

FLORIDA STATEWIDE REGIONAL EVACUATION STUDY PROGRAM





# ATLAS

STORM TIDE

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# MIAMI-DADE

# **VOLUME 7-11**

**BOOK 2 OF 3** FLORIDA DIVISION OF

EMERGENCY MANAGEMENT

SOUTH FLORIDA REGIONAL PLANNING COUNCIL

# SOUTH FLORIDA REGION

INCLUDES HURRIGANE EVACUATION STUDY





# SOUTH FLORIDA STORM TIDE ATLAS

# Volume 7-11 Book 2 Miami-Dade County

This Book is part of Volume 7 of the *Statewide Regional Evacuation Study Program* (SRESP), and one of three county books in the *South Florida Storm Tide Atlas* series. Book 1 covers Broward County; Book 2 covers Miami-Dade County; and Book 3 covers Monroe County. The Atlas maps identify those areas subject to potential storm tide flooding from the five categories of hurricane on the Saffir-Simpson Hurricane Wind Scale, as determined by the National Oceanic and Atmospheric Administration (NOAA) numerical storm surge model, Sea, Lake and Overland Surges from Hurricanes (SLOSH), updated in 2009.

The *Storm Tide Atlas* is the foundation of the hazards analysis for storm tide and a key component of the SRESP. The *Technical Data Report* (Volume 1-11) builds upon this analysis and includes the revised evacuation zones and population estimates, results of the evacuation behavioral data, shelter analysis and evacuation transportation analyses. The study, which provides vital information to state and local emergency management, forms the basis for county evacuation plans. The final documents with summary information are available on the Internet at <u>www.sfrpc.com/sresp.htm</u>.

This Atlas was prepared and published by the South Florida Regional Planning Council with funding from the Florida Legislature and the Federal Emergency Management Agency, through the Florida Division of Emergency Management.



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# **VOLUME 7-11** SOUTH FLORIDA

# STORM TIDE ATLAS

# Book 2 Miami-Dade County

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### A. Introduction

A comprehensive emergency management program requires attention to four key inter-related components: preparedness, response, recovery and mitigation. Preparing and avoiding or reducing potential loss of life and property damage – **preparedness and mitigation** – requires accurate and precise hazard and vulnerability analyses. These analyses are the foundation for evacuation and disaster response planning, as well as the development of local mitigation strategies designed to reduce the community's overall risk to disasters. This Atlas series provides information to state, county and local emergency management officials and planners for use in hurricane preparedness and coastal management in the South Florida Region, including Broward, Miami-Dade and Monroe Counties (Figure 1). It is part of a statewide effort to enhance our ability to respond to a hurricane threat, facilitate the evacuation of vulnerable residents to a point of relative safety and mitigate our vulnerability in the future. The *Statewide Regional Evacuation Study Program* provides a consistent, coordinated and improved approach to addressing the state and regional vulnerability to the hurricane threat.

The specific purpose of this Atlas is to provide Plates that depict storm tide heights and the extent of stillwater, storm surge coastal flooding inundation from hurricanes of five different intensities in the South Florida area. The Atlas was prepared by the South Florida Regional Planning Council as part of the *Statewide Regional Evacuation Study Program.* The Study is a cooperative effort of the Florida Department of Community Affairs, Division of Emergency Management, the Florida Regional Planning Councils and the county emergency management agencies.



Figure 1 The South Florida Region

### B. The SLOSH Model

The principal tool utilized in this study for analyzing the expected hazards from potential hurricanes affecting the study area is the Sea, Lake and Overland Surges from Hurricanes (**SLOSH**) numerical



storm surge prediction model. The SLOSH computerized model predicts the storm tide heights that result from hypothetical hurricanes with selected various combinations of pressure, size, forward speed, track and winds. Originally developed for use by the National Hurricane Center (NHC) as a tool to give geographically specific warnings of

expected surge heights during the approach of hurricanes, the SLOSH model is utilized in regional

studies for several key hazard and vulnerability analyses.

The SLOSH modeling system consists of the model source code and the model basin or grid. SLOSH model grids must be developed for each specific geographic coastal area, individually incorporating the unique local bay and river configuration, water depths, bridges, roads and other physical features. In addition to open coastline heights, one of the most valuable outputs of the SLOSH model for evacuation planning is its predictions of surge heights over land into inland areas.

The Tampa Bay SLOSH model basin completed in 1979 represented the first application of SLOSH storm surge dynamics to a major coastal area of the United States. The model was developed by the Techniques Development Lab of the National Oceanic and Atmospheric Administration (NOAA), under the direction of the late Dr. Chester P. Jelesnianski. In December 1990 the National Hurricane Center updated the SLOSH model. A major improvement to the model was the incorporation of wind speed degradation overland as the simulated storms moved inland. This duplicated the pressure "filling" and increases in the radii of maximum winds (RMW) as the hurricanes weaken after making landfall. The grid configuration also provided more detail and additional information.

The newest generation of the SLOSH model basin incorporated in the 2010 Statewide Regional Evacuation Study Program reflects major improvements, including higher resolution basin data and grid configurations. Faster computer speeds allowed additional hypothetical storms to be run for creation of the MOMs<sup>1</sup> or the maximum potential storm tide values for each category of storm.

#### **1. Hypothetical Storm Simulations**

Surge height depends strongly on the specifics of a given storm including, forward speed, angle of approach, intensity or maximum wind speed, storm size, storm shape, and landfall location. The SLOSH model was used to develop data for various combinations of hurricane strength, wind speed, and direction of movement. Storm strength was modeled using the central pressure (defined as the difference between the ambient sea level pressure and the minimum value in the storm's center), the storm eye size and the radius of maximum winds using the five categories of hurricane intensity as depicted in the Saffir-Simpson Hurricane Wind Scale (see Table 1).

Category	Wind Speeds	Potential Damage	
Category 1	Sustained winds 74-95 mph	Very dangerous winds will produce some damage	
Category 2	Sustained winds 96-110 mph	Extremely dangerous winds will cause extensive damage	
Category 3	Sustained winds 111-130 mph	Devastating damage will occur	
Category 4	Sustained winds 131-155 mph	Catastrophic damage will occur	
Category 5	Sustained winds of 156 mph and above	Catastrophic damage will occur	

#### Table 1 Saffir-Simpson Hurricane Wind Scale

<sup>&</sup>lt;sup>1</sup> Maximum of MEOWs or Maximum of Maximums

The modeling for each tropical storm/hurricane category was conducted using the mid-range pressure difference ( $\triangle p$ , millibars) for that category. The model also simulates the storm filling (weakening upon landfall) and radius of maximum winds (RMW) increase.

Ten storm track headings (E, ENE, NE, NNE, N, NNW, NW, WNW, W, and WSW) were selected as being representative of storm behavior in the South Florida region, based on observations by forecasters at the National Hurricane Center. And for each set of tracks in a specific direction storms were run at forward speeds of 5, 15 and 25 mph. And, for each direction, at each speed, storms were run at two different sizes (30 statute miles radius of maximum winds and 45 statute miles radius of maximum winds). Finally, each scenario was run at both mean tide and high tide. Both tide levels are now referenced to North American Vertical Datum of 1988 (NAVD88) as opposed to the National Geodetic Vertical Datum of 1929 (NGVD29) used in previous studies.

A total of 14,700 runs were made, consisting of the different parameters shown in Table 2.

#### Table 2 Biscayne Bay Basin Hypothetical Storm Parameters

Directions, speeds, sizes, (Saffir/Simpson) intensities, number of tracks and the number of runs.

Direction	Speeds (mph)	Size (Radius of Maximum Winds)	Intensity	Tides	Tracks	Runs
E	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	28	1,680
ENE	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	27	1,620
NE	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	22	1,320
NNE	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	19	1,140
N	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	21	1,260
NNW	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	23	1,380
NW	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	28	1,680
WNW	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	25	1,500
w	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	26	1,560
WSW	5, 15, 25 mph	30 statute miles, 45 statute miles	1 through 5	Mean/High	26	1,560
TOTAL					14,700	

#### 2. The Grid for the Biscayne Bay SLOSH Model

Figure 2 illustrates the area covered by the grid for the Biscayne Bay SLOSH Model. To determine the surge values the SLOSH model uses a telescoping elliptical grid as its unit of analysis with 124 arc lengths (1 < I < 124) and 189 radials (1 < J < 189). Use of the grid configuration allows for individual calculations per grid square, which is beneficial in two ways: (1) it provides increased resolution of the storm surge at the coastline and inside the harbors, bays and rivers, while decreasing the resolution in the deep water where detail is not as important; and (2) it allows economy in computation.

The grid size for the Biscayne Bay Model varies from approximately 0.02 square mile or 19 acres closest to the pole (i = 1) to the grids on the outer edges where each grid is approximately 4.83 square miles.

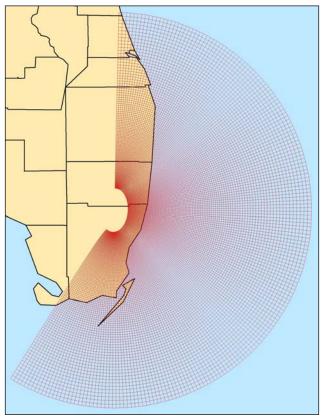


Figure 2 Biscayne Bay Basin Grid

#### 3. Storm Scenario Determinations

As indicated, the SLOSH model is the basis for the "hazard analysis" portion of coastal hurricane evacuation plans. Thousands of hypothetical hurricanes are simulated with various Saffir-Simpson Wind categories, forward speeds, landfall directions, and landfall locations. An envelope of high water containing the maximum value a grid cell attains is generated at the end of each model run. These envelopes are combined by the NHC into various composites which depict the possible One useful composite is the MEOW flooding. (Maximum Envelopes of Water), which incorporates all the envelopes for a particular category, speed, and landfall direction. Once surge heights have been determined for the appropriate grids, the maximum surge heights are plotted by storm track and tropical storm/hurricane category.



Figure 3 SLOSH Grid with Surge Values

These plots of maximum surge heights for a given storm category and track are referred to as Maximum Envelopes of Water (MEOWs). The MEOWs, or Reference Hurricanes, can be used in evacuation decision-making when and if sufficient forecast information is available to project storm track or type of storm (different landfalling, paralleling, or exiting storms).

The MEOWs provide information to the emergency managers in evacuation decision-making. However, in order to determine a scenario which may confront the county in a hurricane threat 24-48 hours before a storm is expected, a further compositing of the MEOWs into Maximums of the Maximums (MOMs) is usually required.

The MOM (Maximum of the MEOWs) combines all the MEOWs of a particular category. The MOMs represent the maximum surge expected to occur at any given location, regardless of the <u>specific</u> storm track/direction of the hurricane. The only variable is the intensity of the hurricane represented by category strength (Category 1-5).

The MOM surge heights, which were furnished by the National Hurricane Center, have 2 values, mean tide and high tide. Mean tide has 0' tide correction. High tide has a 1' tide correction added to it. The Storm Tide limits include the adjustment for mean high tide. All elevations are now referenced to the NAVD88 datum.

These surge heights were provided within the SLOSH grid system as illustrated on Figure 2. The range of maximum surge heights (low to high) for each scenario is provided for each category of storm (MOM) in Table 3. It should be noted again that these surge heights represent the maximum surge height recorded in the county from the storm tide analysis, including inland and back bay areas where the surge can be magnified dependent upon storm parameters.

*Storm Strength	Broward	Miami-Dade	Monroe
Category 1	Up to 3.1'	Up to 5.0'	Up to 7.9'
Category 2	Up to 4.7'	Up to 8.2'	Up to 12.2'
Category 3	Up to 6.2'	Up to 11.4'	Up to 16.4'
Category 4	Up to 8.3'	Up to 14.2'	Up to 20.0'
Category 5	Up to 9.5'	Up to 16.5'	Up to 23.3'

#### Table 3 Potential Storm Tide Heights by County (In feet above NAVD88)

\*Based on the category of storm on the Saffir-Simpson Hurricane Wind Scale \*\* Surge heights represent the maximum values from SLOSH MOMs.

# C. Creation of the Storm Tide Zones

The Plates in this atlas depict SLOSH-modeled heights of storm tide and extent of flood inundation for hurricanes of five different intensities. As indicate above, the storm tide was modeled using the Maximum of Maximums (MOMs) representing the potential flooding from the five categories of storm intensity of the Saffir-Simpson Hurricane Wind Scale.

#### 1. Determining Storm Tide Height and Flooding Depth

SLOSH and SLOSH-related products reference storm tide heights relative to the model vertical datum, NAVD88. In order to determine the inundation depth of surge flooding at a particular location the ground elevation (relative to NAVD88) at that location must be subtracted from the potential surge height.<sup>2</sup>

Surge elevation, or water height, is the output of the SLOSH model. At each <u>SLOSH grid point</u>, the maximum surge height is computed at that point.

Within the SLOSH model an average elevation is assumed within each grid square. Height of water above terrain was not calculated using the SLOSH average grid elevation because terrain height may vary significantly within a SLOSH grid square. For example, the altitude of a 1-mile grid square may be assigned a value of 1.8 meters (6 feet), but this value represents an average of land heights that may include values ranging from 0.9 to 2.7 meters (3 to 9 feet).

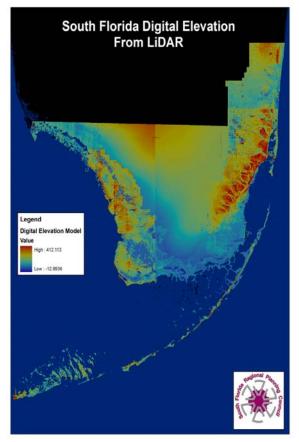


Figure 4 Digital Elevation from LIDAR

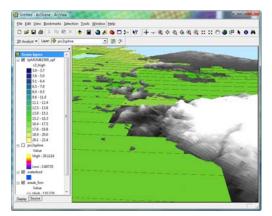
In this case, a surge value of 2.5 meters (8 feet) in this square would imply a 0.7 meters (2 feet) average depth of water over the grid's terrain. However, in reality within the grid area portion of the grid would be "dry" and other parts could experience as much as 1.5 meters (5 feet) of inundation. Therefore, in order to determine the storm tide limits, the depth of surge flooding above terrain at a specific site in the grid square is the result of subtracting the terrain height determined by remote sensing from the model-generated storm tide height in that grid square.<sup>3</sup>

<sup>&</sup>lt;sup>2</sup> It is important to note that one must use a consistent vertical datum when post-processing SLOSH storm surge values.

<sup>&</sup>lt;sup>3</sup> Note: This represents the regional post-processing procedure. When users view SLOSH output within the SLOSH Display Program, the system uses average grid cell height when subtracting land.

#### 2. Storm Tide Post-Processing

The Atlas was created using a Toolset wrapped into ESRI's ArcGIS Plateping application, ArcPlate. The surge tool was developed for the Statewide Regional Evacuation Study Program by the Tampa Bay Regional Planning Council, which had used a similar tool for the previous Evacuation Study Update (2006). This tool enabled all regions within the state of Florida to process the SLOSH and elevation data with a consistent methodology.



The tool basically performs the operation of translating the lower resolution SLOSH grid data into a smooth surface resembling actual storm tide and terrain, processing it with the high resolution elevation data derived from LiDAR. The image on the left represents how the data would look as it appears directly from SLOSH Model output.

Processing all the data in the raster realm, the tool is able to digest large amounts of data and output detailed representations of surge inundation.

Figure 5 SLOSH Display

The program first interpolates the SLOSH height values for each category into a raster surface using spline interpolation. This type of interpolation is best for smooth surfaces, such as water and slow changing terrain. The result is a raster surface representing the surge height for a category that can be processed against the raster Digital Elevation Model from the LIDAR. The "dry" values (represented as 99.9 in the SLOSH Model) are replaced by an average of the inundated grids surrounding the current processed grid. An algorithm performs this action utilizing the range of values in the current category of storm being processed.

Using this methodology, once the elevation is subtracted from the projected storm tide, the storm tide limits are determined. The output of the tool is a merged polygon file holding all the maximum inundation zones for Category 1 through Category 5. The output depicted in this Storm Tide Atlas is determined consistent with the coastal areas throughout the state. Figure 7 presents a compilation of the *Storm Tide Atlas* for the region.

