Miami-Dade County

2025

PART 5: FLOODING - NFIP & CRS

MIAMI-DADE DEPARTMENT OF EMERGENCY MANAGEMENT

INTRODUCTION

The National Flood Insurance Program (NFIP) was created to reduce the impact of flooding on public and private structures by:

- Providing affordable insurance to property owners, renters and businesses
- Encouraging communities to adopt and enforce floodplain management regulations

Table 1 shows the status of Miami-Dade County communities participating in NFIP as of January 21, 2025, per the FEMA Community Status Book Report. The current effective Flood Insurance Rate Maps (FIRM) for all communities in the County are dated September 11, 2009.

Table 1. Status of Miami-Dade County Communities Participating in NFIP[1]

Jurisdiction	Initial FIRM Identified	Entry Date	Additional Comments
Aventura	9/30/1972	10/22/1997	Adopted the Miami-Dade County (CID 120635) FIRM dated 3/2/1994 Panels 82 and 84.
Bal Harbour	9/29/1972	9/29/1972	
Bay Harbor Islands	9/29/1972	9/29/1972	
Biscayne Park	9/29/1972	9/29/1972	
Coral Gables	9/29/1972	9/29/1972	
Cutler Bay	3/2/1994	8/31/2006	
Doral	9/30/1972	5/12/2004	Use Miami-Dade County (CID 120635) Panels 75,160 and 170.
El Portal	9/29/1972	9/29/1972	
Florida City	9/29/1972	9/29/1972	
Golden Beach	9/29/1972	9/29/1972	
Hialeah	9/29/1972	9/29/1972	
Hialeah Gardens	9/29/1972	9/29/1972	
Homestead	9/29/1972	9/29/1972	
Indian Creek Village	9/29/1972	9/29/1972	
Key Biscayne	9/29/1972	9/29/1972	
Medley	9/29/1972	9/29/1972	
City of Miami	9/29/1972	9/29/1972	
Miami Beach	9/29/1972	9/29/1972	
Miami Gardens	9/30/1972	6/21/2004	Use Miami-Dade County (CID 120635) FIRM panels 80, 82, 83 & 90.
Miami Lakes	3/2/1994	7/17/2003	Use Miami-Dade County (CID 120635) FIRM panels 75, 80 & 90.
Miami Shores	9/29/1972	9/29/1972	
Miami Springs	9/29/1972	9/29/1972	
North Bay Village	9/29/1972	9/29/1972	
North Miami	9/29/1972	9/29/1972	
North Miami Beach	9/29/1972	9/29/1972	
Opa-Locka	9/29/1972	9/29/1972	
Palmetto Bay	3/2/1994	2/2/2005	

[1] FEMA Community Status Book Report (January 2025): https://www.fema.gov/cis/FL.pdf

Jurisdiction	Initial FIRM Identified	Entry Date	Additional Comments
Pinecrest	9/30/1972	10/13/1998	Adopted Miami Dade County (CID 120635) FIRM panels 260, 276 and 278. The initial FIRM date is 10/29/1972 for floodplain management purposes.
South Miami	9/29/1972	9/29/1972	
Sunny Isles Beach	3/02/1994	9/10/2003	Use Miami Dade County (CID 120635) FIRM panels 82 & 84. The initial FIRM date is 10/29/1972 for floodplain management purposes.
Surfside	9/29/1972	9/29/1972	
Sweetwater	7/17/1995	9/29/1972	
Virginia Gardens	7/17/1995	9/29/1972	
West Miami	7/17/1995	9/29/1972	
Unincorporated	9/30/1972	9/29/1972	

Miami-Dade County communities continue to participate in NFIP by adopting and enforcing floodplain management ordinances to reduce future flood damage. These floodplain management practices allow homeowners, renters, and business owners within the community to purchase the federally supported flood insurance.

To maintain compliance with NFIP, Miami-Dade County municipalities are responsible, but not limited to the following:

- Accept, review, and maintain records of the elevation for all new construction and substantial improvements in structure within the Special Flood Hazard Areas
- Require permits and review all new construction, including substantial improvements, for compliance with the minimum standards under NFIP and the local floodplain management codes
- Require that all development proposals greater than 50 lots or 5 acres, whichever is less, include Base Flood Elevation (BFE) data
- Ensure that all new construction and substantial improvements in Flood Zones V and VE are adequately elevated so that the bottom of the lowest horizontal structural member of the lowest floor is elevated to at or above the BFE
- Require that all manufactured homes located in the Special Flood Hazard Areas are installed using methods and practices that minimize flood damage; including proper elevation and anchoring to resist flotation, collapse or lateral movement

Community Rating System

A voluntary incentive program was created by NFIP, called the Community Rating System (CRS) for communities participating in the NFIP. The Program recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, homeowners benefit from a significant discount on their flood insurance premium because, rates are discounted to reflect the reduced flood risk resulting from the community's actions to meet CRS goals. The three (3) CRS goals are:

- Reduce and avoid flood damage to insurable property
- Strengthen and support the insurance aspects of NFIP
- Encourage a comprehensive approach to floodplain management

CRS recognizes measures for flood protection and flood loss reduction through four (4) main activity categories: Public Information, Mapping and Regulation, Flood Damage Reduction, and Flood Preparedness. To participate in the CRS Program, a community (County or Municipality) must complete and submit an application to the Federal Emergency Management Agency (FEMA). The community's floodplain management efforts are reviewed by FEMA and they are assigned the appropriate CRS classification based on credit points earned for various activities. Classifications range from 1 to 10 and they determine the premium discount for eligible flood insurance policies. Refer to Table 2 for details on the CRS premium discounts organized by class and flood zone.[2]

Table 2. CRS Premium Discounts by Class and Flood Zone

Class	Discount	Class	Discount	Class	Discount
1	45%	1	10%	1	10%
2	40%	2	10%	2	10%
3	35%	3	10%	3	10%
4	30%	4	10%	4	10%
5	25%	5	10%	5	10%
6	20%	6	10%	6	10%
7	15%	7	5%	7	5%
8	10%	8	5%	8	5%
9	5%	9	5%	9	5%
10	---	10	---	10	---
Flood Zones: A, AE, A1-A30, V, V1 – V30, AO and AH.		*Flood Zones: AR/A, AR/AE, AR/A1 – A30, AR/AH and AR/AO.*		*Flood Zones: B, C, X, D, AR and A99*	

As of December 2024, 469 communities in Florida participate in the NFIP and 265 of these communities participate in the CRS Program. Unincorporated Miami-Dade County has a total of 116,895 flood insurance policies-in-force, ranking number one (1) in the State. Five (5) Miami-Dade County municipalities (City of Miami, Miami Beach, Aventura, Sunny Isles Beach and Hialeah) are on the top 30 Florida communities, with a total of 157,821 flood insurance policies-in-force. They all participate in the CRS Program.[3] Unincorporated Miami-Dade County participates in the CRS Program since October 2003, and has currently achieved a Class 3 Community rating, which guarantees a 35 percent discount on all flood insurance premiums. Furthermore, there are 24 communities in Miami-Dade County that participate in the CRS

[2] April 2024 NFIP Flood Insurance Manual: https://www.fema.gov/flood-insurance/work-with-nfip/manuals/current

[3] Flood Insurance Data and Analytics: https://nfipservices.floodsmart.gov/reports-flood-insurance-data

Program with rating ranging from Class 3 (35% discount) to Class 9 (5% discount), as depicted in Table 3.

Table 3. Community Rating System Communities in Miami-Dade County

Community	Rating	Community	Rating
Unincorporated Miami-Dade	3	**Miami Beach**	5
Aventura	7	**Miami Gardens**	7
Bal Harbor	8	**Miami Lakes**	6
Bay Harbour	9	**Miami Shores**	6
Coral Gables	5	**North Bay Village**	8
Cutler Bay	3	**North Miami**	6
Doral	6	**North Miami Beach**	7
Hialeah	7	**Palmetto Bay**	7
Homestead	7	**Pinecrest**	7
Key Biscayne	8	**South Miami**	6
City of Miami	6	**Sunny Isles Beach**	8
Medley	9	**Surfside**	6

*As of December 17, 2024[4]

The Miami-Dade County Local Mitigation Strategy (LMS) supports the CRS communities and others who wish to become CRS communities and strives to help identify areas where uniform credit can be obtained, as per compliance with the CRS Coordinators Manual. The LMS Plan was expanded to include Part 6, in order to capture and compile information to support Miami-Dade County's CRS Communities, thoroughly address the current and future flood risks, and mitigation measures.

[4] FEMA Community Rating System: https://www.fema.gov/floodplain-management/community-rating-system

Scope

The scope of the Miami-Dade County Local Mitigation Strategy (LMS) Part 6: NFIP and CRS (LMS-Part 5) is to identify the County's CRS activities. A LMS CRS/Flood Sub-Committee will be responsible for supporting the development and review of this section of the LMS. Sub-committees are formed and disbanded as needed. LMS-Part 5 is meant to be supplementary to, and not replace, the responsibilities of the community's (County or Municipal) CRS Coordinator.

Planning Process

LMS-Part 1 states that the LMS is a compilation of initiatives that are identified and supported by the LMS Chair, LMS Co-Chair, LMS Steering Committee (LMSSC), LMS Working Group (LMSWG) and LMS Sub-Committees. Additionally, as illustrated in LMS-Part 4, Appendix B, a Whole Community Approach has been implemented into the LMS.

The LMSWG meets on a quarterly basis (March, June, September and November) and these meetings are open to the public. Meeting information is shared via email to the LMS Distribution List and it is advertised on the LMS webpage: https://www.miamidade.gov/global/emergency/projects-that-protect.page.
The LMSSC and LMS sub-committees meet on an as needed basis.

The LMS Chair provides information on updates and changes to the LMS Program, training and outreach activities, information on new mitigation products, and information pertinent to the stakeholders through an email distribution list.

The LMS undergoes a five-year update cycle for submittal to the Florida Division of Emergency Management (FDEM) and then FEMA for review and approval. Upon FEMA approval, the Plan is locally adopted by the Miami-Dade Board of County Commissioners (BCC). Since 1957, Miami-Dade County has a metropolitan form of government comprised of an unincorporated area and 34 municipalities, each with their own government providing services. The BCC is the governing body of unincorporated Miami-Dade, and has broad, regional powers to establish policies, through ordinances and resolutions, for Miami-Dade County services. These actions automatically include the municipalities in the County. A Municipality can opt-out of an ordinance or resolution through their own resolution. However, when the BCC adopts the LMS, all municipalities must also adopt the LMS in their respective boards or councils for FEMA to consider them to have an approved and adopted hazard mitigation plan. Having a FEMA approved and adopted hazard mitigation plan is a requirement to be eligible to receive hazard mitigation assistance from FEMA.

Local communities that wish to utilize the LMS as their Floodplain Management Plan for credit under the CRS Program must execute a local adoption of the County's LMS Plan.

ASSESSING THE HAZARD - FLOODING

Flooding is an overflowing of water onto land that is normally dry. It can occur as a result of prolonged rainfall over several days, intense rainfall over short period of time, failure of a water control structure or storm surge. Floods are the most common and widespread weather-related natural hazard. In the United States, floods kill more people each year than tornadoes, hurricanes or lightning.[5]

Table 4. Flood Types[6]

Type	Description
River Flooding	Occurs when water levels rise over the top of the river banks due to excessive rainfall over the same area for extended periods of time.
Coastal Flooding	Caused by higher than average high tide and worsened by heavy rainfall and onshore winds (i.e. wind blowing landwards from the ocean).
Storm Surge	An abnormal rise in water level on coastal areas, over and above the regular astronomical tide, cause by forces generated from a severe storm's wind, waves and low atmospheric pressure.
Inland Flooding	Occurs when moderate precipitation accumulates over several days, intense precipitation falls over a short period of time, a river overflows because of an ice or debris jam, or a water control structure fails.
Flash Flooding	Caused by heavy or excessive rainfall in a short period of time, generally less than six (6) hours. Flash floods are generally characterized by raging torrents after heavy rainfall that rip through river beds, urban streets or mountain canyons sweeping everything before them. They can occur within minutes or a few hours of excessive rainfall. Additionally, flash floods can occur when a water control structure fails.

Miami-Dade County is highly vulnerable to flooding, as a result of heavy rainfall and storm surge, due to the County's unique geographical area. The County is surrounded by major bodies of water such as the Atlantic Ocean, Biscayne Park and the Everglades, and rivers, lakes, and canals. Additionally, Miami-Dade County has a relatively flat topography with a mean elevation of 11 feet and its underground water supply is just below the ground surface. As a result, during major rainfall events, rainwater has nowhere to drain and causes occasional flooding. Furthermore, studies are being conducted by the United States Army Corps of Engineers (USACE) to better understand the ongoing threat of sea level rise, its potential impacts and how Miami-Dade County communities are being impacted differently depending upon their geographic location and specific considerations.

For a more thorough flood hazard (flooding, storm surge and sea level rise) assessment, refer to the Hazard Identification & Vulnerability Assessment section on the LMS-Part 1. The aforementioned section was compiled based on the Miami-Dade County Threat and Hazard Identification and Risk Assessment (THIRA). The THIRA rates the County's hazard risks, determines community vulnerabilities and capabilities, and helps to better understand the potential adverse impacts of disasters and emergencies in the County. This document consists of three (3) volumes. Volume 3 is the County's hazard assessment and it contains hazard profiles for each to the hazards that have a potential risk in Miami-Dade County. Each hazard profile includes a description of the hazard, location of where the hazard is most likely to occur within the County, the extent, previous occurrences, the vulnerability and hazard assessment. The

[5] The National Severe Storms Laboratory, Severe Weather 101-Floods: https://www.nssl.noaa.gov/education/svrwx101/floods/
[6] *Ibid*.

THIRA is considered a public safety sensitive document therefore, access to the aforementioned sections will be provided to the Insurance Services Office, Inc. / CRS (ISO/CRS) Specialist by Miami-Dade DEM upon request.

Flooding Background and History in Miami-Dade County

Prior to urban development in Miami-Dade County, the land was frequently inundated for extended periods due to its flat topography, low land elevations, and the high groundwater table in the Biscayne Aquifer. The Biscayne Aquifer is the County's primary source of drinking water. To make land more suitable for urban development, various local governments and private entities initiated the construction of a canal system. A canal system was built to meet human needs by controlling the water levels and the movement of water from one place to another for water supply, flood control, drainage, navigation, and to provide water needed to sustain natural communities in lakes, rivers, wetlands and estuaries. The canal-based water management system in South Florida, developed over the past 100 years, is one of the largest and most complex civil projects in the world.[7]

The canal system that exists in Miami-Dade County today, utilizes gravity flow to move water to the east and ultimately to Biscayne Bay. However, the excavation required for the development of the canal system exposed the Biscayne Aquifer making it susceptible to saltwater intrusion. Saltwater intrusion refers to an influx of saltwater through various pathways into an aquifer. To mitigate this threat to the County water supply, salinity control structures were implemented in the primary and secondary canals throughout Miami-Dade County. For further information on saltwater intrusion in Miami-Dade County, refer to the Hazard Identification & Vulnerability Assessment section on the LMS-Part 1.

The initial canal system design did not take into account the significant urban development that has occurred in the western portion of the County. The western part of the County is lower in elevation and more flood prone. The system relies on gravity flow canal structures to drain the water into Biscayne Bay; however, this is not adequate to drain storm surge water out to Biscayne Bay.

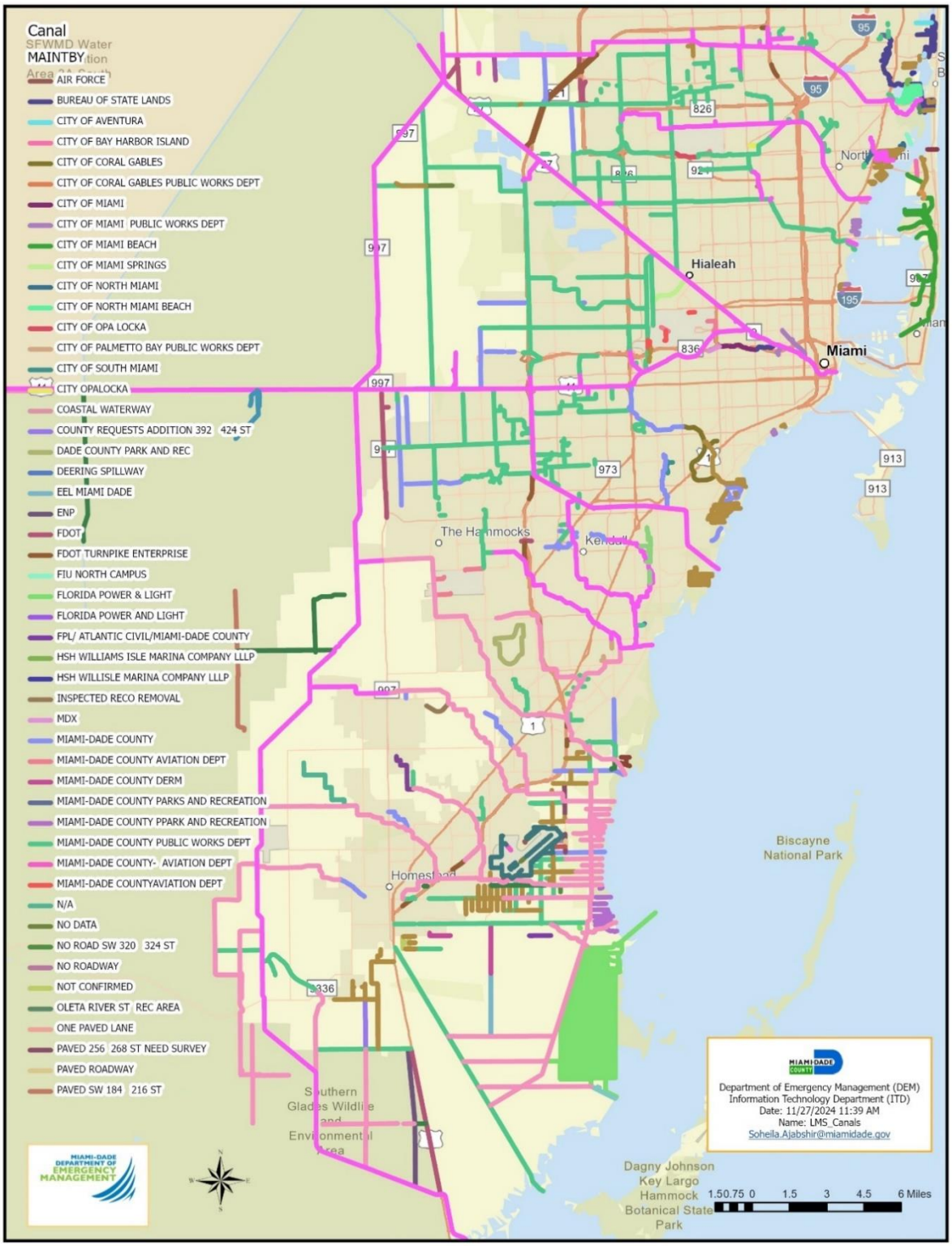
Presently, Miami-Dade County canal system consists of approximately 616 miles of canals. The canal system is divided into 360 miles of primary canals, 260 miles of secondary canals, 350 miles of smaller ditches under private jurisdiction, and 75 miles of coastal waterways. In general, the secondary canal system connects into the primary system, which empties into Biscayne Bay. The primary canals, which include most of the salinity control structures, are maintained and operated by the South Florida Water Management District (SFWMD). Miami-Dade Department of Transportation and Public Works (DTPW) maintains and controls the secondary canals. The private ditches discharge into the secondary and primary canals and the coastal ditches discharge directly into Biscayne Bay. The ability to move water in the secondary system is dependent on the available capacity of the primary system, which, in turn, is dependent in part on the proper operation of the salinity control structures. Figure 1 illustrates Miami-Dade County's canal system and figure 2 illustrates the location of Miami-Dade County canals within the drainage basins.

The LMS continues to work with the SFWMD, DTPW and other County and Municipal stakeholders for canal mitigation measures. Miami-Dade County is significantly reliant on the ability of the canals to provide drainage. As illustrated in Figure 3, drainage basins cross different

[7] Canals in South Florida: A Technical Support Document – Prepared by SFWMD: https://www.researchgate.net/publication/305316875_Canals_in_South_Florida_A_Technical_Support_Document

jurisdictions, which demonstrates the importance of tracking drainage projects throughout Miami-Dade County to better collaborate on flood hazard mitigation with all jurisdictions.

Figure 1. Canals in Miami-Dade County



252 **Figure 2. Canals and Canal Structures within Drainage Basins**

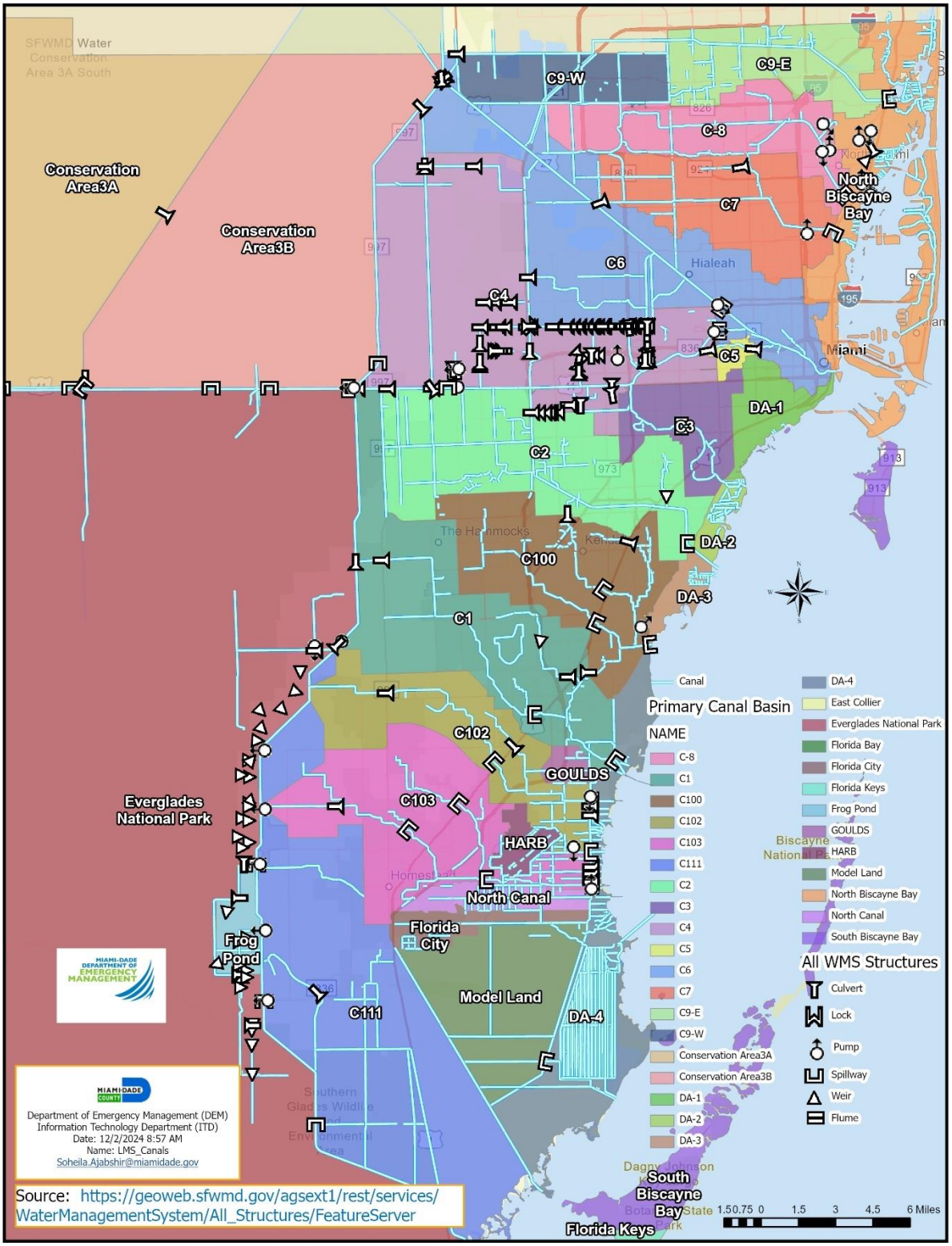


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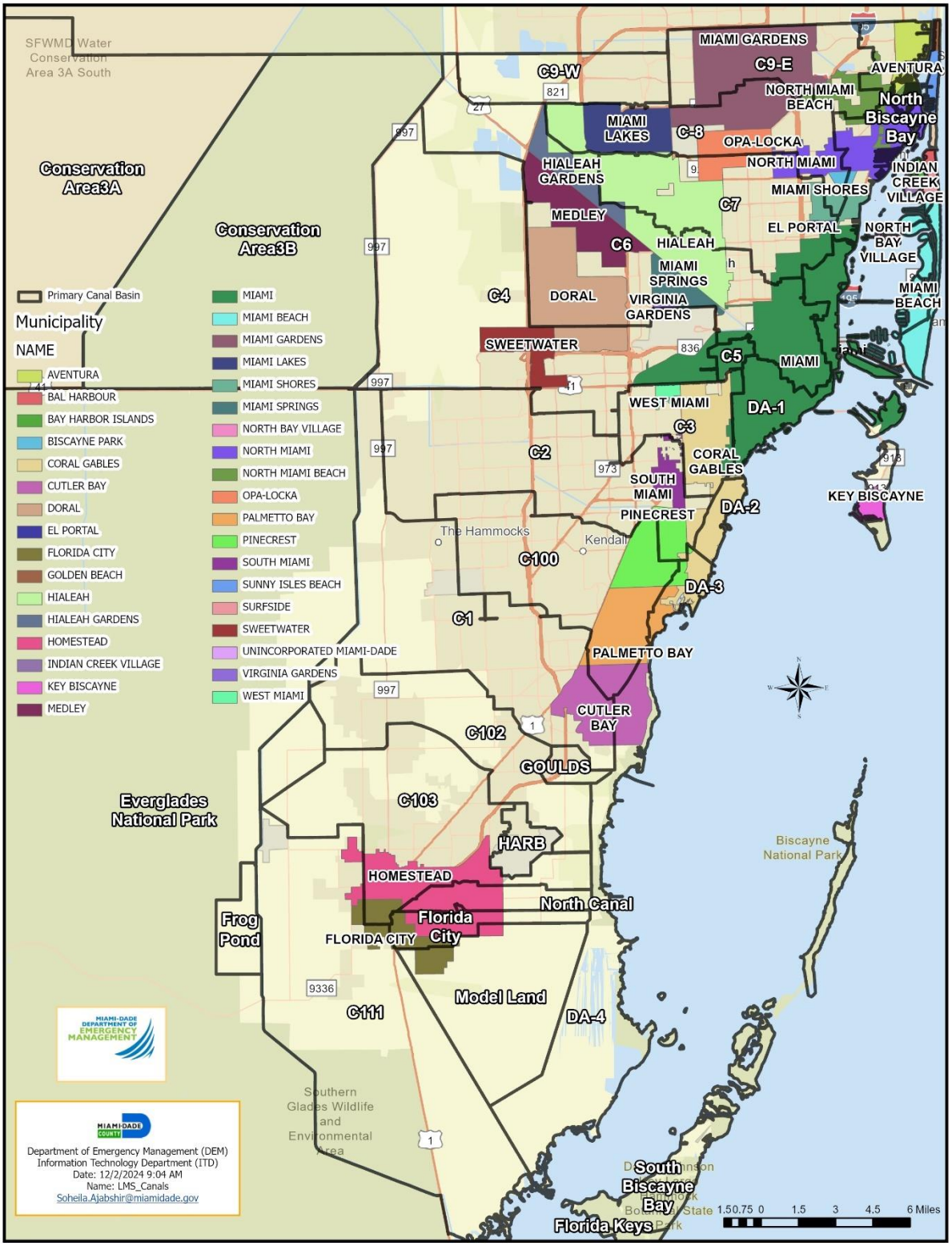
Figure 3. Municipal Boundaries in Relation to Drainage Basins



2024 Rainy Season[8]

South Florida's rainy season typically lasts an average of 155 days starting in mid-May and ending in mid-October. According to the National Weather Service, The El Niño pattern during the winter of 2023-2024 contributed to above normal precipitation, especially in February and March. However, as El Niño waned in the spring, the pattern transitioned rather quickly to much drier than normal in April and May when most areas received only 25 to 50 percent of the normal rainfall for those two months. This led to the development of moderate drought conditions in SW Florida and Palm Beach County in April, spreading south to include most of the southern Florida peninsula by the beginning of June.

Table 5, compiled by the National Weather Service (NWS) - Miami/South Florida Forecast Office, includes six (6) Miami-Dade County sites.

Table 5. Recorded rainfall from NWS sites in Miami-Dade County 2024

Location	Rainfall (inches)	Departure from Normal (inches)
Hialeah	69.54	-3.39
Homestead General Airport	60.38	+2.99
Miami International Airport	69.56	+2.15
Miami/Tamiami Executive Airport	52.05	-4.67
NWS Miami – University Park	65.82	-3.92
Opa-Locka Airport	60.35	-2.30

The late-spring dryness ended quite abruptly with the widespread rain/flood event of June 11-13. Several days of copious rainfall led to major flash flooding across parts of South Florida, mainly in the northern Miami-Dade and southern Broward County metro areas where 2-day rainfall totals of 15 to 20 inches were observed. Rainfall totals of 10-20 inches were common across most of Collier County (highest values over the eastern sections of the county), with generally 5-8 inches elsewhere across the region.

