



Florida Association of Counties

Dr. Patricia Gómez,

Deputy Chief Resilience Officer and Director of Energy

Miami-Dade County

June 29, 2023



Office of Resilience in the Office of the Mayor

MIAMI-DADE COUNTY

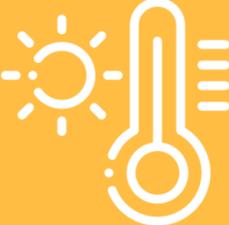
OFFICE OF RESILIENCE

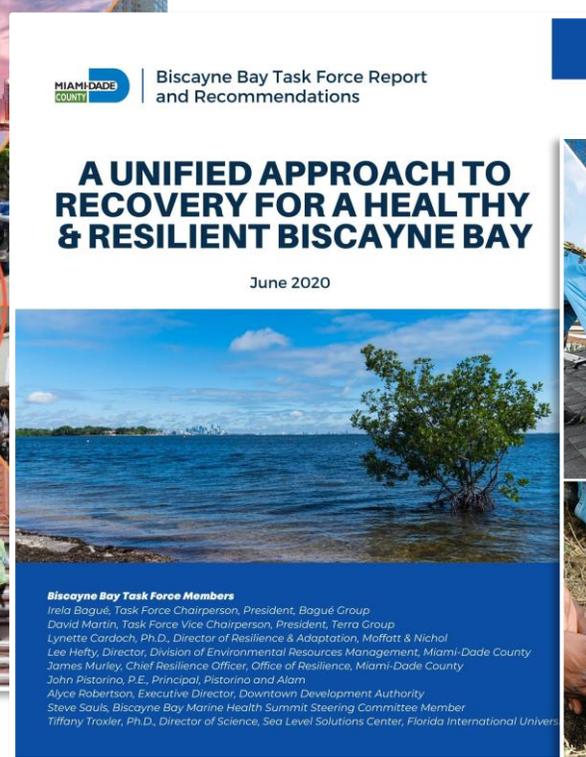
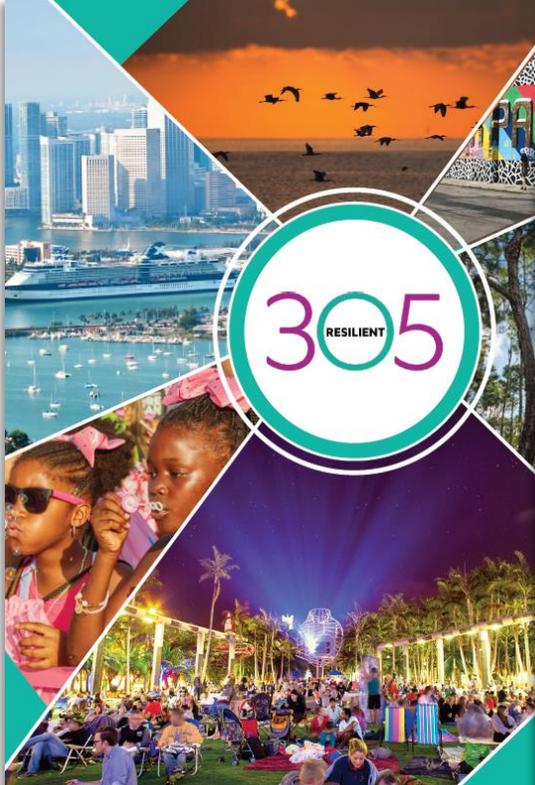
REGULATORY AND ECONOMIC RESOURCES

miamidade.gov/resilience

The Office of Resilience's mission is to lead Miami-Dade County to a resilient and sustainable future by identifying vulnerabilities, coordinating stakeholders, and facilitating innovative solutions.



ENERGY AND CLIMATE MITIGATION	ADAPTATION	COMMUNICATION	BISCAYNE BAY	EXTREME HEAT	FUTURE READY	ZERO WASTE
						
Reduce Sources of Climate Change	Address Sea Level Rise Impacts	Engage & Connect Stakeholders	Protect and Restore	Implement Heat Risk Reduction Efforts	Resilience Implementation & Planning	Minimize Waste & Reduce Consumption

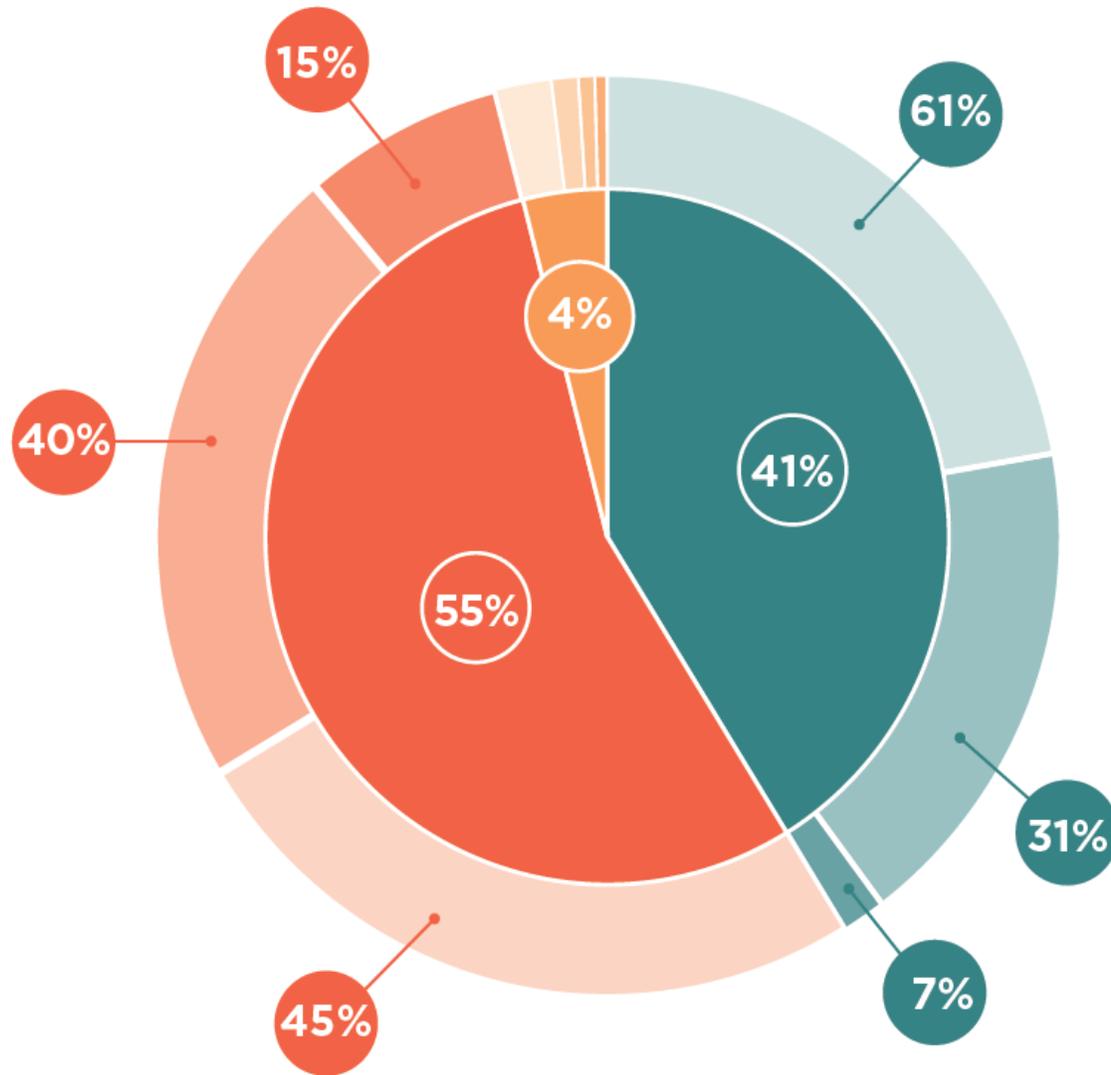


Connected Strategies

A panoramic view of a city skyline at dusk, with numerous skyscrapers illuminated against a sky of pink, orange, and blue. The city is reflected in the water in the foreground. A dark, semi-transparent rectangular overlay covers the bottom portion of the image, containing the text.

REDUCING THE DRIVERS OF CLIMATE CHANGE

Communitywide Sources of Emissions



Buildings and Energy 41%

- Electricity 61%
- Other Fuels 31%
- Natural Gas 7%

Transportation and Land Use 55%

- Air Travel 45%
- Ground - Gasoline 40%
- Ground - Diesel 15%

Water and Waste 4%

- Landfilled Waste 53%
- Wastewater Energy 25%
- Incinerated Waste 12%
- Other 10%



Climate Action Strategy Targets



Emission reductions from 2019 levels

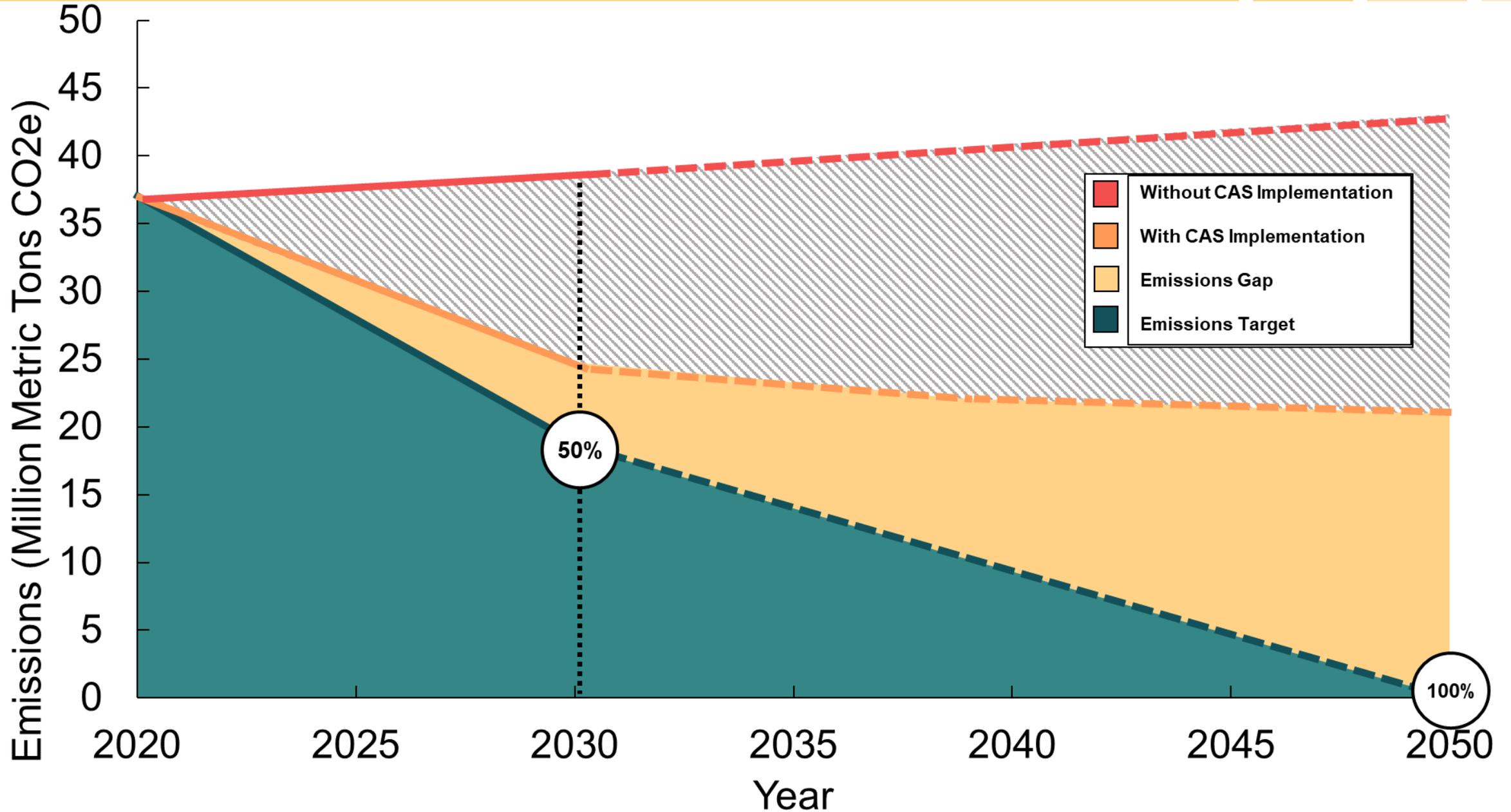
50%

by 2030

Net Zero by 2050

RACE TO ZERO

Miami-Dade GHG Forecast Scenarios



7 Approaches to reach our goal

GETTING TO NET ZERO EMISSIONS BY 2050

7 APPROACHES TO REACH OUR GOAL



ENERGY & BUILDINGS



Benchmark, retune and retrofit existing buildings



Expand on-site and off-site renewable energy generation



Build ultra-low energy buildings



LAND USE & TRANSPORTATION



Reduce transportation-related fuel consumption



Expand and protect green and blue spaces



WATER & WASTE



Convert waste to energy



Reduce waste and water use

Creating Jobs, Health, & Equity





ENERGY & BUILDINGS



APPROACH 1:
BENCHMARK, RETUNE, AND RETROFIT EXISTING BUILDINGS



APPROACH 2:
EXPAND RENEWABLE ENERGY GENERATION



APPROACH 3:
BUILD ULTRA-LOW ENERGY BUILDINGS

EMISSIONS FROM ENERGY & BUILDINGS

41%



PROGRESS UPDATE

APPROACH 1:

