

Greauxing Resilience at Home

City of North Miami, Florida: Good Neighbor Stormwater Park and Repetitive Loss Master Plan



GEORGETOWN CLIMATE CENTER

Authors

Author and editor: **Katie Spidaleri**, Senior Associate, Georgetown Climate Center (GCC)

Authors:

- **Suhasini Ghosh**, Justice Fellow, GCC;
- **Lillian Zhou**, Research Assistant, GCC;
- **Noelle Gignoux**, Research Assistant, GCC;
- **Jesse Elliott**, Spring Research Assistant and Summer Research Fellow, GCC;
- **Katherine McCormick**, Institute Associate, GCC;
- **Jennifer Li**, Staff Attorney, Harrison Institute for Public Law, Georgetown University Law Center;
- **Kelly Cruce**, Adaptation Consultant, GCC; and
- **Caitlyn Cook**, Research Assistant and Summer Research Fellow, GCC.

The following students also provided significant research support: **Maren Kaiser**, Masters of Law in Environmental and Energy Law, Georgetown University Law Center and **Morgan McCue**, Masters in Environmental Meteorology and Policy, Georgetown University.

Acknowledgments

The authors would like to thank the **Doris Duke Charitable Foundation** for its generous support and guidance, and without whom the partnership efforts with Louisiana and Capital Region Planning Commission and this report would not have been possible.

We also appreciate the work of the following individuals who helped us finalize, format, and publish this report: **Brent Futrell**, Director of Design, Office of Communications, Georgetown University Law Center; **Peter Raffle**, Communications Director, GCC; **Caren Fitzgerald**, Communications Associate, GCC; and **Mark Rupp**, Adaptation Program Director, GCC.

Last but certainly not least, we would like to specially thank and acknowledge the following individuals for taking the time to speak with us, review drafts, and provide insights that were invaluable in helping to

inform the development of the **Regional Vision** and these case studies: **Manny Patole**, Independent Consultant; **Christopher Tyson**, formerly Chief Executive Officer, Build Baton Rouge; **Gretchen Siemers**, Director, Planning and Special Projects, Build Baton Rouge; **Lee E. Melancon, III**, Director of Community and Economic Development, Mayor's Office of Community and Economic Development, City of Donaldsonville, Louisiana; **Bithia Ratnasamy**, Director of Housing, Executive Office, Atlanta Housing, City of Atlanta, Georgia; **Carolina Rodriguez**, Project Manager, Housing and Community Development, Department of City Planning, City of Atlanta, Georgia; **Jaren Abedania**, formerly Vice President of Real Estate, Westside Future Fund; **Bridget Wiles**, Chief Operations Officer, APD Urban Planning and Management, LLC; **O. Jesse Wiles**, Principal and Chief Executive Officer, APD Urban Planning and Management, LLC; **Amber Weaver**, Sustainability Officer, Office of Sustainability, City of Asheville, North Carolina; **Paul D'Angelo**, formerly Community Development Program Director, City of Asheville, North Carolina; **Stacy Merten**, formerly Long-Range Planning Manager, Planning and Urban Design Department, City of Asheville, North Carolina; **Vaidila Satvika**, Urban Planner, Planning and Urban Design Department, City of Asheville, North Carolina; **Marc Coudert**, Office of Sustainability, City of Austin, Texas; **Erica Leak**, Development Officer, Housing and Planning Department, City of Austin, Texas; **Erin Wood**, Planner, Watershed Protection Department, City of Austin, Texas; **Isaac W. Stein**, Design Principal, Dept.; **Maggie Tsang**, Managing Principal, Dept.; **Debbie Love**, City Planner, City of North Miami, Florida; **Christopher G. Miller**, President, The Piedmont Environmental Council; **John McCarthy**, Senior Advisor and Director of Strategic Partnerships, The Piedmont Environmental Council; **Cameron Herrington**, Living Cully Program Manager, Oregon; **Crystal Launder**, Housing Planner, Department of Housing and Human Services, City of Boulder, Colorado; **René C. Pastorek**, formerly Director of Planning and Development, St. John the Baptist Parish, Louisiana; **Tara Lambeth**, Coastal and Water Management Division Lead, St. John the Baptist Parish, Louisiana;