Precipitation stayed slightly above normal for the remainder of the summer and rainy season, highlighted by rainfall associated with Hurricanes Debby and Helene which were more notable across SW Florida. After the passage of Hurricane Milton in early October, the year concluded with below normal rainfall.

Overall, 2024 ended up with above normal rainfall over most of SW Florida. Most of metro SE Florida ended up with above normal rainfall, except for an area of below normal rainfall from the eastern Everglades into portions of metro Miami-Dade and northern Palm Beach counties.

[8] South Florida 2024 Weather Summary by the NWS – Miami/South Florida Forecast Office

Significant Flood Events

Hurricane Irene (October 1999) – Hurricane Irene was a typical October tropical cyclone that moved over the Florida Keys and southeast Florida. Tropical Depression 13 formed on October 13, 1999, in the northwestern Caribbean Sea and reached tropical storm status on the same day. The storm continued a general north-northeast track over Cuba and towards the Florida Keys. On October 15th, it reached hurricane strength over the Florida Straits and made landfall in Key West, Florida as a Category 1 hurricane. Hurricane Irene made its fourth landfall near Cape Sable, Florida and then moved across southeast Florida bringing tropical storm conditions and torrential rainfall. The hurricane produced 10 to 20 inches of rainfall throughout the region. On October 16th, the storm moved offshore near northern Palm Beach County.[9]

Although Hurricane Irene did not make a direct landfall in Miami-Dade County, the heavy rainfall severely impacted the County. In some areas, flooding lasted for about a week displacing hundreds of people and isolating thousands. Total losses were estimated near $600 million in southeast Florida. As a result of Hurricane Irene, the BCC created a Flood Management Task Force. The Task Force was charged with analyzing the current flood management system and its performance during Hurricane Irene as well as recommending solutions to protect residents from future flood impacts. After eight (8) months of meetings with affected residents, businesses, municipalities, and federal, state and local agencies, the Task Force issued a Final Report with 18 recommendations that could reduce future flood impacts in Miami-Dade County.[10]

Tropical Storm Leslie (October 2000) – Tropical Storm Leslie was a short-lived tropical storm that developed from Subtropical Depression One, off the east coast of Florida. Although, neither Tropical Storm Leslie nor Subtropical Depression One was responsible for the flood damage that occurred during this event. This event was later referred to as the "No Name" storm.

A tropical wave entered the eastern Caribbean Sea on September 27, 2000 and it remained disorganized as it moved north-northwest. On October 2nd, just south of western Cuba, the tropical disturbance was slightly better organized, and a mid-level circulation was visible in satellite imagery. The system began to move northward across western Cuba and the Florida Straits, and on October 3rd it entered the southeast Gulf of Mexico. As the disturbance moved north toward the west coast of Florida, it interacted with a stalled frontal boundary across southern Florida. The disturbance's interaction with the stalled frontal boundary resulted in a band of very heavy rainfall to become stationary across southeast Florida on October 3rd. On October 4th, the disturbance began to move northeastward over central Florida and moved offshore near Daytona Beach, Florida. At this time, the system became Subtropical Depression One and the storm was upgraded to Tropical Storm Leslie on October 5th.

This system was closely monitored by DTPW, SFWMD and Municipal Public Works, and the appropriate protective actions were taken to lower the canal water levels. Initially, 4 to 8 inches of rainfall was forecast for this system, but rainfall amounts exceeded the forecasts. Ultimately, the system produced 14 to 18 inches of rainfall over a linear area across the County. Rain gauges in South Miami recorded 17.50 inches, 15.79 inches in Sweetwater (NWS Forecast Office), and 15.30 inches at the Miami International Airport.[11] Many of the same areas that were impacted by

[9] National Hurricane Center Tropical Cyclone Report for Hurricane Irene, October 13 – 19, 1999: http://www.nhc.noaa.gov/data/tcr/AL131999_Irene.pdf

[10] Miami-Dade County Flood Management Task Force – Report on Flood of October 3, 2000: https://www.miamidade.gov/environment/library/reports/flood-management.pdf

[11] National Hurricane Center Tropical Cyclone Report for Tropical Storm Leslie (Subtropical Depression One), October 4 – 7, 2000: http://www.nhc.noaa.gov/data/tcr/AL162000_Leslie.pdf

Hurricane Irene the prior year were affected by this system. As a result, the BCC reconvened the Miami-Dade County Flood Management Task Force to evaluate for the installation of supplemental pumps on some key coastal canal structures throughout Miami-Dade County.[12]

"After Hurricane Irene, the Miami-Dade Office of Emergency Management put together a Project Impact and Local Mitigation Strategy effort to coordinate work with the Federal Office of Emergency Management in order to obtain as much federal financial support as possible. The October 2000 flood, coming on the heels of the damage caused by Hurricane Irene, served to energize the participation by all levels of government in the mitigation process. The concerted effort by all participants, and the leadership shown by County staff, have resulted in the likely commitment of tens of millions of dollars for federal money to correct some of the County's flood control deficiencies."

– Miami-Dade County Flood Management Task Force, Report on Flood of October 3, 2000

Hurricane Katrina (August 2005) – The complex development of Hurricane Katrina involved the interaction of a tropical wave, the tropospheric remnants of Tropical Depression Ten and an upper tropospheric trough. On August 19, 2005, a tropical wave that emerged from Africa several days prior merged with the remnants of Tropical Depression Ten producing a large area of showers and thunderstorms north of Puerto Rico. This system was moving northwestward, passing north of Hispaniola and then consolidating just east of Turks and Caicos on August 22nd. Wind shear in the area decreased enough to allow the system to develop into Tropical Depression Twelve in the afternoon of August 23rd over the southeastern Bahamas. The tropical system continued to become better organized and it became Tropical Storm Katrina in the morning of August 24th. Initially, the storm was moving northwestward as it continued to strengthen. However, on August 25th, its interaction with a weakness in the lower tropospheric subtropical ridge over the northern Gulf of Mexico and southern United States, Tropical Storm Katrina began to move westward towards southern Florida. The evening of August 25th, less than two (2) hours before its center made landfall in southeastern coast of Florida, the system strengthened into a Category 1 hurricane. Hurricane Katrina made its first landfall in the United States as a Category 1 hurricane with maximum sustained winds of 81 mph near the border of Miami-Dade County and Broward County late evening on August 25th.

As Hurricane Katrina continued to move westward across southern Florida, the strongest winds and heaviest rainfall were located south and east of the eye, over Miami-Dade County. The storm remained over land for about six (6) hours and weakened into a tropical storm over mainland Monroe County. Once the storm reemerged into the Gulf of Mexico, north of Cape Sable, FL, it quickly regained its strength. Hurricane Katrina made its final landfall near the mouth of the Pearl River at the Louisiana/Mississippi border as Category 3 hurricane on August 29th. This is the costliest [13, 14]and one of the deadliest tropical cyclones on record.

Hurricane Katrina produced substantial rainfall over portions of southern Miami-Dade County. Rain gauges at the Homestead Air Reserve Base recorded 14.04 inches, 12.25 inches in Florida City, and 11.13 inches Cutler Ridge. Rainfall amounts over northern Miami-Dade County were between 2 to 4 inches. Storm Surge was not an issue for Miami-Dade County during this storm. However, Hurricane Katrina served as a grim reminder that storm surge poses the greatest potential cause for loss of life in a single hurricane in the United States.

[12] Miami-Dade County Flood Management Task Force – Report on Flood of October 3, 2000: https://www.miamidade.gov/environment/library/reports/flood-management.pdf

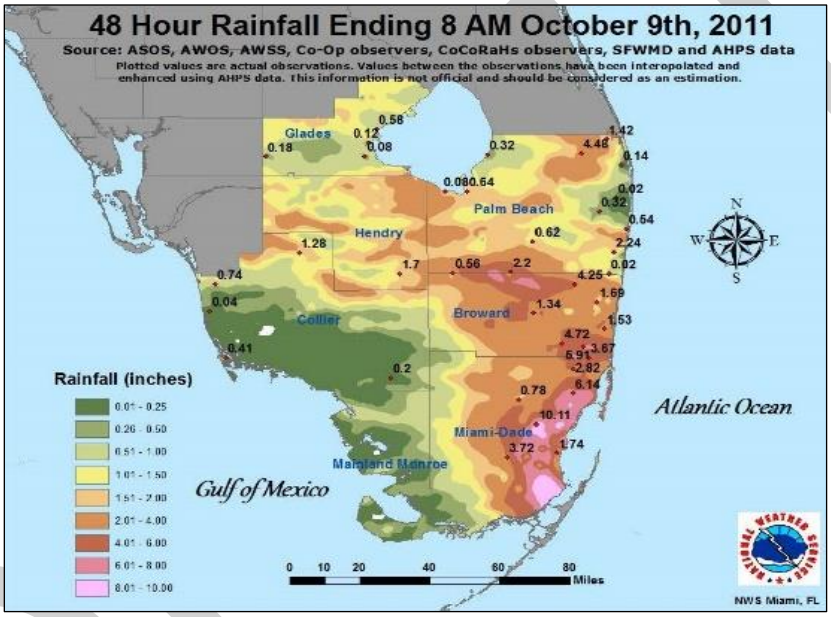
[13] National Hurricane Center's Costliest U.S. Tropical Cyclones Tables: https://www.nhc.noaa.gov/news/UpdatedCostliest.pdf

[14] 2017 Hurricane Harvey tied with Hurricane Katrina as the costliest tropical cyclone on record.

October 2011 – There were two (2) significant flood events in October 2011. During this month, Miami Beach recorded a total of 21.34 inches of rainfall breaking a 1952 record of 18.02 inches. The Miami International Airport recorded a total of 15.52 inches (9.19 inches above normal) making it the 11th wettest October on record.

The first flood event occurred between Friday, October 7th through Sunday, October 9th. The highest rainfall amounts were recorded over the Miami metropolitan area, with the highest occurring south of Kendall Drive. Figure 4 illustrates estimated rainfall amounts covering the period from Friday, October 7th through Sunday, October 9th. Areas in pink indicate rainfall totals between 8 and 10 inches. Rain gauges at the West Kendall/Tamiami Airport recorded 10.11 inches, 8.90 inches in Princeton and 7.40 inches at the Homestead Air Reserve Base.[15]

Figure 4. 48-Hour Rainfall Accumulation Map (October 7 – 9, 2011)



The second flood event occurred between Friday, October 28th and Monday, October 31st. A combination of high levels of atmospheric moisture in the Caribbean and the Gulf of Mexico, and a stalled frontal boundary produced heavy rainfall between October 28 and 31, 2011 (Friday – Monday). This resulted in significant to severe flooding throughout parts of South Florida. Late in the afternoon on October 29th, the front stalled over South Florida and bands of heavy rainfall developed in northern Miami-Dade County, from Miami Beach and Doral north to the Pompano Beach area (Broward County). These areas saw 3 to 7 inches of rainfall in only a few hours resulting in significant street flooding. The front remained nearly stationary over South Florida through October 30th, which resulted in the most significant rain event of the weekend.

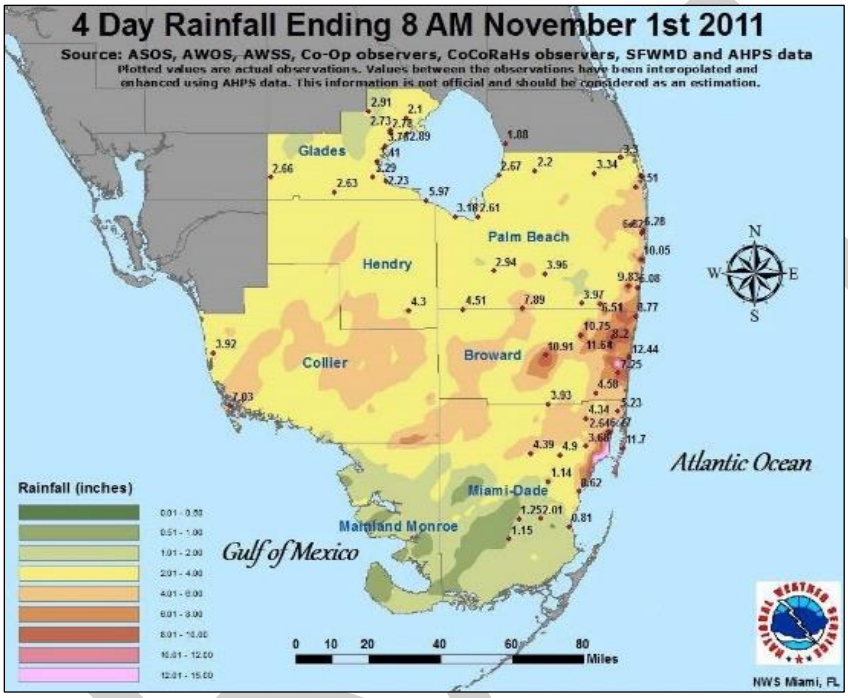
Clusters of heavy rainfall and thunderstorms developed over Biscayne Bay during late afternoon and evening. It later drifted north over Key Biscayne, Cutler Bay and Palmetto Bay during the evening. At midnight on October 31st, the area of heaviest rainfall and thunderstorms was over Pinecrest, Coral Gables and Coconut Grove. In only a few hours, areas from Cutler Bay to

[15] NWS – Miami/South Florida Forecast Office, Public Information Statement: https://www.weather.gov/media/mfl/news/RAIN_EVENT111009.pdf

Coconut Grove received 6 to 10 inches of rainfall resulting in severe street flooding and water intrusion in dozens of homes. Per SFWMD, isolated areas in Coconut Grove may have received over 12 inches of rainfall during this time. Rainfall continued throughout the evening.[16]

Figure 5 illustrates an estimate of rainfall amounts covering the period from Friday, October 28th through Tuesday, November 1st. Areas in pink indicate rainfall totals over 12 inches. The highest rainfall total recorded in Miami-Dade County was in Miami Beach with 11.70 inches.

Figure 5. 4-Day Rainfall Accumulation Map (October 28 – November 1, 2011)

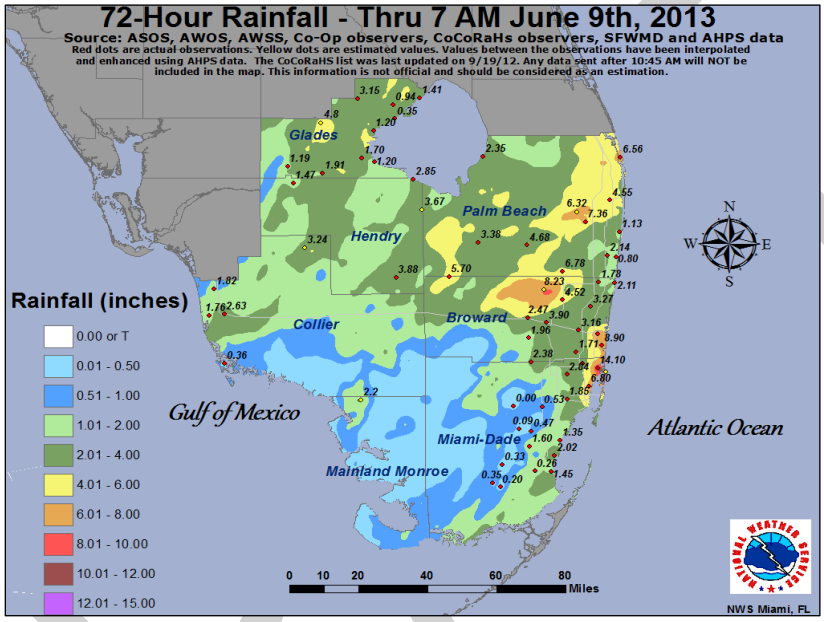


Tropical Storm Andrea (June 2013) – A trough developed north of a persistent cyclonic gyre located over the southeastern Mexico and northern Central America on June 2, 2013. On June 3rd, a broad area of low pressure formed over the southern Gulf of Mexico in response to a tropical wave entering the northwestern Caribbean Sea. Moderate vertical wind shear and dry air in the area hindered the development of the system as is moved northward. Atmospheric conditions became slightly conductive and Tropical Storm Andrea formed in the evening of June 5th several miles southwest of St. Petersburg, Florida. The storm initially began moving northward, but on June 6th it turned northeastward and made landfall along the northwestern Florida Peninsula. Tropical Storm Andrea continued to move across northeastern Florida and southeastern Georgia, and it became extratropical over northeastern South Carolina on June 7th.

[16] NWS Weather Forecast Office, Summary of Heavy Rainfall/Flood Event of October 28-31: https://nwas.org/ej/2012-EJ11/October2011HeavyRain.pdf

Although Tropical Storm Andrea did not make landfall in South Florida, convective rain bands well southeast of the center of the storm produced very heavy rainfall over southeastern Broward County and northeastern Miami-Dade County between June 6th and 7th. A 24-hour total of 13.94 inches was recorded at the SFWMD station in North Miami Beach, 11.71 inches at the FIU Biscayne Campus and 9.89 inches in North Miami/Keystone Point. This excessive rainfall resulted in widespread flash flooding that caused water to enter homes and roads to become impassible.[17, 18] Figure 6 illustrates an estimate of rainfall amounts covering the period from June 6th through June 9th.

Figure 6. 72-Hour Rainfall Accumulation Map (June 7 – 9, 2013)



October 2013 – An area of low pressure near the Yucatan Peninsula directed tropical moisture into South Florida that produced heavy rainfall in the Kendall area, near the Falls Shopping Mall, during the late afternoon and early evening of October 2, 2013. The slow-moving showers and thunderstorms produced rainfall amounts of 7 to 10 inches in just a few hours which resulted in an isolated area of flash flooding. Roads were impassible and The Falls Shopping Mall parking lot was completely under water. Additionally, water entered buildings and vehicles in the area.[19]

February 2015 – A stationary front over South Florida resulted in a strong thunderstorm that produced over 4 inches of rainfall over northeast Miami-Dade County.[20] As a result, significant flooding occurred in the Omni, Edgewater and Midtown areas, mainly along Biscayne Boulevard and North Miami Avenue, in the City of Miami. Multiple cars stalled and flooding was about one

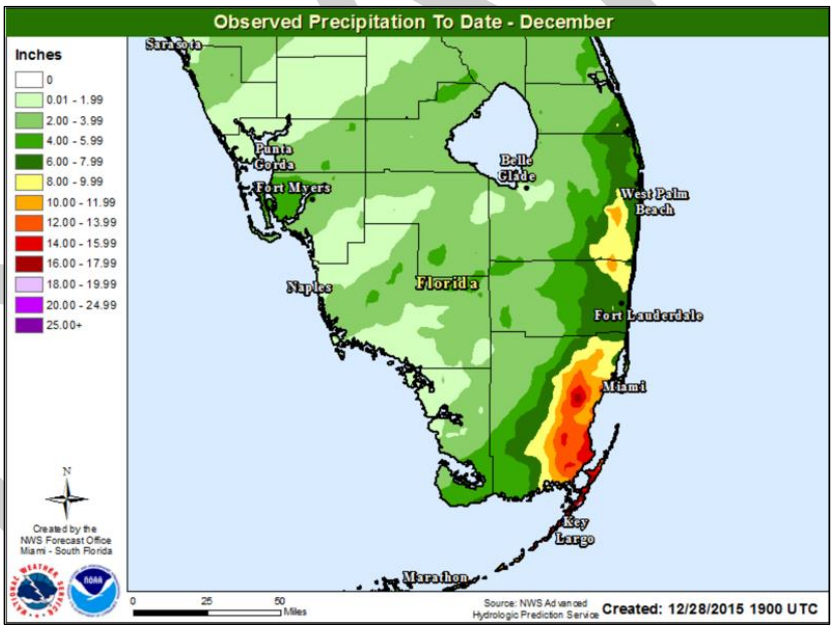
[17] National Hurricane Center Tropical Cyclone Report for Tropical Storm Andrea: https://www.nhc.noaa.gov/data/tcr/AL012013_Andrea.pdf
[18] NWS – Miami/South Florida Forecast Office, Tropical Storm Andrea (June 5 – 7, 2013): https://www.weather.gov/mfl/andrea
[19] NOAA's National Centers for Environmental Information Storm Events Database (Event Type: Flash Flood): https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=478777
[20] NWS – Miami/South Florida Forecast Office, South Florida Winter 2014-2015 Recap: https://www.weather.gov/media/mfl/news/Feb2015WinterSummary.pdf

(1) foot deep. Additionally, multiple businesses in the Miami Midtown Shops closed, because ground floors flooded.[21]

December 2015 – A cold front moved into South Florida on December 3, 2015. On December 4th and 5th, the front stalled over the upper Florida Keys and produce heavy rainfall throughout Miami-Dade County. However, southern Miami-Dade County was the hardest hit area and rainfall amounts recorded between December 5th and 6th were similar to totals observed during previous tropical systems. The Miami Executive Airport recorded 8.92 inches of rainfall and over 10 inches were recorded in West Kendall. The Homestead/Redland area recorded 6 to 8 inches of rainfall resulting in the severe flooding of agricultural fields. Farmers reported significant damage to fall and winter crops, ranging from rotting crops due continuous rainfall to total loss from completely flooded fields. Agricultural damage estimates were about 1 Million dollars with a 70% to 80% loss in crops. Other impacts included numerous road closures, stalled vehicles and Zoo Miami closed for several days due to flooding in the facility.[22]

Typically, December is the driest months in South Florida, but December 2015 had an unusual wet pattern. The Miami Executive Airport in West Kendall recorded 18.43 inches of rainfall, the wettest December on record since 1998; the Redland recorded 14.92 inches; the wettest December on record since 1942 and the Miami International Airport recording its second wettest December on record with 9.75 inches. Figure 7 illustrates observed rainfall amounts for the month of December.[23]

Figure 7. Observed Precipitation for December 2015



[21] NOAA's National Centers for Environmental Information Storm Events Database (Event Type: Flash Flood): https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=565140

[22] NOAA's National Centers for Environmental Information Storm Events Database (Event Type: Flood): https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=605707

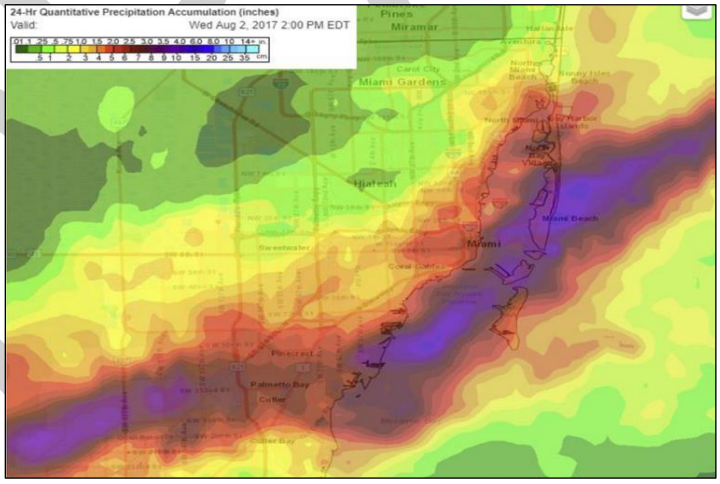
[23] NWS – Miami/South Florida Forecast Office, 2015 South Florida Weather Year in Review: https://www.weather.gov/media/mfl/news/2015WeatherSummary.pdf

August 2017 – A surface low with enough organized deep convection formed within the post-frontal trough and a Tropical Depression developed on July 30, 2017. The system was centered west-northwest of St. Petersburg, Florida. The next day, on July 31st, the system strengthened into Tropical Storm Emily and made landfall near Longboat Key, Florida. Tropical Storm Emily moved over Central Florida and weakened into a Tropical Depression in the early hours of August 1st and moved offshore into the Atlantic Ocean. By August 2nd, the storm became post tropical and dissipated over the Atlantic Ocean.[24]

Tropical Storm Emily was a short-lived tropical storm and no direct impacts were reported in Miami-Dade County. However, the system left an elongated trough across South Florida on August 1st. A combination of the frontal boundary and daytime heating, a band of thunderstorms developed off the coast and moved west. At around 2 pm, the band of thunderstorms became nearly stationary over Miami Beach, Key Biscayne and Downtown Miami. A Flash Flood Warning was issued at 3:47pm until 9:45pm. Later in the afternoon, the same band of thunderstorms redeveloped over The Redlands, Kendall, Palmetto Bay, and Pinecrest area. Rainfall amounts in these areas ranged between 4 and 6 inches with isolated amounts between 7 and 8 inches. The rainfall rates of 2 to 4 inches an hour lasted 2 to 3 hours, around the same time as high tide which exacerbated the flooding.

Significant flooding was reported in Miami Beach and the Brickell area in the City of Miami. Vehicles were stalled in streets with up to 2 feet of water and several streets were closed due to deep standing water. In Miami Beach, 1 to 2 feet of water was reported throughout several streets in South Beach, including Purdy Avenue, West Avenue, Alton Road, Pennsylvania Avenue, Meridian Avenue, Collins Avenue, Washington Avenue and Indian Creek Drive. Water entered businesses, homes, apartment lobbies and parking garages. In Mary Brickell Village, more than 10 businesses and buildings had 1 to 4 inches of water inside their structures. Figure 8 illustrates the 24-hour rain total graphic from NWS Weather and Hazards Data Viewer for this event.[25,26]

Figure 8. Rainfall Map from NWS Weather and Hazards Data Viewer



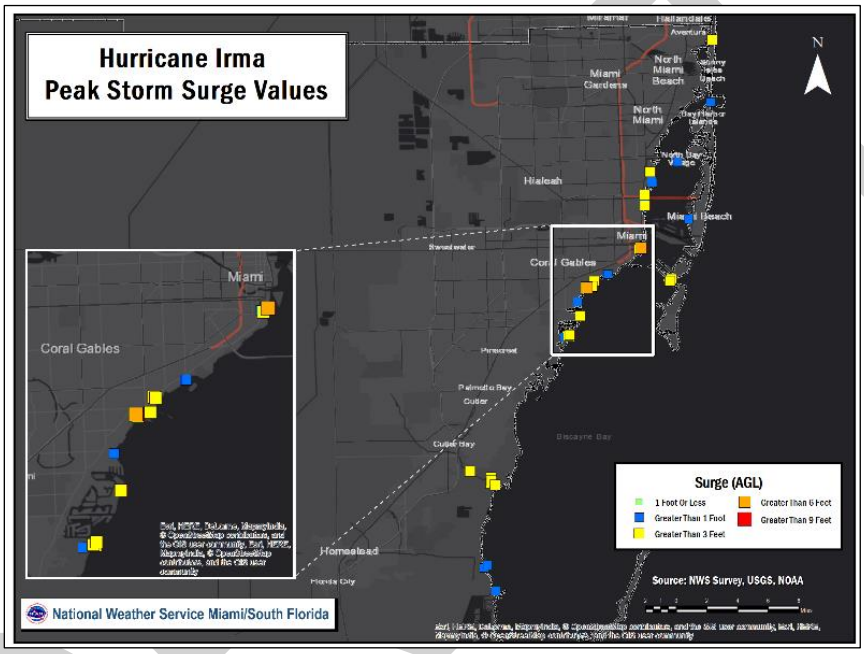
[24] NWS – Miami/South Florida Forecast Office, Tropical Storm Emily (July 13 – August 1, 2017): https://www.nhc.noaa.gov/data/tcr/AL062017_Emily.pdf

[25] NWS – Miami/South Florida Forecast Office, Preliminary Report on August 1, 2017 Miami and Miami Beach Flood Event: https://www.weather.gov/media/mfl/news/Flood_2017Aug1.pdf

[26] NOAA's National Centers for Environmental Information Storm Events Database (Event Type: Flash Flood): https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=718505

Hurricane Irma (September 2017) – Hurricane Irma made two landfalls in South Florida on September 10th. At 9:10 am, Category 4 Hurricane Irma made landfall in Cudjoe Key and at 3:35 pm in Marco Island as a Category 3. The center of Hurricane Irma moved into Central Florida and continued a northward trajectory over Florida. Rainfall amounts in Miami-Dade County were mainly between 6 and 10 inches. Storm surge of approximately 3 to 5 feet travelled 1 to 2 blocks inland along the Biscayne Bay shoreline from Homestead to Downtown Miami/Brickell. Isolated spots in Coconut Grove and Brickell surveyed storm surge inundation greater than six (6) feet. Storm surge inundation north of Downtown Miami had values of 2 to 3 feet and areas along the Atlantic oceanfront (Key Biscayne and Miami Beach) had inundation of 2 to 3 feet and confined to the immediate beachfront. Figure 9 illustrates peak storm surge values in Miami-Dade County.

