



MIAMI-DADE COUNTY SEA LEVEL RISE STRATEGY

**YEAR 1
PROGRESS**



Restoring the Everglades is one of the best ways to protect our water and adapt to rising sea levels.

Letter from Mayor Daniella Levine Cava

I am pleased to present the first progress update on actions taken to implement Miami-Dade County's Sea Level Rise Strategy which I released in February 2021. As you will see in this update, we are already investing in adaptation to reduce our flood risks. Our County budget was oriented around resilience investments, and this year I released the Thrive305 Action Plan which prioritizes Environment, Engagement, Economy, and Equity. The Sea Level Rise Strategy has the same goals as outlined in our guiding principles.

We would also like to dedicate this update to celebrating Commissioner Rebecca Sosa's many years of leadership on addressing this issue. Thanks to her proactive efforts the County has been working for years to understand the risks and take rational steps based on expert input and the most current science. We would like to commend her tireless work on this front and building bridges at all levels of government to ensure our community will thrive for years to come.

Major successes this year include prioritizing septic to sewer projects that will protect the public health of our residents and Biscayne Bay. More conversions are on the horizon. In addition, many of the County's applications to the Resilient Florida Grant Program were successfully recommended for funding. If awarded, these applications could bring back more than \$247 million in state and federal grant funds to support resilience projects in Miami-Dade County. We are pleased that our Environmentally Endangered Lands Program is recommended to receive over \$5.8 million to protect our natural treasures and help improve water quality in Biscayne Bay. This is critical as we know restoring the Everglades is one of the best ways to adapt to climate change. Restoring and expanding our green and blue spaces is a cornerstone of both our adaptation and mitigation strategies. Investing in the Everglades will help us meet the climate goals we set in the Climate Action Strategy and committed to at COP26 in Glasgow.

In addition, we are pleased to see that \$15 million is recommended for affordable housing improvements in the Little River Adaptation Action Area, our award-winning model for adaptation planning and a priority in our Thrive305 Action Plan. Our County thanks the delegation and administration in Tallahassee for prioritizing resilience funds and looks forward to further collaboration. We are working to leverage additional money from the federal government that is expected this year.

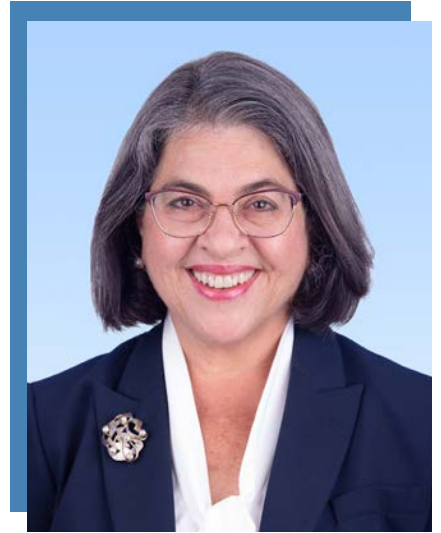
Our departments are ready for these opportunities so we can build projects that increase our resilience. To ensure the success of these projects, I recently appointed a new Director of Resilience Implementation and Planning to help pursue these new funding opportunities while also increasing our tracking of key resilience metrics through interdepartmental coordination of the County's new Resilience Action Team and Resilience Action Council.

Of utmost importance to my administration is our continued collaboration with residents, community partners, municipalities, state and federal agencies, universities, and businesses. We're advancing our work with government partners at all levels to secure funding for joint projects and reduce the total cost of adaptation for our citizens. Our partnership with the U.S. Army Corps of Engineers through our beach renourishment study, "Back Bay" storm surge protection study, and restoration studies are examples of the long-standing relationship with federal government agencies. We continue to partner with the South Florida Water Management District to seek funding for, plan, and implement upgrades to our regional water management system. Through these partnerships and proactive investments, we have become a national leader on climate change adaptation. We will continue to creatively adapt and reimagine how we live with water as we implement the Sea Level Rise Strategy in the coming years.

Respectfully,



Daniella Levine Cava
Mayor of Miami-Dade County





In 2020, Tropical Storm Eta showed us we don't need a strong hurricane to flood.

Introduction – Sea levels are rising

We know that sea levels have already risen due to climate change from carbon emissions. We have seen 10 inches of sea level rise in the last 100 years based on historical records of the tides. For most of us, these subtle changes over time typically go unnoticed. However, the gradual shift becomes more visible during King Tides, hurricanes, or heavy rains. During these events, sea level rise amplifies existing risks and flooding becomes deeper, reaches new areas, and lasts longer than it did in the past. Because we live just a few feet above the ocean and above the groundwater, small changes in sea level ripple through the entire water system. These connections mean that even inland communities are affected by increased flooding as it becomes more difficult to drain water off the landscape.

Miami-Dade County's Sea Level Rise Strategy⁽¹⁾ was released in February 2021 and outlines the approach we are taking to address this long-term challenge. While work has been underway for years, the Strategy outlines five key approaches we are using to adapt over time as well as ten key actions we are taking in the short-term.

This report provides a quick update on what has been accomplished in the past year. Strengthened collaboration with our 34 municipalities is helping us learn from one another and work together on projects. We continue to collaborate with our colleagues throughout the region through the Southeast Florida Regional Climate Change Compact.

We are already investing in adaptation to reduce our flood risks. Our County budget was reoriented around resilience investments, and our Thrive305 Strategy prioritizes Environment, Engagement, Economy, and Equity. While it is not feasible to reduce all risks, several studies show that the benefit-to-cost ratio of certain adaptation measures can be high. Investing earlier in protective measures will lower the total cost, limit impacts to property values, and reduce storm damages. The most cost-effective way to adapt is to incrementally adjust our capital projects and programs. As our departments scale up their efforts, we will continue to seek and advocate for external funding to support larger-scale adaptation projects. Leveraging federal, state, and private resources is a key component of our strategy. Our integrated approach to climate resilience is already gaining recognition - we recently achieved Gold certification through the LEED for Cities program and received three awards from the Gold Coast Chapter of the American Planning Association.





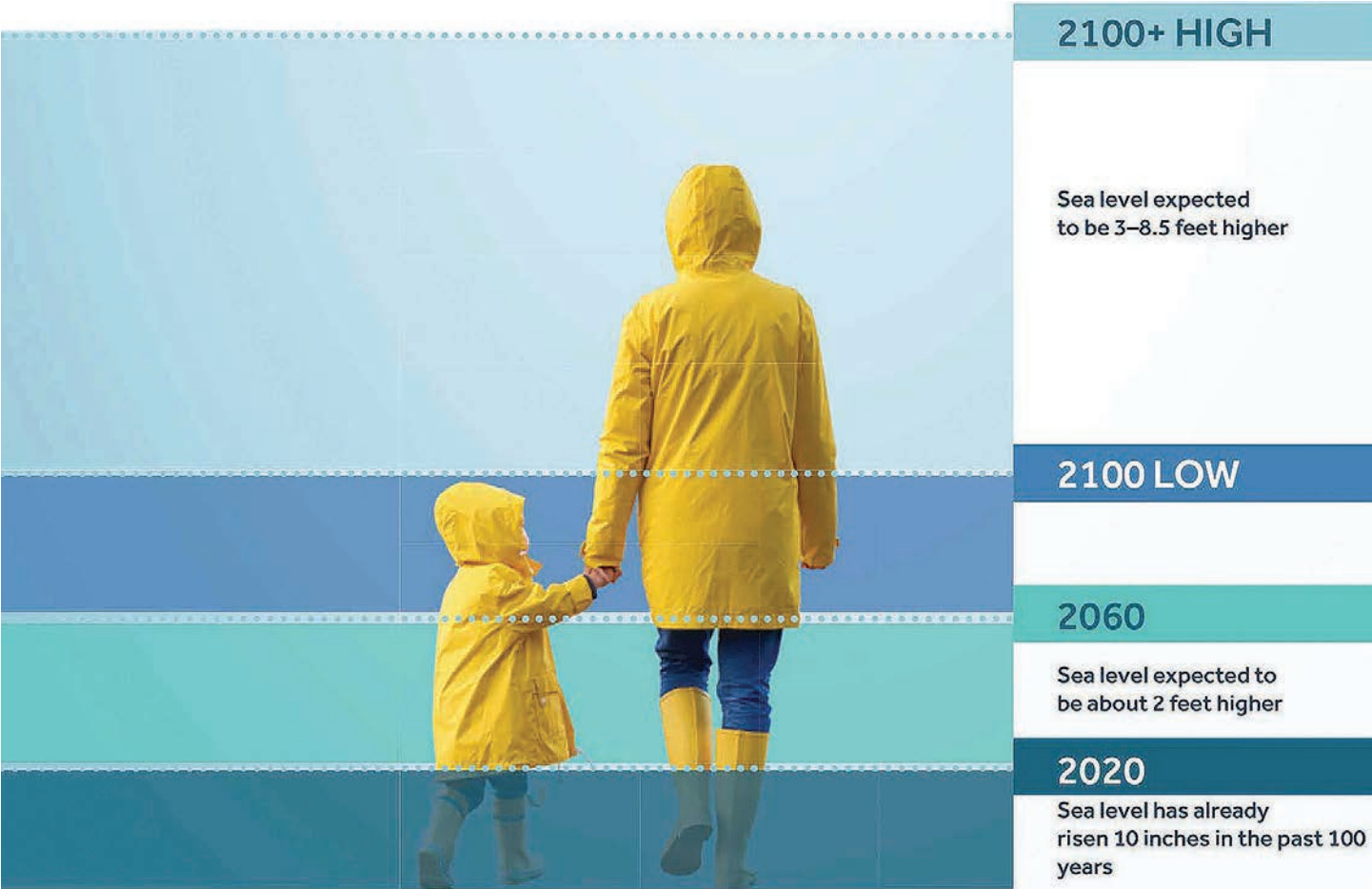
Sea level has already risen about
10 inches in Miami.