Jackie Baumann, Chief Engineer, City of Gonzales, Louisiana; **Dave Canaan**, formerly Charlotte-Mecklenburg Storm Water Services Director, Land Use and Environmental Services Agency, Mecklenburg County, North Carolina; **Darryl Neher**, Chief Executive Officer, Fauquier Habitat for Humanity; **Elizabeth (Betsy) L. Dietel**, Senior Partner, Dietel and Partners; **Angela Chalk**, DHA GIP, Executive Director, Healthy Community Services; **Joel Holton**, Owner, J.B. Holton and Associates, LLC; **Jeremy Sharp**, Zoning Administrator, City of Norfolk, Virginia; **Christian Kamrath**, Adaptation Program Coordinator, Office of Resilience, Miami-Dade County, Florida; **Tameika Devine**, Possibilities Institute (former City Councilmember and Chair of the Affordable Housing Task Force, City of Columbia, South Carolina); **Janet Tharp**, Center for Planning Excellence; **Lyneisha Jackson**, Community Planner, Center for Planning Excellence; **Simone Higginbotham**, Scotlandville Community Development Corporation, North Baton Rouge, Louisiana; **Rinaldi Jacobs**, Full Circle Development; and **Erica Sims**, HDA advisors, Maggie Walker Community Land Trust (Richmond, Virginia).

No statements or opinions contained within this case study report, the Regional Vision, or Georgetown Climate Center's Adaptation Clearinghouse should be attributed to any individual or organization included in the above *Acknowledgements*.

©2022, Georgetown Climate Center
Georgetown University Law Center
600 New Jersey Avenue, NW
Washington, DC 20001

[GeorgetownClimate.org](https://georgetownclimate.org)

[Greasing Resilience at Home:
A Regional Vision](#)

[AdaptationClearinghouse.org](#)

Cover Photos:

(background image) Credit: **Rachelle Sanderson**.

(images from left to right) Credit: **Dee Love; Architects Southwest** for Build Baton Rouge in *Ardendale Master Plan and Guiding Principles*; and **Louisiana Sea Grant**.

Full List of Case Studies

1. **About This Report**
2. Miami-Dade County, Florida: **Little River Adaptation Action Area Plan**
3. Mecklenburg County, North Carolina: **Charlotte-Mecklenburg Storm Water Services, Risk Assessment/ Risk Reduction (RARR) Tool**
4. City of New Orleans, Louisiana: **Gentilly Resilience District Projects**
5. **City of North Miami, Florida: Good Neighbor Stormwater Park and Repetitive Loss Master Plan**
6. City of Houston, Texas: **Resilient Houston and Affordable Housing and Nature-Based Efforts**
7. St. John the Baptist Parish, Louisiana: **Resilient Planning, Affordable Housing, Environmental, and Funding Initiatives**
8. City of Asheville, North Carolina: **Affordable Housing, Environmental, and Climate Resiliency Initiatives**
9. City of Atlanta, Georgia: **Prioritizing Affordable Housing and Nature in the Face of New Growth**
10. City of Austin, Texas: **Affordable Housing and Green Infrastructure Efforts**
11. City of Norfolk, Virginia: **PlaNorfolk 2030, Norfolk Vision 2100, and Resilience Zoning Updates**
12. City of Baton Rouge–Parish of East Baton Rouge, Louisiana: **Imagine Plank Road Plan for Equitable Development**
13. City of Baton Rouge–Parish of East Baton Rouge, Louisiana: **Ardendale Master Plan and Guiding Principles**
14. City of Columbia, South Carolina: **Columbia Compass: Envision 2036 and Affordable Housing Task Force**
15. City of Baton Rouge–Parish of East Baton Rouge, Louisiana: **Scotlandville Community Strategic Plan**
16. City of Charlotte, North Carolina: **Pilot Naturally Occurring Affordable Housing (NOAH) Subsidy Program**
17. City of Richmond, Virginia: **Maggie Walker Community Land Trust and Richmond Land Bank**
18. City of Boulder, Colorado: **Affordable Housing, Manufactured Housing, and Environmental Plans and Initiatives**
19. City of Denham Springs, Louisiana: **Denham Strong Long-Term Community Recovery Plan**
20. City of Donaldsonville, Louisiana: **Donaldsonville Strategic Plan 2020–2025**
21. Town of Warrenton, Virginia: **Fauquier Habitat for Humanity Haiti Street Neighborhood Revitalization**
22. City of Gonzales, Louisiana: **Gonzales Comprehensive Plan**
23. City of New Orleans, Louisiana: **Resilient Housing Prototype in the Seventh Ward**
24. City of Portland, Oregon: **Planning and Zoning for Manufactured Housing Communities**
25. Town of Washington, Virginia: **Rush River Commons Mixed-Use Development**

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.

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 [Greaxing Resilience at Home: A Regional Vision](#) and Georgetown Climate Center’s [Adaptation Clearinghouse](#).

City of North Miami, Florida

Good Neighbor Stormwater Park and Repetitive Loss Master Plan

EXECUTIVE SUMMARY

The City of North Miami, Florida Good Neighbor Stormwater Park is a public open space with the capacity for local flood prevention, doubling as a stormwater reservoir. A repurposed vacant lot within North Miami's residential neighborhood of Sunny Acres, this adaptive stormwater green infrastructure is vegetated with an array of native trees and plants, while also acting as a communal space with walking paths and artistic structures that educate the public on flooding hazards.

