Greauxing Resilience at Home

Miami-Dade County, Florida:
Little River Adaptation Action Area Plan

GEORGETOWN CLIMATE CENTER

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ABOUT THIS REPORT

Louisiana is one of the hardest-hit areas in the United States as extreme weather events and regular flooding become more frequent and intense.[1] These challenges often fall "first and worst" on Black, Indigenous, and People of Color or "BIPOC" and low-income communities.[2] This is especially true in the U.S. Gulf Coast region and the state of Louisiana.

Over time, these challenges are being exacerbated by population increases and transitions as climate and non-climate drivers (e.g., people moving out of urban centers into more rural areas) influence where people choose — or are able — to live.

In southeast Louisiana, resilient, affordable housing initiatives are critical to ensuring equitable adaptation that takes into consideration the myriad overlapping challenges facing all Louisianans, but especially those living in communities that have long borne a disproportionate burden of risk.

Over a two-year period between fall 2020 and spring 2022, **Capital Region Planning Commission** and **Georgetown Climate Center** partnered with dozens of people from government, private, and nonprofit sectors and community stakeholders in Region Seven of the **Louisiana Watershed Initiative**.[3] The result of that partnership effort is **Greauxing Resilience at Home: A Regional Vision**[4] (Regional Vision), a resource to inform Region Seven's ongoing work to increase community resilience by promoting affordable housing and nature-based solutions.

Regional and local governments in Region Seven can use the Regional Vision to identify potential legal, planning, and policy tools and projects to increase the affordability and availability of housing and the use of nature-based solutions. In addition, the Regional Vision offers insights for policymakers across Louisiana, throughout the Gulf Coast region, and nationally.

This report is composed of 24 individual case studies developed by Georgetown Climate Center to support the Regional Vision. These case studies describe best and emerging practices, tools, and examples from Louisiana and other U.S. jurisdictions to make progress on these complex and challenging issues. These case studies are intended to provide transferable lessons and ideas for regional and local governments addressing housing and mitigating flood risk as integrated parts of comprehensive community resilience strategies. Collectively, these case studies present a suite, although not an exhaustive list of tools and approaches that can be used to facilitate any of these efforts.

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1 State of La., Louisiana Climate Action Plan: Climate Initiatives Task Force Recommendations to the Governor 15–16 (Feb. 2022), *available at* **https://gov.louisiana.gov/assets/docs/CCI-Task-force/CAP/ClimateActionPlanFinal.pdf**.

2 *See id.* at 15–17.

3 The Louisiana Watershed Initiative is an effort to create a paradigm shift in floodplain management towards a strategy that approaches flood risk reduction from a nature-based solutions and land-use-based approach. A part of this approach includes identifying eight separate regional watershed management areas to assist in achieving cross-jurisdictional activities.

Region Seven is one of these eight watershed regions. Region Seven encompasses the upper part of the toe of Louisiana's boot. It spans eastward from the Mississippi River near Baton Rouge across the Northshore (i.e., north of Lakes Pontchartrain and Maurepas) to Mississippi and along the Mississippi River to the Bonnet Carré Spillway. The region includes 13 parishes and 45 incorporated municipalities.

4 To reflect their connection to Louisiana's cultural heritage, the project team and members of Region Seven that participated in this process chose to use the word "Greaux," a French-inspired phonetic spelling of the word "Grow," to brand this product.

Where possible, all the case studies share a consistent organizational format to allow easier cross-comparison of tools, processes, and takeaways:

- The **Background** section introduces the regional and local context (e.g., location, demographics) for each case study, including the following facing each jurisdiction: extreme weather risks, housing and environmental challenges, and development pressures.
- The **Housing** section focuses on the legal, planning, and policy tools and projects that have been designed and implemented to support the growth and preservation of housing affordability and availability.
- The **Environment** section highlights how vulnerable habitats like floodplains and other open spaces are being restored, conserved, and protected as a part of comprehensive resilience strategies to provide important ecosystem and community benefits like reducing flood risk and creating community assets, such as parks and trails.
- The **Community Engagement** section summarizes how governments have provided different types of public engagement opportunities and how affected residents have contributed to these planning and decisionmaking processes.
- The **Funding** section identifies how the programs, plans, and projects discussed have been funded by federal, state, and local government and private and nongovernmental sources.
- The **Next Steps** section captures the anticipated future actions that featured case study jurisdictions may take in implementing these tools and strategies.
- The **Considerations and Lessons Learned** section concludes with the primary takeaways from each example that other regional and local policymakers and communities may consider when developing or implementing their own housing and resilience strategies using these legal, planning, and policy tools.