Flood risk into the future

Unlike other types of flooding, long-term sea level rise will not recede. Low-lying areas that are not raised will eventually be permanently underwater. We have not experienced this before, so it requires new ways of thinking. Fortunately, we have a wealth of knowledge in our community, our government agencies, our local businesses, and in our universities to draw upon. In fact, many of our neighbors are world-renowned experts on water management and have been working on these issues for decades.

Southeast Florida has been a leader developing a regional and science-based approach for sea level rise planning. To guide its work, the County relies upon the 2019 Unified Sea Level Rise Projection for Southeast Florida developed by the Southeast Florida Regional Climate Change Compact. These projections are being used by local, state, and federal government agencies for infrastructure projects across our region. These projections are revised every five years to ensure they reflect the best available science. Based on these projections, we expect sea levels to be approximately two feet higher in 40 years and continue rising as seen in the graphic below.

We continue to collaborate with our partners to adapt to sea level rise. Through the Thrive305 Action Plan, we gathered community input across our communities and heard that adapting to climate risks is a top priority, especially in our most vulnerable neighborhoods. We are prioritizing partnerships with local, regional, state, and federal entities, including our 34 municipalities, the South Florida Management District, and the U.S. Army Corps of Engineers, among others. Continued collaboration with partners investing in our local resilience is critical.



Principles guiding our efforts

We will be continually adapting to rising sea levels over the next several decades. While specific projects and needs will change over time, our decisions about how to adapt will be shaped by the guiding principles below.

Mayor Cava released the Thrive305 Action Plan, which offers guidance on how the County operates and tracks progress across four overarching goals: Environment, Engagement, Economy, and Equity. We continue to pursue adaptation actions that follow our guiding principles and align with these multiple goals:

ENVIRONMENT

Reduce environmental pollution by not adding greenhouse gas emissions or other pollutants to our air and waterways. Actions should not be implemented at the expense of the environment and human health.

Build with nature by working with natural processes and natural materials to address long-term flooding hazards.

ENGAGEMENT

Align with other initiatives and plans such as Thrive305, the Comprehensive Development Master Plan, the Long-Range Transportation Plan, the Parks and Open Spaces System Master Plan, the Resilient305 Strategy, the Central and Southern Florida Flood Resiliency Study, and others.

ECONOMY

Make us safer over time by helping to protect lives and incrementally protecting the community from storms and multiple flood risks. Actions should not increase vulnerability to other hazards.

Be flexible and able to respond to changing conditions such as faster rates of sea level rise.

EQUITY

Be equitable by recognizing that historic, unjust discriminatory policies have led some of our residents to have fewer resources to adapt to impacts from climate change. Actions should be driven by inclusive engagement, fair policies, and direct investments and resources to target these disparities.



**We expect sea levels to be about two feet higher
40 years from now.**

Progress implementing the top 10 key actions

The Sea Level Rise Strategy recommended ten key actions to protect our community. Some actions are policy changes that have County-wide impacts on public and private developments. Others are County-led demonstration projects that, once built, can inspire us to design, plan, and build for the future. The ten key actions below, and our progress on each, can be explored on the following pages. Implementation requires collaboration and we want to thank our partners and staff for leading this work.

- 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 Plan transit corridors**



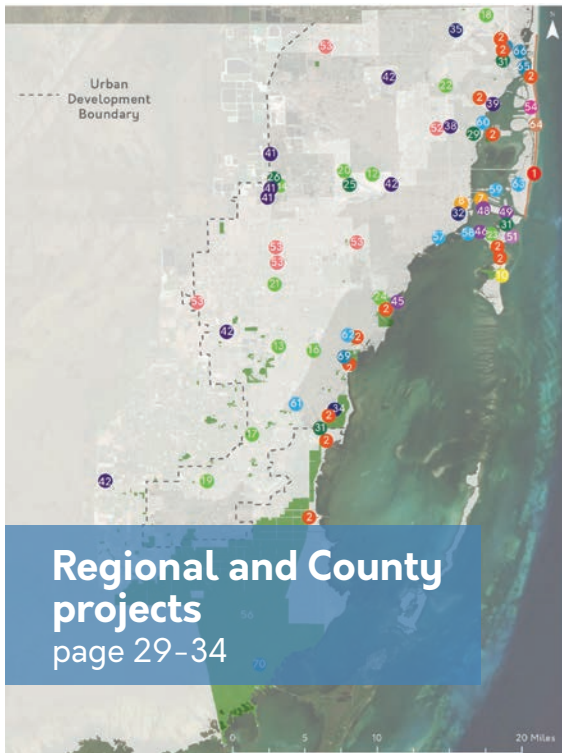
Land acquisition
page 16



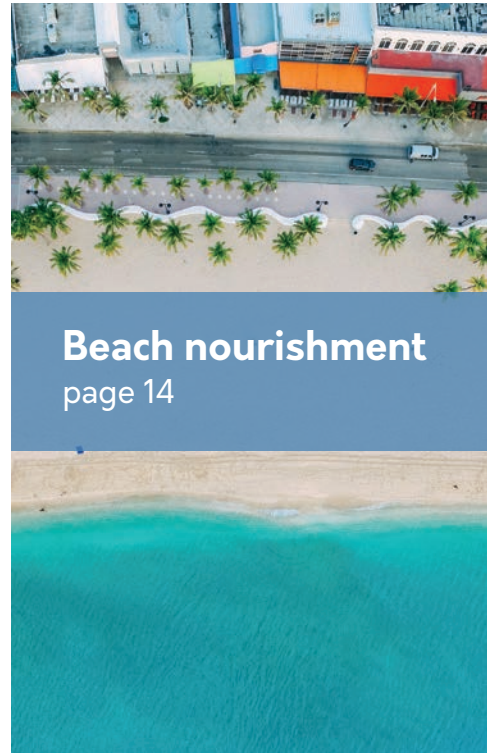
Septic to sewer
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Green infrastructure
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Regional and County projects
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Increasing affordable housing
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1 Accelerate Adaptation Action Areas

Thrive 305 priority



ACTION UPDATE

Key projects are advancing in the Little River AAA as we begin scoping out the location of the next AAA.

OVERVIEW

To apply the Sea Level Rise Strategy adaptation approaches, the County uses a local-level planning tool, referred to as Adaptation Action Areas (AAA), to focus on areas that are most vulnerable to sea level rise and prioritize funding for infrastructure needs and adaptation. AAAs create more detailed plans for the most vulnerable areas. AAAs are selected in coordination with other local governments when applicable and are informed by studies conducted by the South Florida Water Management District's Level of Service program. The AAA planning process helps coordinate projects across departments and jurisdictional boundaries. AAA planning focuses on community engagement and addresses affordable housing, historic resources, land use, transit and mobility, public health, parks, air and water quality, and economic inequalities. This is a priority action in Thrive305.

WHAT HAVE WE ACCOMPLISHED?

We completed the Little River AAA Adaptation Plan, secured additional grant funds, and are beginning implementation. This initiative involved extensive community and departmental engagement to create a shared understanding of current issues and future risk, feasible adaptation approaches and tools, and a path forward for neighborhood improvements and project investments. Key projects are moving forward, but long-term gaps remain and will be addressed through continued planning and collaboration. (SLR Strategy Action 1a)

WHAT'S NEXT?

We are identifying and beginning the groundwork for the next AAA. We'll review previous and ongoing economic development, flood risk, and other planning initiatives and partner with stakeholders to identify an AAA in a vulnerable area that helps us address multiple resilience goals. This effort will lead to additional community engagement, coordination of capital improvement projects, and development of a local adaptation plan outlining strategies and funding opportunities for further implementation. (SLR Strategy Action 1b)

We will develop a five-year implementation plan for future AAAs. The strategy called for the County to develop a model process for creating and implementing local adaptation plans for the most vulnerable areas over the next five years, building on previous or ongoing studies when possible. Staff are taking lessons learned from our experience and that of others doing similar work to outline a path forward for the AAA program that focuses on unincorporated areas and will include municipal partners from surrounding areas where appropriate. (SLR Strategy Action 1c)



Advancing Little River Adaptation Action Area

The Little River Adaptation Action Area⁽²⁾, made up of neighborhoods in Unincorporated Miami-Dade County, the Village of El Portal, and the City of Miami, is one of the lowest-lying, most vulnerable areas. It is already seeing regular flooding impacts made worse as sea levels rise. We're working across jurisdictions and directly with residents to help us better understand and address local challenges with targeted funding and projects. Supported by a Resilience Planning Grant from the Florida Department of Environmental Protection, the County hired Savino & Miller Design Studio to help visualize and map flooding risk and capital projects within the AAA. Our collaboration and engagement at virtual community forums, webinars, and in-person events helped us develop a draft Adaptation Plan for the AAA which outlines how to approach issues like failing septic systems, damage to older buildings, and poor drainage. The County and municipal partners are seeking to complete several projects.