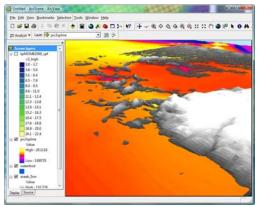


Figure 6 SLOSH Display Post-Processing

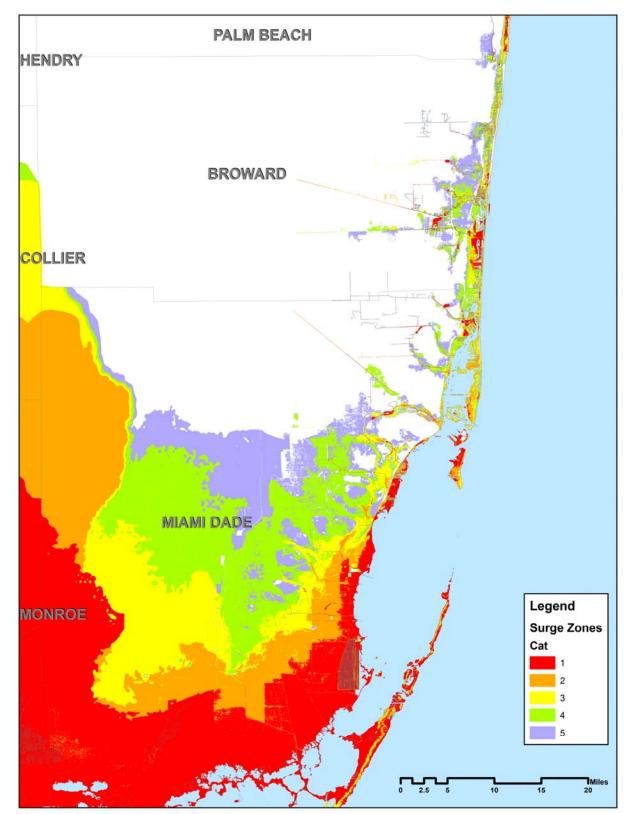


Figure 7 Storm Tide Limits for the South Florida Region Biscayne Bay Basin

### D. Variations to Consider

Variations between modeled versus actual measured storm tide elevations are typical of current technology in coastal storm surge modeling. In interpreting the data emergency planners should recognize the uncertainties characteristic of mathematical models and severe weather systems such as hurricanes. The storm tide elevations developed for this study and presented in the *Storm Tide Atlas* should be used as guideline information for planning purposes.

### 1. Storm Tide and Wave Height

Regarding interpretation of the data, it is important to understand that the configuration and depth (bathymetry) of the Ocean or Gulf bottom will have a bearing on surge and wave heights. A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water in close proximity to the shoreline tends to produce a lower surge but a higher and more powerful wave. Those regions that have a gently sloping shelf and shallower normal water depths, can expect a higher surge but smaller waves. The reason this occurs is because a surge in deeper water can be dispersed down and out away from the hurricane. However, once that surge reaches a shallow gently sloping shelf it can no longer be dispersed away from the hurricane, consequently water "piles up" as it is driven ashore by the wind stresses of the hurricane. <u>Wave height is NOT calculated by the SLOSH model and is not reflected within the storm tide delineations.</u>

### 2. Forward Speed

Under actual storm conditions it may be expected that a hurricane moving at a slower speed could have higher coastal storm tides than those depicted from model results. At the same time, a fast moving hurricane would have less time to move storm surge water up river courses to more inland areas. For example, a minimal hurricane or a storm further off the coast, such as Hurricane Elena (1985), which stalled 90 miles off the Tampa Bay coast for several tidal cycles, could cause extensive beach erosion and move large quantities of water into interior lowland areas. In the newest version of the SLOSH model, for each set of tracks in a specific direction, storms were run at forward speeds of 5, 10, 15 and 25 mph.

### 3. Radius of Maximum Winds

As indicated previously, the size of the storm or radius of maximum winds (RMW) can have a significant impact on storm surge especially in bay areas and along the Gulf of Mexico. All of the hypothetical storms were run at two different sizes, 20 nautical mile radius of maximum winds and 35 nautical mile radius of maximum winds.

### 4. Astronomical Tides

Surge heights were provided by NOAA for both mean tide and high tide. Both tide levels are referenced to North American Vertical Datum of 1988. The storm tide limits reflect high tide in the region.

### 5. Accuracy

As part of the Statewide Regional Evacuation Study, all coastal areas, as well as areas surrounding Lake Okeechobee, were Plateped using remote-sensing laser terrain Plateping (LiDAR<sup>4</sup>) providing the most comprehensive, accurate and precise topographic data for this analysis. As a general rule, the vertical accuracy of the laser Plateping is within a 15 centimeter tolerance. However, it should be noted that the accuracy of these elevations is limited to the precision and tolerance in which the horizontal accuracy for any given point is recorded. Other factors such as artifact removal algorithms (that remove buildings and trees) can affect the recorded elevation in a particular location. For the purposes of this study, the horizontal accuracy cannot be assumed to be greater than that of a standard USGS 7.5-minute quadrangle Plate, or a scale of 1:24,000.

### E. Points of Reference

County emergency management agencies selected reference points, which include key facilities or locations critical for emergency operations. The table below includes the Plate identification number, descriptions of the selected points, and the elevation of the site. The elevation is based on the digital elevation data provided by the LiDAR. It should be noted that if the site is large, elevations may vary significantly. The table also provides the storm tide value from the SLOSH value and the depth of inundation (storm tide value minus the ground elevation) at the site.

<sup>&</sup>lt;sup>4</sup> Light Imaging Detection and Ranging

Plate D	Name	Elevation	C1 DPTH⁵	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
	Homestead General											
1	Airport	4.782	0.000	0.000	0.000	2.801	4.518	0.770	0.770	3.107	7.583	9.300
2	Camp Owaissa Bauer	16.142	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.645	7.064	11.375
3	American Medical Plaza	9.422	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	6.895	7.999
4	Ron Ehman Park	12.027	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	6.697	10.026
5	Miller Drive Park	7.653	0.000	0.000	0.000	0.000	1.034	0.770	0.770	3.050	7.127	8.687
6	Doral Country Club	5.473	0.000	0.000	0.000	0.000	0.000	0.787	0.787	3.050	3.614	3.614
7	Black Point Marina	-2.277	6.479	9.983	12.885	15.386	17.489	4.202	7.706	10.608	13.109	15.212
8	Greenery Mall	6.410	0.000	0.000	0.000	1.798	4.062	0.770	0.770	5.282	8.208	10.472
9	Ad Barnes Park	6.620	0.000	0.000	0.260	0.666	2.072	0.770	1.321	6.879	7.285	8.692
10	South Miami Hospital	11.149	0.000	0.000	0.000	0.000	0.727	0.769	0.768	6.823	8.264	11.876
11	South Miami Station	10.968	0.000	0.000	0.000	0.000	0.734	0.843	0.921	5.398	10.355	11.703
12	Hialeah Station	7.417	0.000	0.000	0.000	0.000	0.000	0.771	0.773	3.050	3.677	3.689
13	Hialeah Race Track	6.646	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.627	3.627
14	Opa Locka Airport	5.672	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
15	Martin Luther King Park	8.111	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
16	Dade County Auditorium Juvenile Assessment	12.338	0.000	0.000	0.000	0.000	0.000	0.768	0.766	3.049	3.620	3.613
17	Center	8.705	0.000	0.000	0.000	0.000	0.000	0.785	0.840	3.041	3.613	3.734
18	Martin L King Station	11.529	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
19	Gwen Cherry Park Miami Central High	8.022	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.618
20	School	4.679	0.000	0.000	0.000	0.000	1.884	0.770	0.770	3.050	3.992	6.564
21	Vizcaya Station	12.549	0.000	0.000	0.000	0.000	0.000	1.104	3.111	5.519	6.498	7.081
22	Vizcaya Downtown Government	15.616	0.000	0.000	0.000	0.000	0.000	1.869	7.480	10.183	11.947	13.512
23	Ctr Government Center	8.242	0.000	0.000	0.000	0.000	0.000	1.765	2.933	4.640	5.742	8.130
24	Mover Station Arena/State Plaza	8.543	0.000	0.000	0.000	0.000	0.000	1.773	2.976	4.731	6.078	8.370
25	Mover Station	10.495	0.000	0.000	0.000	0.000	0.000	1.324	2.069	3.894	5.380	7.649

# Table 4 Selected Points of Reference – Miami-Dade County

<sup>5</sup> DPTH refers to the depth of inundation at the site (storm surge value minus the ground elevation)
 <sup>6</sup> SURGE refers to the storm surge value from the SLOSH Model

Plate ID	Name	Elevation	C1 DPTH <sup>5</sup>	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
	Park West Mover											
26	Station Bicentenial Park Mover	8.392	0.000	0.000	0.000	0.000	0.398	1.294	2.614	4.081	6.640	8.791
27	Station N Miami Beach High	6.599	0.000	0.000	0.000	0.810	2.721	1.707	4.443	5.081	7.409	9.319
28	School	5.996	0.000	0.000	0.000	0.000	0.203	1.530	2.189	3.478	4.891	6.199
29	Key Biscayne Station	3.659	0.000	2.588	4.471	5.667	7.162	2.057	6.247	8.130	9.325	10.821
30	Skylake Mall	7.014	0.000	0.000	0.000	0.000	0.000	0.868	1.060	3.077	3.994	4.618
31	Lipton Tennis Center	3.309	0.011	2.834	4.305	5.009	6.685	3.320	6.143	7.614	8.318	9.993
32	Aventura Mall Federal Corrections	7.666	0.000	0.000	0.000	0.000	0.000	0.796	0.858	3.076	5.879	7.188
33	Institute	11.010	0.000	0.000	0.000	0.000	0.204	0.770	0.770	3.050	8.612	11.213
34	Tamiami Park	4.614	0.000	0.000	0.000	1.755	3.091	0.770	0.770	3.050	6.370	7.705
35	Golf Club of Miami Miami International	6.775	0.000	0.000	0.000	0.000	0.000	0.775	0.775	3.050	3.612	3.612
36	Airport	7.663	0.000	0.000	0.000	0.000	0.000	0.768	0.765	3.047	3.618	3.615
37	Douglas Road Station	11.839	0.000	0.000	0.000	0.000	0.000	1.107	1.336	8.155	8.476	10.888
38	Pro Player Stadium	8.638	0.000	0.000	0.000	0.000	0.000	1.600	2.429	3.477	3.997	4.199
39	Dinner Key Auditorium	4.503	0.000	1.979	5.103	7.004	8.720	3.962	6.482	9.605	11.507	13.223
40	Orange Bowl	3.961	0.000	0.000	0.537	0.707	3.897	1.759	3.870	4.498	4.668	7.857
41	Norland High School	12.154	0.000	0.000	0.000	0.000	0.000	0.891	1.024	3.100	3.665	3.695
42	Allapattah Station	9.868	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.676
43	Brickell Station Eleventh Street Mover	4.344	0.000	0.000	0.921	1.357	2.327	1.884	3.280	5.265	5.701	6.672
44	Station	6.095	0.000	0.000	0.000	0.896	2.804	1.167	2.358	3.908	6.991	8.899
45	Bayside College Bayside Mover	16.152	0.000	0.000	0.000	0.000	0.000	2.701	5.156	6.746	8.663	11.369
46	Station	10.028	0.000	0.000	0.000	0.000	0.451	1.652	2.919	4.737	7.896	10.479
47	Jockey Club Dade Correctional	6.340	0.000	0.000	0.000	0.240	2.139	0.990	1.661	4.561	6.580	8.479
48	Institute	4.133	0.000	0.000	2.486	4.333	7.002	0.770	3.174	6.619	8.466	11.135
49	Tamiami Airport	7.374	0.000	0.000	0.000	0.365	1.650	0.770	0.770	3.050	7.739	9.024
50	Sgt. Joe Delancy Park	8.716	0.000	0.000	0.000	1.088	3.000	0.770	0.770	3.050	9.804	11.716
51	MDCC South Campus	9.858	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	8.245	9.652
52	FIU South Campus	7.334	0.000	0.000	0.000	0.000	0.203	0.770	0.770	3.050	6.181	7.537
53	Cutler Ridge Station	6.011	0.000	0.115	4.491	6.815	9.001	0.768	6.126	10.502	12.825	15.012
54	International Mall	8.216	0.000	0.000	0.000	0.000	0.000	0.759	0.759	3.050	3.619	3.619

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# Statewide Regional Evacuation Studies Program

Plate ID	Name	Elevation	C1 DPTH⁵	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
55	The Falls	8.664	0.000	0.000	0.000	1.421	3.643	0.770	0.812	3.201	10.085	12.307
56	Amelia Earhart Park Tri Rail Miami Airport	-0.230	1.000	1.000	3.280	3.850	3.850	0.770	0.770	3.050	3.620	3.620
57	Station	5.483	0.000	0.000	0.000	0.000	0.000	2.228	3.873	4.724	5.012	5.365
58	Miami Jai Alai	4.326	0.000	0.000	0.000	0.344	0.683	1.831	3.118	4.178	4.670	5.009
59	MDCC North Campus	-0.360	1.130	1.130	3.410	3.991	4.328	0.770	0.770	3.050	3.631	3.968
60	Brownsville Station	7.039	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
61	Dolphin Stadium	8.638	0.000	0.000	0.000	0.000	0.000	1.600	2.429	3.477	3.997	4.199
62	Calder Track	6.966	0.000	0.000	0.000	0.000	0.000	0.835	0.910	3.053	3.672	3.700
63	North Shore Hospital South Dade	6.962	0.000	0.000	0.000	0.000	0.556	0.770	0.770	3.050	4.705	7.518
64	Government Ctr Miami Avenue Mover	9.276	0.000	0.000	0.000	0.000	0.000	1.769	3.007	4.810	6.658	8.904
65	Station Bayfront Park Mover	5.025	0.000	0.000	1.081	3.072	5.497	2.367	4.331	6.106	8.097	10.522
66	Station	4.785	0.000	0.785	2.484	4.200	6.601	2.945	5.570	7.269	8.985	11.386
67	The Mall at 163rd Street	19.719	0.000	0.000	0.000	0.000	0.000	1.420	1.942	3.600	4.764	5.879
68	Fisher Island	4.848	0.000	0.000	1.329	2.039	3.840	2.305	4.132	6.176	6.887	8.688
69	University Country Club	6.011	0.000	0.000	0.000	1.760	2.960	0.770	0.770	3.050	7.771	8.971
70	Town and Country Mall Columbia Kendall	6.342	0.000	0.000	0.000	0.000	2.673	0.770	0.770	3.050	6.021	9.015
71	Medical Ctr Concord Shopping	8.764	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	6.511	7.968
72	Center	6.623	0.000	0.000	0.000	0.091	1.273	0.770	0.770	3.050	6.714	7.897
73	Kendall Mall	7.150	0.000	0.000	0.000	1.148	2.639	0.770	0.770	3.050	8.297	9.789
74	MDPD Headquarters	5.493	0.000	0.000	0.000	0.000	0.000	0.767	0.767	3.050	3.621	3.742
75	Coral Reef Park	7.485	0.000	0.000	1.572	3.708	7.095	0.770	7.278	9.056	11.193	14.579
76	Merchandise Mart	6.245	0.000	0.000	0.000	0.000	0.496	1.126	1.525	3.640	4.549	6.742
77	Charles Deering Estate Matheson Hammock	2.177	0.000	3.926	6.268	9.420	13.690	2.089	6.103	8.445	11.597	15.868
78	Park	0.358	4.163	7.263	10.449	13.045	15.326	4.522	7.621	10.807	13.404	15.684
79	Carol City Station Earlington Heights	8.742	0.000	0.000	0.000	0.000	0.000	0.769	0.768	3.050	3.620	3.620
80	Station	7.725	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.661
81	Museum of Science	15.616	0.000	0.000	0.000	0.000	0.000	1.869	7.480	10.183	11.947	13.512
82	Vizcaya Museum	18.407	0.000	0.000	0.000	0.000	0.000	1.925	7.168	9.811	11.488	12.943
83	Dade County Jail	5.100	0.000	0.000	0.000	0.000	1.501	1.405	4.741	4.925	5.038	6.600