Figure 9. Hurricane Irma Peak Storm Surge Values

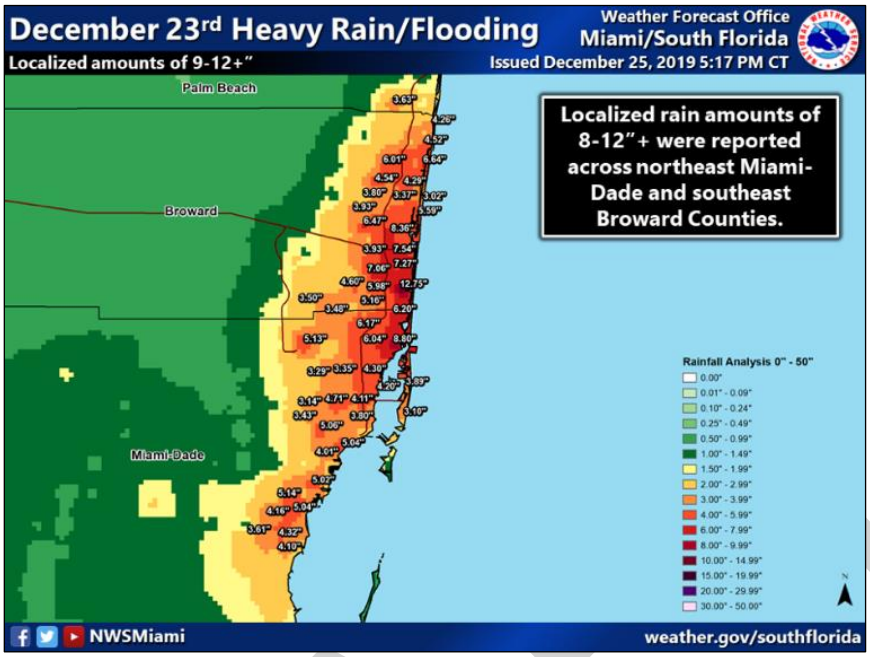


December 2019 - A strong cold front moved across the region behind a low pressure system that developed over the Gulf of Mexico. Ahead of the cold front, a strong line of storms crossed through South Florida and produced heavy rainfall and flooding across the east coast metro areas of northeast Miami-Dade County during the early morning hours of December 23, 2019. The highest rainfall amount was over 8 inches. Significant flooding was recorded from Aventura south and to the North Miami area. Multiple reports received of significant street and parking lot flooding, with reports of flooded parking garages and stalled vehicles, particularly in Aventura as well as along Biscayne Boulevard and NE 123rd Street. Flooding continued impacting several roads across the area into Monday afternoon and evening. Figure 10 illustrates observed rainfall amounts for December 23rd.[27, 28]

[27] NWS – Miami/South Florida Forecast Office, December 2019 South Florida Flooding: https://www.weather.gov/mfl/dec2019flooding

[28] NOAA's National Centers for Environmental Information Storm Events Database (Event Type: Flood): https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=869837

Figure 10. December 23rd Rainfall Accumulation Map



Local flood events are documented by NWS Miami/South Florida Forecast Office at https://www.weather.gov/mfl/events_index and by NOAA's National Centers for Environmental Information Storm Events Database at https://www.ncdc.noaa.gov/stormevents/.

September 13, 2020 – A low pressure system, turned tropical disturbance, moving across the western Atlantic and over the Bahamas abruptly formed into Tropical Depression Nineteen on September 11th. Tropical Depression Nineteen gradually continued westward and the center passed about 10 to 20 miles SSE of Miami, Florida during the morning of September 12th. As Tropical Depression Nineteen moved westward over the South Florida peninsula, it continued to strengthen into a Tropical Storm known as Tropical Storm Sally. Rainfall flooding impacts were moderate to significant across South Florida with around 3 to almost 8 inches across portions of Miami-Dade County. Several broadcast media reports of significant street flooding from Coconut Grove to Brickell and Downtown Miami, and possibly extending into Little Havana. U.S. Highway 1 in Coconut Grove and Brickell was covered in water up to knee-high in places, leading to a number of stalled vehicles.

Flood Impacts

Flood impacts in a structure can range from wet carpets or floors, to damaged interiors leading to destruction of property. In addition, floods can potentially cause damage to infrastructure, such as washing out roads and bridges, or standing water can inhibit the movement of vehicular traffic. The agricultural community can significantly be impacted by floods when crop fields are flooded for an extended period of time or are being washed away.

Flood Regulations in Miami-Dade County

Pre-Flood Insurance Rate Map structures are those built before the effective date of the first FIRM for the community or prior to January 1, 1975 (whichever is later). This means structures built before detailed flood hazard data and flood elevations were provided to the community and usually before the community enacted a comprehensive floodplain management program and regulations.[29] Pre-FIRM buildings can be insured using "subsidized" rates to help residents afford flood insurance even though the structure was built without considering flood protection.[30]

Post-FIRM structures are new construction built after the effective date of the first FIRM for the community. Insurance rates for Post-FIRM buildings depend on the elevation of the lowest floor in relation to the BFE.

The CRS Sub-Committee identified major milestones for flood regulation in Miami-Dade County as depicted in Table 6.

Table 6. Percent Housing Stock by Major Flood Regulation Dates for Miami-Dade County (December 2024)

Color	Year	Description	% of housing stock
	Pre-1957	No special elevation requirements in effect.	23.62%
	1957-1973	General Countywide requirement of the highest of the County Flood Criteria maps (10-year event) (CFC), Back Of Sidewalk (BOS), or highest adjacent Crown Of Road (COR) + 8 inches for residential or 4 inches for commercial construction	22.42%
	1973-1992	First FIRM maps developed identifying flood areas. CFC still enforced.	24.82%
	1993-2008	Incorporated areas begin enforcing flood codes.	20.90%
	2009-2011	Updated FEMA Flood Maps	1.00%
	2012 - present	New Florida Building Code requiring free board for properties within Special Flood Hazard areas, following ASCE24 Table, to be elevated depending on the building category	7.23%

Figure 11 illustrates an overview of the residential construction in relation to the major milestones listed on Table 6. The data was for figure 11 was gathered from the Miami-Dade County Property Appraiser database, by looking at the year of construction. This information is meant to provide an overview on the structures' year of construction, but it does not provide information on the elevation. However, it provides an overview of the standard in place when the structure was built. Individual jurisdictional maps can be made available to all municipalities.

[29] Pre-FIRM Definition/Description (FEMA): https://www.fema.gov/about/glossary/pre-firm-building
[30] Miami-Dade County Regulatory and Economic Resources, Flood Insurance: https://www.miamidade.gov/environment/flood-insurance.asp

Table 7 illustrates the number of structures by the flood regulation milestones for each Municipality.

An Elevation Certificate is used to provide elevation information necessary to: [31]

- Ensure compliance with the community's floodplain management ordinances
- Determine the proper insurance premium rate
- Support a request for a Letter of Map Amendment (LOMA) to remove a building from the Special Flood Hazard Area

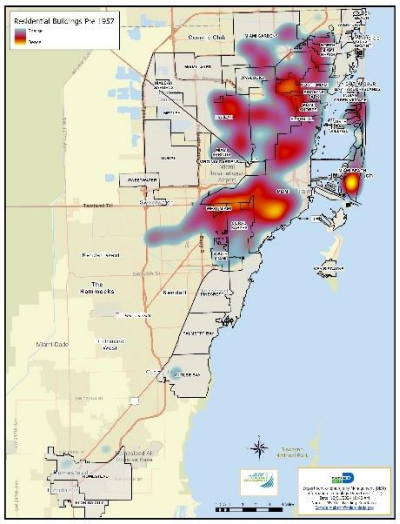
If a structure is located within a FEMA Flood Zone, an Elevation Certificate is needed. It is imperative that every homeowner has an Elevation Certificate because, in case of a disaster, it would demonstrate to County authorities that the structure is at or above the required elevation. Elevation Certificates are required for all new construction, substantial improvements to a structure, and for substantially damaged structures. Miami-Dade County has been collecting Elevation Certificates from developers since 1995 as a requirement for their building permit. However, a comprehensive database of Elevation Certificates for all structures in Miami-Dade County is not available, but the Miami-Dade County Regulatory and Economic Resources Department (RER) continues to gather this data.[32]

[31] NFIP Elevation Certificate and Instructions (FEMA): https://www.fema.gov/media-library/assets/documents/160

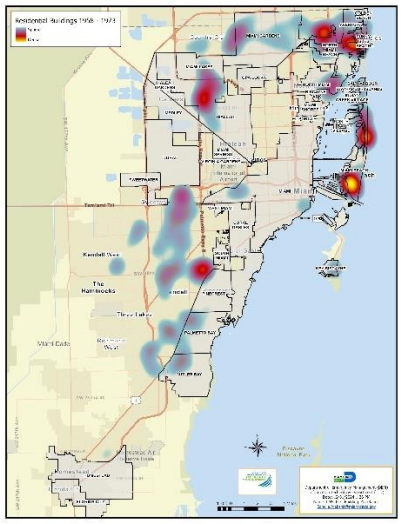
[32] Miami-Dade RER, Flood Protection – Elevation Certificates: https://www.miamidade.gov/environment/flood-elevation.asp

Figure 11. Miami-Dade County Residential Construction by Flood Regulation Milestones

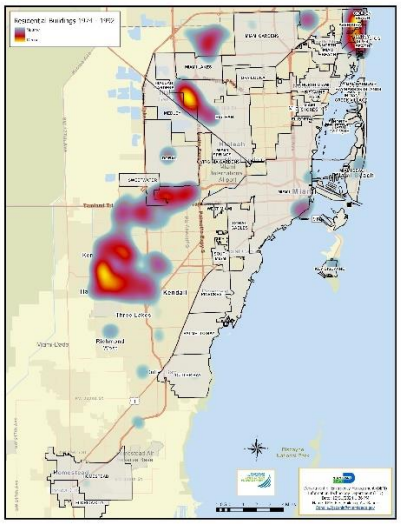
Pre-1957



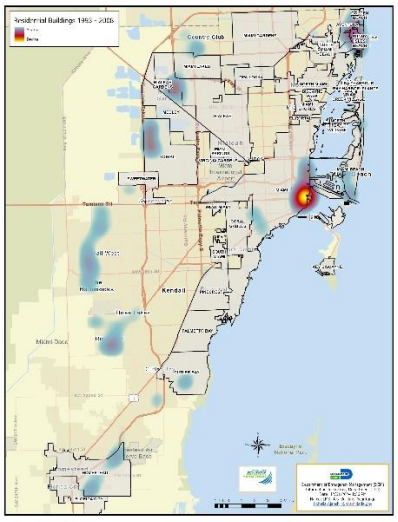
1958-1973



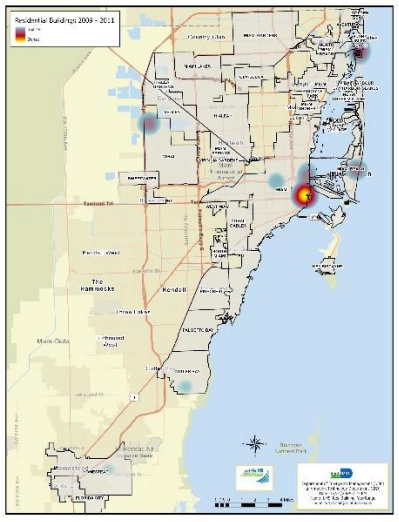
1973-1992



1993-2008



2009-2011



2012-2024

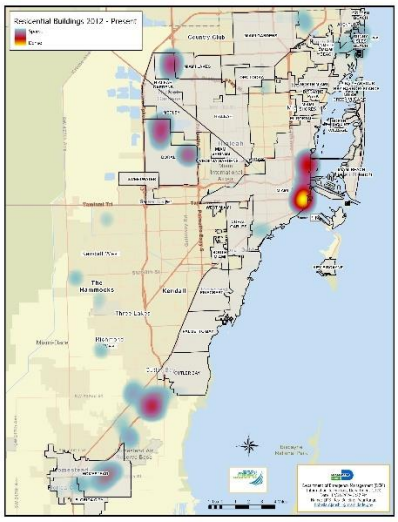


Table 7. Residential Structures by Flood Regulation Dates for Each Jurisdiction

Jurisdiction	Pre 1957	1957 – 1973	1974 – 1992	1993 – 2008	2009 – 2011	2012 – Present
Aventura	19	4,401	11,244	8,107	63	554
Bal Harbour	321	800	1123	661	210	272
Bay Harbor	546	1,307	165	139	5	532
Biscayne Park	912	92	37	2	3	11
Coral Gables	7,094	3,963	2,095	3,047	252	863
Cutler Bay	1284	4,600	3,360	4,783	280	560
Doral	13	844	4,174	11,174	750	6,842
El Portal	667	52	3	14	1	8
Florida City	280	569	301	1,003	30	1,348
Golden Beach	90	24	76	90	11	88
Hialeah Gardens	2	278	2,244	3,266	7	103
Hialeah	14,451	15,048	18,009	5,581	55	3,386
Homestead	1242	1,061	3,012	11,461	310	3,897
Indian Creek Village	3	4	8	31	4	5
Key Biscayne	530	2,326	2,221	1,592	43	371
Medley	17	28	27	22	1	4
Miami Beach	12,721	18,122	6,106	11,061	840	2,125
Miami Gardens	8,881	14,481	4,549	2,408	178	885
Miami Lakes	2	2,845	2,802	3,350	10	553
Miami Shores	2,921	533	179	80	3	31
Miami Springs	2,702	837	256	82	28	51
Miami	38,489	16,256	15,229	33,030	2927	14,733
North Bay Village	680	1,204	557	950	158	21
North Miami Beach	5,831	5,078	1,242	277	13	1,044
North Miami	7,687	5,381	1,166	601	14	152
Opa-Locka	1,864	599	162	275	9	163
Palmetto Bay	306	4,623	2,215	1,001	13	94
Pinecrest	1,177	2,947	863	915	52	500
South Miami	1,683	749	628	527	26	154
Sunny Isles Beach	245	4,889	4,495	6,502	850	2,142
Surfside	979	613	499	848	3	266
Sweetwater	50	954	2,134	383	7	23
Virginia Gardens	432	136	49	9	0	1
West Miami	1,354	97	24	95	2	29
Unincorporated	43,903	82,335	128,070	71,322	1,678	22,045
TOTAL	**159,378**	**198,076**	**219,324**	**184,689**	**8,836**	**63,856**

Figure 12 illustrates the FEMA Flood Zones, also known as the FIRMs, which went into effect in 2009. These maps can be accessed via an interactive web tool at gisweb.miamidade.gov/floodzone. FEMA is conducting an update to the Miami-Dade County FEMA Flood Zones. Preliminary maps were published in February of 2021. As of December 2024, these maps are not yet effective. The preliminary maps may also be accessed via the interactive web tool previously referenced.

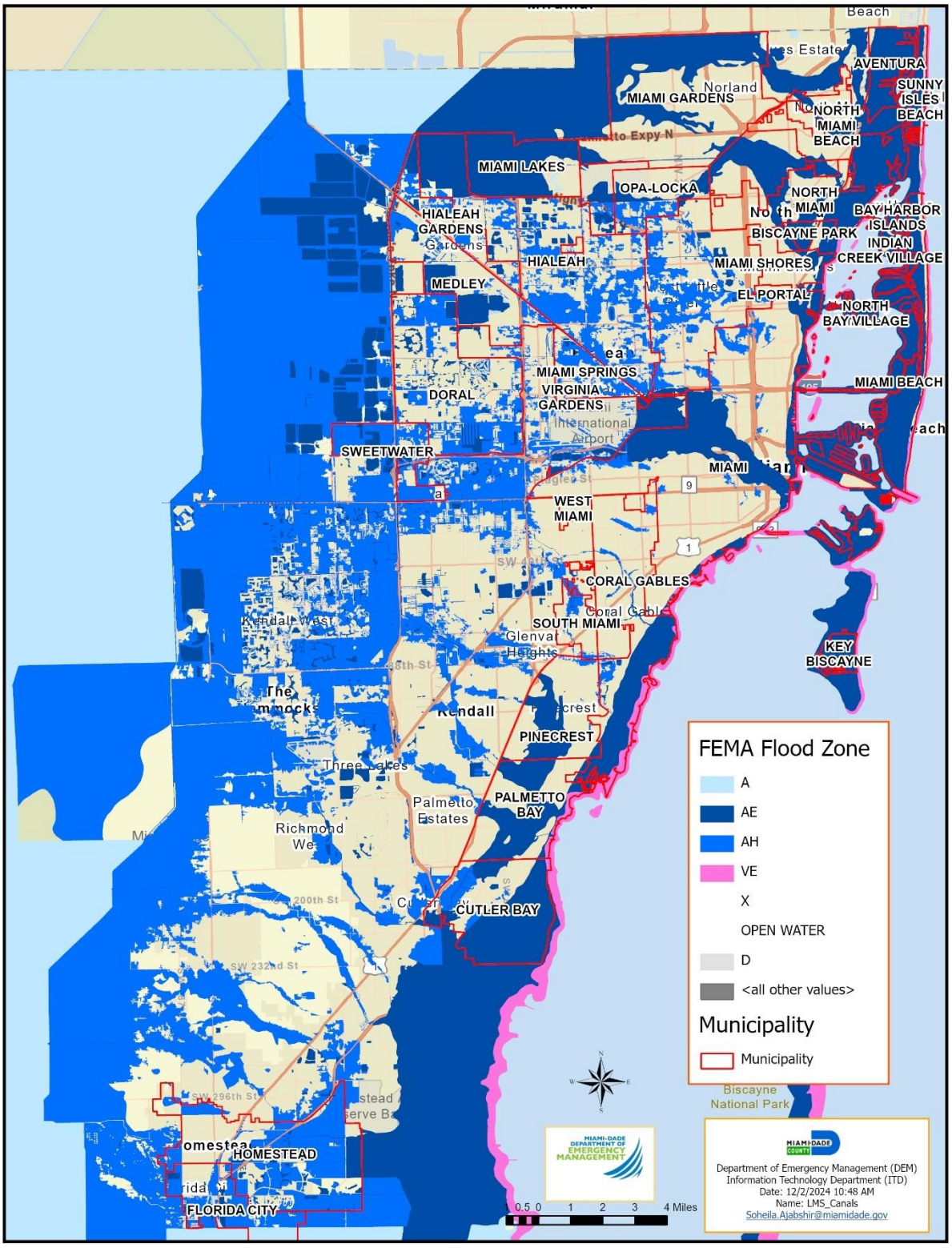
Figure 13 illustrates the number of buildings that are within the Miami-Dade County FEMA Flood Zones AE and AH with clustered building counts with positions relative to their flood zone. These are based on 2024 data from the Miami-Dade County Property Appraiser.

Figure 14 illustrates the number of buildings that are within the Miami-Dade County FEMA Flood Zones VE with clustered building counts with positions relative to their flood zone. These are based on 2024 data from the Miami-Dade County Property Appraiser.

Figure 15 illustrates the number of buildings that are within all the Miami-Dade County FEMA Flood Zones with clustered building counts with positions relative to their flood zone. These are based on 2024 data from the Miami-Dade County Property Appraiser.

Table 8 provides a breakdown of the number of buildings within the FEMA Flood Zones, by jurisdiction.

646 **Figure 12. Miami-Dade County FEMA Flood Zones (2009)**



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649 **Figure 13. Buildings by FEMA Flood Zones – AE and AH**

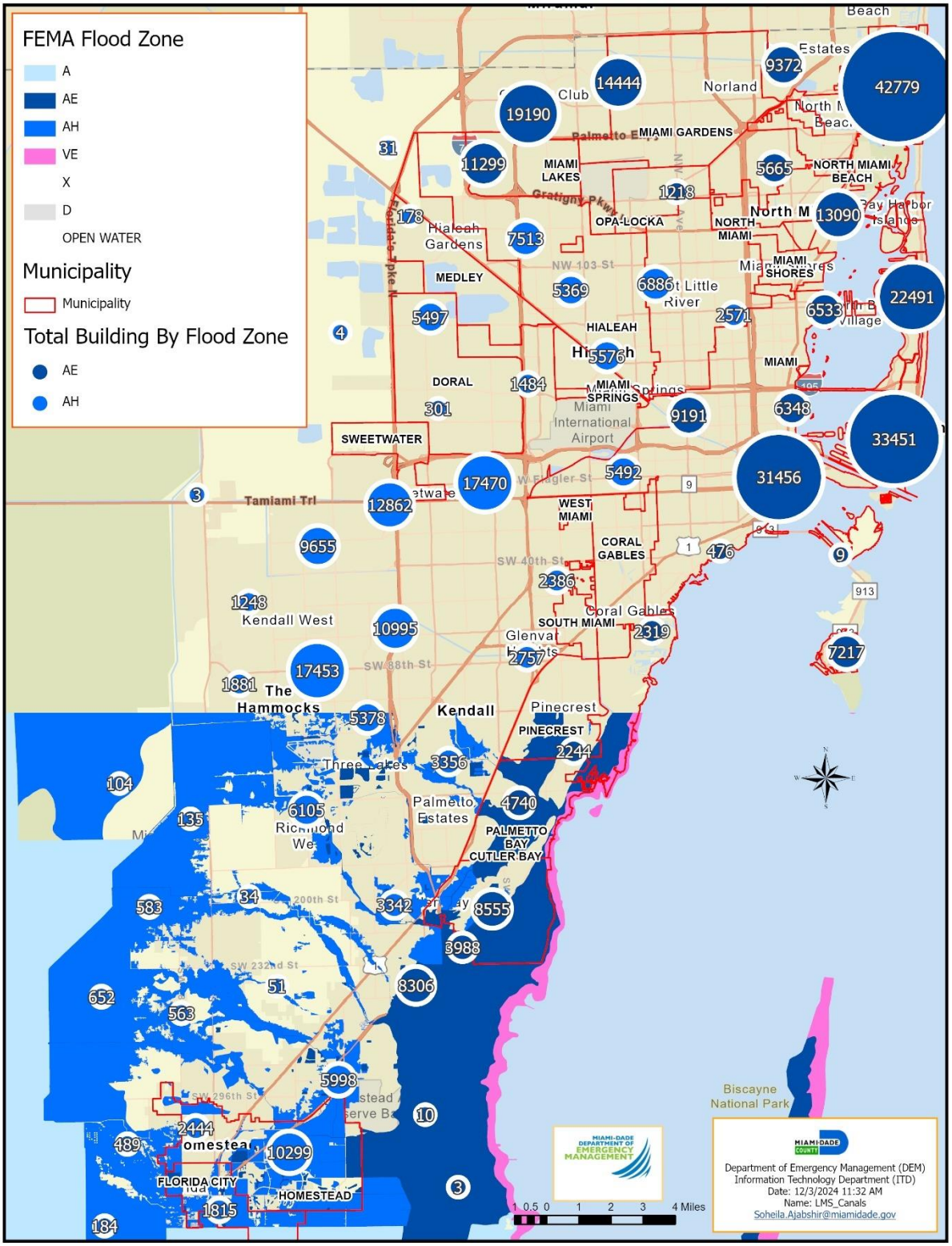

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Figure 14. Buildings by FEMA Flood Zones – VE

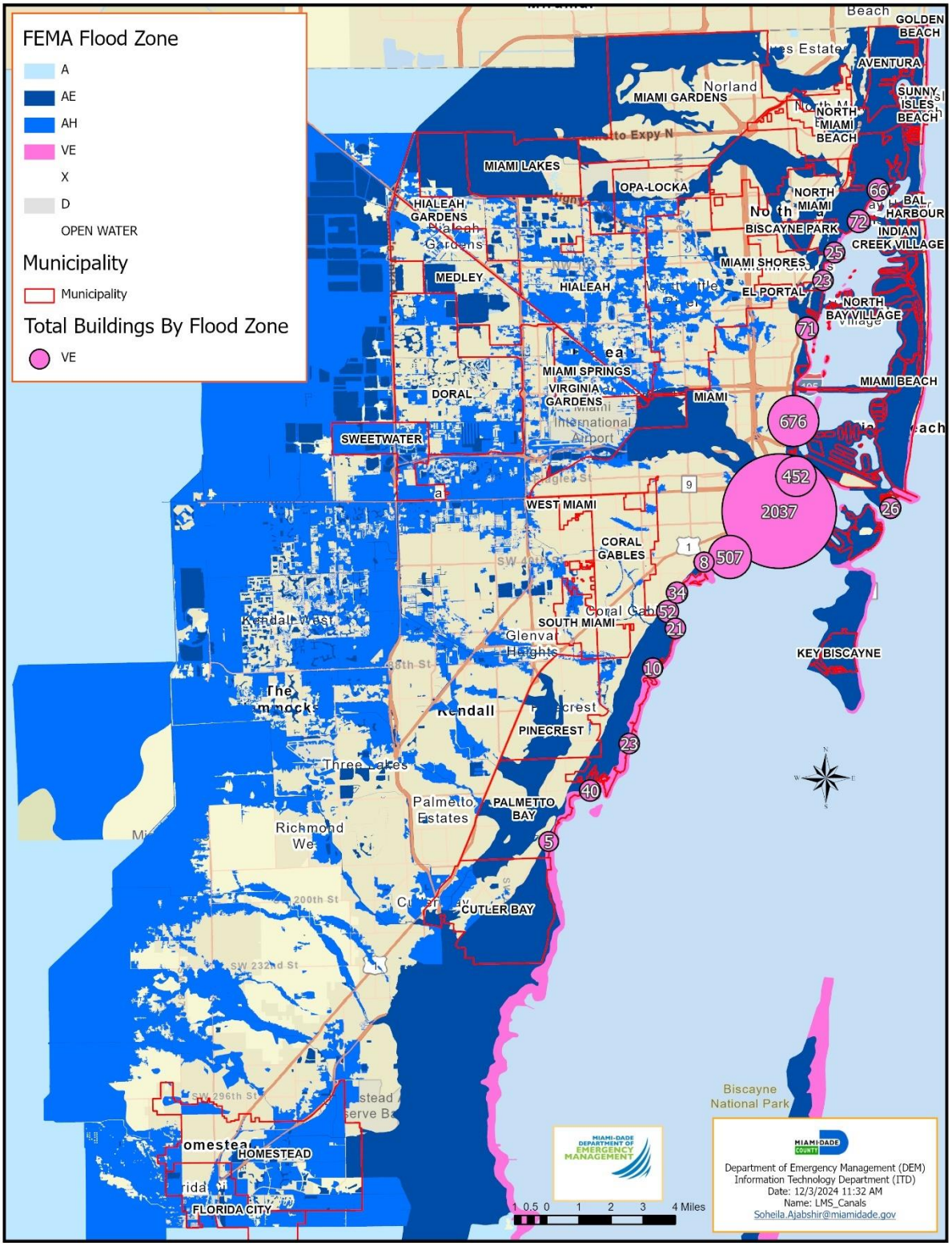


Figure 15. Buildings by FEMA Flood Zones

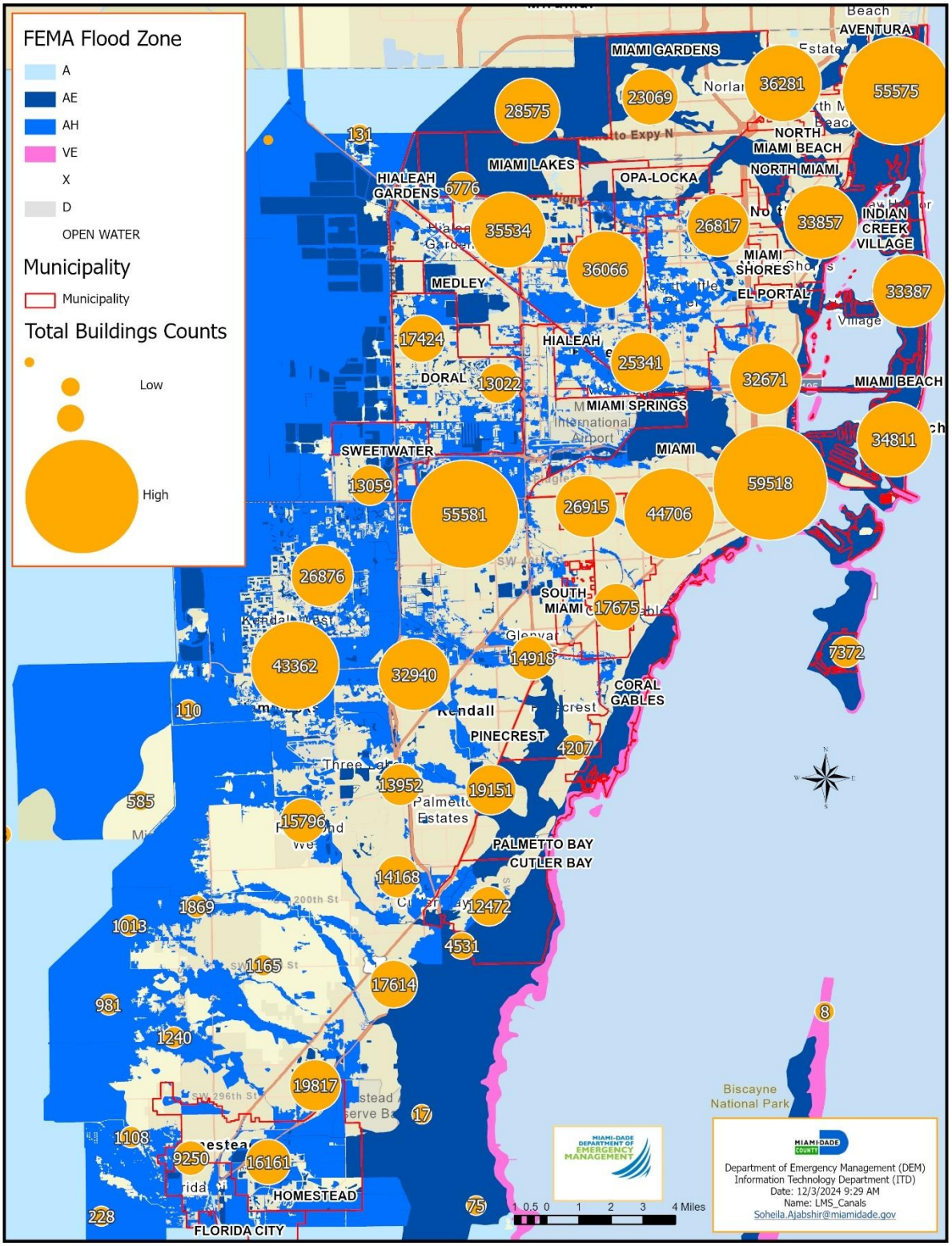


Table 8. Number of Buildings in FEMA Flood Zones for Each Jurisdiction (2024)

Jurisdiction	A	AE	AH	D	VE	X
Aventura		24,861				172
Bal Harbour		642				3,192
Bay Harbor		2,906				
Biscayne Park		1,116				93
Coral Gables		2,977	1,414		65	16,097
Cutler Bay		8,902	2,009			4,343
Doral		166	7,311			19,729
El Portal		10	111			755
Florida City	2	21	1,899			2,072
Golden Beach		269				136
Hialeah		4,478	21,569			40,678
Hialeah Gardens		139	429			5,895
Homestead		770	12,137			9,556
Indian Creek Village		51				20
Key Biscayne		7,298				
Medley		9	456			1,159
City of Miami		51,416	7,084		3,864	84,868
Miami Beach		51,701				3,939
Miami Gardens		14,024				20,227
Miami Lakes		8,934				1,341
Miami Shores		843			24	3,277
Miami Springs		48	2,338			2,486
North Bay Village		3,659				
North Miami		8,579			139	8,580
North Miami Beach		6,458				8,285
Opa-Locka		951	569			3,104
Palmetto Bay		4,802			44	3,857
Pinecrest		2,260	67			4,618
South Miami		1	825			3,977
Sunny Isles Beach		11,971			1	7,719
Surfside		1,562				1,767
Sweetwater		11	3,410			1,103
Virginia Gardens			132			592
West Miami						1,823
Unincorporated	921	53,113	113,619	1	100	217,268
TOTAL	**923**	**233,368**	**164,534**	**1**	**4,172**	**438,347**

Storm Surge

Storm surge is the abnormal rise in ocean water during a tropical cyclone (tropical storm or hurricane), measured as the height of the water above the normal predicted astronomical tide. This is primarily caused by the storm's winds pushing water onshore. The amplitude of the storm surge at any given location depends on the orientation of the coastline with the storm's track, intensity, size, forward speed and the local bathymetry.[33] Coastal areas are more likely to experience high velocity storm surge which can cause erosion and structural damage. Meanwhile, areas inland are more likely to experience rising water as storm surge pushes inland, and into canals and rivers. Storm surge is the greatest threat to life and property from a tropical cyclone.