Key projects that will begin in 2022 include:

- \$19 million (Miami-Dade County) Little River Septic to Sewer Conversion Project: will replace septic systems compromised by elevated groundwater levels with new sewer infrastructure to serve over 300 primarily low- to moderate-income residents in the Larchmont neighborhood and along NE 87th Street.*
- \$29 million (Miami-Dade County) Public Housing Resilience Upgrades: rehabilitate or redevelop up to nine public housing multi-family developments with over 500 units to be more sustainable and resilient providing current residents with a safer home.*
- \$1.6 million (Miami-Dade County) Lake Belmar Stormwater Pump Station: construction of a new pump station for this low-lying subbasin to mitigate repetitive flooding.*
- \$500,000 – (Miami-Dade County) Stormwater Water Quality Control Pilot Project: install innovative technologies to remove nutrients and bacteria to protect Little River and Biscayne Bay.*
- \$24 million (Miami-Dade County) Secondary canal improvements in the Little River basin.*
- \$8 million (City of Miami) Stormwater improvements for Shorecrest South.*
- \$927,000 (Village of El Portal) El Jardin Storm Water Improvements.*

Moving forward, we will continue to implement the projects and policies set out in the Little River Adaptation Plan while facilitating deeper conversations with specific neighborhoods to identify additional projects that advance the community down an adaptation pathway that best fits local needs.

**projects were supported with state funding.*

2 Require County projects be designed for future sea level rise



ACTION UPDATE

Tools and policies are in place, but we need to improve compliance from budgeting through construction.

OVERVIEW

We need updated codes and design standards to account for current and future sea level, so our capital projects are planned, designed, and built to last for their intended design life, be it 50 or 100 years. This increases our sustainability and safety and minimizes our County's repair costs. It is more cost-effective to modify a project in the design phase than it is to retrofit or repair something that has already been built, so we need to make sure sea level rise is accounted for from the beginning. We are most focused on building critical facilities like fire stations and water and sewer pump stations so they can stand the test of time and continue to provide key public services, especially during and following a storm.

WHAT HAVE WE ACCOMPLISHED?

We require that sea level rise be considered in the earliest phases of a project by including it in procurement documents, but more needs to be done to improve compliance and apply our existing standards in a uniform way across departments. To support compliance and implementation of existing requirements to build with sea level rise in mind, the County conducted internal trainings on the flooding vulnerability viewer tool and will continue these trainings in 2022. We need to ensure all staff understand how to integrate sea level rise into the work they do, be it planning, designing, or constructing infrastructure. (SLR Strategy Action 2b)

WHAT'S NEXT?

We will strengthen policy, so all projects are designed for sea level rise. The SLR Strategy called for us to follow the implementation approach of the Sustainable Buildings Ordinance to strengthen existing policy established by Resolution 451-14. We can examine the County code (specifically focusing on Chapter 9) to further clarify that all County projects must be designed to account for sea level rise. No action has been taken yet. (SLR Strategy Action 2a)

We will establish sea level rise design elevation guidelines. The SLR Strategy called for the development of uniform, minimum design guidelines for various types of capital improvement projects to help our staff and consultants consistently account for sea level rise across County projects using the best available science. For planning purposes, we use the Unified Sea Level Rise Projection for Southeast Florida, and this will be integrated into the guidelines. The Water and Sewer Department and our Stormwater Management Team have established their own guidelines, and other departments would benefit from similar standards. (SLR Strategy Action 2c)



Publishing tools and guidelines for resilient design

We want to integrate climate risks into the design of our buildings and infrastructure, but the challenge is how? This year, the County and partners published two resources to help designers with this work. Since 2014, the County has required all County-financed projects to account for sea level rise in planning, design, and construction using the Regional Climate Change Compact's 2019 Unified Sea Level Rise Projection for Southeast Florida as the standard. In order to help departments and consultants meet these design requirements, County staff developed a tool called the 'Flooding Vulnerability Viewer⁽³⁾'. With this tool, a user can go online and see flood risk information for any address within Miami-Dade. County staff use the tool for grant applications, capital projects, and planning. The viewer was released publicly in early 2021.

Another resource published this year focuses on historic preservation. In 2020, the Miami-Dade County Office of Historic Preservation (OHP) and architects Shulman + Associates updated their design review guidelines, called Resilient Rehab⁽⁴⁾. Many of our historic and cultural resources are found within communities most impacted by climate change. Successful preservation of these resources must consider high water and high winds. The guidelines balance preservation with the realities faced by our coastal communities. *Resilient Rehab* helps users identify historic buildings, expands knowledge and appreciation of our history and culture, and provides updated rehabilitation guidelines that include sea level rise and climate considerations. The updated guidelines are one tool in our preservation toolbox and are intended for property owners, architects, preservation staff, and board members. After the guidelines were completed in 2021, OHP received an Award of Excellence in Best Practices from the Gold Coast section of the Florida American Planning Association. The guidelines are being considered for final adoption by the Board of County Commissioners in early 2022.

3 Establish safer building and seawall elevation standards



ACTION UPDATE

Changes to some codes are underway but have not yet been adopted.

OVERVIEW

Because many of the existing requirements for how we build are based on historical data that do not account for sea level rise, several County codes are being updated to include an additional safety factor for rising water levels. Updating these standards will help protect us long-term against sea level rise and short-term from storms.

WHAT HAVE WE ACCOMPLISHED?

We are working to update the County Flood Criteria. These standards determine the minimum height for the ground elevation for many properties, seawalls, and other infrastructure. Our staff have proposed updating the County Flood Criteria to account for historic and future flooding. The next step is for the Board of County Commissioners to vote on the proposed updates. For more information, see the implementation update on the right. (SLR Strategy Action 3b)

WHAT'S NEXT?

We will strengthen our policies to increase freeboard, or the minimum first floor elevation. "Freeboard" protects assets by requiring the floor be built above flood levels. The SLR Strategy called for an additional sea level rise adjustment (consistent with the regional SLR projection) and an increased allowance for building height to account for the higher first floor. The Strategy called for a minimum 1-foot freeboard above the crown of road for all buildings. Our staff are currently working with the County Attorney's Office for a legal review of proposed changes which would provide allowances for additional freeboard up to three feet. Once approved, these proposed revisions would go to the Board of County Commission for a vote. (SLR Strategy Action 3a)

Update County Cut and Fill Criteria. We require a cut-and-fill review for projects within designated basins to determine the amount of land that must be set aside to retain runoff from the 100-year/3-day storm. The SLR Strategy called for this standard to be updated to account for future conditions including rising groundwater levels. Our staff are in preliminary discussions about the best next steps. (SLR Strategy Action 3c)

Revise Shoreline Development Review Criteria. The SLR Strategy called for the current ordinance to be amended to recommend resilient buildings, seawalls, and natural buffers with green infrastructure to reduce flood risk and enhance public access along the shoreline for larger developments near the water. No action has been taken on this yet. (SLR Strategy Action 3d)



Raising Seawall Standards

The minimum heights of seawalls, secondary canal banks, certain roadways, and the ground elevations for some properties are determined by the County Flood Criteria. These standards have been in place for a long time. They were originally designed to make sure there was enough vertical distance between development and the groundwater in the wet season. While these standards have worked well to reduce flood risks, they were last updated in the 1980s and do not account for the six inches of sea level rise we have experienced since that time.

The County's Division of Environmental Resources Management (DERM) has been working to update our standards to account for changes we've seen and to prepare for two feet of sea level rise expected by 2060. Staff engineers used robust stormwater models to account for the additional development, new infrastructure, and rising tide and groundwater levels that have changed since the '80s. After this detailed analysis, staff proposed an update to the County Flood Criteria⁽⁵⁾ and the Water Control Map to raise the standards to account for historic and future sea level rise. The Water Control Map and the County Flood Criteria are based on the flooding that is expected in the event of a certain strength rainstorm (a 25-year/3-day and a 10-year/24-hour storm event, respectively) and a sea level rise projection of two feet.

The proposed updates were released for public comment and expert peer review. Following the comment period and any necessary revisions, the proposed standards will be presented to the Board of County Commissioners for their review and vote. If passed, these new standards will make a significant improvement to existing regulations to ensure that new development (or substantial redevelopment) helps our community incrementally build higher and reduce the risks from future of flooding. If passed, these updates would affect infrastructure and development in unincorporated areas of the County. These changes would also apply to projects in municipalities if a County permit is required, as is the case for new seawalls.

4 Ensure development avoids flooding neighboring properties



ACTION UPDATE

Technical work is well underway but recommended code changes have not been made.

OVERVIEW

Redeveloping properties and elevating them on fill can lead to additional stormwater running off to the street and to lower neighboring areas if proper measures are not in place. Redevelopment and elevation can be beneficial; however, it is essential that we have rules in place to ensure that one property does not worsen flooding for neighbors. Having rules in place that account for future conditions will allow us to incrementally elevate our community without shifting flooding onto other properties or further stressing the regional water management system. Like our partner communities in the Southeast Florida Regional Climate Change Compact, we should ensure runoff is minimized and integrate future groundwater maps into all aspects of planning, design, and construction so underground infrastructure built today will last into the future.

WHAT HAVE WE ACCOMPLISHED?

We developed future groundwater elevation maps. Sea level rise causes groundwater levels to increase, particularly in tidally-influenced areas. Designing underground infrastructure based on historic water levels can lead to infrastructure underperforming or failing. We have already adopted a policy in the Comprehensive Development Master Plan to develop future groundwater elevation maps. The technical work to develop the maps of projected groundwater levels through 2040 has been completed and published online. Our next step is to integrate this information into relevant regulations. That process will likely be on-going over the next few years. In addition, the County's model runs for future groundwater levels in 2060, 2080 and 2100 are being peer reviewed. Anticipated completion of peer review may be late 2022 or early 2023. (SLR Strategy Action 4b)

WHAT'S NEXT?

