Miami Herald

EXPOSED

Miami-Dade County's urban tree project unable to shade residents from record heat

BY **ALYSSA JOHNSON**

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Miami is heating up. With the number of heat advisory days on the rise, the county appointed the world's first chief heat officer and tasked her with finding and implementing solutions – like growing more trees.

A thriving urban tree canopy can mitigate rising temperatures and other effects of climate change. Trees offer a natural cooling effect by providing shade and releasing moisture into the air. They can also help with water filtration and flood prevention.

But the canopy in the Miami area is far below the county's 30% target level, set more than a decade ago to help combat South Florida's blistering conditions. Despite various planting programs, a recent county report shows little improvement in overall canopy cover. And residents pay the price.

It's not an easy problem to solve. The county's patchwork of tree-planting programs has been unable to keep up with tree loss caused by hurricanes and rapid development.

Meanwhile, improper planting and poor tree maintenance have caused newly planted trees to die before they have an impact on the overall canopy.

The problem doesn't affect everyone the same way, either. In Miami, lower-income areas and communities of color tend to have fewer trees, leading to complaints of elevated electricity bills and a higher risk of heat-related health complications for those residents.

Municipalities all over the United States are struggling with similar efforts to increase tree cover. But few have stakes as high as Miami-Dade, with its blistering sun, rising tides and record heat.
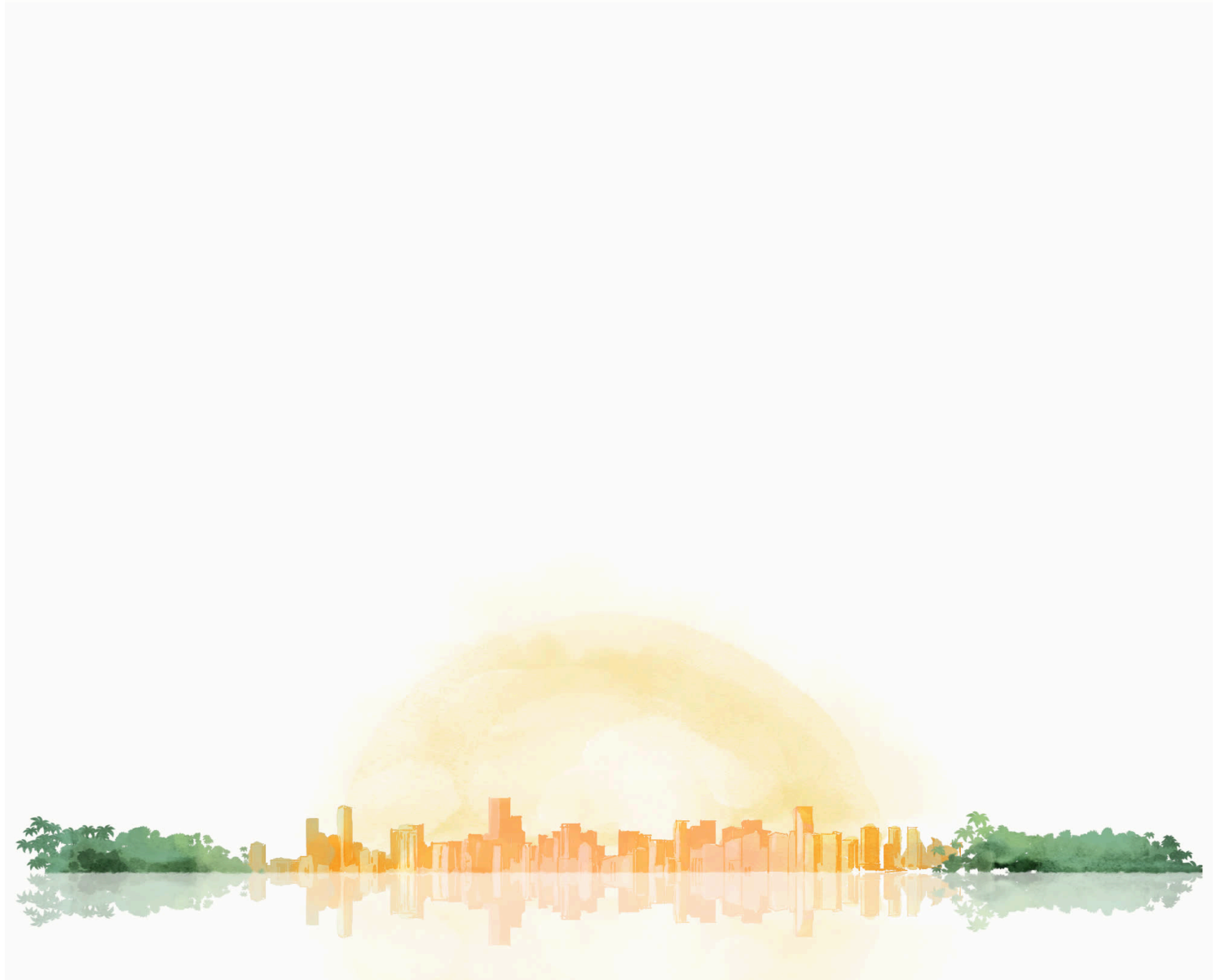
Kimberly Gutierrez could not breathe.

After checking in at an urgent care clinic, the twenty-something was diagnosed with a condition called pulmonary edema, a buildup of excess fluid in the lungs. She was advised to avoid the heat because her diagnosis makes her more susceptible to heat exhaustion or heat stroke.

In Miami-Dade, that's not easy.

In her Hialeah neighborhood, the St. Thomas University student with a passion for gardening and nature is confronted with baking sun radiating off heat-intensifying concrete and asphalt. There are few trees to provide relief.

"Basically, you're living in a concrete jungle," said Hialeah Councilman Bryan Calvo. It's a problem that extends far beyond Hialeah's city limits.

Long before last year's record heat wave, the county government recognized that places across Miami-Dade were withering under an increasingly brutal sun. To address that, in 2007, officials drew up a document called "Greenprint For Our Future: Street Tree Master Plan." The goal was to get the county to 30% tree coverage by 2020—mostly, by planting more trees.

Seventeen years and millions of dollars later, the county is not even close to reaching that target. Despite being relatively well funded and run by a team of dedicated environmentalists, the patchwork of loosely coordinated tree planting and giveaway programs that make up the county's reforestation efforts have, so far, been ineffective in boosting canopy levels.

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Unfortunately, the people who are being most heavily impacted are the people who

have the fewest resources to be able to handle it.