DEM utilizes the National Hurricane Center (NHC) Sea, Lake and Overland Surges from Hurricanes (SLOSH) model[34] to estimate storm surge heights in Miami-Dade County. In order to assist Miami-Dade County residents to understand their risk to storm surge, DEM developed the Miami-Dade County Storm Surge Planning Zones. The Miami-Dade County Storm Surge Planning Zones are areas that could potentially be affected by storm surge of 1.5 feet (18 inches) or higher during a hurricane. Miami-Dade County utilizes a risk-based approach based on the direction, size, forward speed, and arrival at high or low tide, which play a crucial role in pinpointing where the storm surge for each storm is likely to impact. To identify Storm Surge Planning Zones, DEM analyses data from SLOSH's Maximum of Maximums (MOM) models which provides the worst-case scenario of high-water value at a particular location for each storm category. SLOSH MOMs are used nationwide for hurricane evacuation planning and to develop the nation's evacuation zones.[35]

Storm Surge Planning Zones are not evacuation zones and should be utilized for planning purposes by residents, visitors and stakeholders to determine their potential risk of storm surge. There are five (5) Storm Surge Planning Zones:

Zone A – is at greatest risk for storm surge of Category 1 and higher storms
Zone B – is at greatest risk for storm surge of Category 2 and higher storms
Zone C – is at greatest risk for storm surge of Category 3 and higher storms
Zone D – is at greatest risk for storm surge of Category 4 and higher storms
Zone E – is at greatest risk for storm surge of Category 5 storms

Figure 16 illustrates Miami-Dade County's Storm Surge Planning Zones map. Table 9 demonstrates the projected population [36] and clearance times based on revised evacuation modeling done by the South Florida Regional Planning Council (SFRPC) in 2020. The revised data is based on additional evacuation center locations and revised Storm Surge Planning Zones provided to SFRPC by DEM. The time reflected here is based on the SLOSH MOM data models and it projects a maximum timeframe based upon compliance with evacuation orders.

[33] Ocean Facts, What is Storm Surge? (NOAA): https://oceanservice.noaa.gov/facts/stormsurge-stormtide.html
[34] NHC's SLOSH: https://vlab.noaa.gov/web/mdl/slosh
[35] NHC SLOSH Storm Surge MOM: https://www.nhc.noaa.gov/surge/momOverview.php
[36] 2020 Population – Evacuation Clearance Times were revised in 2020

Figure 16. Storm Surge Planning Zones Map

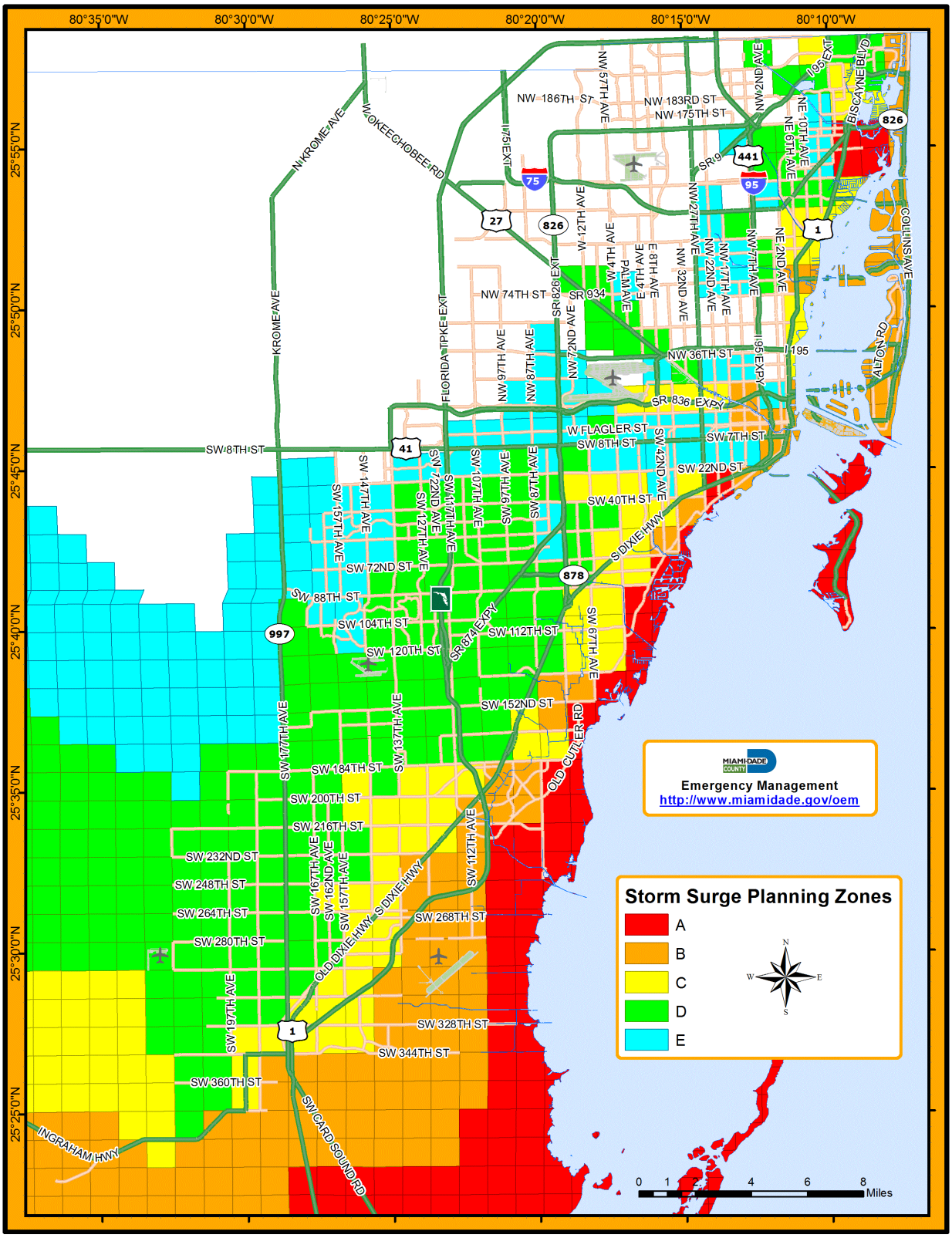


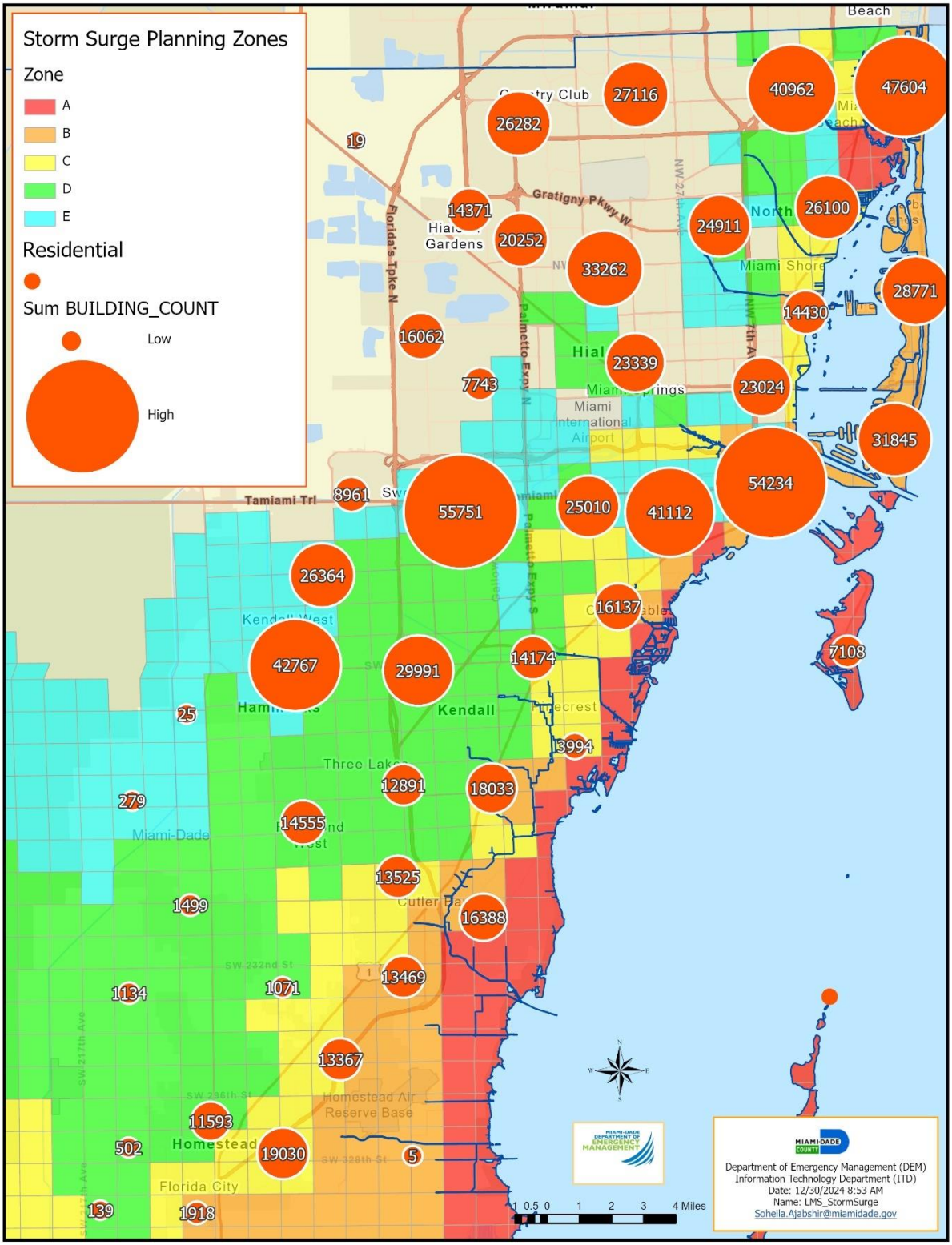
Table 9. South Florida Regional Evacuation Study – 2020 Base Scenario *

	Population				In County Clearance Times (hours)	Out of County Clearance Times (hours)
	Site-Built Homes (includes shadow evacuation)	Tourists	Mobile Homes	Cumulative (includes university population)		
A	559,639	1,138	37,902	599,050	23	23
B	933,746	65,786		1,037,909	32	32
C	1,302,514	76,160		1,417,932	37	37
D	1,955,245	93,387		2,088,073	66	66
E	2,297,842	102,955		2,440,577	77	77

**Clearance times from Base Scenario provided by SFRPC and FDEM on 2021.*

Figures 17 through 23 illustrate Miami-Dade County buildings by land use within the Storm Surge Planning Zones, their counts and relative locations. Tables 10 and 11 provide a breakdown of the building types and the total building area (square feet) for each building type within the Storm Surge Planning Zones in each jurisdiction.

712 **Figure 17. Buildings by Land Use Within Storm Surge Planning Zones – Residential**



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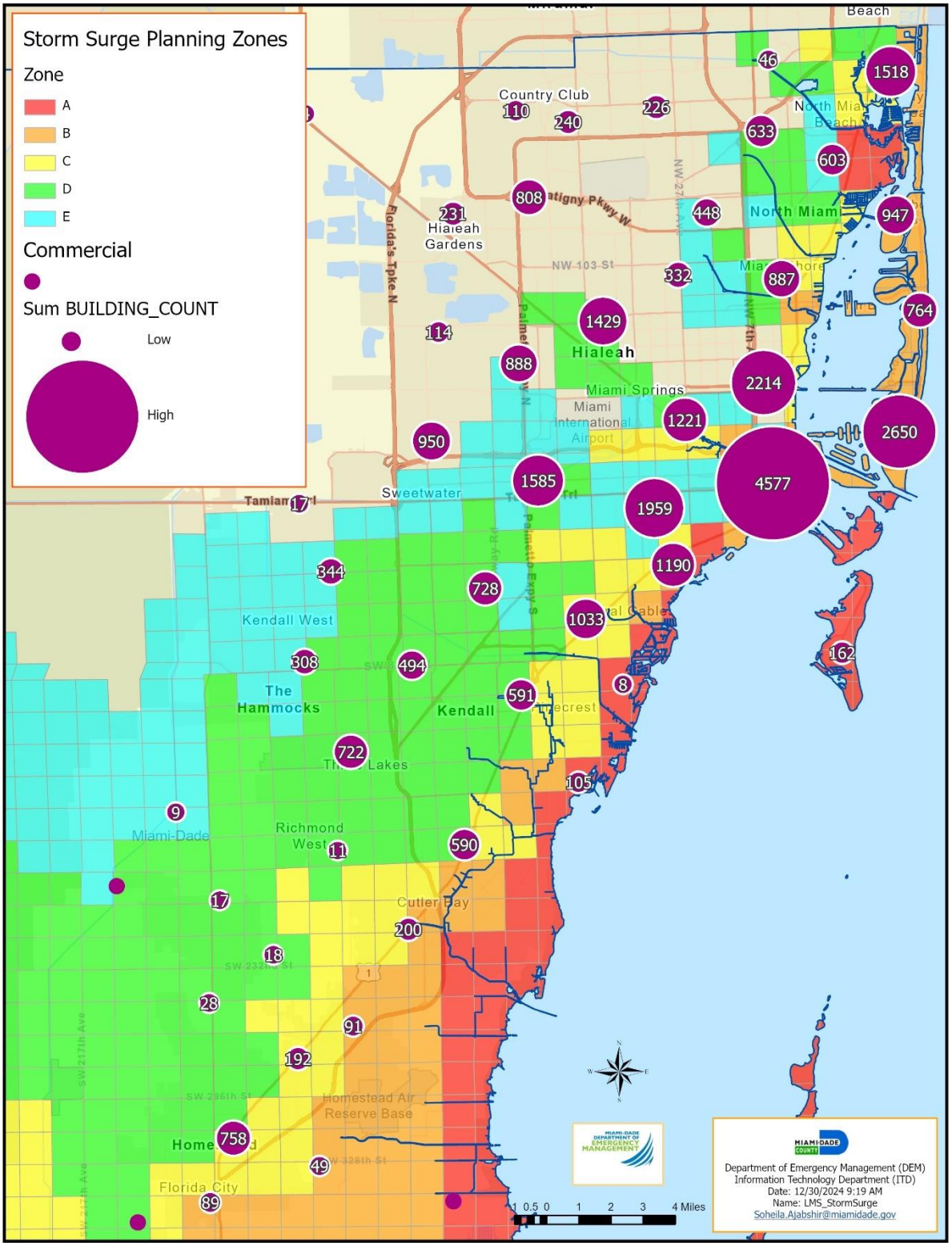
715 **Figure 18. Buildings by Land Use Within Storm Surge Planning Zones – Commercial**



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718 **Figure 19. Buildings by Land Use Within Storm Surge Planning Zones – Agricultural**

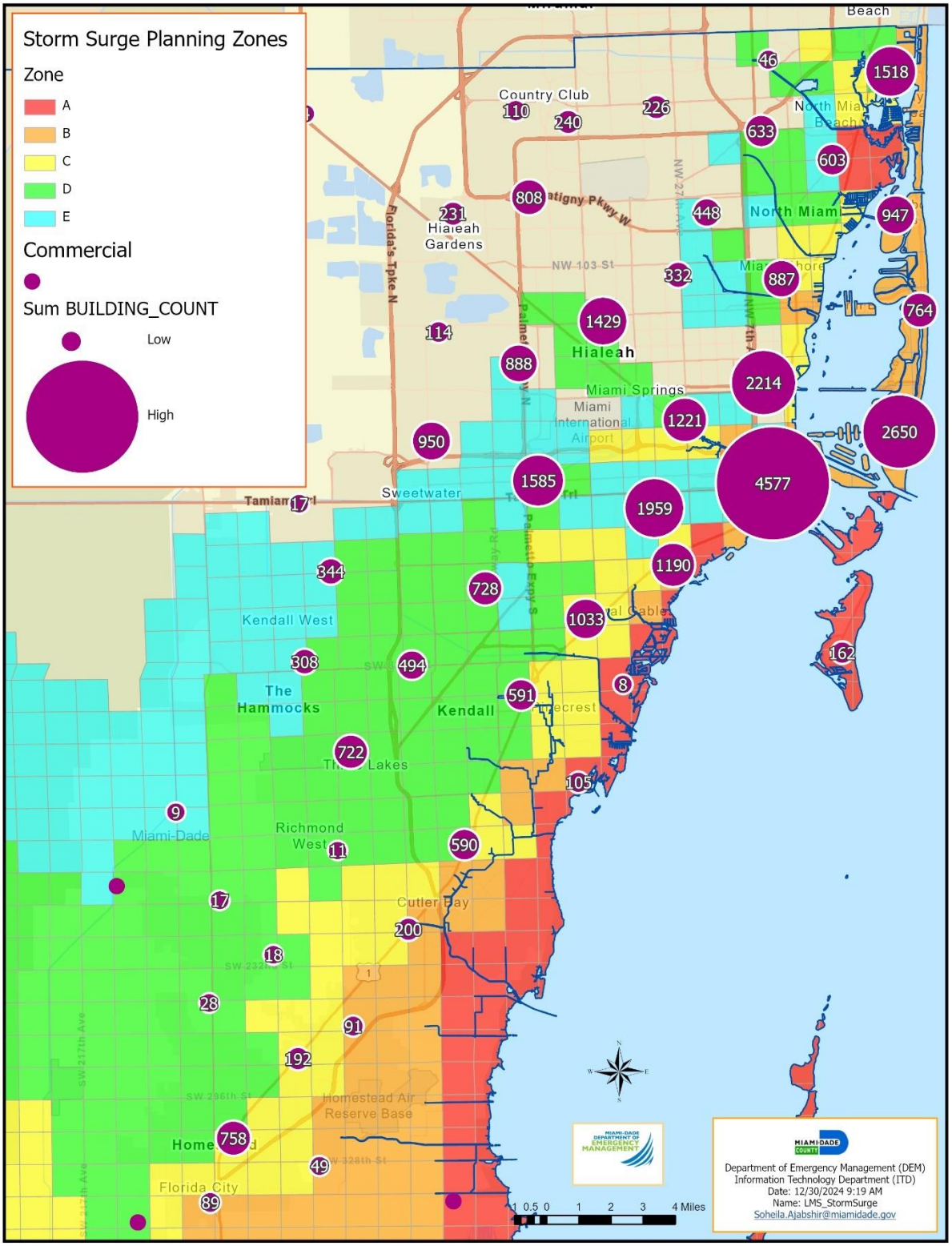

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Figure 20. Buildings by Land Use Within Storm Surge Planning Zones – Governmental

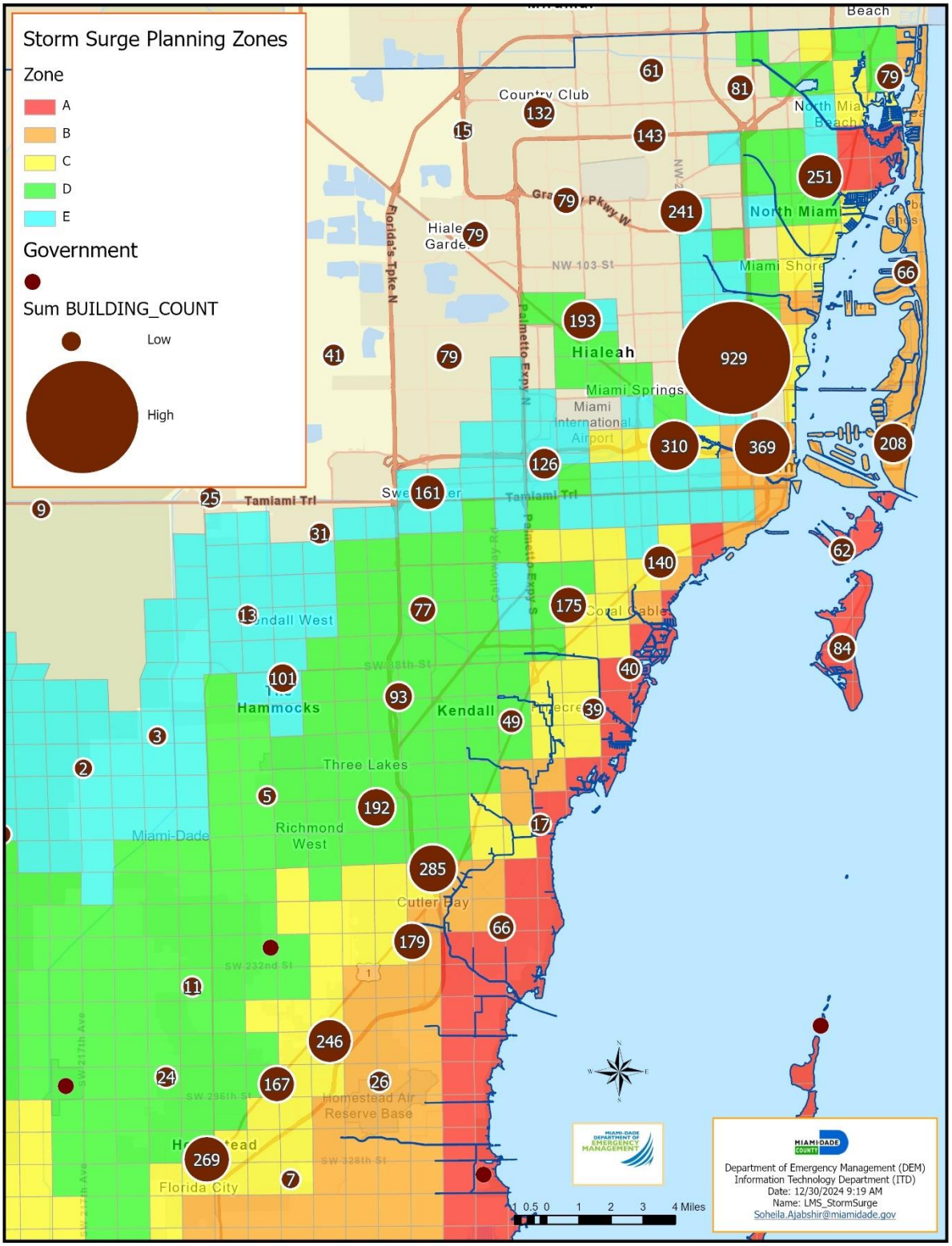
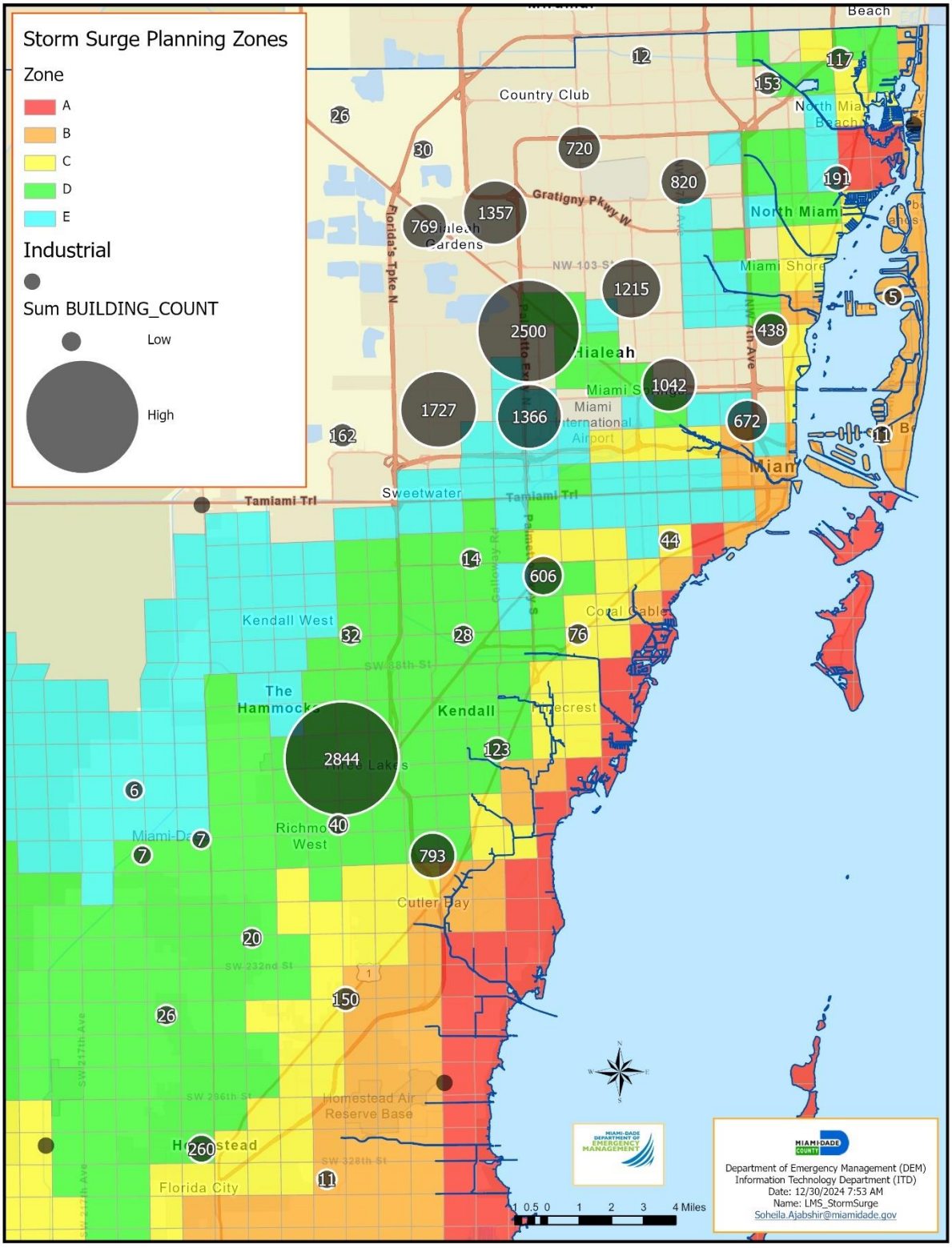
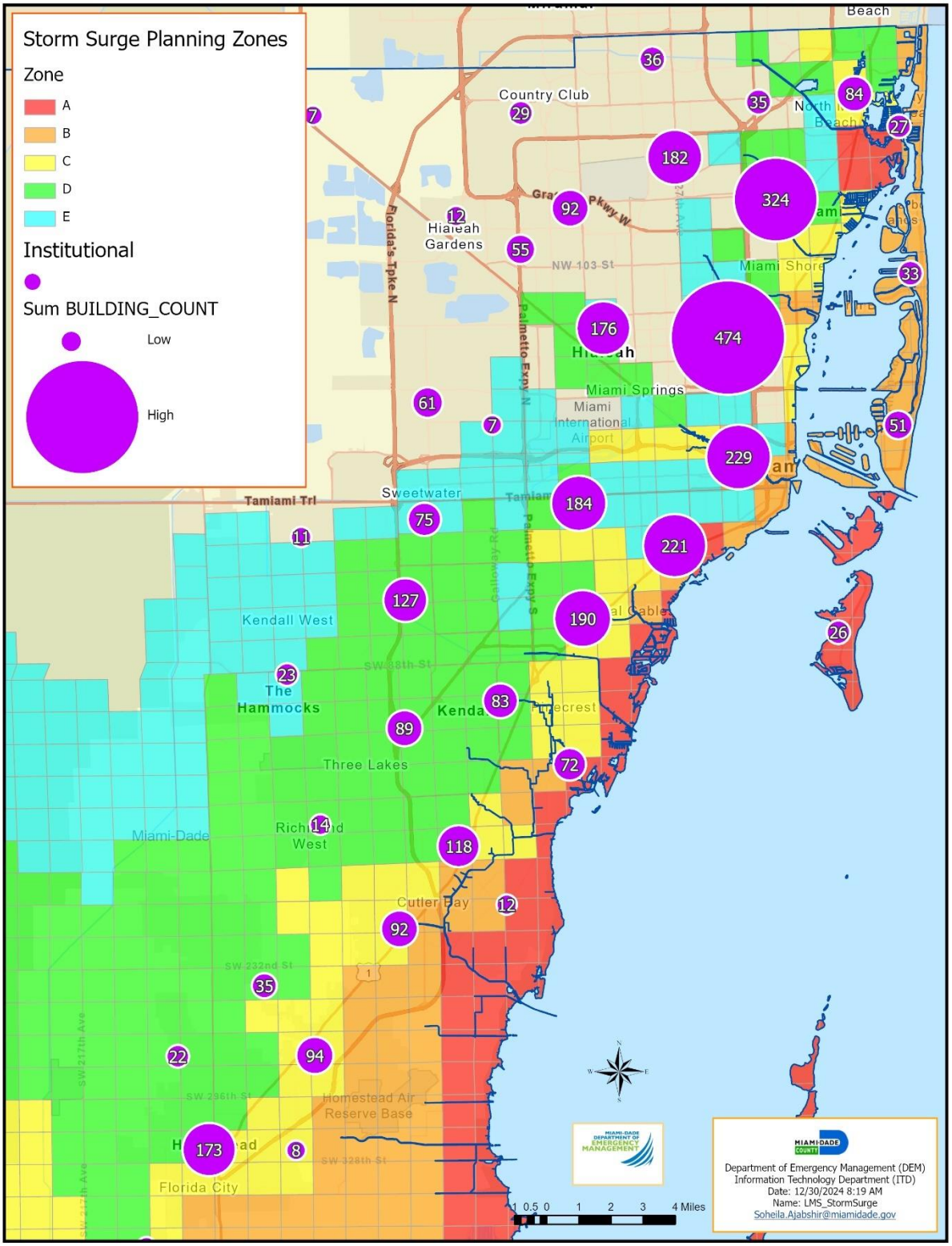