We will update our policies to require on-site stormwater retention. The SLR Strategy called for a revision to Section 11C-3 'Development within Flood Hazard Districts' to conform with current best practices and prohibit flooding of adjacent areas. Our technical experts, including engineers and scientists, have proposed revisions including a five-foot setback of impervious surfaces in some cases and clarifying the requirements that stormwater not run-off to the street or adjacent areas. The technical work is on-going to draft a proposed code revision. These proposed technical changes will need to be reviewed by the County Attorney's Office before they can be sent to the County Commission for a vote. Completion of these revisions is expected in the summer of 2022. If adopted, they would take time to go into effect. The intent is to benefit property owners by reducing the physical risks of flooding as well as improve the health of Biscayne Bay by reducing impacts to water quality. (SLR Strategy Action 4a)



Partnering to Protect Beaches

Because beaches are the front lines between the ocean and the land, they are our first barrier against storms. Beaches and dunes can absorb wave energy from tropical storms and help protect communities. Because storm damage can lead to severe erosion, adding sand to the beach (known as “beach renourishment”) helps preserve them by increasing or maintaining the width of the sand strip. This tool helps us maintain a safe buffer between the ocean and our communities while keeping beaches wide for residents, tourists, and turtles alike. Beaches and dunes can be accompanied by additional recreational amenities like the Beachwalk, a project in the City of Miami Beach for pedestrians to bike or walk along a connected path from South Beach to North Beach.

Our County requested federal assistance with shoreline erosion about 50 years ago. Congress authorized the Dade County Beach Erosion Control and Hurricane Protection Project in 1968 for the stretch of beach between Sunny Isles and Government Cut. Since then, we have worked closely with the U.S. Army Corps of Engineers (USACE) to keep our shoreline intact. We've added renourishment projects in erosional hot spots in Sunny Isles, Bal Harbour, Surfside and Miami Beach. After Hurricane Irma in 2017, Congress approved a Supplemental Budget of \$158 million for beach renourishment in Miami-Dade County. To date, the USACE has awarded five contracts covered 100% by Federal funding. Three contracts have been completed for about \$60 million, placing approximately one million cubic yards of sand. The last two contracts are underway for an additional \$70 million, scheduled for completion by 2023, and will place an additional one million cubic yards of sand. These projects will help protect us from storms and preserve one of our economic engines.

We are also collaborating to complete an USACE-led Coastal Storm Risk Management Feasibility Study⁽⁶⁾ to reauthorize this federal project. Infrastructure along the shoreline is vulnerable to damage from erosion, flooding, and waves caused by coastal storms. This study investigates alternatives to address shoreline vulnerability and focuses on reducing risk from damaging forces of erosion, flooding, and waves. Higher water levels due to sea level rise are making these risks more pressing. A tentative plan was released for public comment in the fall of 2021. This plan calls for adding more sand to the beaches and other measures to keep the shoreline resilient for the next 50 years.

In addition to the federally funded projects, Miami-Dade County and the City of Miami Beach created a local program to ensure sustained funding to manage the beaches between federal projects. Both the County and the City set aside \$1.5 million each year for six years to construct local projects. Due to the ability to match this with state funding, there is \$6 million available each year to address erosion issues along our shoreline.

5 Enhance flood protection by expanding greenways and blueways



ACTION UPDATE

We've funded land acquisitions and continue to explore how to design and fund program expansion.

OVERVIEW

A natural buffer between development and the water provides protection from storm surge and other flooding. Parks and green space, including healthy dunes, plants, and natural areas, can block waves, collect excess water, and reduce stormwater runoff. They are also key to mitigating greenhouse gases. These green spaces have many benefits by providing trails, attractions for tourists, and cool, shaded areas that contribute to clean water and air and improved health. A greenway is often a multi-use path alongside planted trees, vegetation or swales that can help absorb flood waters and add transportation routes to connect neighborhoods with parks and businesses, schools, and other community centers. A blueway or water trail can hold excess water and serve as a water transportation route or recreational amenity. The County has several successful projects and programs in place that demonstrate nature-based infrastructure. The next challenge is to scale up these efforts with additional funding and continue the integration of flood risk as a part of ongoing work.

WHAT HAVE WE ACCOMPLISHED?

We are taking advantage of a new funding mechanism, the Resilient Florida Grant Program, that will provide a recurring funding opportunity for program expansion. We were able to leverage previous studies and vulnerability assessments to apply for and secure more than \$5 million for protecting environmentally endangered lands. We continue to explore other sustainable funding for resilience projects from local, state, and federal sources. (SLR Strategy Action 5c)

WHAT'S NEXT?

We will design and implement a project in support of the Miami-Dade Greenways, Trails, and Water Trails Vision. The SLR Strategy called for us to collaborate with agencies and residents to create a greenway or blueway, potentially in an Adaptation Action Area (AAA). We have advanced our Water Recreation and Access Plan to establish new assets that can support future blueway development. We will continue to explore possible demonstration projects in the Little River and future AAA, and other areas where feasible. (SLR Strategy Action 5a)

We will assess the feasibility of amending existing land acquisition programs to add a goal of minimizing flood risks and offer voluntary buyouts in highly flood-prone areas. The SLR Strategy called for a closer look across programs to understand where multiple benefits can be achieved. Building on lessons learned from the ongoing Voluntary Home Buyout Program, we will collaborate with interdisciplinary staff and partners to explore options for a more integrated approach to reducing flood risks through land conservation. (SLR Strategy Action 5b)



Acquiring Environmentally Endangered Lands

Natural areas like wetlands provide critical protection for the community by acting as a buffer against rising sea levels and the waves and storm surge that come with hurricanes. Green and blue areas also help treat and soak up stormwater which helps reduce flooding and replenishes the fresh drinking water aquifer below our feet. Wetlands are one of the most powerful resources we have to adapt to climate change. In some cases, the living ecosystems can adapt themselves and rise as the sea level rises.

Our County's Environmentally Endangered Lands (EEL)⁽⁷⁾ program has been acquiring natural areas for over 30 years to protect iconic birds and other animals and their habitats. These lands keep Miami-Dade lush and rich with wild beauty. While the program has been successful, there is currently a shortage of funding. EEL manages the County's largest portfolio of lands, with more than 27,000 acres of land, but more resources are needed to ensure proper management and restoration. In many cases, restoring the hydrology of these sites will help protect water resources from the impacts of climate change.

We have worked hard to leverage grant funds to protect natural areas. In 2021, County staff applied for state and federal grants, including applying for nearly \$5 million from the Florida Department of Environmental Protection's Resilient Florida Grant Program. These applications were recommended by the Governor for funding and, if approved by the state legislature, would support the following four initiatives:

- **\$4 million** Environmentally Endangered Lands Program Acquisition and Restoration Project to acquire lands from willing sellers (a total of \$212 million is needed to acquire all lands)
- **\$350,000** Environmentally Endangered Lands Acquisition Project - Wink Eye Slough (152 acres)
- **\$300,000** Buffering Lands Acquisition - Cutler Pit and Adjacent Wetlands (538 acres)
- **\$325,000** Buffering Lands Acquisition - Peters Wetlands (62 acres)

EEL has used existing resources to move closer to completing the purchase of additional lands including several within the South Dade Wetlands Project, an important wetland system. It serves another critical function of protecting drinking water from saltwater intrusion, including at the County's Newton wellfield. Ecologically, this is an important area because it helps bridge our two national parks. These wetlands are home to many of South Florida's endangered species including the Florida Panther, the American crocodile, the Cape Sable Seaside Sparrow, the Swallow-tailed Kite, the Southern Bald Eagle and the Roseate Spoonbill.

6 Flood-proof the County's most vulnerable existing critical facilities



ACTION UPDATE

The County is actively seeking funding from many sources to protect critical facilities.

OVERVIEW

Our critical facilities support essential services that we depend upon before, during and after a storm or other natural disaster. We have prioritized protecting these facilities, including but not limited to our fire stations, water and sewer pumps, ports, and airports to reduce potential damage or disruption from flooding. Protecting these critical assets helps us both in the short-term to be more resilient after hurricanes or extreme rainfall events and in the long-term against rising sea levels.

WHAT HAVE WE ACCOMPLISHED?

We are prioritizing funds for flood-proofing. We're proactively seeking funding from the state and federal government to protect critical assets so they can continue to provide public services when they are most needed. We have secured a \$2 million grant to hire a new resilience manager, architect, and engineer to identify risk mitigation measures we can take to protect our County-owned public housing and certain critical facilities. (SLR Strategy Action 6a)

We applied for \$535 million for resilience projects via the Resilient Florida Grant Program. All proposed projects have been added to our Local Mitigation Strategy⁽⁸⁾ to ensure their eligibility for future federal opportunities such as the Hazard Mitigation Grant Program, which we also applied for. (SLR Strategy Action 6a)

The ongoing U.S. Army Corps of Engineers 'Back Bay' Coastal Storm Risk Management Feasibility Study includes a small proposal to protect a limited number of facilities from storm surge. To ensure we can leverage these funds and future opportunities, we set aside more than \$100 million in this year's budget for match funds to leverage state and federal grant funds available for resilience projects or septic to sewer projects. For more information, see the case study on the right. (SLR Strategy Action 6a)

WHAT'S NEXT?

We continue to seek funding to adapt critical facilities and are exploring ways that recent federal allocations to update infrastructure could be used to support and accelerate our efforts.



Protecting Critical Facilities

In 2018, we analyzed the vulnerability of more than 1,000 County-owned critical facilities and found that more than half of them had some level of risk from tidal or storm surge flooding when accounting for sea level rise. We ranked facilities by their vulnerability and criticality to emergency operations, with buildings like the 911 center ranked as highly critical.

Since that time, we have been seeking funding to protect these facilities. Some are being redeveloped or rebuilt to higher standards. For example, the Water and Sewer Department recently built the electrical control building at the Central District Wastewater Treatment Plant up on stilts. It is now several feet higher than the old electrical building. This new facility was designed to meet updated design guidelines that account for future sea level rise and storm surges. For those facilities that don't have a planned capital project, we need to find additional funding for retrofits. So far, the County has successfully secured a \$1.29 million grant to protect two wastewater pump stations. We have also secured a \$2 million planning grant to identify protective measures for around 40 County-owned public housing assets and other critical facilities (see implementation update #8). The U.S. Army Corps of Engineers "Back Bay" Study could open another funding stream to protect critical facilities if it is authorized by Congress.

