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2. "A Complete Failure of the State": Authorities Didn't Heed Researchers' Calls to Study Health Effects of Burning Sugar Cane | Aug. 19, 2021
   https://www.propublica.org/article/a-complete-failure-of-the-state-authorities-didnt-heed-researchers-calls-to-study-health-effects-of-burning-sugar-cane

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   https://www.propublica.org/article/they-deserve-to-be-safe-candidates-call-on-florida-to-investigate-the-health-effects-of-sugar-cane-burning

5. Sugar Companies Said Our Investigation Is Flawed and Biased. Let's Dive Into Why That's Not the Case. | July 8, 2021
   https://www.propublica.org/article/sugar-companies-said-our-investigation-is-flawed-and-biased-lets-dive-into-why-thats-not-the-case

6. Testing the Air to Tell a Story: How We Investigated Air Pollution Near Florida's Sugar Fields | July 19, 2021
   https://www.propublica.org/article/testing-the-air-to-tell-a-story-how-we-investigated-air-pollution-near-floridas-sugar-fields

The Smoke Comes Every Year. Sugar Companies Say the Air Is Safe.

by Lulu Ramadan, The Palm Beach Post, and Ash Ngu and Maya Miller, ProPublica. July 8, 2021

To harvest more than half of America's cane sugar, billion-dollar companies set fire to fields, a money-saving practice that's being banned by other countries. Some residents say they struggle to breathe, so we started tracking air quality.

ProPublica is a nonprofit newsroom that investigates abuses of power. Sign up to receive our biggest stories as soon as they're published. This article was produced in partnership with The Palm Beach Post, which is a member of the ProPublica Local Reporting Network.

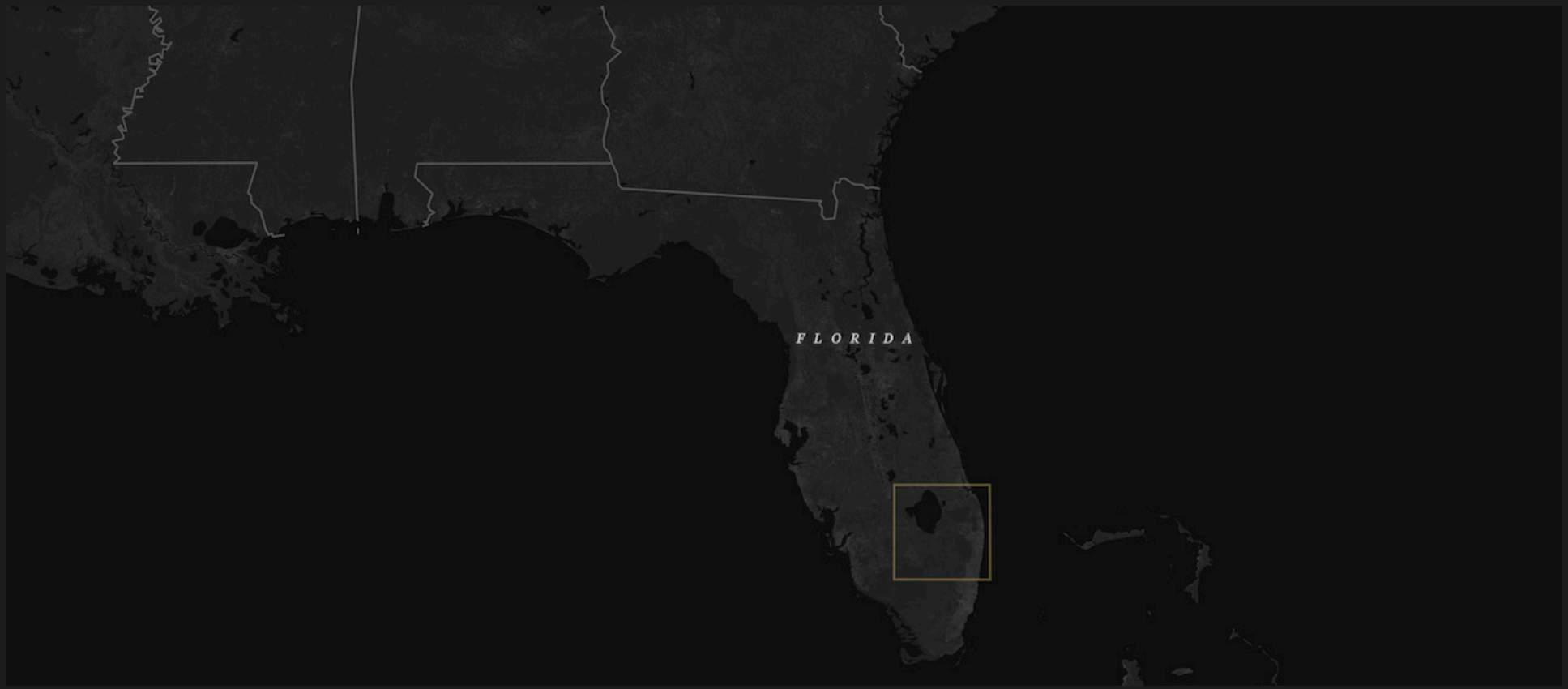
In the fall of 2019, brothers Donovan and Jayceon Sonson spent eight weeks lying in hospital beds, struggling to breathe.

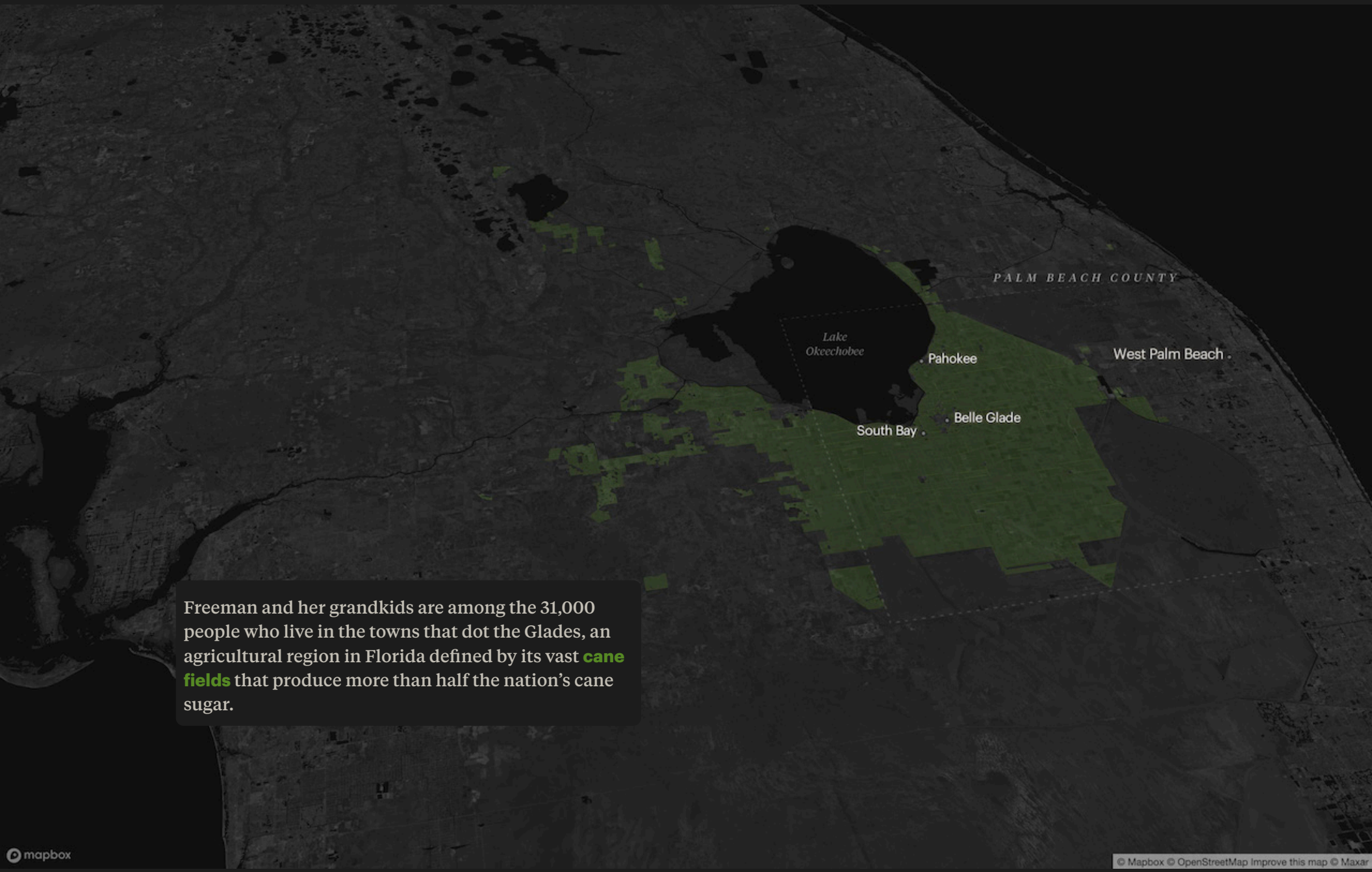
The young boys, then 5 and 6 years old, had developed upper respiratory infections on top of the severe asthma they'd had since they were toddlers.

Anytime they left their apartment, they took their "medicine box," a plastic bin filled with red inhalers, prescribed steroids and a pink nebulizer shaped like a kitten. When the hospital released the boys just before Thanksgiving, doctors sent the family home with guidance on how to protect the boys from future episodes.

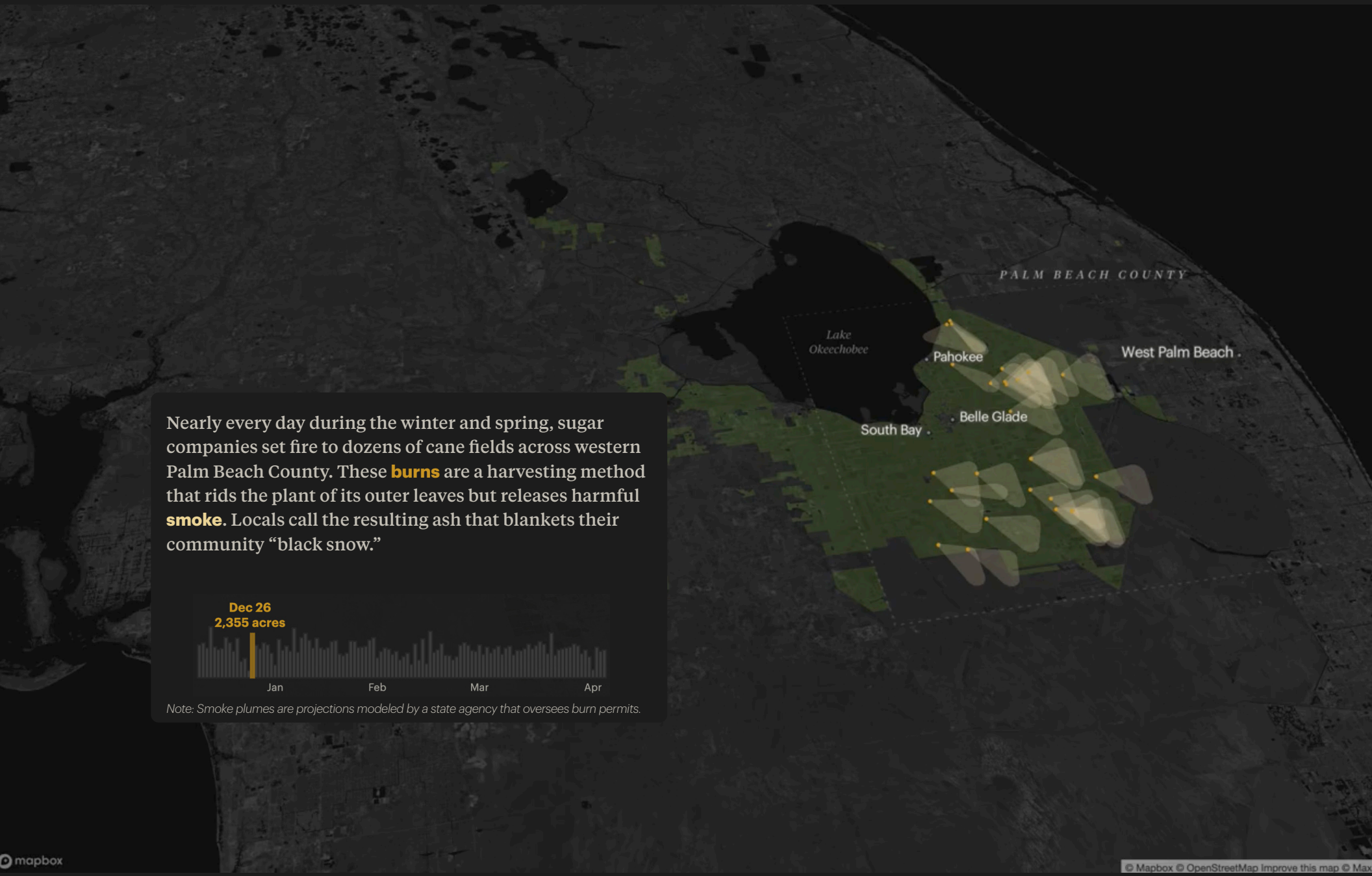
Among the instructions: "Keep your child away from secondhand smoke."

Thelma Freeman, the boys' grandmother, stared at the note. She didn't smoke. Neither did anyone in her home. The problem was all around her, she thought, coming not from smokers but from an industry that provides thousands of jobs in her town: sugar.



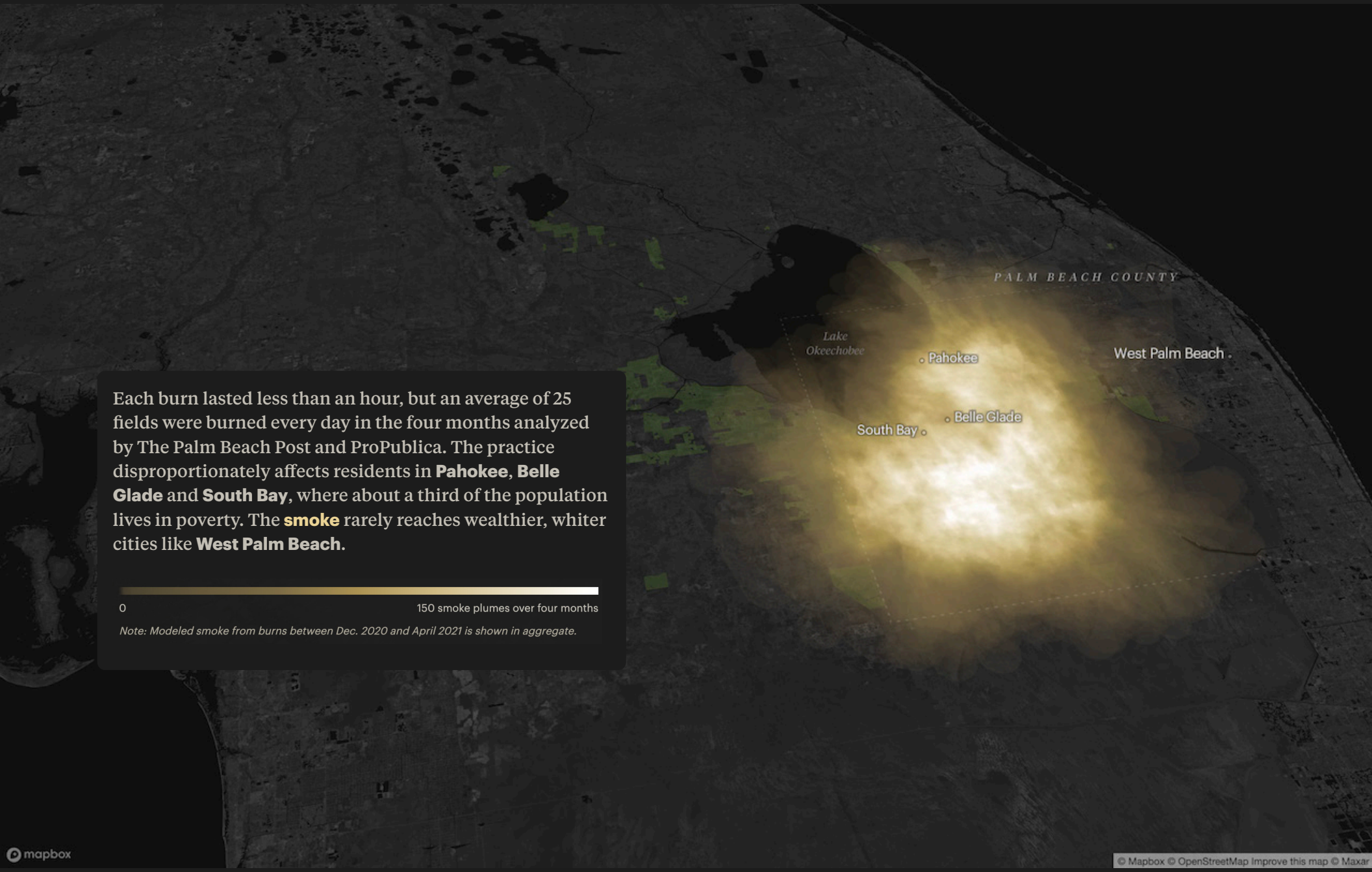


Freeman and her grandkids are among the 31,000 people who live in the towns that dot the Glades, an agricultural region in Florida defined by its vast **cane fields** that produce more than half the nation's cane sugar.