Figure 21. Buildings by Land Use Within Storm Surge Planning Zones – Industrial



730 **Figure 22. Buildings by Land Use Within Storm Surge Planning Zones – Institutional**



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733 **Figure 23. Buildings by Land Use Within Storm Surge Planning Zones – Other**

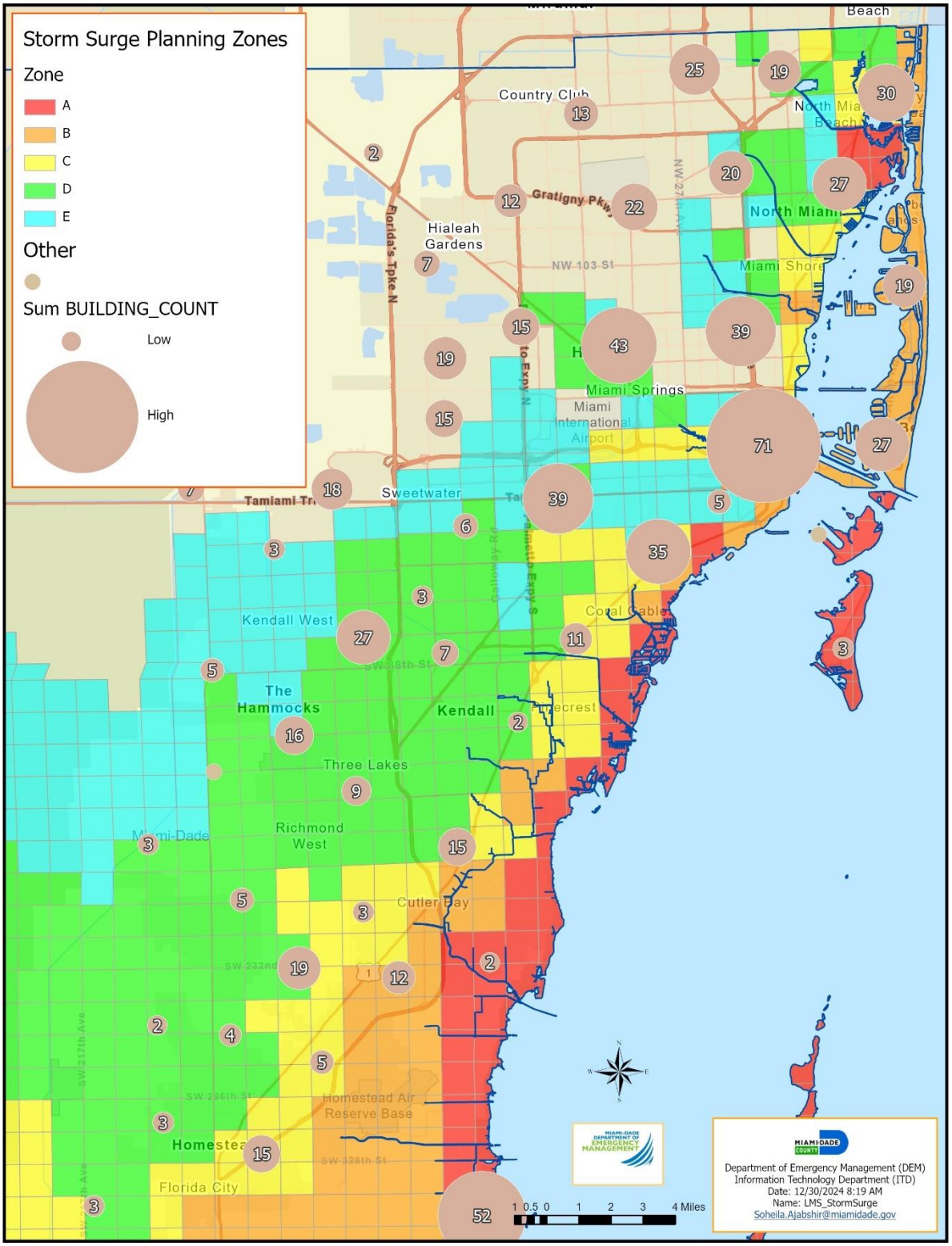

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Table 10. Commercial and Industrial Facilities Within Storm Surge Planning Zones for Each Jurisdiction

Jurisdiction	Commercial		Industrial	
	Number of Buildings	Total Area (sq. ft.)	Number of Buildings	Total Area (sq. ft.)
Aventura	550	13,166,691	8	298,475
Bal Harbour	394	1,658,633	0	0
Bay Harbor Islands	103	664,325	0	0
Biscayne Park	0	0	0	0
Coral Gables	1,716	19,156,832	6	62,410
Cutler Bay	131	3,393,809	1	4,000
Doral	1,507	19,787,275	2,048	39,414,451
El Portal	11	41,253	1	35,777
Florida City	185	2,202,110	49	712,168
Golden Beach	0	0	0	
Hialeah	1,852	16,622,321	2,769	30,994,183
Hialeah Gardens	111	2,055,372	384	4,089,026
Homestead	640	5,110,437	204	1,374,518
Indian Creek Village	10	95,934	0	0
Key Biscayne	348	1,085,372	0	0
Medley	99	1,011,881	904	23,520,187
City of Miami	10,245	95,632,026	1,373	16,385,958
Miami Beach	6,352	30,988,354	15	217,650
Miami Gardens	437	7,693,989	515	12,507,800
Miami Lakes	456	4,605,825	174	6,487,657
Miami Shores	81	697,032	0	0
Miami Springs	191	2,624,973	9	93,150
North Bay Village	75	401,248	1	106,944
North Miami	688	5,462,042	124	2,358,690
North Miami Beach	556	5,273,613	74	990,693
Opa-Locka	219	831,091	680	7,900,011
Palmetto Bay	277	2,990,799	1	56,131
Pinecrest	159	2,157,620	6	16,211
South Miami	647	3,889,185	28	144,236
Sunny Isles Beach	2,299	3,307,366	1	56,279
Surfside	149	1,283,622	0	0
Sweetwater	620	3,966,773	363	3,009,111
Virginia Gardens	24	661,551	2	125,007
West Miami	100	520,240	2	10,935
Unincorporated	7,644	84,231,171	8,533	101,198,244
TOTAL	**38,876**	**343,270,765**	**18,275**	**211,642,621**

Table 11. Residential and Other Structures Within Storm Surge Planning Zones for Each Jurisdiction

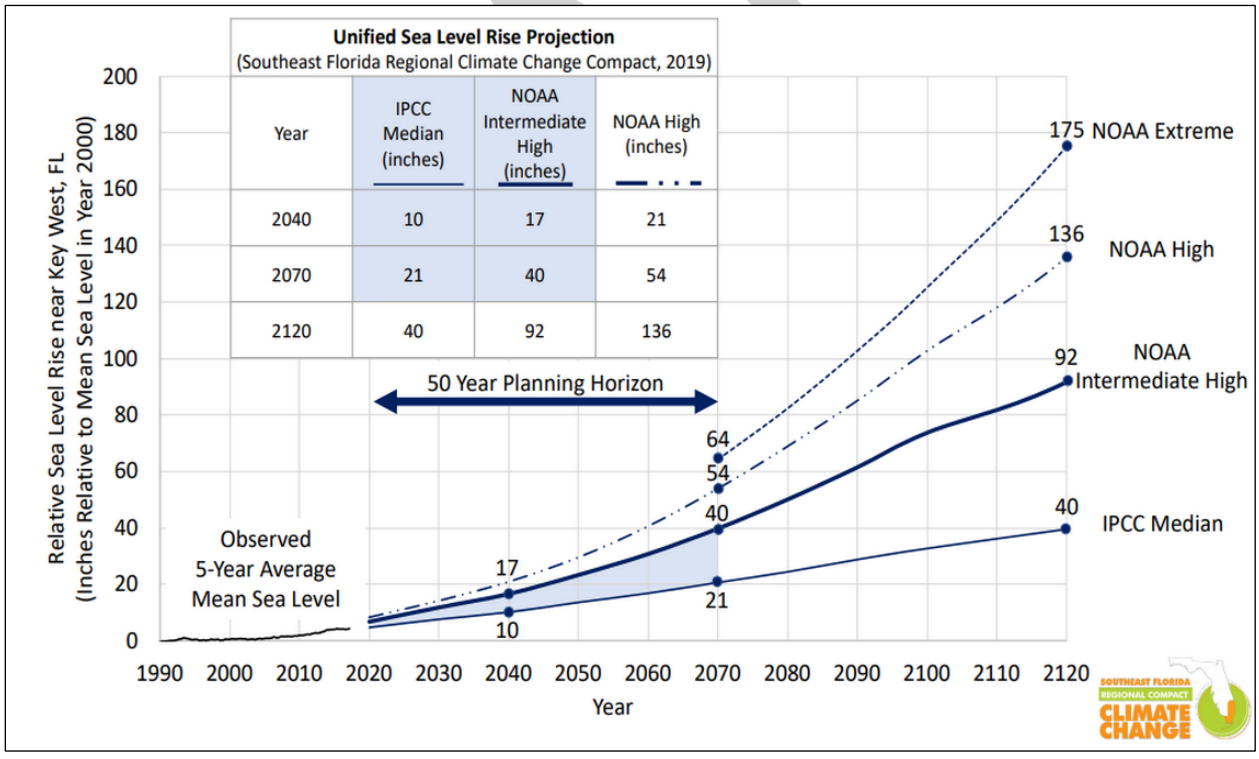
Jurisdiction	Residential		Other Structures	
	Number of Buildings	Total Area (sq. ft.)	Number of Buildings	Total Area (sq. ft.)
Aventura	24,433	40,077,779	46	2,646,134
Bal Harbour	3,530	7,817,227	6	1,055,206
Bay Harbor Islands	2,641	4,632,700	5	266,242
Biscayne Park	1,207	2,216,422	7	27,556
Coral Gables	18,398	48,645,372	311	9,395,643
Cutler Bay	15,148	30,666,505	121	1,614,728
Doral	21,299	47,644,906	140	4,482,052
El Portal	873	1,476,122	5	145,101
Florida City	2,327	4,751,097	163	964,999
Golden Beach	399	2,040,313	4	9,889
Hialeah	60,419	90,114,157	639	10,919,937
Hialeah Gardens	5,889	8,753,126	39	1,328,179
Homestead	19,707	37,785,681	317	3,917,077
Indian Creek Village	59	454,161	2	5,339
Key Biscayne	6,935	15,103,642	30	406,138
Medley	109	113,811	17	197,432
City of Miami	130,661	224,452,107	2,480	53,518,521
Miami Beach	49,646	72,803,391	278	8,420,819
Miami Gardens	32,598	53,622,580	449	7,433,666
Miami Lakes	9,546	22,226,808	86	1,277,680
Miami Shores	4,025	8,290,366	77	1,526,834
Miami Springs	4,691	8,697,842	85	947,992
North Bay Village	3,795	5,602,394	12	150,652
North Miami	16,293	29,148,481	319	4,152,616
North Miami Beach	13,903	21,866,386	145	1,966,375
Opa-Locka	3,378	6,108,934	222	4,904,946
Palmetto Bay	8,432	24,606,134	110	1,239,733
Pinecrest	6,674	24,438,701	76	1,206,556
South Miami	4.035	9,082,609	88	1,809,346
Sunny Isles Beach	16,347	27,511,257	33	1,122,319
Surfside	3,436	6,418,520	11	149,856
Sweetwater	3,585	6,441,572	35	1,035,351
Virginia Gardens	693	1,135,994	10	159,642
West Miami	1,715	4,015,137	18	215,623
Unincorporated	351,510	653,757,837	4,986	70,345,434
TOTAL	**844,305**	**1,552,520,071**	**11,372**	**198,965,613**

Climate Change and Sea Level Rise

There are a number of factors influencing sea level rise; such as, thermal expansion as a result of increasing sea surface temperatures and the melting of land ice due to the Earth's increase average of surface temperatures. Miami-Dade County is in a geographical area surrounded by major bodies of water – the Atlantic Ocean, Biscayne Bay, and rivers, lakes and canals. Figure 24 illustrates the anticipated range of sea level rise for Southeast Florida from 2000 to 2120. The graph and table demonstrate the projected rise of sea level above the 2000 mean sea level by 2040 (short term), by 2070 (medium term) and by 2120 (long term). These projections are intended to assist local and regional decision-makers to plan and make decisions about sea level rise and associated vulnerabilities.[37] Impacts associated to sea level rise in Miami-Dade County include:

- Coastal erosion
- Exacerbated storm surge
- Increased frequency of coastal flooding (i.e. tidal flooding)
- Urban flooding
- Saltwater intrusion
- Infrastructure impacts

Figure 24. Regional Unified Sea Level Rise Projections for Southeast Florida (2019)



[37] Southeast Florida Regional Climate Compact, Unified Sea Level Rise Projection Southeast Florida (2019 Update): https://southeastfloridaclimatecompact.org/initiative/regionally-unified-sea-level-rise-projection/

In July 2013, the BCC implemented the Sea Level Rise Task Force to explore the implications of sea level rise on Miami-Dade County's environment, economy, communities and policies. The Sea Level Rise Task Force presented seven (7) recommendations to the BCC which became six (6) resolutions and were passed unanimously in January 2015. Subsequently, RER's Office of Sustainability became the Office of Resilience.[38] The Office of Resilience continues to work on strengthening the County's infrastructure, plan for more resilient communities, enhance natural protections and promote economic resilience through policies and task forces. Further details on Miami-Dade County's efforts to identify and develop mitigation and adaptation strategies to prepare for sea level rise, go to: https://www.miamidade.gov/global/economy/resilience/sea-level-rise-flooding.page.

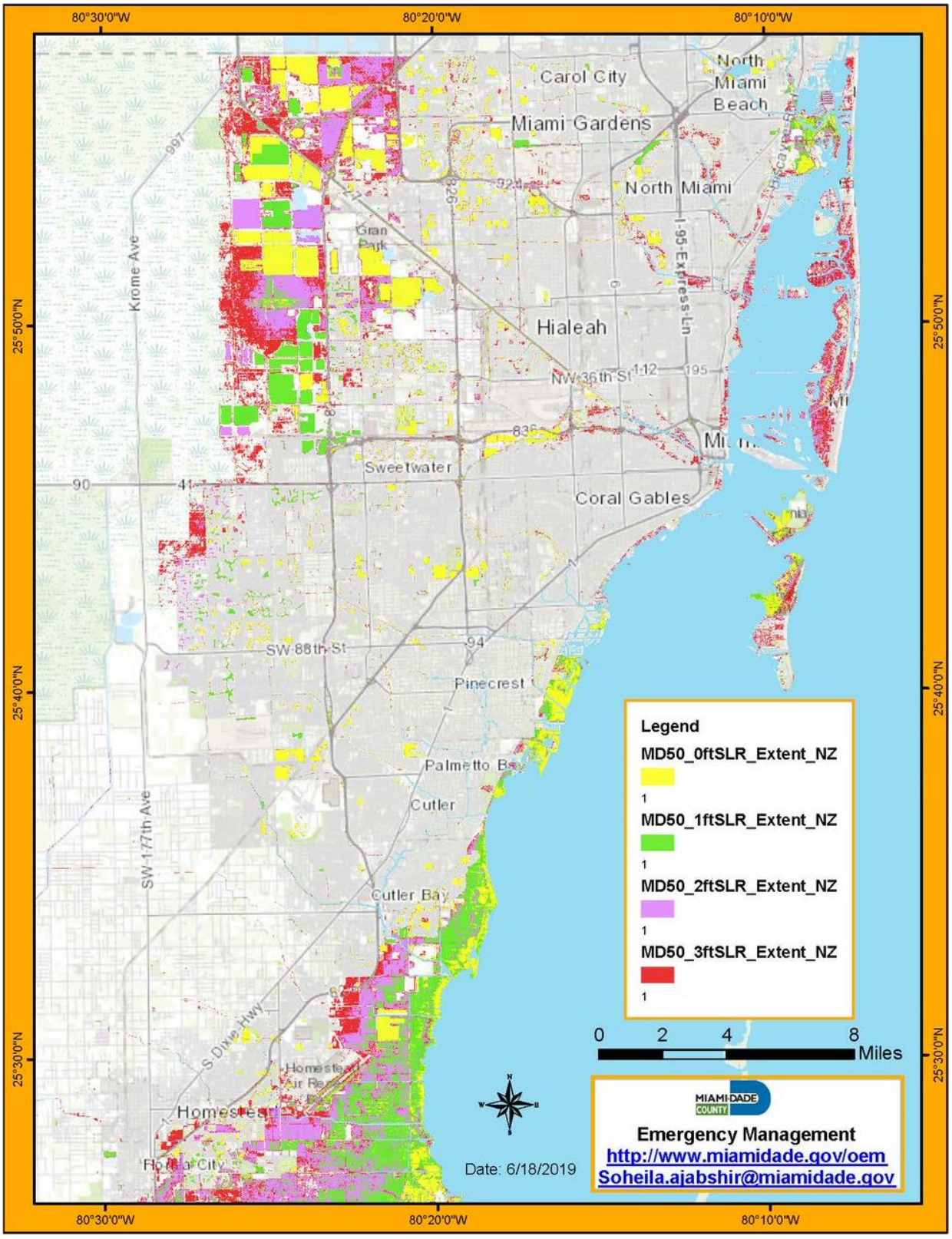
Miami-Dade County has incorporated climate change and sea level rise in a number of planning efforts through mitigation and adaptation.

- Miami-Dade County Comprehensive Development Master Plan (CDMP) incorporated climate change considerations and language in several of the CDMP Elements in October 2013. This implementation will form a foundation for Miami-Dade County to incorporate these considerations into existing capital investments and infrastructure planning processes.
- In 2010, Miami-Dade County partnered with Broward, Monroe and Palm Beach Counties to form the Southeast Florida Regional Climate Change Compact to coordinate mitigation and adaptation efforts for the region.
- Resilient Greater Miami & the Beaches (GM&B), a collaboration between Miami-Dade County, City of Miami, and Miami Beach was selected to join 100 Resilient Cities in 2016. A local multi-jurisdictional partnership to create an inclusive resilience strategy.
- In 2019, GM&B released the Resilient305 Strategy, a living document that addresses resilience challenges prioritized through intergovernmental and community collaboration.[39]

Figure 17 illustrates the potential impacts of sea level rise in Miami-Dade County. This map was developed utilizing data collected for the Southeast Florida Regional Climate Change Compact.

[38] Miami-Dade County Sea Level Rise Report Executive Summary: https://www.miamidade.gov/green/library/sea-level-rise-executive-summary.pdf
[39] Resilient305 Strategy: https://resilient305.com/our-future/

Figure 25. Potential Sea Level Rise Impacts in Miami-Dade County



REPETITIVE LOSSES

For CRS purposes, a repetitive loss property is an insurable structure which has had two (2) or more claims of more than $1,000 paid by NFIP within a ten-year period, since 1978. A Severe Repetitive Loss (SRL) property is an NFIP-insured residential structure that meets at least one (1) of the following criteria since 1978, as defined under the Flood Insurance Reform Act of 2004:

- 1-4 family properties that had four (4) or more separate claims of more than $5,000 each; or
- Two (2) to three (3) claims that cumulatively exceeds the market value of the building

Non-residential structures that meet the same criteria as for 1-4 family properties are considered SRL properties, for CRS purposes.[40]

At least two (2) of the reference claims must have occurred within any ten-year period and must be greater than 10 days apart. Therefore, multiple losses in the same location, within ten days of each other, are counted as one (1) with the payment amounts added together. Repetitive loss designation remains with a structure regardless of ownership changes. Additionally, the designation remains in the community's list even if the insurance policy lapsed, has been terminated or the structure's risk has been mitigated.[41,42]

A repetitive loss area is a portion(s) of a community that includes buildings on FEMA's list of repetitive losses and also any nearby properties that are subject to the same or similar flooding conditions.[43] In Miami-Dade County, mitigation activities in repetitive loss areas are prioritized based on the number of claims placed in each neighborhood. Additionally, drainage capital improvement projects are prioritized in areas with most repetitive losses, flood complaints and low-lying areas with flood protection levels of service below the threshold identified in the CDMP. Figure 26 and 27 illustrates the Repetitive Loss Areas and Severe Repetitive Loss Areas within Miami-Dade County through clusters of their count and approximate locations.

In order to participate in the CRS Program, a jurisdiction must maintain and update its repetitive loss data. This data will assist a jurisdiction to better identify its repetitive flood problems and appropriate mitigation measures. FEMA produces a list of repetitive loss properties for communities that participate in the CRS Program, on a yearly basis and a jurisdiction can obtain it by contacting the ISO/CRS Specialist for the State of Florida. However, communities are required to provide updates to their ISO/CRS Specialist when preparing for a repetitive loss area analysis.

The State ISO/CRS Specialist contact information can be obtained via the following link: https://crsresources.org/100-2.

[40] 2017 CRS Coordinator's Manual: https://crsresources.org/manual/
[41] Developing a Repetitive Loss Area Analysis for Credit Under Activity 510 (Floodplain Management Planning) for the Community Rating System (2017): https://crsresources.org/files/500/rlaa-guide-2017.pdf
[42] FEMA Guidance for Severe Repetitive Loss Properties: https://www.fema.gov/pdf/nfip/manual201205/content/20_srl.pdf
[43] Mapping Repetitive Loss Areas for CRS Handout: https://crsresources.org/files/500/mapping_repetitive_loss_areas.pdf

Figure 26. Miami-Dade County Repetitive Loss (FEMA) Areas

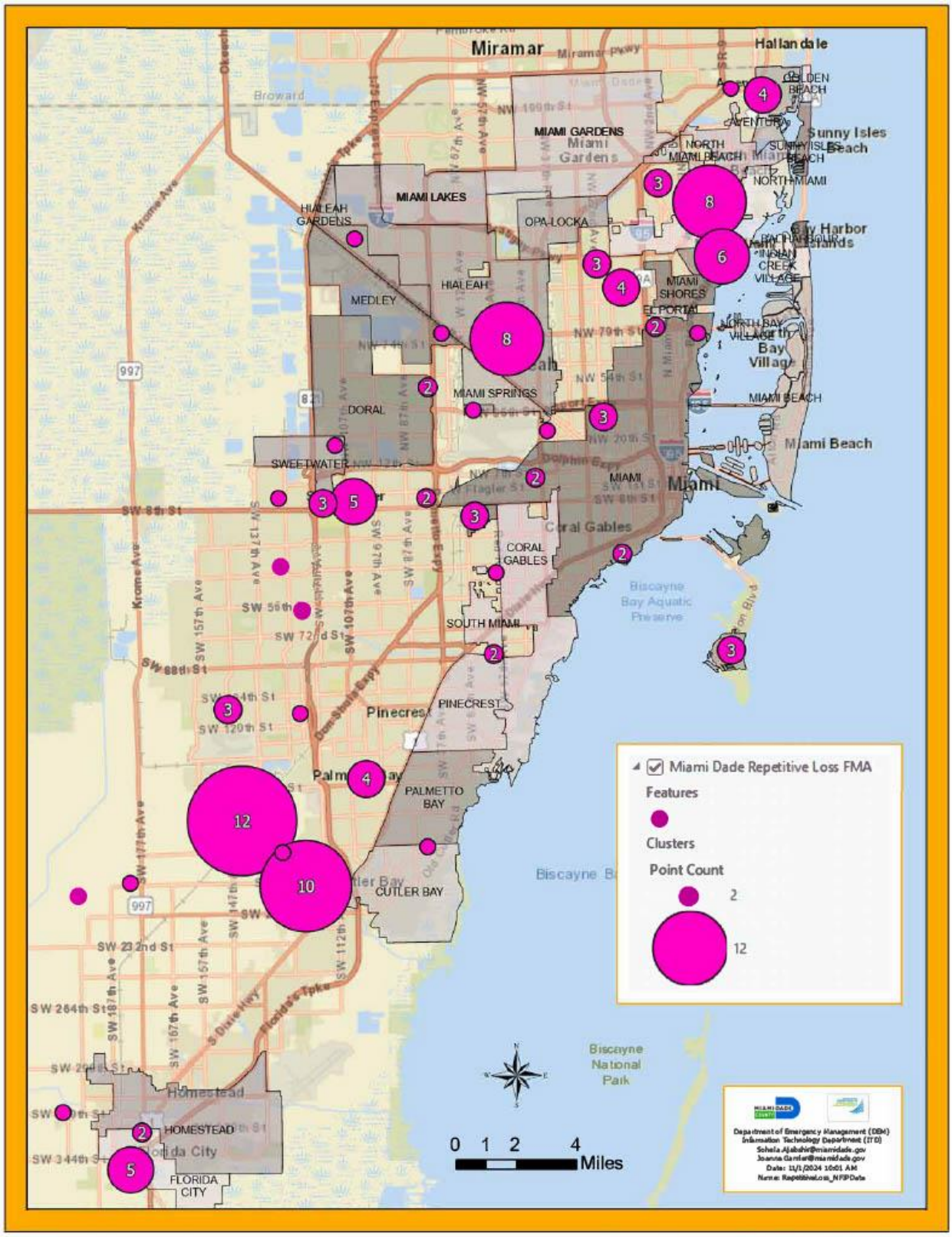
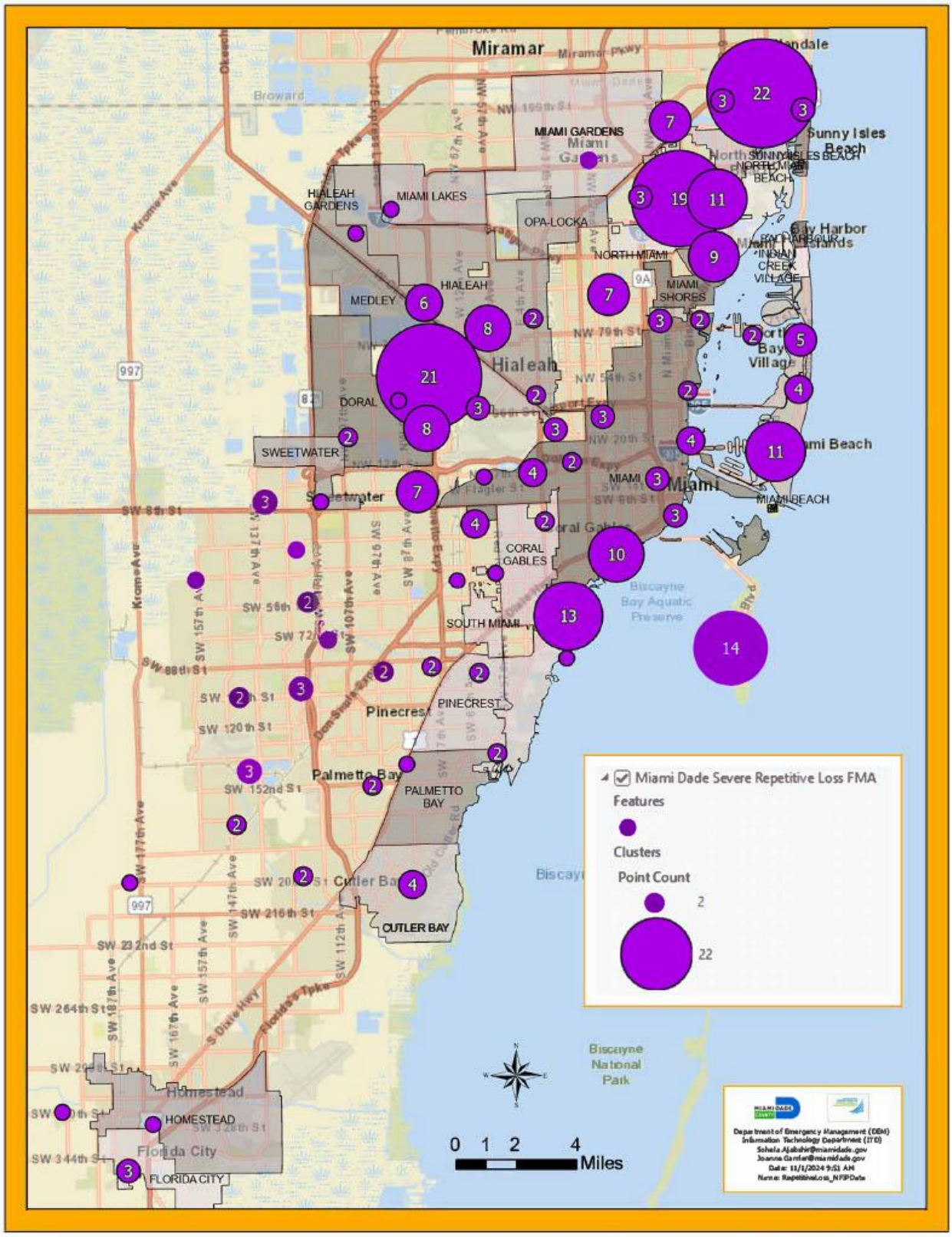


