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FASHION FORWARD

UP-AND-COMING DESIGNERS WITH A FRESH TAKE ON PALM BEACH STYLE

Jordan Kanegis, Logan Poos, Aurelia Demark

THE HEAT IS ON

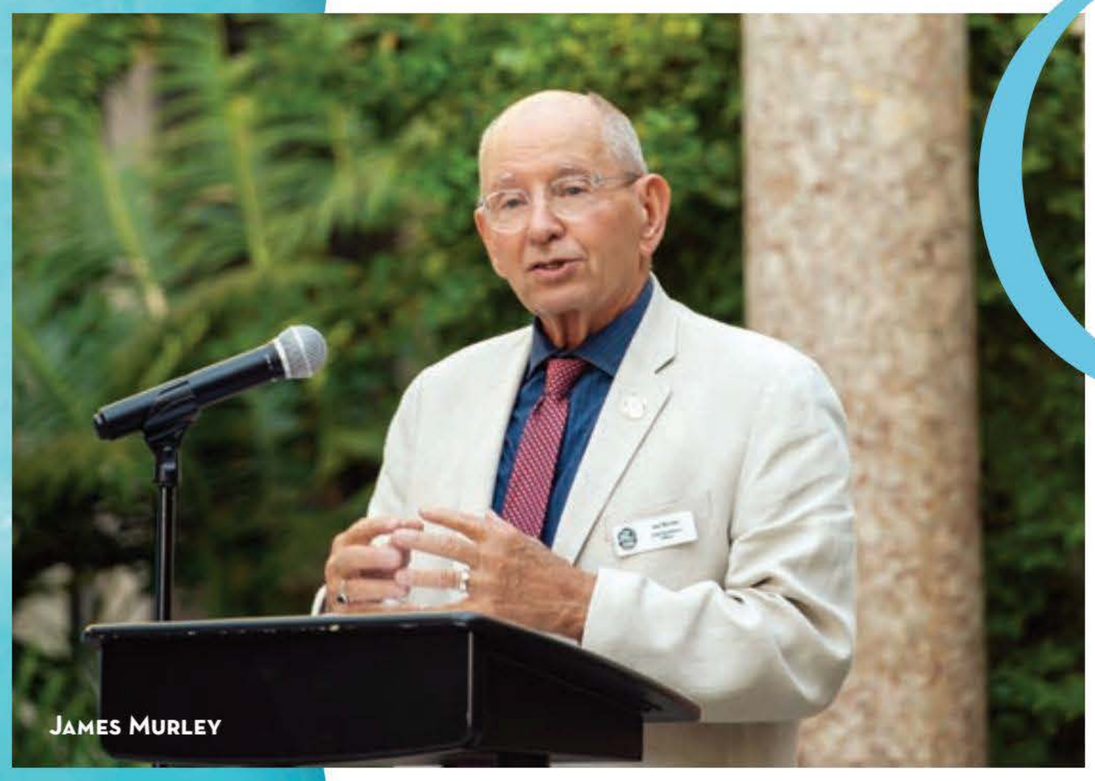
STRAIGHT TALK WITH SOUTH FLORIDA'S CLIMATE WARRIORS

LOCAL LOVE

MELTDOWN

SWELTERING TEMPERATURES, RISING SEAS, AND ABOVE-AVERAGE HURRICANE SEASONS HAVE BECOME A FACT OF LIFE FOR SOUTH FLORIDIANS. CAN THESE LOCAL EXPERTS FORGE A MORE SUSTAINABLE WAY FORWARD?

BY PAIGE BOWERS AND K.S. MEYER



James Murley

90

PERCENT OF RESPONDENTS BELIEVED CLIMATE CHANGE WAS HAPPENING

In the middle of a heat wave last July, South Floridians couldn't even escape the 100-degree temperatures with a quick dip in the ocean because the water was just about as hot.