The project was funded in part through the Van Alen Institute's Keeping Current: Repetitive Loss Properties Grant design competition, won by the City of North Miami, and the landscape architecture firm Dept. for implementation. The Stormwater Park was once considered a repetitive loss property by the Federal Emergency Management Agency (FEMA), due to repetitive flooding from stormwater and sea-level rise — common across South Florida neighborhoods.

As a part of the project, the landscape architects selected to design the park were also asked to put together a plan that could support the replication of this pilot project across the region in the most flood vulnerable communities. Dept. developed a Repetitive Loss Master Plan, which illustrates priority strategies for flood risk reduction and resilient design. Other local decisionmakers of flood-prone communities with vacant, abandoned, deteriorated, or repetitive loss lots can look to North Miami's example for green infrastructure public space design planning that goes beyond capturing stormwater, and integrates the community's well-being — such as access to green space — for greater long-term resilience.

BACKGROUND

The City of North Miami is located in Miami-Dade County, near the southern tip of Florida on Biscayne Bay on the eastern seaboard. U.S. Census Bureau findings from 2020 report the city has a reported population of around 60,000 residents, with great diversity in the region as approximately two thirds of the population is Black or African American, one third Hispanic or Latinx, and one third white.¹

¹ *Quick Facts: North Miami City, Florida, U.S. CENSUS BUREAU,* <https://www.census.gov/quickfacts/northmiamicityflorida> (Apr. 2020 Census results) (last visited Dec. 16, 2021).

North Miami is one of the most vulnerable areas in the nation to sea-level rise, with an estimated nearly 7,000 residents per square mile according to 2010/2020 U.S. Census findings.² On a coastline reckoning with extreme weather events, coastal erosion, and flooding, the county's population of 2.6 million is also the largest population in the United States exposed to sea-level rise.³ The Third National Climate Assessment confirms that South Florida, including Miami-Dade County, is anticipated to experience extreme impacts from climate change, such as significant sea-level rise, higher storm surges along with the potential for increased hurricane intensity and heavy precipitation events.⁴ Even on sunny days in this region, the streets regularly flood at high tide — and just three feet of sea-level rise would leave a substantial part of South Florida underwater.⁵

The city faces compounding vulnerabilities beyond climate change impacts, such as 20 percent of the population living in poverty.⁶ Additionally, recognizing the continued threat of sea-level rise and flooding, the city surveyed their residents' septic systems in 2010 — typically homes without access to the sewer system — to find troubling results. The city stated that:

Unfortunately, due to the rise of the underground water table, influenced by sea level rise, soils are more saturated, resulting in many underperforming septic systems. Of approximately 221 systems identified in the city of North Miami, it is predicted that 80% will be completely compromised by 2040; and that all systems will become non-viable by 2069.⁷

This finding demonstrates one of many concerning impacts from flooding that can be addressed with progressive community and city-wide planning that supports green infrastructure and other flood mitigation projects. Ongoing innovations in coastal adaptation and resilient infrastructure and landscapes, like the Green Neighbor Stormwater Park and Repetitive Loss Master Plan, are needed to protect communities from sea-level rise and recurrent flood losses.

² *Id.*

³ Stéphane Hallegatte et al., *Assessing Climate Change Impacts, Sea Level Rise and Storm Surge Risk in Port Cities: A Case Study on Copenhagen*, OECD ENVIRONMENT WORKING PAPERS (2008), <http://dx.doi.org/10.1787/236018165623>.

⁴ U.S. GLOBAL CHANGE RESEARCH PROGRAM, CLIMATE CHANGE IMPACTS IN THE UNITED STATES: THE THIRD NATIONAL CLIMATE ASSESSMENT 841 (2014).

⁵ ARCH CREEK STUDY AREA BRIEFING BOOK FOR ULI [URBAN LAND INSTITUTE] ADVISORY SERVICES PANEL, MAY 22–27, 2016, available at <https://www.miamidade.gov/green/library/arch-creek-briefing-book.pdf>.