Plate ID	Name	Elevation	C1 DPTH⁵	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
84	Civic Center Station Jackson Memorial	6.740	0.000	0.000	0.000	0.000	0.000	1.065	2.610	3.903	4.357	5.493
85	Hospital	14.411	0.000	0.000	0.000	0.000	0.000	0.866	1.518	3.383	3.987	4.575
86	Culmer Station	9.533	0.000	0.000	0.000	0.000	0.000	1.256	2.499	3.881	4.682	6.036
	Parkway Regional											
87	Medical Ctr	9.571	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.606
00	Financial Dist Mover	F 641	0.000	0.000	0.000	0.664	1 565	2 002	2 510	F (1)	6 205	7 200
88	Station College North Mover	5.641	0.000	0.000	0.000	0.664	1.565	2.003	3.510	5.616	6.305	7.206
89	Station	10.227	0.000	0.000	0.000	0.000	0.000	1.371	2.293	4.131	6.583	8.953
90	N Miami High School	9.906	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.910	4.638
91	Miami Seaquarium	3.079	1.016	3.243	5.293	5.920	7.681	4.095	6.323	8.372	8.999	10.760
92	Dodge Island	8.094	0.000	0.000	0.000	0.471	2.183	2.868	5.563	7.841	8.565	10.277
93	Port of Miami	8.094	0.000	0.000	0.000	0.471	2.183	2.868	5.563	7.841	8.565	10.277
94	Seaport	8.094	0.000	0.000	0.000	0.471	2.183	2.868	5.563	7.841	8.565	10.277
95	Intracoastal Station	5.744	0.000	0.000	0.000	0.133	1.575	0.887	1.369	3.350	5.877	7.319
96	Homestead Airport	4.782	0.000	0.000	0.000	2.801	4.518	0.770	0.770	3.107	7.583	9.300
97	Fruit & Spice Park	7.540	0.000	0.000	0.000	0.688	2.396	0.770	0.770	3.065	8.228	9.936
98	Krome Detention Center	8.222	0.000	0.000	0.000	0.000	0.000	0.806	0.806	3.050	3.611	4.371
99	Homestead Hospital	7.870	0.000	0.000	0.000	1.624	3.964	0.770	0.770	3.513	9.494	11.834
100	Braddock High School	5.775	0.000	0.000	0.000	0.000	1.429	0.770	0.770	3.050	3.620	7.204
101	Hammocks Station	6.016	0.000	0.000	0.000	1.802	2.885	0.770	0.770	3.050	7.818	8.900
102	Country Walk Plaza	7.623	0.000	0.000	0.000	1.257	2.680	0.770	0.770	3.050	8.879	10.303
103	Kendall Gate Mall	7.294	0.000	0.000	0.000	0.000	1.735	0.770	0.770	3.050	5.849	9.029
104	MDCC Kendall Campus	9.858	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	8.245	9.652
105	Loehmanns In Kendall	7.047	0.000	0.000	0.000	0.271	1.489	0.770	0.770	3.050	7.318	8.536
106	Cutler Ridge Center	8.475	0.000	0.000	1.806	4.286	6.476	0.770	5.451	10.281	12.761	14.951
107	Youth Fair Homestead Bayfront	6.112	0.000	0.000	0.000	0.291	1.577	0.770	0.770	3.050	6.403	7.689
108	Park	-0.244	4.133	6.599	9.285	11.508	14.082	3.889	6.355	9.041	11.264	13.838
109	Deering Hospital	13.190	0.000	0.000	0.000	0.000	0.709	0.770	0.766	3.026	9.217	13.900
110	Continental Park	10.611	0.000	0.000	0.000	0.000	0.591	0.770	0.770	3.016	8.779	11.203
111	TGK	7.170	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	4.013
112	Shops at Sunset Place	7.022	0.000	0.000	0.000	3.446	4.653	0.955	1.142	6.235	10.468	11.675
113	Matheson Marina	0.358	4.163	7.263	10.449	13.045	15.326	4.522	7.621	10.807	13.404	15.684
114	Wyndham Gateway	5.827	0.000	0.000	0.000	0.000	0.000	2.188	3.849	4.724	5.002	5.344

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Plate ID	Name	Elevation	C1 DPTH <sup>5</sup>	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
	Hotel											
	Northside Shopping											
115	Center	8.867	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.608	6.374
116	Third Street Mover Station	7.364	0.000	0.000	0.000	1.073	3.711	2.773	5.194	6.943	8.437	11.075
110	Knight Center Mover	7.304	0.000	0.000	0.000	1.075	5.711	2.775	5.194	0.943	0.437	11.075
117	Station	7.131	0.000	0.000	0.000	1.933	4.457	2.777	5.187	6.961	9.065	11.589
	School Board Mover											
118	Station	9.396	0.000	0.000	0.000	0.000	0.000	0.867	1.677	3.704	5.594	6.619
119	Boystown	7.509	0.000	0.000	0.000	0.366	1.543	0.770	0.770	3.050	7.875	9.053
120	Kendale Lakes Mall	6.896	0.000	0.000	0.000	0.000	1.822	0.770	0.770	3.050	5.141	8.718
121	Kendall Village West Kendall Indian	6.557	0.000	0.000	0.000	0.000	2.385	0.770	0.770	3.050	6.340	8.942
122	Hammocks Park	7.639	0.000	0.000	0.000	0.361	1.255	0.770	0.770	3.050	8.000	8.894
123	Tropical Estates Park	6.839	0.000	0.000	0.000	0.447	1.496	0.770	0.770	3.050	7.285	8.335
124	Tropical Park	10.059	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.058	3.742	8.136
125	Dadeland Mall	9.357	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.892	6.077	9.156
126	Florida Memorial College	7.365	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
127	Tri Rail Station 183rd Street Flea	9.159	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
128	Market William Turner Tech	6.390	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
129	School	4.679	0.000	0.000	0.000	0.000	1.884	0.770	0.770	3.050	3.992	6.564
130	Arcola Lake Park North Dade Detention	4.594	0.000	0.000	0.000	0.000	2.504	0.770	0.770	3.050	3.831	7.097
131	Center	-0.540	1.310	1.310	3.590	4.160	5.170	0.770	0.770	3.050	3.620	4.630
132	Santa Clara Station Fifth Street Mover	8.618	0.000	0.000	0.000	0.000	0.000	0.783	0.980	3.118	3.678	4.464
133	Station Freedom Tower Mover	4.461	0.000	2.189	3.909	4.420	7.182	3.485	6.650	8.370	8.881	11.643
134	Station	7.614	0.000	0.000	0.000	0.000	1.577	1.341	2.494	4.146	6.793	9.192
135	Barry University	13.232	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.833	4.062
136	Bay Front Park	16.152	0.000	0.000	0.000	0.000	0.000	2.701	5.156	6.746	8.663	11.369
137	California Club Mall	5.748	0.000	0.000	0.000	0.000	0.000	0.875	1.021	3.083	3.639	3.674
138	Cape Florida (Bill Baggs)	0.788	1.295	4.322	6.409	7.771	9.412	2.084	5.111	7.198	8.559	10.200
139	Crandon Park	3.289	0.000	1.131	3.454	4.528	6.251	2.778	4.419	6.743	7.817	9.540
140	FIU North Campus	4.490	0.000	0.000	0.000	1.608	3.307	1.192	3.099	4.196	6.098	7.797

Plate ID	Name	Elevation	C1 DPTH <sup>5</sup>	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
	Miami Beach Convention											
141	Ctr	6.157	0.000	0.000	0.000	0.333	2.148	1.402	2.710	4.774	6.490	8.305
142	Haulover Park	3.802	0.000	0.000	1.216	2.822	4.297	2.282	3.670	5.018	6.624	8.099
143	Everglades Correctional Ctr Miccosukee Indian	4.230	0.000	0.000	0.000	0.000	1.131	0.767	0.767	3.050	3.621	5.362
144	Village	0.000	0.742	0.742	3.050	3.630	3.641	0.742	0.742	3.050	3.630	3.641
145	Homestead City Hall	6.291	0.000	0.000	0.123	3.280	5.825	0.770	0.771	6.414	9.571	12.116
146	South Dade High School	7.765	0.000	0.000	0.000	0.770	4.531	0.770	0.770	3.035	8.534	12.296
147	Homestead Motorsports	4.828	0.000	0.194	3.069	5.384	8.049	0.770	5.022	7.897	10.212	12.877
148	Shops of Kendall	6.825	0.000	0.000	0.000	0.904	2.126	0.770	0.770	3.050	7.729	8.950
149	Baptist Hospital	11.916	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	4.869	7.149
150	Mall of the Americas	5.500	0.000	0.000	0.000	0.000	1.372	0.751	0.730	3.018	3.636	6.871
151	Dadeland South Station	12.162	0.000	0.000	0.000	0.000	0.000	0.770	0.770	6.981	8.995	11.185
152	Stockade	5.897	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.686
153	Dadeland North Station	-0.364	1.134	1.134	4.681	8.477	10.661	0.770	0.770	4.317	8.113	10.297
154	Okeechobee Station	6.345	0.000	0.000	0.000	0.000	0.000	1.650	2.682	3.968	5.298	5.301
155	Pan American Hospital	5.359	0.000	0.000	0.000	0.000	1.190	2.223	3.720	4.817	5.219	6.549
156	Fairchild Gardens	14.644	0.000	0.000	0.000	0.000	0.669	1.465	6.566	10.301	13.183	15.313
157	University Station	11.071	0.000	0.000	0.000	0.000	0.327	4.422	7.412	9.510	10.516	11.398
158	Jones Boat Yard	4.297	0.000	0.000	0.222	0.572	1.052	2.195	3.754	4.518	4.869	5.349
159	Northside Station	6.482	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.611
160	Joseph Caleb Center	10.708	0.000	0.000	0.000	0.000	0.000	0.770	0.770	3.050	3.620	3.620
161	Tenth St Mover Station	4.946	0.000	0.000	1.576	2.052	3.451	2.512	4.580	6.522	6.998	8.397
162	Overtown Station	12.349	0.000	0.000	0.000	0.000	0.000	1.106	1.608	3.487	4.711	6.824
163	Miami Arena	13.207	0.000	0.000	0.000	0.000	0.000	1.041	1.558	3.441	4.971	6.974
164	Miami Design District	11.180	0.000	0.000	0.000	0.000	0.000	0.889	1.024	3.332	4.551	5.033
165	Gusman Cultural Center	10.180	0.000	0.000	0.000	0.000	1.264	2.330	4.277	6.068	9.125	11.445
166	Dade County Seaport	8.094	0.000	0.000	0.000	0.471	2.183	2.868	5.563	7.841	8.565	10.277
167	Greynolds Park	8.157	0.000	0.000	0.000	0.000	0.000	0.830	1.032	3.155	6.156	7.321
168	Miller Square Shoppes Larry & Penny	7.390	0.000	0.000	0.000	0.000	0.706	0.770	0.770	3.050	4.304	8.096
169	Thompson Park	7.197	0.000	0.000	0.000	3.693	5.717	0.770	0.770	2.959	10.890	12.913
170	Metro Zoo Homestead Air Reserve	9.893	0.000	0.000	0.000	0.000	2.801	0.770	0.770	3.050	8.678	12.694
171	Base	7.422	0.000	0.000	2.515	4.719	6.886	0.770	7.007	9.937	12.141	14.308

# Volume 7-11 South Florida

# Statewide Regional Evacuation Studies Program

Plate ID	Name	Elevation	C1 DPTH⁵	C2 DPTH	C3 DPTH	C4 DPTH	C5 DPTH	C1 SURGE <sup>6</sup>	C2 SURGE	C3 SURGE	C4 SURGE	C5 SURGE
172	Cutler Ridge Mall	6.556	0.000	0.000	3.576	6.171	8.277	0.770	4.198	10.132	12.727	14.833
173	Biscayne National Park	1.112	3.433	5.591	8.433	10.617	13.091	4.546	6.703	9.545	11.729	14.203
174	Shops at Dadeland	12.635	0.000	0.000	0.000	0.000	0.000	0.770	0.770	4.563	7.961	10.360
175	Miami Childrens Hospital	7.379	0.000	0.000	0.614	1.169	2.045	0.888	6.833	7.993	8.548	9.424
176	University of Miami	12.224	0.000	0.000	0.000	0.000	0.000	4.235	6.854	8.773	10.477	11.180
177	Coconut Grove Station	11.412	0.000	0.000	0.000	0.000	0.000	0.713	0.665	4.348	4.681	8.371
178	Mercy Hospital	4.148	0.000	3.931	6.734	8.657	10.274	3.012	8.079	10.882	12.805	14.422
179	Brickell Mover Station Eighth Street Mover	11.212	0.000	0.000	0.000	0.000	0.000	1.772	3.031	5.073	5.607	6.421
180	Station Government Center	6.070	0.000	0.149	1.933	2.193	4.428	3.292	6.219	8.003	8.263	10.498
181	Station	8.887	0.000	0.000	0.000	0.000	0.000	1.724	2.864	4.627	5.996	8.292
182	<b>Riverwalk Mover Station</b>	4.787	0.000	0.976	2.718	4.053	6.784	3.052	5.763	7.504	8.840	11.571
183	First St Mover Station	10.761	0.000	0.000	0.000	0.000	0.245	1.946	3.522	5.302	8.577	11.005
184	American Airlines Arena	4.796	0.000	0.000	0.264	2.613	5.006	1.812	4.166	5.060	7.409	9.801
185	OMNI Mover Station Loehmanns Fashion	3.821	0.000	0.229	1.613	3.575	5.500	1.386	4.050	5.434	7.397	9.321
186	Island	6.121	0.000	0.000	0.000	0.000	1.109	0.837	1.039	3.159	5.999	7.230

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### F. Storm Tide Atlas

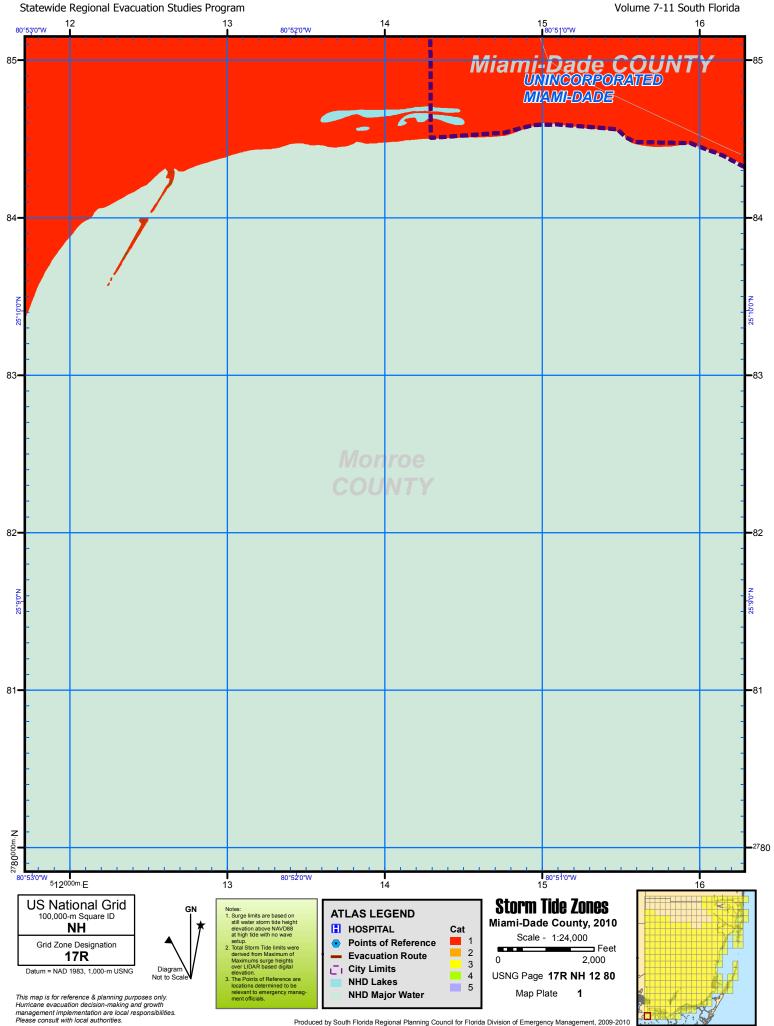
The surge inundation limits (MOM surge heights minus the ground elevations) are provided as GIS shape files and graphically displayed on Plates in the *Hurricane Storm Tide Atlas for the South Florida Region*. The *Atlas* was prepared by the South Florida Regional Planning Council under contract to the State of Florida, Division of Emergency Management, as part of this study effort. The Plates prepared for the *Atlas* consist of base Plates (1:24000) including topographic, hydrographic and highway files (updated using 2008 county and state highway data). Detailed shoreline and storm tide limits for each category of storm were determined using the region's geographic information system (GIS).

The purpose of the Plates contained in this Atlas is to reflect a "worst probable" scenario of the hurricane storm tide inundation and to provide a basis for the hurricane evacuation zones and study analyses. While the storm tide delineations include the addition of an astronomical mean high tide and tidal anomaly, it should be noted that the data reflects only stillwater saltwater flooding. Local processes such as <u>waves</u>, <u>rainfall</u> and <u>flooding from overflowing rivers</u>, are usually included in observations of storm tide height, but are not surge and are not calculated by the SLOSH model. It is incumbent upon local emergency management officials and planners to estimate the degree and extent of freshwater flooding, as well as to determine the magnitude of the waves that will accompany the surge.

Figure 8 provides an index of the Plate series.