More immediately, we applied for more than \$535 million in funding through the Resilient Florida Grant Program. The Governor announced his administration's recommendation that 16 County projects (\$44 million) and 10 municipal projects (\$52 million) within Miami-Dade receive state funding this year. Additionally, Miami-Dade County was awarded over \$77 million with federal funds passed through the Resilient Florida Grant Program. At the local level, we have set aside more than \$100 million in County funds to help us match state and federal grants and to support resilience and septic-to-sewer projects.

Many projects submitted to the Resilient Florida Grant Program support the Sea Level Rise Strategy. For example, we requested funding to purchase coastal buffer lands to protect the community from storm surge and protect drinking water sources. We also applied to elevate and protect wastewater treatment plants and pump stations, fire stations, public housing, and other critical facilities like our data processing center. We requested funding to elevate canal banks, sea walls, and roadways. Additionally, we applied for multiple planning studies to identify ways to protect critical systems like our fueling sites and electrical systems at PortMiami.

7 Integrate green infrastructure into County projects



ACTION UPDATE

We have completed an award-winning green infrastructure project this year. We need to scale up our efforts.

OVERVIEW

We use green infrastructure across the County to manage stormwater. Nature-based features, from small-scale bioswales to larger stormwater parks, can help us reduce current flooding and minimize future flooding from rising sea and groundwater levels. Green infrastructure includes a wide range of tools that support local drainage improvements, including permeable pavers and green spaces like our parks. These tools help hold, manage, and treat stormwater and can be integrated into projects at a marginal cost, thereby helping us reduce the risks of flooding and water pollution. All green infrastructure projects must be suitable for the local conditions and habitat to ensure they will work long-term. If appropriate, plants as part of green infrastructure projects can help us manage water, improve the quality of our air, cool the spaces we use in our communities, and contribute to a more pleasant environment. Increasing our tree canopy is also an essential part of our goal to reduce our carbon emissions.

WHAT HAVE WE ACCOMPLISHED?

We completed elements of a stormwater park and have plans for additional projects that showcase green infrastructure. We installed a 4,280 square foot bioswale demonstration project at Arcola Lakes Park in 2021. In addition, we are advancing Adaptation Action Area planning and have identified opportunities for additional green stormwater control features in County parks such as North Shorecrest, Military Trail, and Soar Parks. The County continues to build on the existing Parks and Open Space System Master Plan and the Waterfront Recreation and Access Plan to create additional opportunities for multipurpose green and blue spaces. (SLR Strategy Action 7a)

WHAT'S NEXT?

We will strengthen policy to require the use of green infrastructure in County-funded projects. The SLR Strategy called for the County to lead by example and integrate green infrastructure as a requirement into planned projects through an update to Chapter 9 of the County code. There may be additional areas in the code that could be explored for updates. No action has been taken yet. (SLR Strategy Action 7b)



Enhancing Arcola Lakes with Green Infrastructure

At Miami-Dade County, we are implementing nature-based elements into our projects. In 2018, the Office of Resilience worked with colleagues in the Parks, Recreation, and Open Spaces Department to successfully apply for funding for the design and construction of a bioswale in Arcola Lakes Park, a park in West Little River. A bioswale is one type of green infrastructure, or infrastructure that works with nature, and looks like a shallow depression on the landscape. It is designed to capture and treat stormwater runoff before it reaches waterways. Arcola Lakes Park is next to a man-made lake and a senior center. It houses a playground and other amenities for the community. This area is part of the historic little river 'slough,' meaning it is low-lying and in the natural floodplain, so it is the perfect location for a nature-based solution to ease flooding. In addition to the bioswale, the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Extension program installed a rain garden, small garden used to capture and treat excess stormwater, within the park. The rain garden is primarily for stormwater treatment to reduce pollution entering Biscayne Bay.

Bioswales, rain gardens, and other green infrastructure can help reduce pollution to improve water quality in canals and water bodies and lessen the risk of prolonged flooding into adjacent spaces, like the tennis court and roadways. Arcola Lakes Park now includes several demonstration projects that highlight small-scale green infrastructure: the bioswale, the rain garden demonstration project, and native plantings to encourage pollinators like bees and butterflies. The park also has educational signs on the benefits of adapting Florida-Friendly Landscaping™ and creating natural infrastructure landscape features. Over the past two years, Million Trees Miami has planted and given away trees at this same park, and in 2021, the UF/IFAS Extension program was able to provide 50 free rain barrels to residents as well as Florida-Friendly Landscaping™ plants.

The Arcola Lakes project won an award of excellence from the Gold Coast Chapter of the American Planning Association.

8 Prepare for disaster recovery to accelerate inclusive adaptation to sea level rise

Thrive 305 priority



ACTION UPDATE

We're adding expert staff to assess critical facilities and housing to prioritize resilience improvements.

OVERVIEW

Living in South Florida means living with the risk of a hurricane. The risks of flooding and storm surge are made worse by rising groundwater and sea levels. Flooding and storm damage disproportionately impact low-income residents, communities of color, non-English speaking groups, seniors, women, and children, among others. Recovery for affected families and businesses can be long and difficult. Building on our hurricane and flood preparedness event in the Little River, we need to boost our partnerships with organizations that have the long-standing experience and expertise to prepare for recovery ahead of time. Recovery must help us adapt to sea level rise and be tailored to meet the needs of those most impacted. This is a priority action in Thrive305.

WHAT HAVE WE ACCOMPLISHED?

We continue to seek federal, state, and private funds to adapt and recover from disasters. Existing grant programs and projects such as the Army Corps of Engineers "Back Bay" Coastal Storm Risk Management Feasibility Study offer potential funding sources to support adaptation measures. We continually monitor and apply for external funding to address these needs. (SLR Strategy Action 8c)

WHAT'S NEXT?

We will explore pathways for expanding programs and resources to help flood-proof existing buildings. We'll explore whether existing programs to retrofit or weatherize homes can be expanded to include flood-proofing as a program component. We'll continue to monitor the potential for any new state, federal and other funding sources that can build the resilience of our existing housing stock, especially any naturally occurring affordable housing. (SLR Strategy Action 8a)

We will continue to seek ways to plan for a just recovery through specific policy and program adjustments. Disasters typically exacerbate inequalities. We'll collaborate with the County's new Office of Equity and Inclusion, local community-based organizations and other partners to develop recommendations to help our community recover and adapt in an equitable way that builds long-term resilience in the face of sea level rise. (SLR Strategy Action 8b)

We will integrate sea level rise into the forthcoming Post-Disaster Redevelopment Plan. By aligning our post-disaster investments with our vision for long-term climate adaptation, we can avoid unwise spending on projects that would be vulnerable to sea level rise and take advantage of the window of opportunity for resilient redevelopment after a storm. We will convene relevant partners to reflect on our experience with the County's first Voluntary Home Buyout Program and develop a summary of lessons learned with recommended next steps. (SLR Strategy Action 8d)



Kickstarting Affordable Housing Resilience Assessments and Keep Safe Miami Initiative

To prepare for shocks like hurricanes and stresses like sea level rise and rising housing costs, we are actively assessing our County-owned affordable housing buildings and identifying measures to upgrade, strengthen and preserve the affordability of multi-family developments. We partner with the City of Miami, City of Miami Beach, the Florida Housing Coalition, and others as part of the Keep Safe Miami program which provides tools and training to educate residents and help affordable housing owners and operators assess their buildings' resilience to climate change and natural disasters. New resources include a Hazards Strategies Guide, Funding Resources Guide, and others. Using these new tools, we've completed 14 initial resilience assessments of County-owned public housing assets to identify and prioritize needed improvements.

In addition, we will use a recently awarded \$2 million federal grant to hire three full-time County staff in 2022. These staff members will work within the Department of Public Housing and Community Development (PHCD) to conduct a detailed resilience and energy assessment of 19 County-owned public housing assets and 20 critical facilities. We will complete the assessments over the next three years to identify specific resilience projects for each development. Then we will seek funding to implement resilience upgrades through various state and federal grant programs. Potential projects include installing energy-efficient impact windows, installing and elevating critical components such as backup generators and Heating, Ventilation, and Air Conditioning systems, deploying temporary flood panels and other forms of floodproofing.

By focusing on building the resilience of our most vulnerable County-owned public housing assets, we can ensure residents can safely shelter in place during severe storms or hurricanes and keep from getting displaced long-term.



ACTION UPDATE

Work is well underway to fund septic system conversions, though it will take decades to fully address.

OVERVIEW

There are more than 120,000 septic systems in our community and previous reports have detailed how many are (or will become) vulnerable as groundwater rises. We are mobilizing resources to scale up sewer extensions and reduce the potential impacts from septic systems on human health and the health of our natural systems, including Biscayne Bay. The costs to convert septic systems are substantial and funding is limited. Therefore, the County is using a methodical and phased approach that aligns infrastructure and land use goals to address the systems that pose the highest risk in order to realize the greatest benefits from our investments.

WHAT HAVE WE ACCOMPLISHED?

We are converting septic systems with available sewers in some areas. We are implementing measures to convert an estimated 12,000 properties on septic systems that currently have sewer lines next to their property. While this work will take several years, \$90 million has been budgeted to address these properties. This year, we completed the mapping work needed to identify properties with septic systems and created an online map viewer to facilitate the prioritization of septic to sewer projects. The existing code may compel some of these properties to connect to the sewer system, which have historically received a “Notice of Required Connection.” Several million dollars have been allocated to connect more than 500 properties this fiscal year. We’re leveraging grant funding from the Florida Department of Environmental Protection to accelerate some connections in the Little River Adaptation Action Area. For more information on what’s been accomplished, see the update on the right. (SLR Strategy Action 9a)

WHAT’S NEXT?