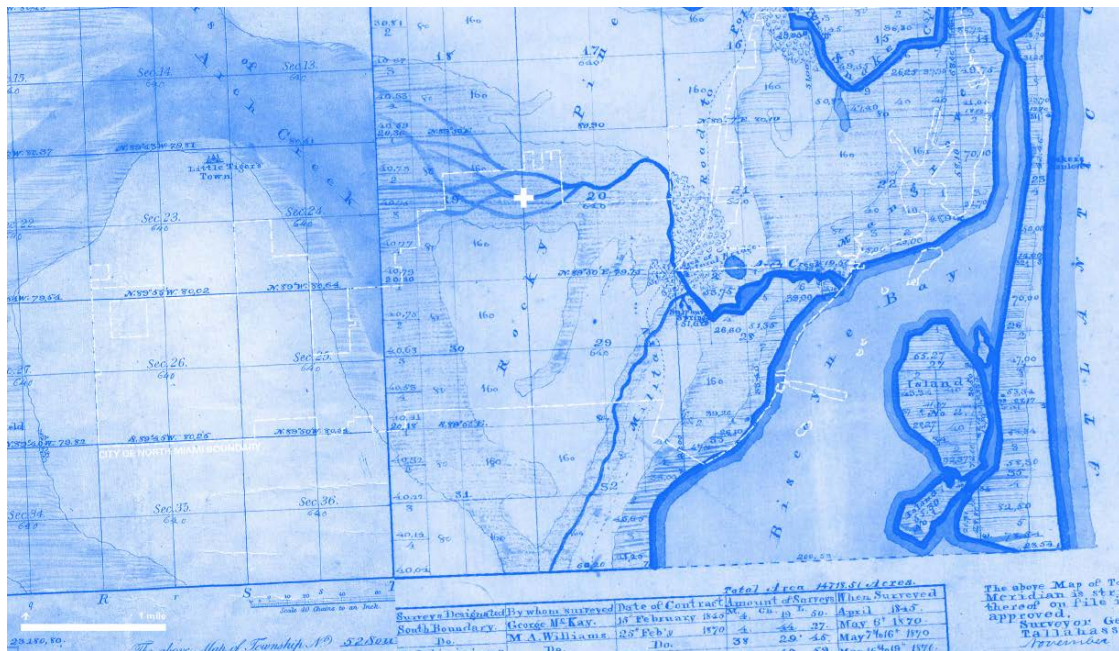
⁶ *Quick Facts: North Miami City, Florida*, U.S. CENSUS BUREAU, <https://www.census.gov/quickfacts/northmiamicityflorida> (Apr. 2020 Census results) (last visited Dec. 16, 2021).

⁷ CITY OF NORTH MIAMI, RESILIENTNOMI QUARTERLY E-NEWSLETTER (Feb. 2020), available at <https://northmiamifl.gov/DocumentCenter/View/9311/E-Newsletter-Volume-1-2020-PDF>.

OVERVIEW OF THE GOOD NEIGHBOR STORMWATER PARK

Years ago, the city recognized that older stormwater conveyance systems were no longer a match for today's flooding and wanted to convert these abandoned lots to green infrastructure that could handle stormwater retention. Rather than simply implementing detention ponds and allowing the sites to remain unused, the city aimed to simultaneously create open space for residents. In 2019, North Miami commissioned a pilot project and master plan to consider the best approach to future repetitive loss acquisitions.

The City of North Miami first purchased the repetitive loss properties that would become the home of the Good Neighbor Stormwater Park through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program.⁸ If a homeowner files for flood insurance twice in a ten-year period, FEMA labels it a repetitive loss property. More specifically, a repetitive loss property is any insurable building for which two or more claims of more than \$1,000 were paid by FEMA's National Flood Insurance Program (NFIP) within any rolling ten-year period.⁹



This image shows waterways as once flowing through the North Miami landscape with an indicator to note the Good Neighbor Stormwater Park's current location.

⁸ See Georgetown Climate Ctr., *FEMA Hazard Mitigation Grant Program*, ADAPTATION CLEARINGHOUSE, <https://www.adaptationclearinghouse.org/resources/fema-hazard-mitigation-grant-program.html> (last visited Dec. 16, 2021).

⁹ *Repetitive Loss Structure*, FED. EMERGENCY MGMT. AGENCY, <https://www.fema.gov/node/405233> (last updated Mar. 5, 2020) (definition of "repetitive loss structure").

Van Alen Institute initiated the Keeping Current: A Sea-Level Rise Challenge for Greater Miami funding competition to enhance community resilience and “create visionary and implementable design solutions to sea-level rise.”¹⁰ Once the City of North Miami’s portfolio of repetitive loss properties was selected, the city invited architects and designers to submit proposals for how to transform the flooded lots into open space public areas that manage stormwater flooding.

Dept. is a Houston-based landscape architecture and urban design studio that was chosen for its Stormwater Park design.¹¹ Dept. was awarded \$80,000 to develop and implement the pilot site, as well as to create a master plan for other repetitive loss properties in North Miami. The proposed Repetitive Loss Vision Plan outlines how to fund and design more of these projects to transform other flood-prone vacant lots into climate resilient community assets.

The parts that follow provide more detail about both the Good Neighbor Stormwater Park and the Repetitive Loss Vision Plan.