Figure 27. Miami-Dade County Severe Repetitive Loss (FEMA) Areas



September 2025 P5-49

852 **Table 12. 2024 Totals Repetitive Loss (RL) Properties by Land Use**
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Jurisdiction	Residential	Commercial	Industrial	Other
Aventura	20	9	0	0
Bal Harbour	1	3	0	0
Bay Harbor Islands	5	1	0	0
Biscayne Park	9	0	0	0
Coral Gables	45	1	0	1
Cutler Bay	45	0	0	0
Doral	36	9	57	0
El Portal	6	0	0	0
Florida City	51	1	0	1
Golden Beach	8	0	0	0
Hialeah	220	11	7	0
Hialeah Gardens	29	2	13	0
Homestead	34	4	0	1
Key Biscayne	30	3	0	0
Medley	1	34	0	0
Miami	209	29	2	3
Miami Beach	96	23	0	1
Miami Gardens	35	0	0	0
Miami Lakes	6	0	1	0
Miami Shores	14	1	0	0
Miami Springs	84	3	0	0
North Bay Village	13	0	0	0
North Miami	53	3	0	0
North Miami Beach	15	1	0	1
Opa-Locka	9	4	3	0
Palmetto Bay	16	1	0	0
Pinecrest	16	4	0	0
South Miami	8	1	0	1
Sunny Isles Beach	12	0	0	0
Surfside	3	2	0	0
Sweetwater	91	1	1	0
Unincorporated Miami-Dade	652	16	40	6
Virginia Gardens	11	0	0	0
West Miami	17	0	0	0

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Table 13. 2024 Totals Severe Repetitive Loss (SRL) Properties by Land Use

Jurisdiction	Residential	Commercial	Industrial	Other
Aventura	5	1	0	0
Bal Harbour	0	0	0	0
Bay Harbor Islands	0	0	0	0
Biscayne Park	0	0	0	0
Coral Gables	7	0	0	0
Cutler Bay	4	0	0	0
Doral	2	3	14	0
El Portal	0	0	0	0
Florida City	3	0	0	0
Golden Beach	1	0	0	0
Hialeah	8	1	1	0
Hialeah Gardens	2	2	4	0
Homestead	1	0	0	0
Key Biscayne	8	0	0	0
Medley	0	6	0	0
Miami	24	5	0	1
Miami Beach	12	6	0	0
Miami Gardens	1	0	0	0
Miami Lakes	1	0	0	0
Miami Shores	14	1	0	0
Miami Springs	84	3	0	0
North Bay Village	13	0	0	0
North Miami	9	1	0	0
North Miami Beach	0	0	0	0
Opa-Locka	0	0	0	0
Palmetto Bay	0	1	0	0
Pinecrest	2	0	0	0
South Miami	0	0	0	1
Sunny Isles Beach	2	0	0	0
Surfside	0	0	0	0
Sweetwater	1	0	1	0
Unincorporated Miami-Dade	49	5	9	1
Virginia Gardens	2	0	0	0
West Miami	4	0	0	0

FLOOD THREAT RECOGNITION SYSTEM[44]

Miami-Dade DEM relies on automated flood warning systems that provide early notice of a flood for all locations within Miami-Dade County. Systems are able to provide flood warnings 24-hours a day, seven (7) days a week. These flood warning systems provide information such as timing and potential of an oncoming flood for the County. Miami-Dade County uses a series of different systems operated by NWS, DTPW, SFWMD, and the United States Geological Survey (USGS).

As stated previously in this Plan, the SLOSH models are utilized for coastal areas and Miami-Dade DEM utilized SLOSH MOM models to develop the County's Storm Surge Planning Zones. These zones indicate areas that are potentially at risk for storm surge and may be designated as evacuation areas. Miami-Dade County utilizes the following flood warning systems to monitor rainfall amounts and receive flood warnings on a daily basis.

National Weather Service (NWS) Miami/South Florida Weather Forecast Office

Miami-Dade DEM receives flood, flash flood, and urban and small stream watches and warnings from the NWS Office via e-mail, phone, text, and the Emergency Management Network (EMNet), during significant weather events that may result in flooding throughout the County. Weekly webinars are scheduled by NWS for weather briefings to Miami-Dade DEM and Municipal partners. Additional weather briefings are added in the event that a significant rain event is forecast or ongoing.

Miami-Dade Department of Transportation and Public Works (DTPW)

DTPW maintains a number of rain gauges throughout Miami-Dade County that collect breakpoint and rain total information over a 24-hour period. This data allows Miami-Dade County and its municipalities to track and identify the areas with the most significant rainfall, in real-time.

South Florida Water Management District (SFWMD)

SFWMD tracks rainfall and canal stage data in real-time. This real-time data is considered provisional until it undergoes the SFWMD's Quality Assurance and Quality Control (QA/QC) process and subsequently posted on DBHYDRO as "Archived." DBHYDRO is SFWMD's corporate environmental database that stores hydrologic, meteorological, hydrogeological and water quality data. The provisional (real-time) data is available via the following link: www.sfwmd.gov/portal/page/portal/levelthree/live%20data.

United States Geological Survey (USGS)

USGS has WaterWatch, a website that displays maps, graphs, and tables describing real-time, recent and past stream conditions.

Florida Interoperable Picture Processing for Emergency Response (FLIPPER)

This is a geographic information system (GIS) map-based platform. Through FLIPPER, the County and its municipalities can assess the risk of their facilities from potential storm surge, determine overall elevation of the land surrounding their facilities and determine the proximity to canal structures and which drainage basin they are in. FLIPPER has a number of integrated data layers including, but not limited to the following:

[44] CRS Activity 610 (Flood Warning and Response) Element – Flood Threat Recognition System

- Hydrology (canal structures, canal by type, canal maintained by, primary canal basing, ground elevation)
- FEMA Flood Zone (to the parcel level)
- Storm Surge Planning Zones
- Active Hurricane Information
- Live Weather Radar

Determination of a Significant Rain Event

Communities can utilize the National Oceanic and Atmospheric Administration (NOAA) Hydrometeorological Design Studies Center's Precipitation Frequency Data Server (PFDS) to determine if a particular incident should be considered a significant event. The PFDS is a point-and-click web portal for precipitation frequency estimates and supplementary products. The web portal can be accessed via the following link: hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=fl. After a location is selected, the precipitation frequency (PF) and confidence limits estimates are displayed in different formats (i.e. tables and graphs). [45] Figure 21 illustrates the PF in a table format (PF Tabular) for the Miami International Airport station. The numbers in parenthesis are the PF estimates at the lower and upper bounds of the 90% confidence interval. However, there is a 5% probability that the PF estimates will be greater than the upper bound or less than the lower bound.

Figure 28. Significant Rain Event Chart

NOAA Atlas 14, Volume 9, Version 2 MIAMI INTL AP
Station ID: 08-5663
Location name: Miami, Florida, USA*
Latitude: 25.7906°, Longitude: -80.3164°
Elevation:
Elevation (station metadata): 29 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.580 (0.475-0.717)	0.663 (0.542-0.820)	0.799 (0.651-0.991)	0.913 (0.739-1.14)	1.07 (0.836-1.37)	1.19 (0.909-1.55)	1.31 (0.966-1.75)	1.43 (1.01-1.97)	1.60 (1.08-2.25)	1.72 (1.14-2.47)
10-min	0.849 (0.695-1.05)	0.971 (0.794-1.20)	1.17 (0.954-1.45)	1.34 (1.08-1.67)	1.57 (1.22-2.01)	1.74 (1.33-2.27)	1.92 (1.42-2.56)	2.10 (1.48-2.88)	2.34 (1.59-3.30)	2.52 (1.67-3.61)
15-min	1.03 (0.847-1.28)	1.18 (0.968-1.47)	1.43 (1.16-1.77)	1.63 (1.32-2.03)	1.91 (1.49-2.45)	2.13 (1.62-2.77)	2.34 (1.73-3.12)	2.56 (1.81-3.51)	2.85 (1.94-4.02)	3.07 (2.03-4.41)
30-min	1.58 (1.29-1.95)	1.82 (1.48-2.25)	2.20 (1.80-2.73)	2.53 (2.05-3.15)	2.97 (2.32-3.81)	3.31 (2.53-4.31)	3.65 (2.69-4.87)	4.00 (2.82-5.48)	4.46 (3.02-6.28)	4.80 (3.17-6.89)
60-min	2.09 (1.71-2.58)	2.39 (1.96-2.96)	2.92 (2.38-3.63)	3.39 (2.75-4.22)	4.07 (3.20-5.28)	4.63 (3.55-6.08)	5.22 (3.86-7.01)	5.84 (4.14-8.06)	6.71 (4.57-9.52)	7.40 (4.89-10.6)
2-hr	2.60 (2.14-3.19)	2.97 (2.44-3.66)	3.64 (2.98-4.49)	4.25 (3.46-5.26)	5.17 (4.11-6.70)	5.95 (4.60-7.79)	6.78 (5.06-9.09)	7.69 (5.49-10.6)	8.97 (6.15-12.7)	10.0 (6.66-14.3)
3-hr	2.89 (2.38-3.53)	3.29 (2.71-4.03)	4.06 (3.33-4.98)	4.78 (3.90-5.90)	5.92 (4.74-7.69)	6.90 (5.37-9.05)	7.98 (5.98-10.7)	9.16 (6.58-12.6)	10.9 (7.51-15.4)	12.3 (8.20-17.4)
6-hr	3.40 (2.81-4.13)	3.91 (3.24-4.76)	4.90 (4.04-5.97)	5.86 (4.80-7.18)	7.38 (5.96-9.58)	8.72 (6.83-11.4)	10.2 (7.71-13.7)	11.9 (8.58-16.3)	14.3 (9.91-20.0)	16.2 (10.9-22.9)
12-hr	3.97 (3.30-4.79)	4.66 (3.88-5.63)	5.95 (4.93-7.21)	7.18 (5.92-8.74)	9.11 (7.37-11.7)	10.8 (8.47-14.0)	12.6 (9.56-16.7)	14.6 (10.6-19.9)	17.5 (12.2-24.4)	19.9 (13.5-27.9)
24-hr	4.64 (3.88-5.57)	5.51 (4.60-6.61)	7.09 (5.90-8.53)	8.57 (7.09-10.4)	10.8 (8.80-13.8)	12.8 (10.1-16.4)	14.9 (11.4-19.6)	17.2 (12.6-23.2)	20.5 (14.4-28.4)	23.2 (15.8-32.3)
2-day	5.46 (4.59-6.51)	6.43 (5.40-7.67)	8.20 (6.87-9.81)	9.85 (8.20-11.8)	12.4 (10.1-15.6)	14.5 (11.5-18.5)	16.8 (12.9-22.0)	19.4 (14.3-26.0)	23.0 (16.3-31.6)	26.0 (17.8-35.9)
3-day	6.06 (5.11-7.20)	7.07 (5.96-8.40)	8.91 (7.47-10.6)	10.6 (8.84-12.7)	13.2 (10.8-16.6)	15.4 (12.2-19.5)	17.7 (13.6-23.1)	20.3 (15.0-27.1)	24.0 (17.0-32.9)	27.0 (18.6-37.2)
4-day	6.61 (5.58-7.82)	7.61 (6.42-9.01)	9.43 (7.93-11.2)	11.1 (9.29-13.3)	13.7 (11.2-17.1)	15.9 (12.7-20.1)	18.2 (14.1-23.6)	20.8 (15.4-27.7)	24.5 (17.4-33.4)	27.5 (19.0-37.8)
7-day	8.07 (6.85-9.51)	8.97 (7.60-10.6)	10.6 (8.98-12.6)	12.2 (10.3-14.5)	14.7 (12.1-18.3)	16.8 (13.5-21.2)	19.2 (14.8-24.7)	21.7 (16.2-28.7)	25.4 (18.2-34.5)	28.5 (19.8-38.9)
10-day	9.32 (7.92-10.9)	10.2 (8.68-12.0)	11.9 (10.1-14.0)	13.5 (11.4-16.0)	16.0 (13.2-19.8)	18.1 (14.6-22.7)	20.4 (15.9-26.2)	23.0 (17.2-30.3)	26.7 (19.2-36.1)	29.7 (20.7-40.5)
20-day	12.6 (10.8-14.7)	14.0 (12.0-16.3)	16.4 (13.9-19.1)	18.4 (15.6-21.6)	21.3 (17.5-25.9)	23.7 (19.0-29.1)	26.1 (20.3-32.9)	28.6 (21.4-37.1)	32.1 (23.1-42.8)	34.9 (24.4-47.2)
30-day	15.4 (13.2-17.9)	17.3 (14.8-20.1)	20.3 (17.3-23.6)	22.8 (19.3-26.6)	26.1 (21.4-31.4)	28.7 (23.1-35.0)	31.2 (24.3-39.1)	33.8 (25.3-43.4)	37.1 (26.7-49.1)	39.6 (27.9-53.3)
45-day	19.1 (16.4-22.1)	21.5 (18.4-24.9)	25.2 (21.6-29.3)	28.2 (24.0-32.9)	32.1 (26.3-38.2)	34.9 (28.1-42.2)	37.6 (29.3-46.6)	40.2 (30.1-51.2)	43.3 (31.3-56.9)	45.6 (32.2-61.1)
60-day	22.4 (19.3-25.8)	25.1 (21.6-29.0)	29.4 (25.2-34.0)	32.7 (27.9-38.0)	37.0 (30.3-43.8)	40.0 (32.2-48.1)	42.8 (33.3-52.8)	45.4 (34.0-57.6)	48.5 (35.0-63.3)	50.5 (35.8-67.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

[45] Section 5 of the NOAA Atlas 14: https://www.weather.gov/media/owp/hdsc_documents/NA14_Sec5_PFDS.pdf

MIAMI-DADE COMPREHENSIVE DEVELOPMENT MASTER PLAN[46]

Miami-Dade County Regulatory and Economic Resources Department (RER) – Planning Bureau Division provides services related to sound growth management, historic preservation, urban planning, sustainability planning, and transportation development through the Comprehensive Development Master Plan (CDMP) and related activities.

The CDMP provides general objectives and policies that address the where and how Miami-Dade County will approach the development or conservation of land and natural resources during the next 10-20 years. Furthermore, it addresses the delivery of County services to accomplish the Plan's objectives. Miami-Dade County is comprised of approximately 2,000 square miles of land and over 420 square miles have been developed for urban use. The CDMP establishes the broad parameters for government to conduct detailed land use planning and zoning activities, functional planning and programming of infrastructure and services. Additionally, it establishes minimum standards, or Level of Service (LOS) standards for the delivery of certain County services and facilities including roadways/traffic, mass transit, parks, water, sewer, solid waste, and drainage.

The CDMP establishes a growth policy that encourages development:

1. At a rate commensurate with projected population and economic growth
2. In a contiguous pattern centered around a network of high-intensity urban centers well-connected by multi-modal intra-urban transportation facilities
3. In locations which optimize efficiency in public service delivery and conservation of valuable natural resources

CDMP Elements

Chapter 163 of the Florida Statutes requires each local government to adopt a comprehensive plan and sets the minimum criteria including the identification of the required elements of a comprehensive plan. The Miami-Dade County CDMP is comprised of 12 Elements preceded by a Statement of Legislative Intent. The first nine (9) elements listed below, are required by Chapter 163 and the remaining Elements are optional and included in the CDMP at the discretion of the County.

Statement of Legislative Intent
I. Land Use Element
II. Transportation Element
III. Housing Element
IV. Conversation, Aquifer Recharge and Drainage Element
V. Water, Sewer and Solid Waste Element
VI. Recreation and Open Space Element
VII. Coastal Management Element
VIII. Intergovernmental Coordination Element
IX. Capital Improvements Element
X. Educational Element
XI. Economic Element
XII. Community Health and Design Element
XIII. Property Rights Element

[46] CDMP - TOC, Introduction & Statement of Legislative Intent (2020): https://www.miamidade.gov/planning/library/reports/planning-documents/cdmp/table-of-contents.pdf

The documents for the aforementioned CDMP Elements can be accessed via the following link: miamidade.gov/planning/cdmp-adopted.asp.

A major review and update of the CDMP is done every seven (7) years, a process known as the Evaluation Appraisal Report (EAR). The EAR includes an evaluation of the County's progress in implementing goals, objectives, policies, maps and text to the CDMP. It also recommends changes. There is also a tri-annual CDMP amendment process for periodic review of the development capacity of the urban area.

Each CDMP Element contains Adopted Components and Support Components that have not been adopted, but provide background information. The current report only contains the CDMP components that have been adopted as a County policy. The Support Components are contained in separate documents. The Support Components and the EARs include background data and analyses, inventories of existing conditions, methodology projections or other estimates of future conditions, and summaries of applicable state, regional and preexisting County plan policies.

The CDMP addresses Unincorporated Miami-Dade and the 34 municipalities. However, Chapter 163 of the Florida Statutes, requires each Municipality to adopt their own plans for areas within their jurisdictions.

Further details and additional CDMP documents can be accessed via the following link: miamidade.gov/planning/cdmp.asp.

CRITICAL FACILITIES PLANNING[47]

The critical facilities inventory is managed by Miami-Dade DEM and Miami-Dade Information Technology Department. The facilities included in this inventory have been deemed critical by the state and federal government. This is updated annually. The list cannot be made public due to the sensitive information it contains. However, the list can be provided to the ISO/CRS Specialist by Miami-Dade DEM upon request.

The list of critical facilities includes the phone number(s) of the operators for all public and private critical facilities affected by flooding. Warning and notifications to these facilities are facilitated by the DEM distribution lists for all response and recovery agencies and organizations. Therefore, they receive all emergency information and distribute to their organizations and jurisdictions through their own processes.

[47] CRS Activity 610 (Flood Warning and Response) Element – Critical Facilities Planning

FLOOD PUBLIC INFORMATION ACTIVITIES

Flood protection information, at the local level, is readily available online to assist Miami-Dade County residents to understand their residence's flood risk. The flood protection webpage is maintained regularly by Miami-Dade RER and it can be accessed via the following link: www.miamidade.gov/environment/flood-protection.asp. Miami-Dade RER includes information on the following:

- Elevation Certificates
- Flood & Drainage Complaints
- Flood Insurance
- Flood Zone Maps
- Property Sale Disclosure
- How to protect your property
- Stormwater Utility
- Water Control Map and County Flood Criteria Update

FEMA Flood Zones

The FEMA Flood Maps can be accessed on Miami-Dade RER's webpage, via the Environment tab through the Flood Protection tab. Miami-Dade County has an interactive web tool for the Flood Zone Maps, where homeowners can enter their address for more detailed information on their Special Flood Hazard Areas or flood zones. Once the property address is entered, it will zoom to the location on the map and display an information panel to the right side of the screen. The user is able to view the elevation of each FEMA Flood Zone within the address entered and the appropriate contact information for the Municipality is provided.

The FEMA Flood Zone Maps interactive web tool is available via the following link: gisweb.miamidade.gov/floodzone.

Property Sale Disclosure

The Miami-Dade County Code requires that any purchase of improved real estate in a Special Flood Hazard or Coastal High Hazard Area (also known as Flood Zones) include a full disclosure to the buyer stating that the property lies in either of the aforementioned zones. If the structure is substantially damaged or improved, it may be required to be raised to the current required flood elevation.

The seller of any improved real estate located in Unincorporated Miami-Dade County shall include in the contract, or a rider to the contract, the following disclosure in a bold font no less than a 10-point font size:

"THIS HOME OR STRUCTURE IS LOCATED IN A SPECIAL FLOOD HAZARD AREA. IF THIS HOME OR STRUCTURE IS BELOW THE APPLICABLE FLOOD ELEVATION LEVEL AND IS SUBSTANTIALLY DAMAGED OR SUBSTANTIALLY IMPROVED, AS DEFINED IN CHAPTER 11C OF THE METROPOLITAN MIAMI-DADE COUNTY CODE, IT MAY, AMONG OTHER THINGS, BE REQUIRED TO BE RAISED TO THE APPLICABLE FLOOD ELEVATION LEVEL."

The Unincorporated Miami-Dade County Flood Zone Disclosure Form can be accessed via the following link: miamidade.gov/environment/library/forms/flood-disclosure.pdf. For further details, please refer to Chapter 11-C of the Code of Miami-Dade County.

COMMUNITY PREPAREDNESS

Increasing the community's flood preparedness and awareness is achieved through different avenues, such as, public education, the countywide distribution of the official Hurricane Readiness Guide, social media, and community outreach events throughout the year. In addition to Miami-Dade County's efforts, municipalities conduct their own, or in partnership with the County, public information and community outreach activities to promote flood education, preparedness and mitigation.

Miami-Dade County Hurricane Webpage

The Miami-Dade County official hurricane preparedness webpage includes information for every resident to be aware of before, during and after a hurricane or any other emergency. Emergency planning information included on the webpage includes the following:

- Emergency Kits and Checklists
- Emergency Evacuation
- Evacuation Assistance for residents with accessibility issues
- Pet Preparedness
- Hurricane Readiness Guide
- Tree Preparation prior to the hurricane season
- Shelter-in-Place
- Storm Surge Planning Zones
- And more

The hurricane preparedness webpage can be accessed via the following link: miamidade.gov/hurricane.

Know Your Zone

Miami-Dade County residents are encouraged to know if their residence is within a Storm Surge Planning Zone prior to a storm making landfall. The Storm Surge Planning Zone section of the County's hurricane webpage provides information on storm surge's threat to life and property, a description of each of the planning zones, and an FAQ in English, Spanish and Haitian Creole. Additionally, residents can locate if their home or business is within a Planning Zone by entering the address into the Storm Surge Planning Zone Finder (Know Your Zone application). The Know Your Zone application can be accessed via the following link: https://mdc.maps.arcgis.com/apps/webappviewer/index.html?id=4919c85a439f40c68d7b3c81c3f44b58.

StormReady Community[48]

NWS created the StormReady® Program to encourage communities to take a proactive approach on improvising hazardous weather operations and strengthen local safety programs. To receive this recognition the County or Municipality must establish a 24-hour warning point and Emergency Operations Center, have more than one way to receive severe weather warning and forecasts to alert citizens, have a system that monitors weather conditions locally, promote public readiness, and develop a formal hazardous weather plan.

[48] CRS Activity 610 (Flood Warning and Response) Element – StormReady Community

Miami-Dade County has been a StormReady® Community since 2002 and was awarded this status again in September 2019. Other StormReady® Communities in Miami-Dade County include Doral, Homestead, Miami Beach, North Miami, Florida International University, Miami-Dade College, St. Thomas University and University of Miami.

#HurricaneStrong

#HurricaneStrong is part of the National Hurricane Resilience Initiative created in 2016 to improve hurricane preparedness, mitigation, and overall readiness through increased public awareness and engagement. The initiative consists of a partnership between FEMA, NOAA, The Weather Channel and the Federal Alliance for Safe Homes (FLASH), which is the country's leading consumer advocate for strengthening homes and safeguarding families from natural and manmade disasters.

The #HurricaneStrong initiative follows five (5) key messages to promote and elevate hurricane resilience:

- Personal safety
- Family Preparedness
- Financial Security
- Damage Prevention
- Community Service

In May 2018, Miami-Dade County was selected as the second County in the nation to receive this designation of a #HurricaneStrong community. This was a result of the County's profound commitment to a more resilient community by continuously improving the County's ability to recover after a disaster.

Weather-Ready Nation Ambassador

The Weather-Ready Nation (WRN) Ambassador is NOAA's initiative to strengthen partnerships with local, state, federal and private organizations toward building a more resilient community in the face of increasing vulnerability to extreme weather events. WRN Ambassadors will promote and encourage preparedness and mitigation activities by encouraging the community to be "weather-ready" and promoting Weather-Ready Nation key messages through outreach activities.

The Miami-Dade LMS and DEM were named WRN Ambassadors on October 2014 and March 2016, respectively.

Ready MDC App

Ready Miami-Dade County (ReadyMDC) is a free local hurricane preparedness and decision-making support mobile application available to Miami-Dade County residents and visitors. ReadyMDC provides users with access to various local preparedness resources and materials, such as the Miami-Dade County Hurricane Readiness Guide and Storm Surge Planning Zones online education page. Real-time information is available before, during and after a storm or hurricane.

Information includes:

- Evacuation Order
- Emergency Evacuation Bus Pick-Up Sites
- Know Your Zone
- Open Evacuation Centers
- Important Evacuation Information
- Direct Contact with Miami-Dade County's 311 Contact Center
- Safety Tips
- Phone numbers, websites and social media

The Ready MDC App provides real-time information relevant to recovery relief efforts. This application is available for Android and iOS devices.

Miami-Dade Alerts

Miami-Dade Alerts is a free service that enables County residents and visitors to receive emergency texts and/or emails regarding public safety issues, recommended public protected actions, or other emergency information. Additionally, this service provides weather advisory notifications issued by NWS (e.g. tornado, tropical storm and hurricane warnings) or any other emergency which may require protective actions.

Residents and visitors who live or work in Miami-Dade County can register for this service online at miamidade.gov/alerts.

Social Media

A large number of the population utilizes social media as a source of news and information. Therefore, Miami-Dade DEM manages social media government pages on Facebook and X (formely Twitter). DEM provides information on regionally adopted preparedness messages, informs the public on events being monitored (emerging or occurring), and provides insight on DEM programmatic areas.

Facebook.com/MiamiDadeCountyEM

X.com/MiamiDadeEM

Table 15 outlines several community outreach activities performed by different Miami-Dade County agencies throughout the year. Additionally, please refer to Appendix A for samples of the public information materials provided.