We will decommission vulnerable septic systems, starting with the most vulnerable. We are prioritizing decommissioning septic systems with compromised functionality, including the approximately 9,200 within our Water and Sewer Department’s service area that are identified as most vulnerable to rising groundwater by 2040. To support this, we will implement a program to prioritize installing sanitary sewer infrastructure in the highest priority areas and will construct projects as funding is secured. For more information, see the update on the right. (SLR Strategy Action 9b)

County engineering experts have also proposed a revision to the existing code to ensure that all new septic systems installed (or completely replaced) treat the wastewater to a higher standard to reduce the public health risk and risks to the environment that result from undertreated sewage. Proposed revisions need to be considered and voted on by the Board of County Commissioners. (SLR Strategy Action 9b)



Connecting to the Sewer System

In 2020, the County released a Plan-of-Action Report⁽⁹⁾ to address vulnerable septic systems. In response, our Water and Sewer Department (WASD) initiated multiple projects to convert septic systems to the sanitary sewer system. Given the scale of the actions needed, it will take decades to fully address.

An on-going septic to sewer project is well underway and will ultimately connect approximately 1,000 commercial properties to sewers. Once completed, this \$126 million project will divert half a million gallons of wastewater daily which will reduce nutrients reaching waterways. Because this project is targeting key commercial corridors, it will also support long-term economic growth by allowing denser development. There are 35 projects under this initiative which are planned to be completed by 2023. So far, five projects are finished, and the other 30 are in various stages of design and procurement.

In addition to addressing septic systems in the commercial corridors, we are taking the following steps to address systems countywide:

- Installing public sewer pipes (called “laterals”) to the property lines to make it easier to connect to the sewer system for the 12,000 properties with available sewer infrastructure. This work has been budgeted for over the next five years. Properties that have a vulnerable septic system will be prioritized first.
- Converting approximately 300 septic systems to sewer service in the Little River Adaptation Action Area with support from the Florida Department of Environmental Protection.
- Continuing to seek funding for expansion of the sewer system, prioritizing the most vulnerable. This year the County applied for over \$200 million in grant funds. While the funding was not awarded, we continue to look for support for these infrastructure projects.

Groundbreaking for the Little River Connect 2 Protect sewer expansion happened earlier this year. This project will help residents in the lowest-lying areas who have suffered repeated failures of their septic systems causing sewage back-ups and public and environmental health risks. In some cases, residents have not been able to shower or use their plumbing when it rains. In one area, this project will connect residents with the existing sewer system in the street in front of their houses. In another area, the sewer network needs to be completely expanded before residents can connect to it. While we are leveraging grant funds for this work, more than two thirds of the project costs are coming from the County's Building Better Communities General Obligation Bond.

10 Increase affordable, resilient housing on high ground within SMART Plan transit corridors

Thrive 305 priority



ACTION UPDATE

We unveiled new affordable housing units and are redeveloping more properties under the RAD Program.

OVERVIEW

Many buildings are at risk from sea level rise, including naturally occurring affordable housing. Building affordable housing outside flood-prone areas can help reduce future sea level rise impacts to residents and buildings. By building in safer areas, we can reduce the number of residents who need to evacuate before a hurricane, reduce flood damage, and reduce costs for new infrastructure that supports development in flood-prone areas that may not be safe to live in. As people move from less safe areas, housing prices in safer areas will increase. We must ensure that affordable housing options are available to serve existing residents and accommodate new residents moving from flood-prone areas. Partnering with municipalities and community leaders will be critical. This is a priority action in Thrive305.

WHAT HAVE WE ACCOMPLISHED?

We have integrated sea level rise into some of our transportation and redevelopment planning, but more needs to be done. Our Transportation Planning Organization included sea level rise considerations into their Long Range Transportation Plan, but we need to continue working to integrate flood risks into transit-oriented development planning. We continue to work with partners such as the University of Miami to explore affordable housing solutions in the context of climate resilience and long-range planning. This year, the Office of Resilience provided sea level rise guidance for the South Dade Busway, Beach Corridor SMART Plan, and downtown Government Center redevelopment projects. (SLR Strategy Action 10a)

We have existing programs and incoming funding to preserve some affordable housing. The County Housing Rehabilitation Program offers low-interest loans up to \$45,000 to single-family homeowners to make improvements to roofing, plumbing, heating and electrical systems in their homes. In addition, the Governor recommended two housing projects for funding through the Resilient Florida Grant Program: \$15 million for housing resiliency improvements in the Little River Adaptation Action Area and \$575,275 for updates to County-owned Ingram Terrace. (SLR Strategy Action 10b)

WHAT'S NEXT?

We must prioritize the preservation of affordable housing in safer areas and increase the resilience of existing housing. Our resilience, housing, and community development program staff continue to collaborate with researchers and organizations to integrate climate change and flood risks into housing policies. We will make resources available to preserve, climate-proof, and reinvest in existing neighborhoods. A big step to achieve this is to prioritize funding for existing weather-proofing programs such as the County's Weatherization Assistance Program. We must also prioritize working with planning and design staff and consultants to emphasize resilience. (SLR Strategy Action 10b)



Continuing the Rental Assistance Demonstration Program

Miami-Dade's Department of Public Housing and Community Development (PHCD) manages approximately 9,000 public housing units, which serve more than 20,000 residents. Approximately \$2 billion is needed to improve the conditions of existing public housing sites, which are over 40 years old on average. The budget for operating, maintaining, and making necessary improvements to these units comes directly from federal public housing funds, which have been facing significant cutbacks. One way to address this issue is through the federal Rental Assistance Demonstration (RAD) program⁽¹⁰⁾, which provides housing agencies a path to modernize housing and shift to more sustainable, long-term funding sources via the federal Section 8 program. In 2019, the County began converting most of our older public housing to RAD by partnering with private real estate development partners to rehab or reconstruct public housing units.

In 2020, 1,557 units of public housing were converted to RAD and 248 additional units of mixed-income housing were created through these projects. In 2021, PHCD unveiled 318 new affordable housing apartments. Two buildings, Brisas del Río and The Gallery at River Parc, which included 57 public housing units converted to RAD are the latest additions to River Parc campus on Miami River's south bank. The redesigned campus, which was originally all public housing, will provide 2,400 units of mixed-income housing within a mixed-use development that includes promenades and a river walk. This masterplan design contains multiple elements that interact with the River's water systems and ecosystem.

Another RAD conversion project, South Miami Gardens, is a site within a transit-oriented neighborhood and is well connected to an existing Metrorail station. The project involves the redevelopment of the 58 public housing units in an area that is naturally elevated and safe from sea level rise and storm events. The redevelopment of this site through the RAD program ensures that these affordable housing units are preserved and that current residents get access to new healthy, sustainable, modern, and beautiful housing. In addition, PHCD and its development partner are creating an additional 420 units of mixed-income housing at the site within mixed-use buildings.

PHCD is working closely with the Office of Resilience to plan how future developments in areas vulnerable to sea level rise can be redeveloped to be more resilient.

Implementation Table

No.	Action	Performance Metrics	Progress Update
1	Accelerate Adaptation Action Areas across the County	Number of resilience projects started within AAAs	Key projects are advancing in the Little River AAA as we begin scoping out the next AAA. Projects moving forward include septic to sewer conversion, water quality retrofits to stormwater infrastructure, drainage improvements, affordable housing rehabilitation and park expansion. Work will continue in 2022.
2	Require that County projects be designed for sea level rise	Internal process amended to require use of sea level rise projections in all project phases	Sea level rise design requirements exist but are not consistently applied to all County projects; we should prioritize creation of uniform design guidelines to ensure consistency across departments. The Director of Resilience Planning and Implementation will work with the Resilience Councils on this process in 2022.
3	Establish safer building and seawall elevation standards	Establishment of codes	Changes to some codes are underway but have not yet been adopted. Technical work has been completed for some. The County Attorney's Office reviews all proposed changes before proposals go to the Board of County Commissioners for a vote. The Director of Resilience Planning and Implementation will monitor progress in 2022.
4	Ensure development avoids flooding neighboring properties	Adoption of revised stormwater and County Flood Criteria rules	Technical work is well underway, but recommended code changes have not been made. The County Attorney's Office reviews all proposed changes before proposals go to the Board of County Commissioners for a vote. The Director of Resilience Planning and Implementation will monitor progress in 2022.
5	Enhance flood protection by expanding greenways and blueways	Green way and blueway pilot project in design phase	We applied for and secured nearly \$5 million for protecting environmentally endangered lands, critical examples of green and blue infrastructure. We will continue seeking additional funds for green and blue infrastructure in 2022 and beyond.
6	Flood-proof the County's most vulnerable critical facilities	Number of flood-proofing projects completed for critical facilities	We do not have a centralized method to track the number of flood-proofing projects that have been completed but analysis is underway. The Director of Resilience Planning and Implementation will work with the Resilience Councils on this process in 2022.
7	Integrate green infrastructure into County projects	Pilot stormwater park completed Chapter 9 of County Code updated	Green infrastructure projects have been installed in Arcola Lakes. The County Code has not been updated. The Director of Resilience Planning and Implementation will work with the Resilience Councils on this process in 2022.
8	Prepare for disaster recovery to accelerate inclusive adaptation to sea level rise	Establishment of new program or enhancement of existing program to help residents and small businesses recover and adapt	We launched the Strive305 program that supports small businesses and entrepreneurs to learn, grow and access funding for recovery through tools like Axis Helps Miami. We're also adding expert County staff to assess critical facilities like senior affordable housing buildings to prioritize resilience improvements.
9	Address vulnerable septic systems	Number of vulnerable septic systems addressed	We do not have a centralized method to track the number of connections to the sewer system, but analysis is underway. The Director of Resilience Planning and Implementation will work with the Resilience Councils on this process in 2022.
10	Increase affordable, resilient housing on high ground within SMART Plan transit corridors	Number of affordable housing units within 0.5 miles of a transit corridor that are developed above future flood levels	In 2020, 1,557 units of public housing were converted to RAD and 248 additional units of mixed-income housing were created. In 2021, PHCD unveiled 318 new affordable housing apartments. Further analysis of existing affordable housing units within 0.5 miles of a transit corridor needs to be completed. The Director of Resilience Planning and Implementation will work with the Resilience Councils on this process in 2022.