ENVIRONMENT

Stormwater Retention

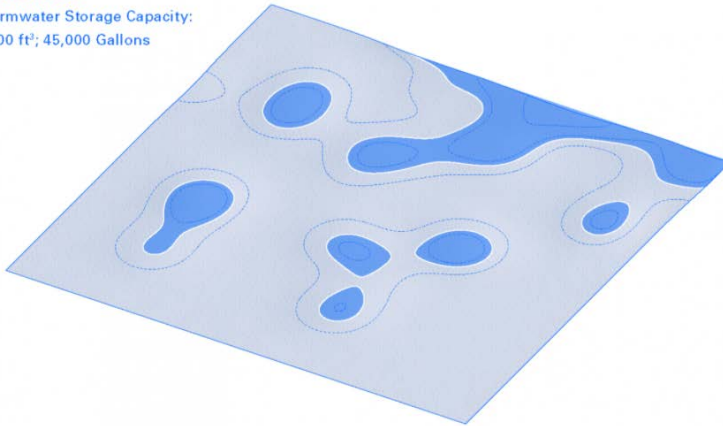
The Good Neighbor Stormwater Park was designed with a new piping and basin system to provide additional stormwater storage space that can subsequently decrease the amount of flooding on nearby properties. A retention basin to mitigate flooding can hold and infiltrate much larger volumes of stormwater than an average repetitive loss property that goes unmanaged. The Stormwater Park is now a sustainable climate-resilient public space with a retention pond that can hold four times its original capacity as a vacant lot, mitigating stormwater flooding for surrounding lots — hence named “Good Neighbor.”

¹⁰ *Keeping Current*, VAN ALAN INST., <https://www.vanalen.org/project/keeping-current/> (last visited Dec. 16, 2021).

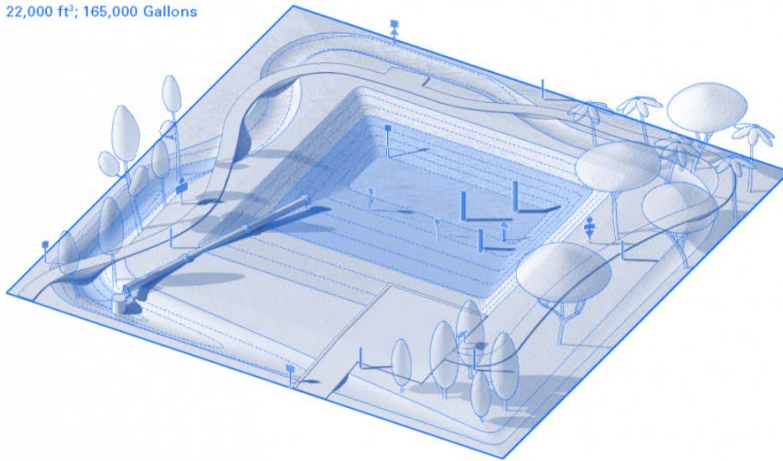
¹¹ DEPT., <https://www.dept.llc> (last visited Dec. 16, 2021).

Vacant Lot

Stormwater Storage Capacity:
6,000 ft³; 45,000 Gallons

**Stormwater Park**

Stormwater Storage Capacity:
22,000 ft³; 165,000 Gallons



The 18,000-square-foot site also now supports a diverse selection of native plants and trees in a demonstration garden of several South Florida habitats, including pine flatwoods, hardwood hammock, marsh, and cypress slough.

Planting throughout the site further increases stormwater retention and management capacity by absorbing water, improves groundwater filtration and storage, while restoring ecological function in an urban area. In addition, many native South Florida plants are tolerant of wet conditions and require little to no maintenance once the plants are established.

The Good Neighbor Stormwater Park is an opportunity for both the city and the immediate neighborhood surrounding the park to accrue many benefits. Going into this project, the city articulated three main goals to create:

1. Stormwater management solutions and earn points under the Community Rating System;
2. Valuable community spaces; and
3. Forward-looking and scalable projects beyond this single pilot.

To the first goal, NFIP employs a [Community Rating System \(CRS\)](#) which is a voluntary insurance rating program that recognizes communities for implementing floodplain management practices that exceed the federal minimum requirements of NFIP. In exchange for flood-risk-reduction practices, policyholders within CRS jurisdictions can receive lower flood insurance premiums. With the Stormwater Park, North Miami can earn points in multiple CRS activity areas, which can decrease the cost of flood insurance across the city. The city is currently a CRS Class 6. For example, CRS Activity 530 “Flood Protection” credits structure flood protection projects based on the number of buildings affected by the project.¹² The project demonstrates a resilience strategy that bolsters NFIP ratings, while offering a model for alternative land use of flood-prone vacant land found often in frontline communities.