Nearly every day during the winter and spring, sugar companies set fire to dozens of cane fields across western Palm Beach County. These **burns** are a harvesting method that rids the plant of its outer leaves but releases harmful **smoke**. Locals call the resulting ash that blankets their community "black snow."

Note: Smoke plumes are projections modeled by a state agency that oversees burn permits.



Each burn lasted less than an hour, but an average of 25 fields were burned every day in the four months analyzed by The Palm Beach Post and ProPublica. The practice disproportionately affects residents in **Pahokee**, **Belle Glade** and **South Bay**, where about a third of the population lives in poverty. The **smoke** rarely reaches wealthier, whiter cities like **West Palm Beach**.

0 — 150 smoke plumes over four months

Note: Modeled smoke from burns between Dec. 2020 and April 2021 is shown in aggregate.

For years, residents in Florida's heartland have complained about the smoke and ash that blanket this patchwork of mostly Black and Hispanic communities.

And for years, state health and environmental officials have said the air is healthy to breathe. So has the sugar industry, the largest employer in the region, with more than 12,000 workers during the six-month harvest season.

That battle has now escalated in federal court. In perhaps the largest challenge to the multibillion-dollar industry in years, Glades residents are suing sugar companies, alleging that pollution from cane burning damages residents' health. The industry denies those claims, arguing as recently as November that a government-run air monitor in Belle Glade showed the area is in compliance with the Clean Air Act, the landmark 1970 law aimed at protecting the public from harmful pollution.

The problem? State officials found that the monitor was malfunctioning as far back as eight years ago, and, as of last week, it was still not fit to gauge Clean Air Act compliance. Documents obtained through public records requests show that the Florida Department of Environmental Protection flagged the faulty monitor in 2013, telling their federal counterparts that it didn't meet strict accuracy standards and wasn't suited to determine whether the air quality meets the requirements outlined in the federal law.

The monitor could cost the state as much as $35,000 to replace. But even if it were working properly, the state and federal framework for measuring air quality fails to capture the impact of sugar cane burning, an investigation by The Palm Beach Post and ProPublica found.

That's because federal regulators rely on 24-hour and annual averages to track a type of particulate matter — an inhalable mixture of pollutants and debris tied to heart and lung disease — that is emitted by cane burning. These averages sometimes obscure short-term pollution, a defining feature of Florida's harvesting process.

A sugar cane burn sends out smoke from a field near South Bay. Thomas Cordy / The Palm Beach Post

The Post and ProPublica set out to see what the air is like in the Glades during the burns. The reporters analyzed cane burn permits and plume data from the Florida Department of Agriculture and Consumer Services, which projected where smoke would travel. They also worked closely with six experts in air-quality and public health from universities across the country, including three in Florida, as well as with residents, to place outdoor air sensors that measured particulate matter. The measurements were not intended to assess compliance with the Clean Air Act. Rather, the goal was to see if residents were being exposed to pollutants in ways that current monitoring systems would miss.

They were.

The sensors captured repeated spikes in pollution on days when the state authorized cane burning and projected that the smoke would blow toward them, our analysis found. While particulate matter can come from a variety of sources, air monitoring experts said the findings suggest the pollution is likely coming from cane burns. These short-term spikes, lasting less than an hour, often reached four times the average pollution levels in the area. Health and air-quality experts added that this exposure poses health risks both in the short term and over the course of the monthslong burn season.

Other major sugar-producing countries are moving to end or sharply limit cane burning, acknowledging that the practice is harmful because it subjects those nearby to many of the same pollutants that come from smoking tobacco, albeit with less intensity than inhaling from a filtered cigarette. Brazil, which produces more than 20% of the world's cane sugar, has been phasing out the practice for more than a decade after researchers there raised concerns about particulate matter emissions.

Each year in the United States, tens of thousands of people die prematurely from exposure to particulate matter. People of color are disproportionately exposed, according to research published in April.

Palm Beach County emits more particulate matter from agricultural fires than any other county nationwide, according to Environmental Protection Agency emissions estimates from 2017, the latest year for which data is available. Those emissions are almost entirely byproducts of cane burning: 98.5% of the agricultural acreage burned in the county since 2010 has been for sugar cane, according to data from the state agriculture department.

The experts who reviewed The Post and ProPublica's sensor analysis said the findings suggest policymakers should bolster air monitoring in the Glades, begin considering shorter-term spikes in pollution that are not currently built into federal air standards, and study community exposure to these pollutants.

For many residents, life in the Glades revolves around the sugar industry. Companies like U.S. Sugar and Florida Crystals are the main employers in the region. Thomas Cordy / The Palm Beach Post

As residents and the industry battle in court, federal officials also have been eyeing changes. Under former President Donald Trump's administration, the EPA considered — and rejected — strengthening regulation of particulate matter, which could have included a lower threshold for 24-hour averages or requirements for measuring in shorter durations. In June, President Joe Biden's EPA announced that it would review that decision, acknowledging that evidence shows long- and short-term exposure to particulate matter can harm people's health, "leading to heart attacks, asthma attacks, and premature death."

But while the federal agency weighs more protections for public health, Florida lawmakers moved in a different direction this spring, passing legislation to protect farmers from legal challenges over air pollution, with some elected officials arguing that there's no evidence of poor air quality in the state's sugar-growing region. Gov. Ron DeSantis signed the bill into law in April.

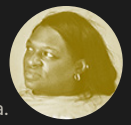
U.S. Sugar and Florida Crystals, the region's two largest sugar producers, disputed The Palm Beach Post/ProPublica analysis, criticizing the news organizations' air-testing methods. The companies praised the quality of Florida's air, again citing data from the state Department of Environmental Protection.

"By ignoring this data and instead using unqualified and error-ridden data to create a false and misleading narrative, these outlets are deliberately causing doubt and disbelief that will undermine the trust that the Glades communities have in their public health system at such a critical time," said a spokesman for U.S. Sugar.

Florida Crystals also emphasized the knowledge of its experts in criticizing the reporting. In a statement, the company cited its investment in “innovative technologies” and its mission to “sustainably supply” food. “Our commitment to advanced, smart farming practices and to being a responsible member of our communities is rooted in our heritage in generational family farming, which led us to pioneer organic sugarcane farming in the US in the 1990s and continues to drive our vision today and for the future,” the company said.

Yet residents reveal a different reality. Over the course of a year, The Post and ProPublica spoke with dozens of Glades residents, teachers, custodians, doctors, nurses and field workers about their experiences with cane burning. Some responded to automated text messages sent when the newsrooms’ monitors detected spikes in pollution, allowing residents to share descriptions of smoke and their reactions in real time.

One Resident’s Experience With Sugar Cane Smoke, as Told to a Text Bot



On Feb. 4, about 1,500 acres were expected to burn. **Otishia Harvey** lives in Pahokee and messaged a text bot set up by The Palm Beach Post and ProPublica.

Hi from Palm Beach Post & ProPublica. We hear there’s sugar cane burning today and have questions about the air. First, what city are you in?

Pahokee

Thanks. How did the air smell today? Reply:
“1” if you didn’t notice a smell
“2” if it was noticeable
“3” if it was pretty bad
“4” if it was as bad as it gets

2

Got it. Did you see smoke? Reply:
“1” if you don’t see smoke
“2” if you see some smoke
“3” if you see a lot of smoke
“4” if it’s as bad as it gets

2

Did you experience coughing, itchy throat or any other health problems when you could see or smell smoke? Reply Yes or No

Yes

2

Did you experience coughing, itchy throat or any other health problems when you could see or smell smoke? Reply Yes or No

Yes

What are you experiencing? Please provide as much detail as you’re comfortable with.

Trouble breathing coughing and sneezing runny nose and red eyes

Note: Conversation is abridged.

Many of these accounts paint a picture of a community often left with little choice but to stay indoors to avoid the smoke and ash outside.

Freeman keeps her grandchildren inside when she sees black snow — almost every day for six months of the year, she said. On a February afternoon, Donovan, clutching his scooter, tried to slip past her from the covered porch of her apartment in Pahokee. It was the 7-year-old's third time outside that month.

Pressing her palm to his chest, she stopped the boy before he reached the lawn. "Not today, baby," Freeman said. Ash was in the air and settling on grass and a makeshift swing hanging from a tree.

"Why would I risk it when I know what will happen?" she said.

Thelma Freeman demonstrates how a nebulizer is worn on her grandson Jayceon. Freeman's other grandson Donovan, seated, also uses a nebulizer. Thomas Cordy / The Palm Beach Post

To reach the Glades from Palm Beach, you have to drive about 40 miles west — a straight shot along State Road 80 from former President Trump's Mar-a-Lago home. Beachfront mansions and luxury suburban communities give way to vast stretches of rolling green crops and yellow highway signs warning of smoke. At the end, amid the lush fields, is a string of small towns made up of modest houses along crumbling streets, aging apartment buildings and trailer parks.

Tucked between Lake Okeechobee and the Everglades, the land is composed of nutrient-rich black muck, ideal for growing cane. The U.S. government transformed the region at the turn of the 20th century by damming the lake and draining the water at its southern bend, turning the marsh into an agricultural mecca.

A roadway sign warns of low visibility from cane burn smoke. Thomas Cordy / The Palm Beach Post

U.S. Sugar was the first company to settle in the region, in the 1930s. Florida Crystals followed in the 1960s. The two companies would soon become the largest producers of cane sugar in the country. Today, there are more than 410,000 acres of cane, the largest field crop contained to a single area in the state.

Florida farmers produced 21 million tons of cane sugar in the 2019-2020 harvest season, more than half the nation's supply. The U.S. Department of Agriculture estimated the value of Florida's sugar cane crops at about $648 million in 2019, the most recent year for which data is available.

While the sugar industry brings jobs to the area, the Glades communities remain among the poorest in the state. In fact, in the 1980s, Belle Glade was "so racked by poverty and AIDS that foreign service trainees were sent there to prepare for the Third World," wrote Michael Grunwald in his book "The Swamp," a history of the Everglades. Little has changed. Today, the median household income hovers at just above $24,000 — less than half the statewide figure.

The area is home to migrant field workers from Central America and the Caribbean, as well as Black and Hispanic American families who have lived in the Glades for generations. Many rely on the sugar industry for jobs.

Burning the cane is the cheapest method to prepare it for harvest, allowing sugar companies to maximize profits.

How Sugar Cane Is Burned and Harvested

1 Before harvest, a worker lights the cane on fire with a torch-wielding truck.

2 The burns release smoke containing pollutants harmful to people and the environment.

3 In roughly 15 to 40 minutes, the fire burns through the plant's outer leaves.

4 The stalks are harvested and transported to mills to be turned into sugar.

Thomas Cordy / The Palm Beach Post

To cope with the smoke and "black snow," the flurries of ash that carry into neighborhoods, residents have adopted a series of unwritten rules: If you can't shut your windows in the heat, press an air conditioner filter against the opening to keep the smoke out; rush children inside at the first whiff of the familiar, acrid stench; brush the flakes off your clothes instead of rubbing them off, otherwise they'll stain; and, importantly, keep an inhaler or nebulizer nearby.

Burning season brings an influx of patients complaining of breathing problems to clinics and hospitals, doctors and nurses said.

"I basically learned how to treat asthma when I moved here," said Beverly Jean Hunt, a registered nurse at a pediatric practice in Belle Glade, where she moved from Miami in 1995. "[Patients] almost become accustomed to it so they know they have to come in early on. They tell us, 'Cane season is starting,' to get their prescriptions for asthma medication filled early."

At some schools, administrators warn about smoky conditions in campuswide announcements. Teachers say that, during burning season, they cancel outdoor recess and send kids home after asthma attacks.

"The conditions can be unbearable," said Sayed Moghani, a math teacher at Pahokee Middle School. "Sometimes, when kids miss too much class, I do home visits to check on them and I find out their parents just proactively kept them at home because of their asthma and the smoke."

Despite complaints like this from educators, the industry is so intertwined with the community that it leases fields from the local school district. Rosenwald Elementary School in South Bay collects about $7,000-12,000 a year from U.S. Sugar, which harvests cane on district-owned land adjacent to the campus, Type Investigations and Grist reported last year. The Post and ProPublica identified two additional land-leasing contracts that the Palm Beach County School District has with sugar companies — one near the Pahokee Middle-High School campus and another near the district's bus depot in Belle Glade.

Since 2015, some Glades residents have pushed back, working with the Sierra Club on a campaign to end cane burning.

Others have been successful at stopping the smoke from reaching their neighborhoods. In 1991, the wealthier, suburban communities of Wellington and Royal Palm Beach, east of the cane fields, flooded state officials with complaints about smoke and soot reaching their homes.

The Florida Department of Agriculture acted swiftly: It banned sugar growers from burning when the wind blows east.

Cane burning curbed to reduce ash, soot in the skies

By BELINDA BROCKMAN, MARY McLACHLIN and LISA SHUCHMAN
Palm Beach Post Staff Writers

WEST PALM BEACH — State regulators say they will crack down on the burning of sugar cane fields when the harvest begins in two weeks.

A deluge of complaints — most from Palm Beach County residents — about smoke and ash from last year's harvest has forced state agriculture and environmental officials to impose tougher restrictions, they said Monday.

"We've never had the magnitude of complaints we had this past year," said David Utley, district manager of the Florida Department of Agriculture's forestry division, which controls outdoor burning. He said his office received 40 to 50 complaints, and others went to the Governor's Office and to U.S. Sen. Bob Graham, D-Fla.

"We're trying to eliminate the potential problems for people having to breathe the ash and deal with stuff falling on their cars and in their swimming pools," Utley said.

Environmental groups, unaware of the proposed regulations, took legal action Monday to have the current burning rule thrown out. They said it allows smoke laden with oily soot and ash, mercury and the toxic herbicide paraquat to "fall all over South Florida."

The Sierra Club Legal Defense Fund filed the petition for a state administrative hearing on behalf of the Palm Beach Garden Club, the Florida Audubon Society and the Florida Wildlife Federation.

The new regulations should eliminate the need for such a hearing, Utley said.

"We've been working on this since last April, since the sugar cane season ended," he said. "We knew there had to be changes."

Growers should realize that if they continue to burn cane as they have, it could result in a state ban of the practice, Utley said.

Growers don't know details of the new restrictions, said Andy Rackley, vice president and general manager of the Florida Sugar Cane League.

"We're certainly concerned," Rackley

Please see CANE/8A

A 1991 article from The Palm Beach Post reports on tougher cane burning restrictions.

Officials with the Department of Agriculture, which is in charge of regulating cane burning, at the time said they were responding to intense criticism and a growing population that needed protection from smoke compounding urban pollution. "We're trying to eliminate the potential problems for people having to breathe the ash and deal with stuff falling on their cars and in their swimming pools," David Utley, an agriculture official, said at the time.

About 35,000 people lived in Wellington and Royal Palm Beach in the early 1990s, when the complaints first flowed. Today, about 31,000 people live in the Glades.

The more recent effort to curb burning in the area did appear to prompt Agriculture Commissioner Nikki Fried to announce a slate of changes to the state's sugar cane burn program in October 2019. Restrictions on burning, such as denying permits when the air quality is poor, would minimize the impact of smoke, the department said.

The Florida Forest Service, the arm of the agriculture department in charge of cane burning, did deny more permits from October 2020 through March 2021 than it has on average in the last five harvest seasons, rejecting about 12% of requests, compared to about 5% in the past. Forest Service officials said they rejected requests on days when wind projections suggested the smoke wouldn't disperse. Still, officials ultimately authorized roughly the same overall number of burns as they have in the past, with about 11,000 fires approved throughout the season, department data shows.

Fried's changes don't bar burning when the wind is blowing in the direction of the Glades, and residents and environmental advocates say the rules did little to alleviate the impact of the smoke reaching the neighborhoods.

Meanwhile sugar industry representatives have fiercely defended cane burning, denying that it causes major pollution or health problems.

U.S. Sugar recently ran an ad on a billboard in Belle Glade that reads: “The air out here is cleaner than congested urban areas.”

In Tallahassee, the sugar industry operates one of the most formidable lobbying forces in Florida. U.S. Sugar and Florida Crystals have individually outspent every other company in the state on lobbying at the administrative and legislative levels since 2018, when the state first started its digital lobbyist pay database, a Post and ProPublica analysis found. That includes outspending corporate giants like Walt Disney Co., Florida Power & Light, and HCA Healthcare.

At times, the two sugar companies combined employed more lobbyists than there are state senators. Over the objections of environmental groups, they’ve successfully lobbied lawmakers to change environmental regulations regarding water policies that affect farming operations.

But lobbying is only one reason sugar companies have so much influence; the other is jobs.

The industry is the largest in the Glades, employing more than 12,000 workers, both seasonal and permanent residents, during harvest season, which lasts about six months. Any change to harvesting practices would have a “significant economic impact,” Judy Sanchez, a vice president at U.S. Sugar, told The Post and ProPublica in an interview.

“For so many of us, this is the only way to make a living,” said Phyllis McAllister, a local teacher whose husband retired from a job at a sugar mill because of breathing problems that his doctor attributed to “weak lungs.”