Evan Mallen, Georgia Institute of Technology's
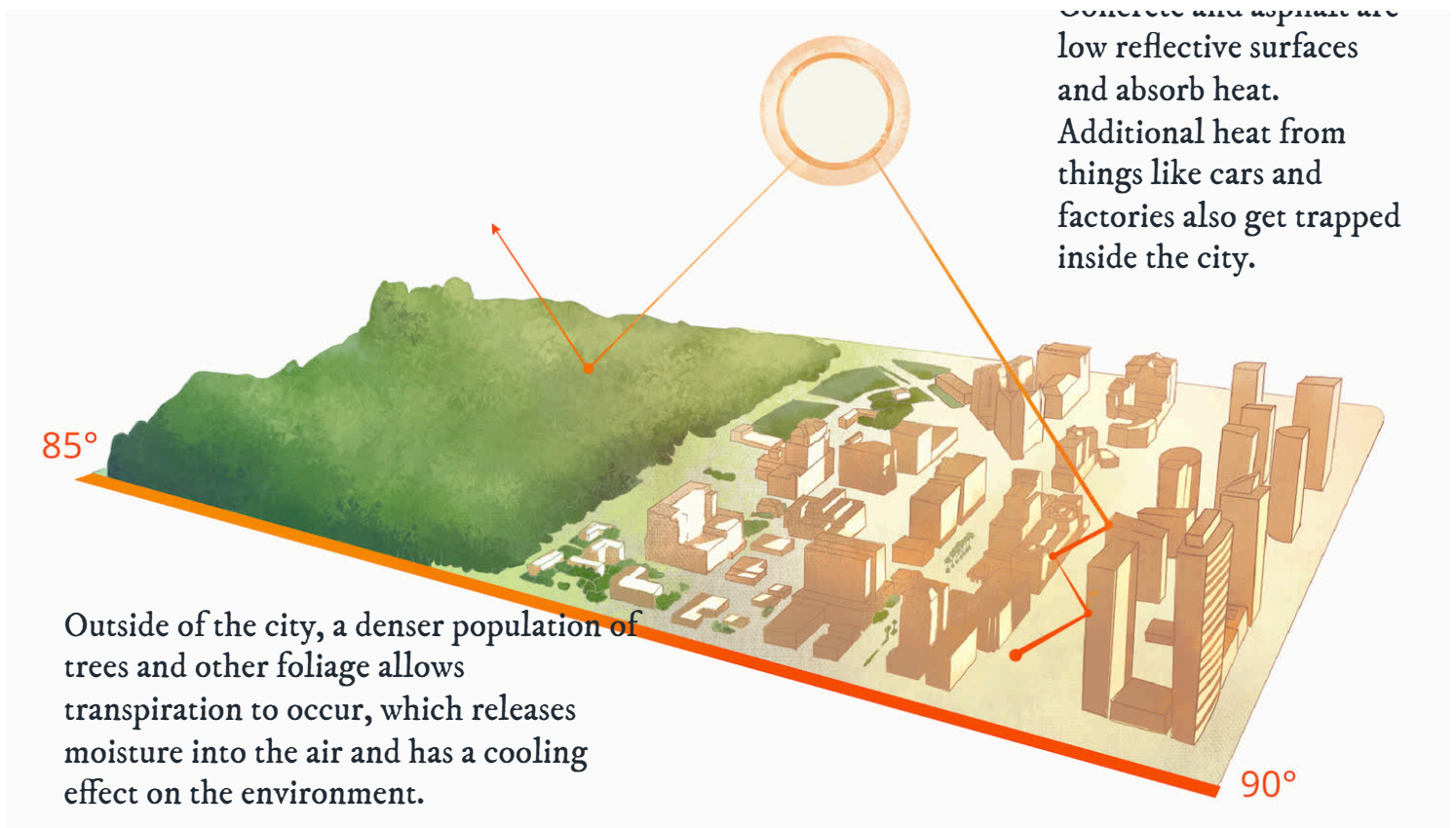*Urban Climate Lab*

While the county government leads Miami-Dade's reforestation and canopy preservation efforts, it has limited jurisdiction to actually achieve its goals. It can't unilaterally put trees on private property, which makes up most of the available planting land in the county. And a recent state law limits any local prohibitions against cutting down trees on residential property.

As canopy levels stagnated from widespread deforestation over much of the last decade, a Herald investigation found mismanagement, understaffing, jurisdictional issues, challenges enforcing preservation laws, and a lack of systems promoting transparency and accountability have critically undermined the urban reforestation efforts in Miami-Dade County – one of the hottest areas in the country, both in terms of temperature and population growth.

"We're doing absolutely everything we can with every resource we have available to us, and there's just not enough," said one of the county's tree experts, Gabriela Lopez, in an interview last year. Lopez manages Neat Streets, one of the county programs that plants trees in parks and other public spaces and gives grants to municipalities to support tree-planting efforts.

Heat island effect

Urban areas absorb more heat than rural areas because of how infrastructure reacts to sunlight.

Concrete and asphalt are

Concrete and asphalt are low reflective surfaces and absorb heat. Additional heat from things like cars and factories also get trapped inside the city.

85°

Outside of the city, a denser population of trees and other foliage allows transpiration to occur, which releases moisture into the air and has a cooling effect on the environment.

90°

Since taking office, county Mayor Daniella Levine Cava has cultivated an environmentally friendly image as she tries for a reboot of Miami-Dade's reforestation efforts – an area where she says her predecessors fell short.

Planting data from Levine Cava's first two years in office show little difference between her administration's planting efforts and those under her predecessor. But since 2022, both the budget for tree-related projects and the number of trees planted through county programs increased. The county's projections show those figures will continue to rise.

The mayor, who is running for reelection and will be on the ballot in August, promised to build "the first comprehensive, ambitious, and concrete plan to get to our 30% goal with a priority on areas with lower-than-average tree canopy and income levels."

The county's 2023 target for issuing a draft plan came and went. No plan was published. No draft was provided in response to a Herald request.

Levine Cava wrote a letter to community organizers last May saying the county would not be on track to reach the lofty canopy goal by 2030 as had been the hope. To do that, she wrote, the county would have to plant or give away 750,000 trees each year. Currently, she said, the county has the capacity to plant just 10,000 trees a year on county land, and give away or provide grants for planting another 10,000 on private or municipal land.

As for setting a more realistic timeline, Levine Cava wrote that the plan was still too ill-defined to say. County officials now say a draft of the canopy plan will be released in May and that they are preparing to have "an honest conversation" with the community about where things stand.

County parks superintendent Alfredo Rivero (far right) supervises a county tree-planting project along NW 199th Street in Miami Gardens on June 06, 2023. Pedro Portal *pportal@miamiherald.com*

Total canopy coverage in the Miami area has hovered around 20% on average for much of the past decade, according to the county's latest report. In one out of five ZIP codes, data show the overall canopy was below 10% at last measure.

There are significant limitations on the county's primary reforestation programs. Technically, the county cannot plant trees in Miami-Dade's 34 municipalities, except along county- or state-maintained roads as part of their "street tree" planting program. So, to fill the gaps, the county relies on tree giveaways and a recently implemented grant program that gives cities money to plant trees.