BENCHMARK, RETUNE, AND RETROFIT EXISTING BUILDINGS





LAND USE & TRANSPORTATION



APPROACH 4:

REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION



APPROACH 5:

EXPAND AND PROTECT GREEN AND BLUE SPACES

EMISSIONS FROM LAND USE & TRANSPORTATION

55%



PROGRESS UPDATE

APPROACH 4:

REDUCE TRANSPORTATION-RELATED FUEL CONSUMPTION

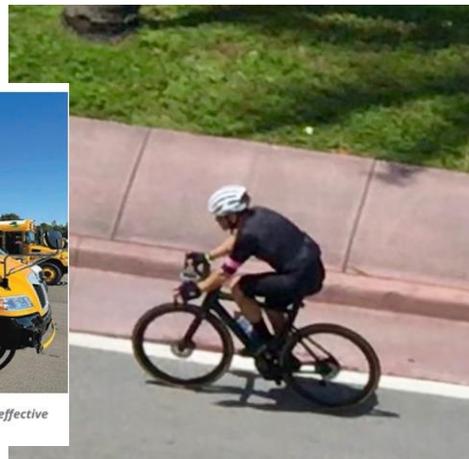


Transit-oriented Development (TOD) through:

- Rapid Transit Corridors
- Expansion of Rapid Transit Zone regulations



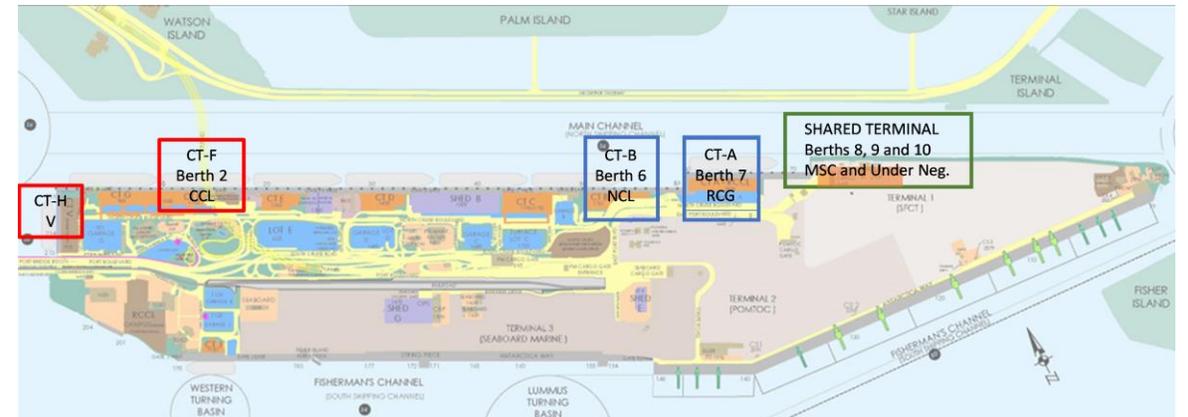
M-DCPS is investing in healthier, more cost-effective student transportation with electric buses.



Biking and Walking

11.47 miles of downtown bike lanes

5.95 miles of paved trails or off-road paths



Port Miami Shore Power

- First in SE of United States
- 5 berths / 3 cruise ships can use simultaneously
- 6 cruise industry partners



WATER & WASTE



APPROACH 6:
CONVERT WASTE TO ENERGY



APPROACH 7:
REDUCE WASTE AND WATER USE

EMISSIONS FROM WATER & WASTE

4%

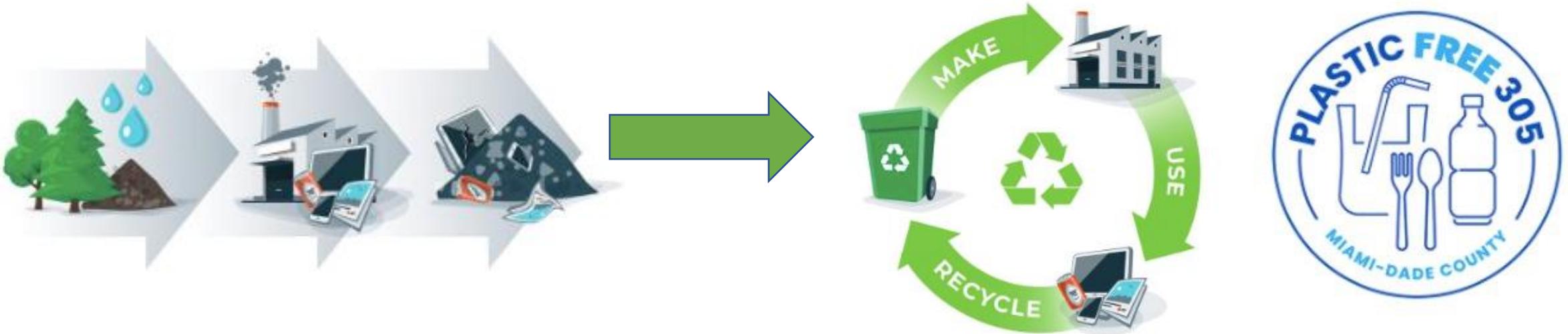


APPROACH 6:

CONVERT WASTE TO ENERGY



Miami-Dade's Department of Solid Waste Management (DSWM) and its Water and Sewer Department (WASD) are the County's largest service providers for processing waste, water, and wastewater services in the county. These services are essential for community, environmental, and economic sustainability. For decades, both departments have burned waste to produce energy. By investing in new, more efficient facilities the County can create more energy, avoid harmful methane emissions, and avoid sending waste to the landfill.



APPROACH 7:

REDUCE WASTE AND WATER USE



Producing less waste and using less water are the easiest and cheapest ways to reduce emissions. In Miami-Dade County each person produces an average of six pounds of garbage and uses 140 gallons of water every day. Moving and processing that garbage and water takes a lot of electricity and fuel, which costs residents and businesses money. County water conservation, recycling, composting, and food recovery programs help reduce waste. Community-led initiatives and entrepreneurial innovation can have an even bigger impact by creating new businesses and jobs.



Miami-Dade County's Water and Sewer Department (WASD) is the largest water utility in the Southeastern United States, providing water and wastewater services to most residents in the County.

The Water Use Efficiency Plan has reduced daily water use by 16 million gallons per day, saving energy and infrastructure costs and reducing customer bills.

WASD's water conservation program provides rebates to residents and businesses for high efficiency toilets, faucets, and shower heads. It also provides landscaping tips and rain barrels.

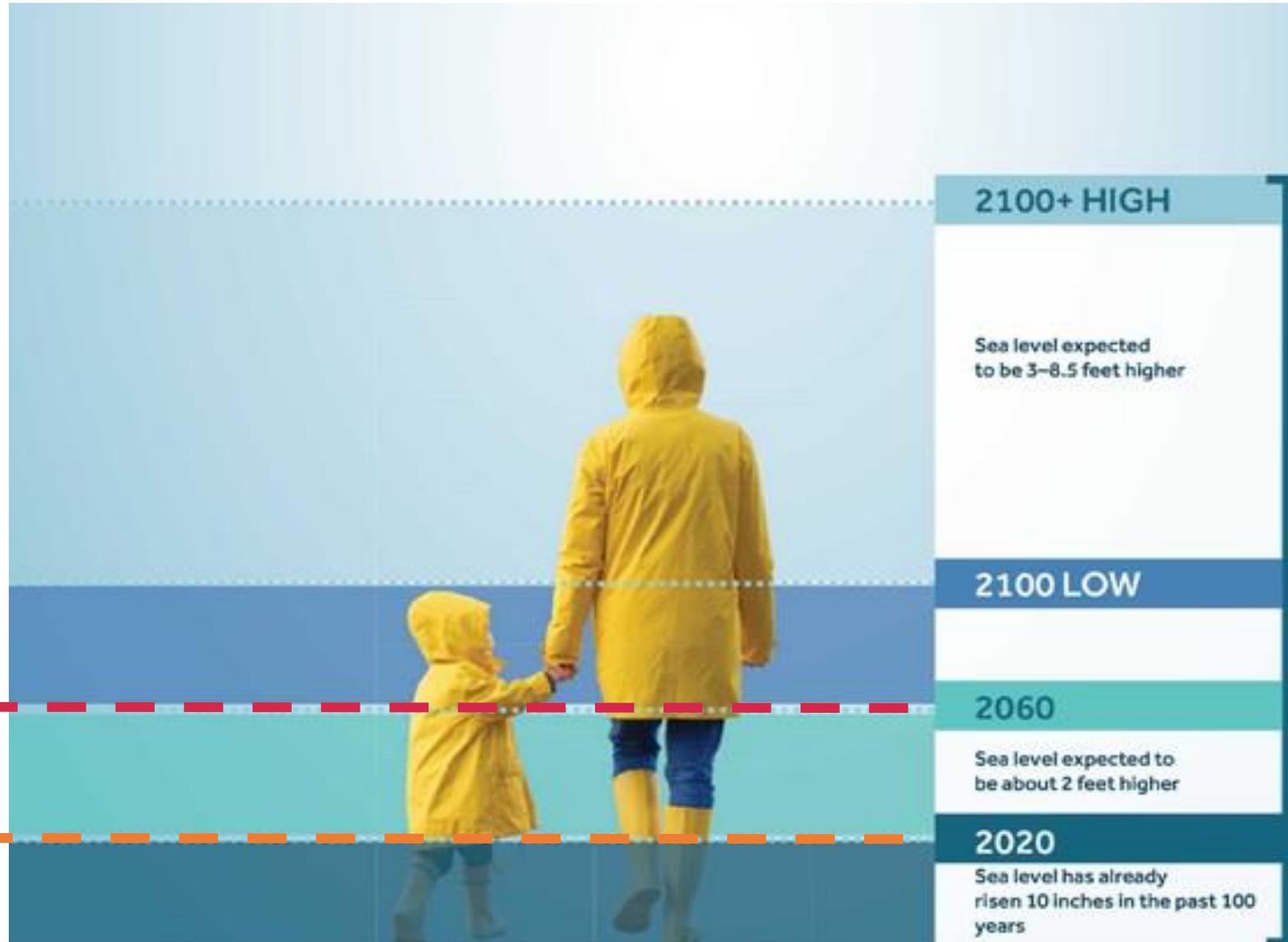
A panoramic view of a city skyline at sunset, with numerous skyscrapers illuminated by warm lights. The sky is filled with soft, pink and orange clouds. In the foreground, a body of water reflects the city lights. A dark blue rectangular overlay covers the bottom portion of the image, containing the text.

PREPARING FOR THE IMPACTS OF CLIMATE CHANGE

How sea level is changing

Sea levels will be
~2 feet higher
in 40 years

Sea level has risen ~10
inches in past 100 years
and risen 4 inches since
1992



Ground Elevation

Average ground elevation in
Miami-Dade County is:

~ 7.0 ft above sea level

Little River AAA

Water

0 - 0.1 ft

0.1 - 1 ft

1 - 2 ft

2 - 3 ft

3 - 4 ft

4 - 5 ft

5 - 6 ft

6 - 7 ft

7 - 8 ft

8 - 9 ft

9 - 10 ft

10 - 11 ft

11 - 12 ft

12 - 13 ft

13 - 14 ft

14 - 15 ft

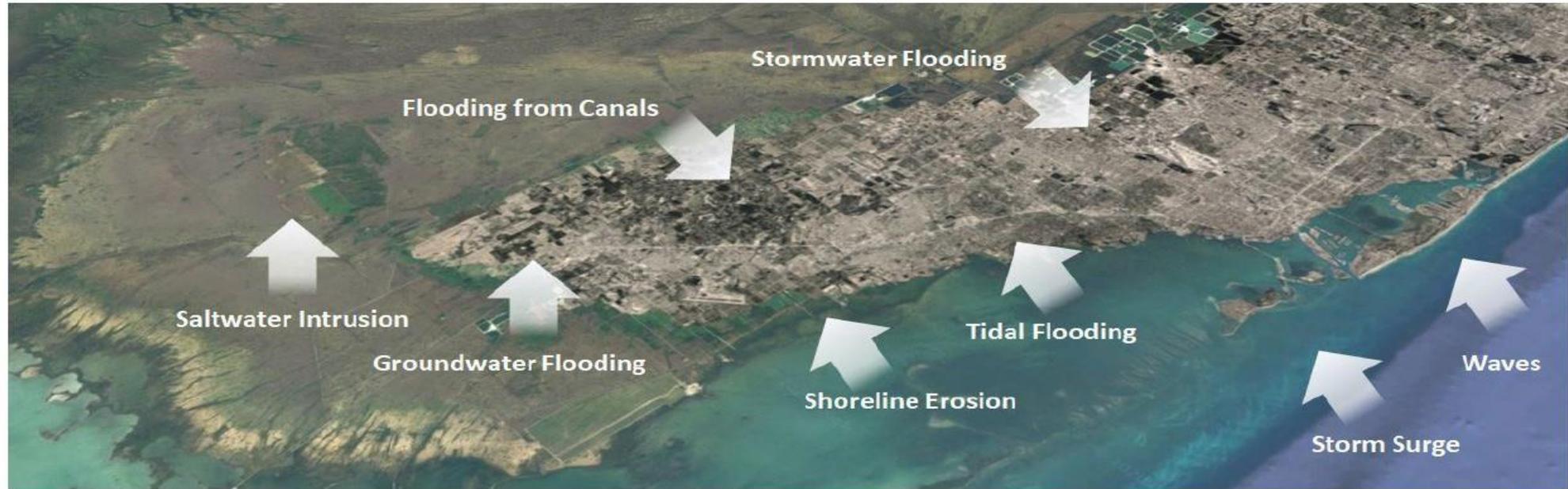
15 - 20 ft

20 - 25 ft

> 25 ft



Sea level rise is making other types of flooding worse



Less Frequent

Most Frequent



Storm Surge

Rise in ocean water levels from coastal storms



Flooding from Canals

Overtopping of canal banks from heavy rains, and higher than normal high tides in coastal areas