Table 15. Community Outreach Activities

Activity	Frequency	Topics/Actions	Audience
RER's *Do You Know Your Flood Zone?* Brochure Mailout	Annual	The brochure is mailed out via the Stormwater Utility Bill and it is available online. The topics included in the brochure include: • General Flood Information • FEMA Flood Zone Maps • Flood Protection • Flood Insurance • Elevation Certificates • Building Permit Requirement(s) • Repetitive Losses	Over 43,000 Households (mailed) Countywide (online)
Flood Protection on RER's Website www.miamidade.gov/environment/flood-protection.asp	Continuous	The webpage is updated regularly with the most current information on the following topics: • Elevation Certificates • Repetitive Losses • Flood and Drainage Complaints Form • Flood Insurance • Flood Zone Maps/Flood Risk Maps • Coastal Flooding • Real Estate and Insurance Agents • Property Sale Disclosure • Protect Your Property • Stormwater Utility	Countywide
Miami-Dade County Official Hurricane Readiness Guide	Annual	The official Hurricane Readiness Guide contains important information for every resident to be aware of before, during and after a hurricane or any other emergency. The Guide includes information on the Storm Surge Planning Zones, what to do in preparation to a hurricane threatening Miami-Dade County, what to do when an evacuation order is given, available County services and more. The Hurricane Readiness Guide is available in English, Spanish and Haitian Creole.	Mailed to every residential address in Miami-Dade County (1 Million households) and distributed during outreach events, to County Commissioners' offices, County departments, Municipal governments, private businesses, public sector partners and not-for-profit organizations

Activity	Frequency	Topics/Actions	Audience
Bring Your Kid(s) to Work Day	Annual	On a designated date every year, Miami-Dade Fire Rescue and DEM Employees bring their kids to work to experience a day at work with their parents. The kids are brought in to the EOC for DEM Staff to discuss Miami-Dade County's natural hazards, hurricane and disaster preparedness.	MDFR and DEM Employees
StormZone	Annual	StormZone is a school-based multidisciplinary science and social studies education program that teaches students about the science of severe natural disasters. Students that are part of this program, participate in an interactive exercise at the Miami-Dade EOC in which they learn about hurricane and disaster preparedness.	Approximately 60 students (5th and 6th Grade) from Miami-Dade Public Schools
County Mayor's Hurricane Preparedness Press Conference	Annual	The Miami-Dade County Mayor conducts a Hurricane Preparedness Press Conference at the beginning of each Atlantic Hurricane Season. The Press Conference is broadcasted via the Miami-Dade County TV Channel, webpage and Social Media pages.	Countywide
Youth Fair	Annual	DEM has a booth/table at the Youth Fair staffed with DEM Staff to provide information on hurricane and disaster preparedness to attendees. Staff facilitates discussions on hurricane and disaster preparedness with attendees and reading material is provided for adults and kids to take home.	Approximately 2,000 attendees
Emergency and Evacuation Assistance Program (EEAP) Call Down	Semi-Annually	Call down is conducted by calling all active EEAP registrants to update their records and provide them information on hurricane preparedness.	4,200 EEAP Clients
Hurricane Preparedness Events/Community Outreach Presentations by DEM	Over 100 events throughout the Year	Throughout the year, DEM continuously participates in a number of local events hosted by municipalities, hospitals, schools, businesses, and non-for-profit, community and faith-based organizations. These events provide an opportunity to directly engage with residents and provide essential information on hurricane and disaster preparedness, and mitigation measures for the hurricane season and other Miami-Dade County hazards (e.g. flooding). These presentations are conducted in English, Spanish and Haitian Creole to better engage and educate the community.	17,736 *(in 2019)*

Activity	Frequency	Topics/Actions	Audience
Residential Healthcare Facility (RHCF) CEMP Workshop	Annual	This workshop is conducted to educate RHCF owners and administrators in developing RHCF CEMP with an all-hazards approach to insure the residents' life safety. The workshop serves an opportunity to provide emergency and disaster preparedness information.	All Hospitals, Group Homes, Nursing Homes, Assisted Living Facilities, Adult Day Cares, Ambulatory Surgical Centers and Intermediate Care Centers within Miami-Dade County

EMERGENCY WARNING DISSEMINATION[49]

In accordance with the Miami-Dade County CEMP, DEM provides flood warnings as early as it is practical in an effort to provide as much advance notice as possible. For tropical cyclones, notifications begin approximately five (5) days prior to the anticipated arrival of the storm. When the Miami-Dade EOC is activated, ESF 14 (Public Information) is responsible for the dissemination of emergency information to all media outlets and the public.

In order to expedite the dissemination of information, Miami-Dade County developed pre-scripted messages and message templates for staff to quickly issue appropriate flood advisories. These will provide guidance and can be modified, as needed, to fit the specific emergency or incident. ESF 14 contains pre-scripted messages that are disseminated to the public. Additionally, the DEM Severe Weather Standard Operating Procedures (SOP) has pre-scripted messages for the Duty Officer to disseminate to Miami-Dade DEM Staff and DEM partner agencies. Municipal emergency management, colleges and universities are part of DEM's distributions lists; therefore, they receive all emergency notifications and disseminate it to the residents and students within their jurisdiction through their own processes.

Messaging on flood advisories in Miami-Dade County via the Emergency Alert System (EAS) through all channel/stations, is done by NWS – Miami/South Florida Forecast Office. NWS utilizes pre-scripted draft messages for all types of flood advisories. The pre-scripted messages include the type of advisory, time the advisory expires, the reason the advisory was issued and location(s) that will experience flooding as a result of the weather system. Additionally, NWS has several pre-scripted messages with precautionary/preparedness statements that they can choose from when preparing the advisory for issuance.

Miami-Dade County uses a cable override system for the public notification of emergency warnings. A Florida EAS Plan is prepared by the State Emergency Communications Committee in conjunction with FDEM and is based on recommendation from the state and County emergency management officials, NWS, and the broadcast industry and cable operators. The purpose of this Plan is to put in place a system that can be utilized by emergency officials to announce or transmit an emergency alert to the potentially impacted population. The Florida EAS Operational Plan can be accessed via the following link: https://www.fab.org/eas-plan. The EAS is tested monthly and the schedule can be accessed via the following link: fab.org/eas-test-schedule/.

There are additional forms of public notification that are utilized to send emergency alerts in the event that an emergency or event requires protective action(s). When emergency protective action(s) are issued, an EAS and/or Wireless Emergency Alert (WEA) message can be disseminated via DEM's Integrated Public Alert Warning System (IPAWS) compliant software systems EMnet or WebEOC. Simultaneously, DEM would also disseminate messages through Miami-Dade Alerts and social media (i.e. Facebook and X). When an emergency notification to a specific geographic area is required, the VESTA Alert Notification System can be utilized. A brief description of each system is below.

- **IPAWS** is a national warning system used to notify the public of emergency situations which may require protective actions. It is designed to warn the public of local weather emergencies, such as flooding. The primary method utilized for developing and

[49] CRS Activity 610 (Flood Warning and Response) Element – Emergency Warning Dissemination

disseminating an IPAWS message is through the EMnet system, located in the supervisor platform of the Miami-Dade Fire Rescue (MDFR) Dispatch Center Headquarters. In the event EMnet is not operational, the fax request methodology or the WebEOC IPAWS messaging system will be utilized as the backup methods to disseminate information to the public.

- **Everbridge Alert Notification System** is a notification system is designed to handle a large volume of alerts, ensuring that messages are delivered to a vast number of recipients simultaneously. This scalability is crucial during large-scale emergencies when timely communication with the public is critical. The system incorporates multiple delivery channels (text,email, voice) to ensure that messages are received even if one channel fails.
- **Social Media** is utilized to disseminate emergency information, such as protective actions and general emergency information before, during and after an incident. During a Miami-Dade EOC activation, the Social Media Unit Leader of the EOC Planning Section is responsible for the collection, evaluation, and posting of public information through all of the County's social media platforms. Additionally, Miami-Dade DEM uses social media to promote personal preparedness awareness in the community, severe weather advisories, safety tips, among other topics.

Along with the aforementioned public information systems, many of Miami-Dade County buildings have NOAA Weather Radios to provide notification of flood and severe weather watches and warnings. Some of these buildings include the Fire Alarm Office, EOC, DEM offices, County executive offices, Miami International Airport (Air Traffic Control Tower), hospitals, healthcare centers, educational facilities and fire stations, among others.

Additionally, Miami-Dade County disseminates press releases with emergency information and general preparedness information for all types of incidents. During a countywide emergency (e.g. hurricane), the Miami-Dade County utilizes the miamidade.gov/emergency webpage to provide residents and visitors with the most accurate information, including updates to County services during a particular emergency. This webpage provides updates on:

- Evacuation Orders
- Schools
- Waste Collection
- Animal Services
- Parks
- Seaports
- Libraries
- Museums
- Correction and Rehabilitation Facilities
- Government Offices and Courthouse
- Transit
- Airports
- Streets, Expressways, Tolls and Bridges
- Beaches and Marinas
- Curfews
- Open/closed Shelters
- Water and Sewer
- Hospital and Clinics

When necessary, in-person notifications of protective measures orders are conducted by law enforcement (County and Municipal). This is used to supplement information disseminated via means of mass communication. In-person communication by law enforcement include:

- Door-to-door communication – individually notifying residents within a specific geographic region
- Vehicle Public Address System – communication of evacuation orders via the public address system in police vehicles, also known as route alerting

FLOOD RESPONSE OPERATIONS[50]

The Miami-Dade CEMP and Protective Measures Plan identify flood response roles and responsibilities for all our County stakeholders. The clearance times illustrated on Table 8, dictate the time needed to implement response activities which includes hurricane evacuation operations.

Miami-Dade County's CEMP establishes the framework that the County and its municipalities utilize to address all types of hazards. The CEMP outlines the basic strategies, assumptions, operational goals and objectives, and mechanisms through which Miami-Dade County will mobilize resources and conduct activities to guide and support emergency management efforts through preparedness, response, recovery and mitigation. Additionally, it includes the roles and responsibilities of the local government, state and federal agencies, and other stakeholders.

The Miami-Dade CEMP was adopted by the BCC on October 18, 2022 by Resolution R-982-22. Volume I of the CEMP can be accessed via the following link: miamidade.gov/fire/library/OEM/CEMP.pdf. Volumes II, III and IV can be obtained by contacting Miami-Dade DEM.

The Miami-Dade DEM Protective Measures Plan focuses on an all-hazards approach to respond to all types of emergencies. It provides contingencies to lessen the exposure of people to hazards related to the incident through protective measures such as evacuation, shelter-in-place, isolation/quarantine and restricted entry/repopulation. The Plan provides a decision-making process that defines which protective measure is best for the current conditions of each incident and an implementation process. This Plan can be found of Volume III of the CEMP. Figures 30 and 31 are part of the DEM Protective Measures Plan. Figure 30 illustrates the protective measures decision matrix for evacuations, sheltering-in-place, and isolation/quarantine. Figure 31 illustrates the protective measures decision matrix for restricted entry/repopulation.

[50] CRS Activity 610 (Flood Warning and Response) Element – Flood Response Operations

Community Information and Reporting

Miami-Dade County operates the 311 Contact Center which provides a fast, simple, and convenient way for residents to obtain accurate information on local government services throughout an emergency and non-emergency situation. Additionally, the 311 Contact Center can be utilized to report neighborhood problems such as building code violations, roadways issues (e.g. pothole, damaged sidewalk), water and sewer issues (e.g. clogged drains) canal issues, flooding reports, among others. The 311 Contact Center can be reached via:

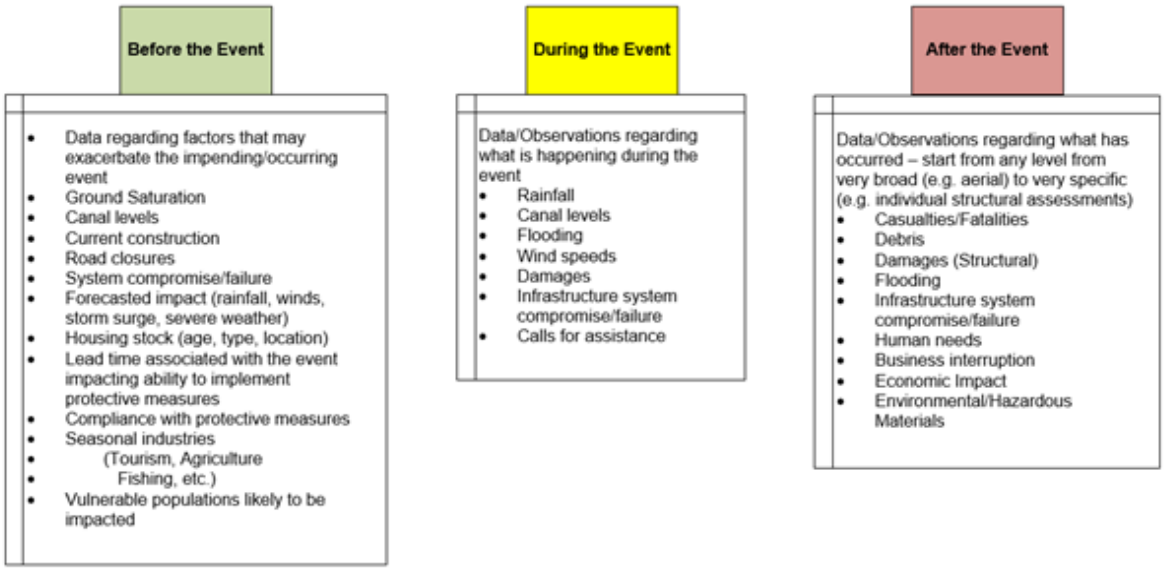
- Phone, by dialing 311 or (305) 468-5900
- Online at https://311.miamidade.gov/311/s/
- X (formerly Twitter) at X.com/miamidade311
- 311Direct Mobile App on the Google Play store and on Apple App Store
- Email at 311@miamidade.gov

Further information on Miami-Dade County's 311 Contact Center can be accessed via the following link: https://www.miamidade.gov/global/311/home.page

Hazard Impact Assessment

Hazard impact assessments of potential and actual impacts are conducted by gathering data before, during and after an incident. Details of this process are outlined on DEM's Hazard Impact Assessment Plan (HIAP) which can be found in Volume III of the CEMP. Figure 29 provides an overview of how hazard impact assessments will be conducted by Miami-Dade County agencies and municipalities.

Figure 29. Impact Assessments Before, During and After an Incident



Damage Assessment Software

In order to standardize how damages are reported, Miami-Dade County created the Snapshot Damage Assessment (Neighborhood Damage Assessment Form) after Hurricane Andrew. The

system provides four (4) basic levels of structural damage and two (2) levels of flooding that are helpful for reporting impacts to residential structures. Currently, this system is used for public reporting.

In 2024, Miami-Dade DEM implemented a more robust damage assessment tool for our partner agencies and municipalities, called Crisis Track. Crisis Track became the County's official damage assessment software. Crisis Track is a comprehensive system where information can be collected on impact areas, incidents, initial damage assessments and detailed structural assessments. The software has been designed for assessment data to be gathered via a tablet or laptop on the field, subsequently, the data is synchronized and viewed on the Crisis Track Viewer at the agency and Municipal Emergency Operations Centers (EOC). Crisis Track can be utilized for countywide incidents (e.g. hurricane) or local incidents (e.g. tornado). Miami-Dade DEM, in conjunction with local building officials, developed a guide and training on reporting flood and structural damage for mobile/manufactured homes, residential structures, and mid and high-rise structures. Furthermore, a training component was established to complement the system and provide uniform training for personnel who conduct on-field assessments, and personnel who may be working in the EOC and generating damage assessment reports within their jurisdiction.

Special Needs Evacuation Assistance

Miami-Dade DEM maintains and manages the Emergency and Evacuation Assistance Program (EEAP) for residents with functional and access needs. This program offers specialized transportation for individuals that live at home and are in need of assistance during an evacuation, are electrically-dependent and require sheltering in a Medical Management Facility (MMF) and/or would like to receive a wellness call after an incident or disaster.

Eligible EEAP applicants will be assigned to an evacuation center (Medical Evacuation Center or MMF) appropriate for the level of care required due to their medical condition(s). When any incident, such as a hurricane or flood, requires evacuation of Miami-Dade County's vulnerable population, the Evacuation Support Unit (ESU) is activated. The ESU is responsible for:

- Coordinating the call down of registrants prior to an evacuation order
- Verifying the evacuation status
- Appropriate facility and transportation assignment
- Transportation for the evacuation and repopulation
- Wellness Checks
- Demobilization of assets and facilities when they are no longer needed

Residents with functional and access needs should register for the EEAP prior to an emergency to ensure the appropriate assistance will be provided, when needed. Applications go through a review process by the DEM Vulnerable Populations Coordinator and the Florida Department of Health (FDOH) in Miami-Dade County. Subsequently, applications are entered into the EEAP database, which utilizes GIS, to manage registrants throughout the year and during an emergency evacuation. In order to maintain EEAP client information up-to-date, a call-down is conducted twice a year by calling all active EEAP registrants to update/confirm their records.

Further information on the EEAP can be accessed via the following link: miamidade.gov/global/service.page?Mduid_service=ser1539637068904426.

Figure 30. Protective Measure Decision-Making Matrix (Evacuation, Shelter-in-Place and Isolation/Quarantine)

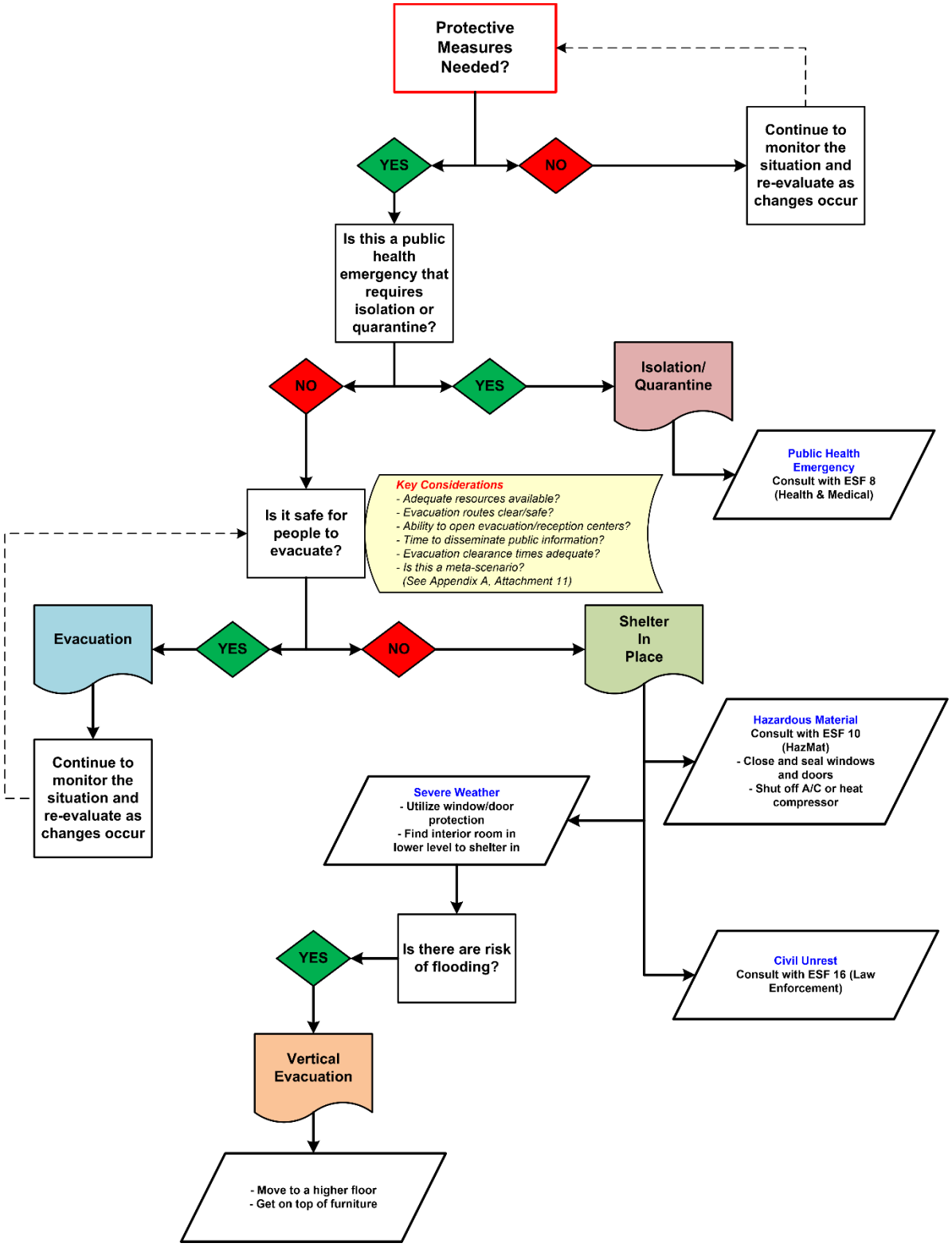
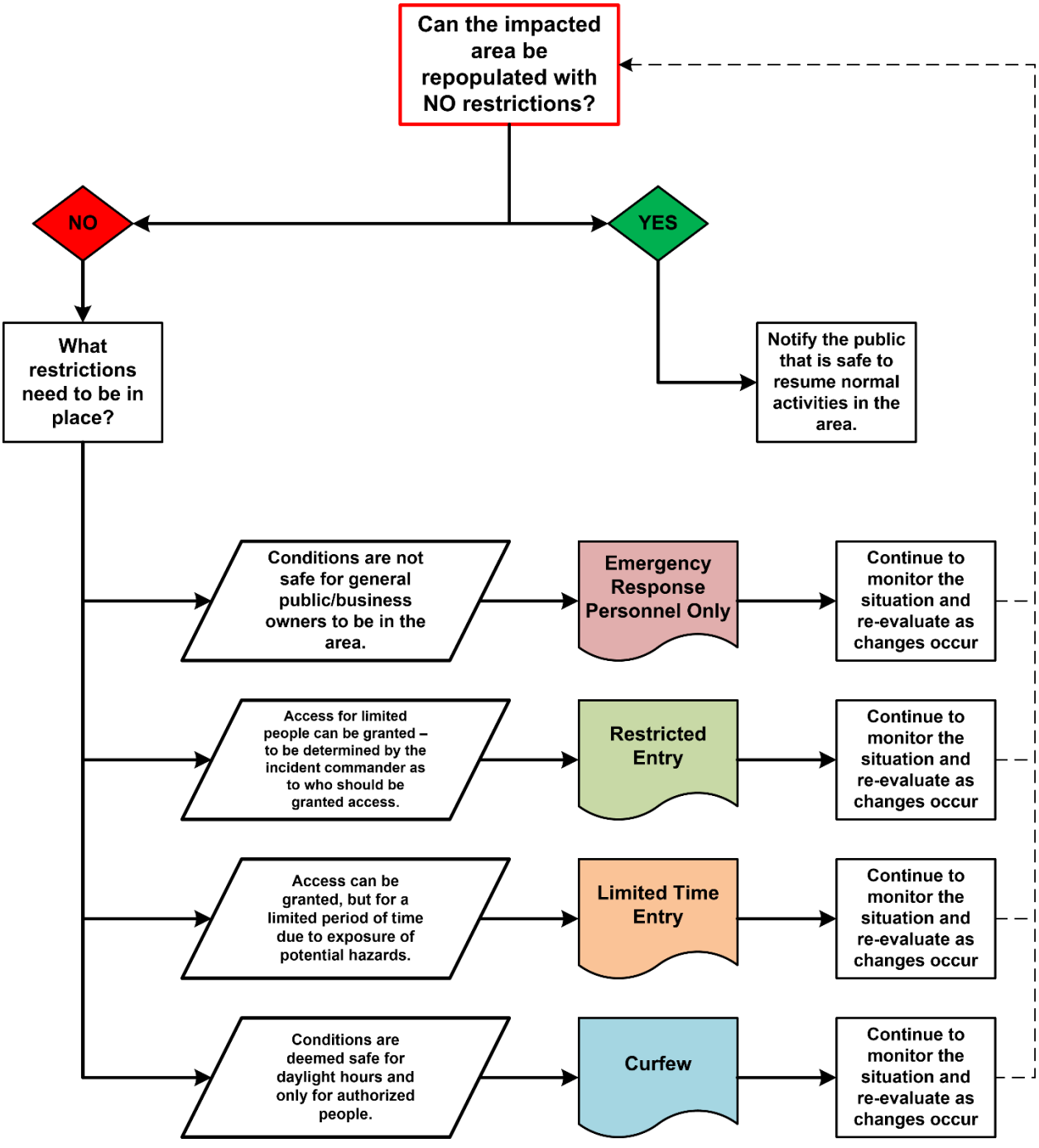


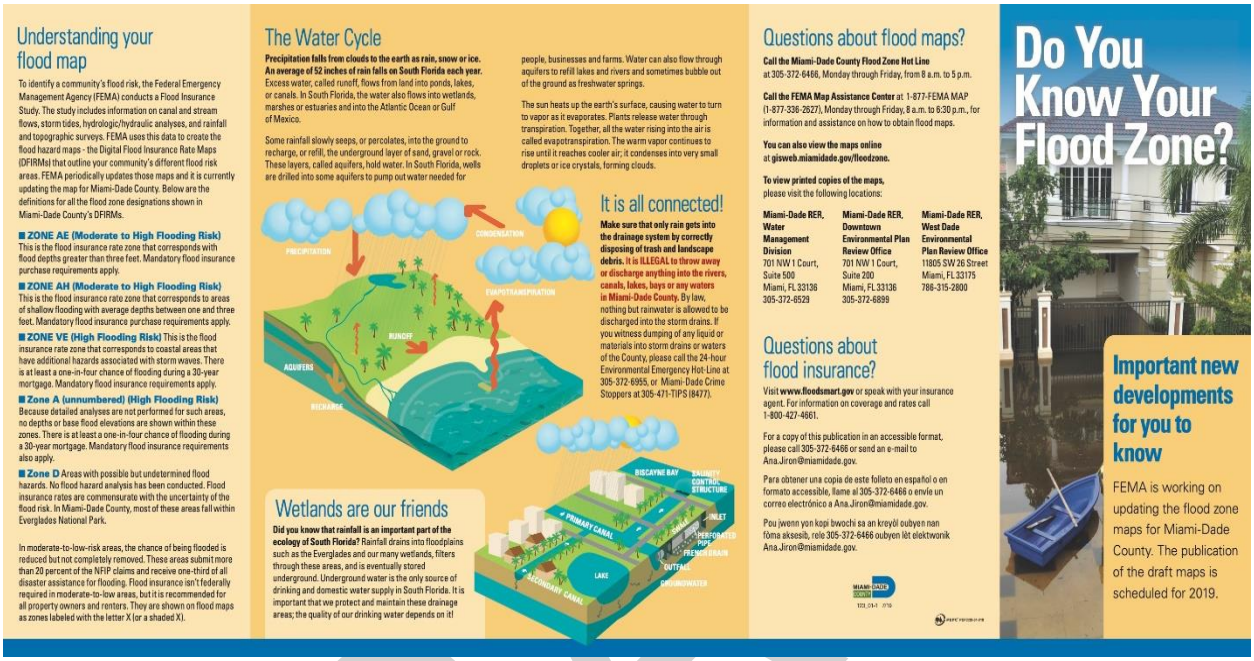
Figure 31. Protective Measure Decision-Making Matrix (Repopulation/Restricted Entry)



APPENDICES

Appendix A: Do You Know Your Flood Zone? Brochure

Available Online: www.miamidade.gov/environment/flood-maps.asp
Available in English, Spanish and Haitian Creole



Understanding your flood map

To identify a community's flood risk, the Federal Emergency Management Agency (FEMA) conducts a Flood Insurance Study. The study includes information on canal and stream flows, storm tides, hydrologic/hydraulic analyses, and rainfall and topographic surveys. FEMA uses this data to create the flood hazard maps - the Digital Flood Insurance Rate Maps (DFIRMs) that outline your community's different flood risk areas. FEMA periodically updates those maps and it is currently updating the map for Miami-Dade County. Below are the definitions for all the flood zone designations shown in Miami-Dade County's DFIRMs.

■ **ZONE AE (Moderate to High Flooding Risk)** This is the flood insurance rate zone that corresponds with flood depths greater than three feet. Mandatory flood insurance purchase requirements apply.

■ **ZONE AH (Moderate to High Flooding Risk)** This is the flood insurance rate zone that corresponds to areas of shallow flooding with average depths between one and three feet. Mandatory flood insurance purchase requirements apply.

■ **ZONE VE (High Flooding Risk)** This is the flood insurance rate zone that corresponds to coastal areas that have additional hazards associated with storm waves. There is at least a one-in-four chance of flooding during a 30-year mortgage. Mandatory flood insurance requirements apply.

■ **Zone A (unnumbered) (High Flooding Risk)** Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones. There is at least a one-in-four chance of flooding during a 30-year mortgage. Mandatory flood insurance requirements also apply.

■ **Zone D** Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk. In Miami-Dade County, most of these areas fall within Everglades National Park.

In moderate-to-low-risk areas, the chance of being flooded is reduced but not completely removed. These areas submit more than 20 percent of the NFIP claims and receive one-third of all disaster assistance for flooding. Flood insurance isn't federally required in moderate-to-low areas, but it is recommended for all property owners and renters. They are shown on flood maps as zones labeled with the letter X (or a shaded X).

The Water Cycle

Precipitation falls from clouds to the earth as rain, snow or ice. An average of 52 inches of rain falls on South Florida each year. Excess water, called runoff, flows from land into ponds, lakes, or canals. In South Florida, the water also flows into wetlands, marshes or estuaries and into the Atlantic Ocean or Gulf of Mexico.