To achieve the second goal, the Stormwater Park provides social benefits in an underserved area of the city. According to the U.S. Census Bureau, about one in five residents in North Miami live below the poverty line.¹³ Many inland communities of South Florida face the impacts of coastal sea-level rise compounded by precipitation events and recurrent flooding. Moreover, these areas are often burdened with the secondary impacts of ongoing flooding, such as continued inundation of sewage and septic systems. As such, adapting to climate change goes beyond elevating individual homes, or moving out of the flood zone. Not everyone has the capacity to relocate, or the desire to as such. Adapting to these impacts requires neighborhood- or region-wide inclusive projects and planning. This has created an opportunity to transform these sites into valuable community spaces, such as the Stormwater Park, while supporting equitable climate adaptation planning and solutions.

North Miami specifically chose the location of the pilot Stormwater Park to be implemented where public health concerns began to rise from the number of septic systems being impacted. This low-income area is also where the city has a higher proportion of people of color. The Stormwater Park is already reducing flooding, making neighborhoods more livable, safe, and enjoyable for residents. The park also provides a respite or urban retreat and recreational amenity for area residents.

Lastly, the city worked with Dept. to make the third goal of scalability and replicability possible through the Repetitive Loss Master Plan.

¹² FED. EMERGENCY MGMT. AGENCY, NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM COORDINATOR’S MANUAL FIA-15/2017 (2017), *available at* https://www.fema.gov/sites/default/files/documents/fema_community-rating-system_coordinators-manual_2017.pdf.

¹³ *QuickFacts: North Miami City, Florida, U.S.* CENSUS BUREAU, <https://www.census.gov/quickfacts/northmiamicityflorida> (last visited Dec. 16, 2021).



Credit: Dept.

Adaptation Action Areas in Miami-Dade County

Miami-Dade County has been undertaking several adaptation and resilience actions. Although the county's efforts are distinct from those in North Miami, the two are complementary. Therefore, it is worthy to highlight one example of how multiple governments can address flooding and other impacts that extend beyond jurisdictional boundaries.

Sixty-five percent of North Miami is in Arch Creek Basin, a low-lying area that naturally collects water, and in turn, many residents here experience flooding on their properties. North Miami is in Miami-Dade County, which is prioritizing the Arch Creek Basin as a pilot Adaptation Action Area (AAA), designated under Florida's Community Planning Act.¹⁴ An AAA, as defined in the act, is an optional comprehensive plan designation for areas at risk of flooding from high-tide events, storm surge, flash floods, stormwater runoff, and related impacts of sea-level rise. Local governments in turn can prioritize policies and funding for coastal infrastructure and adaptation planning in these areas. "Criteria for an Adaptation Action Area may include, but need not be limited to, areas for which the land elevations are below, at, or near mean high water, which have a hydrologic connection to coastal waters, or are designated as evacuation zones for storm surge."¹⁵

The Arch Creek Basin comprises approximately 2,838 acres of Miami-Dade County, is economically diverse, includes numerous historical resources, and crosses jurisdictional boundaries for five different local governments. In 2016, the County Board of

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-adaptation-action-areas-e-in-florida-s-community-planning-act.html>.

¹⁵ FLA. STAT. § 163.3177(6)(g)(10) (2021).

Commissioners adopted Resolution No. R-66-16 to design a pilot program for Adaptation Action Areas. The Arch Creek area was selected as the county's first AAA pilot project to serve as a model for future adaptation initiatives — as having vulnerabilities common to other areas in the county.¹⁶

This is part of Miami-Dade's comprehensive strategy that has the goal to improve the resilience of the entire community to climate change, in addition to mitigating repetitive losses. As described in the county's 2019 Recommendations to Protect Water, Sewer, and Road Infrastructure from Sea Level Impacts report, the Comprehensive Development Master Plan Policy CM-9H:

Mandates that all capital projects consider sea level rise. In addition, Resolution No. R-617-17 requires that county civil infrastructure projects use the Envision Rating System, which includes climate risk criteria. The Envision Rating system is a framework that includes 64 sustainability and resilience indicators, called 'credits,' organized around five categories: Quality of Life, Leadership, Resource Allocation, Natural World, and Climate and Resilience. These collectively address the sustainability of infrastructure projects.¹⁷

This work is noteworthy because flooding will require coordination and resilience actions at different scales. Miami-Dade is also using different, but complementary tools to North Miami's Good Neighbor Stormwater Park and Repetitive Loss Vision Plan, with AAA overlay zones, updates to the county's local comprehensive plan, and civil infrastructure guidelines. Across different levels of government, regional and local policymakers will have to consider a suite of tools for adaptation and resilience that are based on various factors, like applicable legal authorities and community needs and priorities.

Planning

South Florida is primarily a floodplain where natural waterways have been in-filled or altered in ways that no longer allow for natural drainage basins, such as Arch Creek. Additionally, impervious surfaces prevail in urban areas which prevent stormwater infiltration and worsen flooding. Resilient floodplain management will require maximizing stormwater catchment capacity, particularly in flood-prone or repetitive loss lots.