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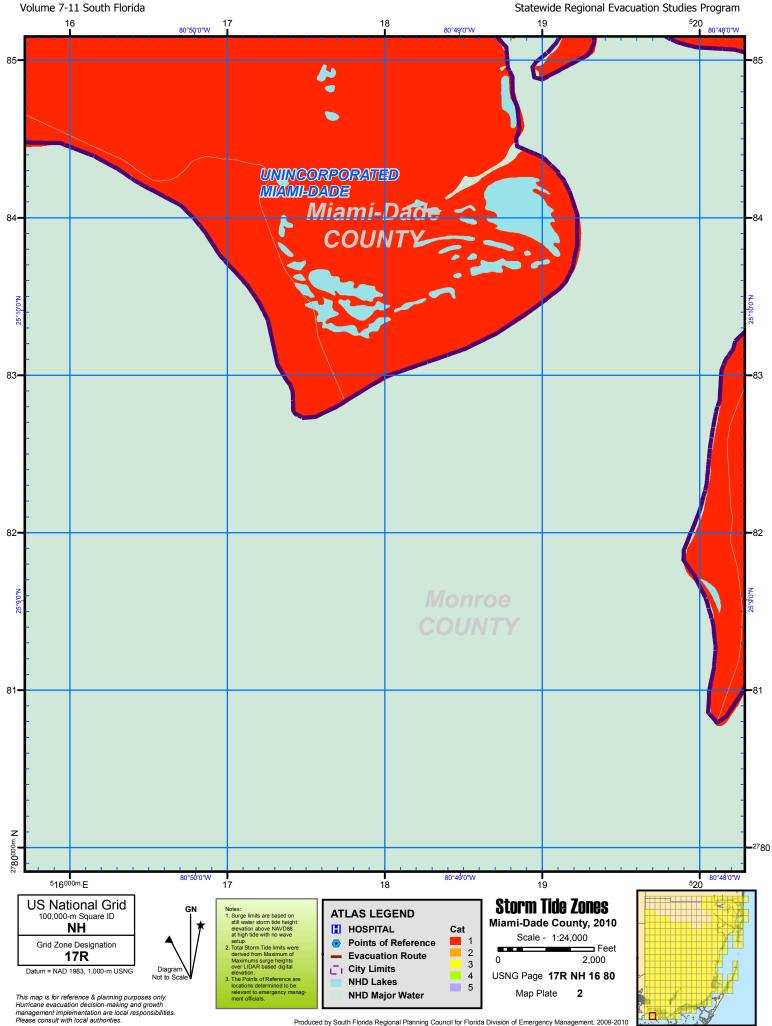
Figure 8 Atlas Plate Index



Storm Tide Atlas - Miami-Dade County

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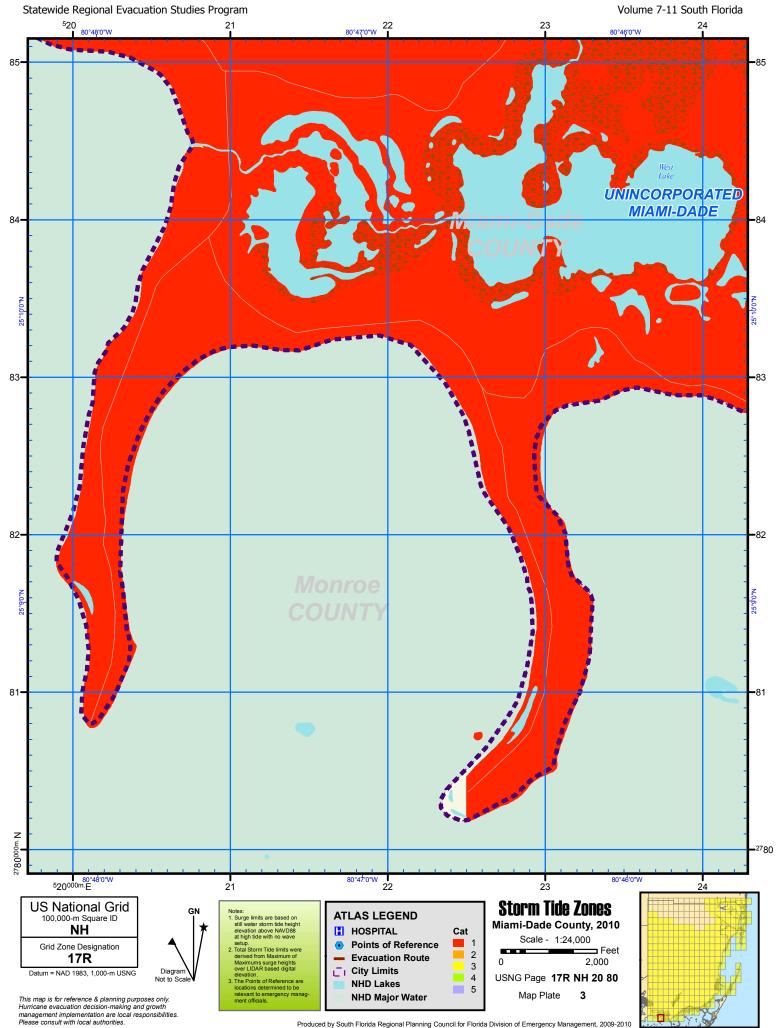
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Storm Tide Atlas - Miami-Dade County

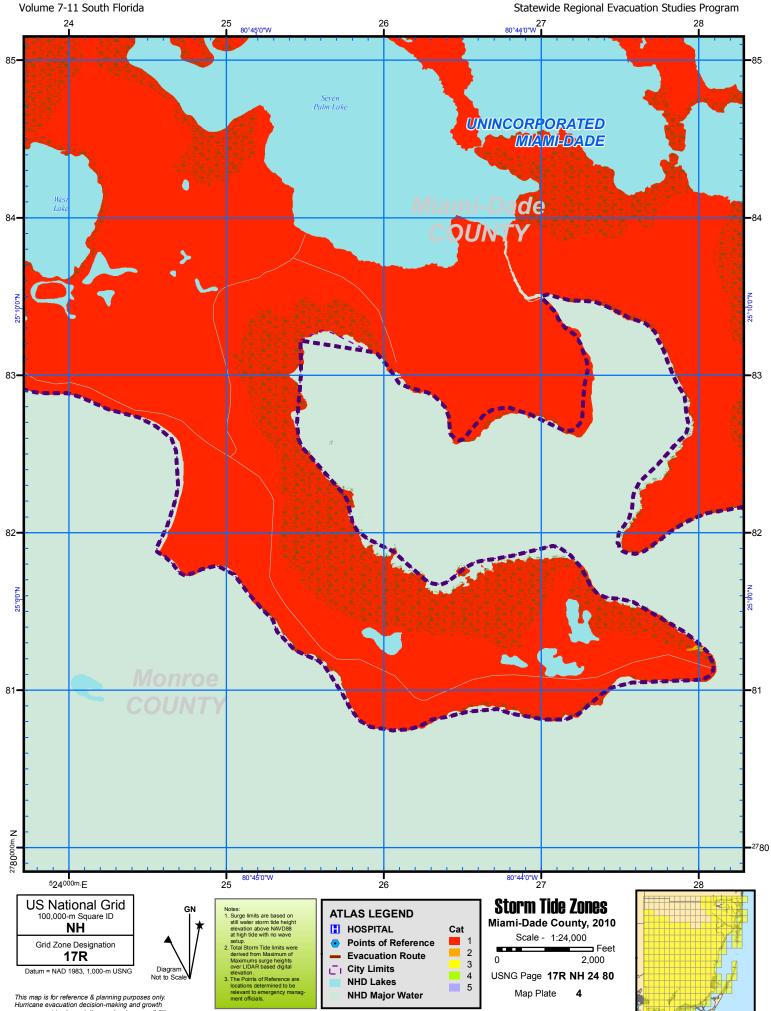
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Storm Tide Atlas - Miami-Dade County

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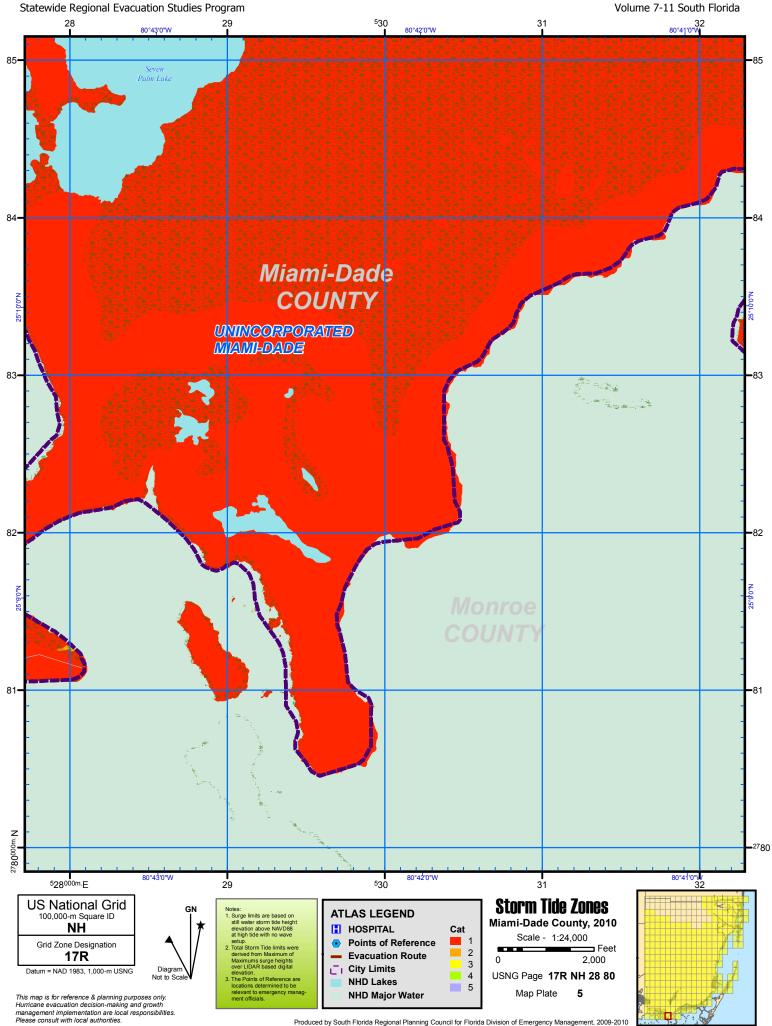


This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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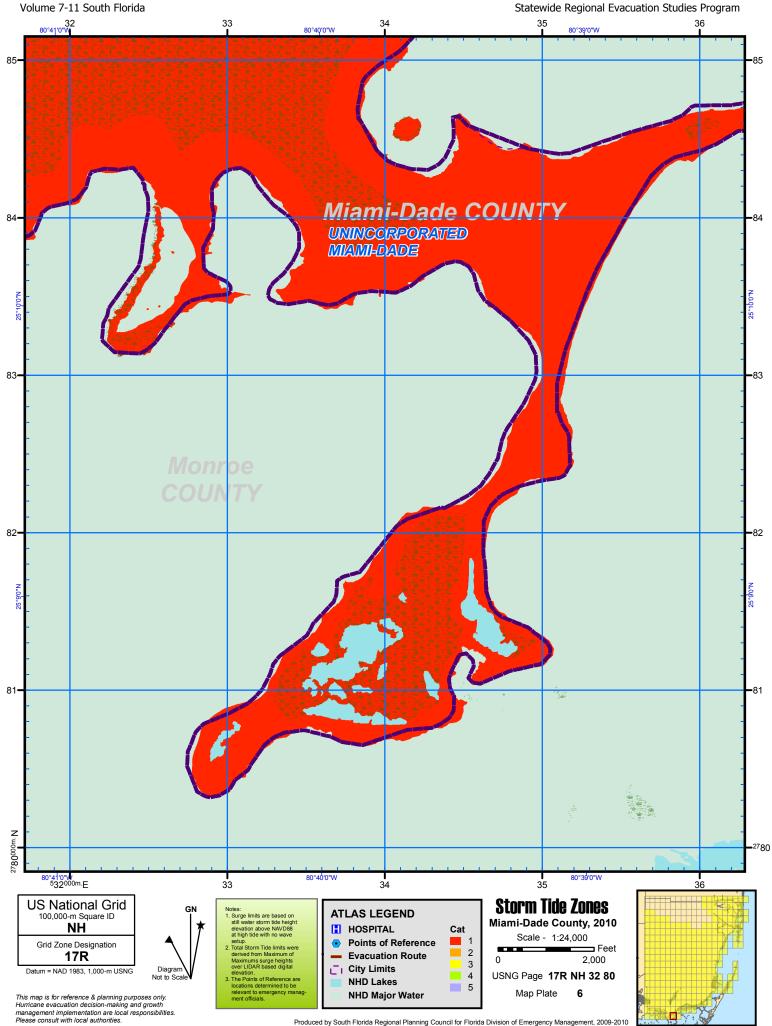
Storm Tide Atlas - Miami-Dade County



Storm Tide Atlas - Miami-Dade County

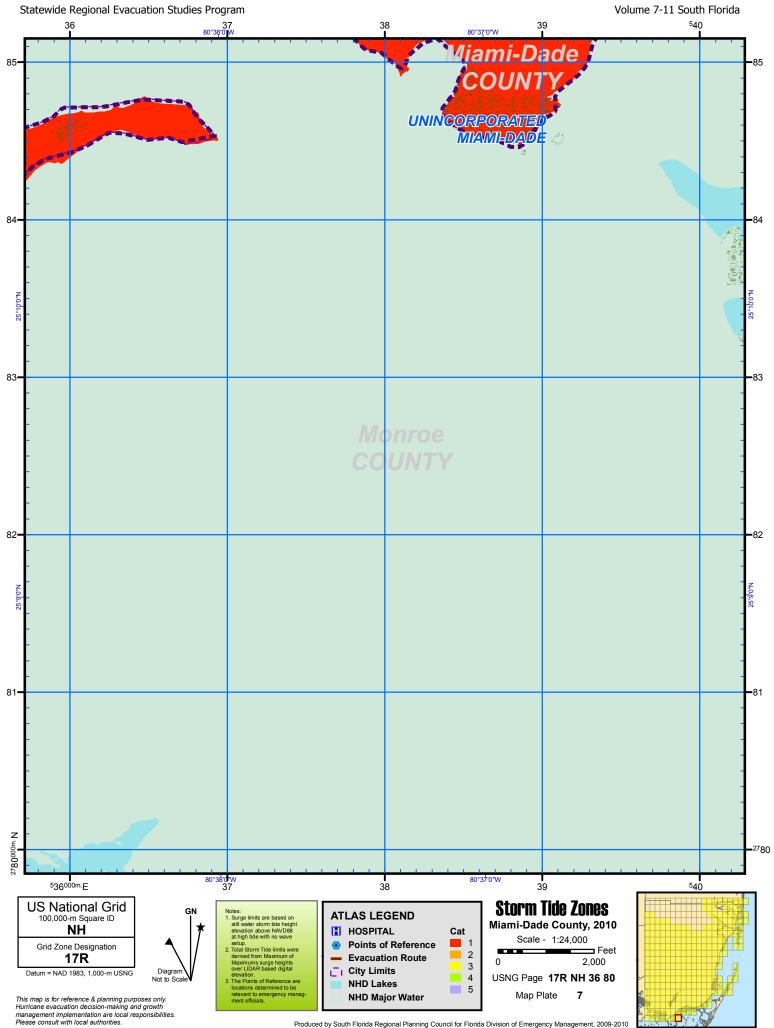
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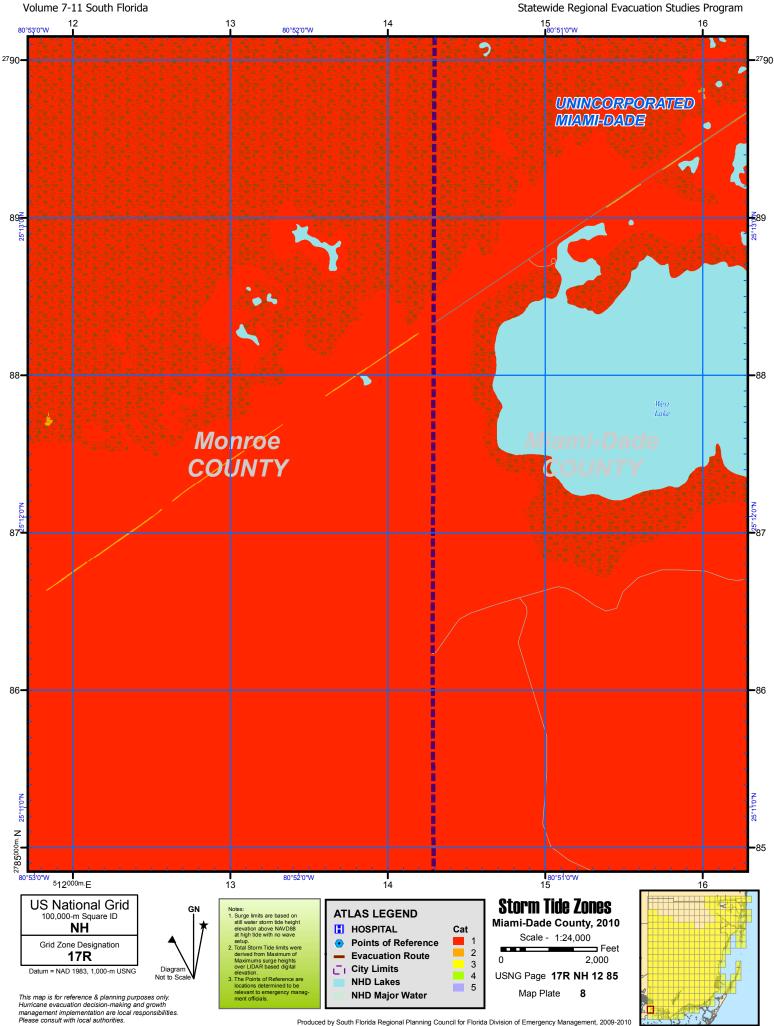


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Storm Tide Atlas - Miami-Dade County