A few additional notes about the case studies:

- **The case studies selected prioritize relatable and scalable models from places similar to Louisiana:** Wherever possible, Georgetown Climate Center aimed to acknowledge and lift up the work of jurisdictions and nongovernmental actors in Region Seven and neighboring watershed regions to inspire peer-to-peer sharing and actions from as close to home as possible. These resources are drawn from 12 states, with an emphasis on regions and local areas in the Gulf and Mid-Atlantic: Colorado, Florida, Georgia, Illinois, Iowa, Louisiana, New York, North Carolina, Oregon, South Carolina, Texas, and Virginia. Examples and lessons drawn from these regions are easiest to apply to a Louisianan context because they feature similar geography or analogous impacts from flooding and other climate effects.
- **There are no perfect, "one-size-fits-all" solutions:** While the case studies and resource entries informing the Region Vision are instructive for Region Seven and beyond, none of them are "perfect" examples of how to solve these complex and challenging issues. Georgetown Climate Center found no single case study or resource that provides a point-for-point or model for what Region Seven is trying to accomplish. No other jurisdiction identified is currently trying to integrate housing, flooding, equity, resilience, and population changes together in a single plan, ordinance, or policy. However, some jurisdictions are moving in that direction, or are making progress on discrete elements of what will eventually become a more holistic strategy. Therefore, this report and the Regional Vision draw analogous connections and recommendations that can be combined to facilitate more comprehensive planning and land-use efforts.

The case studies in this report were informed by interviews with practitioners and community leaders in charge of designing and overseeing this work. No statements or opinions, however, should be attributed to any individual or organization included in the *Acknowledgements* section of this report.

It is also important to note that the examples described in each case study are ongoing and the content included in this report is current as of spring 2022. For future updates about these and other case studies and the Regional Vision, please visit **Greauxing Resilience at Home: A Regional Vision** and Georgetown Climate Center's **Adaptation Clearinghouse**.

Miami-Dade County, Florida

Little River Adaptation Action Area Plan

EXECUTIVE SUMMARY

The Little River Adaptation Action Area (AAA) plan was released in January 2022 as part of the process to implement the Miami-Dade County Sea Level Rise Strategy. Adaptation Action Areas are locations that are especially prone to climate impacts like coastal flooding so that they can be prioritized for funding and planning purposes.[1] The Little River AAA is made up of parts of the City of Miami, as well as the Village of El Portal and two unincorporated areas.

Identified as one of the communities in that area most susceptible to climate impacts, Miami-Dade County's Office of Resilience, in collaboration with Florida's Department of the Department of Environmental Protection and private partners like Savino-Miller Design, developed the adaptation plan to address existing conditions across five sectors by offering distinct adaptation tools that can help mitigate the impacts of climate within each sector. From this plan, local policymakers and planners can take the generalized idea behind AAA — and the practice of making adaptation plans more specific to localities — as well as the specific projects and programs recommended within the document and implement them in their own communities.

BACKGROUND

Miami-Dade County is located in the southeastern most part of Florida, encompassing more than 2,000 square miles.[2] It is home to parts of two national parks — the Everglades and Biscayne Bay — 34 unincorporated cities (and several additional unincorporated areas), and incorporated cities like Miami, Florida City, and Sweetwater.[3] With a population of around 2.7 million people, the is

[1] ARCADIS, MIAMI-DADE COUNTY SEA LEVEL RISE STRATEGY (2021), *available at* https://miami-dade-county-sea-level-rise-strategy-draft-mdc.hub.arcgis.com/.

[2] *About Miami-Dade County*, MIAMI-DADE COUNTY (2021), https://www.miamidade.gov/global/disclaimer/about-miami-dade-county.page.

[3] *Cities Within Counties*, DIV. OF LIBRARY INFO. SERV., FL. DEP'T OF STATE (2022), https://dos.myflorida.com/library-archives/research/florida-information/government/local-resources/citycounty-list/counties/#Miami-Dade.

primarily Hispanic, (62.8 percent), Black (15.3 percent,) and white (12.8 percent white).[4] Over 75 percent of people speak a language other than English as their first language at home.[5]

Little River — one community within Miami-Dade County — includes the Village of El Portal, the northern part of Miami, and two unincorporated areas.[6] It has almost 19,000 residents, 68 percent of which are Black, and has a median household income of around $30,000.[7] Most of the neighborhoods within Little River are located on the Little River itself, the Little River Canal, or Biscayne Bay.[8]

Because of the community's location and its low elevation, many residents are concerned about the threat of sea-level rise and flooding. In recent years, King tides[9] and heavy rainfall events have damaged or destroyed homes, overwhelmed infrastructure and drainage systems, and caused septic systems to fail, ultimately forcing families to leave their homes.[10] In the Little River community alone, residents reported that they were experiencing repeated damage to their yards, basements, and garages due to flooding, which also led to mold and additional structural issues.[11] Streets are flooding every day due to rainstorms, and urban development in the area has replaced much of the natural, green spaces that historically would help with stormwater drainage.[12]

To address these issues, as well as other associated climate impacts, the county developed the **Miami-Dade Sea Level Rise (SLR) Strategy**, which outlines five adaptation approaches: (1) to build on fill; (2) to build like the Keys; (3) to build on high ground around transit; (4) to expand green- and blueways; and (5) to create green and blue neighborhoods.[13] As part of the implementation plan, the county identified several communities likely to be most impacted by climate change, and designated them as Adaptation Action Areas (AAA).

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[4] *Data USA: Miami-Dade County, FL*, DATA USA, https://datausa.io/profile/geo/miami-dade-county-fl (last visited Jan. 13, 2022).