Tidal Flooding

Higher than normal high tides which may occur absent storm conditions and compromise drainage infrastructure



Saltwater Intrusion

Movement of saline ocean water into freshwater aquifers



Groundwater Flooding

Elevated groundwater tables due to rising tides



Stormwater Flooding

Caused by heavy rains overwhelming drainage infrastructure and natural percolation



Shoreline Erosion

Loss of beach sediment due to natural processes and accelerated by sea level rise and heavy storms

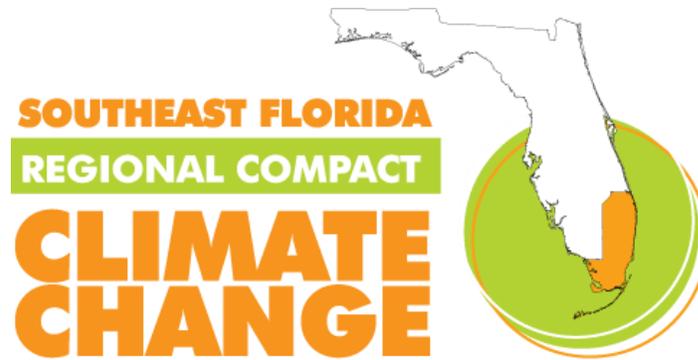


Waves

Ocean waves can lead to erosion and cause damage to structures during storm events

Regional collaboration to meet regional challenges

- Miami-Dade County works closely with our local and regional partners through the **Southeast Florida Regional Climate Change Compact** to address the full range of climate change causes and outcomes.
 - [Regional Climate Action Plan \(RCAP\)](#) - the Compact's guiding tool for coordinated climate action in Southeast Florida to reduce greenhouse gas emissions and build climate resilience.





Adaptation: Preparing for climate change

MIAMI-DADE
SEA LEVEL RISE
STRATEGY

Build Like the Keys

**Build on High Ground
Around Transit Corridors**

Green & Blueways

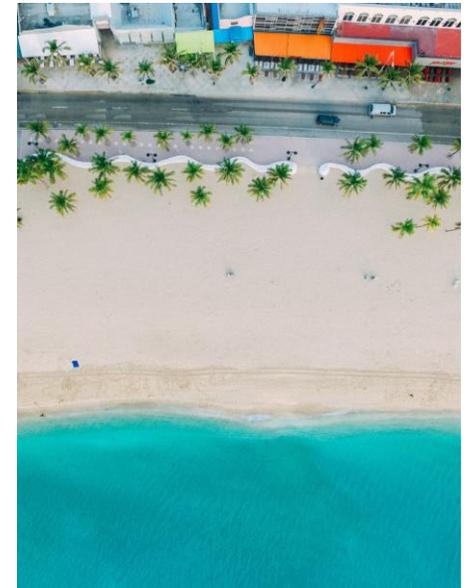
**Green & Blue
Neighborhoods**

Build On Fill

<https://www.miamidade.gov/sealevelrisestrategy>

Progress implementing the top 10 key actions

- 1 Accelerate Adaptation Action Areas across the County
- 2 Require County projects be designed for sea level rise
- 3 Establish safer building and seawall elevation standards
- 4 Ensure development avoids flooding neighboring properties
- 5 Enhance flood protection by expanding greenways and blueways
- 6 Flood-proof the County's most vulnerable critical facilities
- 7 Integrate green infrastructure into County projects
- 8 Prepare for disaster recovery to accelerate inclusive adaptation
- 9 Address vulnerable septic systems
- 10 Increase affordable, resilient housing on high ground within SMART Program transit corridors

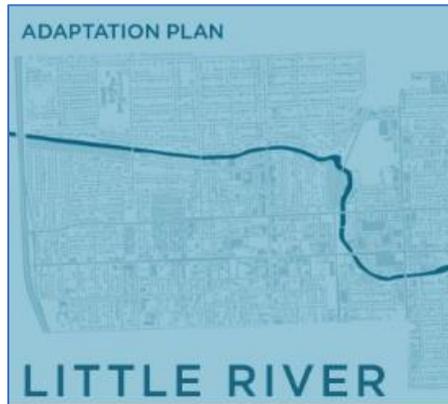


Goals of AAA Planning:

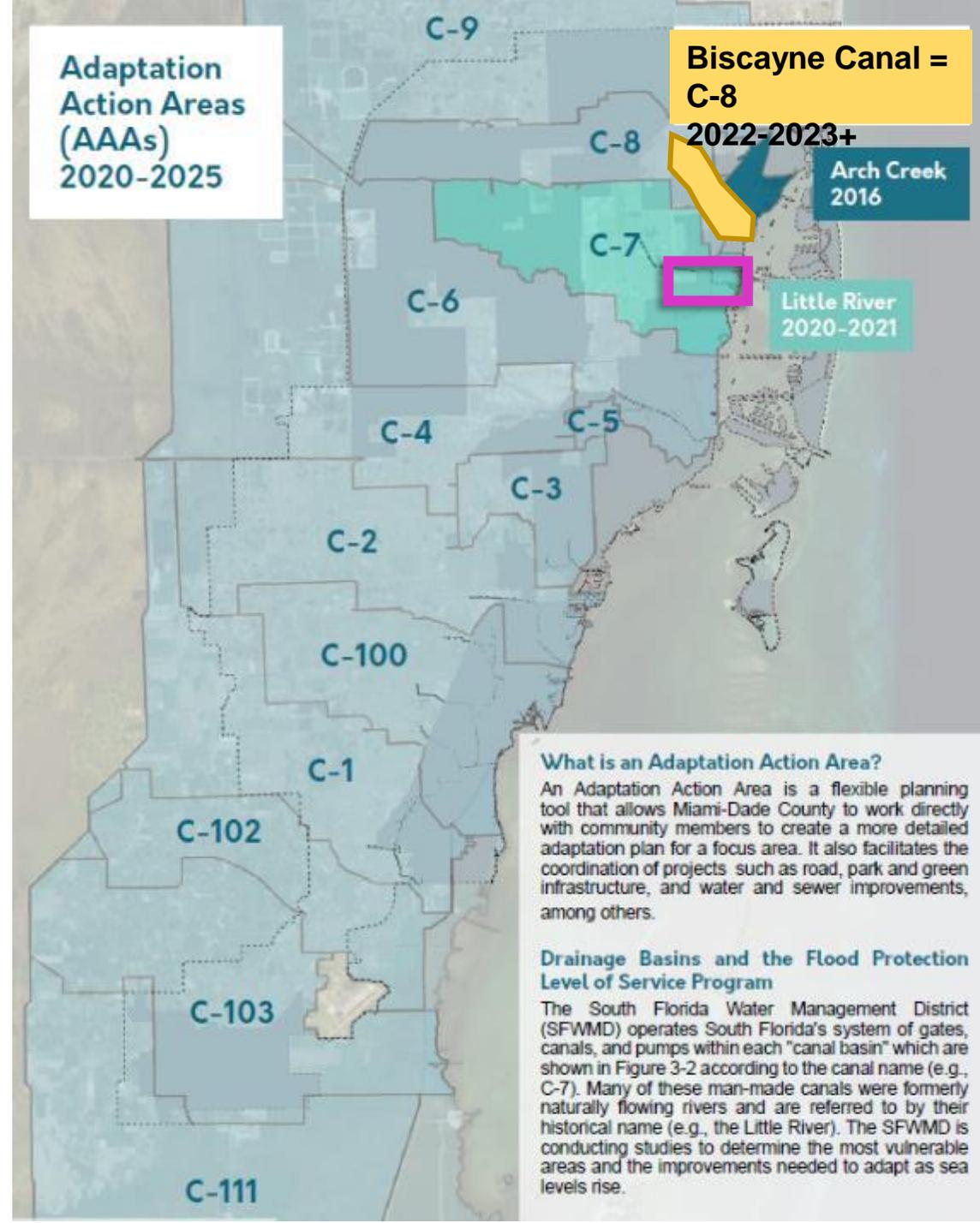
- **Align** relevant studies, data, and planned projects
- **Collaborate with and build capacity** among community members, municipalities, and others to identify values, challenges, projects, and policies to adapt to sea level rise
- **Develop local adaptation plans** that includes policy recommendations, and list of **resilience projects** for potential funding & implementation

Implementing:

**Miami-Dade County
Sea Level Rise Strategy
Key Action #1**



<https://adaptation-action-area-in-little-river-mdc.hub.arcgis.com/>



Strengthening Systems Through Related Studies



Everglades
(CERP & BBSEER)

'Back Bay' CSRM Study

Central and Southern Florida (C&SF) '216' Resiliency Study
emphasis on canal system

'Beach' CSRM Reauthorized
in 2022
*renourishment & dune
enhancement*

Key Biscayne
CSRM
*Combined ocean front
& back bay study*



PARKS & CONSERVATION LANDS



AGRICULTURE



WESTERN & SOUTHERN SUBURBS



SLOUGHS



THE RIDGE



MAINLAND BAYFRONT



ISLAND BAYFRONT



ISLAND OCEANFRONT



WATER



Mainland

Islands

Other Efforts: SFWMD Level of Service (LOS) County & Municipal Resilience, Stormwater Master Plans, etc. Biscayne Bay Reasonable Assurance Plan

Thank you!
Gracias!

Dr. Patricia Gómez
Deputy Resilience Officer and Energy Manager
Patricia.Gomez@miamidade.gov

Sign up for our newsletter: miamidade.gov/resilience

MIAMI-DADE WATER & SEWER DEPARTMENT

Presented by:

Debbie Griner, Chief of
Resilience and
Sustainability



AGENDA



**WATER AND
SEWER
OVERVIEW**



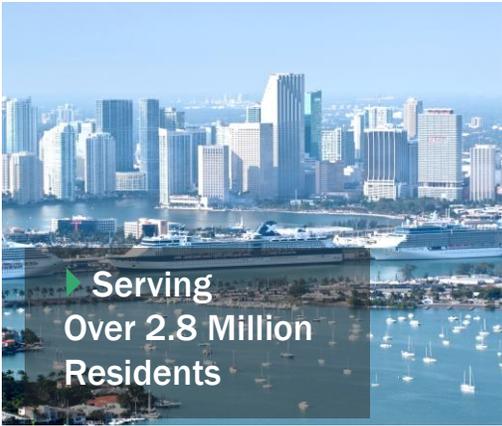
**RESILIENT
CIP**



**CONNECT
2
PROTECT**

A commitment to resilient water infrastructure is a commitment to every resident of and visitor to Miami-Dade County.

1



WASD AT A GLANCE

The Miami-Dade Water & Sewer Department (WASD) is the largest water utility in the Southeastern United States, providing high-quality, affordable water & wastewater services to the people of Miami-Dade County.