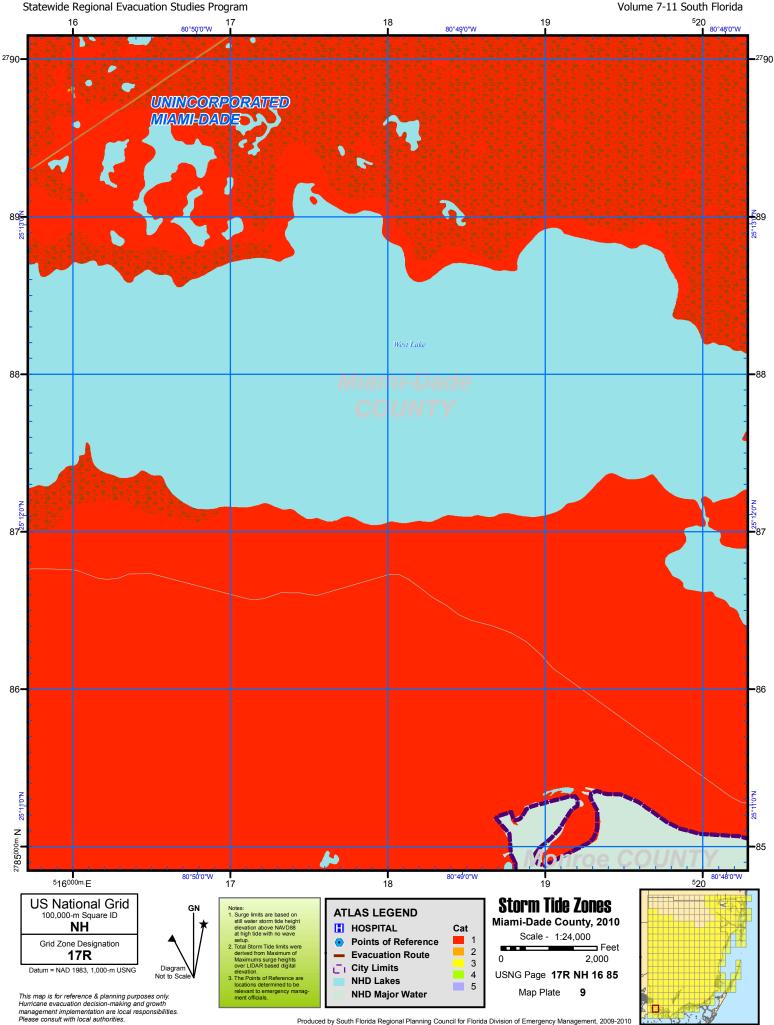


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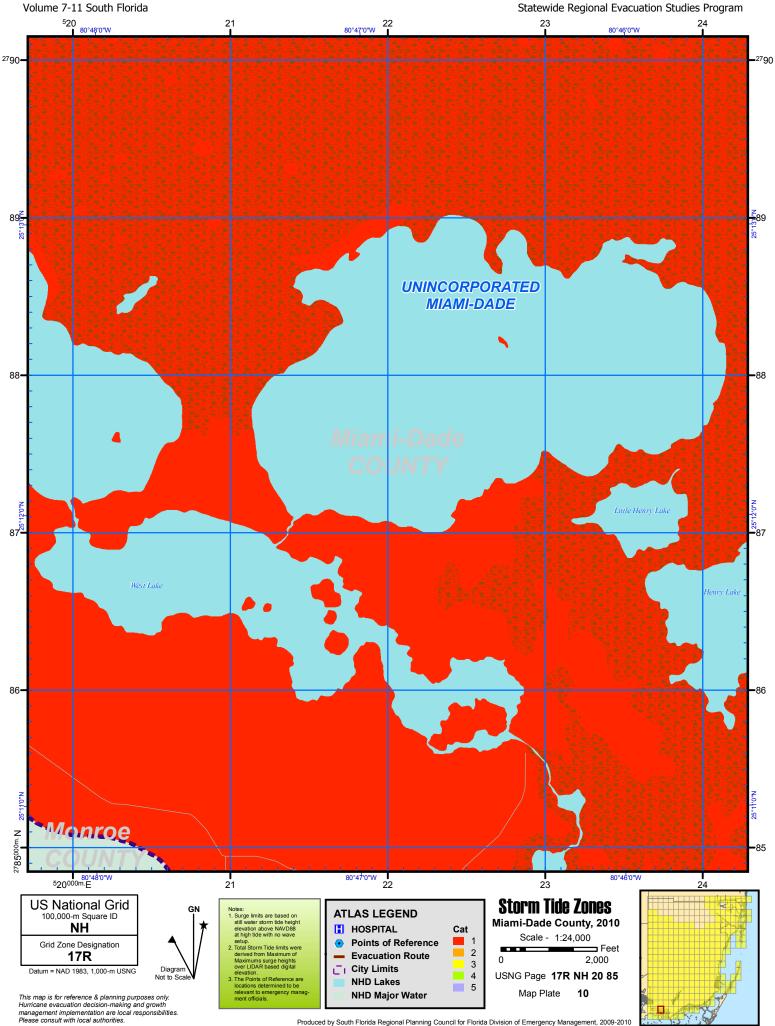


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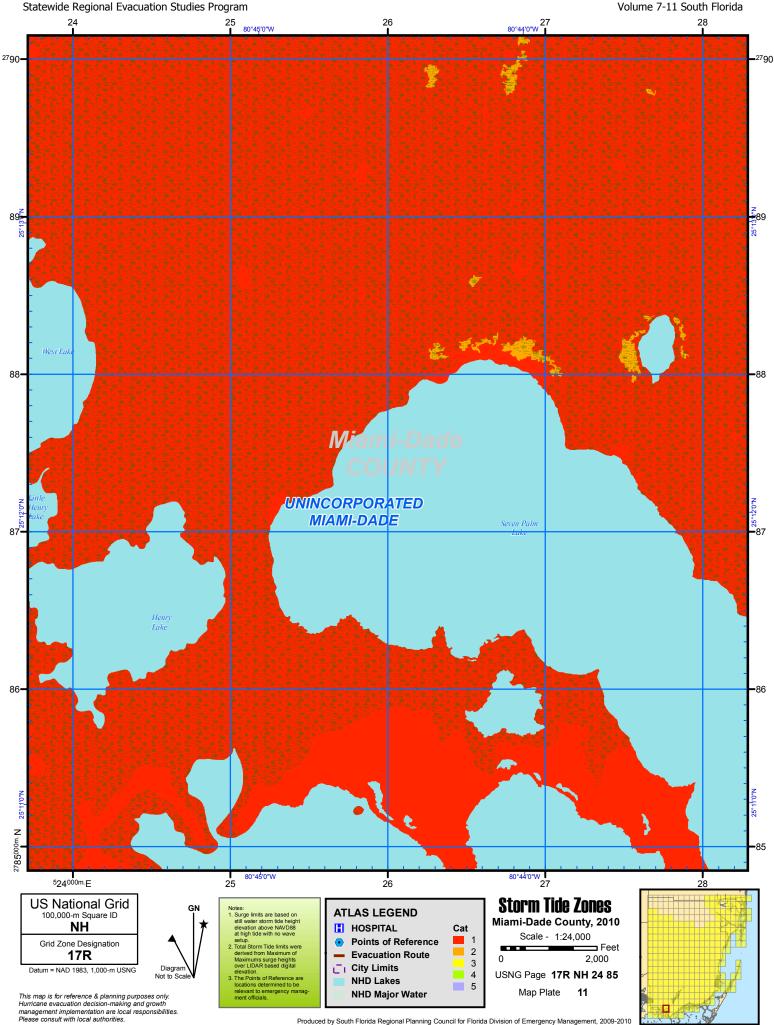


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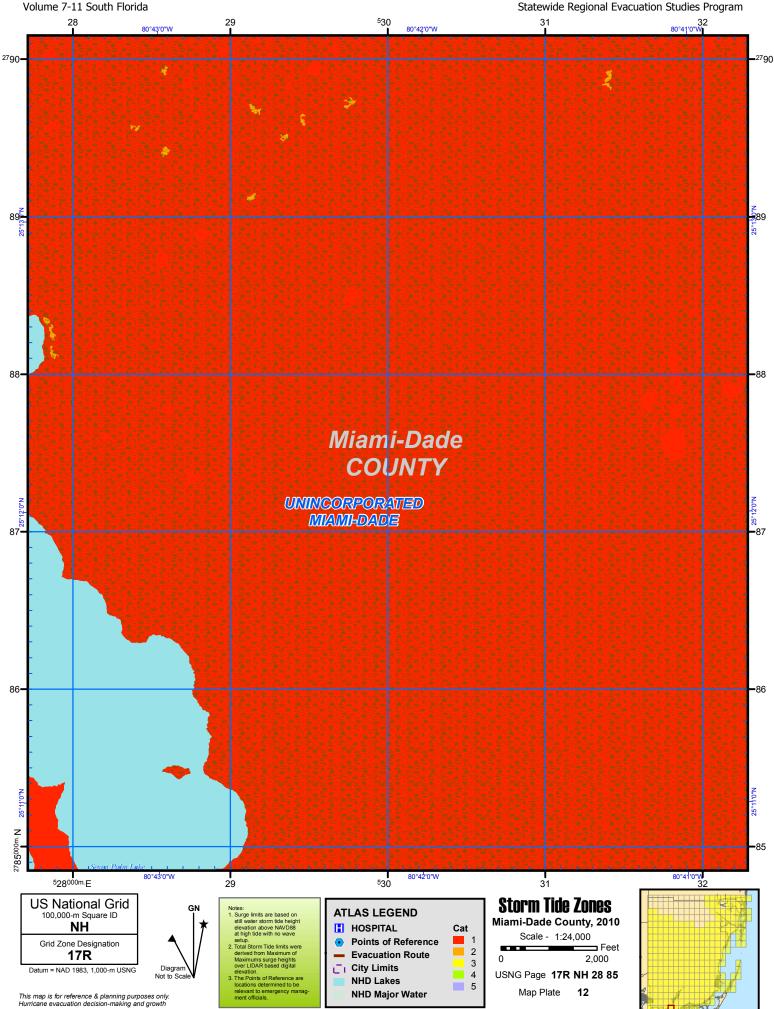


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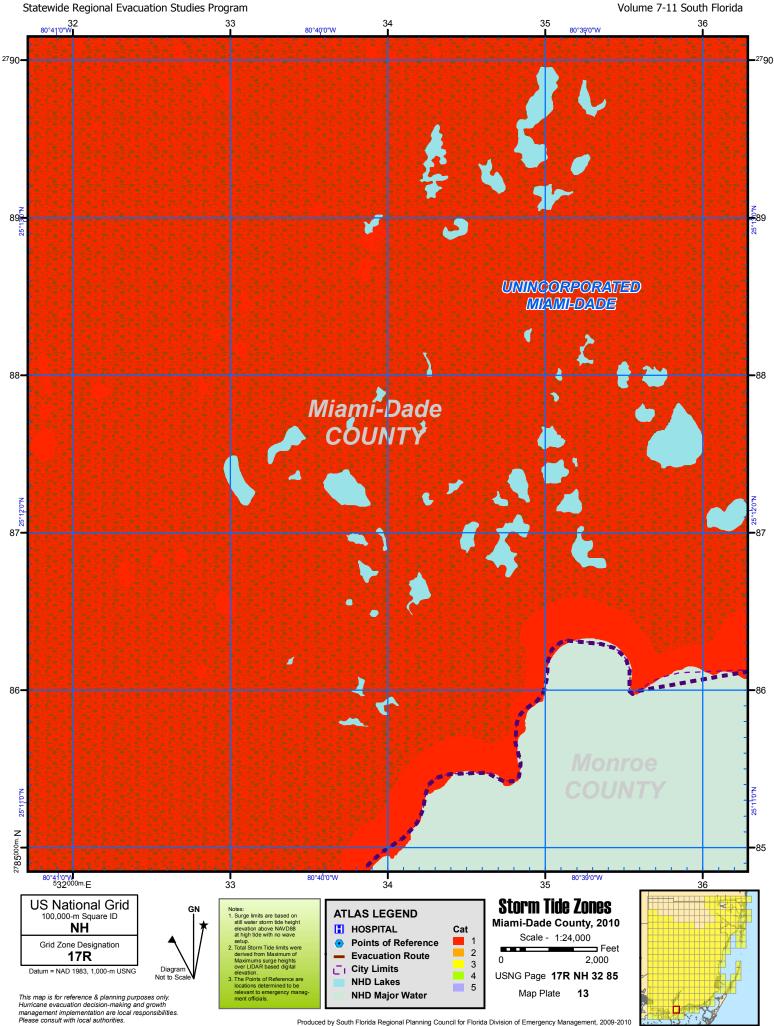


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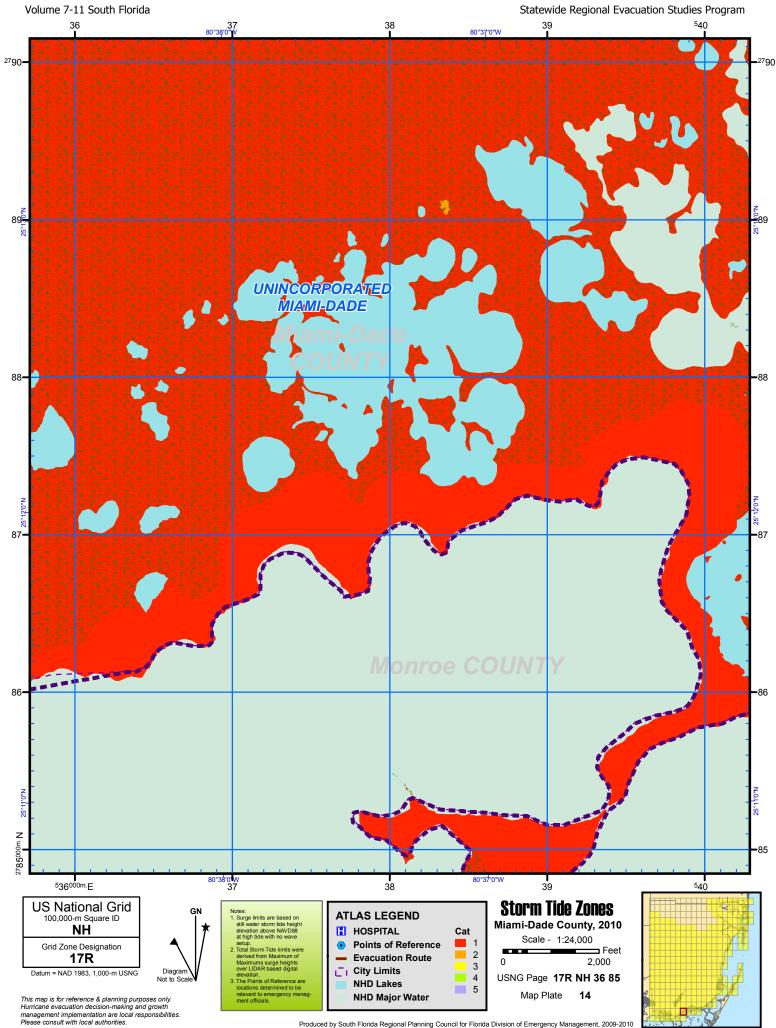