[5] *Id*.

[6] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 8 (2022).

[7] *Little River*, NICHE (2022), https://www.niche.com/places-to-live/n/little-river-miami-fl/residents/.

[8] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 8 (2022).

[9] "A King Tide is a higher-than-normal tide that typically lasts about 3 hours. King Tides occur annually and predictably; in September through November in Miami. King Tides may cause residents to experience 'sunny day flooding' where a street or other areas will temporarily become flooded when it is not raining." *King Tides*, MIAMI.GOV (2022), https://www.miamigov.com/My-Government/ClimateChange/King-Tides.

[10] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 10 (2022).

[11] *Id*. at 30.

[12] *Id*.

[13] ARCADIS, MIAMI-DADE COUNTY SEA LEVEL RISE STRATEGY (2021), *available at* https://miami-dade-county-sea-level-rise-strategy-draft-mdc.hub.arcgis.com/.

Adaptation Action Areas

In 2011, the State of Florida passed a law to enable local governments to adopt optional comprehensive plan designations for areas that experience coastal flooding and are vulnerable to sea-level rise for the purpose of prioritizing funding for infrastructure projects and adaptation planning.[14] Under the state Community Planning Act, local governments can adopt AAA and consider policies in their local comprehensive plans to increase a community's resilience.[15]

In 2015, the state developed a guidance document to better assist counties and municipalities in Florida with exploring the potential use of AAA.[16] As such, AAA have been used throughout Florida, including in Miami-Dade County.

According to Miami-Dade County, an AAA "is a flexible planning tool that allows Miami-Dade County to work directly with community members to create a more detailed adaptation plan for a focus area. It also facilitates the coordination of projects such as road, park and green infrastructure, and water and sewer improvements, among others."[17] The Little River Community was identified as one of these AAA.

There are many benefits of identifying a neighborhood or larger area as an AAA. Throughout Florida, AAA planning and identification have allowed local governments and stakeholders to align plans and capital projects across the region to better leverage available resources; better educate and collaborate with community stakeholders to identify values, challenges, and potential solutions to adapt to sea-level rise; and create more forward-thinking plans that include, among other recommendations, next steps and potential policy changes that can be implemented.[18]Additionally, "AAA planning enhances opportunities to learn from and collaborate with residents, community leaders and neighborhood organizations to determine which adaptation approaches are preferred for a given area."[19] The collaborative aspect of AAA brings together stakeholders, organizations, and agencies when they otherwise may have been siloed to create a more

[14] Georgetown Climate Ctr., *Creation of "Adaptation Action Areas" in Florida's Community Planning Act*, ADAPTATION CLEARINGHOUSE (June 2, 2011), https://www.adaptationclearinghouse.org/resources/creation-of-e-adaptation-action-areas-e-in-florida-s-community-planning-act.html.

[15] *Id*.

[16] Georgetown Climate Ctr., *Adaptation Action Areas Guidebook: A Planning Guidebook for Florida's Local Government*, ADAPTATION CLEARINGHOUSE (Aug. 2015), https://www.adaptationclearinghouse.org/resources/adaptation-action-areas-guidebook-a-planning-guidebook-for-florida-s-local-government.html.

[17] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 16 (2022).

[18] *Id*.

[19] ARCADIS, MIAMI-DADE COUNTY SEA LEVEL RISE STRATEGY 57 (2021), *available at* https://miami-dade-county-sea-level-rise-strategy-draft-mdc.hub.arcgis.com/.

holistic approach to address the short- and long-term needs of communities that are especially susceptible to the impacts of climate change.

Further, the legal authority and guidance resources behind AAA lend them a greater amount of statewide legitimacy and awareness that might not exist for purely local or jurisdiction-specific land-use plans and zoning designations. Since these optional plan designations are codified in a state statute, state and local policymakers together have a shared term and understanding of how AAA can increase local resilience to flooding and climate impacts. This can help to attract more attention to AAA, reduce the time and effort involved in socializing new concepts within and across governments, and decrease the time it takes to plan for and implement potential actions on the ground.

This state support, however, is importantly balanced by the fact that AAA are a model that can be adapted to fit local needs and context and are not a "one-size-fits-all" tool that lack flexibility.

OVERVIEW OF THE LITTLE RIVER ADAPTATION ACTION AREA PLANNING EFFORT

Miami-Dade County's Office of Resilience has been working with the Florida Department of Environmental Protection and Savino Miller Design Studios to develop a plan to implement adaptation projects in the Little River AAA.[20] The multijurisdictional planning effort began in October 2020 with the collection of background research on the community as a whole. From there, the county has worked to engage with community members as Savino Miller Design Studios developed the plan. The Adaptation Plan for the Little River Adaptation Action Area was published in January 2022.[21] The publication of this plan marks the first county-led pilot of an AAA in Miami-Dade County. The Little River area was selected after a convergence of different factors, including increased attention relating to poor water quality and fish kills in Biscayne Bay, where the Little River canal was a significant contributor to these issues. Other issues related to septic, especially with increase flooding and contamination of the groundwater table. These issues, backed by political support due to the election of Mayor Daniella Levine Cava, enabled by a state planning grant, led to the start of this work.