2

RESILIENT CAPITAL IMPROVEMENT PLAN – DRIVERS AND PROGRAMS

Consent Decree

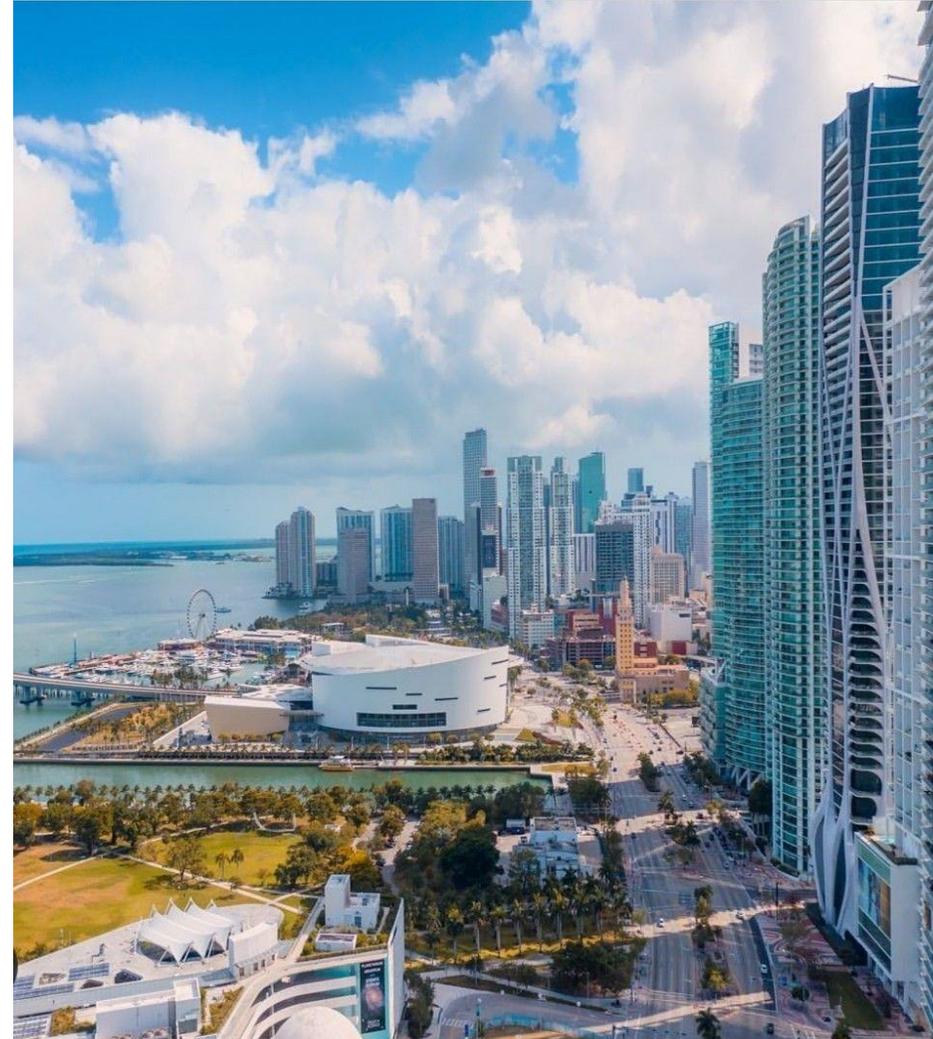
To achieve full compliance with the US EPA Clean Water Act

Ocean Outfall Legislation

To comply with State of Florida legislation requiring elimination of normal use of ocean outfalls to dispose of treated wastewater

Pump Station Resilience

To manage the improvement to pump stations, force mains, and gravity lines



Connect 2 Protect

To protect Biscayne Bay and the environment by implementing septic to sewer conversions

Water Reset

To address critical needs across water treatment plants & the distribution system

Asset Management

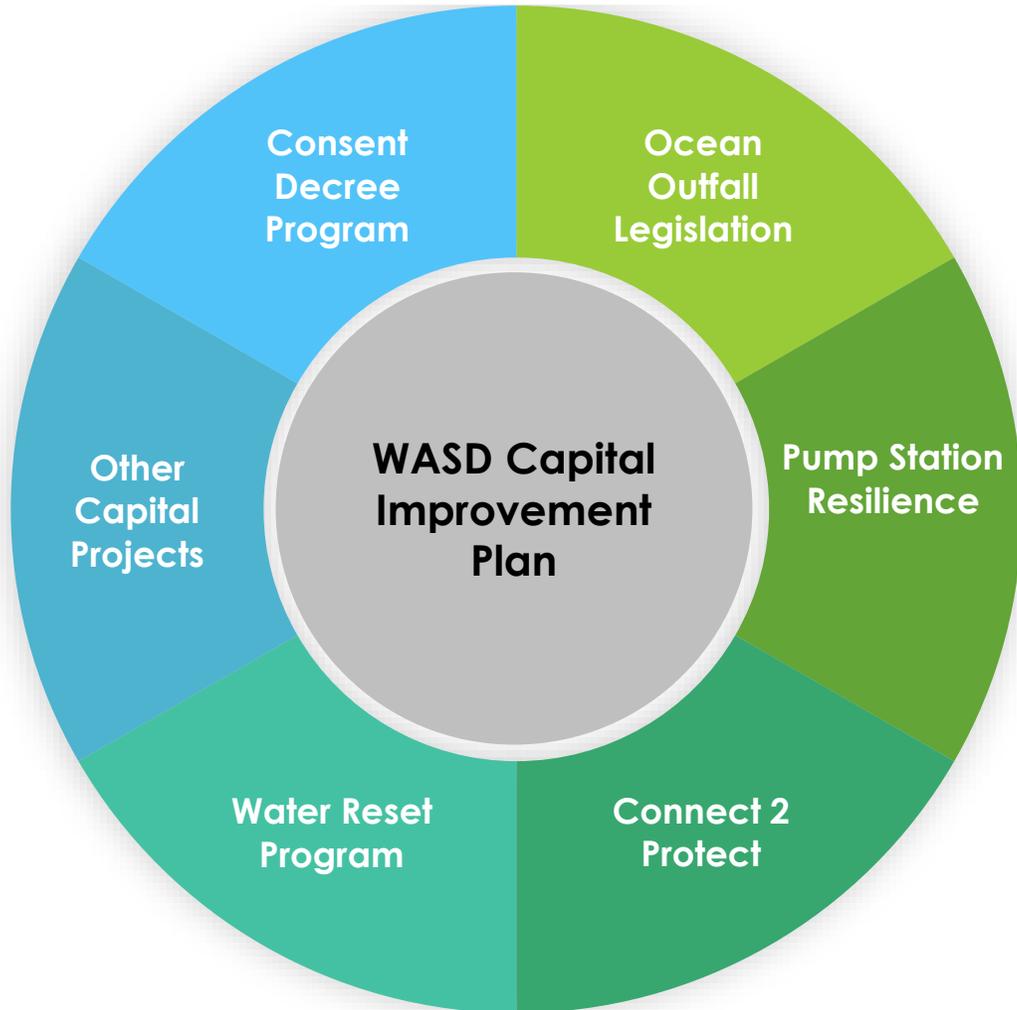
To address aging infrastructure through systematic renewal & replacement

Resilient Design

To maximize asset lifespan, resource conservation, and protect natural systems through climate-ready and sustainable design

2

RESILIENT CAPITAL IMPROVEMENT PLAN - *FUNDING*



Investment Drivers	ADOPTED BUDGET FY 23
Consent Decree Program	\$1,469
Ocean Outfall Legislation	\$2,089
Pump Station Resilience	\$505
Connect 2 Protect	\$90
Water Reset Program	\$300
Capital Projects	\$3,381
Totals	\$7,834 M

2

RESILIENT CIP PRACTICES – *FUTURE-PROOFING OUR FACILITIES*



Above: Water flows out of the Miami River, flooding a walkway as Hurricane Irma (2017) passes through

Below: Three regional wastewater treatment plants are located on the coast, inside the “Inundation Zone”.



2

RESILIENT CIP PRACTICES – *FUTURE-PROOFING OUR FACILITIES*

- ✓ Elevating and hardening structures for flood protection
- ✓ Increasing energy efficiency at facilities
- ✓ Providing back-up and diverse power sources at facilities
- ✓ Minimizing the corrosive effects by using inert and non-metallic pipe materials
- ✓ Improving community safety and reducing operational hazards



Pump Station 301 in Sunny Isles

2

RESILIENT CIP PRACTICES – *FUTURE-PROOFING OUR FACILITIES*



OVERHAUL OF OUR FACILITIES FOR
EMERGENCY RESPONSE



CONNECTIVITY ASSESMENT



CAT 5 BUILDINGS FOR OPERATORS



STATE-OF-THE-ART CONTROL ROOMS



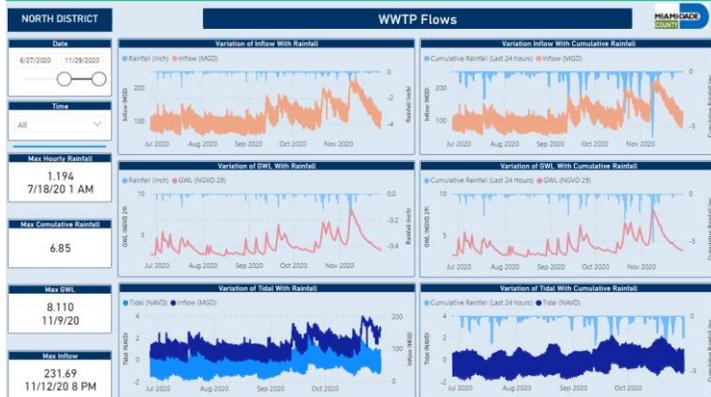
NEW MATERIALS/ STORAGE BUILDINGS

2

RESILIENT CIP PRACTICES – PEAK FLOW MANAGEMENT



Data Analytics



- Rain & flow monitoring
- Interactive dashboards
- Risk assessments



Operational Solutions



- Address Infiltration and Inflow
- CCTV monitoring
- Smoke testing
- Stormwater infrastructure maintenance/ improvements