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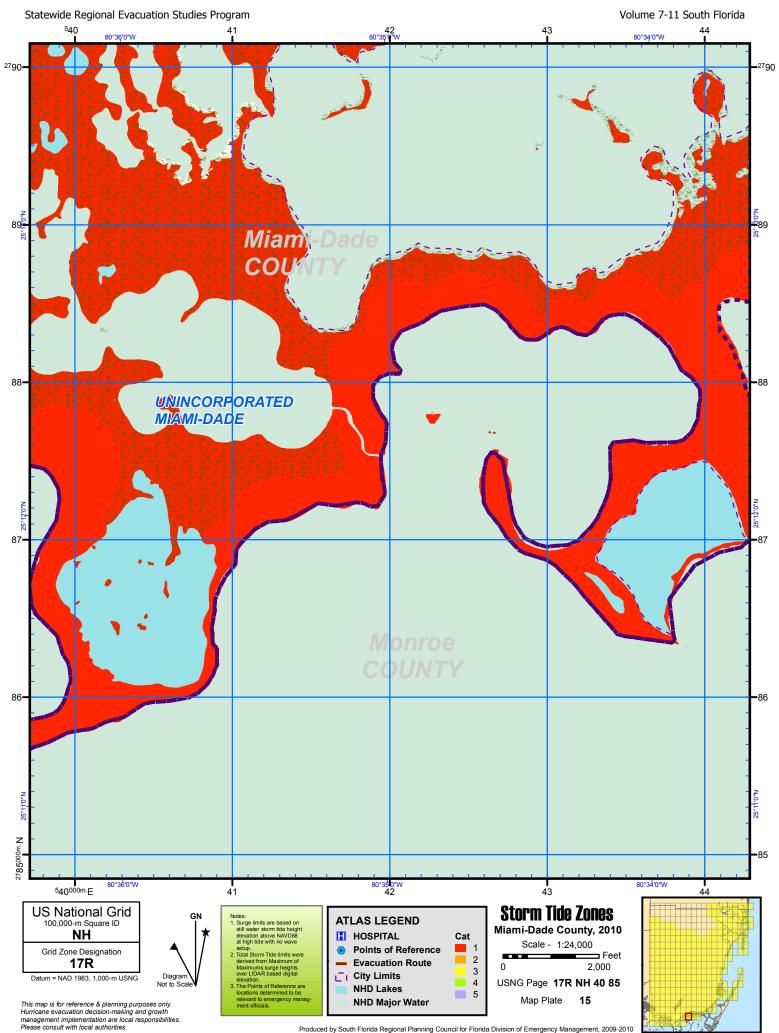
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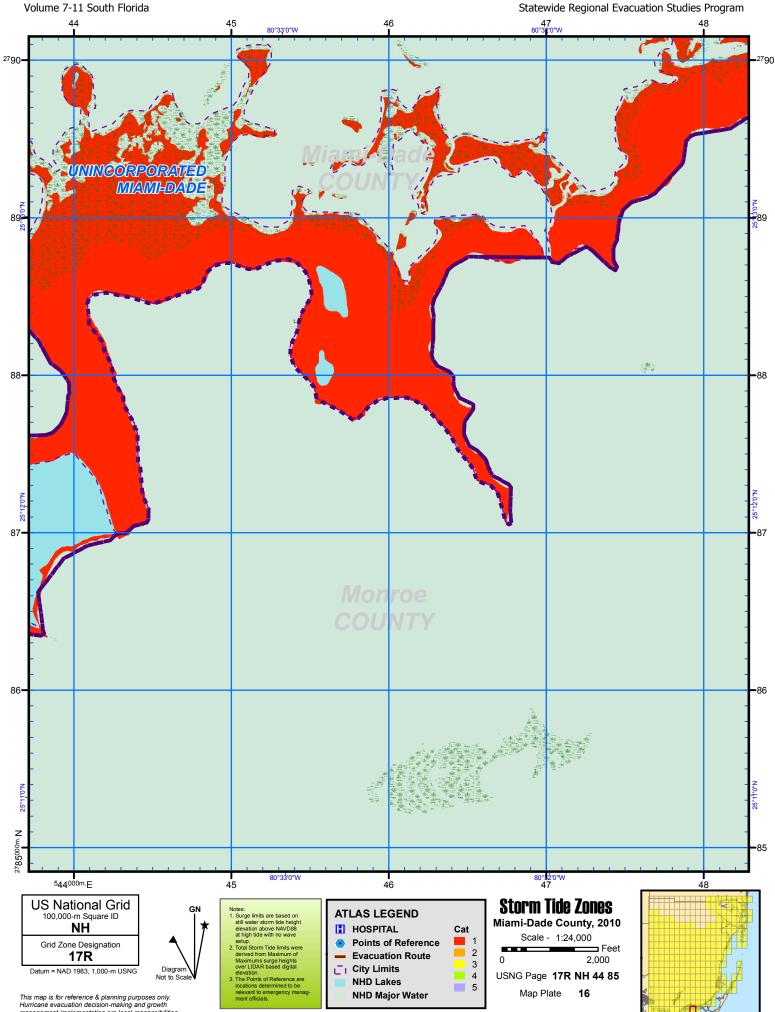
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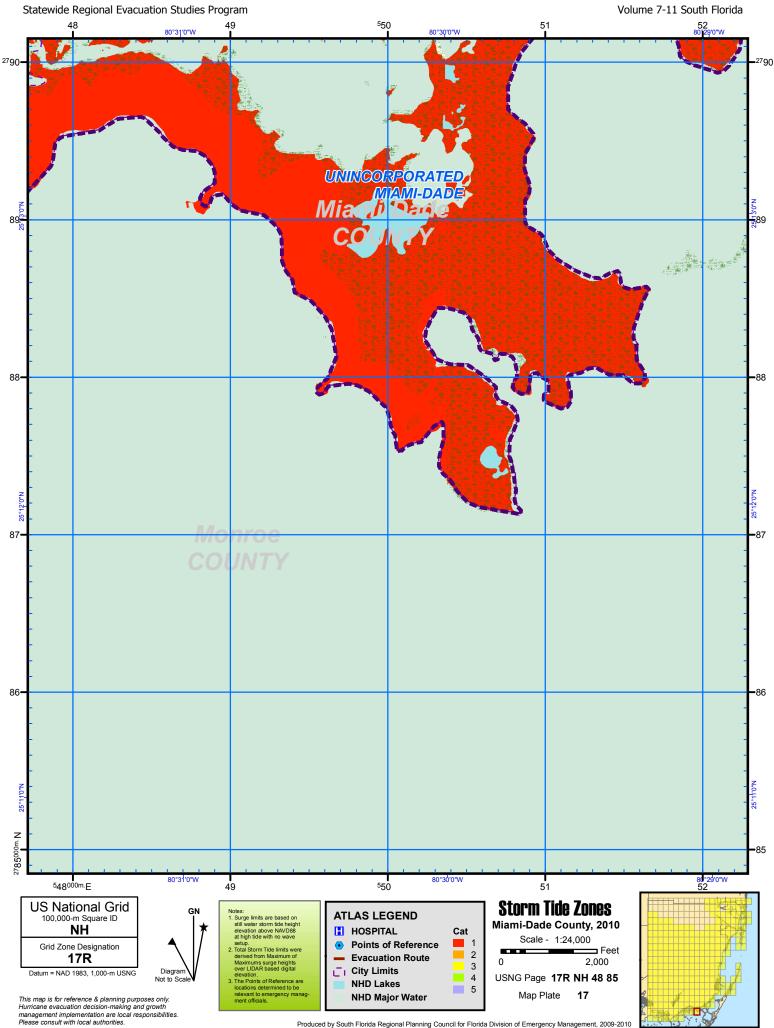
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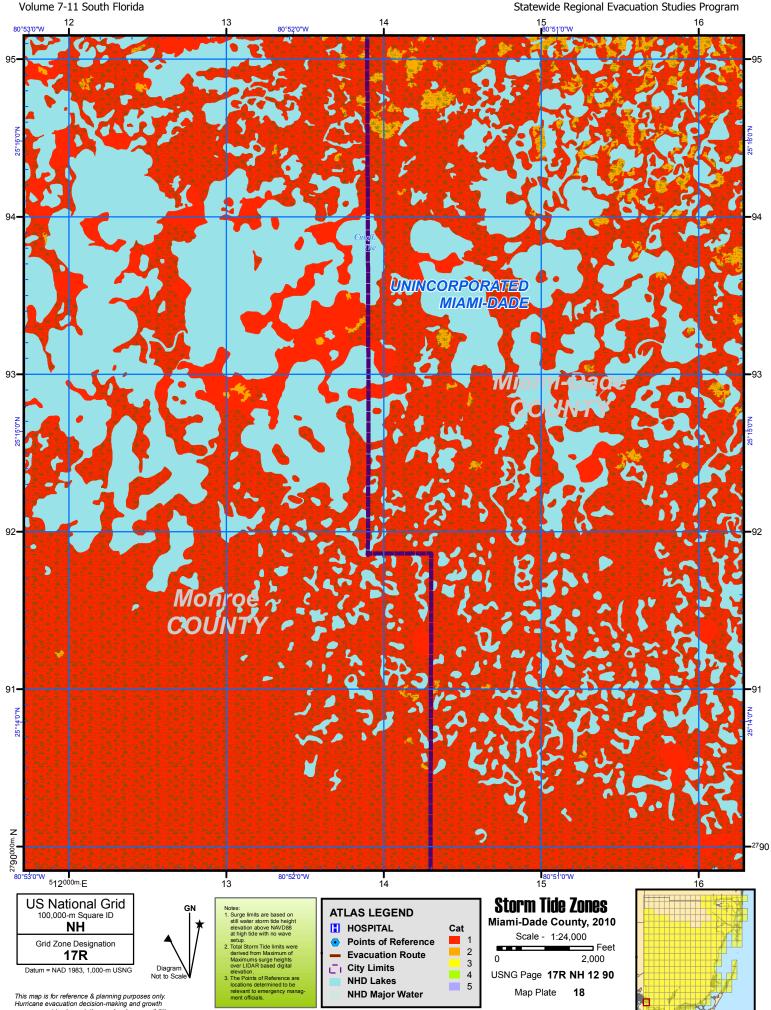
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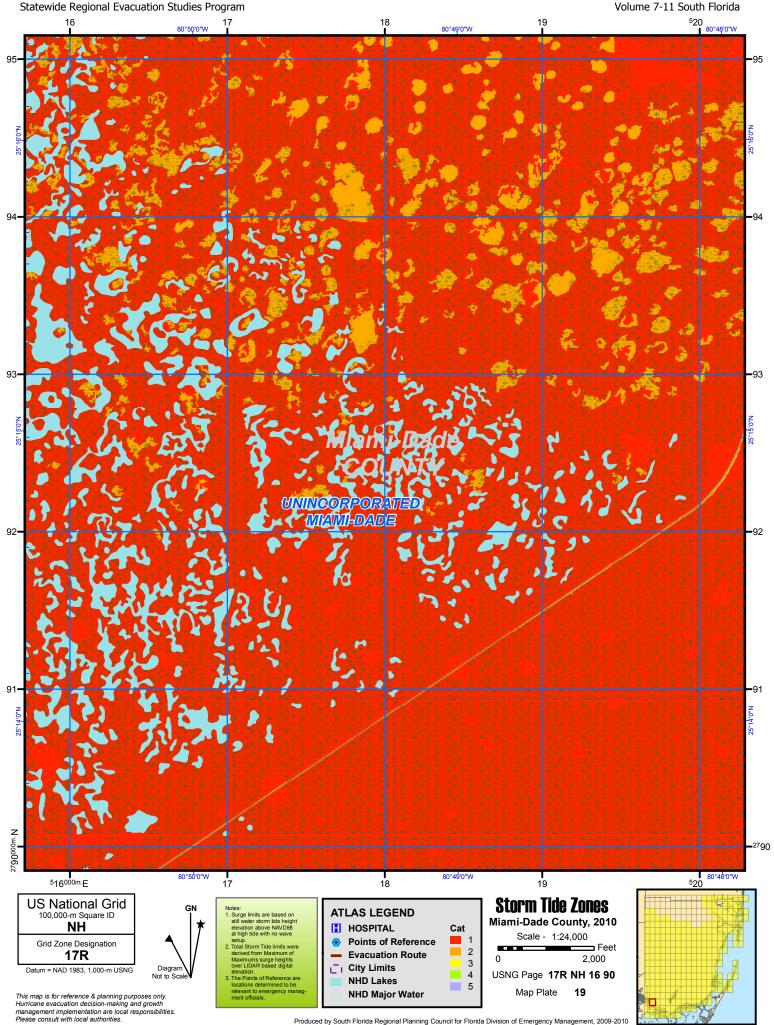


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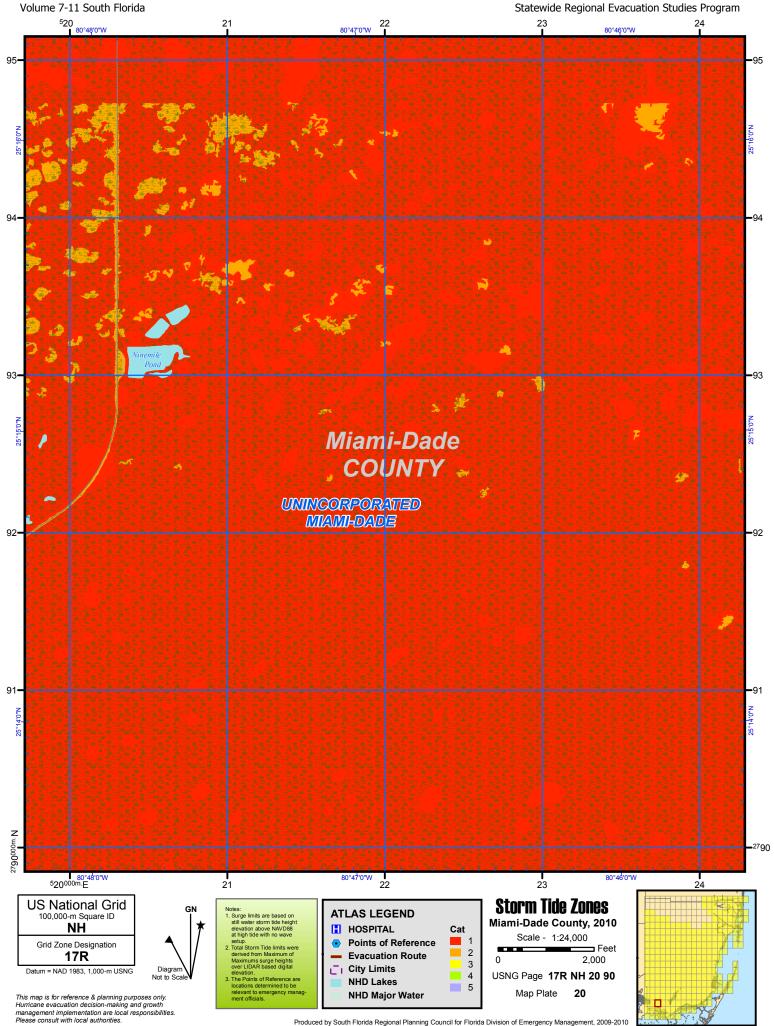


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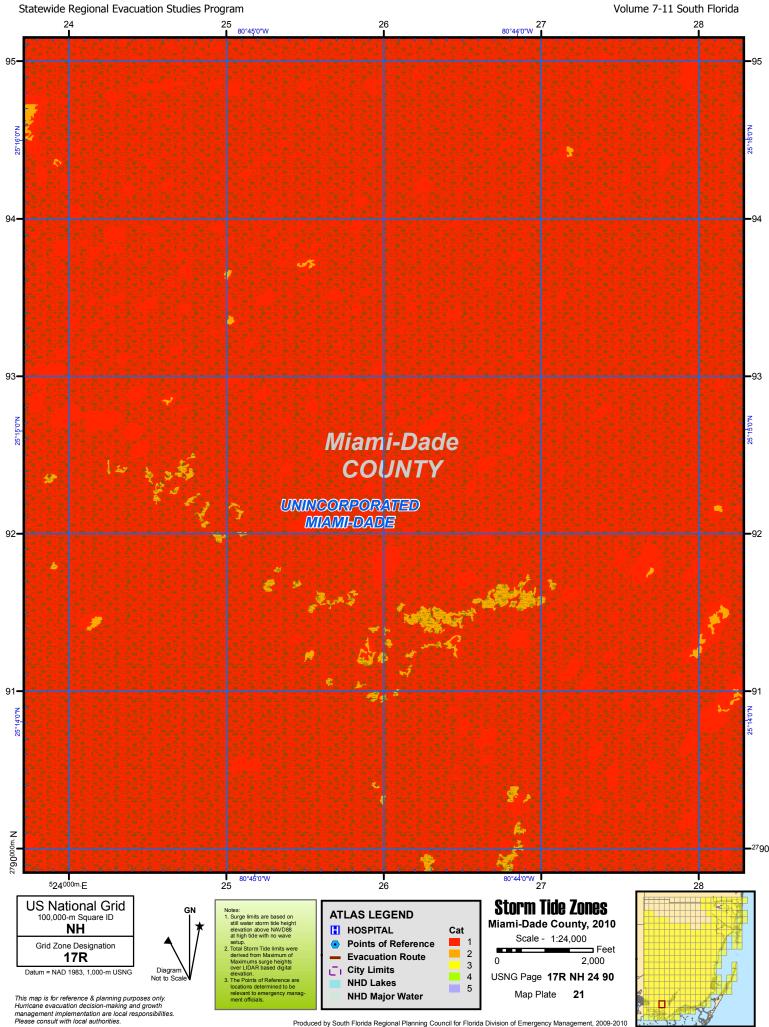


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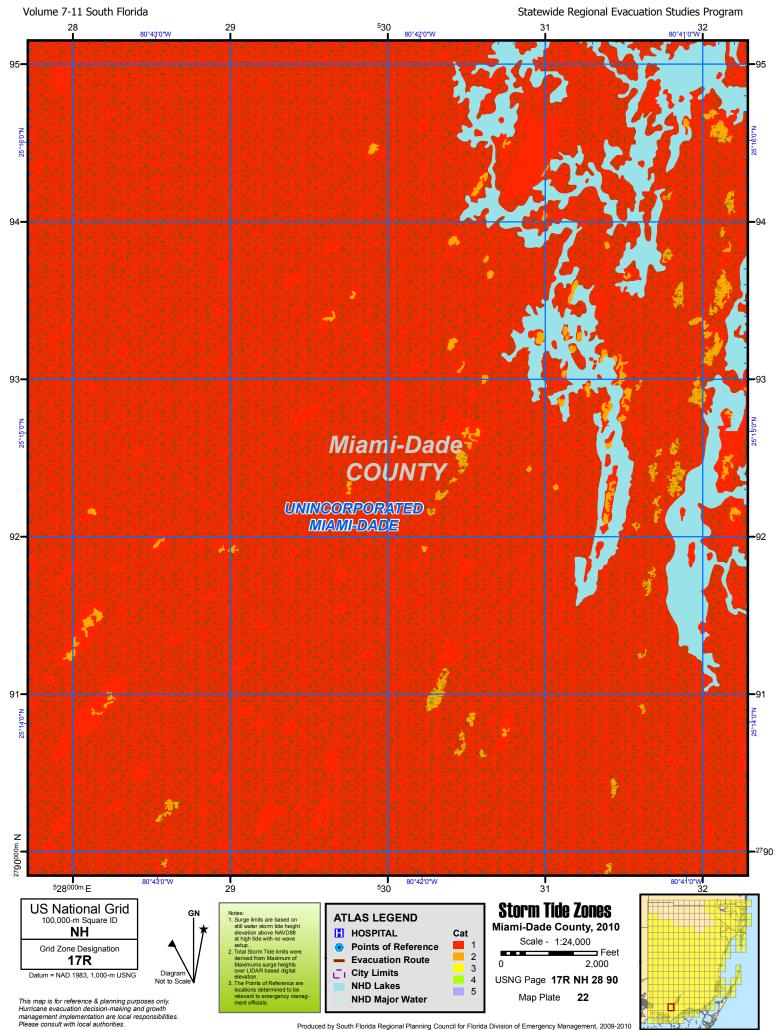