“It would be nice to end the burning,” McAllister said, “but I don’t want my neighbors to lose their jobs.”

Local officials agree, echoing the company line. “If it were possible to stop the smoke and keep all of our jobs, why not? But it isn’t,” said South Bay Mayor Joe Kyles.

South Bay Mayor Joe Kyles watches a cane burn in the distance while attending a food distribution event at a local church. A U.S. Sugar ballcap shields his face from the sun. Thomas Cordy / The Palm Beach Post

While American sugar executives argue they can't overhaul their processes, the country is an outlier on the global stage. The U.S. is the fourth-largest sugar producer in the world. China is the only other top five sugar-producing country that hasn't moved to end cane burning.

In the last decade and a half, the three other top sugar-producing countries have turned away from burning as researchers and public officials raised concerns about a specific byproduct of the practice: fine particulate matter, or PM2.5. The toxins are so tiny — 1/30 the width of a human hair — they can be easily inhaled, inflaming the throat on their way to the lungs, and in some cases making their way into the bloodstream.

In 2007, researchers in Brazil, the world leader in sugar production, found links between exposure to smoke from cane fields and increased hospitalizations for asthma. Officials responded to pollution concerns with a plan to completely stop burning and instead remove cane leaves with blades before harvesting the sugar. Brazil still burns cane today with plans to phase the practice out within a decade.

Likewise, Thailand has restricted burning while transitioning to a total ban within the next two years. One study estimated it will cost growers between $3 and $6 more per ton of sugar to harvest cane without torching it. In May, Vietnamese news publications reported that Thailand's cabinet approved a $192 million subsidy program to aid farmers in the transition after complaints from growers about the financial impact. Some farmers defied the burn ban by burning their fields at night, Thai media reported.

India, the second-largest producer of sugar, already has banned and criminalized crop burning. Officials there have fined and even arrested some who have violated the ban, according to Indian media reports.

Florida Crystals said that South Florida shouldn't be compared to foreign countries, noting that the farming practices, soil and weather conditions, and regulations in those places differ. The company also noted the large role that government subsidies played in the transition away from burning elsewhere.

Even in the U.S., however, sugar interests in one state — Louisiana — have made changes. Farmers there tweaked their burning practices in the mid-1990s, after state regulators pressed for change in response to hundreds of complaints from residents each year about smoke. Instead of burning the cane while it stands in the field, as farmers do in Florida, most Louisiana farmers now cut the cane before burning it, said Joey Breaux, an assistant commissioner at the state agriculture department.

This post-harvest burning produces a less intense fire and, in turn, less smoke and soot, which led to fewer complaints, Breaux said. Because Louisiana doesn't track individual field burns the way Florida does, it's difficult to verify the pollution impacts in Louisiana and compare the two states. In interviews, Louisiana officials said the agriculture department had seen a steep drop in complaints since the mid-1990s. When asked for any complaints made about cane burning since 2015, Louisiana agriculture officials provided just eight.

In the same decade that Louisiana was taking action, the federal EPA became increasingly concerned about particulate matter. Mounting research tied PM2.5 to heart and lung disease, asthma and premature death.

Young men walk near a burning cane field, looking for rabbits to chase down. For some families in the Glades, selling rabbit meat is their only source of income. Thomas Cordy / The Palm Beach Post

In 1997, the EPA set national air-quality standards that aim to reduce exposure enough to protect public health. Regulators charged individual states with monitoring the air.

In Florida, that task falls to the state Department of Environmental Protection, which measures PM2.5 and other toxins using a network of air monitors — equipment owned and operated by local health departments. The state, in turn, sends that data back to the EPA, where federal officials determine potential violations.

But across 400,000 acres of sugar crops that span three counties, there is only one monitor, in Belle Glade. Tucked in a government complex next to the local free clinic and jail, the air monitor was flagged eight years ago because it wasn't fit to enforce EPA standards. By comparison, the rest of Palm Beach County has three monitors, all situated in suburban neighborhoods or cities, all recording data to enforce those standards. That's because under the Clean Air Act, population is a main factor in deciding where to place monitors. Environmental regulators originally designed the rules to protect large populations from industrial pollution.

That has left rural areas like the Glades with far fewer monitors — and has left swaths of the country with no oversight at all. More than 65% of counties across the country do not have an EPA monitor, which can cost between $10,000 and $35,000 depending on the model. The agency is looking into ways to improve air-quality oversight in rural areas, including places with agricultural burning, an agency spokesperson said.

At least at first, the state intended the Belle Glade monitor to be used to assess EPA compliance. Florida installed the Belle Glade monitor in 2009. Within four years, though, state officials noticed something odd. Officials used two monitoring methods at the Belle Glade site to gauge the accuracy of the monitor's pollution measurements — a normal practice for air-monitoring agencies. The pollution measurements between the two differed by 23% to 43%, with each monitoring method producing both lower and higher measurements at times, well outside the requirements needed to meet the EPA's strict quality standards.

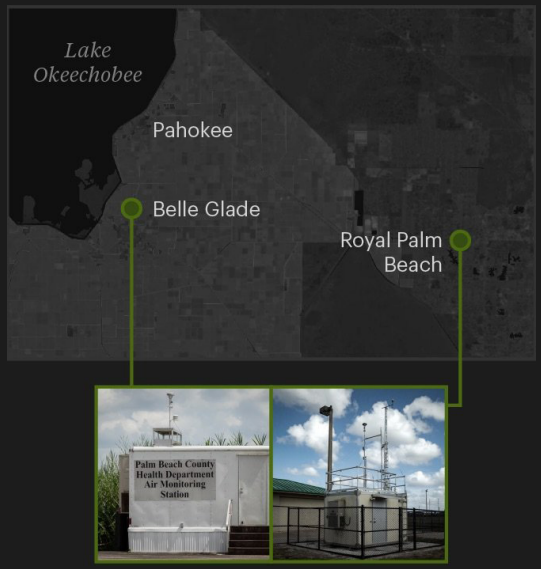
The next-closest monitor, about 30 miles east in Royal Palm Beach, just outside the sugar region, also produced suspect readings.

In separate records obtained by the news outlets, the Florida Department of Environmental Protection wrote to the EPA to ask the federal agency to remove both air monitors from its national network, which the EPA uses for enforcing federal law. The EPA approved the removal, meaning federal officials could no longer use the monitor to hold polluters accountable if they found Clean Air Act violations.

Some states, after spotting a problem, will go beyond what's required by federal law by replacing monitors, adding more monitors or adopting modeling to collect better data. In California, for example, officials deployed portable PM2.5 monitors during wildfires last year to enhance pollution monitoring.

State Air Monitors

The state operates one air monitor in the Glades sugar-growing region. The next-closest monitor is to the east, in Royal Palm Beach.



And in other places, because of population growth, the state is required to replace the monitor; that's what happened with Florida's Royal Palm Beach monitor in 2017, according to a Department of Environmental Protection report that year.

But the original Belle Glade monitor, the one best positioned to capture agricultural pollution, remained, as of last week.

Alexandra Kuchta, a spokesperson for the state's Department of Environmental Protection, defended the monitor, saying it wasn't intended to provide data to enforce the Clean Air Act. Instead, it is used to provide more general information about where air falls on the Air Quality Index, a tool that broadly tells the public whether the air is good, unhealthy or hazardous. The AQI is fueled by monitors that do not have to meet the EPA's strict accuracy standards.

Academic studies and news reports, however, have questioned the AQI's ability to accurately gauge pollution risks. For example, a Reuters report last year highlighted a Philadelphia oil refinery explosion; the AQI showed that day as one of the year's cleanest in the city, despite the refinery owner reporting that the blast had released large amounts of hazardous chemicals.

Florida's use of the monitor is concerning, said Ricardo Cisneros, an environmental health professor at University of California, Merced and expert on air quality monitoring. He pointed out that the same model of monitor is used by California officials and is usually known for producing very accurate pollution readings — making the Belle Glade monitor's discrepancies especially worrisome.

"You have data now saying you have an instrument that is not working properly," said Cisneros, who reviewed state documents describing the monitor's problems at the request of The Post and ProPublica. "I would question its validity."

After the news outlets started asking questions about the Belle Glade air monitor, Kuchta, the Department of Environmental Protection spokesperson, said in January that Palm Beach County, whose department of health owns the equipment, plans to replace the monitor "in the future." The new monitor, which a June 29 department report said was expected to be installed this month, will meet the EPA's standards, she added. The Palm Beach County Department of Health would not respond to any questions for this story.

In addition to sparse monitoring in rural areas, experts have identified other gaps in the regulatory system that leave communities like the Glades vulnerable. Chief among them is how the EPA measures particulate matter. Officials use 24-hour and annual averages to determine whether the air is safe. The metrics were designed to capture long-running sources of pollution. That means that short-term pollution — like the smoke from sugar cane burns, which usually last less than an hour — can fly under the radar.

On paper, areas with bursts of pollution but otherwise clean air average out to normal levels.

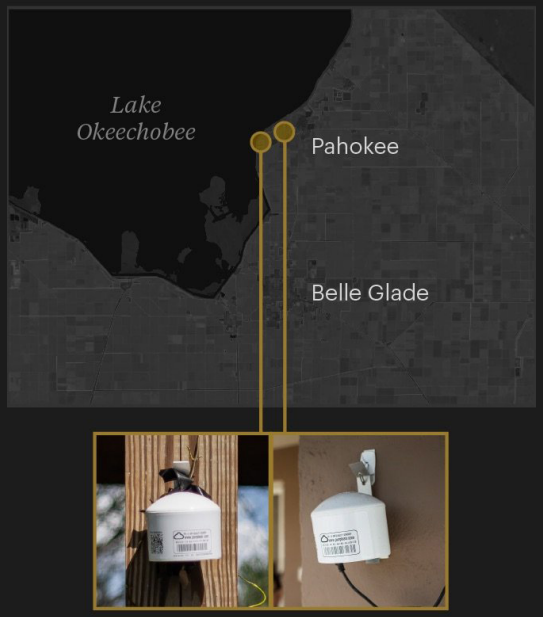
"The thing that the standards are not very good at protecting is these localized exposures," said Dr. Mark Frampton, a pulmonologist at the University of Rochester who served on the EPA's Clean Air Scientific Advisory Committee, the team tasked with assessing the nation's standards for this type of pollution.

To get a better sense of what Glades residents were experiencing in real time, The Post and ProPublica consulted with a panel of six air-quality experts, five of whom have used low-cost sensors to track air quality elsewhere in the country. With their guidance, the news organizations placed three such sensors, made by Utah-based PurpleAir, outside homes in Pahokee during the cane-burning season. Two of the sensors collected data for four months. A third sensor experienced technical issues, so the news organizations omitted it from the analysis.

The news organizations found sensor hosts through an outreach campaign that included mailing letters to area teachers, knocking on doors to distribute flyers and calling registered voters. None of the sensor hosts are part of the ongoing legal challenge or affiliated with environmental groups.

PurpleAir Sensors Hosted by Pahokee Residents

The Post and ProPublica analyzed data from low-cost air sensors placed at two homes in Pahokee during the cane-burning season.



Jose and Sandra Fonseca in front of their home with a PurpleAir sensor provided by The Post and ProPublica. The sensor collected real-time air-pollution data for four months. Thomas Cordy / The Palm Beach Post

Jose Fonseca, a parks worker who grew up in the Glades, was among those who hosted a sensor. He doesn't have any major health problems but often experiences coughing fits when he's outdoors during cane season. His mom, Sandra, also struggles to breathe when there's smoke outside.

"People say that it's unhealthy and we see the smoke, we smell it, but I wanted to know how much of that we're exposed to," Fonseca said.

To be sure, the low-cost sensors aren't as precise as the pricier equipment used by the federal and state governments, and research shows they tend to give higher readouts. The sensor readings, however, can be corrected using an EPA formula.

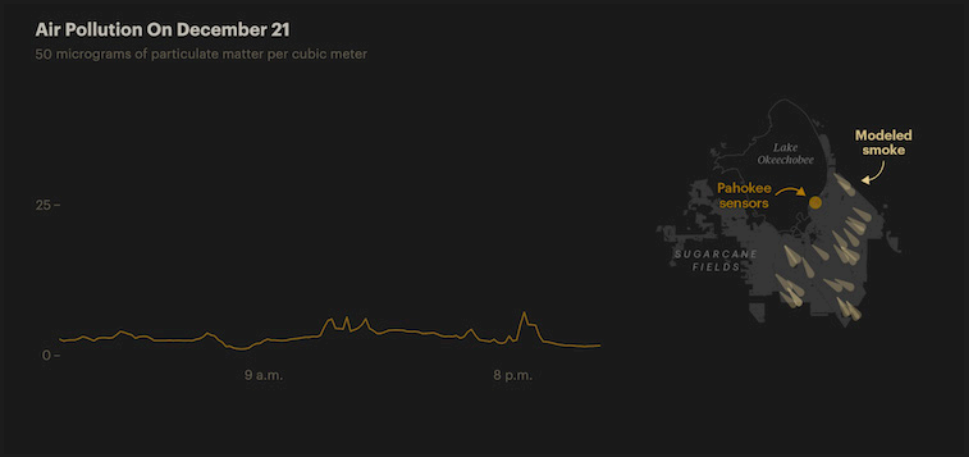
PurpleAir sensors are among the most accurate low-cost air sensors on the market, according to studies by the South Coast Air Quality Management District, the largest air-quality agency in Southern California, where officials are battling some of the poorest air quality in the nation.

In fact, the EPA deploys the same PurpleAir sensors to communities as part of air-testing programs in the Midwest, California and tribal communities in the Northwest. These efforts have helped the EPA get a more complete understanding of air quality across regions, an EPA spokesperson said, adding that the agency considered the programs a success.

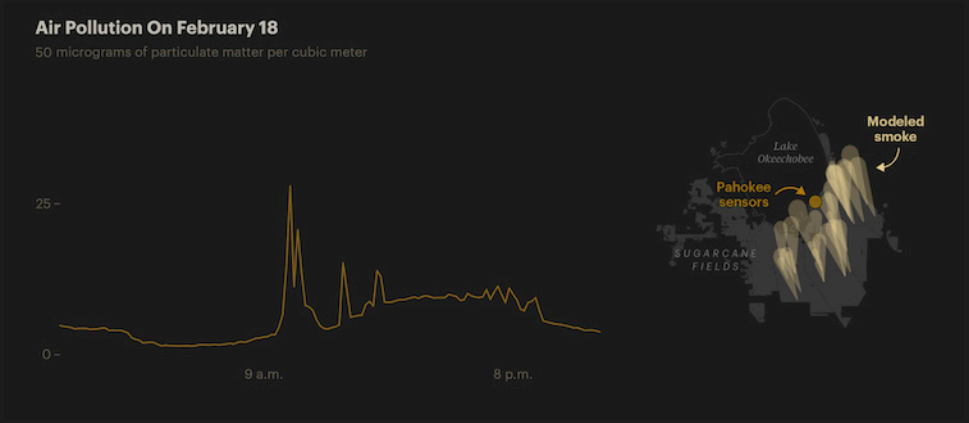
Experts advised The Post and ProPublica to use the Glades sensors to gauge real-time changes in air pollution, not to compare exact measurements to Clean Air Act standards.

Data from these sensors appeared to back up what residents often described during burn season: smoke from cane burns reaching neighborhoods intermittently.

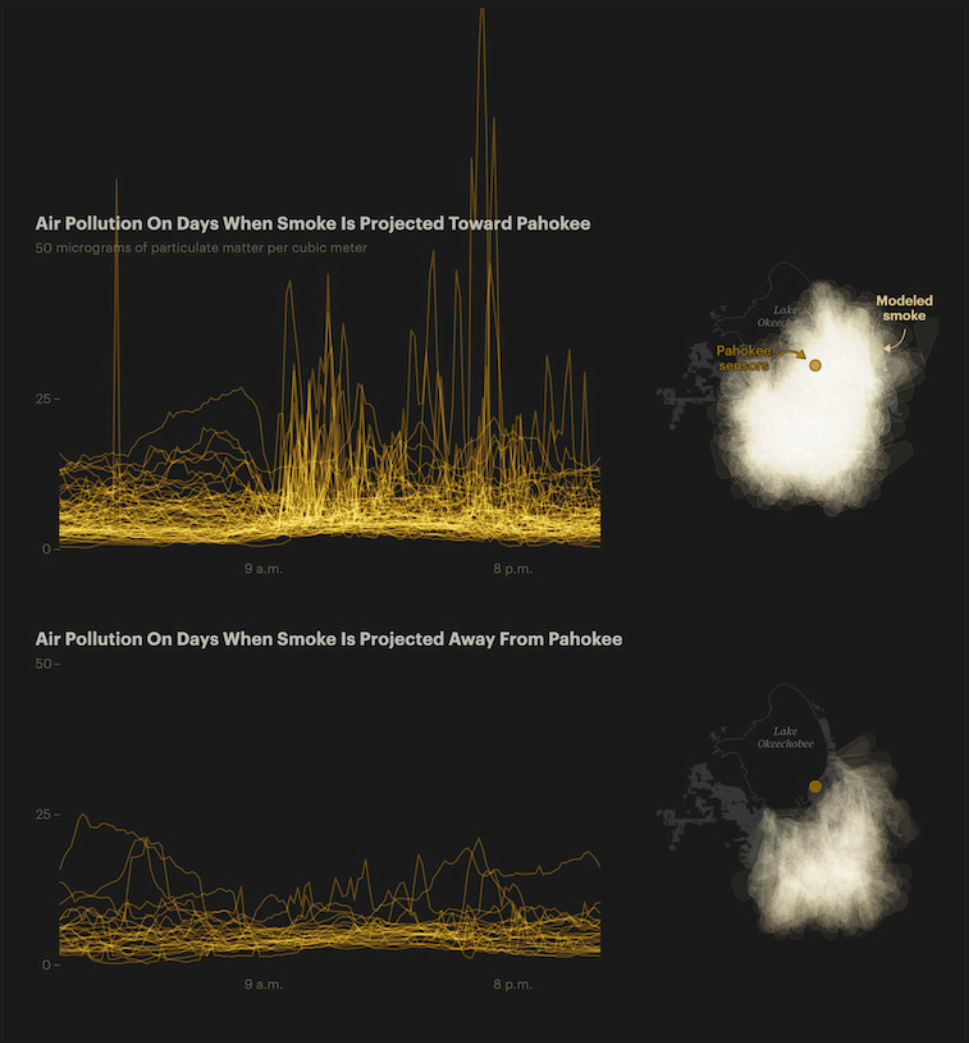
Our two sensors in Pahokee measured air pollution in real time for four months. This is what the average **PM2.5** levels looked like on Dec. 21. Even though about 1,400 acres were burned, projections showed that the smoke would blow away from Pahokee. The sensor report was relatively calm.