While the county says its tree planting and giveaway programs prioritize "underserved communities" and "high heat areas," a Herald analysis of county tree data showed little rhyme or reason to how most trees have been distributed. Overall, the county's various planting programs were not more prevalent in the areas with the fewest trees or limited economic resources, according to the analysis.

Also, by generally distributing tree-related resources equally between the county's commission districts – rather than prioritizing the highest-need areas – the county's street tree planting program privileges politics over need and does not meaningfully address the inequities in canopy coverage.

In a statement, county officials said that particular program was not specifically designed to address inequities unlike some of the other initiatives.

"Each of the programs of the County have been developed to serve a different purpose (e.g., to protect our water supply, endangered ecosystems, help private property owners rebuild lost canopy) and not all have historically focused on equity," county officials said in the statement.

Planting data show one grant-based initiative has recently been more effective at directing resources to underserved communities.

"We want to make sure that there's equity in our distribution of the trees," said Levine Cava.

How trees help mitigate flooding

Foliage increases the surface area for rain to be absorbed or evaporate from.

Roots provide a pathway for water to flow into and take up moisture from the soil.

The Herald's analysis was based on data from four of the county's primary reforestation programs between 2016 and 2022. The data show those programs were responsible for planting just under 2,000 trees in the 2017 fiscal year. Over the next five years, that number had ballooned to over 7,500 trees planted annually, with the largest increase after 2021 when the county did its most recent canopy assessment.

In response to the Herald's reporting, the county provided updated numbers suggesting more trees were planted in 2023 than the previous year.

The impact of the county's most recent planting initiatives on the overall canopy is difficult to assess, however. Depending on the species, it takes five to 10 years for a sapling to mature enough to contribute to the canopy.

Meanwhile, in many places, including Hialeah, Gutierrez's majority-Hispanic community, the county's planting and tree giveaway efforts have not kept up with the canopy loss resulting from rapid development and storm damage.

Hialeah saw its canopy cover fall between 2016 and 2020. And it wasn't alone among lower-income, high-minority enclaves. Opa-locka, overwhelmingly Black and one of the poorest cities in Miami-Dade, also fell significantly.

Evan Mallen, senior analyst at the Georgia Institute of Technology's Urban Climate Lab, said that the residents who suffer the most as temperatures rise are those in underserved communities that tend to have fewer trees and more paved surfaces.

"Unfortunately, the people who are being most heavily impacted are the people who have the fewest resources to be able to handle it," Mallen said.

Ultimately, while a handful of predominantly wealthy Miami-area cities like Coral Gables have been recognized by the "Tree City USA" initiative for their lush foliage and tree protection programs, far more communities are left facing the heat.

Tree canopy cover reduces heat

On the morning of July 30, 2023, there was a 20° F difference in peak temperature between the residential area along East Fourth Street in Hialeah and the tree-lined Coral Way in Coral Gables.

75° F   140° F

Coral Gables   Hialeah

Graphic: Sohail Al-Jamea, Casey Frank, Rachel Handley, David Newcomb

A Herald review of some recently planted trees revealed a spotty record.

While some of the newly planted trees have flourished, others look puny and sad years later, victims of "green wasting" – a term used by urban tree scientists to describe a tree that is planted but without a plan to make sure the young sapling survives.

When presented with pictures of previously planted trees that had struggled to grow, the mayor's office noted that some trees thrive "better than others."

"Unfortunately, not all street trees establish and thrive because the street/roadway environment is prone to harsh site and environmental conditions," according to a statement from Levine Cava's office.

A sapling planted along the county's northern border as part of Miami-Dade's reforestation program, photographed on May 13, 2023. Casey Frank *Miami Herald*

"The hardest part of [the tree's] life cycle is the first five years: getting established, getting watered, not getting weed whacked," said urban tree scientist Deborah Hilbert, the former executive director of the Florida Urban Forestry Council. Because of those challenges, Hilbert said programs aimed at maintaining already existing tree cover tend to have more of an impact on overall canopy levels than planting trees.

But, in Miami-Dade, the few protections in place for existing trees can be easily surpassed.

A recently enacted state law limits the power of municipalities to intervene when a property owner wants to cut down a tree. And the latest surge of newcomers calling Miami home prompted new construction projects, leaving less and less of the county's land available for tree-planting initiatives.

The county does not own enough land to support the number of trees necessary to meet the 30% canopy goal, Levine Cava wrote in her letter last year. She said the success of the county's urban canopy program will depend on private landowners agreeing to plant trees and to stop cutting them down.

'Cement city'

Although the county first published its reforestation plan in 2007, no real effort was made to measure the canopy levels until nearly a decade later.

In 2016, with the help of scientists at Florida International University and the University of Florida, Miami-Dade County compiled its first interim progress report: the canopy stood at a sobering 19.9%.

By 2020, when the county took its latest measure, the canopy coverage was just 20.1% – essentially the same level it had been five years previously. And in many places, canopy coverage got worse.

Community organizations identified "areas of concern" in these ZIP codes where the canopy level was lower than 20% and poverty was above 20%.

The county assessment found that areas with higher percentages of Hispanic residents tended to have lower tree canopy cover. The

residents in the highlighted ZIP
codes are more than 80% Hispanic.

More than 30% of residents in these ZIP codes are Black. In 2016, the county assessment found areas with more Black residents tended to have lower canopy coverage. But that was no longer true in 2020 after some predominantly Black areas saw improvements.

E. 44th Street, Hialeah

According to the county's status report, areas with lower median household income tended to have fewer trees.

832 Coral Way, Coral Gables

In line with national trends, in
Miami, areas with the highest
median income have the highest
levels of tree coverage, aside from
highly-developed areas like
downtown.

