of Horticulture.

"A plant typically has a pest because it's not happy," says Galligan. "Just like humans, when we're stressed and down, we're much more susceptible to catching something, and a plant is the same way."

There must be a better way. "We try to figure out an approach that lets nature take care of nature," Galligan explains.

"Biodiversity in the landscape is just as important as biodiversity in integrated pest management. It's kind of like the antibiotic approach; trying to do things that don't create resistances is important." This is because integrated pest management employs a science-based approach to managing harmful bugs, weeds, and fungi, in efforts to minimize economic, health, and environmental risks, according to the U.S. Department of Agriculture. Although chemicals may be used, they are not a first

resort. Approximately 1 billion pounds of conventional pesticides are used annually in the U.S. alone, according to the U.S. Geological Survey, and often with impacts felt well beyond their intended weed and insect targets.

While chemical sprays are necessary, they are just one tool in the Garden's pest control arsenal, and a last resort, at that. Instead, each plant is treated as a different "patient," if you will, with only specific needs addressed as they are observed.

There are a few rules: Abide by the notion of "right plant, right place," Galligan says. Often, this can help you avoid pests altogether. Even a plant well-suited to Southwest Florida can be prone to challenges such as pests that attack or weeds that choke when it's placed in the wrong location.

And finally, keep it simple. Celebrate your successes, and share your results—whether they work or not.

Jenny Fuentes is the Garden's Senior Content Manager.

Here are a few straightforward, low-impact pest management techniques that our horticulturists employ in the Garden. You can replicate these in residential neighborhoods and at business properties throughout Southwest Florida.

Herbicide alternatives		Lower-toxicity pesticides
 <p>Groundcover plants & mulch</p> <p>Cover bare soil with mulch or groundcover plants. Some that thrive in Southwest Florida include Asiatic jasmine (<i>Trachelospermum asiaticum</i>), golden creeper (<i>Ernodea littoralis</i>), and for full sun, the inch plant (<i>Tradescantia zebrina</i>). Nature is all about competition, and you can use it to your advantage by letting mulch or groundcover plants outcompete weeds for sunlight.</p>	 <p>Resist the urge to prune shrubs</p> <p>While gardening trends over the past century have leaned toward trim, tidy, and neat, it may behoove us to rethink our collective gardening mindset. By taking a natural approach and allowing shrubs to grow freely, the plant retains more leaves vital to photosynthesis and casts a wider shadow, reducing the soil's exposure to sunlight, and with it, weeds.</p>	<p>Soaps & oils</p> <p>Insecticidal soaps and neem oil are two quick, easy, and low-toxicity options to control an array of pests (think immature, soft-bodied insects such as whiteflies, spider mites, aphids, and mealybugs). Neem oil, used in organic gardening, is also effective with some fungal diseases.</p> <p>Mechanical means</p> <p>When you see aphids and mealybugs on the tips of your plants, breaking out a chemical spray isn't the only course of action. You can also trim that section and enclose it in a bag so the pests don't spread. Or, opt to spray pests away with a high-powered hose. That in and of itself can solve the problem.</p> <p>Resist the urge to wipe out natural predators</p> <p>Once you wipe out predators, you wipe out that natural life cycle.</p>
 <p>Let fallen leaves lie</p> <p>Speaking of aesthetics, it's time to revisit our handling of fallen leaves. While it looks tidy to rake and bag them up, nature has a purpose for tree "debris." The leaves decompose and nourish the plants around them. Plus, the leaves act as a natural mulch, inhibiting weeds.</p>	 <p>Get your hands dirty</p> <p>While a deep dive into your home garden may be in order, grabbing even a handful of weeds as you notice them can make a dent in weed growth over time.</p>	<p>"Nature takes care of nature," Galligan says. He believes the Garden fared better than other properties during a whitefly epidemic some years back because our staff resisted heavy pesticide use, and let predatory bugs feed on the flies.</p>

Let them "Bee"

Reducing toxins helps these native insects prosper—and pollinate

By Britt Patterson-Weber

The next time you step outside, take note of the different plants you see. Grass, trees, shrubs, flowers—what's the range of species in your neighborhood? Plant diversity is important for a healthy ecosystem. But you won't have a varied plant palette if you don't have an assortment of pollinators.

Pollination is how flowering plants reproduce. Plants can't select their mate like a bird can, so they need a pollinating agent to transfer pollen for them. This agent could be a natural force, like wind, or an entirely separate organism that carries pollen from one flower to another. By far, the most efficient, economically significant

pollinator on Earth are bees, which perform about 80% of all pollination globally.