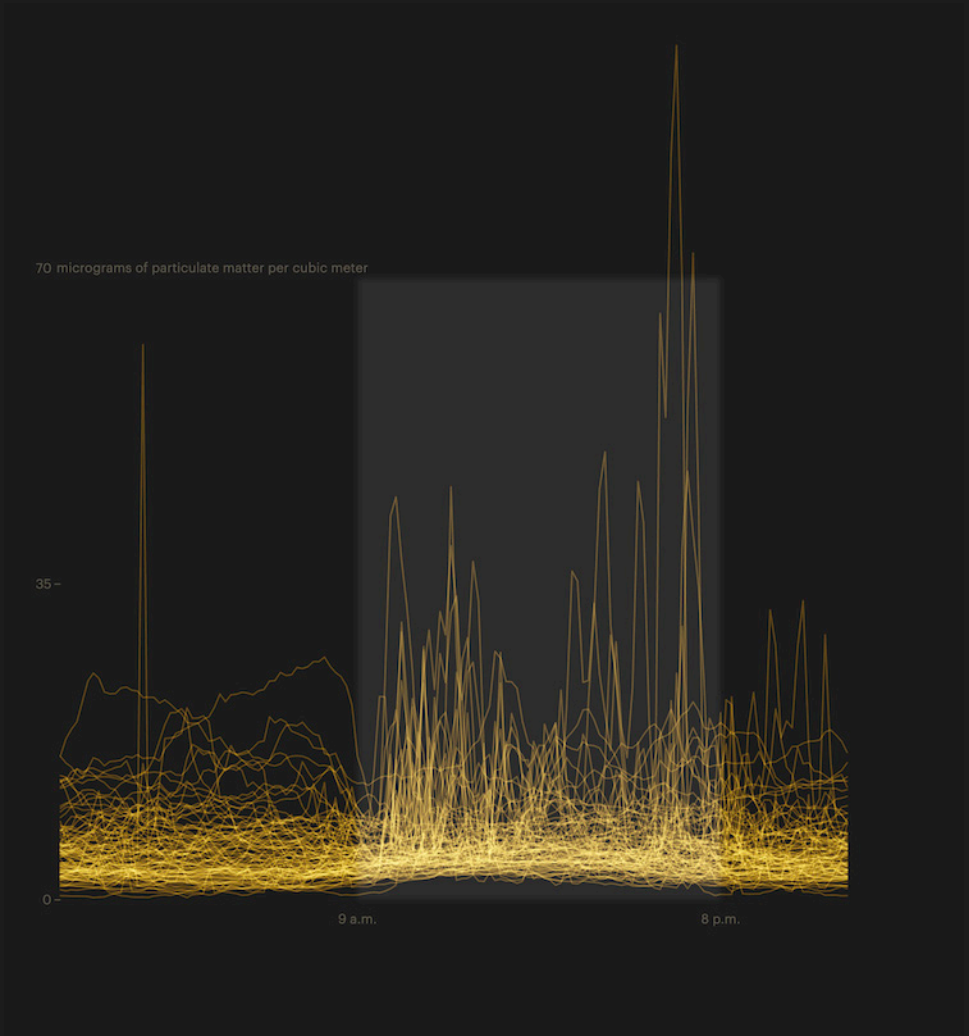
These are the **PM2.5** levels from Feb. 18. On this day, roughly 1,800 acres were burned and the smoke was projected to blow toward Pahokee. The sensors picked up on air pollution in the morning and afternoon.



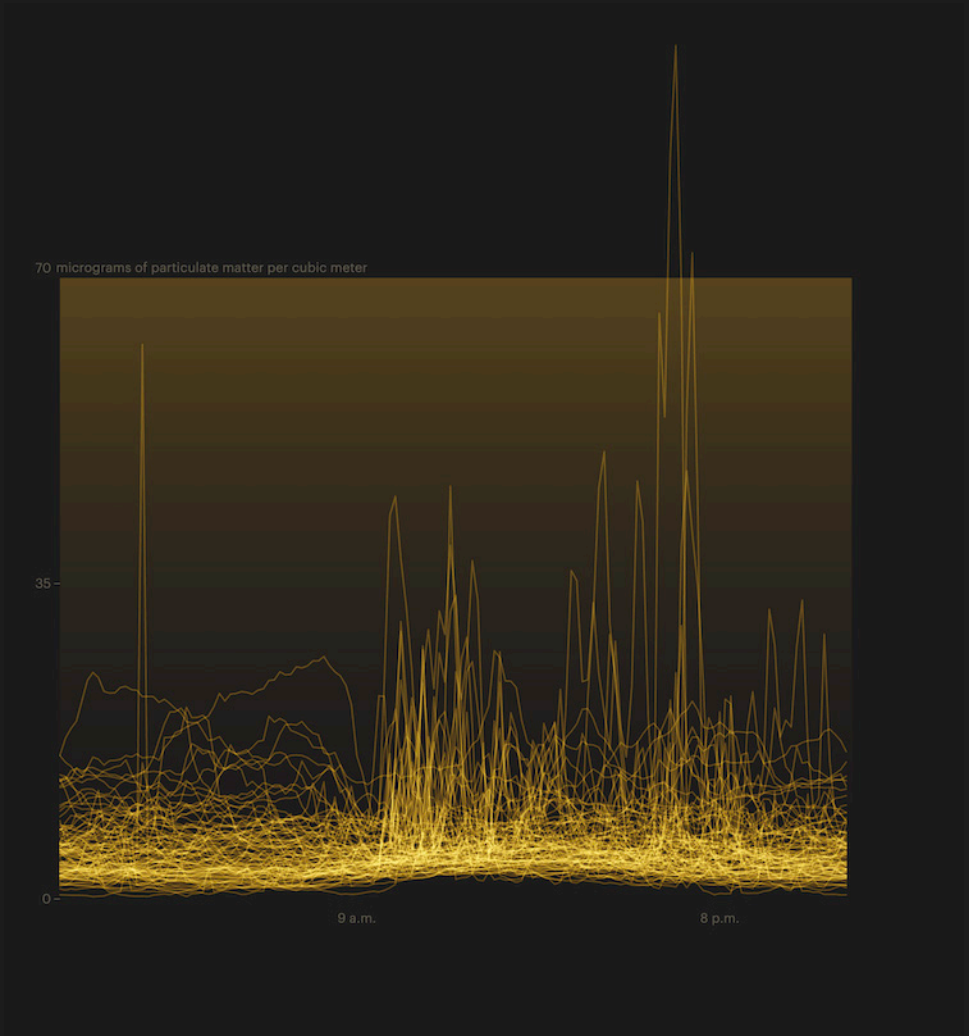
Since **PM2.5** can also come from sources like cars and wildfires, it is tough to tie these spikes to cane burning specifically. But our analysis of more than 100 days of data found repeated spikes in PM2.5 on days when the state authorized cane burns and projected smoke would blow **toward** instead of **away from** town.



Spikes often reached four times the average pollution level in the area. The sensors also reported more spikes in PM2.5 between **9 a.m. and 8 p.m.** — the hours when cane is burned and the resulting smoke may linger. These findings strongly suggest a link between air pollution and cane burning, said Christopher Holmes, a Florida State University professor who reviewed the news organizations' findings.



A growing body of research shows that **any level of PM2.5** can be harmful, but it's difficult to know the precise health impact of exposure to these short bursts of air pollution. While the World Health Organization says PM2.5 should not exceed 25 micrograms per cubic meter over 24 hours, there is no standard for exposures lasting less than an hour.



Sugar companies challenged The Post and ProPublica's analysis because it is based on pollution measured in 10-minute intervals, rather than the 24-hour averages that state and federal officials use. The companies added that the Belle Glade monitor hadn't registered PM2.5 levels that exceed 24-hour federal standards, though the EPA says that monitor couldn't be used to make such determinations.

The news organizations measured shorter intervals because individual cane fires generally last less than an hour. Experts said that short spikes in pollution might not appear in 24-hour averages — which include about 13 hours a day when cane burning doesn't take place and spikes in pollution are rarely recorded.

Sheryl Magzamen, a Colorado State University professor who studies the health impact of exposure to environmental toxins and reviewed the news organizations' analysis, said the short bursts of PM2.5 recorded by the PurpleAir sensors in the Glades can have immediate health effects.

"We've seen that spikes in air pollution, even short-term changes, had meaningful impacts on inhaler use, which we take to be signs of asthma and COPD [chronic obstructive pulmonary disease] exacerbation," she said, referring to her past research. "It shouldn't be surprising to us that inhaling smoke is bad for you."

Magzamen, who spoke regularly with The Post and ProPublica over the past year, submitted a grant proposal to NASA to expand on the media outlets' research. She aims to partner with academics and community leaders to deploy a larger network of sensors across Florida's sugar-growing region, examine satellite data and analyze health trends — actions the state has never taken.

"Everyone has kind of said, 'Why aren't we studying this?'" she said. "These exposures are here, in our communities, and nobody is doing anything about it."

Christopher Holmes, a Florida State University professor and expert in air quality monitoring, said The Post and ProPublica's analysis highlights a need for more scrutiny. With better equipment and data, government agencies can examine whether spikes in pollution are directly tied to the smoke and assess the health impact on residents, he said.

To get a sense of what Glades residents experienced, The Post and ProPublica deployed automated text messages to 51 residents across the region in the moments after the low-cost sensors picked up spikes in pollution. (To find participants, the outlets called every sixth person in the area's voter rolls, knocked on doors in Glades neighborhoods and handed out flyers at food banks.)

Some described coughing, itchy eyes and trouble breathing. Others simply described the smell of the smoke or shared pictures.

Cane is burned across the Glades for several months out of the year. In March, Thelma Freeman saw a smoke plume from a cane burn while driving near her home. Sights like this are common. Thelma Freeman

Many who replied opted to stay anonymous, some citing fear of repercussions in a town reliant on sugar companies. “Ash everywhere hard breathing,” a former U.S. Sugar mill worker with severe asthma replied during a spike. He asked that his name not be used for fear of losing retirement benefits.

Health and air-quality researchers said some of the symptoms residents say they experienced align with elevated exposure to PM2.5.

“I’m not surprised that there would be effects even with shorter-term exposure, especially if the exposures are repeated and recurrent,” said Frampton, the pulmonologist and former EPA adviser. “If you have asthma, that can trigger immediate effects. It doesn’t have to be around for very long at all.”

A 2020 EPA rule proposal, citing research on pollution and health impacts, notes that exposure to high levels of PM2.5 lasting less than one hour can impair heart function, promote clot formation and increase blood pressure. The report adds that studies have linked mortality to daily exposures below the federal 24-hour standard. The EPA is currently reassessing that standard.

For other pollutants, health effects related to short-term exposure have moved the EPA to create standards for shorter durations, such as every hour or every five minutes. While that could be an option here, some experts warn that monitoring particulate matter the same way could present enforcement problems. For example, Frampton said, with shorter averages, local governments run the risk of violating the Clean Air Act every time there's a single burst of pollution, like a house fire.

Even so, he added, that doesn't dismiss the need for state regulators to step in and address recurring short-term pollution like cane burning in rural areas.

"Do some monitoring, demonstrate that people are getting exposed to something that's in the range that's known to cause adverse health effects, and then do something about that local situation," he said.

Local clergy joined citizens and mayors from Clewiston, South Bay and Belle Glade to voice their support for the sugar industry, which faces a federal lawsuit. Pastor Robert Rease of Belle Glade spoke at the press conference in October.
Thomas Cordy / The Palm Beach Post

For now, 10 Glades residents are pressing their case in federal court. The complaint claims sugar cane companies were negligent in burning cane and spilling ash into the community, despite the fact that alternatives exist.

The residents are also asking the court to force sugar companies to pay for annual lung cancer screenings, citing research by the World Health Organization that has linked the illness to the same pollutants produced by cane burning. The suit seeks class-action status on behalf of thousands living near cane fields.

But as the case worked its way through the court system, lawmakers passed a measure in April to expand the state's Right to Farm Act, which aims to protect farmers from so-called nuisance lawsuits, typically filed by neighbors seeking to curb odors, noise and other side effects of farming. At first, the Right to Farm laws were a response to urban sprawl in the 1970s and 1980s, when several states moved to protect farmers from development that drew closer to rural areas and exposed farmers to lawsuits over practices that predated suburban growth. The laws have since been expanded to shield a range of farming and ranching practices from legal scrutiny.

Sponsors of the legislation insisted that it wouldn't affect the pending lawsuit in the Glades. But while sugar cane burning wasn't mentioned in the Florida legislation, lawmakers did add "particle emissions" to the list of protected farming operations, creating a hurdle for those seeking to sue farmers over air pollution in the future. DeSantis signed the legislation into law.

That means the current case may be the last in Florida to consider pollution from cane burning as a central issue. The case hinges on the question of air quality, said Matthew Moore, the chief lawyer for Glades residents. Lawyers from Boca Raton-based Berman Law Group, Moore's firm, hired an environmental engineer who used air modeling estimates that suggested pollution emissions were higher than those recorded by the state-run Belle Glade monitor, legal filings show.

In a motion to dismiss the case, sugar companies cited readings from the Belle Glade monitor to write that pollution concentrations "were well within NAAQS," or the standards in the Clean Air Act, even though the monitor couldn't be used to determine that. The motion to dismiss added in its criticism that the complainants didn't "perform any monitoring of their own."

Last week, a federal judge ruled that the case should move forward on negligence, pollution discharge and health-monitoring claims. He dismissed two of the plaintiffs' other claims alleging battery and civil rights violations. Previously, the judge dismissed a nuisance claim, among others.

Meanwhile, environmental groups are calling on the state to step up its monitoring. The Sierra Club released a study in May, headed by a Ohio-based Miami University researcher, that found that the single monitor in Belle Glade cannot capture smoke pollution across the region. Environmentalists and residents leaned on the report to push for better air monitoring and no-burn buffer zones near towns.

For now, residents like Otishia Harvey live with the burning.

An elementary school teacher, Harvey has spent most of her life in the Glades, raising five children in her Pahokee home. She developed asthma as an adult and regularly wakes up with attacks so severe, she can't move. Three years ago, after her first severe asthma attack, she taught her then-5-year-old son, Zaiden, how to squeeze steroid drops into tubes that connect a medical mask to Harvey's nebulizer, a device the size of a lunchbox. Zaiden would place the mask on his mom's face and wait by her bedside until her heavy breathing slowed.

Otishia Harvey's son Zaiden prepares a nebulizer treatment for his mother at their home in Pahokee.
Thomas Cordy / The Palm Beach Post

Now, she navigates around the sugar cane burns, avoiding the outdoors when she can.

“Breathing is the most normal thing you can do. It’s the most effortless thing,” she said. “And it’s to the point where if I don’t take the asthma medication, it feels like I’m going to die.”

After an intense asthma attack in October, she said her doctor told her she should leave the Glades if she ever wants her breathing to improve.

“It isn’t fair,” Harvey said. “I’m like most people here. We can’t leave.”

Otishia Harvey sits with her nebulizer at her home in Pahokee. Thomas Cordy / The Palm Beach Post

Methodology

ProPublica and The Palm Beach Post analyzed sugar cane burn permit data and PM2.5 readings from Dec. 10, 2020, to April 4, 2021. The permit data was provided by the Florida Department of Agriculture and Consumer Services, and we filtered the records down to burns originating in Palm Beach County. PM2.5 readings were collected from three PurpleAir outdoor air sensors placed at residences in Pahokee, Florida. The burn season was ongoing during the entire time period the air sensors were collecting data. Data from one sensor was omitted entirely from the analysis because it did not meet the quality assurance standards described below.

PM2.5 Analysis

PurpleAir sensors are low-cost air-quality sensors that provide real-time measurement of fine particle pollution, including PM2.5. PurpleAirs are not regulatory-grade monitors, but they are useful in monitoring rapidly changing air quality in local contexts when raw output values are adjusted.