2020 Percent Tree Canopy Cover

0%   15%   30+%

Doral

Kendale
Lakes

Goulds

Homestead
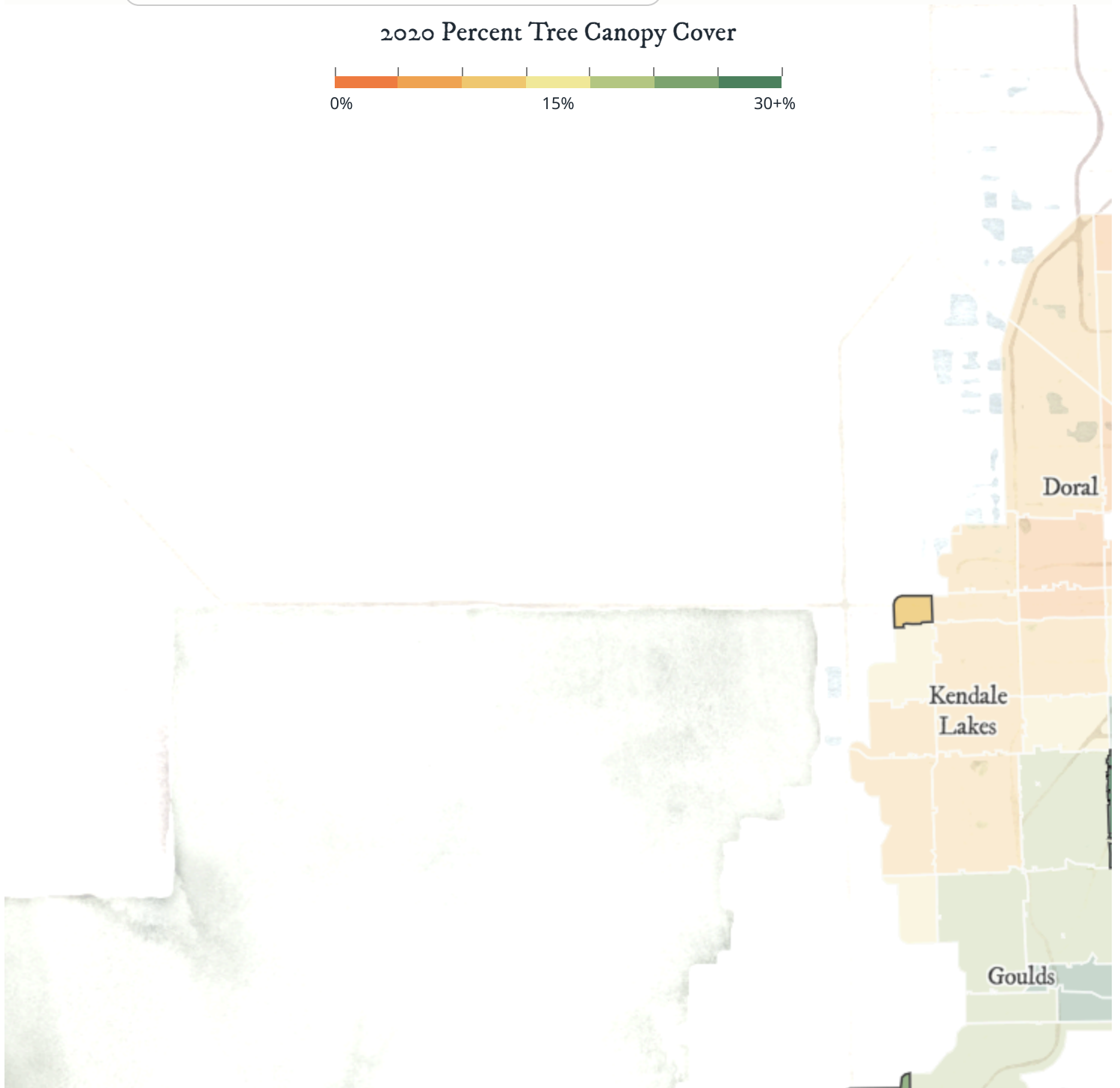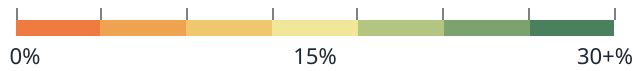
Sources: Miami-Dade County Urban Tree Canopy Assessment, US Census • Graphic: David Newcomb

The lack of trees in many communities has widespread impacts on residents' quality of life.

When Jeanette Ruiz adopted a dog in 2016, she was looking forward to giving her pet a healthy life. However, after she took her new pup for a walk in her community in Country Club, an area west of the Miami Dolphins' stadium that she calls "cement city," she quickly realized the sidewalk was burning and chafing her dog's paws.

She noticed there were no shaded routes to walk, so she and her husband had to take the dog to the city next door, Miami Lakes, to access more trees and cooler conditions. Not only was their dog able to take longer walks, but she found it was easier for her and her husband to be outside.

Trees don't just provide shade. They also cool the air through evapotranspiration —essentially, the trees function as sweat glands for an entire community.

"It's like trees are sweating for us all the time," said Mallen, the analyst at the Georgia Institute of Technology's Urban Climate Lab. "As water comes out through their leaves it cools down the air as that water evaporates."

Ruiz, the program director for the Miami Climate Alliance, says she is probably more aware than her neighbors of the impact trees have on conditions. Most people in her neighborhood tend to venture outside only in the morning or evening to avoid the sun.

"I think people are just used to the fact that we don't have trees, but when I do the comparisons with another community like Miami Lakes, it's a drastic difference," Ruiz said.

But both communities are still far below the goal of 30% canopy coverage, and a county report shows they each lost canopy between 2016 and 2020, the date of the latest canopy survey.

Tree canopy cover in Miami-Dade County ZIP codes in 2016 and 2020

Most ZIP codes saw minimal change between the two measures. But a few places like Key Biscayne saw significant gains, while Hialeah experienced the largest canopy losses.

Search...

	ZIP	CITY	2016	2020
1	33131	Miami	5%	5%
2	33132	Miami	4%	5%
3	33010	Hialeah	8%	7%
4	33126	Miami	9%	7%
5	33130	Miami	6%	8%
6	33012	Hialeah	10%	8%
7	33172	Miami	11%	9%
8	33013	Hialeah	12%	9%
9	33054	Opa Locka	11%	9%
10	33015	Hialeah	13%	9%
11	33174	Miami	11%	9%
12	33166	Miami	12%	9%

	ZIP	CITY	2016	2020
13	33128	Miami	7%	10%
14	33142	Miami	10%	10%
15	33016	Hialeah	12%	10%

↓ Show 62 rows

Source: Miami-Dade County Urban Tree Canopy Assessment • Chart: David Newcomb

While these problems aren't unique to South Florida, Miami-Dade County also has challenges that other metro areas don't as it tries to improve its urban canopy.

In developing the 2007 master plan, county regulators noted difficulties stemming from a "confusing regulatory and maintenance environment" that "varies depending on location." According to the report, "who does tree planting and maintenance activities along a given roadway depends often on the size of the roadway and whether the governmental agencies have maintenance agreements in place with other agencies."

The Department of Parks, Recreation and Open Spaces oversees the street tree planting program, which puts trees on county and state roads. The Department of Regulatory and Economic Resources runs the tree giveaway program, Adopt-A-Tree and the county's Environmentally Endangered Lands Program which oversees the preservation of natural forest areas in Miami-Dade. And Neat Streets, a multijurisdictional board housed in the parks department, conducts its own tree giveaways throughout the year and also administers the county's tree grant program.

Throughout the years, the county has also implemented smaller-scale initiatives like one aimed at planting trees at bus stops.

County officials told the Herald in an email that their different programs should
"not be viewed as an inhibitor" and did not cite any plans for changing their
approach or consolidating programs into one.