Despite their significance, though, most people can name just a few different kinds of bees—and yet, there are 20,000 species of bees buzzing around worldwide. In the United States, there are over 4,000 species, with more than 320 native species here in Florida. It's these wild, native bees that are doing the heavy lifting in the environment, sustaining ecosystems, and promoting biodiversity.

Distinct from their well-known cousin, the non-native European honeybee (*Apis mellifera*), native bees do not live in managed hives. In fact, many native bees shun such high-density housing. Solitary bees, like mining bees, dig deep underground holes for nesting; mason bees nest in small cavities they line with mud, while leafcutter bees prefer to cut their own leaf bits to line their nest cells.

The world of native bees is diverse, but, unfortunately, overlooked. Wild bees are the ones pollinating native plants, which in turn support wildlife higher on up the food chain—and the bees are providing this critical ecosystem service for free. It's also not just native plants they pollinate: native bees provide over \$5 billion in crop pollination services every year. Imagine the domino effect that could happen, environmentally and economically, if native bee populations were to disappear.

What can you do to support native bees? First, feed them. Bees require both nectar and pollen to meet their nutritional needs. Like humans need to eat a balanced diet, so, too, do bees—and different plants offer different nutrients like carbohydrates, lipids, and proteins. For the home gardener, that means plant a diversity of plants, at least 15 species that bloom during different seasons. Consider leaving some bare ground within your landscape for those ground-nesting bees. Don't worry too much about getting stung: solitary bees are known to be less aggressive than honeybees since they're not protecting thousands of their family members in a nearby hive. Finally, minimize the use of pesticides. Broad-spectrum pesticides can be harmful to beneficial insects. Integrated pest management strategies, such as the ones shared on page 31, are a good way to reduce pesticide use and protect these hard-working pollinators.



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



Natural Resources Manager Ian Talty and Natural Resources Director Eric Foht collect seeds from dune plants.

Photo: Jennifer Reed

Field Notes

By Jennifer Reed

Dive into this look at three ongoing conservation projects.

Restoring Sand Dunes

Forty or so years ago, beach naupaka (*Scaevola taccada*) was touted as a good stabilization plant for beach dunes. But this dense shrub, native to parts of Asia, Africa, Australia, and the Pacific Islands, proved problematic. It overtakes the dunes, displacing important native species that provide habitat, capture sand, and minimize erosion. It also dominates open spaces where endangered coastal plants such as prickly pear (*Opuntia stricta*) and inkberry (*Scaevola plumieri*) could take root.

The City of Naples is removing beach naupaka from its shorelines. In a typical beach restoration project, this invasive plant would be replaced with sea oats, sprinkled with a few other species. But monocultures—even ones consisting of native plants—aren't ecologically sound, either.

Conservationists at Naples Botanical Garden have studied beach dunes at undeveloped beaches to better understand the diversity of coastal plants and the roles they play in a naturally occurring sand dune. The Garden and City teamed up last year to replant three beach access points using the shorelines of Delnor-Wiggins Pass State Park as a model.

Pleased by the results, the City has asked the Garden to take its involvement to the next level.

The Garden's pilot planting relied on nursery grown plants. Now, we're working to produce our own using seeds collected from local shorelines. Genetics matter. Plants imported from elsewhere may be the same species as the ones that grow here, but they likely have different bloom times, preferred growing conditions, and optimal temperature ranges compared to those from Southwest Florida. In short: Plants grown from locally harvested seeds create healthier, more resilient dunes.

"We want to change how beach dune restorations are done," says Vice President of Conservation Chad Washburn. "Our coastline is the economic engine of our community and the frontline for coastal resiliency. By restoring and managing beach dunes for plant diversity, we can help to

ensure that they will continue to trap and hold sand, provide resiliency, and recover quickly after storms."

"We are so happy to partner with the Garden on projects like the dune restorations," says Heather Shields, the City of Naples arborist overseeing the beach dune project. "The beach is what brings people to Naples. You can go to a variety of places across the U.S., but you can't get that Naples beach anywhere else."

The exotic plant removal and dune restoration, she adds, will keep the City's beaches beautiful for generations.

Hunting for Ghosts



Photo: Sarah McKeown

Our team went ghost hunting one Tuesday last May. Not of the supernatural sort, of course, but of the botanical one.

They sought the elusive ghost orchid (*Dendrophylax lindenii*), one of the world's rarest plants. In the United States, only about 1,500 are



Natural Resources Associate Jaycie Newton collects seeds for future beach dune restoration projects.