PurpleAir sensors consistently overestimate PM2.5, according to results from a nationwide study by the EPA. To address this, the EPA developed a formula that adjusts PurpleAir sensor data using relative humidity and other correction factors. At this time, the agency has tested the formula mainly under wildfire conditions, and continues to refine it.

We averaged raw data using 10-minute intervals and then omitted points that had a greater than 70% difference between channels as part of a quality assurance method recommended by EPA researchers. We then used the EPA's formula to adjust the data and then averaged the results across both sensors. We chose to calculate averages over 10-minute intervals because cane burns typically last roughly 15 to 40 minutes.

We looked at sensor data between 9 a.m. and 8 p.m. because that is the authorized window for burning. Burns are generally permitted between 9 a.m. and one hour before sunset (roughly 6 p.m.) for noncertified burners and two hours after sunset for certified burners. Experts advised that we should include a buffer for allowing smoke to disperse into communities.

Burn Permit Analysis

The burn permit data provided by the state contained a location and a modeled smoke plume for each authorized burn.

To determine whether smoke was likely blowing toward Pahokee or not, we categorized each day into one of two categories:

- "Toward Pahokee": At least one sugar cane smoke plume that day had potential to be blown toward the sensors located in Pahokee.
- "Away from Pahokee": All sugar cane smoke plumes were unlikely to be blown toward the sensors.

Assuming that plumes might disperse somewhat farther than their modeled boundaries, a burn was categorized as "toward Pahokee" if at least one of the following conditions was met. Burns that met none of the following conditions were categorized as "away from Pahokee":

- Its plume's projected boundaries were within a 2.5-mile radius of the Pahokee sensors.
- Its plume was pointed within 15 degrees of Pahokee, even if the projected boundaries did not intersect with a 2.5-mile radius around Pahokee.
- Its plume was wider than 150 degrees (indicating variable winds) and the burn was less than 10 miles away from Pahokee.

If any of the burns that day fell into the "toward Pahokee" category, we categorized that day as "toward." If none of the burns that day fell into the "toward" category, we categorized that day as "away from Pahokee."

Data Quality and Limitations

In analyzing burn permits, we confirmed with the Florida Department of Agriculture which permits were canceled, leaving only those that were authorized. Though the department has no mechanism for confirming that each burn ultimately took place, it said requesters generally cancel permits or indicate a change in acreage to 0 or 1 if they do not burn the field.

Burn-permit data was missing or likely incomplete on a handful of days. The Florida Department of Agriculture said its server was down on occasion, but could not specify which days or times across the entire time period. We therefore omitted days from our analysis that had unusually low burn counts of fewer than 3. We also omitted permits that listed an acreage of 0 or 1. The Department of Agriculture said these burns were authorized but not ultimately conducted.

One sensor also reported an anomalously high raw value of roughly 1,800 micrograms per cubic meter on Feb. 20, which we omitted from our analysis.

The following air-quality experts guided The Post and ProPublica in planning our sensor effort and analyzing our data: Christopher Holmes, Florida State University; Ricardo Cisneros, University of California, Merced; Sheryl Magzamen, Colorado State University; Darby Jack, Columbia University. Two additional academics from Florida universities guided The Post and ProPublica in the analysis. They asked not to be named because of university policies.

"A Complete Failure of the State": Authorities Didn't Heed Researchers' Calls to Study Health Effects of Burning Sugar Cane

Health officials in Florida's sugar belt failed to act on recommendations to study the health impact of cane burning, despite decades of internal research and complaints from residents.

by Lulu Ramadan, The Palm Beach Post

June 8, 2021

Co-published with The Palm Beach Post

A sugar cane field burns before it is harvested in Okeelanta, Florida, on Jan. 29, 2021. Greg Lovett/The Palm Beach Post

This article was produced for ProPublica's Local Reporting Network in partnership with The Palm Beach Post.

It was the eve of the 2015 harvest season in Florida's heartland. As they did every year, sugar companies prepared to torch swaths of cane, a practice that sends plumes of smoke into the skies near rural Lake Okeechobee.

This time, though, they faced mounting public criticism from residents and environmentalists, who claimed the smoke was making people sick. So on Sept. 30, industry leaders held a conference call with a special guest who tried to quell the objections: Pat Dobbins, the former head of a health department responsible for two Florida counties in the country's largest cane-sugar-producing region.

She said decades of air-quality monitoring and mountains of public-health records suggest there is no link between cane burning and poor health outcomes in the community, according to media reports.

But privately, the assessment among government researchers was anything but unanimous. Within a week of Dobbins' statement, researchers for the health department in Palm Beach County wrapped up the draft of a study that linked sugar cane burning to significant levels of toxic pollution known to cause cardiovascular disease, cancer and respiratory illness.

In fact, it was the third such air-pollution study commissioned by the department over two decades, each raising more alarms about the popular harvesting practice than the last. Its findings prompted researchers to recommend that Palm Beach County undertake a health-risk assessment, a tool the Centers for Disease Control and Prevention and state health departments use to identify environmental toxins and protect vulnerable communities. Health studies in Brazil, the world leader in sugar production, contributed to the decision there to shift away from burning cane, with officials passing laws to entirely phase out the practice by 2031 and instead use blades to remove the plant's leaves.

Although local and state health officials have assessed the health risks of pollutants in Palm Beach County at least 10 times since the 1980s, they did not follow up on this recommendation, according to the state database that lists all such reviews. While versions of the three studies were ultimately published in academic journals, the local health department did not pursue further research into the health effects of sugar cane burning, even as complaints from residents mounted and the debate moved to the legal arena.

To better understand health trends in the sugar-growing Glades region, The Palm Beach Post and ProPublica did their own analysis, using eight years of hospital and emergency room data provided by the state and focusing on patients from Belle Glade, the largest city in the area.

The review found that hospital and emergency room visits for breathing problems among Belle Glade patients spiked during cane-burning season — similar to a trend that local health officials first observed in clinics nearly 30 years ago. The seasonal difference in Belle Glade also was bigger than changes in other, similar populations where burning wasn't present, The Post and ProPublica found.

We shared the findings with three academics who specialize in air quality and health in Florida and Colorado. And while they cautioned that the analysis cannot speak to the causes of respiratory illnesses, these experts said the trends suggest that what is needed is exactly what health officials recommended six years ago: a thorough look at illnesses potentially linked to exposure to cane-burning pollution.

Officials at the Palm Beach County Health Department declined to be interviewed for this story and did not respond to detailed written questions from the news organizations about their handling of the air-quality research findings or the Post/ProPublica analysis. Dobbins did not return multiple calls for comment.

Today, Florida's multibillion-dollar sugar companies continue to burn cane, spilling ash — or "black snow," as

locals call it — into mostly Black and Hispanic communities.

Glades residents are now suing sugar companies in federal court, asserting that exposure to cane burning has caused widespread respiratory illness. Sugar companies have denied that claim, in part arguing that the practice is tightly regulated by Florida's agriculture and environmental protection departments. U.S. Sugar and Florida Crystals, the region's two largest sugar producers, both declined to comment on the health department studies, but the companies did send statements saying they were committed to operating safely in the Glades.

"As a long-standing employer and responsible neighbor in the Glades community, there is no higher priority of ours than the health and wellbeing of our families, friends and neighbors," a U.S. Sugar spokesperson wrote. "That commitment is only matched by how serious[ly] we take our responsibility to be good stewards of the environment which as farmers is the foundation for the work we do each and every day."

"We are proud of our 60-year heritage in the Glades communities, where we have led and supported efforts that protect and enhance our communities," Florida Crystals said, "and we are committed to continuing to build on our legacy as a trusted partner with our neighbors."

U.S. Sugar took issue with the news organizations' analysis, saying the underlying data lacked "critical factors" needed to draw any conclusions.

Meanwhile, state lawmakers have moved to further protect the industry, pointing to the lack of conclusive data tying cane burning to health problems experienced by people living in the Glades.

In April, the state Legislature passed a bill that hinders residents' ability to sue farmers over air pollution. In fighting against its passage, Dr. Ronald Saff, an asthma specialist with nonprofit health advocacy group Florida Physicians for Social Responsibility, told lawmakers that studies have proven that exposure to pollution comparable to the particulates sent into the air by cane burning causes asthma and stunts lung development.

Rep. Spencer Roach, a Republican from Southwest Florida, pushed back, chiding Saff for referencing broad academic studies and not specific data on the Glades.

"It continues to offend me when people come before this body … and are not ready with data," Roach said. "If you're going to propose we take action or pass a law to end someone's way of life, you better damn well have some data that you can present." The news organizations contacted Roach by email and phone for comment about the 2016 health department recommendation for further study; he did not respond.

A similar lack of data on air pollution trends in Florida's sugar region was at the center of an investigation published in July by The Post and ProPublica, which found that the state and federal framework for measuring air quality fails to capture short spikes in harmful pollution, a defining feature of Florida's cane-harvesting process.

The Post and ProPublica spoke with dozens of Glades residents over the course of a year about living amid burning cane fields. Many described widespread breathing problems during burn season and a reliance on asthma inhalers and nebulizers, as the news organizations reported in July. Activists have unsuccessfully urged state officials to pause cane burning amid the COVID-19 pandemic, saying the smoke and ash put Glades residents at further risk from the respiratory virus; Belle Glade has been a hot spot.

More than 500 pages of internal documents, released to The Palm Beach Post and ProPublica in response to a public records request, show that the county health department, which reports to the state, first began studying cane burning three decades ago, culminating with the 2016 recommendation to do a health-risk assessment. At each step, researchers pointed to concerns not unlike those that led to the Brazilian action, linking toxic pollution to sugar cane burning.

Public health experts said the health department could have taken several measures to begin to address the concerns raised in the air-quality studies, including conducting a cursory examination of health trends.

"It would be easy for a health department to look at health and hospitalization data," said Vickie Boothe, an epidemiologist and environmental engineer who worked at the Environmental Protection Agency and the CDC. "That's a complete failure of the state."

The First Pollution Studies

Signs pointed to a problem long before the Palm Beach County Health Department launched its air-pollution studies.

Field workers frequented clinics with complaints of breathing problems and parents spoke of children developing asthma as toddlers, said Dr. Jean Malecki, who ran the county health department from 1991 to 2009 and started her career as a clinician in the Glades. During that period, Palm Beach County residents regularly complained about smoke and ash reaching their homes; at one press conference in the 1990s, state officials described dozens of complaints.

"There was significant observational evidence that the burning of cane caused respiratory problems," Malecki said. "I saw firsthand the problems that the people in Belle Glade were facing."

In her first year as head of the department, she assigned a researcher to study health trends. By 1992, that researcher concluded that more people were going to local clinics for respiratory problems during cane-burning season, but he couldn't link the trend to pollution. There was too little science on cane-burning emissions. He recommended more research on the subject.

In 1997, the county health department took that step in the Glades, tapping Florida International University to study particulate matter, a mixture of tiny, hazardous particles in the air. That year, the EPA set national standards for particulate matter after research tied the pollutant to lung disease, heart disease and premature death.

The FIU team's one-year study found higher concentrations of particulate matter — specifically PM10, tiny inhalable particles smaller than the width of a cotton strand — in Belle Glade during cane-burning season than in Delray Beach, a wealthier coastal town nearly 40 miles away, where the state at the time operated an air monitor. Outside of the harvest season, the two communities had similar pollution levels.

The researchers couldn't pin down the source of the particulate pollution since it can come from an array of sources: cars, factories, even outdoor grills. Any combustion, including cane burning, could have caused the spikes, and both the 1992 and 1997 studies acknowledged there was still a lot researchers didn't know about the environmental effects of cane burning.

More than a decade passed before the health department sought to close that gap in knowledge. In 2009, James Stormer, who headed the department's air-quality division, tapped connections at his alma mater, the University of Florida, to push the research forward by looking more closely at the emissions from cane burning.

"No one else internally really seemed all that interested, to be honest," Stormer said. "It just kind of fell on me, and I was scientifically curious."

So was Chang-Yu Wu, a professor from the University of Florida who studies air pollution. Working with Stormer and a team of researchers, Wu built a combustion chamber to burn samples of cane and measure the pollutants released, and then used those measurements to predict the levels of pollutants likely suspended in the air during industry burns.

They experimented with whole stalks, as are burned in the Florida fields during the harvest, and with the outer leaves, which some harvesters elsewhere in the world remove using blades and burn off-site. Pollution emissions were consistently higher when they burned whole stalks, as farmers do in the Glades.

Of particular concern was a smaller class of particle pollution known as PAHs, or polycyclic aromatic hydrocarbons. Usually associated with burning tobacco or oil, PAHs are considered by scientists to be among the most toxic air pollutants. The Florida research team estimated that cane burning was responsible for more than half the PAHs in the air in Palm Beach County. Cane burning also produced an estimated 89% of the county's carbonyls, a category of gaseous pollutants. Among them are formaldehyde and acetaldehyde, which the EPA has linked to cancer; the higher the concentration, the higher the risk of cancer. Although federal regulators haven't adopted limits on outdoor PAHs, research shows that exposure to even low levels over a long time can contribute to illnesses, including asthma, heart disease, cancer and birth defects, a 2020 EPA report notes.

In the spring of 2010, Stormer and Wu presented their findings to health department officials in a meeting at the agency's headquarters. The event also included sugar industry representatives, according to two people present. The team said their research positioned regulators to "make better decisions about the permitting and management of this practice to better protect human health and the environment," according to the slideshow the team showed.

Wu, who spoke with The Post and ProPublica, published the findings in an academic journal two years later.

Stormer and Wu pushed forward with another study in 2013, this time collecting air samples during burn season and at other times of year.

Stormer retired in 2015, before the study was sent to an academic journal, but Wu submitted the findings the next year.

The 2016 report compared toxic pollution in Belle Glade to Araraquara City, Brazil, a cane-producing region outside Sao Paulo known for high levels of air pollution. The level of PAHs in Belle Glade were "significantly higher," at times as much as tenfold what it was in Araraquara, the study says.

Wu also pinpointed a single day, Oct. 25, 2013, when farmers burned more than 2,900 acres of sugar cane — the highest number of authorized burns during their study period. That day, researchers recorded the highest concentration of PAHs. They also noted the presence of wildland fires, which had burned through roughly 1,000 acres in the region.

Researchers recommended approving fewer sugar cane burns per day, a process regulated by the Florida Forest Service under the umbrella of the state agriculture department. They also broadly recommended more "control for sugarcane burns." State officials never adopted limits on the number of burns or acres authorized per day. (As The Post and ProPublica reported last month, state agriculture officials adopted some restrictions on cane burning in 2019, including denying permits when the air quality is poor. In the most recent burning season, however, they ultimately approved roughly the same number of burns as they had in the past five burn seasons, department data shows.)

And, finally, the 2016 study suggested the need for a health analysis aimed specifically at the illnesses linked to PAHs, including cancer.

"The health-risk assessment was the obvious next move," said Stormer, an environmental engineer. "I'm no epidemiologist. We weren't qualified to tell if there were any related health trends."

A Battle Over Clean Air

Around the time the studies were trickling out of the health department, a public battle between sugar companies and environmentalists was unfolding in the Glades. They were clashing over the facts about burning, but also competing for the attention of the health department, vying for resources to look into — or look away from — the issue.

Residents from the three sugar-producing counties in Florida — Palm Beach, Hendry and Glades — had complained dozens of times to the state or to local health departments since 2009, when health officials in Palm Beach County launched their second air-quality study.

Some complainants called state or local authorities about the nauseating scent, describing itchy eyes or chest tightness, complaint records show. Others lamented that their porches and roofs were coated in powdery soot. One complaint simply and in all caps read: "SUGARCANE SMOKE IS CAUSING HEALTH PROBLEMS."

In 2012, Donna Po, who lives in Loxahatchee, a town on the eastern edge of sugar fields in Palm Beach County, sent a detailed letter to the health department, attaching 68 pictures she'd taken of the smoke and ash. That day, she wrote, her 12-year-old son, Matthew, had coughing fits all afternoon. She gave him steroids using a nebulizer, a machine with a mask attached that turns medicine into an inhalable mist.

"I do not care about all the fancy tests that are probably being done when the wind is not blowing this way," Po wrote on Jan. 19, 2012. "I only need to look at my son and breathe the air to know that the sugar cane burning is hazardous to our health."

Po's complaint was forwarded to the Florida Forest Service. A health department official wrote her back, suggesting she direct future concerns to the Forest Service, which has no health authority but is in charge of cane burning.

"I felt very dismissed," Po told The Post and ProPublica in an interview. "It just felt like, why bother? Nothing will ever change."

The local health department routinely forwarded cane-burning complaints — including those describing health problems — to the Florida Forest Service, as the agency in charge of agricultural burns, records show. Forest rangers investigated the complaints, but regularly closed them without taking any enforcement action. They often wrote in reports that the smoke had dissipated or that the burns were authorized by the state.

In 2015, some residents who were the most vocal critics of cane burning partnered with the Sierra Club to launch a "Stop the Burn" campaign. The group held press conferences, sent emails to lawmakers and distributed glossy postcards across the region calling for the industry to adopt what activists call "green harvesting," the moniker for an alternative to burning that involves removing the leaves with blades.

Glades residents, however, soon got more mailers, this time warning that an end to burning would lead to the shutdown of a vital industry.