The plan begins with a brief executive summary that lays out the unique characteristics and issues the Little River community faces due to climate change.[22] Because of the expansive community engagement process that is embedded into AAA planning, the document also includes stories and experiences collected directly from community members living within the Little River AAA, and contains a section of the risks and challenges that climate change poses to the neighborhoods.

[20] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 16 (2022).
[21] *Id*.
[22] *Id*. at 12.

These include risks related to flooding, equity and historic discrimination concerns, and issues stemming from the impacts of extreme heat.[23] This section also breaks down the consequences that these risks and challenges have on five distinct sectors: stormwater and drainage, wastewater systems, housing, natural areas and greenspace, and transportation.[24]

To address the issues outlined in the five sectors, the rest of the plan outlines "Next Steps," which explores a mix of adaptation approaches, which are "supported by specific tools."[25] The adaptation approaches and accompanying tools, which are outlined in the Miami-Dade County SLR Strategy, are specifically adapted to the Little River community and the unique challenges the AAA faces. As such, the plan prioritizes four specific projects to address the most urgent issues facing residents of the Little River AAA: improving local stormwater management, expanding greenspaces, addressing housing issues, and transitioning septic systems to the main sewer system.[26] The plan also provides specific examples of where these priority projects are being implemented. Finally, the authors of the plan outline the various policy changes that can take place, and how implementation of the plan recommendations can be monitored.[27]

The parts below focus on the elements and recommendations in the Little River AAA plan that deal with affordable housing and nature-based solutions to mitigate flood risk.

HOUSING

In the Little River community, there are three public housing structures — Kline Nunn, Little River Plaza, and Little River Terrace.[28] In 2017, the county released an action plan that identified the first two developments as some of the county's assets most vulnerable to climate change.[29] In addition to these affordable housing units, other types of homes throughout the Little River include "private mobile home communities, private and multifamily residences, and private single-family homes."[30] The housing stock impacted by sea-level rise and flooding is exacerbated by an ongoing housing crisis in the Little River community and Miami-Dade County more broadly. Specifically, there is a current housing shortage within the Little River community, and as of today, communities of color and those who rent or have low- or fixed-incomes are most severely impacted.[31] To determine the level of vulnerability in the Little River community, the county developed a map that differentiates between land/property usage, while also color coding which

[23] *Id.* at 30–35.
[24] *Id*. at 36–45.
[25] *Id*. at 48.
[26] *Id.* at 60.
[27] *Id*. at 70–72.
[28] *Id*. at 40.
[29] *Id*.
[30] *Id*.
[31] *Id*. at 41.

areas are most at risk of flooding and sea-level rise.[32] The Office of Resilience recommends that any further housing development should be redirected to the less flood-prone areas identified by the map, while also taking into account "the potential displacement of existing communities in less flood-prone areas due to increased, new development and potentially higher property taxes."[33]

Outside of this general recommendation, the Little River AAA plan outlines several adaptation tools specific to future home development, including elevating buildings, elevating critical equipment, and the potential creation of a voluntary buyout program.

- **Elevating buildings**: Currently, most homes in the Little River AAA were built in the 1960s and 1970s, before the existence of modern floodplain management standards.[34] This has resulted in many of the homes — including low-income and multi-family units — having first-floor elevations well below base flood elevation levels set by the Federal Emergency Management Agency. Elevating buildings will involve raising structures above expected sea-level rise levels, as well as retrofitting them with measures that can help reduce flood risk to the structure.[35] Relating to existing structures, buildings can be elevated through "elevating an existing structure in-place by filling the lower levels of the home and raising the roofs, beams, doors, and windows," or like filling the lower levels of a home and raising the roof, or using piling.[36] However, while it can be cost-effective to plan for elevation in new developments, practices like piling can be expensive, and the burden typically falls to the homeowner. While elevated structures can save homeowners money in the long-term, upfront investments in these changes can be expensive for individuals. As one potential option to reduce this initial expense, the Office of Resilience recommends that neighborhoods could plan on grouping multiple homes as part of an elevation project to consolidate and reduce overall costs.[37]

- **Elevating critical equipment**: Whereas raising the height of entire buildings can be extremely costly, permanently raising critical equipment like air conditioning units, generators, and fuel takes can be less expensive and a more immediate way to prepare for higher water levels.[38]

- **Offering voluntary buyouts**: Federal, state, and local government **programs** exist that offer willing homeowners an opportunity to sell their property to the government in instances where that property has been flooded or is at risk of flooding.[39] This land is then

[32] *Id*. at 46.
[33] *Id*. at 86.
[34] Savino Miller Design Studio, Draft Adaptation Plan: Little River Adaptation Action Area 130 (2021).
[35] *Id*. at 47.
[36] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 86 (2022).
[37] *Id*.
[38] *Id*.
[39] *Id*.

typically restored to public open spaces, which can help to drain stormwater runoff. Implementing a similar program in Little River for low-income homeowners could be extremely helpful, but more "conversations and education are needed for residents in the AAA who are interested in exploring the voluntary buyout option."[40]