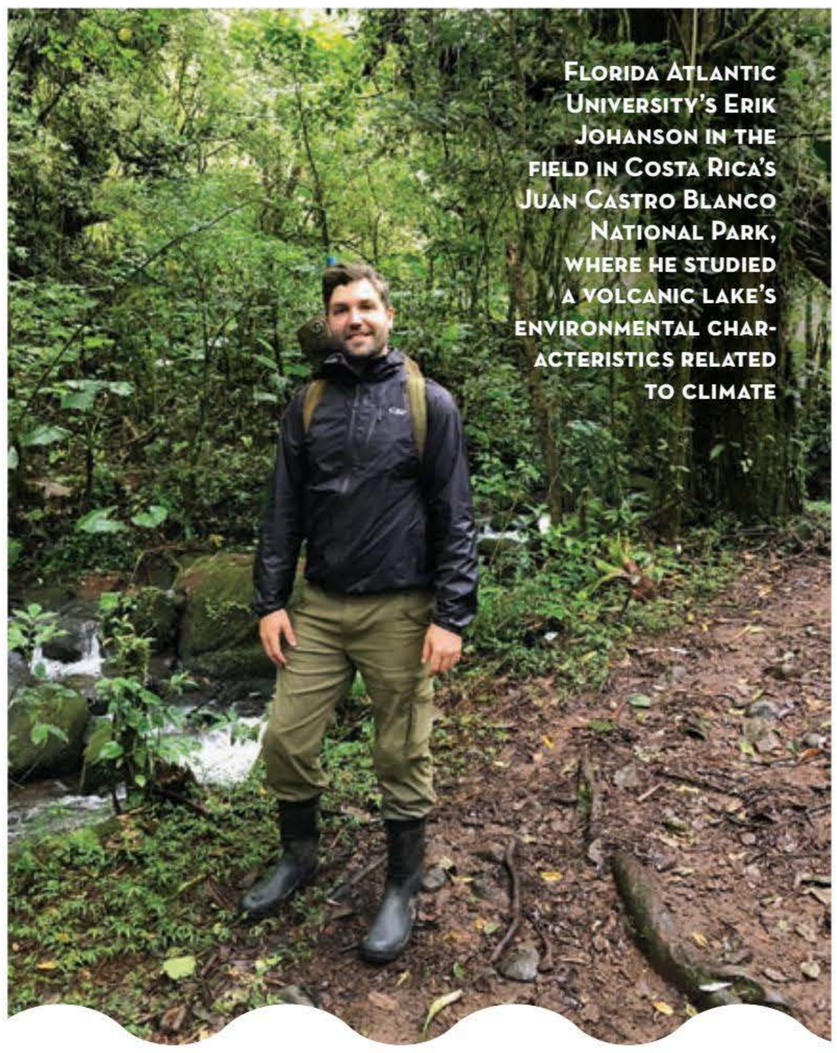
That alone made for a jaw-dropping bit of national news—ocean water rarely rises above 90 degrees Fahrenheit—but then came the race to save dying coral from scorching coastal waters. This was not just about the vibrantly hued aesthetics of reefs, but rather about safeguarding a valuable component of the global food supply (reefs provide key nurseries for marine life of all kinds) and a source of protection from powerful waves during storms (serving as built-in infrastructure to stem surge). It was also about money: reefs bring in billions of dollars a year to the state's economy. Data from the National Oceanic and Atmospheric Administration (NOAA) suggests that coral reefs in Florida generate $4.4 billion in local sales, $2 billion in local income, and 70,400 full- and part-time jobs.

Dramatic weather events like this are caused and compounded by climate change, or what the United Nations defines as long-term shifts in temperatures and weather patterns brought on by human activities such as burning coal, oil, or gas. When these fossil fuels are burned, they release greenhouse gases that encircle the earth and trap the sun's heat, which leads to higher temperatures and other detrimental environmental occurrences such as stronger storms, melting glaciers, rising seas, droughts, and food shortages.