The county has never published a plan describing how these piecemeal programs
should work together to achieve the overall canopy goal.

A Google Street View image from 2021 shows saplings planted closely together between more
established trees along the Miami-Dade County's northern border. Reporters who visited the
site in 2023 found the trees had not experienced noticeable growth. *Google Street View*

No public-facing website charts the county's tree-planting progress overall.
Behind the scenes, there is no uniform data that can be used to measure all
planting efforts. Instead, each program has a different way of documenting
planting efforts. And each county program has differing goals on what tree
planting should accomplish, some privileging aesthetics over shade.

County officials said that they are developing new mapping tools to begin
tracking their trees more effectively in hopes of building a "county-wide tree
inventory." That effort began with an inventory of trees planted in county parks

but will eventually expand to trees planted along county and state roads, a county spokesperson told the Herald.

'You can't just pop a tree in'

Kim Roy said that the county has always overlooked Bunche Park, a historically Black neighborhood in Miami Gardens where she grew up.

Roy, who now resides in Broward County, said trees were scarce in her former community. She only remembers the county planting trees in Bunche Park once.

"A lot of the trees didn't survive," Roy said. She said the county never returned to check on the trees. The follow-up care then landed on the community, Roy said, making the newly-planted trees a nuisance.

Ian Leahy, senior advisor at American Forests, a nonprofit focused on equity in urban forestry projects, said that successful reforestation projects in urban environments require a holistic, community-oriented approach.

"You can't just pop a tree in and solve the problem," Leahy said. "You have to think, 'Okay, what's underground? What's above ground? What's the community situation beyond it?'"

Now, residents of Bunche Park and surrounding neighborhoods are taking matters into their own hands.

From left to right, workers Reynaldo and Pablo Olguin, Juan Melo, Alexis Reyes and Brigido Gonzalez, plant oak trees in Miami Gardens as part of the county's tree-planting program. Pedro Portal *pportal@miamiherald.com*

Following the county's latest canopy assessment, the faith-based community organization People Acting for Community Together, or PACT, identified 15 "areas of concern" where the group urged the county to prioritize tree planting.

Those areas, which include places like Opa-locka and Bunche Park, are communities that have high poverty rates and low tree canopy.

PACT proposed that the county plant more trees on public school property in the identified areas. In 2023, the county commission pledged $200,000 to fund PACT's proposal. The county also partnered with the organization to plant trees at churches and other faith facilities in those areas.

Rev. Ana Jackson, PACT member-at-large, said the county would not have prioritized these neighborhoods without the advocacy of community members.

"Without PACT pushing them—we've been working on this since 2021—we wouldn't be where we are today," Jackson said.

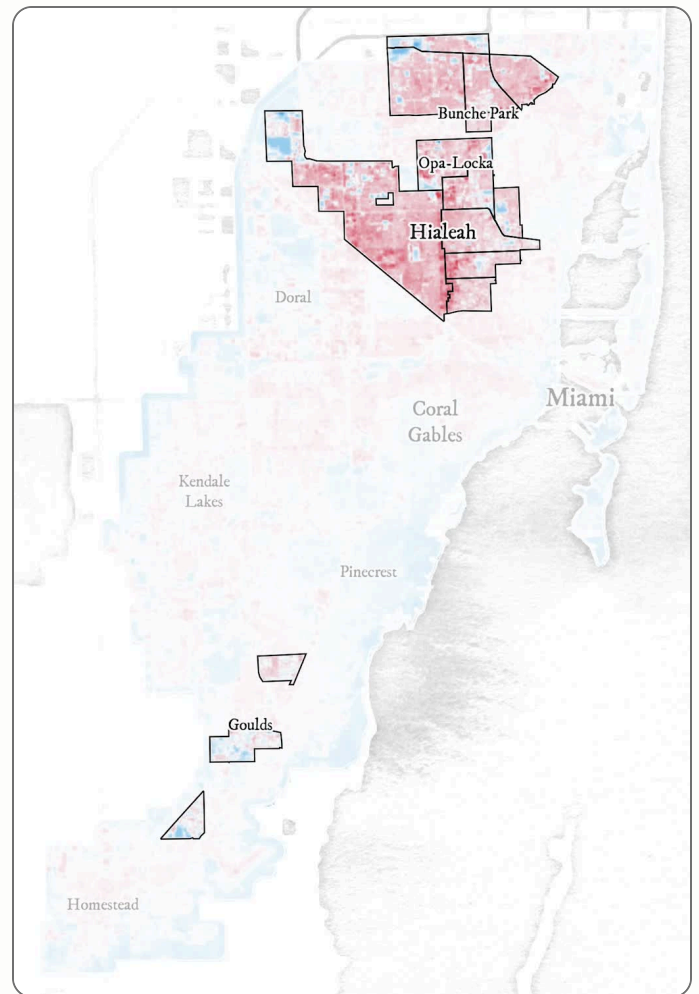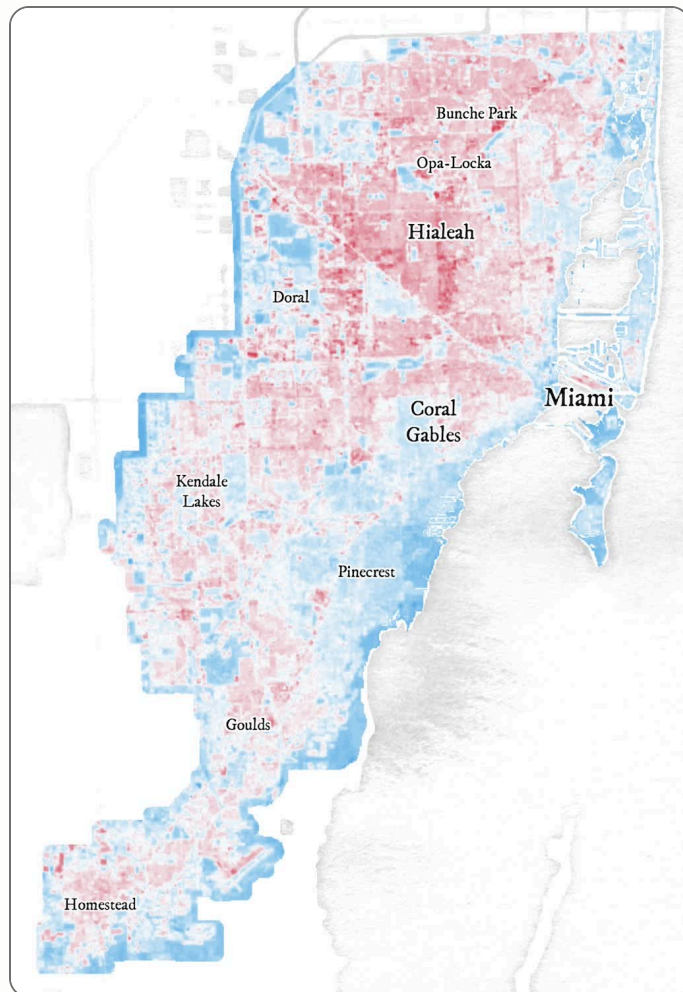## PACT Areas of Concern are hotter than other parts of the county

According to a Herald data analysis, average surface temperature in the areas of concern was significantly higher than higher-income areas at the same time and day.