Currently, Miami-Dade County is seeking funding to redevelop and renovate the three existing affordable housing developments with these adaptation tools in mind.[41] Expected to start in the summer of 2022, the Public Housing and Community Development Department's plan to retrofit these properties to "modern resilience and sustainability standards" is estimated to cost $29 million.[42]

ENVIRONMENT

Green Spaces

Much of the lower Little River neighborhood landscapes have been transformed from naturally flowing rivers into a managed canal system.[43] Where once there was a river slough and wildlife, now there are canals and urban communities. While there are still a "few pockets of green space and natural areas," one of the main goals of the Office of Resilience, (as stated in the plan), is to expand green- and blueways throughout the community.[44] Several places in the Little River AAA area are already being expanded or renovated to improve the environment within these communities.[45] For example, the Village of El Portal is working to plant trees along routes that children take to school and increase access to water for all residents.[46] In addition, Miami is exploring how to enhance parks near the water, with an additional goal of developing green spaces near future transit projects.[47]

To further increase access to green spaces and improve parks, the strategy outlines two adaptation tools: expanding green spaces and increasing living shorelines.

- **Expanding green spaces**: Green spaces like parks and wetlands offer several benefits to the community in which they are located, including functioning as a place to collect, treat, and store water. In redeveloping open spaces using green infrastructure projects like urban forests, mangroves, and the installation of living shorelines, communities can make more room for increasing water levels. "Green spaces can help block debris from moving

[40] *Id*.
[41] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 86 (2022).
[42] *Id*.
[43] *Id*. at 42.
[44] *Id*.
[45] *Id*. at 53.
[46] *Id*. at 84.
[47] *Id*.

through our canal system during storm events, reduce stormwater runoff, filter water before it enters the canals and ground, and support recreation and physical and mental well-being."[48] Several parks and open spaces are slated for redevelopment, which should incorporate planting more trees and upgrading natural stormwater infrastructure.

- **Increase living shorelines**: Living shorelines are areas along the water that are stabilized and protected from storms, waves, and erosion through the use of natural elements like plants and rocks.[49] In addition to shoreline protection benefits, living shorelines can also create habitats for natural resources.

Currently, the county's Department of Parks, Recreation, and Open Spaces (PROS) is working to expand the current footprint of a park within an unincorporated coastal area to include a recently acquired 1.4 acres of adjacent property.[50] Between the estimated start of the project in March 2022 and the estimated completion in spring 2023, PROS plans to host public meetings in an effort to better incorporate residents' input for design elements relating to the park.[51] In a more inland unincorporated area, PROS is working with partners like CITY Furniture and the Arbor Day Foundation to plant over 400 trees in an existing park to reduce flooding and the impacts of extreme heat.[52] Eventually, the plan is that "the park will benefit from the design and installation of a bioswale for onsite stormwater storage and water quality treatment near [the] existing parking lot."[53]

Drainage and Stormwater

Because the broader Little River area is made up of several municipalities and unincorporated areas, local stormwater management, ownership, and operation consists of various agencies and entities, including Miami-Dade County, the City of Miami, the Village of El Portal, and the Florida Department of Transportation.[54] The primary drainage system within the Little River AAA is made up of the Little River canal and its associated salinity control structures, the smaller canals, and the neighborhood systems, which consist of street inlets, pipes, pumps, French drains, and exfiltration trenches.[55] When conducting a study relating to potential flood mitigation alternatives, the South Florida Management District (the District) found that the Little River area and its drainage infrastructure was among the most vulnerable in the area.[56] This is primarily due to the

[48] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 36 (2021).
[49] SAVINO MILLER DESIGN STUDIO, ADAPTATION PLAN: LITTLE RIVER ADAPTATION ACTION AREA 86 (2022). In comparison, sea walls typically are considered gray infrastructure and use manmade materials.
[50] *Id*.
[51] *Id*.
[52] *Id*.
[53] *Id*.
[54] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 128 (2021).
[55] *Id.*
[56] *Id*. at 33.

fact that when the stormwater system was designed, sea-level rise was not necessarily a risk that was taken into account.[57] The amount of low-lying areas in the community, and the continued use of inadequate or malfunctioning French drain systems continues to exacerbate flooding issues,[58] as does the high concentration of impervious surfaces in several "pockets" throughout the AAA.[59]

In the past, the Department of Transportation and Public Works used financing from general obligation bonds to fund the construction of new stormwater pump stations and the retrofitting of existing pump stations to better service and provide flood relief for certain neighborhoods in the Little River AAA.[60] Additionally, both Miami and the Village of El Portal have Stormwater Management Plans that include phased improvements that will help decrease flooding.[61]

To continue to address stormwater and drainage concerns, the Little River AAA plan offers four adaptation tools: improving the regional drainage system, improving local stormwater management, increasing permeable surfaces, and expanding green spaces.