Given Southeast Florida's delicate, interconnected ecosystem, area environmental experts, advocates, and lawmakers have recognized the need to work together to both help the region adapt to its changing climate and mitigate some of the causes.

"We're looking at what we can do as a worldwide challenge," says James Murley, chief resilience officer of Miami-Dade County. "Can the world and all of us who are a part of this problem reduce the rate of emissions so that we can slow down the warming of the atmosphere? Any way you look at it, you don't turn off that process overnight or in a year."

But with concerted effort, it's not without hope.



Florida Atlantic University's Erik Johanson in the field in Costa Rica's Juan Castro Blanco National Park, where he studied a volcanic lake's environmental characteristics related to climate

IMPACT YOU FEEL: IT'S TOO DARN HOT

It isn't all in your head—it's in your backyard. You can feel it, and you're not alone. According to a Fall 2023 Florida Climate Resilience Survey conducted by Florida Atlantic University (FAU), which sought to gauge Floridians' views on their preparedness for and resilience to climate hazards, 90 percent of respondents believed climate change was happening. A similar nationwide

Erik Johanson and a FAU graduate student explore a coastal estuary in Ecuador that holds sediment records of El Niño climate events that impact the region over time.

ANN MATHEWS

ANN MATHEWS

Palm Beach County officials have embarked upon resilience efforts to support an enhanced ecosystem where native species can thrive. One such project is the Currie Park Living Shoreline, pictured above at planting in 2017 and left in 2021 following four years of growth.

10

THE TOP 10 HOTTEST YEARS ON RECORD ALL OCCURRED IN THE LAST 15 YEARS.

study conducted by Yale University found that 74 percent of Americans believe the same thing. The FAU report chalked that difference up to Florida's experience with hurricanes and other severe weather—like the 26 inches of rain that fell in Broward County in less than 12 hours in April 2023 and the hundred-plus-degree heat indexes of last summer.

None of that data is slowing population growth in the Sunshine State. In December, Florida's Office of Economic and Demographic Research (EDR) reported that the state's population increased by 359,000 people in 2023. It estimated that over the next five years, the state's population will continue to grow by about 300,000 people annually. Despite the results of the FAU and Yale studies, it seems worrisome trends don't bother out-of-staters who continue to flock to Florida for the weather and outdoor lifestyle. But the influx of new residents exacerbates the factors that are triggering the increased heat and unruly storms.

"The top 10 hottest years on record are all in the last 15 years," says Erik Johanson, PhD, head of FAU's Environmental Change Laboratory. "This is a worrying trend because we have a growing population here, growing energy demands, and less natural space that can mitigate these climate impacts."

Because severe weather has not been limited to the past 15 years, Johanson's lab has reconstructed paleoclimate records to see how events like droughts have historically impacted societies. "I can look at the past and find some really critical, important examples," he says. "But the sheer magnitude and the speed of changing climate today is what stands out as such a unique thing and a worrying thing, especially when you consider the effects and the influence of communities along the coastlines and in vulnerable areas and how slow to adapt those communities can be given the infrastructure that's there."

CAN COOLER HEADS PREVAIL?

Experts say individuals need to own their role in this moment. "There are a lot of actions people can do on an individual basis," Johanson says, adding that they can opt for cleaner e-vehicles or hybrids to cut down on greenhouse gas emissions. They can also push their local representatives to support the types of large, multidecade projects that will be required to mitigate climate change. FAU's Climate Resilience Survey indicated that the will to encourage government officials to act on more environmentally friendly policies is there, but Johanson notes that it's hard to get politicians to focus their energy on efforts that involve results that may not be seen for another 20 to 40 years.

Which is why it's good to be able to turn to the science. Murley points to research universities like the University of Miami and FAU, both of which are providing crucial data that can not only spur elected officials to act, but also help them to better understand the specific actions to take. However, because the rate of climate change is so fast, oftentimes the best you can do is create strategies that will slow that process down and allow us to adapt.