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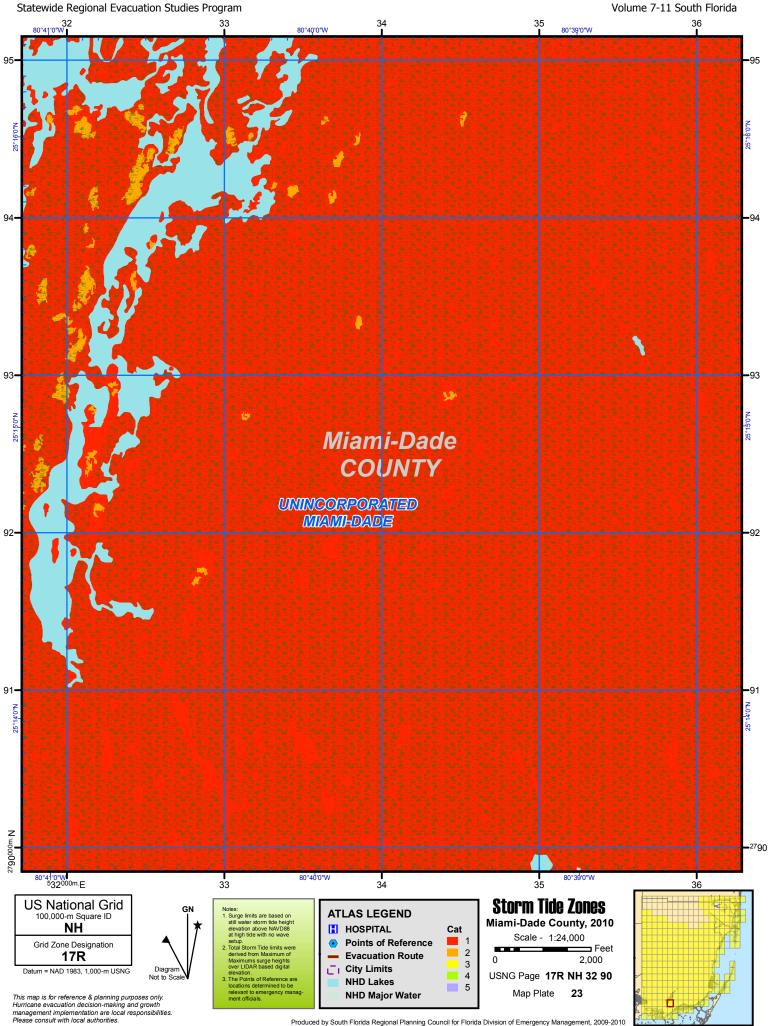


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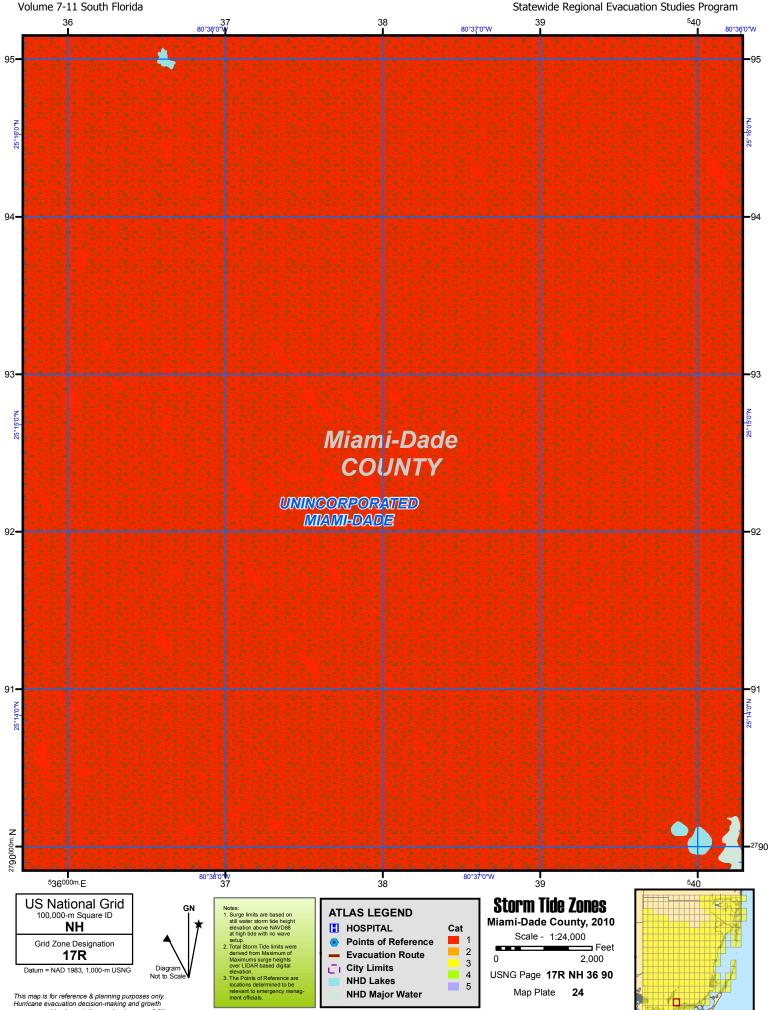


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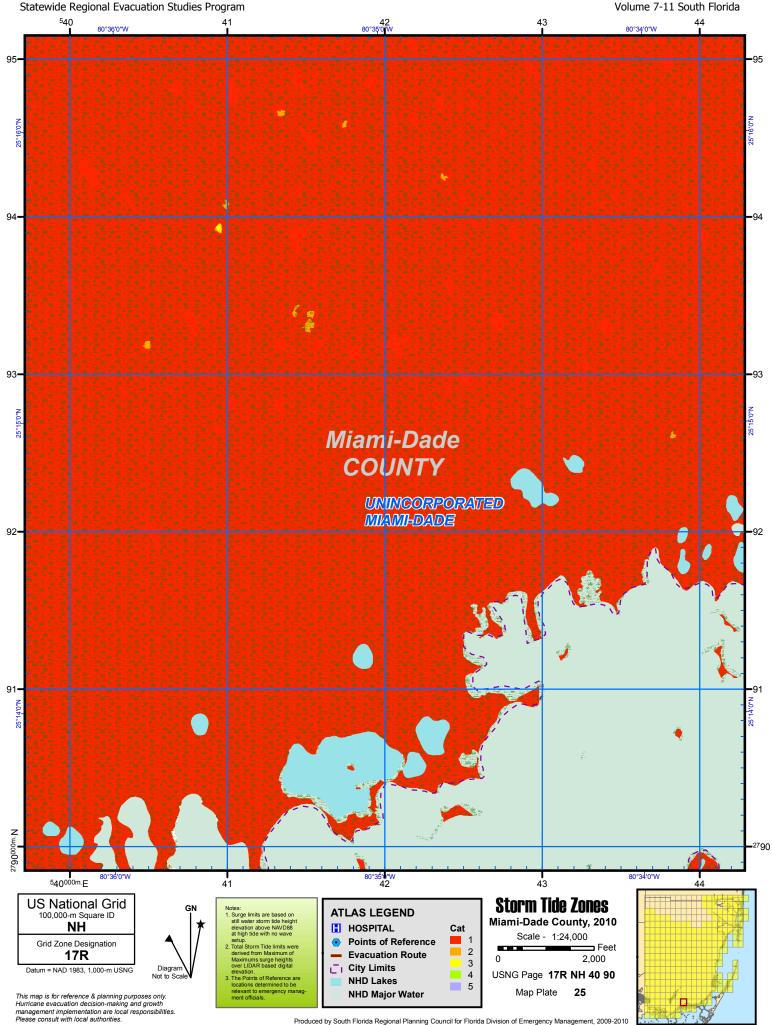


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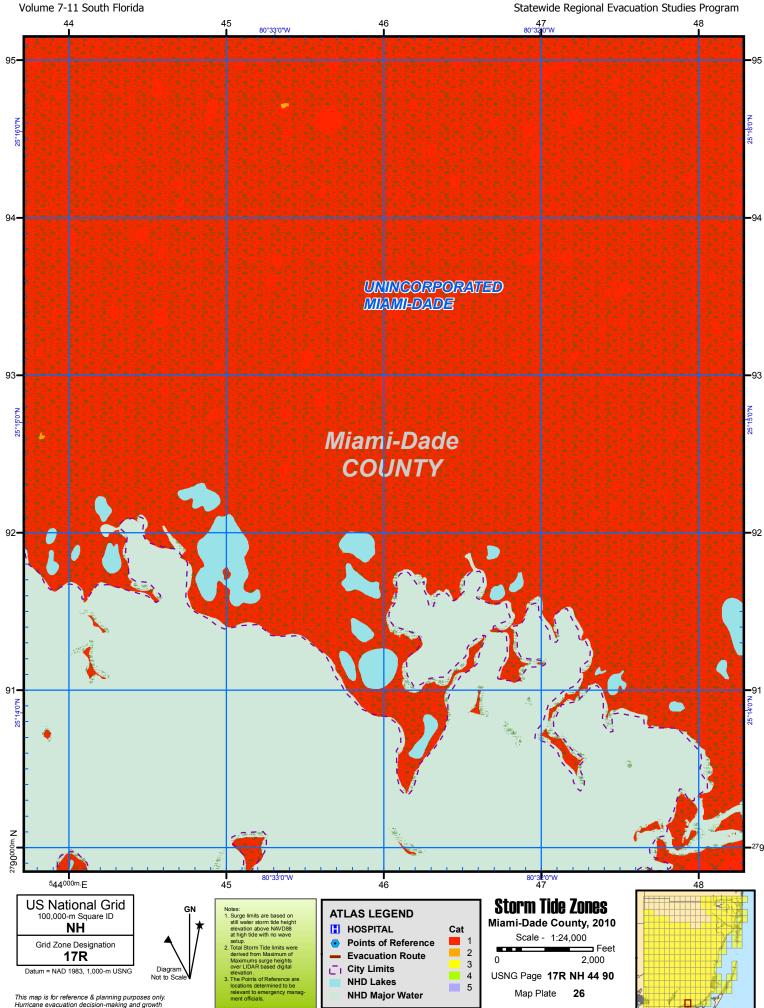


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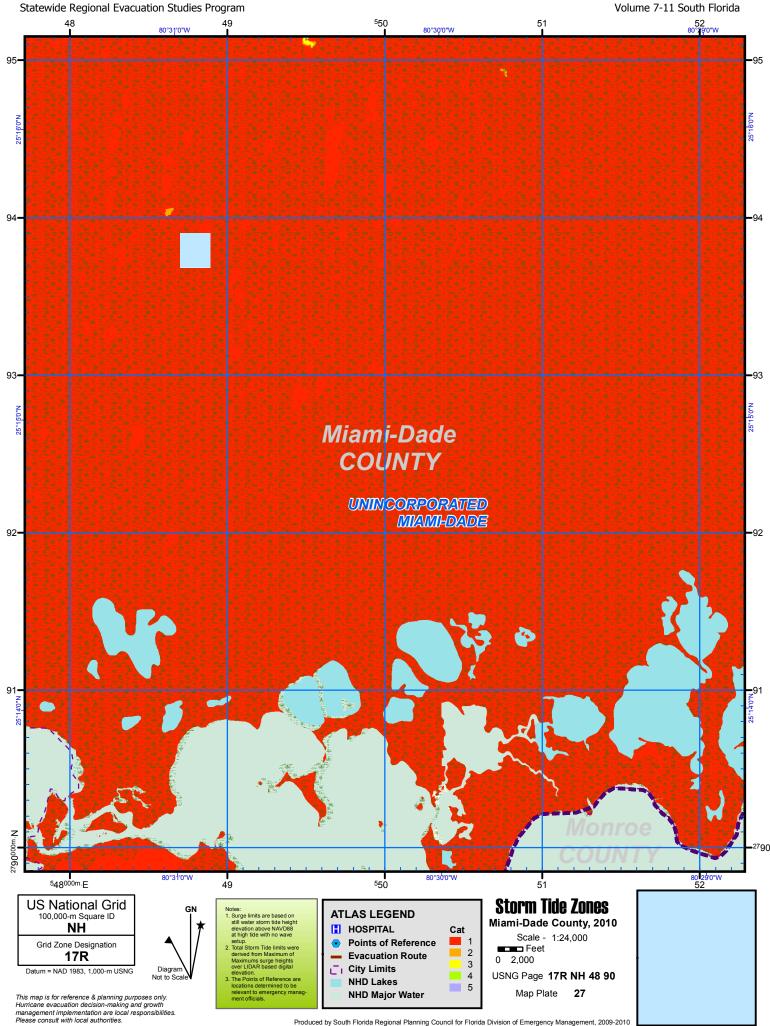


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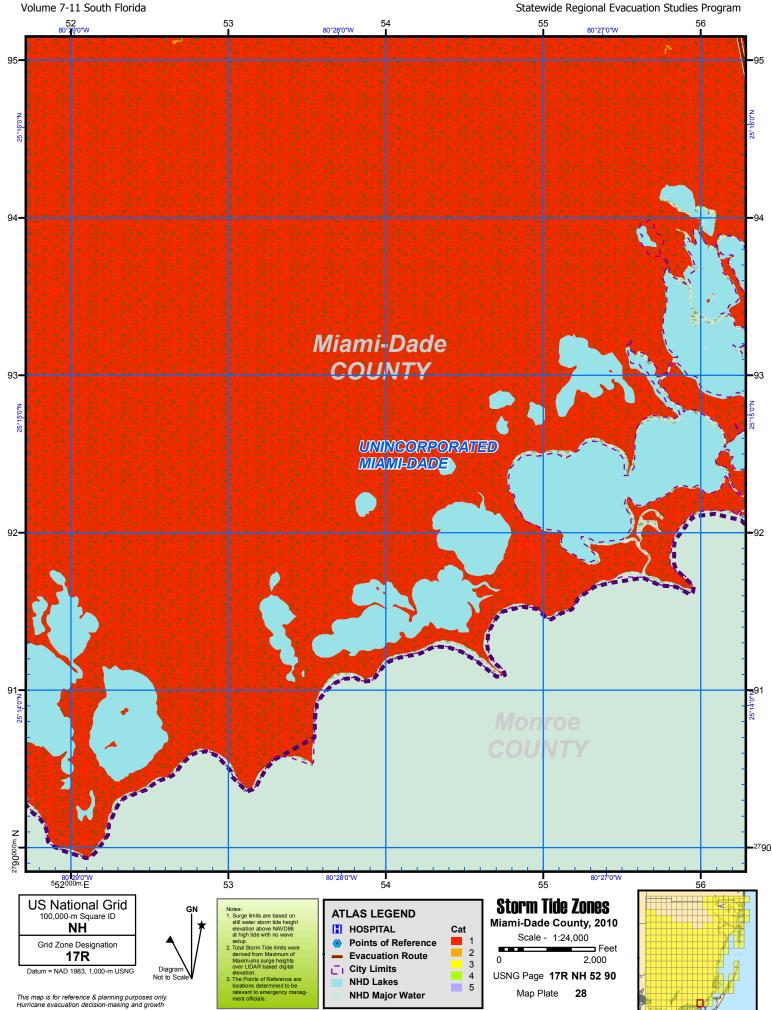