- **Improving the regional drainage system**: The District has continued to leverage grant opportunities to study how to improve the Little River canal and flood control in the Central and South regions of Miami-Dade County. Improving the regional drainage system further will require a "vast flood protection network consisting of an extensive system of canals, water control structures, levees, and reservoirs managed by the South Florida Water Management District."[62]
- **Improving local stormwater system**: To improve the stormwater system and management, the current drainage network should be modified to minimize the extent and duration of flooding during heavy rainfall. This modification can include the installation of backflow preventers and increasing spaces to store and treat water through the use of green infrastructure.[63]
- **Increasing permeable surfaces**: These types of surfaces (using green or manmade materials) — which help with absorption and drainage — can be installed in parks and open, green spaces throughout the community. Permeable surface projects are best suited in places where groundwater levels have not yet reached the surface.

[57] *Id*. at 128.
[58] "A French drain is a trench filled with a perforated pipe and gravel that allows water to drain naturally from your yard." *How to Install a French Drain*, THE HOME DEPOT, https://www.homedepot.com/c/ah/how-to-install-a-french-drain/9ba683603be9fa5395fab9012cc2665 (last visited Jan. 10, 2022).
[59] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 129 (2021).
[60] *Id*. at 33.
[61] *Id*.
[62] *Id*. at 36.
[63] *Id*.

- **Expanding green spaces**: The expansion of green spaces can assist in filtering stormwater and can hold excess water during rain and weather events.

Specific instances where these types of tools have been (or are planning to be) implemented include stormwater management improvement in the Lake Belmar area of the AAA, which is an unincorporated coastal area.[64] Estimated to cost around $10 million, the Miami-Dade's Department of Public Works and Transportation (DTPW) is looking to start construction in early 2023 to retrofit the existing drainage systems within a neighborhood, install new drainage infrastructure, and construct a new pump station that will help to keep stormwater moving throughout the system.[65]

Farther inland in Larchmont, which is also unincorporated, DTPW is partnering with the Division of Environmental Resources Management in a multiphase project to improve local stormwater management and water quality.[66] The first phase of the project will involve retrofitting existing drainage pipes with lining, replacing certain parts of the drainage infrastructure that is currently causing leaks, and installing a new pollution control structure.[67] "The improvements will help mitigate repetitive flooding, extend the service life of the drainage infrastructure and improve water quality[, and] benefit approximately 2,000 residents in the area."[68] Phase two is a pilot project that will be deployed in the community to install new water quality control measures within pipes and pump stations and at various points of intersection in the existing drainage infrastructure.[69] This will not only help to improve the water quality for residents of the neighborhood, but will also keep harmful chemicals and bacteria from entering the Little River canal and Biscayne Bay.[70]

Septic Systems

In the Little River AAA alone, it is estimated that over 100 septic systems are already failing due to the high level of the groundwater table.[71] This means that, in households that are dependent on septic systems, wastewater is not treated property.[72] There is also a significant risk that during storm events, this untreated water can flood the home.[73] Two unincorporated areas of the Little

[64] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 64 (2022).
[65] *Id*. The pump station installation and operation will be funded by a $3,000,000 Resilient Florida grant.
[66] *Id*. at 68.
[67] *Id*.
[68] *Id*.
[69] *Id*.
[70] *Id*.
[71] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 38 (2021).
[72] *Id*.
[73] *Id*.

River AAA most affected by these issues are not tied to the county's sanitary sewer infrastructure.[74]

To address septic systems concerns, the AAA plan outlines two adaptation tools: converting septic systems to sewer systems and raising drain fields.

- **Converting septics to sewers**: This process will essentially require that households that currently use septic systems be connected to the central sewer system.
- **Raising drain fields**: Because the expansion and connection to the centralized sewer system can incur significant costs and take long periods of time, raising a drain field within a community can be the most cost-effective, short-term solution. A drain field is an area filled with unsaturated soil where septic wastewater is discharged. This soil can help treat and disperse the wastewater until it eventually is absorbed back into the groundwater table.[75] By elevating, or "mounding" a drain field — especially in places where groundwater is extremely close to the surface —wastewater has more time to filter through the soil before it reaches the water table.[76]

Plans are currently underway within the Little River AAA to connect households currently dependent on septic systems to sewer lines.[77] Some areas of Little River already border existing sewer infrastructure, making it easier to connect to the sewer system in a quicker, more economical fashion[78]. In some instances, when the distance between a property and the county sewer system is minimal — or a "feasible distance" — property owners are actually required to make this connection at their own expense.[79]

Some locations that fall in the Little River AAA are taking a phased approach to transition from septic. In one unincorporated coastal area, the county's Water and Sewer Department (WASD) are spending upwards of $1,000,000 to convert around 40 residential properties along two streets to finish the transition process to remove the septic tanks and drain fields and design and install new public sewer infrastructure to connect the properties to the main lines.[80] Inland, WASD is spending $18 million to similarly convert 40 residential properties.[81]

While the first stage of work is in the construction and completion phase, the latter is still in the design phase, which accounts for the price differentiation. It is important to highlight these high costs. One estimation concluded that connecting just 475 properties using septic in Miami-Dade

[74] *Id*.
[75] *How Your Septic System Works*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/septic/how-your-septic-system-works (last visited Jan. 13, 2021).
[76] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 41 (2021).
[77] *Id*.
[78] *Id*.
[79] *Id*.
[80] Savino Miller Design Studio, Adaptation Plan: Little River Adaptation Action Area 64 (2022).
[81] *Id.* at 68.