Mailers distributed by S.A.F.E. Communities, an organization that has defended cane burning. The flyers were photographed by a Glades resident who is a plaintiff in a federal lawsuit against sugar companies over cane burning. Courtesy of Steve LaPorte

They came from a pro-business organization called S.A.F.E. Communities, which stands for Sustainable Agricultural Fire Education. The group's board included a U.S. Sugar executive, along with Dobbins, the former head of the joint health department in Glades and Hendry counties, according to S.A.F.E.'s website.

"Stopping Pre Harvest Burns would hurt farming, which hurts our local farm based economies and will eventually force farmers and those who depend on farmers (which is almost everyone in the Glades) - off their land and out of the area," one mailer read. The sugar industry is the largest employer in the Glades, providing more than 12,000 jobs during the six-month harvest season.

Another mailer, provided to The Post and ProPublica by residents, also warned that ending cane burning would leave "trash mounds" that would attract snakes and rats and allow for the spread of wildfire.

The organization's website went further, reassuring residents that ash often seen suspended in the air and wind during cane season wouldn't harm them.

"Ash from burnt sugarcane is not a health risk," the website once read. "The ash particles you see are large enough and heavy enough to fall to the ground. Particles of this size are not considered a health hazard."

That's not entirely true: Though research shows that smaller particles are more harmful to people's health, the CDC says that particles that are large enough to see still pose a threat, specifically those that are 10 micrometers in diameter or smaller, including smoke, soot and dust.

"Breathing in particle pollution can be harmful to your health," the CDC warns on its website. "Coarse (bigger) particles, called PM10, can irritate your eyes, nose, and throat."

S.A.F.E. Communities was launched by the Lake Okeechobee Business Alliance, a nonprofit business advocacy group. Julia Du Plooy, the alliance's president and a member of S.A.F.E.'s board, did not respond to questions about S.A.F.E.'s claims or the CDC's position on harmful particles, but instead offered a general statement. She said volunteers started the campaign to "counter the bad information" about cane burning from outside groups.

"As a mother that is raising my children in a rural farming community, I felt it was important to engage with facts about our good air quality, how farmers are good stewards and community partners that help make our communities a great place to live," Du Plooy wrote in a statement.

The mailers were just one part of the industry's counter-campaign. The Florida Sugar Cane League, a coalition of sugar farmers that lobbies for sugar interests, tapped former health department officials to speak about cane burning. Among them was Randall Miller, a supervisor with the Palm Beach County Health Department's air-quality division until 2016. Three months after retiring, he started an environmental consulting company for residential and commercial clients, including the Florida Sugar Cane League. Miller also serves on S.A.F.E.'s board.

As a consultant, he still enjoyed direct access to his former colleagues, emails obtained by The Post and ProPublica through a public records request show. Health department employees emailed Miller daily air-quality reports from his former division, according to the records. Moreover, on at least two occasions, they forwarded him complaints from a resident concerned about cane burning.

In 2018, for instance, Steve LaPorte lodged a complaint with the department about heavy smoke near his home in Moore Haven on the western edge of Lake Okeechobee. But instead of hearing back from the department, LaPorte got a response from Miller, according to a copy of the email provided by LaPorte, first reported last year by Grist and Type Investigations.

Miller wrote that he was reaching out on behalf of the Florida Sugar Cane League.

"They are interested in trying to better understand your concerns about pre-harvest burning and to see if we can determine how you and your community might have been affected yesterday," Miller wrote on April 13, 2018. "The Florida Sugar Cane League and affiliated growers work very hard at minimizing effects of agricultural activities on local (and distant) communities and are very interested in understanding how communities have been affected when concerns arise."

LaPorte said both instances shocked him. "I wondered how Big Sugar got my emails to the health department," said LaPorte, who has since joined other Glades residents as a plaintiff in the federal lawsuit against sugar companies over cane burning.

The health department declined to answer questions about this episode and how it handles complaints from the public. Neither the Florida Sugar Cane League nor Miller responded to requests for comment for this story.

In July 2019, a month after residents filed the lawsuit against sugar companies claiming cane burning was making them sick, Miller wrote a letter to the editor of The Palm Beach Post touting his public health experience and again defending cane burning. An editor's note on the letter included the fact that Miller was a consultant for the Florida Sugar Cane League.

"We do not need a trial to find facts," he wrote. "They are available today through years of publicly available data. There is overwhelming evidence that the Glades communities have very good air quality. While they may have their share of health challenges, the science shows that sugarcane burns are not a health concern."

But Stormer and Wu's studies, produced by the health department during Miller's tenure, had suggested the opposite. (Miller did not reply to questions about whether he had been aware of those studies.)

Assessing the Risks

There are clear models in place for health-risk assessments, and they've been established over the course of more than 40 years.

Congress created the Agency for Toxic Substances and Disease Registry in 1980 to investigate the health impacts of exposure to toxic chemicals in the environment. It partnered with individual states to finance researchers tasked with probing environmental health issues.

With federal assistance, Florida has acted on the recommendations of dozens of local health departments to investigate environmental pollution, like groundwater contamination or radon levels in the air. In fact, health officials have carried out such risk assessments in Palm Beach County at least 10 times since the late 1980s, to generate research into issues such as a mercury spill at a medical building; air, soil and water quality at homes built on a former landfill; and well-water safety near a former electronics plant.

And, in many cases there and across the state, the investigations yielded action that prevented harm to public health. In Tampa in 2018, the state team assessed contamination from a former chemical plant site that was slated for redevelopment. The agency recommended against building wells and called for testing pollution concentrations in the soil and groundwater before the developer could build on the site.

The state health department on its website called it "a success story," writing that, "Because of this evaluation, the Department prevented residents from being exposed to potentially toxic groundwater vapors."

The website lists another "success story" in Palm Beach County that same year. Responding to concerns about an odor coming from an oil storage tank at Saint Andrew's School, a private school in Boca Raton, state health officials collected indoor air samples to test for contaminants linked to oil. The assessment led to a recommendation to repair a ventilation system that filters out such contaminants.

After The Post and ProPublica reached out to health department employees for this story, one employee placed a call to Stormer, who had retired, to ask whether the agency had carried out a risk assessment, Stormer told the news organizations. It hadn't, he said.

A risk assessment, especially in the face of an ongoing source of pollution like cane burning, is a natural next step after finding high levels of environmental pollutants, said Boothe, the former EPA and CDC epidemiologist and environmental engineer.

In a case like this, Boothe said, a health-risk assessment would involve complicated modeling that combines pollution emissions data with health data. State and federal agencies have partnered on similar modeling for wildfires, which are more sporadic and more difficult to track, Boothe said.

"What's the excuse for not doing it in a situation where residents are exposed to smoke regularly year after year after year?" she said.

In May, The Post and ProPublica reached out to Dr. Alina Alonso, the head of the county health department. She did not return calls. So a reporter approached her at a Palm Beach Board of County Commissioners meeting to request an interview about the air-quality studies and the health impacts of cane burning. Alonso

insisted she wasn't the right person to speak to about the topic and said that the department had examined health trends and determined "allergies" were the contributing factor to the health problems Glades residents had been experiencing.

But no such study on allergies in the Glades appeared in a records request for all health department studies on air quality and health in the region since 1980, and, when asked, the department did not provide any further evidence.

A mention of allergies in the Glades does appear, however, on the S.A.F.E. Communities website on a page dedicated to defending cane burning. The website claims there is "no uptick in emergency room visits for respiratory complications during the sugarcane harvest season. However, residents of the Glades and other regions do experience the normal health issues such as allergies associated with a change in the seasons."

The Post and ProPublica followed up with detailed questions by email to Alonso about the studies and the allergy trends she'd mentioned. After more than three months, the department did not answer any of them.

Looking at Hospitals

Analyzing hospital admissions and emergency room visits would have been a logical step to take in assessing health trends in the community, experts said.

"It's not a great leap for the health department to pull off that analysis, honestly," said Eric S. Coker, an environmental health professor at University of Florida and former epidemiologist for the New Mexico Department of Health.

In the absence of such an analysis, The Post and ProPublica examined health trends in the Glades using eight years of hospitalization data from Florida's Agency for Health Care Administration, which oversees hospitals throughout the state. With the guidance of academics, The Post and ProPublica compared the average rate of hospitalization and emergency room visits between burning and non-burning seasons. While the analysis cannot speak to the cause of any illnesses, experts advised that the data is useful for understanding broad trends between seasons. The news organizations focused on patients with a Belle Glade ZIP code, the largest ZIP code in the sugar-growing region.

The analysis found that for patients from Belle Glade, hospital and emergency room visits for respiratory illness rose by 35% during the burning seasons. Those months, October to March, overlap with pollen and flu seasons, so higher rates of respiratory illnesses are to be expected. But the seasonal trend was more pronounced in Belle Glade than it was elsewhere.

In fact, the Belle Glade ZIP code had the highest percentage increase among other South Florida ZIP codes of similar population size, racial makeup and median household income, including areas in Opa-Locka, Fort Myers, Fort Lauderdale and Miami, all urban or suburban areas. (Research shows that low-income minority communities are likely to experience asthma and other illnesses at a higher rate. People in low-income areas tend to have less access to adequate housing and health care, factors that can compound health problems.)

An exact geographic comparison was difficult because the Glades is unique, in that it is the only largely Black, low-income community living near agricultural fields in South Florida. So experts recommended comparing Belle Glade trends to those in a similarly rural area as well, despite differences in income and racial demographics.

In that comparison, the Belle Glade ZIP code still had a higher average percentage increase in hospitalizations and emergency room visits for respiratory illnesses. Indiantown, a rural, largely white area just north of the Palm Beach County sugar-growing region, had an average seasonal increase of 19%, compared to the 35% in Belle Glade.

Presented with the Post/ProPublica analysis, experts said the findings suggest a need to examine health trends and the potential link to cane burning more closely.

"What we do see strongly suggests the need for more intensive, robust research," said Coker, one of three academics who advised The Post and ProPublica on their analysis.

Health officials and academics, with access to additional data, could take steps to incorporate a number of factors, including pollution trends and individual medical history, Coker said.

Sheryl Magzamen, an environmental health and air-quality expert at Colorado State University who also advised The Post/ProPublica on their analysis, said the trend in Belle Glade is "a good indicator that smoke could be a strong hypothesis for why those changes are occurring." She added that though the data doesn't speak to cane burning specifically, it also doesn't rule it out as a factor. NASA recently announced a partnership with Magzamen and academics from six universities across the country to study air pollution and health in the sugar-growing Glades region, an initiative prompted by The Post and ProPublica's reporting.

Presented with the findings, the state and local health departments did not respond.

The Post and ProPublica also shared the findings with the two largest sugar growers in the region, Florida Crystals and U.S. Sugar. Florida Crystals did not comment on the findings. U.S. Sugar challenged the news organizations' analysis and said it was insufficient to draw any conclusions. The analysis, the company said, doesn't take into consideration individual factors like "age, medications and medical history, smoking history and percentage of the population on Medicaid," which are "critical factors when analyzing data."

The state declined to provide the kind of detailed patient information that would allow for such an individual-level analysis, citing federal privacy law. That data is, however, available to health departments and academics.

U.S. Sugar has also pointed to state data on the adolescent asthma rates in sugar-growing Palm Beach, Hendry and Glades counties, which are lower than the state average. A state report from 2013 — the latest "Burden of Asthma" review to be publicly posted on the state Department of Health website — shows just that. Even so, the average asthma rate in Palm Beach County lumps the small agricultural region of 31,000 people into a county with a population of 1.5 million.

The Post/ProPublica finding that there were upticks in respiratory-illness-related hospital visits during cane-burning season in Belle Glade aligns with what many residents, doctors and nurses described to the news organizations.

Dr. Seneca Harberger — a clinician at the C.L. Brumback Clinic in Belle Glade, which is owned by the Palm Beach County Health Care District — said patients often come into the clinic complaining that the smoke is aggravating their breathing problems. (The Health Care District — which also owns the only hospital in the Glades, Lakeside Medical Center — declined to comment.)

"Patients absolutely come probably on a daily basis and say their asthma, their COPD is made worse by the burning," Harberger said. (COPD, or chronic obstructive pulmonary disease, is an inflammatory disease that makes it harder to breathe.) The free clinic regularly doles out nebulizers to patients, many of whom are on government-backed health insurance, he added.

The nebulizers come shaped like cartoon animals for kids.

Left: Peggy Cuyler with her son Goivanni. Right: Cuyler's sons Cash and David with their nebulizers. Thomas Cordy/The Palm Beach Post

Peggy Cuyler, 37, owns two — a blue seal and a black-and-white panda. Her 5-year-old son Cash and 6-year-old son David both like the seal. When they have simultaneous asthma attacks, she has to choose who gets the panda.

"I have to be the bad mom that gives one the wrong nebulizer," she said from her Pahokee apartment complex, holding her third son, 6-month-old Goivanni, who was diagnosed with asthma at 2 months old.

Like others in the area, she doesn't let her kids outside during cane season. The reactions are immediate, she said. "It chokes them."

Health Data Analysis Methodology

In the absence of a formal health-risk assessment by state and local health officials, The Palm Beach Post and ProPublica examined seasonal health trends in the Glades using data on hospitalization. Reporters sought guidance from three health and air-quality academics from three universities: Amy Stuart at the University of South Florida, Sheryl Magzamen at Colorado State University, and Eric S. Coker at the University of Florida.

Through a request to the Florida Agency for Health Care Administration, we received data on all hospital inpatient admissions and emergency department visits in Florida between 2011 and 2019.

The state agreed to release data that did not include patient names, but did include information such as the patient's race, gender, age and ZIP code. The data also includes diagnoses associated with the patient admission or visit. Exact admissions and ER visit dates were not included and instead records were grouped by quarter and year.

A 2015 study carried out in Hawaii tracked negative health outcomes — hospital admissions, emergency department visits and prescription fills for acute respiratory illnesses — on days when companies burned sugar cane on the island of Maui. (Hawaii farmers used to produce sugar cane, which included a pre-harvest burning process, but phased out sugar production in 2016.)

Because the data provided for Florida lacked the exact dates of hospital visits, it was difficult to link any hospital admissions or emergency room visits directly to cane burning the way researchers had done in

Hawaii. However, academics advised reporters that the available data in Florida could be used for a broader analysis, known as an ecological study. This type of study focuses on groups of people rather than individuals, and it is often the first step in carrying out a detailed health analysis.

Presented with The Post and ProPublica's findings, U.S. Sugar, one of the largest sugar producers in the region, challenged the analysis and said it was insufficient to draw any conclusions from, largely because it doesn't take into consideration factors like patients' "age, medications and medical history, smoking history and percentage of the population on Medicaid," which are "critical factors when analyzing data."

The state, however, declined to provide details like patient identifiers and medical history, which would have allowed for a thorough patient-level analysis, citing the Health Insurance Portability and Accountability Act, a federal law aimed at protecting patient medical information. That data is available to health departments and academics, who could use it to carry out a complex analysis that might link illnesses directly to a specific environmental factor. Experts said our ecological analysis suggests a need to examine the health trends in the Glades further.

Our Analysis

The reporters analyzed hospital inpatient admissions and emergency room visits during burn and non-burn seasons. Florida's sugar cane harvest season begins in October (the first month of Quarter 4) and generally lasts until March (the last month of Quarter 1). Though harvest season has been extended into April and May in the past, a majority of cane burns took place in the first six months of the harvest season in the years we examined, according to burn permit data from the Florida Department of Agriculture and Consumer Services, which oversees agricultural burns.

The analysis focused on the same diagnoses as those examined in the Hawaii study: asthma with exacerbation, acute bronchitis, acute sinusitis, acute pharyngitis including streptococcal pharyngitis, acute conjunctivitis, cough, headache, all pneumonias, and other acute airway problems.

Then, reporters organized the data by patient ZIP code, at the advice of experts. This allowed the news organizations to examine trends among residents, rather than performing an analysis by hospital, which might have included out-of-region visitors or failed to capture patients who sought medical attention outside the area.

Reporters used U.S. Census Bureau population estimates by ZIP code to calculate the crude rate of hospitalization and emergency room visits per 10,000 residents.

The data covered eight harvest years. To summarize the seasonal trends in hospitalizations in each ZIP code, reporters calculated the average visit rate during the seasons when sugar is not burned (Quarters 2 and 3) and during the sugar-burning season (Quarters 4 and 1), then calculated the percentage difference between the two.

Experts advised that there is an expected, natural increase in respiratory illnesses between the summer and winter/spring because of factors including pollen and flu seasons. The key, they said, was to examine whether the increase was more pronounced among Glades patients than patients from comparable areas.

Experts suggested comparing a ZIP code in the Glades region to similar ZIP codes outside the cane-burning Glades region. They also advised avoiding ZIP codes with too few people. The largest ZIP code in the Glades region is 33430, which captures more than 20,000 people, including all of Belle Glade, as well as some unincorporated areas outside city limits.

Ideally, the comparison ZIP codes would be similar in geography (to account for factors like rural and urban pollution) as well as race and income (to account for existing health trends linked to race or income). But the

Glades is unique. Because it is the only largely Black community living among field crops in South Florida, it was difficult to find an exact match outside the cane-burning region.