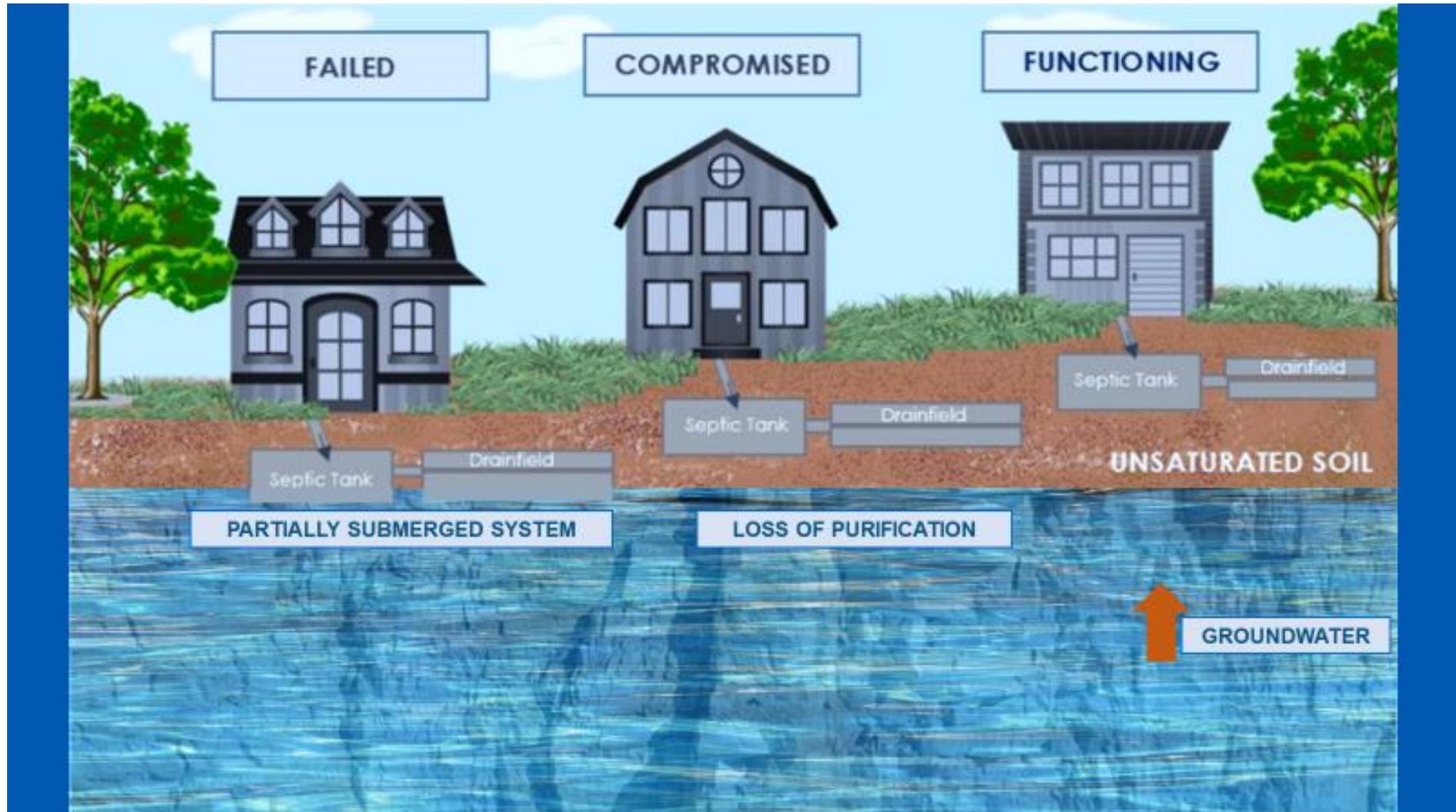
Public Outreach



- Educational campaigns
- Water efficiency programs



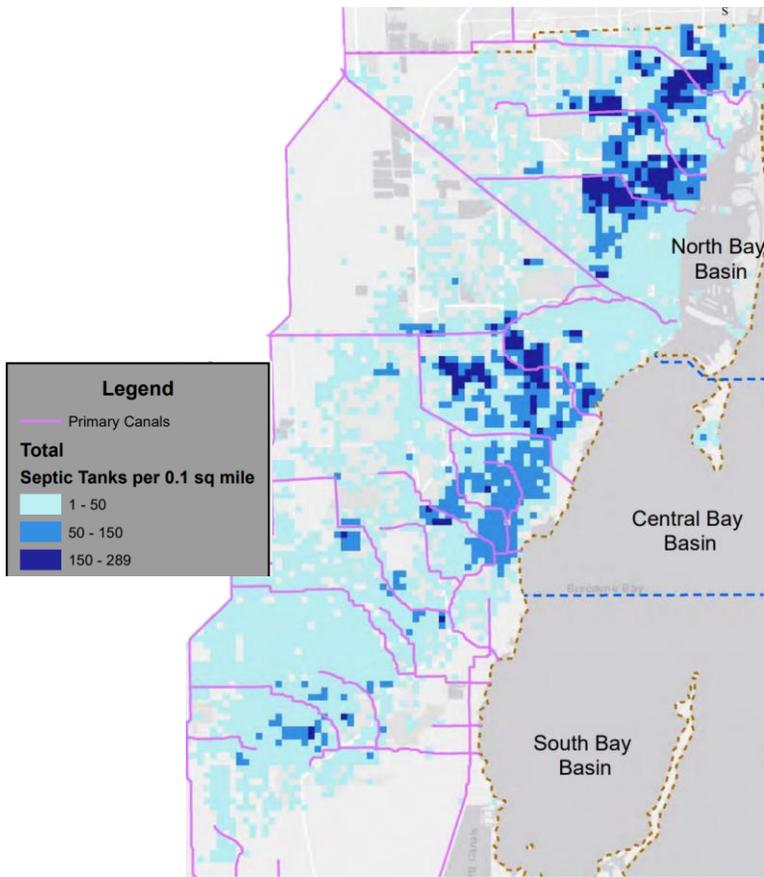
CONNECT 2 – HOW SEA LEVEL RISE IMPACTS SEPTIC TANKS PROTECT



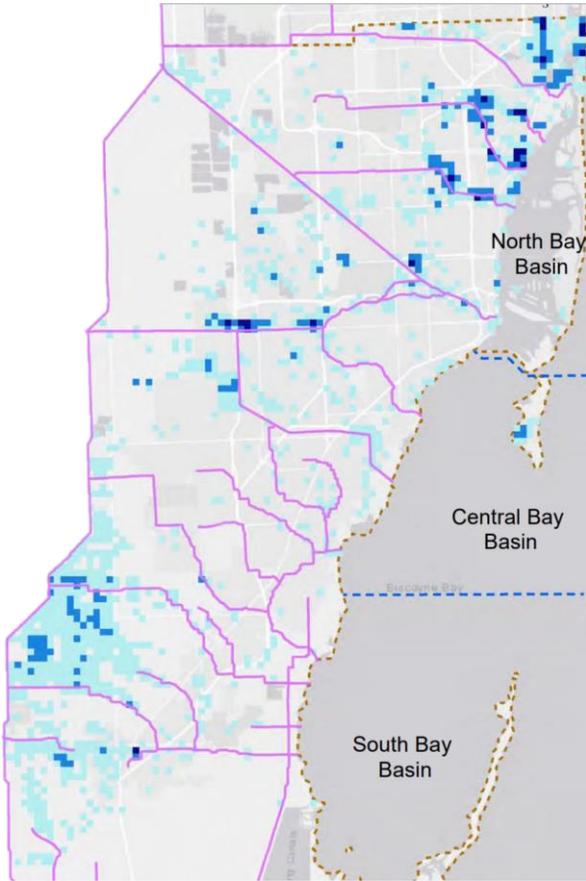
3

CONNECT² – WHERE ARE THE SEPTIC TANK SYSTEMS? PROTECT

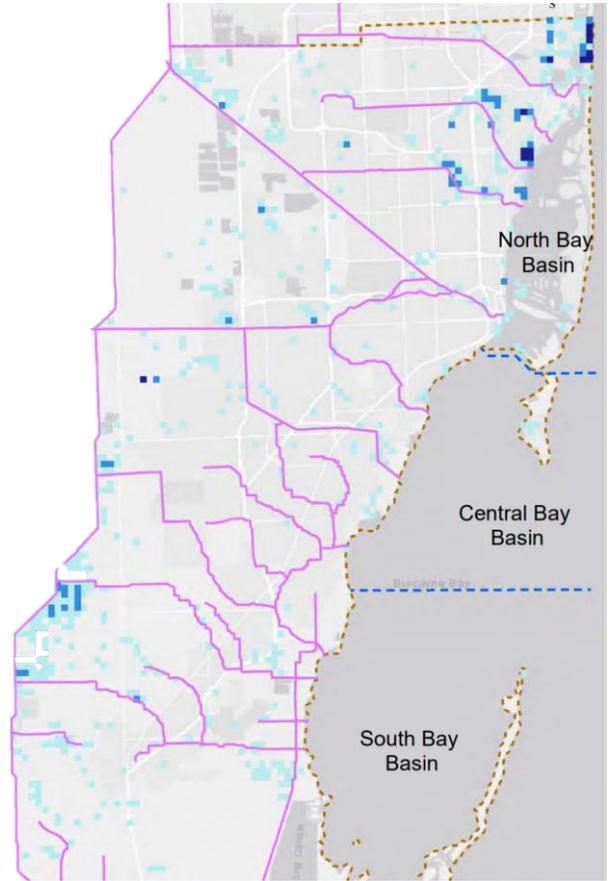
~120,000 Countywide



2040: ~3,500 Compromised



2040: ~10,500 Failing



3

CONNECT² PROTECT

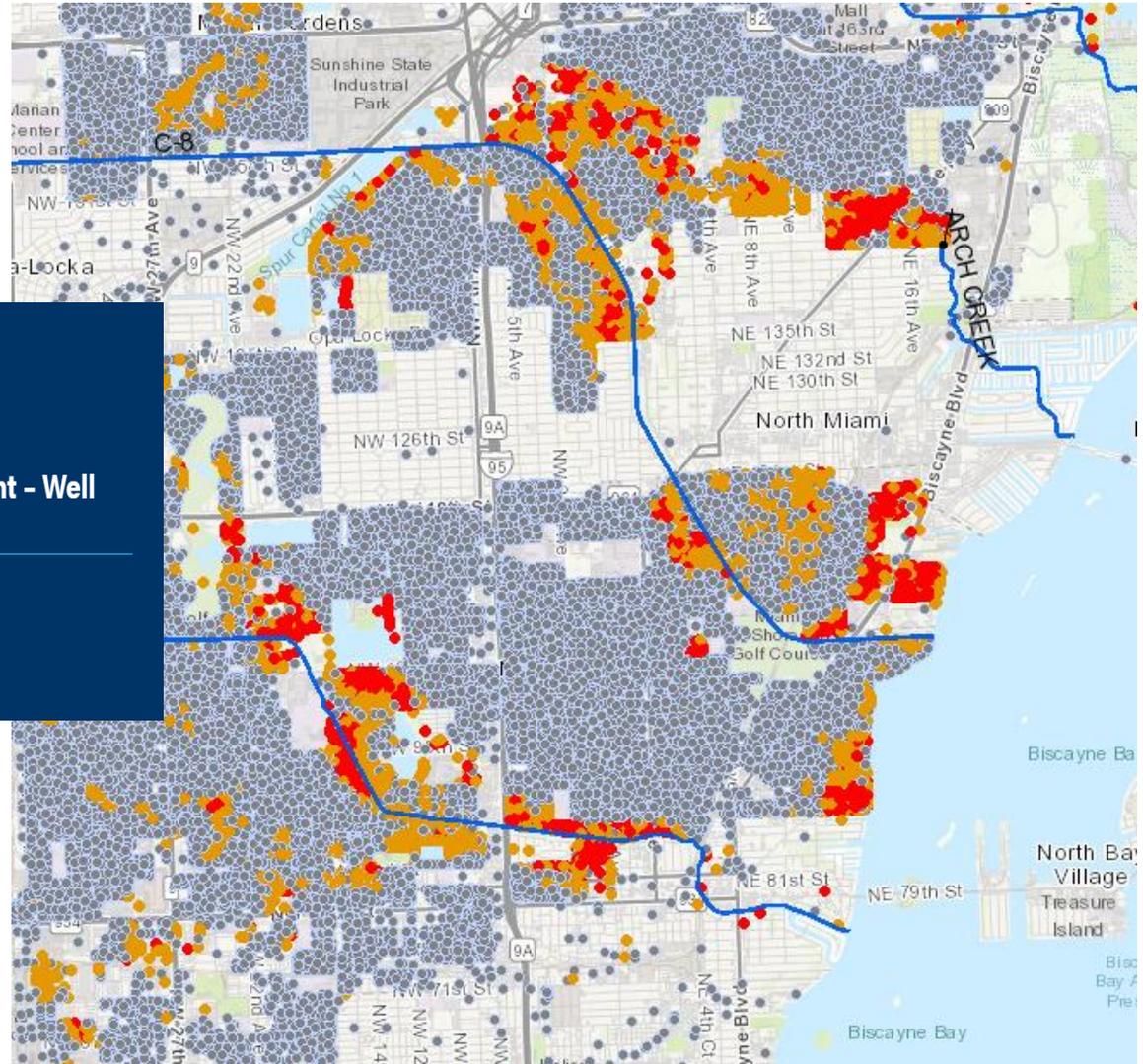
- AWARD WINNING VISUALIZATION TOOL



2023 NACo ACHIEVEMENT AWARD WINNER

**Miami Dade Water and Sewer Department - Well
and Septic to Sewer Solution**

MIAMI-DADE COUNTY, FLA.



3

CONNECT² - PROJECTS PROTECT

+11,000



Connections in various stages of design, permitting, or construction since 2022



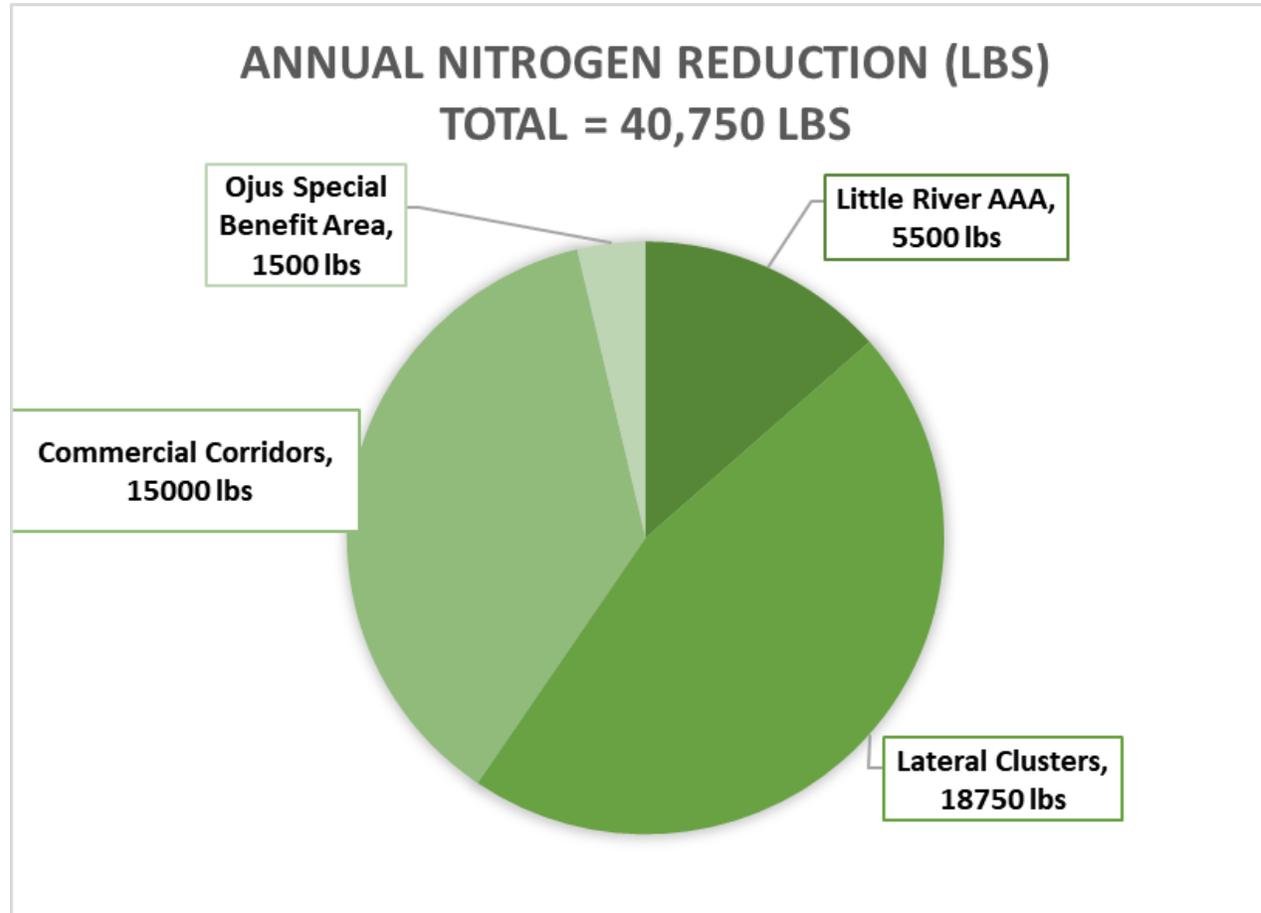
Multi-year program focusing on converting failing or vulnerable septic tanks to sanitary sewer infrastructure, which will:

- ✓ Protect your health
- ✓ Protect our nature resources including the Biscayne Bay
- ✓ Protect your home and private property