County could cost upwards of $19 million.[82] Because a significant number of septic systems are already failing in the Little River AAA and the cost of conversion is so high, the short-term solution of mounding drain fields could be vital to maintain the quality of water within the groundwater table.[83]

COMMUNITY ENGAGEMENT

Community engagement throughout the development of the Little River AAA plan has been significant. At the very beginning of the process — collecting background research —stakeholders and community members were asked to "fill in gaps in knowledge."[84] This involved one-on-one conversations with various community-based organizations, partners in academia, people within county and municipal departments, and individual residents living within the Little River community. The five sectors on which the adaptation tools are based — stormwater and drainage, septic systems and sewer, parks and green spaces, housing, and streets and transportation — evolved directly from these conversations, wherein these individuals and entities helped to determine long-standing and emerging issues within the AAA.[85]

To develop the draft AAA plan, the county, in collaboration with its partners, hosted five online community forums dedicated to listening to residents that "live, work, and play in the Little River Adaptation Action Area."[86] The purpose of these community forums was to hear directly from residents what challenges they faced relating to rising sea levels and increased flooding events, what programs were working to address these challenges, new ideas or programs that could be implemented to mitigate them, and how the county could better invest in adaptation measures.[87]

Additionally, the county hosted five separate "key issue" webinars focused on educating the community about the effects climate change may have on water quality, septic systems, parks, housing and equity, and home elevation; and how individuals were currently being affected by climate impacts within these areas. The responses from residents are articulated in the AAA plan, which includes direct quotes and stories from residents relating to issues they have had with each of the given sectors the AAA plan addresses.

Acknowledging that not all concerned stakeholders would be able to attend these webinars, Miami-Dade County also worked with partners to "spread the word," both in-person and online, about seeking input for the development of the AAA plan. Other outreach methods included door-

[82] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 41 (2021).
[83] *Id*.
[84] *Id*. at 8.
[85] *Id*.
[86] *Planning for Sea Level Rise in the Little River Adaptation Area*, MIAMI-DADE COUNTY, FL OFFICE OF RESILIENCE, https://adaptation-action-area-in-little-river-mdc.hub.arcgis.com/ (last visited Jan. 13, 2021).
[87] Savino Miller Design Studio, Draft Adaptation Plan: Draft Little River Adaptation Action Area 9 (2021).

hangers, hosting a King Tide Day event, in-person and virtual flyers, direct letters to those living in unincorporated areas, and more.[88]

FUNDING

The development of the Little River AAA plan itself was supported by a $75,000 Resilient Planning grant from the Florida Department of Environmental Protection. These state grants require a local match, which the county met through in-kind staff time and resources.

Beyond that, the cost of implementing identified adaptation tools and ultimately achieving the five strategies envisioned by the Miami-Dade Sea Level Rise Strategy will require significant monetary backing. "Successful adaptation means sourcing financial resources and assistance from multiple sources so that communities, especially low-wealth and historically marginalized neighborhoods, do not bear the brunt of the costs."[89] Some projects have already been funded, either partially or fully, by existing grants or loans. For example, Miami-Dade County has already received $5.4 million from the State of Florida to help transition households from septic to sewer.[90] The county is currently applying for additional funding to complete the transition of 1,650 septics in the area to the county's sewer system, which will cost upwards of $68 million.[91]

For those projects not yet funded or financed, the Little River AAA plan provides a potential funding resources table that includes the type of capital, top funding and financing pathways, and in some instances, even specific partners and funders. For example, projects relating to local stormwater management can leverage grants from foundations, the state, or the federal government — including from the National Fish and Wildlife Foundation, The Kresge Foundation, or the U.S. Environmental Protection Agency. Stormwater utility fees, established by the Florida Department of Environmental Protection, can also be used.[92] For other projects, like septic to sewer conversion, pathways like tax increment financing can be implemented by municipalities in partnership with developers.[93]

NEXT STEPS

The Little River AAA plan includes policy recommendations that can hopefully turn these adaptation projects and tools into reality. The Office of Resilience recommends that the county,

[88] *Id*.
[89] *Id*. at 79.
[90] *Id*. at 41.
[91] *Id*.
[92] *Id*.
[93] *Id*.

municipalities, and other key stakeholders take immediate next steps within the next five years and beyond to:[94]

1. Continue seeking funds to adapt critical assets and infrastructure, with a priority to address immediate public and environmental health and urgent safety needs including failing septic systems, vulnerable housing, and chronic stormwater flooding.
2. Conduct a pilot program to upgrade small-scale stormwater infrastructure to reduce debris, pollution, nutrients and address poor water quality which is contributing to fish kills and seagrass die off.
3. Design and install a demonstration green infrastructure stormwater management project within our parks system.
4. Continue quarterly AAA-focused interdepartmental and interjurisdictional coordination meetings to align ongoing projects and identify new priority resilience projects in order to seek funding.
5. Explore the feasibility of AAA designation in the County Comprehensive Development Master Plan (CDMP), the county's local comprehensive plan.
6. Continue engaging with residents and other stakeholders to give them progress updates about discuss opportunities for further collaboration including developing resilience project proposals building off of the plan.
7. Develop a multilingual water quality educational campaign with partners around the Little River that considers targeted messaging for local businesses and light industrial or commercial areas in the watershed.
8. Continue partnership with the South Florida Water Management District and other agencies to identify ways to reduce flood risk and improve water quality over the long term.
9. Integrate specific language to preserve and expand tree canopy into all applicable county project proposals to help manage flood, water quality and extreme heat risks.
10. Address vulnerable septic systems in the AAA through coordinated planning and funding.
11. Engage public, private, and nonprofit stakeholders as part of a pilot for the Living Shoreline Design Guidelines project and explore perceptions, preferences, barriers, and collaborations for implementation.