"We know it gets hot in the summer, but our younger generations are starting to feel a change about when they can go out and play safely," says Megan Houston, chief resilience officer for Palm Beach County. "We also worry about our outdoor workers—our farmers, our construction crews, our tourist industry workers [who] have to be outside, as well as pregnant women and parts of our

MEGAN HOUSTON (CENTER)

elderly population. Even some medications don't work as effectively on hotter days, so things like that are important to recognize and figure out how to [solve]."

One way Palm Beach County is trying to beat the heat is by increasing the tree canopy. Houston says that the county received a $1 million grant from the Environmental Protection Agency (EPA) to add trees along walking and recreation areas in the western part of the county. County officials will also be giving out nearly 2,000 trees to Belle Glade, South Bay, and Pahokee residents so they can increase tree coverage around their homes. Typically, those areas have 9 percent tree coverage, and Houston says this program aims to get it up to nearly 40 percent.

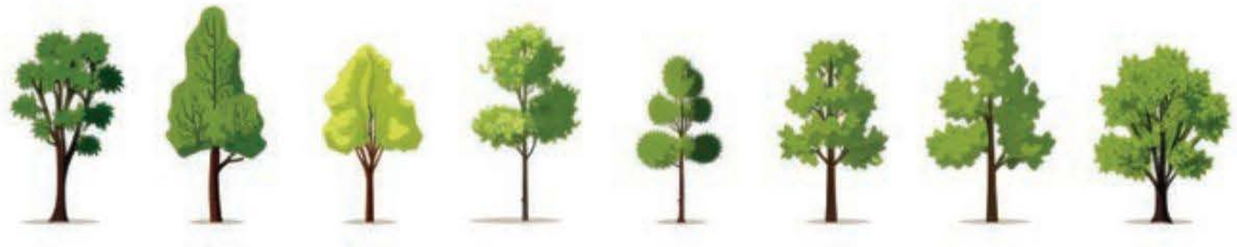
"We know what it's like to stand under an oak tree instead of being on the hot pavement waiting for the bus," Houston says. "So, it helps provide that reduced 'feels like' temperature, improves air quality, and can help with stormwater mitigation. The benefits go beyond the aesthetically pleasing component that we think about."