Photo: Jennifer Reed

known to exist—all within conserved land in Collier County. (There is another population in Cuba.) Our team joined Jared Franklin, Environmental Specialist with Rookery Bay National Estuarine Research Reserve, and Mike Owen, the biologist for Fakahatchee Strand Preserve State Park—the man who had last seen the ghost orchids in the site the group surveyed back in the late 1990s.

The place they explored—a place we're keeping secret since poaching is one of the orchid's biggest threats—contained a hardwood hammock with brush so dense that Franklin periodically needed a machete to clear a path.

Look low, Franklin instructed. Ghost orchids need heat and humidity and draw both from the ground during cool, dry periods. The team fanned out,



The team didn't find any ghost orchids, but they were able to collect seeds of the *Epidendrum nocturnum*, another important native orchid. Photo: Jennifer Reed



Encyclia tampensis

Photo: Paul Osborn

circling oak trees and peering for greenish roots clinging to bark. The orchids wouldn't bloom for a few more months, a pity for our explorers. A ghost orchid in bloom is a magical thing with ethereal, white blossoms that appear to float in midair.

The group saw no ghosts, but they spotted and recorded numerous populations of other rare native orchids, such as yellow-helmet orchid (*Polystachya concreta*), butterfly orchid (*Encyclia tampensis*), and night-scented orchid (*Epidendrum nocturnum*).

Plant surveys like this one help land managers understand the plants in their care and determine how to best protect them.

"We can't manage what we don't know is there," Franklin says. Rookery Bay and the Garden also collaborate on native seed collections—a task that is impossible without first conducting surveys.

A petition has been filed to place the ghost orchid under the federal Endangered Species Act; currently, it receives only state-level protection. Even though this plant survey did not turn up any ghost orchids, scientists routinely comb the wild looking for new populations and checking the status of known ones.

Long-term data help scientists understand whether ghost orchid populations are shrinking, stable, or increasing. Scientists also look to the health of these orchids to inform them about the ecosystem's overall health.

Rescuing Florida Native Plants

Florida has 235 native plant species considered "globally rare." More than 70% of them, 168, are not secured in a conservation seed bank.

To save rare plant genetics before they are lost, the Center for Plant Conservation (CPC) launched the Florida Plant Rescue, a multiyear, multi-organization seed collection and conservation effort focused on those 168 unprotected species. Naples Botanical Garden is one of six botanical gardens participating, along with the Florida Native Plant Society, Institute for Regional Conservation, and Florida Natural Areas Inventory, where the project's coordinator is based.

Each participating garden holds the seeds it collects, ensuring the seeds remain available locally for restoration projects, explains Katie Heineman, the CPC Vice President for Science and Conservation. The gardens also will share seeds with other institutions.

The CPC this year funded collecting trips for eight species, created a first-of-its-kind database listing the native species conserved at every seed bank in the state, and finalized a governance charter for participating institutions.

Our Garden has pledged to collect at least five species, with the priorities being pineland twinflower (*Dyschoriste angusta*), an imperiled wildflower, and manyflowered grasspink (*Calopogon multiflorus*), an orchid that is globally imperiled and threatened in Florida.

One of our trips took place last May along a trail at Rookery Bay National Estuarine Research Reserve, where pineland twinflower is known to exist. Sure enough, Garden conservationists and Jared Franklin, Environmental Specialist for Rookery Bay, spotted the tiny, purplish, low-growing imperiled wildflower just minutes into their expedition.

This kind of work is critical in Florida, the No. 3 state in the country in terms of biodiversity with nearly 3,000 native species.

But plants in Florida face numerous threats, ranging from new construction to sea-level rise to storms.

"Florida has an amazing botanical community that can be tapped into," Heineman says. "It's a really exciting time to be doing conservation in Florida."

Jennifer Reed is the Garden's Editorial Director.



(Top) Jared Franklin and Chad Washburn look for the targeted species at Rookery Bay.

(Right) Eric Foht documents pineland twinflower.

Photos: Jennifer Reed





The Garden offers an ideal new home for native turtles rescued from poachers. Here, Florida SouthWestern State College Professor Jordan Donini, an expert on turtles, prepares to release two into the Garden's native Southwest Florida habitat. He intends to monitor 34 rescued turtles over the next year to see how they adjust and compare to the existing turtle population. For the full story, visit naplesgarden.org/turtle-release.

Photo: Sarah McKeown



4820 Bayshore Drive
Naples, FL 34112
239.643.7275
naplesgarden.org