Surface temperature

Below avg.   Above avg.

PACT Areas of Concern

5°F hotter than high income areas at the same time and day

Source: NASA Landsat-8 as measured on Oct 18, 2023 • Graphic: David Newcomb

St. Philip Neri, the church located in Bunche Park that Roy has attended since she was a small child, is one of the faith organizations involved with PACT. Roy is one of the PACT leaders at the church and said she frequently hears concerns from residents about the heat and high electric bills.

Energy bills are so high residents of Miami Gardens circulated a petition asking the government to intervene, said resident Jonathan Knowles, who thinks the problem could be addressed by planting more trees to shade residents' houses from the relentless sun.

Knowles recently moved from a greener area in the southern part of the county to Norland, a neighborhood in Miami Gardens, and immediately felt the impact of living in an area with fewer trees.

"Down south, me and my fiance could walk around and be fine, but we can't do that here in the middle of the day," Knowles said. In Miami Gardens, people who don't have cars have to wait out in the sun to catch a bus, he said. It's a problem he wants to see the government prioritize.

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> ## We're doing absolutely everything we can with every resource we have available to us, and there's just not enough.
>
> Gabriela Lopez, Neat Streets Miami-Dade County

Miami-Dade's chief heat officer, Jane Gilbert, said she heard mixed messages from residents about whether they want more trees when she toured various communities with PACT members.

"They both were saying they want trees, and then they're concerned about the trees because it's taking up parking space or stuff could fall on their cars," Gilbert said.

Given these widespread concerns, she said planting enough trees to help mitigate rising temperatures is "going to take a lot more outreach than the county has done in the past in these neighborhoods."

The effects of urbanization

The county has prided itself on maintaining the overall tree canopy levels between the 2016 and 2020 surveys. But many communities throughout the county have seen trees in their neighborhoods disappear over the past few years. Residents say development is to blame.

Florida has seen a rise in new residents since the pandemic. Development has increased. As a result, trees have been cleared out of the way with few substantial measures in place to protect them.

Raul Martinez, a former mayor of Hialeah who loves trees and flowers, said that during his tenure he made efforts to plant trees in areas around the city that desperately needed them. Because Hialeah began as a heavy industrial city, Martinez said he wanted to provide more canopy to its residents.

"I planted a lot of oak trees," said Martinez, who was first elected mayor in the 1980s. "But now I don't know that they've ever planted a single tree in public right-of-way since I left almost 20 years ago."

Over the past few years, Hialeah applied for and was awarded grant money from the county to plant trees. But Martinez said current city leadership still prioritizes development over the environment and beautification in Hialeah. In his opinion, developers have few restrictions and make little effort to plant trees.

The city of Hialeah did not provide answers to the Herald's questions about how the city council plans to address the diminishing canopy cover.

Timelapse of canopy loss from development in Hialeah

Between 2016 to 2023, the forested land near W 108th St. and NW 97th Ave. was destroyed as the area was developed.

Source: Google Earth satellite images • Graphic: Sohail Al-Jamea

It's the same story across the county, where there are limited meaningful protections for trees.

If someone, like a developer, wants to cut down trees, the county requires them to obtain a permit from the Department of Regulatory and Economic Resources.

Permits are given based on a handful of factors, including the reason for cutting down the trees and the species of trees.

In practice, there are few consequences for those who cut trees without a permit. County officials said that, generally, they work with residents to reconcile most tree-cutting violations but that the "use of fines and penalties has its place in enforcement of the County's Tree Code."

The county code and permitting requirements aim to protect large, mature trees. But a state law passed in 2019 allows the permitting process to be bypassed if a tree is deemed a safety hazard by a certified arborist.

With few exceptions, trees that are cut down in Miami-Dade County are supposed to be replaced by the person who cut them, per the county code. But in the event a new tree can't be planted, there is an option to pay money to the county's Tree Trust Fund. The money generated in the fund goes toward various tree planting and environmental projects.

In 2021, when County Commissioner Eileen Higgins became the chairwoman for Neat Streets, she requested an audit of the fund and found that it had accumulated $4.2 million since 2016. She said in an interview with the Herald in 2022 that she was "outraged" that for years, the money sat unused.

"We have a real heat problem here. We have funds sitting around not doing anything and we had another department with not enough money," said Higgins. "That's why you have checks and balances, right? It's easy to put money into a Tree Trust Fund. We had a process for that, but we didn't have a process for getting the money out."

After the audit, some of the money was rerouted to Neat Streets, restoration projects and planting on county-owned land.