IMPACT YOU FEEL: RISING WATERS

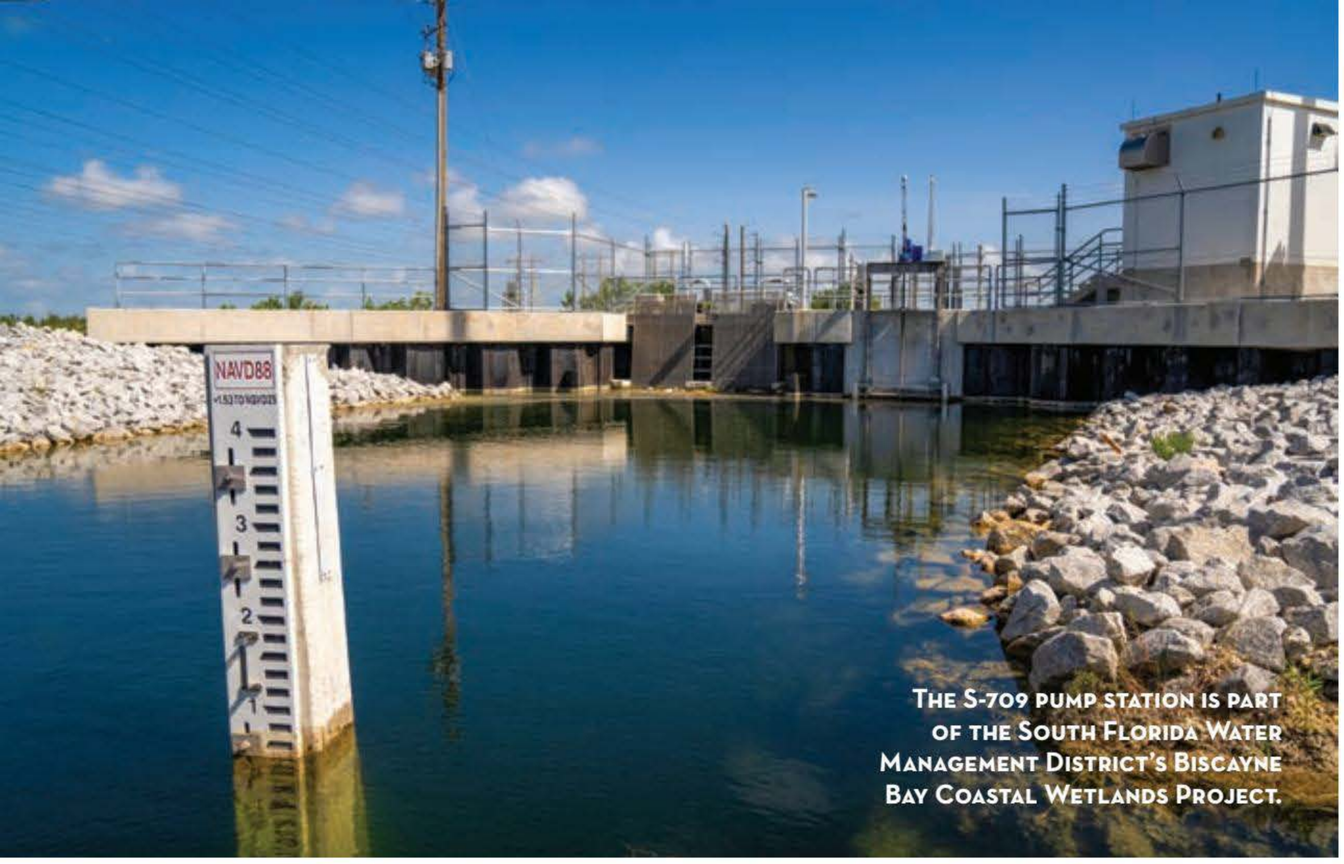
Sure, there are king tides and the occasional late-summer gully washers that leave water where water shouldn't be. But it's more than that—more frequent and more impactful.

According to the Florida Climate Center in Tallahassee, not only are Florida's sea levels as much as 8 inches higher than they were in 1950, but the rate of that rise is rapidly accelerating. In Miami, data shows that sea levels increased 6 inches between 1985 and 2016. Looking to the future, projections from the U.S. Army Corps of Engineers indicate that levels in Miami are expected to rise yet another 6 inches over the next 15 years (the same increase in half as many years). With the state already at a low elevation, these rising waters could cause problems for coastal communities and habitats, to include being more vulnerable to storm surges and erosion.

Hearing or reading that is one thing. Seeing it through virtual reality goggles really drives