CONNECT **2** – WATER QUALITY OUTCOMES

PROTECT





CONNECT² PROTECT

- MORE THAN \$250 MILLION IN GRANT FUNDING

Grant Program Name	Amount Awarded	Status
Water Resources Development Act (WRDA)		
WRDA 2022 - sewer system expansion	\$190,000,000	Authorized by Congress
FDEP Biscayne Bay Water Quality Grant Program		
Connect to Protect / Little River Adaptation Action Area (Funding Year 1)	\$4,900,000	In Construction
Connect to Protect / El Portal (Funding Year 2)	\$6,700,000	Approved Work Plan
Connect to Protect / Future PS Basin along Little River (Funding Year 3)	\$14,500,000	Work Plan Under Development
Resilient Florida Grant Program		
Schenley Park Septic to Sewer Conversion	\$27,500,000	Award Notification
Federal Appropriations (Earmark) Requests		
2021 Request for Sewer Laterals - Sponsor: Diaz-Balart	\$750,000	Award Notification
2021 Request for Installing Pump Station - Sponsor: Salazar	\$1,600,000	Award Notification
2022 Request for Assist Property Owners with Connection Cost - Sponsor: Diaz-Balart	\$3,000,000	Award Notification
2022 Request for Assist Property Owners with Connection Cost - Sponsor: Gimenez	\$1,500,000	Award Notification
2022 Request for El Portal and Miami Shores - Sponsor: Wilson	\$3,452,972	Award Notification
2023 Request for Assist Property Owners with Connection Cost - Sponsor: Wilson	\$3,000,000	Sponsored
State Appropriations (Earmark) Requests		
2023 Request for Assist Property Owners with Connection Cost - Sponsor: Rizo	\$1,000,000	Award Notification
2023 Request for Assist Property Owners in Schenley Park - Sponsor: Fernandez-Barquin	\$2,000,000	Award Notification



CONNECT² – *FINANCIAL PLANNING* PROTECT

General Obligation Bonds

- GOB funds have served as the primary mechanism for the extension of water/sewer infrastructure.
- Costs of new infrastructure is funded by all residents.

Special Assessment Area

- Model provides ability to fund the improvements with bond proceeds.
- City recovers debt service through a recurring tax on the project's beneficiaries.

Florida Department of Environmental Protection (FDEP) Grants

- Water Quality Improvement Grant Program
- Resilient Florida Grant Program
- Biscayne Bay Water Quality Improvement Grants

State Appropriations (Earmark) Request

Federal Appropriations (Earmark) Request

Bipartisan Infrastructure Bill

Other Non-Utility Grant Sources: Housing, Economic Development, Transportation

4

RESILIENCE AS A STRATEGIC DRIVER – ORGANIZATION PLANNING

Vibrant Organizational Culture

Invest in the human capital, transparent and fair recruitment, retention, training and development, succession planning, and engagement to increase morale, retain institutional knowledge, instill confidence, and improve workplace culture.

Exceptional Customer Experience

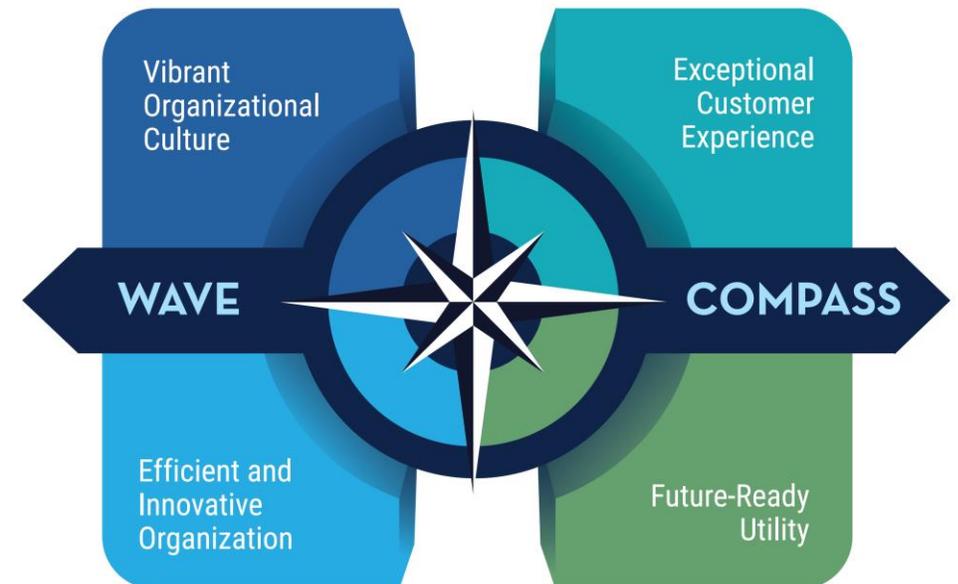
Enhance service and effectively engage with stakeholders to ensure the value of its service is well understood and customers have the very best experience.

Efficient and Innovative Organization

Optimize internal business systems, CIP, and daily operations, and integrate innovation to the greatest extent possible to ensure the Department's business-related and operational systems must be at the ready and able to respond to variable conditions.

Future-Ready Utility

Ready the organization for emergent and dynamic future conditions by enhancing emergency preparedness and response, advance its resilience framework, develop strong financial systems, and increase sustainable practices.



T H A N K Y O U F O R Y O U R T I M E

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things Miami-Dade
Water and Sewer
Department**

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Addressing the Health and Economic Impacts of Extreme Heat in Miami-Dade

June 29, 2023

Presented By: Samantha Jacob, Esq., Resilience Policy Manager, Miami-Dade County

OVERVIEW:

1. **The dangers of extreme heat**
2. **Who is most at risk**
3. **What we're doing about it**



WHAT IS EXTREME HEAT?



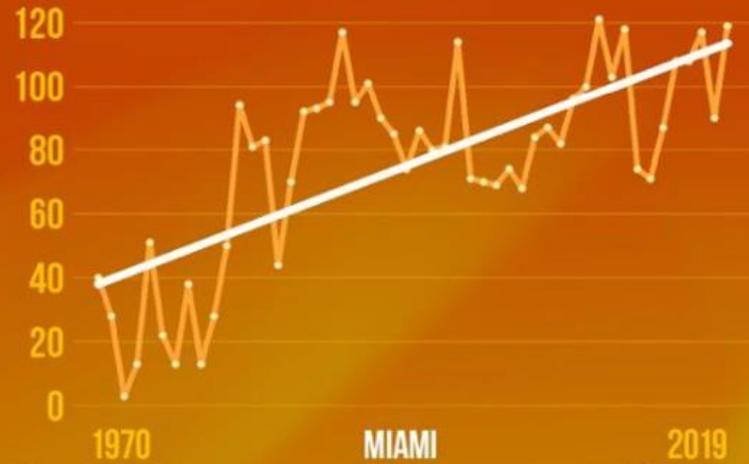
Miami-Dade County is known for its hot and humid climate, with heat indexes often reaching over 90°F

THE DANGERS OF EXTREME HEAT



CURRENT HEAT TRENDS IN MIAMI-DADE

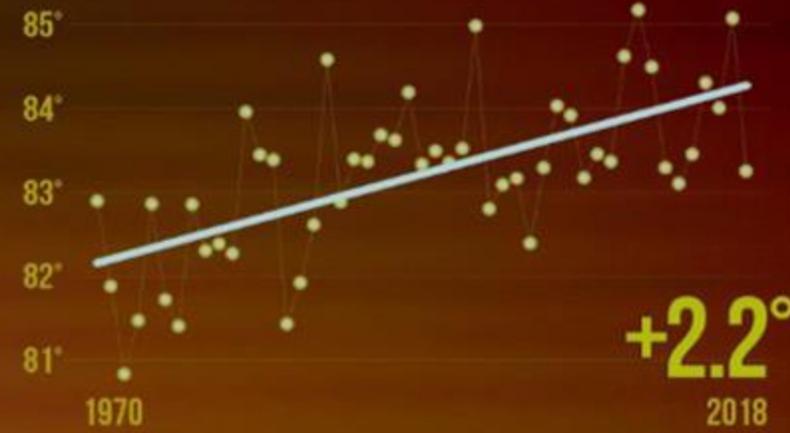
DAYS ABOVE 90° 77 MORE DAYS



Day count based on data of change with 1970. Source: NOAA, etc.

CLIMATE CENTRAL

SUMMERS ARE GETTING HOTTER MIAMI



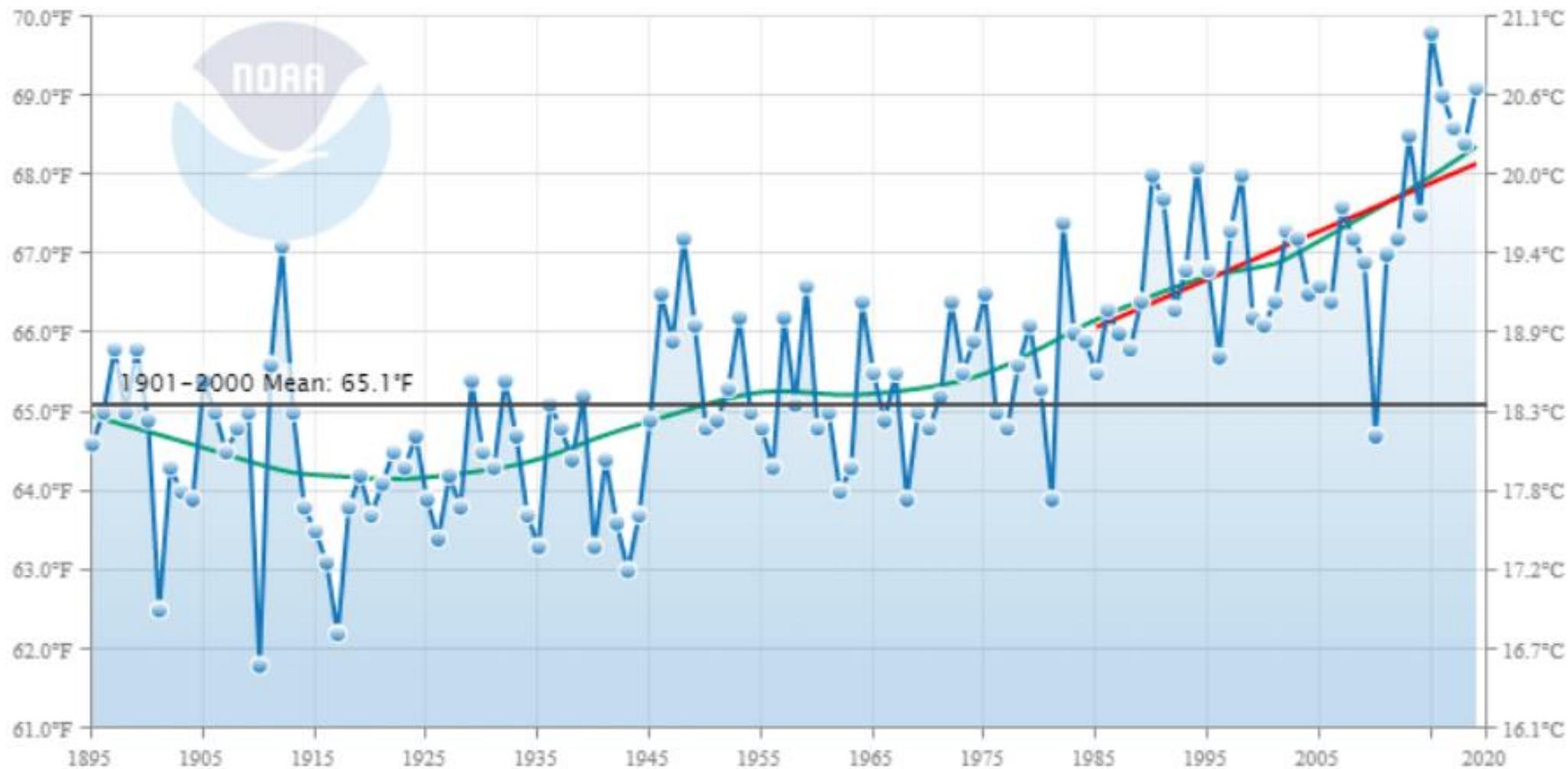
Temperature based on data of change with 1970. Source: NOAA, etc.