Financing (current & potential future)

- Existing staff resources
- Urban Sustainability Directors Network Equity, Diversity, Inclusion Fellowship Program
- Resilient Florida Grant Program

- Capital Infrastructure Improvement Program
- Building Better Communities bond
- Impact fees
- State, Federal grants
- Community Development Block Grant – Mitigation

- Existing staff resources

- Existing staff resources

- Parks, Recreation, and Open Spaces Budget
- Grants

- Community Development Block Grant – Mitigation
- FEMA Hazard Mitigation Grants
- Disaster recovery funds
- Resilient Florida Grant Program
- Federal infrastructure funds
- Congressional appropriations if USACE “Back Bay” Study authorized

- Annual budget
- Community Development Block Grant – Disaster Recovery
- State, Federal grants
- Design competitions

- Existing staff resources
- State, Federal Grants
- Potential to enhance existing programs (such as the disaster recovery funding sources, hazard mitigation funds, County Home Weatherization, Rehabilitation and Residential Construction Mitigation Program, HUD 203 (k) Rehabilitation Mortgage Insurance

- General Obligation Bonds
- Resilient Florida Grant Program
- State, Federal grants
- Federal infrastructure funding

- Low Income Housing Tax Credits (LIHTC)
- Community Development Block Grant (CDBG)
- Home Investment Partnerships (HOME) Program
- State Apartment Incentive Loan (SAIL)
- State Housing Initiatives Partnerships (SHIP) Program
- Miami-Dade County Documentary Stamp Surtax
- Miami-Dade Affordable Housing Trust Fund
- Miami-Dade Housing Finance Authority Bonds
- State, Federal grants

Regional Projects

Miami-Dade County continues to collaborate with local, state and federal partners to ensure our communities and regional infrastructure systems are adapted to a future with higher sea levels.

Southeast Florida Regional Climate Change Compact

The County is a founding member of the Southeast Florida Regional Climate Change Compact⁽¹¹⁾ which also includes Broward, Monroe and Palm Beach counties. The Compact is a network of highly talented and committed leaders of counties that face similar long-term risks as Miami-Dade County. Continued regional coordination through the Compact is essential to collaborate on and fund critical projects.

Federally-Funded Coastal Storm Risk Management (CSRM) Feasibility Studies

Two U.S. Army Corps of Engineers (USACE) CSRM studies are underway. The feasibility studies are 100% federally funded. Projects supported by the County will be recommended by USACE to the U.S. Congress for funding to complete additional detailed planning, engineering, and design work before implementation. The two CSRM studies are:

- The “Back Bay” Study: This study is investigating solutions to reduce damage from coastal storm surge amplified by sea level rise on non-oceanfront areas. Due to the County’s geographic size, population, and complexity of coastal flooding risks, the USACE is evaluating measures within seven focus areas selected based on physical and social vulnerability to storm surge flooding. Potential measures include elevating homes, restoring mangroves, and building floodwalls and surge barriers. Additionally, critical infrastructure will be evaluated for flood-proofing county-wide. Projects that receive funding and ultimately move forward will be on a 65%-35% cost-share between the federal government and the County.
- The “Beach” Study: This study seeks to reauthorize beach renourishment projects along Miami-Dade County’s Atlantic shoreline.

Other related USACE studies

The USACE is conducting the Harbor Navigation Study with PortMiami and undertaking a broader, multi-state study called the South Atlantic Comprehensive Study (SACS) to support a resilient South Atlantic region. In the future, the USACE may work with the South Florida Water Management District to complete the Central and Southern Florida (C&SF) Project Flood Resiliency Study to identify measures to adapt the regional water management system as sea levels rise.

Comprehensive Everglades Restoration Plan (CERP) & the Biscayne Bay and Southeastern Everglades Ecosystem Restoration (BBSEER) Project

Under the South Florida Ecosystem Restoration Program, the USACE implements the Comprehensive Everglades Restoration Plan (CERP), among other projects. CERP is a state-federal partnership with the South Florida Water Management District aimed at restoring more natural regional flow of freshwater to support ecosystems, support the drinking water supply, and reduce saltwater intrusion. The Biscayne Bay and Southeastern Everglades Ecosystem Restoration (BBSEER)⁽¹²⁾ is analyzing six CERP program components in our County.

C-111 South Dade Project

Under the South Florida Ecosystem Restoration Program, the USACE implements the C-111 South Dade project in collaboration with the South Florida Water Management District. The project focuses on the Northeast Shark River Slough, the Taylor Slough, and the eastern panhandle of Everglades National Park while maintaining flood protection in the basin. The project complements other infrastructure projects to reduce groundwater seeping out of the eastern part of the national park. The project also enables additional water flow into the national park and Florida Bay, providing operational flexibility, enhancing environmental restoration of the area, and maintaining flood protection.

South Florida Water Management District (SFWMD) Sea Level Rise and Flood Resiliency Plan

In 2021, the SFWMD released a draft of their “Sea Level Rise and Flood Resiliency Plan,” the first District initiative to compile a comprehensive list of priority resiliency projects with the goal of increasing community resiliency to flooding and SLR impacts throughout South Florida. This goal will be achieved by updating and hardening water management infrastructure and implementing effective, resilient, basin-wide solutions.

This year the Biscayne Bay and SE Everglades Ecosystem Restoration project was launched.



0 5 10 20 Miles



Funded County Projects

Miami-Dade County is already implementing a combination of projects that support Adaptation Approaches. Projects displayed on this map are either fully or partially completed, ongoing, or have received full or partial funding. They are organized by color categories that match several adaptation tools in our toolbox.



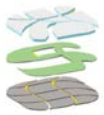
Build artificial reefs & breakwaters

Project # 1



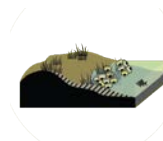
Improve seawalls

Project # 45, 46, 48, 49, 126, 127, 135



Continue resilient land use planning

Project # 2 (13 park locations) 101, 102



Increase living shorelines

Project # 51, 138, 139, 140



Convert septs to sewer

Project # 103, 104, 131



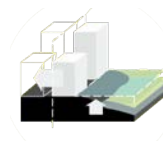
Increase permeable surfaces

Project # 52, 53
(5 areas)