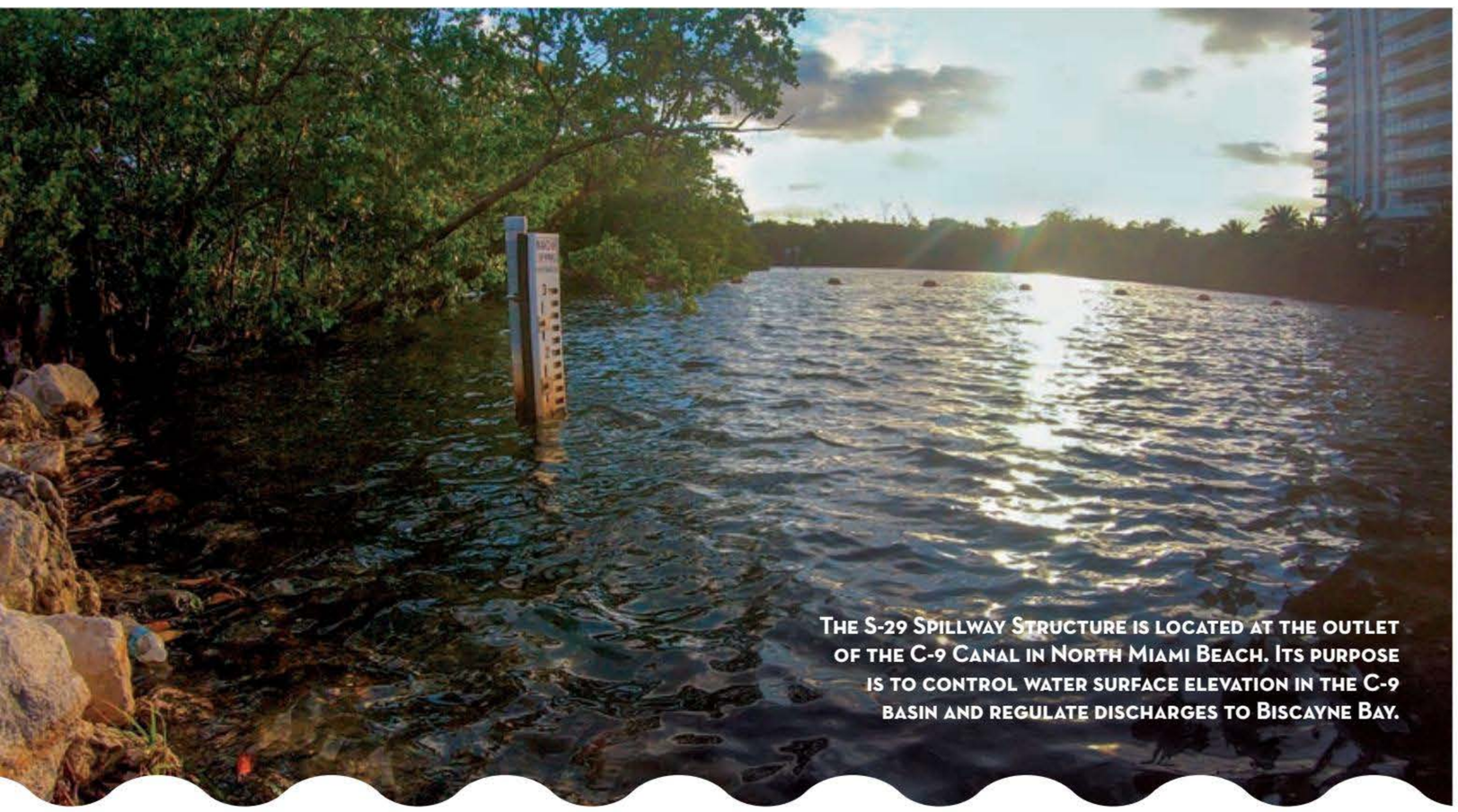


PALM BEACH COUNTY RECEIVED A $1 MILLION GRANT FROM THE ENVIRONMENTAL PROTECTION AGENCY (EPA) TO ADD TREES ALONG WALKING AND RECREATION AREAS IN THE WESTERN PART OF THE COUNTY.



The S-709 pump station is part of the South Florida Water Management District's Biscayne Bay Coastal Wetlands Project.

Carolina Maran



The S-29 Spillway Structure is located at the outlet of the C-9 Canal in North Miami Beach. Its purpose is to control water surface elevation in the C-9 basin and regulate discharges to Biscayne Bay.

the point home, as FAU scientists found in Fall 2022, when they went into the community to research how witnessing a fictional flooding scenario in West Palm Beach's Osprey Park positively impacted residents' willingness to be informed about strategies such as higher seawalls and man-made islands to mitigate the impacts of rising sea levels. The presentations even made an impression on West Palm Beach Mayor Keith James, who looked at it as an alternative way of discussing the issue with the public.