CLIMATE CENTRAL

+2.2°

Miami-Dade County, Florida Minimum Temperature

Smooth Trend Line
1985-2019 Trend (+0.6°F/Decade)



MIAMI-DADE COUNTY

Heat Index above	Historical (1971-2000)	By midcentury (2036-2065)	By late century (2070-2099)	By late century, if we limit warming to 2°C (2070-2099)
90°F -----	154 days	187 days	200 days	183 days
100°F -----	41 days	134 days	166 days	115 days
105°F -----	7 days	88 days	138 days	60 days
Off the Charts	0 days	1 days	14 days	0 days

HEAT VULNERABILITY STUDY - POPULATIONS AT RISK IN MIAMI-DADE

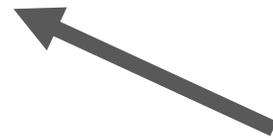
Hospitalizations

- % Living in Poverty
- % Mobile Homes

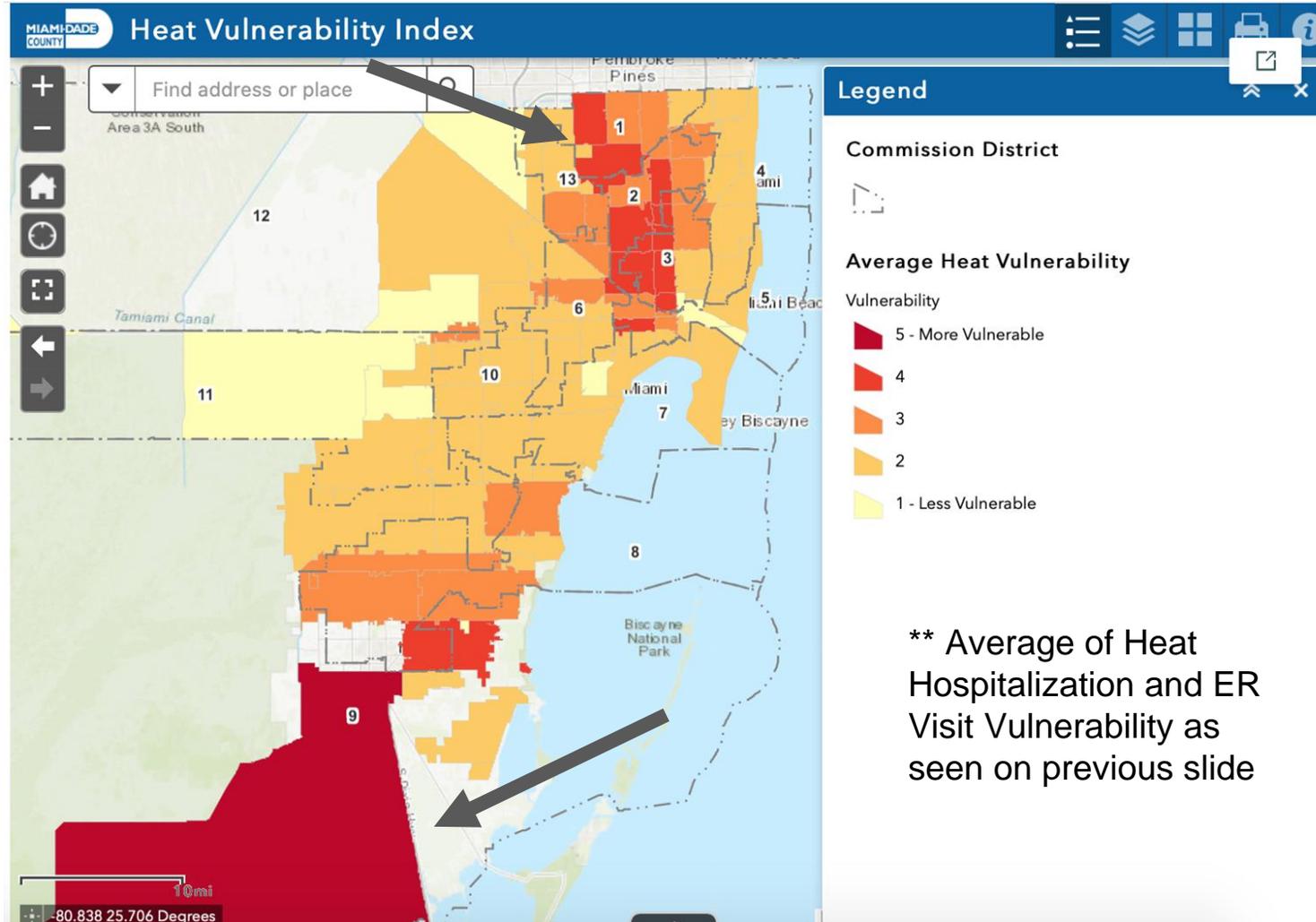
Emergency Department Visits

- Daytime surface temperature
- % Outdoor Workers
- % Age less than 18

Category	Description of Data	Provider
Health Outcome	Heat Related Illness Emergency Department	FDOH
	Heat Related Illness Hospitalizations	FDOH
Exposure	Land Surface Temperature	NASA
	% Impervious Surface	NLCD (2019)
Sensitivity	% Older Adults (age > 65)	US Census
	% Living Alone	US Census
	Children 0-5	US Census
	% Living in Poverty	US Census
	Household Income	US Census
	% Limited Language Proficiency	US Census
	% African American	US Census
	% Hispanic	US Census
	% Indigenous	US Census
	% Mobile Homes	US Census
	% High School Education	US Census
	% Outdoor Workers (Agr, Forestry, Fish, Mining, Construction)	US Census
	% Female Head of Housing	US Census



ARCGIS STORYMAP: VULNERABILITY



Risks to human health and wellbeing are **INCREASING**

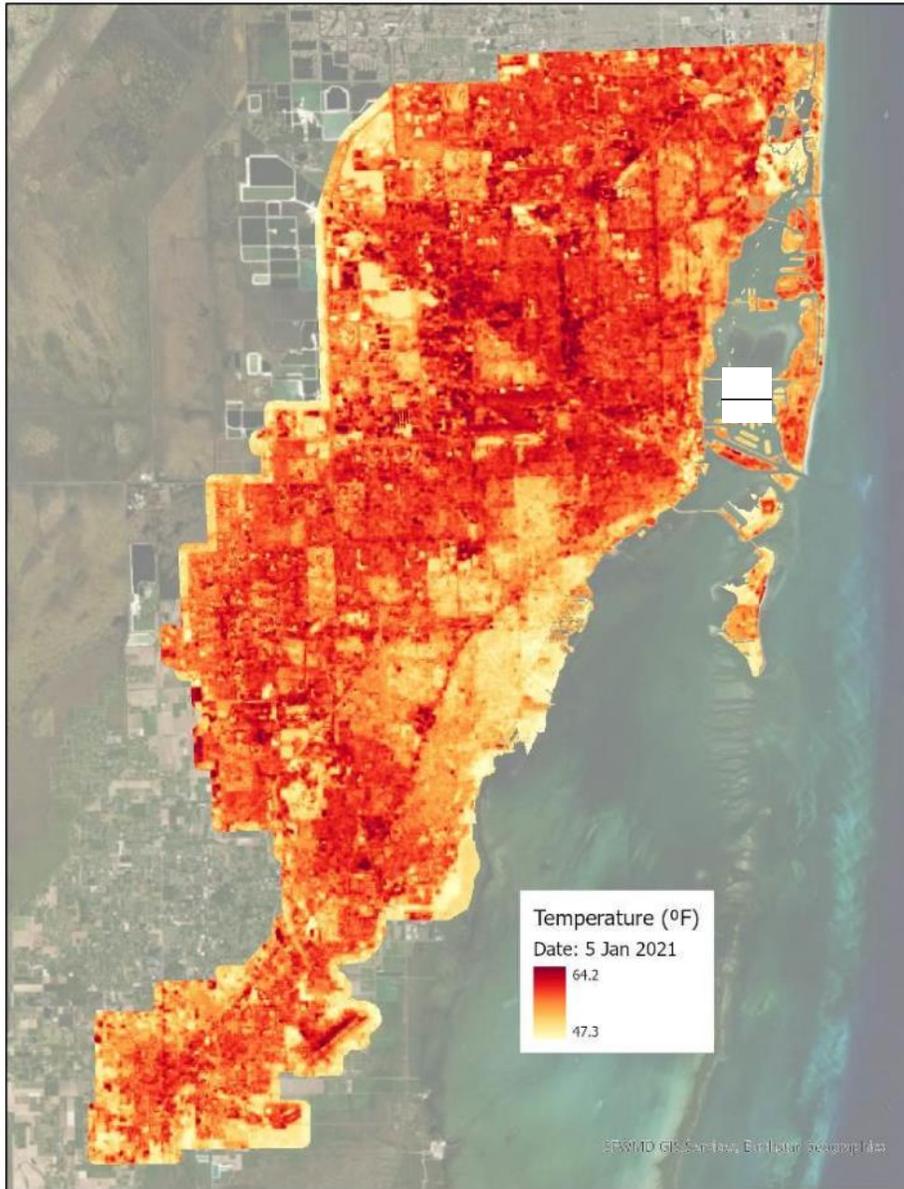


WHO ARE THE POPULATIONS MOST AT RISK?



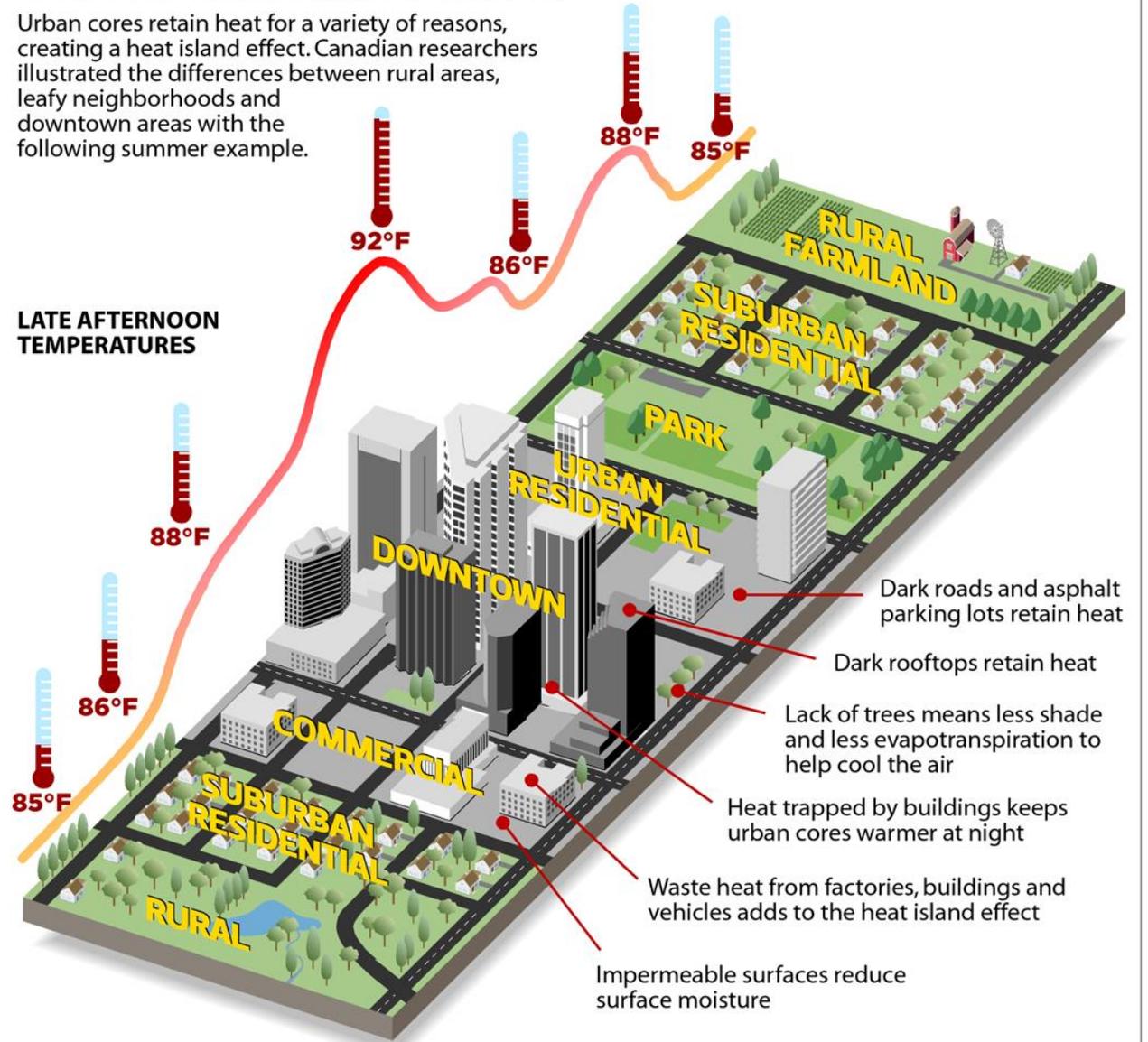
WHERE IS THERE THE MOST RISK?