To identify any areas that are similar in population size, racial makeup and income, reporters used data from the 2013-2017 five-year American Community Survey, which falls in the middle of the time period covered by the hospitalization data. In all of South Florida, reporters identified 10 ZIP codes with more than 10,000 people, Black populations larger than 35% (compared to Belle Glade's 56% Black population) and median household incomes below Florida's 2015 low-income threshold of $36,950 (compared to Belle Glade's median household income of about $26,000).

Unlike Belle Glade, these ZIP codes cover largely urban or suburban areas. The percentage increase in hospitalizations and emergency room visits for respiratory illnesses during burn seasons in the Belle Glade ZIP code was higher than the increase in these similar areas.

Percentage change in the average rate of respiratory illness visits between offseasons and burn seasons:

1. Belle Glade (33430): 35%
2. Opa-Locka (33054): 28%
3. Fort Myers (33916): 27%
4. Fort Lauderdale (33313): 23%
5. Fort Lauderdale (33311): 20%
6. Miami (33136): 19%
7. Miami (33147): 19%
8. Miami (33127): 17%
9. Miami (33150): 16%
10. Miami (33142): 16%
11. Miami (33161): 16%

We Reported on Pollution From Sugar Cane Burning. Now Federal Lawmakers Want the EPA to Take Action.

Citing a Palm Beach Post/ProPublica report on the burning of cane fields, leading members of Congress have called for the EPA to investigate air monitoring in Florida and to change national pollution standards.

by Lulu Ramadan, The Palm Beach Post, and Maya Miller, ProPublica

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Andrea Wise/ProPublica. Photos: Thomas Cordy/The Palm Beach Post; Getty Images.

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For years, residents living amid Florida's sugar fields have complained about pre-harvest crop burning, which sends smoke and ash into their communities. And for years, state health and environmental officials, as well as sugar companies, have said the air is healthy to breathe.

But now, leading lawmakers in Congress are calling for a federal investigation into how the state has tracked air quality while also pressing to tighten the nation's pollution standards, in response to an investigation by The Palm Beach Post and ProPublica that found a series of shortcomings in how authorities monitor the air in Florida's heartland.

State officials used a single monitor to track air quality across the 400,000-acre sugar-growing region for at least eight years, despite telling their federal counterparts that it was malfunctioning and unfit to determine whether the air met standards set under the Clean Air Act, the landmark law aimed at protecting public health. The news organizations also found that current pollution standards fail to capture short-term spikes in pollution, a defining feature of Florida's sugar harvesting process, when burning releases bursts of harmful smoke into the atmosphere. U.S. Sugar and Florida Crystals, the region's two largest sugar producers, have challenged the investigation's methodology and conclusions, saying the practice of burning is heavily regulated and that the air is safe.

Citing the reporting, Sen. Jeff Merkley, a Democrat from Oregon and one of the upper chamber's leading voices on environmental justice, said he wants the U.S. Environmental Protection Agency to investigate the circumstances around the malfunctioning monitor and create protocols to make sure a similar situation does not happen again.

As The Post and ProPublica reported last month, the EPA allowed the state to continue using the monitor to track the Air Quality Index, a public information tool that communicates whether the air is good, unhealthy or hazardous. The move, however, meant federal officials could no longer use the equipment to hold polluters accountable if they found Clean Air Act violations.

"What the predominantly Black and Hispanic communities living near cane fields in Florida have been put through is completely unacceptable," said Merkley, who serves as chair of the Environment and Public Works Subcommittee on environmental justice and regulatory oversight, in a statement. "No one — regardless of the color of their skin, where they live, or their income — should have to breathe in harmful smoke, or worry about whether their child is getting poisoned when they play outside."

Changes to the nation's air-monitoring framework are necessary, Merkley said, "to make it harder for industries to bury evidence of the dangerous pollution levels they're causing."

Likewise, Rep. Debbie Wasserman Schultz, a top Democrat in Florida representing parts of Broward and Miami-Dade counties, called on the EPA to revamp its standards to capture short-term pollution, adding, "Clean Air Act methodologies often fail in that regard."

The EPA measures particulate matter, a harmful fine soot pollution, using 24-hour and annual averages. But, as The Post and ProPublica reported last month, those averages sometimes obscure short-term pollution, like that seen during cane burning.

To better understand air conditions during the burns, The Post and ProPublica partnered with residents to install air sensors at homes in Pahokee, one of three towns that dot the Glades, a region of 31,000 people living amid cane fields. The sensors tracked particulate matter, a mixture of pollutants that researchers have tied to heart and lung disease. The sensor readings showed repeated spikes in pollution on days when the state had authorized cane burning and projected smoke would blow toward the sensors, The Post and ProPublica

analysis found. The spikes often lasted less than an hour and were less frequent and less pronounced on days when the wind was blowing in other directions.

In June, EPA officials announced that they are reviewing the agency's particulate matter standards, after acknowledging that exposure to this pollution in the long- and short-term can be harmful.

"The most vulnerable Americans are most at risk from exposure to particulate matter, and that's why it's so important we are taking a hard look at federal standards that haven't been updated in nine years," agency spokesperson Tim Carroll wrote in an email Tuesday. The EPA plans to propose changes in summer 2022 and a final rule the following spring.

The smoke from cane burning disproportionately affects the Glades communities, where about a third of the population lives below the poverty line. In the 1990s, Florida agriculture officials banned burning when the wind blows toward the wealthier, whiter communities east of the cane fields, after residents there complained.

Wasserman Schultz, a member of the House appropriations subcommittee on agriculture and the committee on oversight and reform, noted that Congress passed recent legislation that made $100 million available to state and local environmental agencies to bolster air monitoring. Half of that amount is dedicated to communities that face disproportionate exposure to pollution. She called on Florida to apply.

"State and local officials don't have the right air monitoring tools to determine how these communities are being harmed," Wasserman Schultz said. "The State of Florida must invest in air quality monitoring in the Glades to truly understand how communities are impacted."

Rep. Lois Frankel, a Florida Democrat whose district is just northeast of the Glades, said her office would be available to help the state pursue these grants.

The Post and ProPublica asked Rep. Ted Deutch, a Democrat who represents parts of Palm Beach and Broward counties southeast of the Glades, whether the EPA should change the way it tracks particulate matter or whether states should enhance air monitoring to better measure localized pollution. In response, he said, "As a society, we should be doing all we can — at the federal level, state level, and private entities — to protect vulnerable communities from potentially unhealthy living conditions created by hazardous air emissions."

Whether Florida will seek federal funding is unclear. Air monitoring in the Glades is overseen by the state Department of Environmental Protection, using equipment owned and operated by the Palm Beach County Health Department. Neither agency responded to questions about whether they plan to pursue federal grant funding to bolster monitoring in the area, but they have defended the quality of Florida's air.

Elected officials in the region have also been largely silent. Of the four policymakers representing the Glades at the county and state levels, just one responded to requests for comment for this story.

Palm Beach County Commissioner Melissa McKinlay, whose district includes the Glades, said in a statement that she supports Merkley's call for an investigation into the malfunctioning air monitor, in Belle Glade, and encourages state environmental officials to pursue the air-monitoring grants.

The Glades has lacked a representative in the U.S. House since April, when Congressman Alcee Hastings died from pancreatic cancer. A special primary election for the heavily Democratic seat is set for November, with the general election slated for January 2022. The Post and ProPublica left messages for the 17 candidates who qualified for the ballot. Just three responded: Rev. Elvin Dowling, Phil Jackson and Emmanuel Morel. All three Democrats supported Merkley's request for an investigation and said officials need to bolster air monitoring in the Glades. They also said the industry should consider changes to its harvest practices to better protect public health. None of the six candidates who have raised the most campaign dollars responded to our requests.

The sugar industry is the largest employer in the area and one of the largest political donors in Florida.

For its part, the Palm Beach County Health Department has defended its air-monitoring efforts, noting in a statement that the EPA approved the state's air-monitoring plan, including the continued use of the Belle Glade monitor. "The Department of Health continues to work with the Department of Environmental Protection to ensure we are upholding the Clean Air Act," a spokesperson wrote.

A Department of Environmental Protection spokesperson also defended the state's air monitoring, noting that even though The Post and ProPublica's sensor analysis found short spikes in air pollution, the state's 24-hour averages are well within federal standards. Both the Health Department and DEP referred detailed questions to the EPA.

Carroll, the EPA spokesperson, told The Post and ProPublica that the federal agency "shares the concerns of our partners in Congress and residents of Florida when it comes to harmful particulate matter in the air and we're working quickly to address the issue, which includes working with the State of Florida to upgrade the Belle Glade monitor."

After the news organizations started asking questions about the monitor this year, state and local officials said they planned to replace the equipment with a monitor that will meet the EPA's strict accuracy standards. A June Health Department report noted the monitor was expected to be installed in July, but a spokesperson subsequently said it would happen "later in 2021."

As this plays out, researchers from six universities are stepping in this fall to learn more about cane burning.

A week after The Post and ProPublica published its investigation, a division of NASA dedicated to air quality and health announced it would be partnering with a team of scientists to study the impacts of sugar cane burning and allocate a $218,000 grant toward the effort. The lead researcher, one of a half-dozen experts who advised the news organizations, said her grant proposal was spurred by the media outlets' work. The study is poised to place 45 sensors across the community.

Meanwhile, U.S. Sugar, one of the largest sugar companies in the region, criticized the news organizations before publication, which the outlets wrote about, and again following the July 8 investigation. In press releases, the company dismissed The Post and ProPublica reporting, saying the story "ignored the facts on our local community and our sustainable farming practices" while encouraging residents to sign up for a tour of U.S. Sugar's operations.

"Farmers respect our neighbors by treating them with honesty, fairness, and a commitment to the environment we all share by ensuring that our farming operations follow the best available scientific guidance and strictest regulations," Judy Sanchez, a U.S. Sugar vice president, wrote last month.

The press releases did not allege any factual errors in the investigation, and there have been no corrections to the stories.

"They Deserve to Be Safe": Candidates Call on Florida to Investigate the Health Effects of Sugar Cane Burning

Voters in Florida's biggest sugar-cane-growing region will soon select their likely representative in Congress. Some candidates are calling on officials to further research industry practices after a Palm Beach Post/ProPublica investigation.

by Hannah Morse, The Palm Beach Post

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A sugar cane field burns outside of Pahokee, Florida, on Feb. 3. Greg Lovett/The Palm Beach Post

https://www.propublica.org/article/they-deserve-to-be-safe-candidates-call-on-florida-to-investigate-the-health-effects-of-sugar-cane-burning

This article was produced in partnership with The Palm Beach Post, which was a member of the ProPublica Local Reporting Network.

Florida Democrats running to represent the state's largest sugar-growing region in Congress say that state officials need to examine whether the industry's harvesting practices are harming the health of residents in Florida's heartland. The primary election, which will be held Tuesday, will likely decide the ultimate winner, given the heavily Democratic district.

The calls came in response to an investigation by The Palm Beach Post and ProPublica that found the Florida Department of Health ignored the recommendations of its own researchers to do such an assessment five years ago, despite mounting complaints from residents and multiple studies linking a practice known as cane burning to toxic pollution. Sugar companies are the largest employers in the region.

For about six months each year, from October through the following March, farmers burn sugar crops to rid the plants of their outer leaves, sending smoke and ash into the patchwork of largely Black and Hispanic communities known as the Glades. The companies say the practice is safe and heavily regulated by state agricultural and environmental officials. But, as the news organizations reported in August, state health researchers told their bosses in 2016 that the issue was ripe for more study, after finding significant levels of toxic pollutants known to cause cardiovascular disease, cancer and respiratory illness.

Seven of the 11 Democrats vying to replace the late Rep. Alcee Hastings, a Democrat who died in April, said the Florida health department should now follow through with a health-risk assessment, a tool that the Centers for Disease Control and Prevention and state health departments use to pinpoint toxins in the environment and protect vulnerable communities.

"The only reason we don't know more about how sugar cane burning affects the health of Glades residents is because of the willful ignorance of public health officials in Florida's health department," said state Rep. Omari Hardy, a Democrat from West Palm Beach who is running in the special election for the vacant seat in the 20th Congressional District.

As The Palm Beach Post and ProPublica reported, local and state health officials have assessed the health risks of other pollutants in Palm Beach County at least 10 times since the 1980s, although they declined to do so in 2016 when it came to cane burning. The federal government provides funding and guidance to Florida and other states to do such assessments.

"I think those tests need to be conducted, and they really need to look at what's occurring there — before, during and after the burning — and see how that's affecting the people, and then move forward with some solutions," said Barbara Sharief, another candidate and a Broward County commissioner who owns a pediatric home health care firm.

The Rev. Elvin Dowling, a former Hastings aide running in the race, said the potential health effects of cane burning "need to be investigated to the fullest extent possible."

Four other Democratic candidates — Broward County Commissioner Dale Holness, state Rep. Bobby DuBose of Fort Lauderdale, former Palm Beach County Commissioner Priscilla Taylor, and retired Navy officer Phil Jackson of Palm Beach County — agreed, saying they supported more health research. Sheila Cherfilus-McCormick — a health-care executive from Broward County who has raised the most money in the race, primarily through loaning $3.7 million to her own campaign — declined to comment, while the others in the field did not respond to requests.

Two Republicans are also running for their party's nomination: Jason Mariner, CEO of a South Florida media company, and Greg Musselwhite, a welding inspector who ran against Hastings in 2020. The former did not respond to a request for comment and the latter did not answer questions, simply saying that the Post/

ProPublica investigation had "lots of great information."

State officials have been largely silent on the issue of cane burning while expanding protections for the sugar industry. In April, Republican Gov. Ron DeSantis signed into law legislation that makes it harder for residents to sue farmers over air pollution. DeSantis and the Florida Department of Health did not respond to requests for comment for this story. The state-run Palm Beach County Health Department, where researchers first flagged concerns over the toxic pollution emitted by cane burning, issued a statement that did not address questions from the Post and ProPublica about whether the department should pursue a health risk assessment. "The Department of Health continues to work with the Department of Environmental Protection to ensure we are upholding the Clean Air Act," the department said, noting its network of air monitors.

In the absence of a health risk assessment, The Palm Beach Post and ProPublica examined health trends in the Glades using state hospitalization data. The review found that hospital and emergency room visits for breathing problems among Belle Glade patients spiked during the cane-burning season — similar to a trend that local health officials first observed in clinics nearly 30 years ago. The seasonal difference in Belle Glade was bigger than changes in other similar populations where burning wasn't present.

U.S. Sugar and Florida Crystals did not respond to requests for comment for this story, but both companies have denied that cane burning is responsible for residents' health problems. They have also said they are committed to operating safely in the Glades. U.S. Sugar previously took issue with the news organizations' health analysis, saying the underlying data lacked "critical factors" needed to draw any conclusions.

The harvesting practice has emerged as an issue in the congressional race because the region produces more than half the nation's cane sugar. Hastings, the district's previous representative, was co-chair of the House Sugar Caucus, an informal group of lawmakers who industry lobbyists once credited with "helping to maintain quotas that keep cheaper foreign sugar out of the U.S. market," according to The Associated Press.

Sugar companies were among Hastings' biggest supporters. In 2020, he received $22,000 from U.S. Sugar's political action committee and affiliated individuals — the largest amount they gave to any congressional candidate that cycle, according to Open Secrets, which tracks political spending across the country. His second-largest source of contributions: individuals affiliated with Fanjul Corp., which is the parent company of Florida Crystals, who gave a combined $16,800.

Former colleagues said Hastings was a fighter for the industry because it meant protecting jobs in the area. The sugar companies provide some 12,000 jobs to seasonal and permanent residents during the six-month harvest season.

Environmental groups and some residents are now calling on the industry to end burning and switch to an alternative cultivation method, where blades are used instead of fire. The U.S. and China are the only nations among the top five sugar-producing countries that have not moved to phase out cane burning. American sugar interests, however, say the switch would not work due to the climate and soil makeup in South Florida. The transition, they say, would also lead to job losses.

Some candidates acknowledge the economic importance of the industry, but see cane burning as a racial justice issue, too. The Glades area of Palm Beach County is made up of three cities that sit along the southeastern shore of Lake Okeechobee, surrounded by the Everglades Agricultural Area. The residents are mostly Black and Hispanic families who have lived in the area for generations, as well as migrant field workers from the Caribbean and Central America. The largest city, Belle Glade, has a poverty rate of 41%.

"If I say 'Black Lives Matter,' I have to mean it not just when Black folks are getting killed by the police," Hardy told The Palm Beach Post and ProPublica. "I have to mean it when their children are getting asthma because large corporations can't figure out how to make a profit off of sugar cane without fouling the air that those kids breathe."

Taylor, a former Democratic state representative who represented the Glades area during her tenure, said rural residents living amidst hundreds of thousands of acres of sugar cane fields deserve the same governmental protection as residents who live in the more populated coastal areas of the county. About 40 miles to the east sits former President Donald Trump's Mar-a-Lago home and other wealthy enclaves.

"The people in the Glades deserve the same as everyone else. They deserve to be safe," Taylor said. "I think we should do everything possible to assure that."

At the local level, the mayors and city commissioners who represent the Glades have generally backed the sugar industry, emphasizing the importance of agricultural jobs to their communities. In fact, earlier this year, some testified in support of the bill that further protected sugar companies from lawsuits over air pollution.