"I think city leaders, when they experience virtual reality and the issues presented, it will leave a lasting memory as to what the impact of sea level rise could be," James said in an FAU video about the project.

HOW TO DRY OUT

Carolina Maran, PhD, the South Florida Water Management District's district resiliency officer, notes that the group is trying to build extra capacity into its system so that it can both manage the region's water supply and protect its ecosystems and property.

"When you've had a year as wet as we've had, the groundwater table is high, [and because of] the sponge that we live on, the water can't go down, so it's going to do what all water does—flow downhill to the canal," Maran says. "We have to manage those systems carefully."

Maran says that higher seas make it harder to discharge water to the ocean, which increases the flood risk. The district is investing in enlarged canals, elevated canal banks, and enhanced culverts that will make it easier to carry water out to sea with pumps. The point is to create more pressure against the rising ocean, she says, and keep saltwater out of the aquifers that provide much of the region's drinking water. Johanson points to an effort that is currently underway to buy additional land south of Okeechobee that would potentially create more conservation space where water could gather and then flow south into the Everglades.

But these efforts to manage the rising heat and waters require coordination and collaboration between the resilience and water management officers in Southeast Florida.

"If Miami-Dade decides to add pumps and pump more water into our primary canals, then someone downstream will be seeing flooding," Maran says. "We need to plan for these things together."

MAKING AN IMPACT TOGETHER

One of the forces behind this push for a cohesive plan for environmental resiliency is the Southeast Florida Regional Climate Change Compact, or Compact for short. Compact is a 15-year partnership between climate practitioners in Palm Beach, Broward, Miami-Dade, and Monroe counties to coordinate a strategy that mitigates the impact of greenhouse gases on the region.

"Climate change doesn't care if your district is red or blue," says Lauren Evans, a local consultant for Compact. "These impacts are occurring regardless of political party, and so we really try to roll up our sleeves and focus on the solutions we can advance. We try to harmonize our region's voices on matters related to climate and resiliency, to provide nonpartisan credibility and legitimacy and continuity."

One of Compact's primary goals is to secure funding for environmental projects. Evans points to a recently successful venture: "We have a $1 million planning grant from the EPA that we are [using to develop] a regional greenhouse gas reduction plan," she says. "That plan will set our region up to be eligible for $4.3 billion in potential competitive funding from the federal government—from the EPA—to

4.3 BILLION

THE AMOUNT OF POTENTIAL COMPETITIVE FUNDING THE SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT COULD BE ELIGIBLE TO RECEIVE TO ADVANCE CARBON REDUCTION STRATEGIES IN OUR REGION

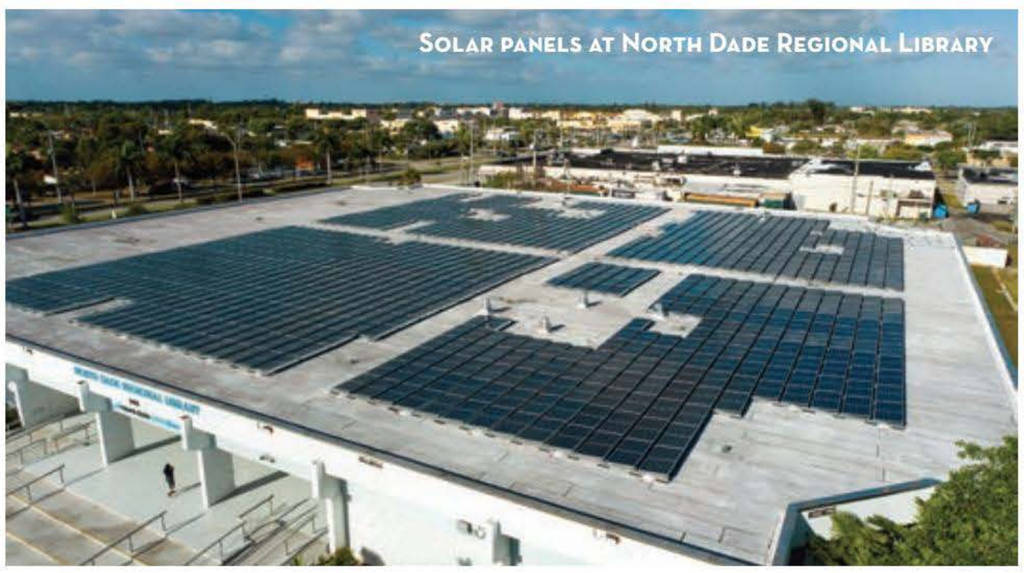
advance carbon reduction strategies in our region."