¹⁶ ARCH CREEK STUDY AREA BRIEFING BOOK FOR ULI [URBAN LAND INSTITUTE] ADVISORY SERVICES PANEL, MAY 22–27, 2016, available at <https://www.miamidade.gov/green/library/arch-creek-briefing-book.pdf>.

¹⁷ MIAMI-DADE CNTY., RECOMMENDATIONS TO PROTECT WATER, SEWER, AND ROAD INFRASTRUCTURE FROM SEA LEVEL IMPACTS, FINAL REPORT FOR RESOLUTION R-361-18 10 (Feb. 2019), available at <https://www.miamidade.gov/govaction/legistarfiles/Matters/Y2021/210608.pdf> (submitted via a Memorandum from Mayor Daniella Levine Cava, to the Board of County Commissioners, dated March 11, 2021).

The proposed Repetitive Loss Master Plan as developed by Dept. illustrates the priority strategies for flood risk reduction and resilient design across the city of North Miami.¹⁸ If adopted and approved by the city (see part on Next Steps), the master plan can help the city, as desired, continue to transform flood-prone properties in North Miami.

As currently written, the plan contemplates two different planning horizons, the first for the next ten to 15 years and the second for the longer term beyond that initial period.¹⁹ The first planning horizon is built around realizing the near-term hazard mitigation, CRS, social, and environmental benefits of the Good Neighbor Stormwater Park for a small watershed of homes.²⁰ The second is envisioned as having the city work towards creating a “Stormwater Network” to potentially convert more vacant and abandoned repetitive loss properties to stormwater retention sites that can expand these benefits to other parts of the city.²¹ Longer-term goals, as described in the plan, reach a landscape-level scale in which a number of individual parks become a stormwater infrastructure network allowing for regional adaptation to sea-level rise and flooding.

In the plan, Dept. proposes six design typologies for future sites given the potential lots available within a residential district in the city.²² These typologies illustrate how new stormwater parks can be adapted in these different location-specific contexts.²³ In selecting potential sites, the draft plan suggests that the city could determine priority areas based on project feasibility, and community flood risk, as well as urban context, zoning, elevation, and other site-specific characteristics, as funding allows.²⁴ The plan suggests that stormwater parks can be networked and grown simply by clustering sites in priority vulnerable areas and connecting them through a system of bioswales in the existing street right-of-way — rather than requiring new street construction or configurations.²⁵ As put forth by Dept., this green infrastructure network would have compounding benefits at scale, “increasing stormwater infiltration capacity, protecting the municipal water supply from saltwater intrusion, restoring the ecological function of the Arch Creek Basin, and strengthening resilience in North Miami.”²⁶ Regardless, any potential future designs and actions would be driven by community residents through engagement processes like those used for the Good Neighbor Stormwater Park.

¹⁸ DEPT., NORTH MIAMI STORMWATER PARKS: TRANSFORMING FLOODED PROPERTY INTO RESILIENT INFRASTRUCTURE (Aug. 2020), *available at* https://issuu.com/isaacwstein/docs/rfp_masterplan_final_digital (draft plan developed by Dept., but not adopted or approved by the City of North Miami, Florida as of January 2022).

¹⁹ *Id.* at 13.

²⁰ *Id.* at pt. I.

²¹ *Id.* at pt. II.

²² *Id.*

²³ *Id.* at 54.

²⁴ *Id.* at 53.

²⁵ *Id.* 66–69.

²⁶ *Id.* at 53.

COMMUNITY ENGAGEMENT

Along with maximizing flood mitigation potential, community engagement has been a project priority for North Miami planners from the start. The Stormwater Park lot is primarily in a Haitian and Hispanic neighborhood. The city tried to overcome barriers to engagement by including representative community members. Another local project partner, the Urban Impact Lab, spent months meeting with and hearing from hundreds of North Miami residents through events and surveys, to understand their needs for this new community space. Urban Impact Lab conducted surveys in three languages to ask residents questions like whether they were exposed to flooding risk, and about favorite hobbies that they would like to see reflected in this space — such as walking, running, reading, or spending time in nature. Ultimately the park's community-friendly design incorporates a central basin with a walking trail and bioswale around it, native vegetation supporting numerous local habitats, and integrated artistic interpretive signage.

Holistic resilient design also incorporates community education. One of Dept.'s design priorities was making the invisible visible — by showcasing stormwater flows rather than hiding them — to educate the community about flood risk and green infrastructure. The park design and retention pool make flood water visible to the community, which becomes an opportunity to increase local awareness about flooding, and how much water the area receives. Dept. collaborated with Miami-based artist Adler Guerrier for an art installation inside the retention pond that uses physical markers that rise above the water to indicate the natural fluctuations of the water table in the neighborhood.