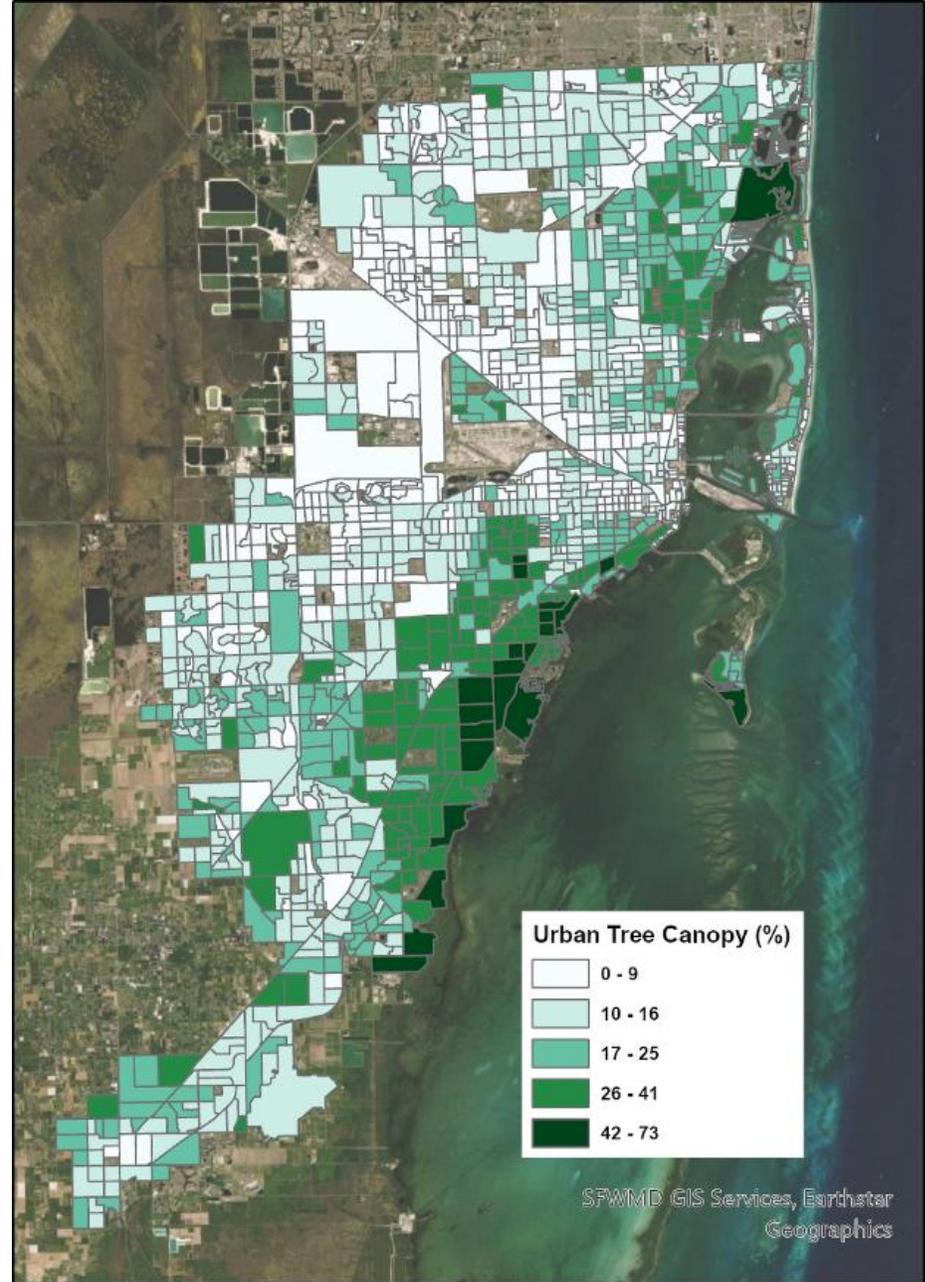
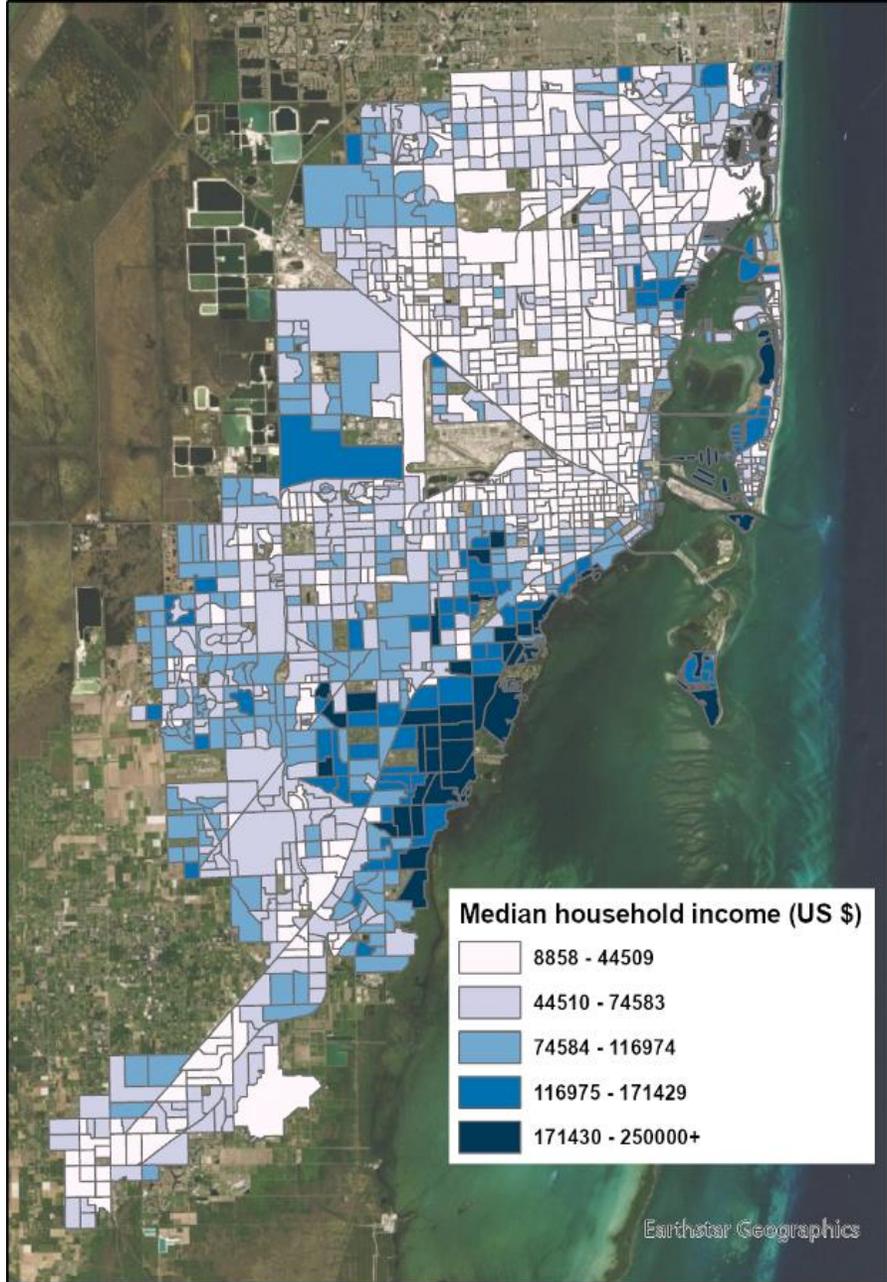
Urban Heat Island Effect

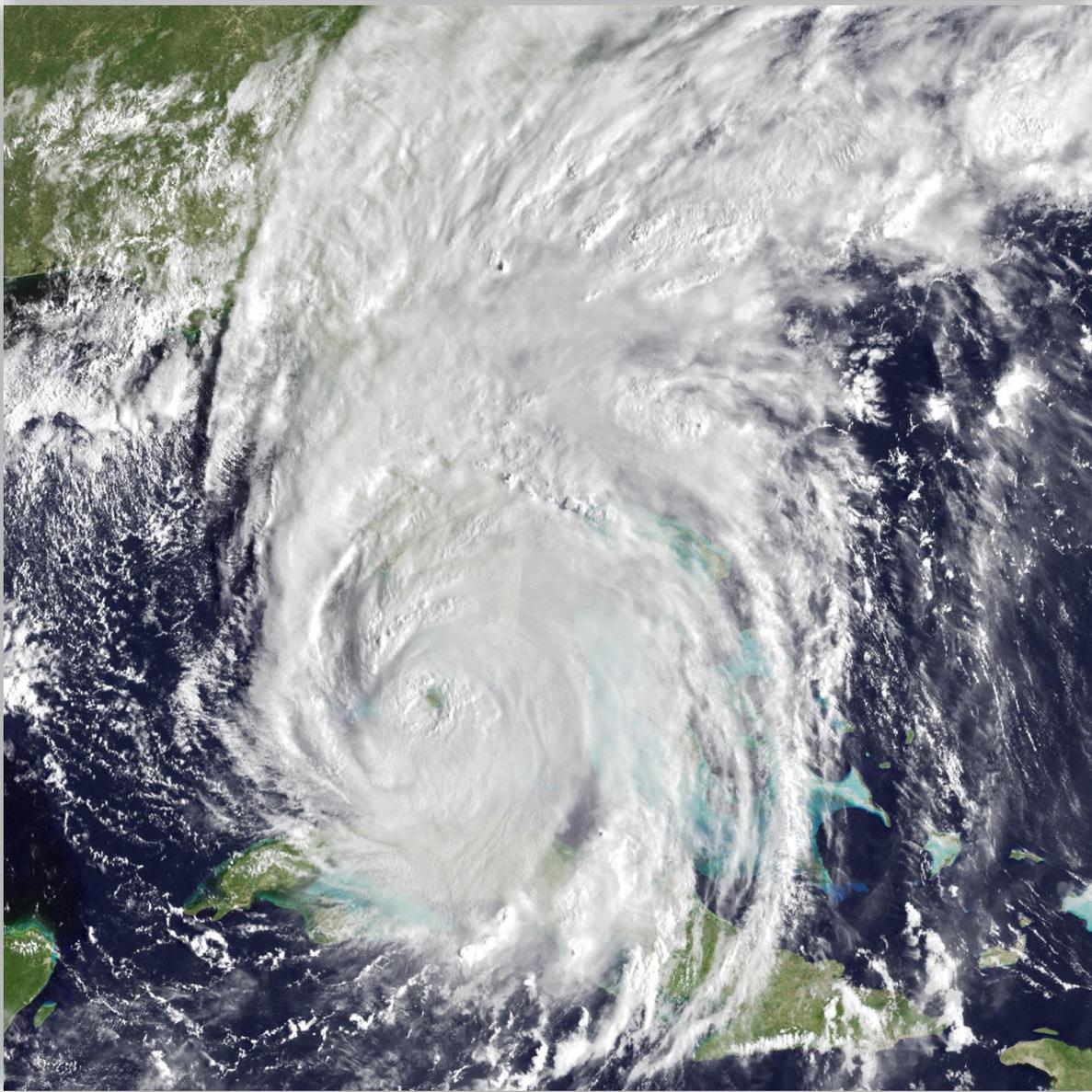
Urban cores retain heat for a variety of reasons, creating a heat island effect. Canadian researchers illustrated the differences between rural areas, leafy neighborhoods and downtown areas with the following summer example.



SOURCE: D.S. Lemmen and F.J. Warren, Climate Change Impacts and Adaptation

PAUL HORN / InsideClimate News





Extreme Heat Action Plan

Goal 1: Inform, Prepare and Protect People

Goal 2: Cool our Homes and Emergency Facilities

Goal 3: Cool our Neighborhoods



CLIMATE & HEAT HEALTH TASK FORCE



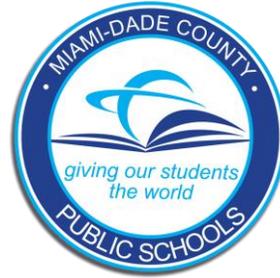
Goals:

- Prioritize short term actions
- Create framework for monitoring progress
- Recommend staffing & other resource needs for implementation
- Equitable representation
- Best available science

<https://miamifoundation.org/extremeheat/>



MIAMI BEACH



Goal 1: Inform, Prepare and Protect People



- ❖ Build on the Success of the Heat Season Campaign
- ❖ Enhance Messaging and Protocols
- ❖ Engage and Support Employers of Outdoor Workers
- ❖ Seek Worker Protections at all Levels of Government
- ❖ Engage and Prepare Healthcare Practitioners
- ❖ Leverage Urban Heat Research Group for Continued Learning



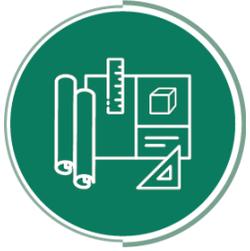
Goal 2: Cool our Homes and Emergency Facilities



- ❖ **Seek Increased Support for Efficiency and Cooling Upgrades**
- ❖ **Advocate for Heat Safe and Affordable Housing Policies**
- ❖ **Improve Coordination and Expand Outreach on Energy Efficiency**
- ❖ **Invest in Energy Resilience at Evacuation Shelters**
- ❖ **Ensure Compliance with Assisted Living/Nursing Home Generator Rule**
- ❖ **Incorporate Extreme Heat in Countywide Resilience Hub Plan**



Goal 3: Cool our Neighborhoods



- ❖ **Create a Bold Tree Plan**
- ❖ **Cool our Commutes**
- ❖ **Cool Our Schools**
- ❖ **Expand Access to Water and Shade**
- ❖ **Plant and Protect Trees on County Land**
- ❖ **Pilot and Scale Cool Pavements**
- ❖ **Ramp up Engagement and Citizen Science**



RECENTLY ADOPTED LEGISLATION AND POLICY



- ✓ Lowered heat threshold (NWS Policy)
- ✓ Heat Season marketing campaign fully funded

- ✓ Renewable energy at emergency facilities
- ✓ \$1.3M to install 1,700 efficient A/C units in public housing without adequate cooling
 - ✓ \$3.5M towards home weatherization programs
 - ✓ \$4M towards retrofits of affordable multifamily housing

- ✓ Tree Canopy MOU with M-DCPS
- ✓ Allocation of \$3.2 million from the TTF for tree planting in EEL and other County lands
- ✓ Additional \$2.5M allocated in FY 22-23 budget for tree canopy coverage



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