[94] The following policy recommendations are taken directly from the Little River AAA Adaptation Plan. SAVINO MILLER DESIGN STUDIO, ADAPTATION PLAN: LITTLE RIVER ADAPTATION ACTION AREA 71 (2022).

12. Conduct an analysis of coastal structures/seawalls in the Little River AAA to identify additional opportunities for natural infrastructure and water recreation access (which may tie into future living shoreline design guidelines).
13. Leverage federal and state funds to expand weatherization and other resilience retrofits, such as elevation for private and public affordable housing.
14. Develop a pilot program strategy to train and hire local residents in blue - green jobs.

The Office of Resilience, through the plan, also notes potential metrics it can use to measure implementation success and conduct future research within specific sectors:[95]

- Improving local stormwater management: Frequency of stormwater infrastructure maintenance, water quality, flooding extent, groundwater levels, and repetitive loss relating to specific properties.
- Septic to sewer conversion: Number of septic systems, water quality, and utility debt or assistance needs.
- Expanding green spaces: Number, type and quality of green spaces, access to green spaces (within less than a ten-minute walk), percentage of tree canopy cover, and impervious surface area.
- Making housing stock more resilient and expanding affordable housing: Percentage of cost-burdened renters, percentage of owner-occupied versus renter-occupied housing units, and first floor elevation of building

CONSIDERATIONS AND LESSONS LEARNED

The Little River AAA plan is an example of how intensive, purposeful outreach to a community cannot only help create trust between government agencies and the people that they serve, but it can also help direct the course of an adaptation plan itself. In this instance, it was only through community involvement and engagement that Miami-Dade County, Savino Miller Design Studios, and other related partners were able to develop the major themes around which the AAA plan is based: stormwater and drainage, wastewater systems, housing, natural areas and greenspace, and transportation. By viewing the Miami-Dade SLR Strategy and its corresponding adaptation strategies through the lens of these major themes, these entities were able to better propose adaptation tools that better fit the needs of the Little River AAA.

The plan also shows that integration between overarching, governing plans and plans specific to neighborhoods is vital. In this instance, the governing document is the Miami-Dade SLR Strategy. However, the Little River AAA strategy incorporates the guiding principles of the SLR strategy

[95] *Id*. at 72.

throughout, and even directly addresses how the five adaptation approaches outlined by the SLR Strategy can be implemented in the Little River community by using the adaptation tools described in a previous section. AAA in and of themselves are an example of how adaptation plans and the processes involved in developing them can be neighborhood-specific, and driven by the unique needs and problems faced by the community.

During the Little River AAA development process, government agencies and Savino Miller were able to leverage various different projects and initiatives already taking place within the community that also provide co-benefits across different sectors. For example, the South Florida Water Management District and the C7 Basin had just been identified as two of the most vulnerable places across all basins within the state. A fish kill in 2021 in the Biscayne Bay due to warmer temperatures and overpollution — as well as another study that showed that hundreds of residents with septic systems had experienced severe flooding — highlighted these vulnerabilities. When projects were taken to address water quality issues, they benefited the fish species, improved the stormwater infrastructure, and helped to mitigate flooding impacts. These projects served as the impetus for the AAA project in Little River. Like Miami-Dade County, other local policymakers can consider how planning and land-use tools can be used to advance climate, environmental, social, and other benefits simultaneously. This can increase support for this type of work by bringing together more concerned stakeholders and also help to provide other strategic advantages, such as increasing the potential types of funding that could be used for project implementation.

To be effective and act on the trust communities placed in planning processes, other plans like the Little River AAA one should be designed with forward-thinking implementation in mind to increase chances of policy and project recommendations being put into practice.

The Little River AAA plan fleshes out specific policy recommendations that can be undertaken to encourage the development of many of these adaptation tools.

Additionally, while most of these projects fall under the overarching theme of facilitating resilience, other funding opportunities exist outside the environmental sphere that can help get these types of projects up and running. One of the key elements of the AAA plan is its breakdown of how different projects can be categorized to leverage different funding sources. For example, stormwater management projects could leverage grant funding from philanthropies and foundations. The AAA plan also highlights the importance of considering one-time funding opportunities — such as the federal American Rescue Plan. Plans can potentially enable governments and communities to mobilize faster and gain a strategic advantage in securing one-time and other funding opportunities because they include priority projects that can be funded, versus having to start from scratch only after funding announcements are made by different entities.