FUNDING

The primary funding support to design and install the Stormwater Park, as well as develop the proposed master plan for a network of such parks, came from the Van Alen Institute. The team also received a coastal resilience grant from the Florida Department of Environmental Protection for \$50,000 for materials and planning. In addition, The Nature Conservancy provided in-kind donations in the form of native plants. The park was also made possible by private donations totaling \$6,000.

NEXT STEPS

Two weeks after the grand opening of the park, the largest recorded rainfall event occurred in the neighborhood. The park exceeded its design limits by not only capturing the stormwater from the properties as intended, it also captured the roadway runoff. In the past, during an average rain event, the road would be under water for some period of time. By the next day the flood waters had completely receded.



The Stormwater Park Hours after a severe rain event. Credit: Debbie Love, City Planner, City of North Miami, Florida.



The Stormwater Park one day post-storm event. Credit: Debbie Love, City Planner, City of North Miami, Florida.

As illustrated by this instance, the Good Neighbor Stormwater Park has already started to provide the intended flood mitigation, community, and ecological benefits it promised by trapping precipitation and runoff, improving water quality, and attracting residents. According to city staff and as seen in photo below, the vegetation has begun to grow in and green up, and wildlife has begun to return — including sightings of herons and butterflies occupying the park.



Good Neighborhood Stormwater Park, November 2021. Credit: Debbie Love, City Planner, City of North Miami, Florida.

In addition, the Repetitive Loss Master Plan, although finalized by Dept., will be brought before the North Miami City Council for formal approval and adoption in 2022. If approved and adopted by the city, the plan would become a part of the city's local comprehensive plan, which guides zoning and land-use decisions in North Miami, and incorporated by reference. Specifically, the plan would be used to inform future capital improvement actions, including the reuse and restoration of additional repetitive loss properties in the city.

It is important to note, however, the city's potential future use of the Repetitive Loss Master Plan would be implemented in concert with community residents, similar to how the Stormwater Park project was carried out with robust engagement. As such, the city would intend to carry out the plan with the support of residents in other neighborhoods with repetitive loss properties.

CONSIDERATIONS AND LESSONS LEARNED

The Good Neighbor Stormwater Park project exemplifies climate-resilient landscape architecture or green infrastructure, made successful through diverse public-private partnerships adopting

equitable community engagement and support, and long-term planning. Other local governments can similarly seek opportunities to reuse and repurpose vacant, abandoned, and flood-prone lots — including repetitive loss properties — to reduce localized flooding and create community assets.

One of the most noteworthy aspects of North Miami's work is the foresight of the city to look beyond one pilot project and consider ways to scale this work to other repetitive loss properties. The Good Neighbor Stormwater Park supported the development of the Repetitive Loss Vision Plan. If approved and adopted by the city, the plan has the potential to seed flood mitigation, environmental, and social benefits throughout North Miami. This type of scalability or replicability may also position local governments to have a strategic advantage with funders interested in supporting projects that maximize larger benefits for communities.

As demonstrated in North Miami, it is critical that decision makers be mindful of community-specific needs and context, such as the climate and compound impacts facing a given area, and center residents in the process to identify and design lots. This is especially important when replicating potential pilot projects through plans like the Repetitive Loss Vision Plan. Here, the neighborhood serves as an example of how to direct local resilience investments to an underserved area of a city to enable people to stay in their homes longer in the face of increasing flood risks. Potential future applications of the plan could look very different and, for example, restore vacant lands in a post-buyout neighborhood.

Government actors should be upfront with communities about project expectations and timelines to build and maintain trust. For example, plants take time to grow in and become established, so a newly landscaped space may look stark at first, and better after a year. In turn, proactive communication with residents around a greater vision is important. Interested residents, like youth, can even be encouraged to become local stewards of parks and open spaces as they mature and change over time. The educational and ecological features in the Good Neighbor Stormwater Park further support community learning and literacy around flood resilience initiatives.

In addition to community members, this project demonstrates the value of public-private partnerships, including with landscape architects for resilient design that may be institutionalized.

This project also piloted new stormwater concepts in Miami-Dade County. As a result, the city and Dept. had to work closely with the county to evaluate how to permit stormwater infrastructure in the form of a park under a permitting system designed for traditional retention and detention ponds. This example illustrates the need for early and collaborative dialogues across different levels of government to enable novel or innovative resilience projects to be implemented.

Lastly, the Good Neighbor Stormwater Park relied on multiple, diverse sources of funding to be implemented, in addition to in-kind donations of native plants and time from volunteers. Local governments and communities interested in this type of work similarly need to be creative and prepare to obtain diverse funding sources for projects like this one.



Good Neighborhood Stormwater Park, November 2021. Credit: Debbie Love, City Planner, City of North Miami, Florida.