Most Miami-Dade ZIP codes fail to reach 30% tree canopy cover

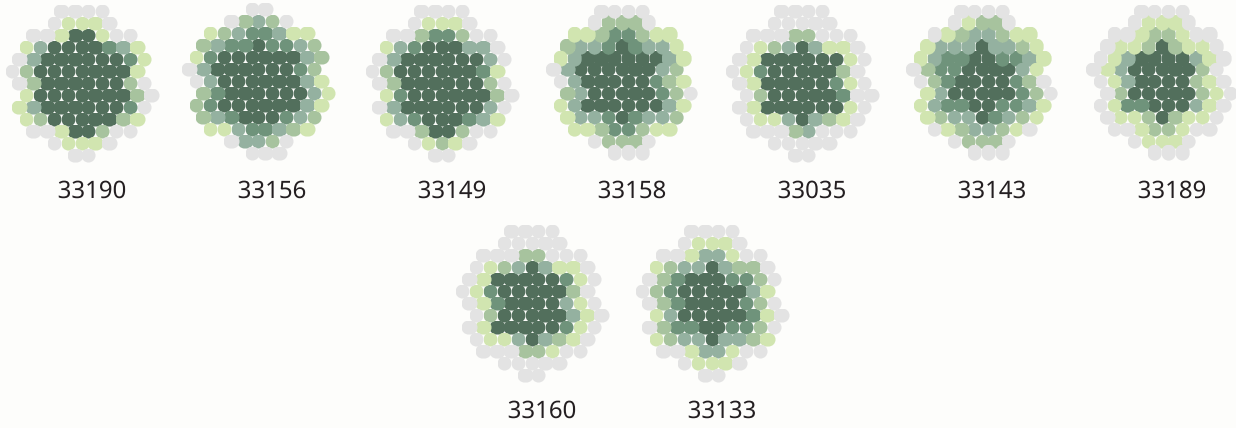The majority of ZIP codes in Miami-Dade remain well below county-wide target level.
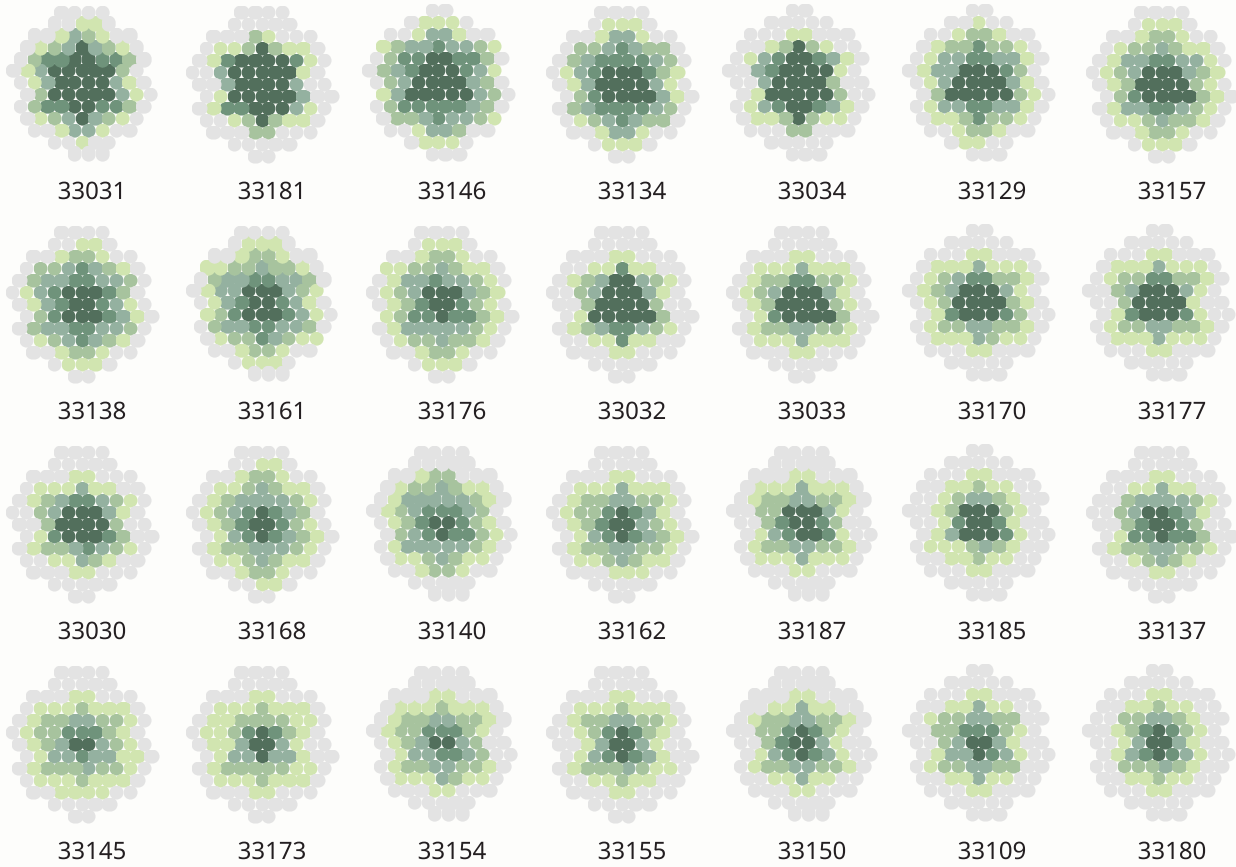
0%   ≥30% TREE COVER

Each dot is 1% of each ZIP code's land area
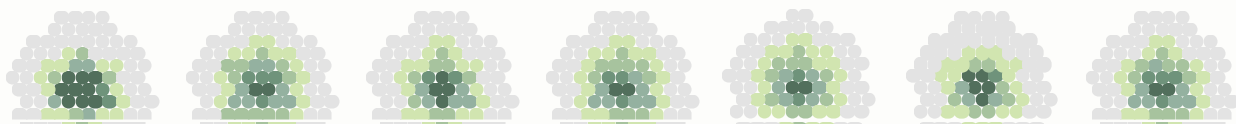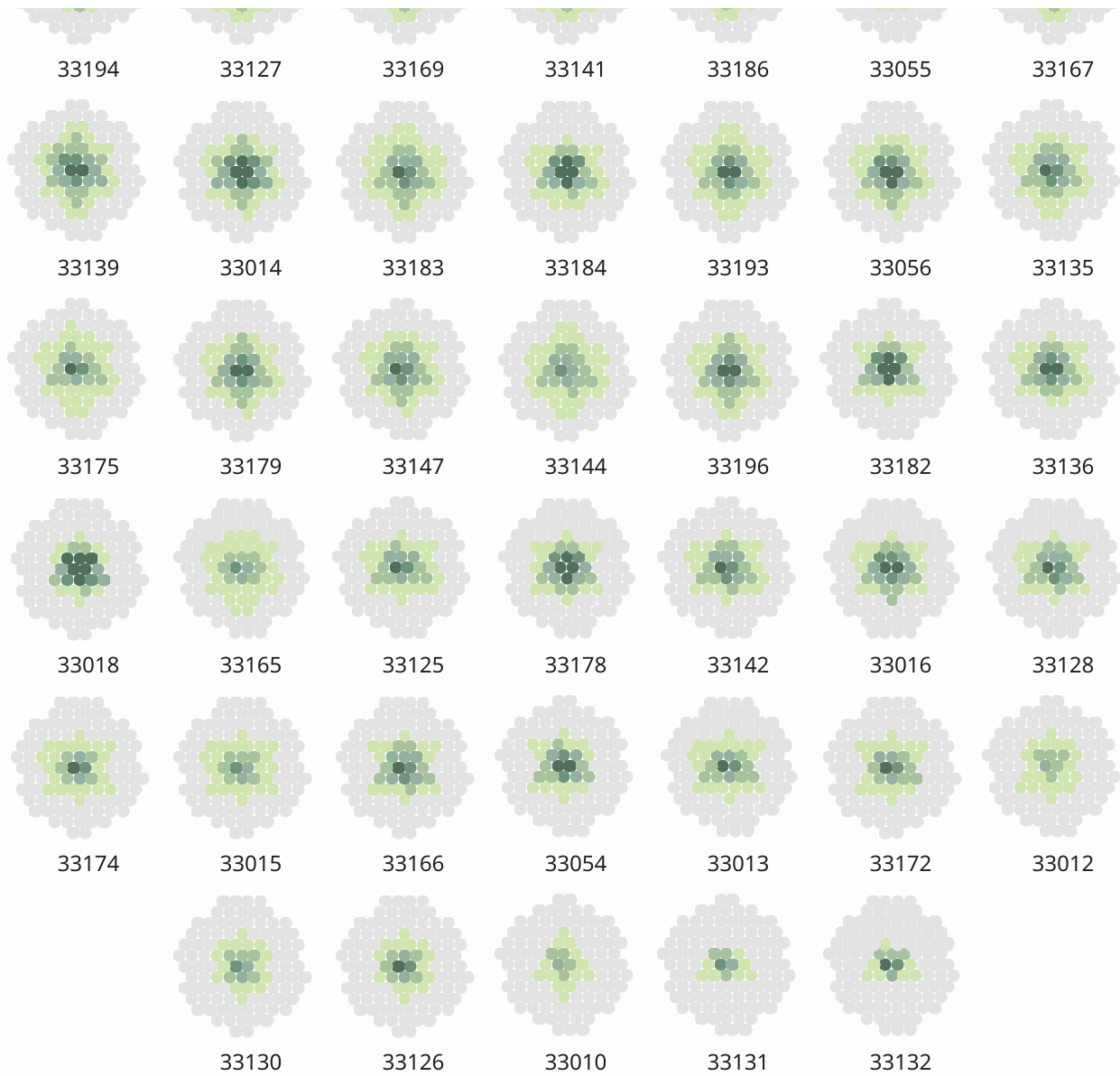
Above 30%