Evans says this is just one of the Compact initiatives that is pulling the region's stakeholders together—from local governments to the media, from the private sector to planning agencies—when it comes to elevating and developing a vision for Southeast Florida. In her mind, it's the kind of progress that stands to differentiate the region as the national epicenter for climate technologies.

"We really need to stop framing this in a way that this is all just a drag on our economy, when really the solutions here have the opportunity to unlock enormous economic opportunities for our region," Evans says. "[It can] create the jobs and technologies and work that, frankly, our children are going to inherit from us."

That work still lies ahead. Evans says Compact is pursuing multiple avenues toward resiliency, as there will more than likely be no single, cure-all technology or practice that will come along and fix things in one fell swoop.

James Murley agrees, holding up his phone as an example: "The iPhone represents [an] unexpected technology breakthrough, because I'm old enough to remember when there was no iPhone. What I can do on an iPhone today is like Buck Rogers, the comic book [hero], when I was growing up. So, we have the ability to make technology work for us. I don't think it's going to eliminate the stuff we are talking about; maybe we really have a breakthrough in taking carbon out of the atmosphere, and then we really slow down that warming. Things are possible, but they also shouldn't become a reason for not being responsible for leaving this place better than we found it." ‹‹



SOLAR PANELS AT NORTH DADE REGIONAL LIBRARY

WATERY WOES

Algae are a typical part of a marine ecosystem that provide food and keep bodies of water healthy and oxygen enriched. But when water temperatures rise, it can create conditions where some algae can grow at a faster rate and create a dangerous reddish- or green-pigmented scum that releases toxins that make people and animals sick.

FAU's Harbor Branch Oceanographic Institute is conducting ongoing research to determine what types of algae are behind these blooms and the factors that cause them to evolve into something more dangerous. And institute researchers have discovered a link between blooms and coral bleaching, including findings first published in the international journal *Marine Biology* in 2019.

Scientists had previously attributed coral bleaching (and massive coral death) mainly to warming water temperatures due to climate change. But armed with 30 years of unique data from Looe Key Reef in the Lower Florida Keys, FAU's researchers have discovered that the problem of coral bleaching is not just due to a warming planet, but also a planet that is simultaneously being enriched with reactive nitrogen from multiple sources.

The problem starts with runoff: improperly treated sewage, fertilizers from farming, and contaminated topsoil are all contributors to elevated nitrogen levels in groundwater. As that nitrogen-rich water makes its way to the ocean, it causes phosphorus starvation in coral reefs. Call it a one-two punch—once the corals are starved for phosphorus, they're more likely to bleach because their overall temperature thresholds are chemically suppressed.

FAU's research links reactive nutrients and algae concentrations, showing that South Florida's coral reefs were dying off long before they were impacted by rising water temperatures.

"Our results provide compelling evidence that nitrogen loading from the Florida Keys and greater Everglades ecosystem caused by humans, rather than warming temperatures, is the primary driver of coral reef degradation at Looe Key Sanctuary Preservation Area during our long-term study," Brian Lapointe, PhD, the study's senior author and a research professor at FAU's Harbor Branch, said in a statement. "The good news is that we can do something about the nitrogen problem, such as better sewage treatment, reducing fertilizer inputs, and increasing storage and treatment of stormwater on the Florida mainland."