Some rainfall slowly seeps, or percolates, into the ground to recharge, or refill, the underground layer of sand, gravel or rock. These layers, called aquifers, hold water. In South Florida, wells are drilled into some aquifers to pump out water needed for people, businesses and farms. Water can also flow through aquifers to refill lakes and rivers and sometimes bubble out of the ground as freshwater springs.

The sun heats up the earth's surface, causing water to turn to vapor as it evaporates. Plants release water through transpiration. Together, all the water rising into the air is called evapotranspiration. The warm vapor continues to rise until it reaches cooler air; it condenses into very small droplets or ice crystals, forming clouds.

It is all connected!

Make sure that only rain gets into the drainage system by correctly disposing of trash and landscape debris. It is ILLEGAL to throw away or discharge anything into the rivers, canals, lakes, bays or any waters in Miami-Dade County. By law, nothing but rainwater is allowed to be discharged into the storm drains. If you witness dumping of any liquid or materials into storm drains or waters of the County, please call the 24-hour Environmental Emergency Hot-Line at 305-372-6955, or Miami-Dade Crime Stoppers at 305-471-TIPS (8477).

Wetlands are our friends

Did you know that rainfall is an important part of the ecology of South Florida? Rainfall drains into floodplains such as the Everglades and our many wetlands, filters through these areas, and is eventually stored underground. Underground water is the only source of drinking and domestic water supply in South Florida. It is important that we protect and maintain these drainage areas; the quality of our drinking water depends on it!

Questions about flood maps?

Call the Miami-Dade County Flood Zone Hot Line at 305-372-6466, Monday through Friday, from 8 a.m. to 5 p.m.

Call the FEMA Map Assistance Center at 1-877-FEMA MAP (1-877-336-2627), Monday through Friday, 8 a.m. to 6:30 p.m., for information and assistance on how to obtain flood maps.

You can also view the maps online at **giswed.miamidade.gov/floodzone.**

To view printed copies of the maps, please visit the following locations:

Miami-Dade RER, Water Management Division
701 NW 1 Court, Suite 500
Miami, FL 33136
305-372-6529

Miami-Dade RER, Downtown Environmental Plan Review Office
701 NW 1 Court, Suite 200
Miami, FL 33136
305-372-6899

Miami-Dade RER, West Dade Environmental Plan Review Office
11805 SW 26 Street
Miami, FL 33175
788-315-2800

Questions about flood insurance?

Visit **www.floodsmart.gov** or speak with your insurance agent. For information on coverage and rates call 1-800-427-4661.

For a copy of this publication in an accessible format, please call 305-372-6466 or send an e-mail to Ana.Jiron@miamidade.gov.

Para obtener una copia de este folleto en español o en formato accesible, llame al 305-372-6466 o envíe un correo electrónico a Ana.Jiron@miamidade.gov.

Pou jwenn yon kopi bwochi sa an kreyòl oubyen nan fòma aksesib, rele 305-372-6466 oubyen lèt elektwonik Ana.Jiron@miamidade.gov.

Do You Know Your Flood Zone?

Important new developments for you to know

FEMA is working on updating the flood zone maps for Miami-Dade County. The publication of the draft maps is scheduled for 2019.

Why do floods occur?

Because Miami-Dade County is located in a unique geographical area, it is particularly susceptible to flooding from major rain events and storm surge. The County is surrounded by major water bodies, the Atlantic Ocean, Biscayne Bay, and many rivers, lakes and canals. Miami-Dade County lies close to sea level and its underground water supply is just below the ground surface. Therefore, major rain events sometimes leave rainwater nowhere to drain, causing occasional flooding in some areas of the County.

Know your flood risk

If you are not sure where your property is located on the map, please call Miami-Dade County's 311 Contact Center or Flood Zone Hotline at 305-372-6466 and your exact flood zone designation will be confirmed.

You can also find the flood zone for your property, using the website: **giswed.miamidade.gov/floodzone.**

You can also visit the FEMA Map Service Center Website to download a copy of the maps at **msc.fema.gov**.

The Stormwater Utility Section also provides flood protection assistance to citizens, in the form of site visits and advice on how to protect your property from flooding. Please call Miami-Dade County's 311 Contact Center or 305-372-6688 to report any unusual flooding in your area or to request a site visit for your property.

Additional floodplain information

The hotline also provides additional information about your flood risk, such as location of coastal high hazard areas, flood depths at your property, historical flood maps, newly mapped flood prone areas, special rules for building in the floodplain, and future sea level vulnerability.

For information about natural conservation areas, and other protected areas, visit our Environmental Considerations tool at **www.miamidade.gov/environment/environmental-gis.asp** or call the Flood Zone Hotline.

Get an Elevation Certificate

Once you have determined that your house lies in a flood zone, an Elevation Certificate can then tell you how high your house was built in relation to that flood zone. These Certificates are required for all new construction, as well as for construction projects that involve making substantial improvements to a structure. An Elevation Certificate is an important document that every homeowner should have, and in case of a disaster, would demonstrate to County authorities that your house is at or above the required elevation. If the Certificate shows that your house is lower than the required elevation, then the so-called "50% rule" would apply to your house. This rule means that if your house is in a flood zone and is damaged and/or improved to an amount greater than 50% of its market value, it will have to be raised to meet the current elevation requirement. Miami-Dade County has kept records of these Certificates on file since the County began participating in the Community Rating System (CRS). For more information about the 50% rule or Elevation Certificates, please call Miami-Dade County's 311 Contact Center or the Flood Zone Hotline at 305-372-6466.

Insure your home

Flood insurance is required for any federally backed mortgage in a Special Flood Hazard Area. PLEASE NOTE: when purchasing flood insurance, the policy does not go into effect until 30 days after purchase. Please visit **www.floodsmart.gov** for the most current information on flood insurance premiums and to locate a flood insurance agent in your area.

Because of Miami-Dade County's rating under the National Flood Insurance Program's (NFIP) Community Rating System, Miami-Dade County policy holders who live in a flood zone have enjoyed a 25 % discount on their flood insurance premiums since October 1, 2003. A 10% discount on flood insurance is also available for those who live outside of flood zones, except on preferred risk policies.

Protect your home

There are things you can do to minimize or eliminate property damage before a flood event occurs. Grading your property, elevating and securing electrical appliances, placing all low-lying electrical fixtures on separate electrical circuits, and using flood-resistant materials on exterior surfaces are some ways you can help yourself. Under emergency conditions, sand bags can be used to protect structures from flood waters, and elevating or covering furniture and valuables can help minimize damage.

Retrofitting your home

All construction in Miami-Dade County requires the issuance of building permits prior to construction. Building permits are obtained after submittal and approval of building plans. An important part of the review process is the requirement that structures be built high enough and use proper design to protect against flood damage. If you plan to construct an addition to your house, build a new house, or for any other type of development, call Miami-Dade County's Department of Regulatory and Economic Resources (RER) at 786-315-2000 for information on how to obtain the necessary permits. If you see construction taking place in Miami-Dade County without the proper permits, please call the Miami-Dade County's 311 Contact Center or the Code Enforcement Office at 786-315-2424 to report it. To obtain information on how to select a contractor to repair your home after a flood or other natural disaster, or to conduct a search to find out if a complaint has been filed on a contractor working in Miami-Dade County, please visit **www.miamidade.gov/building/contractor-inquiry-search.asp.**

If you live in a condo

If you live in a condominium, private community with an association, or if your place of business is located in a commercial property such as a warehouse or shopping mall, then you should become familiar with the drainage system in your private community and/or place of business. Specifically, you should be aware of the location, condition and operation of the on-site drainage system that your homeowner's association or place of business is responsible for maintaining. It is also a good idea to develop a list of important contact persons/phone numbers associated with the maintenance of the drainage system BEFORE an emergency arises.

Be aware

When an Emergency Flood Warning Notice is issued for your area, take safety precautions immediately:

- Do not walk or drive through flowing or standing water. Unseen obstructions or hazards may harm you or your vehicle. Also, sewage from overflowing sewer lines may be present in the water.
- Avoid downed power lines and electrical wires. These lines can cause shock and electrocution.
- Turn off the power in your house. This should include electrical power as well as all propane gas tanks and lines.
- Watch your step in flooded areas. Slip-and-fall accidents are common in wet, slippery areas.
- Be alert for small animals that are flushed out by flooding conditions. Under stress, animals may react by biting when disturbed.
- Be aware of gas leaks in the house. Do not smoke, nor use candles or open flames, until you are sure no leaks exist; ventilate enclosed areas if you think gas is present.

For more information, please visit the Red Cross website at **www.redcross.org/get-help/how-to-prepare-for-emergencies/types-of-emergencies/flood.html.**

Repetitive losses

A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP. Currently there are over 122,000 RL properties nationwide. To find out more about repetitive loss properties, visit our website at: **www.miamidade.gov/environment/repetitive-losses.asp.**

Weather warnings / watches.

The National Weather Service monitors local weather conditions. If flooding from rain is anticipated, the Service will broadcast Flood Warning Notices through television, radio and wire services. These notices are intended to make you aware and help you prepare for possible flooding. If an Emergency Flood Warning Notice is issued, the National Weather Service will broadcast this warning through the Emergency Alert System, and through TV and radio stations. For more information visit **www.miamidade.gov/fire/alerts-and-notifications.asp.**

Your opinion counts

Miami-Dade County is constantly updating its Floodplain Management Plan. To reduce street flooding, the County's Stormwater Utility is in the process of identifying, prioritizing and implementing local drainage projects throughout the County. We would like to hear from you to be sure we are meeting your needs. Please see the following questions and respond by calling our Flood Complaints Hotline, from 8 a.m. to 5 p.m., Monday through Friday, at 305-372-6688.

We would like to know:

Do you have flooding problems in your neighborhood or at your place of business? If so, have you notified the County, and if you did, was our response satisfactory?

Have you noticed the drainage improvements being constructed by Miami-Dade County? Have they helped reduce flooding in your local community?

Appendix B: 2024 Hurricane Readiness Guide

Available Online: www.miamidade.gov/hurricane/library/guide-to-hurricane-readiness.pdf
The Guide is fully translated in English, Spanish and Haitian Creole

CONTENTS

E ÍNDICE

K *TABDÈMATYÈ*

GENERAL PREPAREDNESS INFORMATION

ENGLISH

ESPAÑOL

KREYÒL

Neurodivergent individuals can prepare for a hurricane by visiting https://padlet.com/djffumnsucard/hurricanepreparedness.

E Las personas neurodivergentes pueden encontrar información sobre cómo prepararse para un huracán en el sitio web **https://padlet.com/djffumnsucard/hurricanepreparedness.**

K *Moun ki newodivèjan yo ka prepare pou yon siklòn lè yo vizite* ***https://padlet.com/djffumnsucard/hurricanepreparedness.***

For up-to-the-minute hurricane information, download the **Ready MDC** mobile app.

E **Para obtener información actualizada sobre huracanes, descargue la aplicación para dispositivos móviles Ready MDC.**

K ***Pou w jwenn enfòmasyon aktyalize sou siklòn, telechaje aplikasyon mobil Ready MDC a.***

iPhone

Android

To learn more, visit miamidade.gov/hurricane.

E **Para más información, visite miamidade.gov/hurricane.**

K ***Pou plis enfòmasyon, vizite* miamidade.gov/hurricane.**

Language Legend

E Español

K Kreyòl

MIAMI-DADE DEPARTMENT OF EMERGENCY MANAGEMENT

BEFORE

TORNADOES AND STORM SURGE

TORNADOES

Hurricanes and tropical storms can also produce tornadoes. Usually, these tornadoes are relatively weak and short lived, but they pose a significant threat to life and property.

STORM SURGE

During a hurricane, storm surge is the greatest threat to life and property. It is an abnormal rise of water generated by a hurricane. Storm surge can travel several miles inland, especially along bays and canals, and can reach heights well over 20 feet.

If you live in a high-rise building and choose to shelter-in-place, stay on floors just above flood water or storm surge, but not higher than the 10th floor. Hurricanes bring dangerous winds and the higher up you go in a building, the stronger the wind speed.

KNOW YOUR ZONE

All Miami-Dade County residents should know which Storm Surge Planning Zone they live in. To determine your zone, go to **miamidade.gov/hurricane**, find the Storm Surge Planning Zone section, then enter your address. You can also download the Ready MDC mobile app or call 311.

Upon identification of a threat, each zone (or portions of a zone) will be evacuated depending on the hurricane's track and projected storm surge, independent of the hurricane's category.

A Storm Surge Planning Zone is an area that could be affected by storm surge of 1 ½ feet or higher during a hurricane. These planning zones are not to be confused with your flood zone.

Know Your Zone

- Zone A is at greatest risk for storm surge from a Category 1 hurricane and higher.
- Zone B is at greatest risk for storm surge from a Category 2 hurricane and higher.
- Zone C is at greatest risk for storm surge from a Category 3 hurricane and higher.
- Zone D is at greatest risk for storm surge from a Category 4 hurricane and higher.
- Zone E is at greatest risk for storm surge from a Category 5 hurricane.

To view Storm Surge Planning Zones please refer to the map at the end of this Hurricane Guide.

Appendix C: News Release Samples

https://www.miamidade.gov/global/release.page?Mduid_release=rel1728416338588230

Media Contact

EOC PIO
eocpio@miamidade.gov
786-788-5303

Miami-Dade County Officials provide update on Hurricane Milton Preparations

MIAMI-DADE (October 08, 2024)– Hurricane Milton is currently a major category 4 hurricane as it heads toward landfall on the west coast of Florida. The storm is expected to bring life-threatening storm surge to the Tampa Bay area and west coast – even as they continue to recover from Hurricane Helene.

Miami-Dade is now under a tropical storm warning. The most likely impacts in our County includes heavy rainfall, localized flooding, and sustained tropical storm force winds, starting as early as tonight. Milton is a major storm and it remains important to stay prepared as the county will be affected by the outer bands.

The Emergency Operations Center remains activated to ensure the community is ready to respond. County services including water and sewer and transit services including Metrorail, Metrobus, and Metromover currently remain open. The Trash and Recycling Centers have extended their hours until 7pm and all other waste collection services are operating normally, weather permitting.

All non-essential County government offices will be closed Wednesday. October 9 and Thursday, October 10.

As emergency personnel continue to monitor potential impacts over the next 48 hours, Miami-Dade County will keep the community updated on any other service changes.

The county announced voluntary evacuation of mobile home parks yesterday:

- The E. Darwin Fuchs Pavilion, located at 10901 Coral Way, is a pet-friendly evacuation center open only for mobile home residents who voluntarily wish to relocate.
- Miami-Dade Transit is providing transportation assistance for mobile home residents who are voluntarily evacuating; residents should call the 311 Contact Center or submit the online form for assistance to request transportation assistance. 311 is open extended hours until 10 pm tonight.

Miami-Dade County departments have been aggressively preparing for and responding to flooding over the last few days.

Yesterday, the Parks, Recreation and Open Spaces (PROS) Department began distributing sandbags at nine regional parks countywide. PROS has already successfully distributed more than 70,000 sandbags to residents in need and the majority of our sites have closed based on the enormous demand.

The County is grateful for the many residents and families who have volunteered to foster the most vulnerable cats and dogs from the Animal Services Department (ASD). ASD staff has been overwhelmed by the number of residents who have stepped up to take in pets this week and Miami-Dade remains extremely grateful for their service.

MIA is currently open and operating, although some airlines have cancelled or will cancel flights. Travelers are encouraged to confirm their flight status before heading to the airport.

PortMiami is currently under port readiness condition Yankee. Under Yankee, the Port will not be receiving any inbound vessels and crews are busy emptying yards this morning. The tunnel is closed into the port but remains open for outbound vehicles.

The US Coast Guard also announced that they will begin locking down all drawbridges for boat traffic starting at noon today.

It is important that the community takes key steps to prepare:

- Gather hurricane supplies now. Make sure three days of supplies (e.g., non-perishable food and water) are on hand for each person in the household. Residents can fill their own containers with Miami-Dade tap water!
- Put up hurricane shutters;
- Fill any vehicle's gas tank with gasoline. Extra gasoline should be stored in an appropriate container and in a safe area of the home;
- Do not trim trees or shrubs at this time. The County's 13 Trash and Recycling Centers have extended their operating hours and will remain open until 7 p.m. today.
- Make sure home, yard and construction debris are properly secured. Any objects that hurricane winds could blow about should have been tied down or brought indoors (garbage cans, patio furniture, garden tools, toys, etc.).

Keep in mind the following flood and water safety measures:

- Help minimize overflows to the wastewater system by keeping manhole covers closed, and by minimizing water usage in the morning and evening during heavy rain.
- Residents can report severe flooding within unincorporated Miami-Dade or the city of Miami by calling 311 or using the 311Direct app. Residents should only call 911 if they have a medical- or life-threatening emergency.
- County crews are on standby to drain flooded areas as needed.
- Residents and visitors are urged to practice flood safety – "turn around don't drown," AVOID walking or driving in flooded areas.
- Head to miamidade.gov/hurricane or download the Ready MDC app for more flood safety information and updates.

Continue monitoring local media and verified social media platforms as the County shares important updates this week.

# # #

To request materials in accessible format, sign language interpreters, and/or any accommodation to participate in any County-sponsored program or meeting, please contact at or email, , five days in advance to initiate your request. TTY users may also call 711 (Florida Relay Service).

DANIELLA LEVINE CAVA,OFFICE OF THE MAYOR

Stephen P. Clark Center
111 NW 1st Street, Miami, FL 33128

https://www.miamidade.gov/global/release.page?Mduid_release=rel172744219098971

Media Contact

Media and Public Relations Bureau
mdfrpio@miamidade.gov
305-204-2526

Inclement Weather from Hurricane Helene

MIAMI-DADE (September 25, 2024)– According to the National Hurricane Center (NHC), Hurricane Helene is currently located approximately 45 miles east-northeast of Cozumel, Mexico, and is moving northwestward at 10 mph. Helene is likely to become a major hurricane by Thursday as it crosses the eastern Gulf of Mexico. The forecast track indicates the storm will make landfall along the Big Bend coast of Florida late Thursday.

While Miami-Dade County is under a Tropical Storm Warning, the county remains outside of the immediate forecast cone. Tropical storm-force winds could reach parts of South Florida, including Miami-Dade County, as early as tonight. County officials are closely monitoring the situation and preparing for any potential impacts. Residents are urged to remain informed and follow safety guidelines.

Though Governor Ron DeSantis has declared a state of emergency for multiple counties in Florida, including those in the storm's path, Miami-Dade County has not been included on that list. However, we continue to work closely with state and federal authorities to monitor any changes and ensure preparedness.

"The Miami-Dade Department of Emergency Management continues to monitor the path of Hurricane Helene, and although it is not currently a direct threat to our county, this is a great opportunity to remind everyone of the importance of being prepared," said Pete Gomez, Director for Miami-Dade Department of Emergency Management.

This heavy rainfall may cause localized flooding in areas that are low-lying or with poor drainage. Miami-Dade County is actively monitoring the potential for flooding in our area and advises everyone to stay updated on weather forecasts. Other Miami-Dade County departments have been preparing for the upcoming rainy season.

"We continue to build a resilient community by providing our residents and visitors with all the tools they need to be safe," said Mayor Daniella Levine Cava. "We remain vigilant and all of our County departments are ready to respond to mitigate any impacts this storm may have in our region. We also stand at the ready to assist other communities in northern Florida who will be directly impacted by the storm."

Please be prepared and stay safe. The Miami-Dade Department of Emergency Management (DEM) encourages our community to follow these tips during inclement weather:

- Visiting South Florida? Know what to do when your vacation is suddenly interrupted due to severe weather. Before heading out to catch your flight, be sure to check with your airline directly for any possible delays
- It is never safe to drive or walk into flood waters: Don't drive or walk around road barriers or through large puddles. Hidden debris may be just under the surface that could hurt you or disable your car
- It is vital to know what to do if you are driving and hit a flooded road: More than half of the deaths from flooding each year occur in vehicles. Turn around, don't drown
- Don't underestimate the power of water: 6 inches of fast-moving flood water can knock over an adult. It takes just 12 inches of rushing water to carry away a small car, while 2 feet of rushing water can carry away most vehicles
- Stay away from downed power lines and electrical wires: Electrocution is also a major killer in floods. Electrical current can travel through water. Report downed power lines to Florida Power and Light's customer service number at 305- 442-8770
- Do not play in standing water: If water is stagnant for extended periods, there is a potential for contamination. Playing or remaining in standing water should be avoided
- Do not remove manhole covers: Removing manhole covers can inundate sewage pipes and overwhelm sewer facilities. It can also suck in people and debris which can cause drowning and loss of life

- Sign up for free emergency alerts: Receive emergency texts or emails regarding public safety issues, recommended public protective actions or other emergency information by signing up for Miami-Dade Alerts
- Monitor media: Continue monitoring local media or verified social media platforms for the latest updates, advisories, and instructions from public safety officials. Follow DEM on X @MiamiDadeEM and on Facebook

For more information, please contact Miami-Dade Fire Rescue's Media and Public Relations Bureau at 305-204-2526.

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To request materials in accessible format, sign language interpreters, and/or any accommodation to participate in any County-sponsored program or meeting, please contact at or email, , five days in advance to initiate your request. TTY users may also call 711 (Florida Relay Service).

PETE GOMEZ,EMERGENCY MANAGEMENT

R. David Paulison Fire Rescue Headquarters
9300 NW 41st St, Miami, FL 33178-2414

Appendix D: Emergency and Evacuation Assistance Program

Information available online:
https://www.miamidade.gov/global/service.page?Mduid_service=ser1470238193996672

MIAMI-DADE COUNTY

Delivering Excellence Every Day

Miami-Dade County
Office of Emergency Management
9300 NW 41 St, Doral, FL 33178

We Need Your Assistance!
VOLUNTEERS NEEDED

The Office of Emergency Management (OEM) works year-round to prepare for any type of disaster or emergency. As we prepare, we would like to invite you to participate in an important upcoming event.

On **Saturday, March 16th, 2019,** OEM will be conducting a call-down of the **Emergency and Evacuation Assistance Program (EEAP)** registry and the **Community Emergency Response Team (CERT)** database.

Emergency and Evacuation Assistance Program (EEAP) provides evacuation support to individuals with functional and access needs. The program is targeted towards residents of Miami-Dade County who need specialized transportation assistance or have medical needs that prevent them from evacuating on their own.

The **Community Emergency Response Team (CERT)** Program enables community citizens to prepare themselves for hazards that may impact their community in any major disaster or event and to provide assistance in their neighborhood.

Please join us in making calls to update information for the EEAP and CERT registries. We need your support in being part of the solution and helping the community!

Date: **Saturday, March 16th, 2019**
Time: **8:00 a.m. to 5:00 p.m.** *(or anytime between these hours, minimum 4 hours)*
Location: **Miami-Dade County Emergency Operations Center**
9300 NW 41 Street, Doral, Florida 33178

Lunch will be provided.

We need ***English, Spanish and Haitian Creole speaking volunteers*** to help us place phone calls and update registrant's information.

3 options to RSVP as a volunteer:

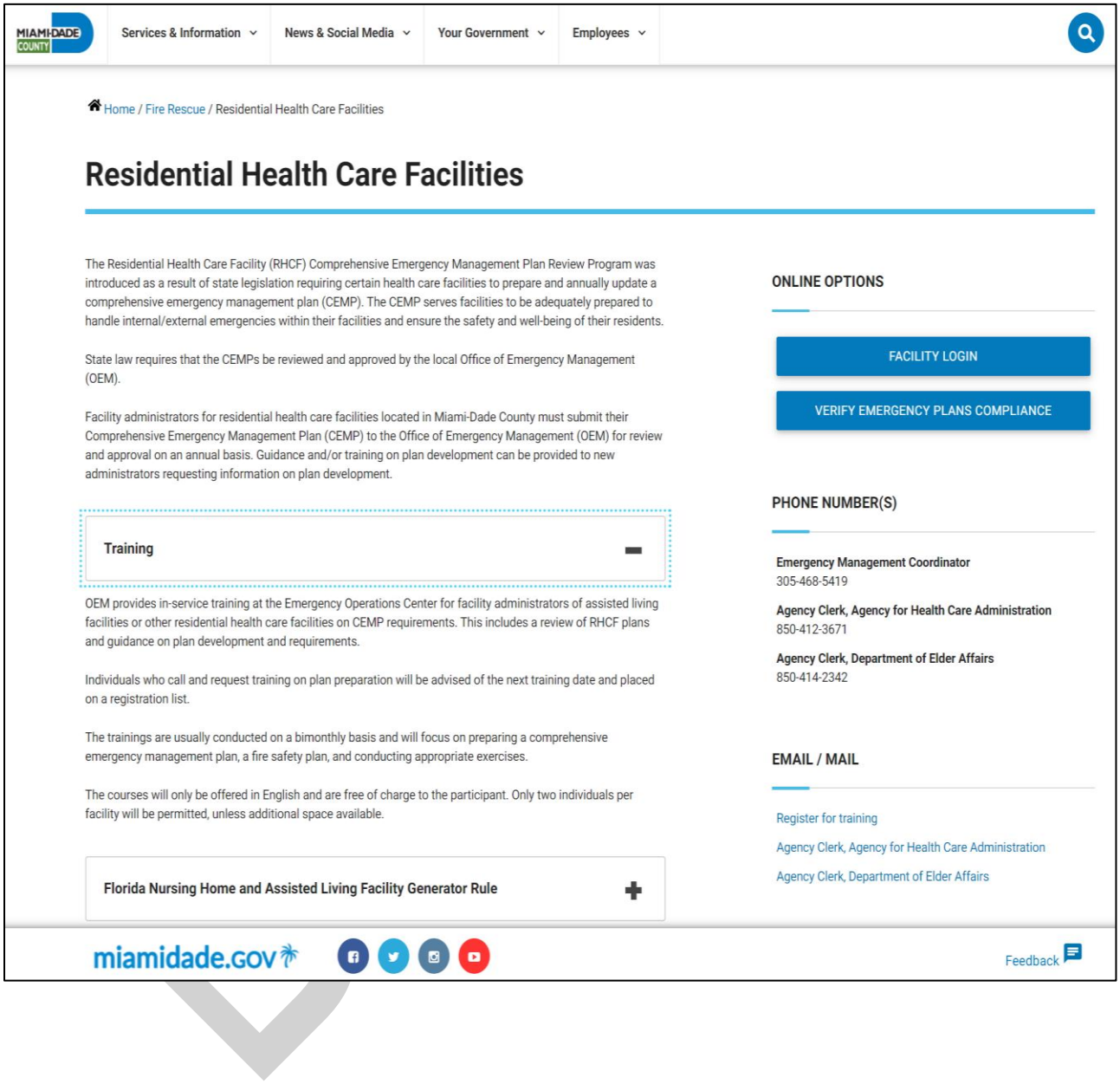
1. Use Eventbrite registration: **https://calldown2019march.eventbrite.com**
2. E-mail [redacted]: [redacted]**@miamidade.gov**
   Specify in your email:
   - What hours are you available to participate (start and end time)?
   - What languages do you speak (English, Spanish or Haitian Creole)?
3. Call or text us at 305-[redacted]

If you need any accommodations, please let us know.

Your participation is greatly appreciated!
Thank you for your support!

Appendix E: Residential Health Care Facility (RHCF) Requirements

Information available online:
https://www.miamidade.gov/global/service.page?Mduid_service=ser1539637068904426



Appendix F: Acronyms

BCC	Miami-Dade Board of County Commissioners
BFE	Base Flood Elevation
BOS	Back of Sidewalk
CDMP	Comprehensive Development Master Plan
CEMP	Comprehensive Emergency Management Plan
CFC	County Flood Criteria
COR	Crown of Road
CRS	Community Rating System
DTPW	Miami-Dade Department of Transportation and Public Works
EAR	Evaluation Appraisal Report
EAS	Emergency Alert System
EEAP	Emergency and Evacuation Assistance Program
EMNet	Emergency Management Network
EOC	Emergency Operations Center
ESU	Emergency Support Unit
FDEM	Florida Division of Emergency Management
FDOH	Florida Department of Health
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FLASH	Federal Alliance for Safe Homes
FLIPPER	Florida Interoperable Picture Processing for Emergency Response
GIS	Geographic Information System
GM&B	Greater Miami & the Beaches
HIAP	Hazard Impact Assessment Plan
IPAWS	Integrated Public Alert Warning System
ISO/CRS	Insurance Services Office, Inc. /Community Rating System
LMS	Local Mitigation Strategy
LMSSC	Local Mitigation Strategy Sub-Committees
LMSWG	Local Mitigation Strategy Working Group
LOMA	Letter of Map Amendment
LOS	Level of Service
MDFR	Miami-Dade Fire Rescue
MOM	Maximum of Maximums
NFIP	National Flood Insurance Program
NHC	National Hurricane Center
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PF	Precipitation Frequency
PFDS	Precipitation Frequency Data Server
QA/QC	Quality Assurance and Quality Control
RER	Miami-Dade County Regulatory and Economic Resources
RHCF	Residential Healthcare Facility
SFRPC	South Florida Regional Planning Council
SFWMD	South Florida Water Management District
SLOSH	Sea, Lake and Overland Surges from Hurricanes
SOP	Standard Operating Procedures
SRL	Severe Repetitive Loss
THIRA	Threat and Hazard Identification and Risk Assessment
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WEA	Wireless Emergency Alert
WRN	Weather-Ready Nation