Flood-proof buildings

Project # 7, 8, 105, 106, 107, 108, 109, 132, 133, 134



Increase waterfront setbacks

Project # 54



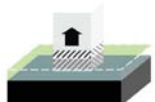
Enhance dunes

Project # 10, 11



Preserve wetlands

Project # 56, 141, 142, 143



Elevate buildings

Project # 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 110



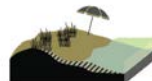
Raise roads

Project # 57, 58, 59, 60, 61, 62, 63, 128, 129



Elevate critical equipment

Project # 25, 26, 29, 31, 124, 125



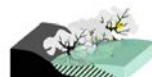
Renourish beaches

Project # 64



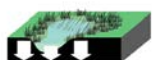
Expand green spaces

Project # 32, 34, 35, 111



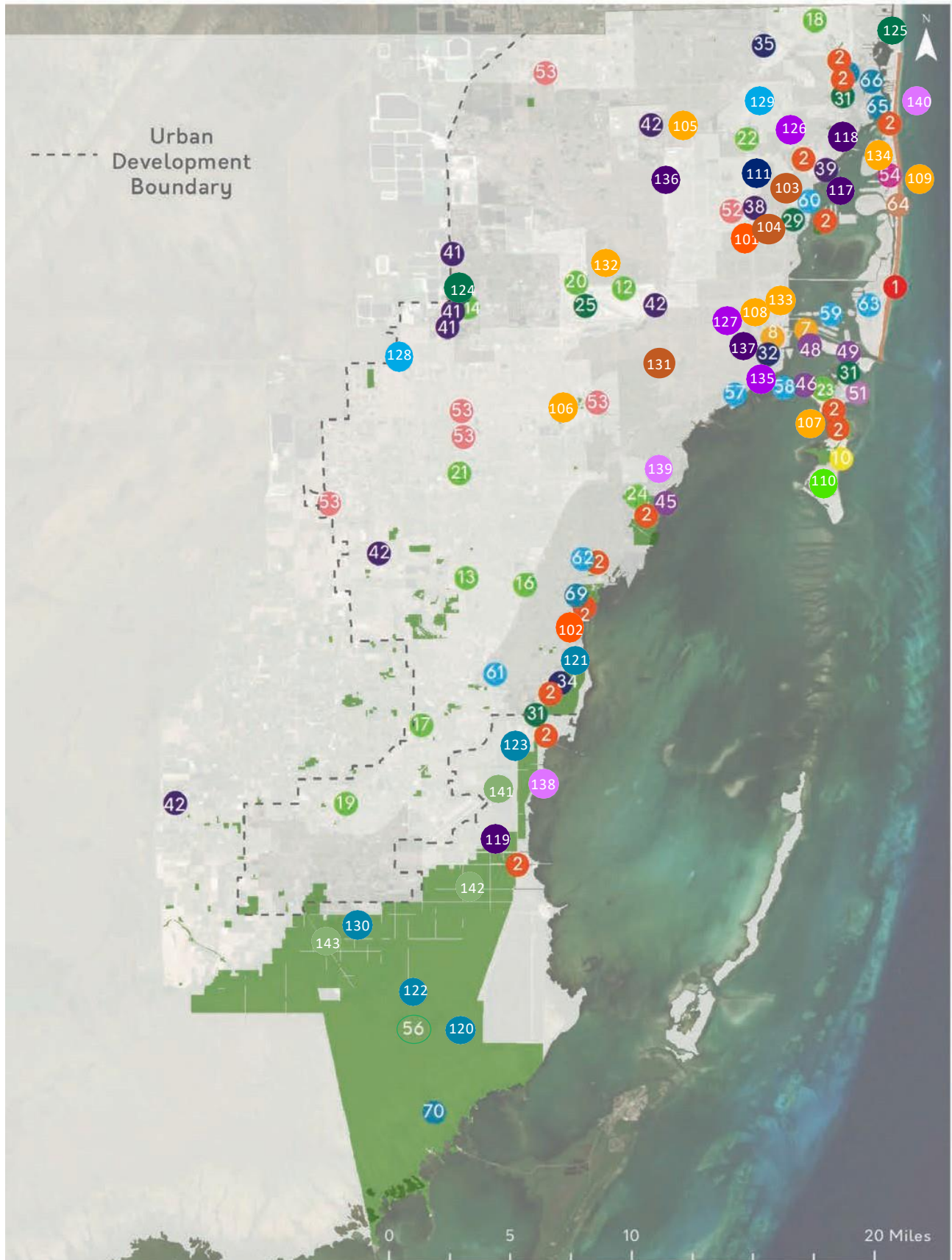
Restore mangroves & marshes

Project # 65, 66, 67, 69, 70, 71, 120, 121, 122, 123



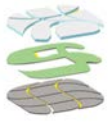
Improve local stormwater management

Project # 38, 39, 41, 42, 112 -119, 136, 137



Unfunded County Projects

Miami-Dade County continues to plan for and seek funding for additional projects that support a combination of Adaptation Approaches. Projects displayed on this map are under consideration or are seeking funding for planning, design, or construction. They are organized by color categories that match the adaptation tools in our toolbox.



Continue resilient land use planning

Project # 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13



Improve local stormwater management

Project # 46, 50



Convert septic to sewer

Project # 72



Improve seawalls

Project # 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61



Deploy temporary flood panels

Project # 23



Preserve wetlands

Project # 62



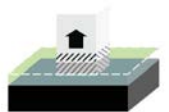
Enhance dunes

Project # 29



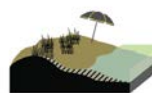
Raise roads

Project # 64, 65



Elevate buildings

Project # 30, 31, 32, 33, 34, 35, 36, 38



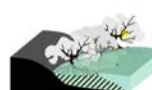
Renourish beaches

Project # 67



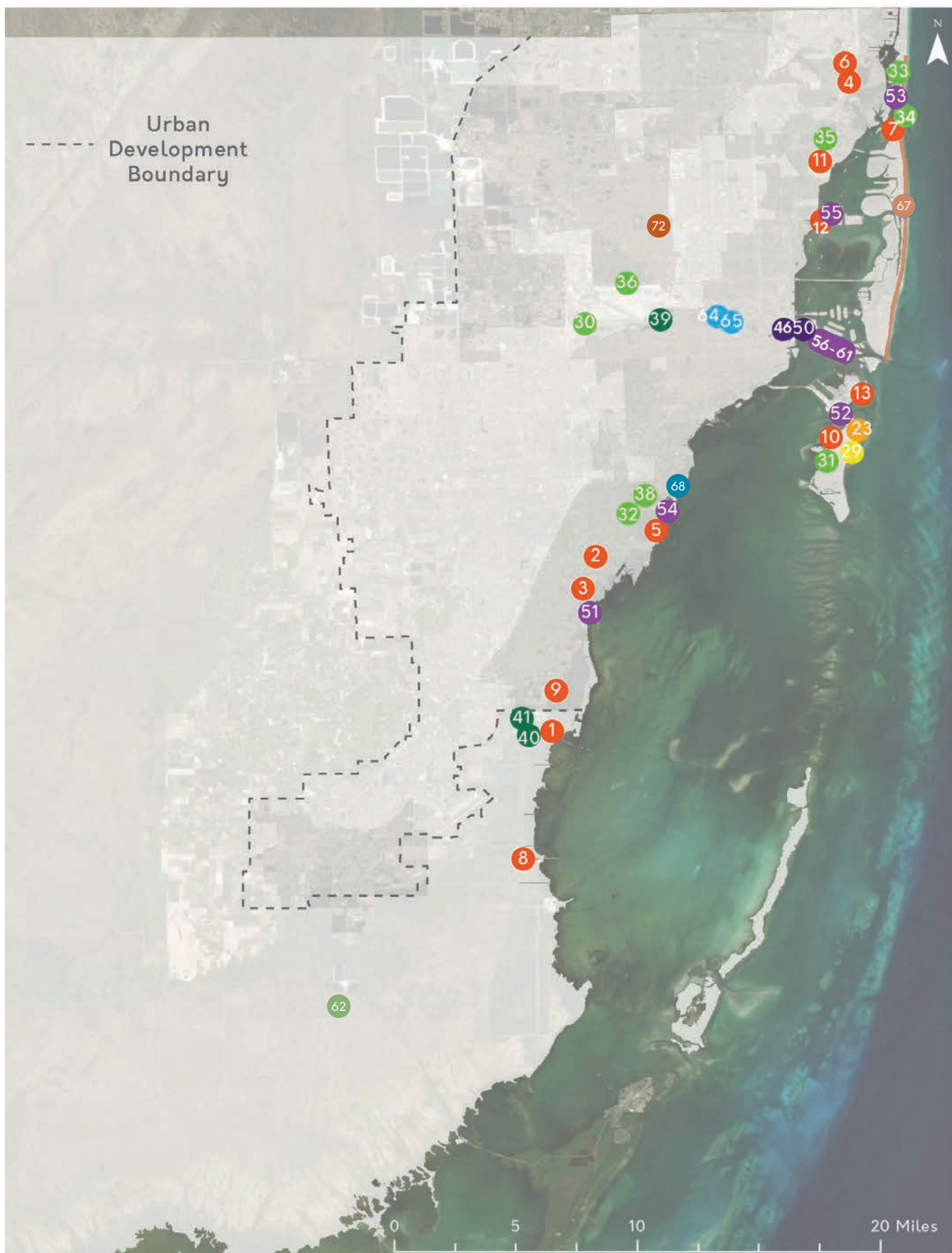
Elevate critical equipment

Project # 39, 40, 41



Restore mangroves & marshes

Project # 68, 69



Resources Table

Reference No.	Resource	Source	
1	Miami-Dade County Sea Level Rise Strategy	Office of Resilience, Miami-Dade County	
2	Little River Adaptation Action Area	Office of Resilience, Miami-Dade County	
3	Flooding Vulnerability Viewer	Office of Resilience, Miami-Dade County	
4	Resilient Rehab: A Guide for Historic Buildings in Miami-Dade County	Office of Historic Preservation, Miami-Dade County	
5	County Flood Criteria Update	Department of Regulatory and Economic Resources, Division of Environmental Resource Protection (DERM), Miami-Dade County	
6	Miami-Dade County Back Bay Coastal Storm Risk Management Feasibility Study	US Army Corps of Engineers	
7	Miami-Dade County Environmentally Endangered Lands Program (EEL)	Department of Regulatory and Economic Resources, Division of Environmental Resource Protection (DERM), Miami-Dade County	
8	Miami-Dade County Local Mitigation Strategy Web Mapper	Fire and Rescue Department, Division of Emergency Management, Miami-Dade County	
9	Miami-Dade County Septic-to-Sewer Plan of Action	Water and Sewer Department, Miami-Dade County	
10	Miami- Dade Rental Assistance Demonstration Program	Department of Public Housing and Community Development, Miami-Dade County	
11	Southeast Florida Regional Climate Change Compact	Southeast Florida Regional Climate Change Compact	
12	Biscayne Bay and Southern Everglades Ecosystem Restoration (BBSEER) Project	US Army Corps of Engineers	

Hyperlink

<https://miami-dade-county-sea-level-rise-strategy-draft-mdc.hub.arcgis.com>

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

<https://gisweb.miamidade.gov/vulnerabilityviewer>

www.miamidade.gov/planning/library/reports/resilient-rehab-report.pdf

<https://www.miamidade.gov/environment/water-control-and-flood-criteria.asp>

<https://www.saj.usace.army.mil/MiamiDadeBackBayCSRMFeasibilityStudy>

<https://www.miamidade.gov/pa/endangered-lands.asp#:~:text=The%20EEL%20program%20is%20administered%20by%20the%20Miami-Dade,is%20approved%20by%20the%20Board%20of%20County%20Commissioners>

<https://mdc.maps.arcgis.com/apps/dashboards/50e1db23f56e4f6a81d47f415cbbf18e>

<https://www.miamidade.gov/mayor/library/memos-and-reports/2020/12/12.10.20-Septic-Systems-Vulnerable-to-Sea-Level-Rise-Plan-of-Action-Report.pdf>

<https://www.miamidade.gov/global/housing/rental-assistance-demonstration-program.page>

<https://southeastfloridaclimatecompact.org>

<https://www.saj.usace.army.mil/BBSEER>