The elected officials who represent the area at the county and state levels have largely declined to weigh in. Just two responded to requests for comment for this story: State Sen. Tina Polsky and Palm Beach County Commissioner Melissa McKinlay, the latter of whom was recently appointed to the Environmental Protection Agency's Local Government Advisory Committee, a panel for local officials to provide input on environmental and public health issues. Both of them, however, declined to speak on the issue of cane burning, citing an ongoing lawsuit that Glades residents have filed against sugar companies in federal court; neither the state nor the county are parties to the lawsuit.

Sugar Companies Said Our Investigation Is Flawed and Biased. Let's Dive Into Why That's Not the Case.

ProPublica and The Palm Beach Post published an investigation into the air quality in Florida's heartland, where more than half the country's cane sugar is harvested, often by burning the fields. Sugar companies challenged our reporting. We respond.

by Lulu Ramadan, The Palm Beach Post, and Maya Miller and Ash Ngu, ProPublica

July 8, 2021

Co-published with The Palm Beach Post

A sugar cane field burns before it is harvested near South Bay, Florida, on Jan. 29, 2021. Greg Lovett/The Palm Beach Post

https://www.propublica.org/article/sugar-companies-said-our-investigation-is-flawed-and-biased-lets-dive-into-why-thats-not-the-case

This article was produced for ProPublica's Local Reporting Network in partnership with The Palm Beach Post.

On July 8, The Palm Beach Post and ProPublica published an investigation into harvest practices in the nation's largest cane sugar-producing region.

For decades, residents in Florida's heartland have raised concerns about exposure to pollution from burning cane fields, a technique used to rid the plant of its leaves. In June 2020, The Post partnered with ProPublica's Local Reporting Network to investigate the topic.

Over the course of the past year, the news organizations have been working together to understand the impact of cane burning on air quality and local health. We interviewed dozens of people, collected hundreds of public records and read thousands of pages of documents on the nation's air-monitoring infrastructure.

Through installing outdoor air sensors at the homes of residents during cane burning season, we developed a better understanding of pollution patterns in the neighborhoods at the center of vast swaths of cane fields. Our analysis found repeated spikes in pollution, generally lasting less than an hour, on days when the state authorized burns and projected that smoke would blow toward our sensors. Experts said these findings strongly suggest a link between air pollution and cane burning.

Prior to publication, we sent our findings, project methodology and questions to U.S. Sugar and Florida Crystals, the largest sugar producers in the region. The companies responded by challenging our reporting and methodology. The Post and ProPublica carefully reviewed those criticisms and engaged with the companies over several weeks, clarifying our evidence and providing more information upon request, including our raw data, documents obtained through public records requests and scientific studies on the health effects of particulate matter. Below is a breakdown of the criticisms and the reporting team's responses.

Both companies criticized our finding that the state air monitor in Belle Glade was malfunctioning as far back as eight years ago. Spokespeople for the companies called the monitor reliable.

In 2013, the Florida Department of Environmental Protection flagged the Belle Glade monitor for discrepancies, saying it wasn't fit to determine compliance with the National Ambient Air Quality Standards, the pollution thresholds set by the Clean Air Act. The monitors used to enforce these thresholds and crack down on polluters must meet strict quality-assurance criteria, according to the Environmental Protection Agency.

Instead of replacing or repairing the monitor, the state environmental department kept running the monitor for the Air Quality Index, a tool used to broadly tell the public whether the air is good, unhealthy or hazardous. The EPA allows this, but the Air Quality Index is not an enforcement tool.

After The Post and ProPublica questioned the Florida Department of Environmental Protection about the monitor, a spokeswoman said it would be replaced "in the future" with one that meets the EPA's stricter standards. In a June 29 air-monitoring plan, the department said the monitor was expected to be replaced this month.

A U.S. Sugar spokesperson said that "data collected and authorized by local health departments and the FDEP continue to show that the air quality in the Glades is safe, healthy and consistently better than the standards set by the EPA."

The Belle Glade monitor routinely showed good air quality on the EPA's Air Quality Index. Even so, the country's air monitoring system is ill-equipped to detect pollution in the Glades for these reasons:

1. The 24-hour air-quality averages can obscure short spikes in pollution: The EPA enforces annual and 24-hour standards for a type of pollution called particulate matter. That means state agencies average out the data collected by monitors over 24 hours and a year. Shorter spikes can be obscured by the averages. Researchers have found that even short-term exposure to these pollutants, especially on a repeated

basis, can be harmful.

2. Monitoring in rural areas is insufficient: When the EPA first set up the country's air-monitoring network, agency officials decided that the more people living in an area, the more air monitors were required to measure pollution levels. This left many rural areas with no monitors. Palm Beach County has three regulatory monitors, all of which are in suburban or urban areas instead. The one monitor in the Glades could not be used to enforce air pollution standards.

3. Monitors can miss pollution from highly localized sources: Each air-quality monitor is housed in a single location and is unable to detect pollution beyond a certain range. In the Glades, sugar growers burn individual fields across a region spanning 400,000 acres. That means a single monitor in Belle Glade might not pick up on pollution across the region.

Our analysis spanned four months, whereas the EPA requires at least three years worth of data to determine Clean Air Act compliance. That's because our goal was not to replicate regulatory monitoring. Instead, we aimed to better understand the air quality in the Glades during the burning season. The data helped us identify gaps in air monitoring that may leave residents exposed to harmful pollution.

Experts who helped us form our plan and later reviewed the data said the repeated spikes in pollution during burn season, along with residents' health concerns, warrant more regulatory scrutiny of the area's air quality.

After being interviewed by the reporters, Sheryl Magzamen, a Colorado State University professor, submitted a grant proposal to NASA aimed at expanding the network of air sensors in the Glades and examining health trends. "I certainly hope you highlight that the motivation for submitting the grant was your reporting on this issue," Magzamen told The Post and ProPublica.

Both companies criticized our decision to use low-cost PurpleAir sensors instead of data from the state monitor in Belle Glade. A U.S. Sugar spokesperson said, "It is incredible that the Palm Beach Post and ProPublica would base its air quality findings on low-cost sensors they paid to have placed in backyards operated by non-professionals."

PurpleAir sensors are an accessible solution for everyday people interested in measuring their air quality. Their low cost, portability and ease of operation are attractive features to state and federal governments too. In fact, the EPA uses PurpleAir sensors as part of a loan program across the Midwest, in tribal communities and in California to get a more detailed picture of air quality.

Though they are not used for enforcement purposes, the EPA also recently began integrating real-time data from PurpleAirs in its AirNow Fire and Smoke Map, which tracks fires and air quality nationwide. PurpleAir initiatives have been successful at providing the public with real-time air-quality data to help protect its health, an EPA spokesperson told The Post and ProPublica.

That said, researchers need to make some adjustments when using the sensors. The equipment can be affected by high levels of humidity, PurpleAir creator and founder Adrian Dybwad said in a 2020 panel discussion on air-quality research. He added, however, that significant effects are rare, usually seen when humidity levels surpass 80%. Even so, the EPA developed a correction formula for PurpleAir monitor readings that accounts for relative humidity, among other factors. In consultation with air-quality experts who have used PurpleAir sensors and EPA researchers, The Post and ProPublica applied the EPA formula to the data. Our methodology details the quality-assurance steps we took to vet our sensor data.

It's true that The Post and ProPublica paid for the PurpleAir sensors, but all of our sensor hosts were volunteers and none were paid or otherwise compensated.

Florida Crystals criticized our use of 10-minute averages to measure pollution instead of the 24-hour averages used by state and federal regulators.

Experts suggested we do this because of the short-term nature of cane burns, which typically last less than an hour.

Although the EPA doesn't require the reporting of shorter time periods like 10-minute averages for particulate matter, it has shifted to shorter averages for other pollutants. For instance, the agency used to measure sulfur dioxide, a byproduct of burning oil and coal, using 24-hour averages. After multiple studies tied short-term exposure to the gas to breathing problems, and after a successful lawsuit against the EPA over short-term measurements, the agency adjusted its standards in 2010. It now measures sulfur dioxide using one-hour and five-minute averages.

Both companies said spikes in pollution could not be tied to sugar cane because they occurred outside the time frame in which burns are performed.

One of the challenges with tracking cane burning is there's no way to know exactly when each burn took place. Permits issued by the state don't dictate the exact time growers must burn their cane. Instead, the state issues permits using time brackets. For example, one permit might authorize a grower to burn cane anytime between noon and 8 p.m.

There were some spikes in pollution outside the time frame that burns are authorized. But the majority of the spikes fell within the time frame when cane burning permits are authorized (between 9 a.m. and two hours after sunset, or about 8 p.m., for certified burners).

To strengthen our analysis, we used modeled smoke plume data from the state. Pollution spikes were more pronounced and concentrated on days when smoke was projected to move toward our sensors versus away from them. For this reason, experts told us the analysis strongly suggests the spikes were coming from nearby cane burns.

U.S. Sugar questioned how we found our sensor hosts, pressing us on whether they were activists with the Sierra Club.

They are not. None of the residents who hosted the monitors have worked with environmental advocacy organizations in the Glades. And none have taken part in the pending federal lawsuit against sugar companies over cane burning.

In fact, most of the residents we spoke with had no ties to environmental groups or the lawsuit. When the news organizations started reporting a year ago, we set out to speak with as many Glades residents as possible. We wanted to hear from people who had not taken an active role in the public battle over cane burning. "We just want to know: What's in the air? What are we breathing?" said Jose Fonseca, a parks worker who grew up in the Glades and hosted a PurpleAir sensor for this project.

We used a number of tools to reach hundreds of residents, including sending letters to public school teachers and custodians across the Glades; knocking on doors in neighborhoods in Belle Glade, Pahokee and South Bay; attending a virtual church service; canvassing food distribution sites; delivering flyers to businesses and nonprofits; and calling local doctors and nurses. We also set up an automated text bot to interview residents in real time when we witnessed pollution spikes on our PurpleAir sensors. Ultimately, we connected with dozens of residents who spoke about the air quality in the agricultural community.

A U.S. Sugar spokesperson said: "The Palm Beach Post and ProPublica are selectively presenting their preferred interpretation of studies to support a biased conclusion for this story." Florida Crystals also alleged that our newsrooms cherry-picked studies that align with our findings.

While there are disagreements among policymakers about how polluters should be regulated, there is little dispute among scientists about the harms associated with particulate matter.

The companies specifically criticized The Post and ProPublica's references to a 2020 EPA rule proposal that examined research into long- (annual) and short-term (daily or less) exposure to particulate matter. The proposal reads that "several key epidemiologic studies report positive and statistically significant PM2.5 health effect associations based largely, or entirely, on air quality likely to be allowed by the current primary PM2.5 standards."

A seven-member EPA committee, selected by the Trump administration, ultimately concluded that current standards "sufficiently" protect health.

In mid-June, the EPA under President Joe Biden announced it would reconsider the previous decision to maintain the standards. The agency cited the prior proposal's "strong body of scientific evidence" showing that long- and short-term exposures to PM2.5 can lead to heart attacks, asthma attacks and premature death.

Testing the Air to Tell a Story: How We Investigated Air Pollution Near Florida's Sugar Fields

A look at the community engagement and citizen data-collection that made our major investigation in the Florida Glades come to life.

by Logan Jaffe

July 19, 2021

Otishia Harvey demonstrates a nebulizer treatment at her home in Pahokee, Florida, in February.
Thomas Cordy/The Palm Beach Post

The Glades is an area of Florida just south of Lake Okeechobee, the large body of water in the center of the state you can easily spot on a map. As a Floridian, I probably should have known that this area produces more than half of America's cane sugar, but I only learned that recently while reading our stellar Local Reporting Network investigation into how air pollution from the area's sugar industry poses health risks for residents who live there. Reporter Lulu Ramadan of The Palm Beach Post worked with ProPublica engagement reporter Maya Miller and news applications developer Ash Ngu to shed light on how sugar cane companies set fire to dozens of cane fields across western Palm Beach County. The smoke from setting the crop ablaze — a harvesting method that saves sugar companies money — affects the day-to-day lives of people living in the Glades.

I encourage you to read the entire story, but I want to highlight the deep level of community engagement and involvement of Glades residents in the reporting. Working closely with residents was particularly complicated for this investigation because many of the same people who are affected by the seasonal burns also benefit from the industry's role as one of the biggest employers in the region. To reach residents, reporters sent letters to public school teachers and custodians across the area; they knocked on doors, attended a virtual church service, canvassed food distribution sites, distributed flyers to local businesses and organizations, and reached out to doctors and nurses in the area.

While interviews provided a trove of information about people's experiences, reporters also wanted to quantify data about the quality of the air residents breathed. The problem was there wasn't much information to be had: While the area has one air monitor, it wasn't producing the highest quality measurements and had been malfunctioning as far back as eight years ago, as their reporting showed.

To collect reliable data, ProPublica and The Palm Beach Post collaborated with residents to set up their own air monitors. For four months, these PurpleAir sensors collected data. When the sensors detected a spike in pollution, reporters used a text bot to interview residents in real time about what they were experiencing.

The result of these efforts is a stunning piece of multimedia journalism. To accompany the story, here's a bit more insight from our reporting team. Parts of our interview were edited for clarity.

You all have slightly different roles: Lulu, you're a locally based reporter in Florida; Maya, you're a reporter who specializes in community engagement; Ash, you're a reporter who specializes in data visuals. How did your various types of expertise shape your approaches to this project?

Lulu: We knew early on that we wanted to talk to a lot of people in this community. The Glades is a segment of our county that we don't cover as a newspaper as often as we should. And so there was a lot of trust building that had to happen with sources. We didn't want them to feel like we were swooping in. We started by coming up with ideas on engagement, and how to reach people who would help us fill in the gaps on what the experience was like living in the community where you're seeing the smoke and ash from cane burns.

Maya: One of the things that was really interesting is that this issue has been written about before and is politicized in the community. People have gotten mailers from both sugar companies and the Sierra Club, you know, saying kind of charged things about what burning is like. We really wanted to break through that and just talk to people who weren't involved in that fight, and people just living there day to day. From the outset, we saw people living in the community as experts in their own right. So, we talked to air quality experts, but also the people living there, who know the conditions better than anyone.

Ash: For me, it was mostly about, what can we say with what the sensors are reporting? And [it's] sort of a high-pressure question, because we had these sensors out there, and as I learned more and more about them, [I learned] they are totally useful in certain circumstances, and also they have some asterisks that we need to account for. And so I spent a lot of time just reading about the PurpleAirs in the beginning, just to understand what do they even do?

You mentioned that while out in the community, you'd often start conversations with residents by asking the question, "Do you own a nebulizer or asthma inhaler?" Why?

Lulu: We wanted to learn about people's health experiences. And we did find really quickly that when we started to ask people, "Do you know anybody who has asthma? Or do you have asthma? Do you own a nebulizer?" that without exception, every neighborhood we did this in, at least one person owned a nebulizer or asthma inhaler, and in most of those cases they allowed us to photograph it and talk to them about it.

We use that as an entryway. And then we'd tell them we're trying to understand what the public health situations are like. [We'd ask], "Why do you need your nebulizer and asthma inhaler?" and they start to open up and mention the smoke, and then we would start asking them about what it's like navigating the sugar cane burning when you have asthma. How often do you need your nebulizers? That was an example, to me, about trust building. When we were clear about just trying to understand underlying health, [community members] opened up quite a bit and a lot of them ended up being on-record sources who [we] photographed.

So, there's the qualitative data aspect of collecting information about people's lived experiences, and there's quantitative data that comes from the citizen science aspect of air monitors. Can you talk a bit more about how both methods informed your reporting?

Ash: On a quantitative basis, we have real-time pollution data from two sensors. Every two minutes, [the sensors] are reporting how much of PM2.5, which is a very, very small, inhalable particle that does harmful things to your health, is in the air. And we have that [data] across four months of the burn season. And so what the data shows is these, what we call spikes — which our experts say strongly suggest a link to cane sugar burns — oftentimes in the morning and afternoon, when sugar cane burns are happening.

Maya: One of the big questions we were trying to answer from the outset was: Residents are saying the air quality is harming their health, and yet the [EPA-approved air] monitor in this area and the industries and the state officials are saying the air quality is clean. How do you reconcile what's really going on here? And so we looked at the broader EPA monitoring system, and identified gaps in it that, actually, the Government Accountability Office had also identified recently: that rural areas don't really have a lot of [air] monitoring, and that short spikes in pollution are often missed by longer-term averages. We wanted to find a way to harness all of what the residents were concerned about, let them speak for themselves, and get out of the way.

Right … as the reporting shows, nobody has truly been able to answer the question of whether the air in the Glades is safe. How has reporting this story changed the way you think about what "safe" means?

Lulu: I think it's something that even government officials are still tackling, really. For example, under the Trump administration the EPA committee had made the decision that the current particulate matter standards were sufficient for protecting public health. But the EPA, under the Biden administration, recently said they're going to revisit that decision. There's this complete lack of data that has afforded [lawmakers and sugar companies] protection against criticism.

Maya: One of the people we met through engagement is Thelma Freeman and her two grandsons. During the burn season, she feels like she has to keep her sons indoors. And I think my conception of the area's safety is informed by what residents told us and how they live their lives.

Ash: I think that "safe" is what wealthy people expect and experience in their everyday environment. People who have means are able to experience a level of physical health and mental health in some cases that far surpasses people who don't have means, and that's because they live in safe environments for the most part.