| 33190 | 33156 | 33149 | 33158 | 33035 | 33143 | 33189 |

| 33160 | 33133 |

15 to 30%

| 33031 | 33181 | 33146 | 33134 | 33034 | 33129 | 33157 |

| 33138 | 33161 | 33176 | 33032 | 33033 | 33170 | 33177 |

| 33030 | 33168 | 33140 | 33162 | 33187 | 33185 | 33137 |

| 33145 | 33173 | 33154 | 33155 | 33150 | 33109 | 33180 |

Below 15%

33194   33127   33169   33141   33186   33055   33167

33139   33014   33183   33184   33193   33056   33135

33175   33179   33147   33144   33196   33182   33136

33018   33165   33125   33178   33142   33016   33128

33174   33015   33166   33054   33013   33172   33012

33130   33126   33010   33131   33132

Source: NLCD 2020 Tree Canopy Cover (CONUS) • Chart: David Newcomb

In 2023, Higgins was replaced by County Commissioner Kevin Cabrera as the chair of Neat Streets. Cabrera told the Herald that he believes the county is "serious" about addressing inequities in the canopy through the grant program, which attempts to funnel more money and resources to low income communities.

But the commissioner acknowledged that there's "room for improvement," especially with making sure community members know about the tree services available to them. He said it's unfortunate that Neat Streets is "one of Miami-Dade's best kept secrets."

"As a resident, I never knew any of these things existed," said Cabrera. "Many times there are resources in government, but I think we can always do a better job of making sure we market them."

Seeking a fresh start

A $10 million grant awarded last fall by the U.S. Department of Agriculture could give a jolt of adrenaline to the county's planting programs. Federal money for tree planting was also awarded separately to Homestead, Miami, Miami Beach and Opa-locka.

With more money coming in, the county is pushing to refocus and amplify its efforts—this time aiming to address the inequities with the tree canopy and achieve its long-promised goal of a 30% canopy level.

Levine Cava said priorities include "more staffing, more technology, more trees, more targeted outreach." But she said there was "no specific plan" to create one overarching tree program. Instead, she said the county is looking at ways to increase coordination between its various tree-related programs.

She said that community engagement will be a primary focus as part of an effort to "make sure that our trees last."

"We're going to be a door-to-door grassroots effort, talking to people in the neighborhoods that we need to target and having conversations and encouraging them, supporting them to take trees and to take care of trees," said Levine Cava. She said the county will provide support at every step of the process, from planting trees, to caring for them.

For now though, the plan is more of a vision than a reality. The final proposal still has to be approved by the federal government before the money is released. County officials expect the approval to be granted by the end of April.

Credits

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Rachel Handley | Illustrations & design
Sohail Al-Jamea | Design & animations
Pedro Portal | Photography
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Casey Frank | Editor
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Methodology

This project evaluates the urban tree planting initiatives in Miami-Dade County, focusing on the county's claims about promoting equity and targeting socio-economically needy areas with low tree canopy coverage.

Data sources
Canopy Data
Published in 2021 by the University of Florida and Florida International University urban tree canopy within Miami-Dade County's Urban Development Boundary. This includes canopy assessments from 2016 and 2020 over an area of approximately 1147 km².

Planting Data
Data sources for planting data spanning from 2016 to 2022 include: Street Trees (All data were initially in PDF format and converted to CSV for analysis using Tabula), Neat Streets Miami, Green Grants and the bus stop planting program.

NOTE: Data from the county's Adopt-a-Tree program did not indicate the number of trees given away. As such, that program was not included in the Herald's planting analysis.

Demographic Data
The analysis utilized data from the 5-year 2019 American Community Survey (ACS) at ZCTA levels and employed the 2019 UDS Zipcode to ZCTA crosswalks.

Analysis
Geocoding and plotting
For the street tree data, intersections described in the data were geocoded using the **tidygeocoder** library and arcgis. The tree locations were approximated along the line between two intersections for each planting event using the **sf** library to sample points regularly along these lines. If the distance between intersections was over 5 km, the endpoints were hand-checked for geocode accuracy. **Tidyverse** library

was used for datawrangling.

Regression analysis

A tree-planting regression analysis was performed to discern relationships between tree-planting efforts and both demographic variables and canopy coverage. The regression considered trees planted per square mile to account for differing ZCTA areas. The most significant correlation coefficients from the regression analysis are as follows:

Bus stop planting program and Black residents:+0.30, indicating a strong positive relationship between the number of trees planted at bus stops and the percentage of Black residents, indicating that the bus stop program might have benefitted areas with more Black residents.

Green Grants with income:-0.23, suggesting a negative correlation between income levels and the number of trees planted through the Green Grants program, indicating that lower-income areas might be receiving more trees through that program.

This story was originally published April 22, 2024, 1:23 PM.
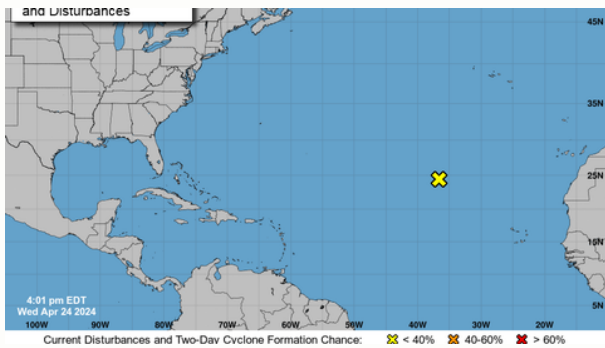
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