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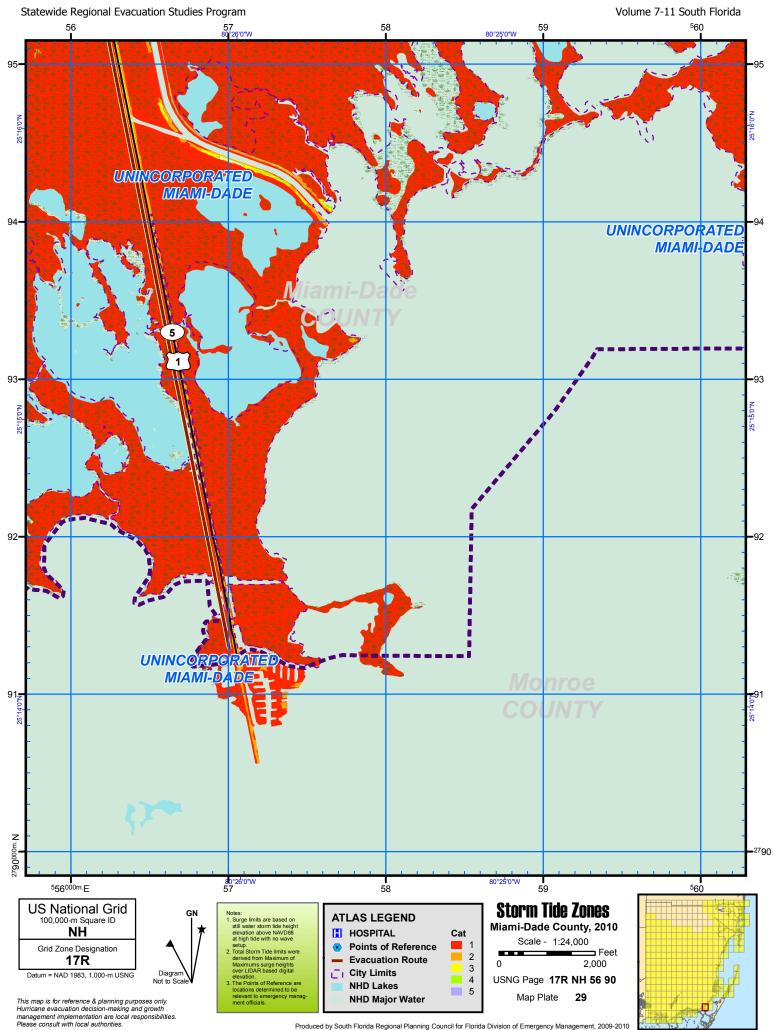
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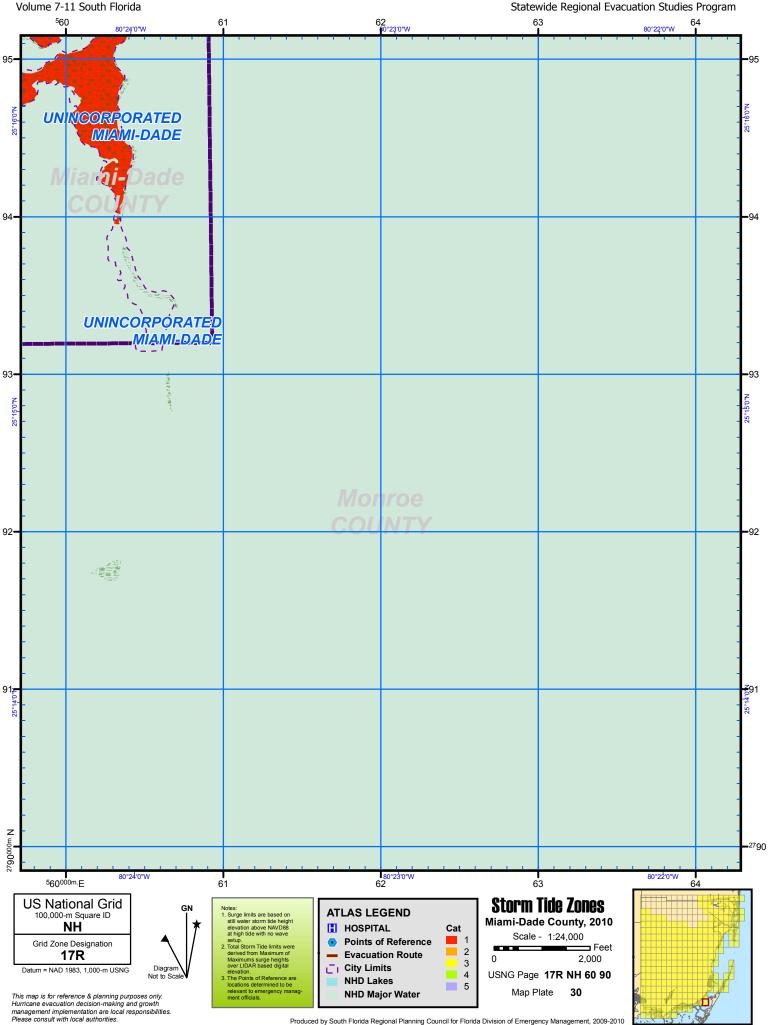
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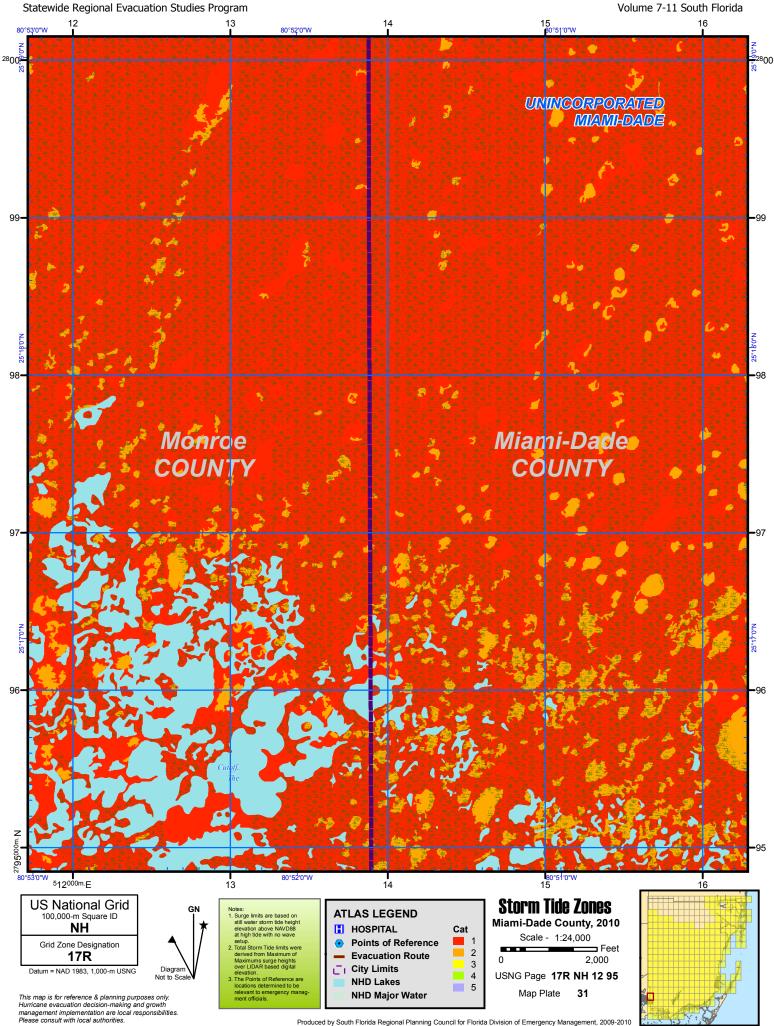
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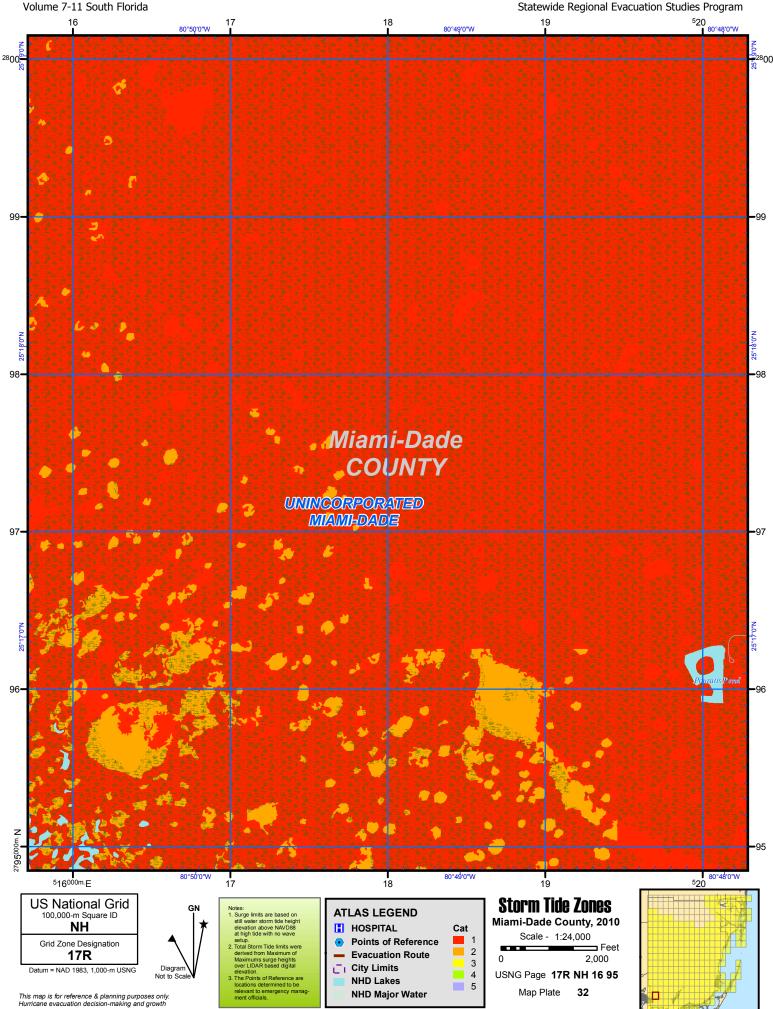
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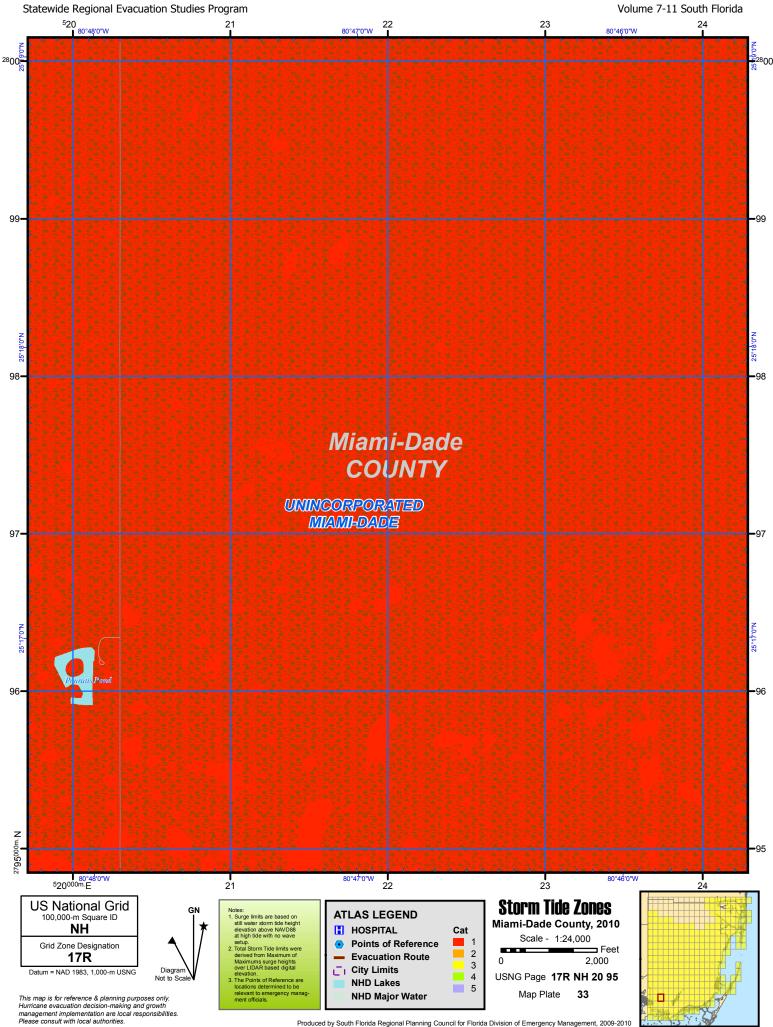


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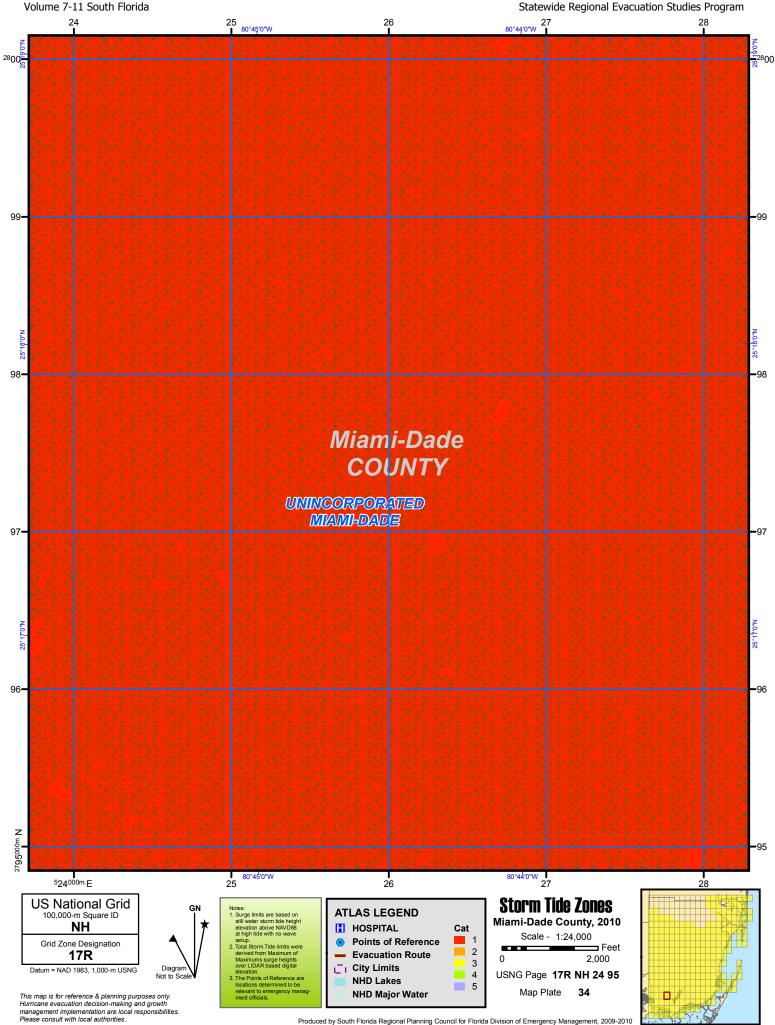


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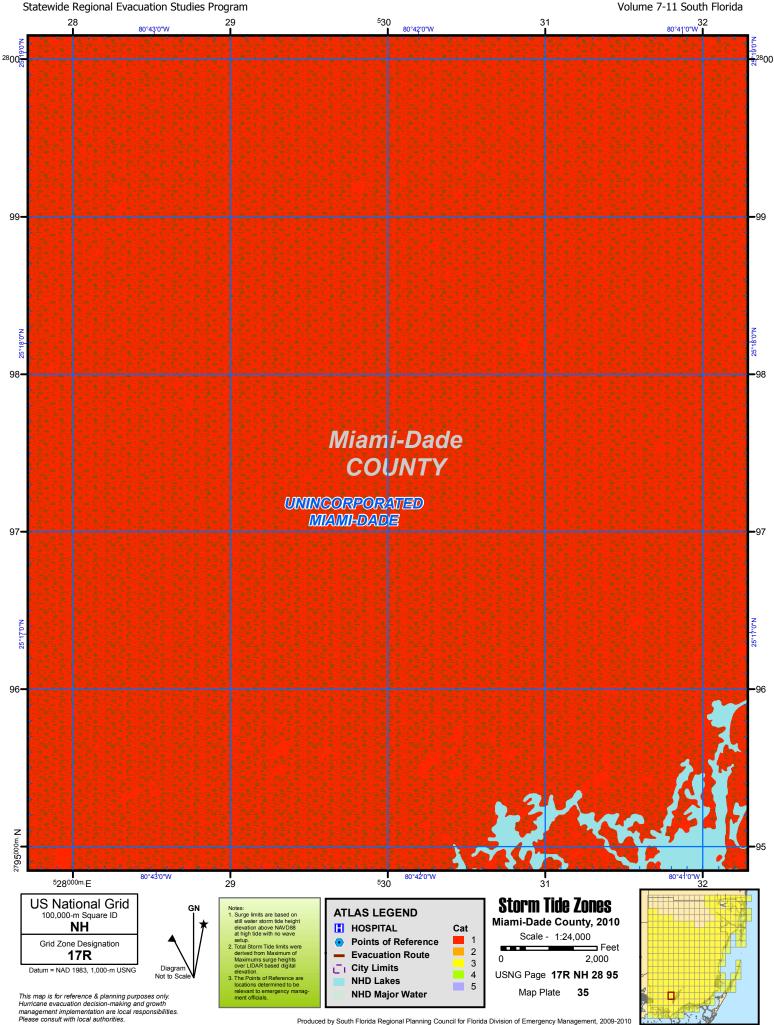


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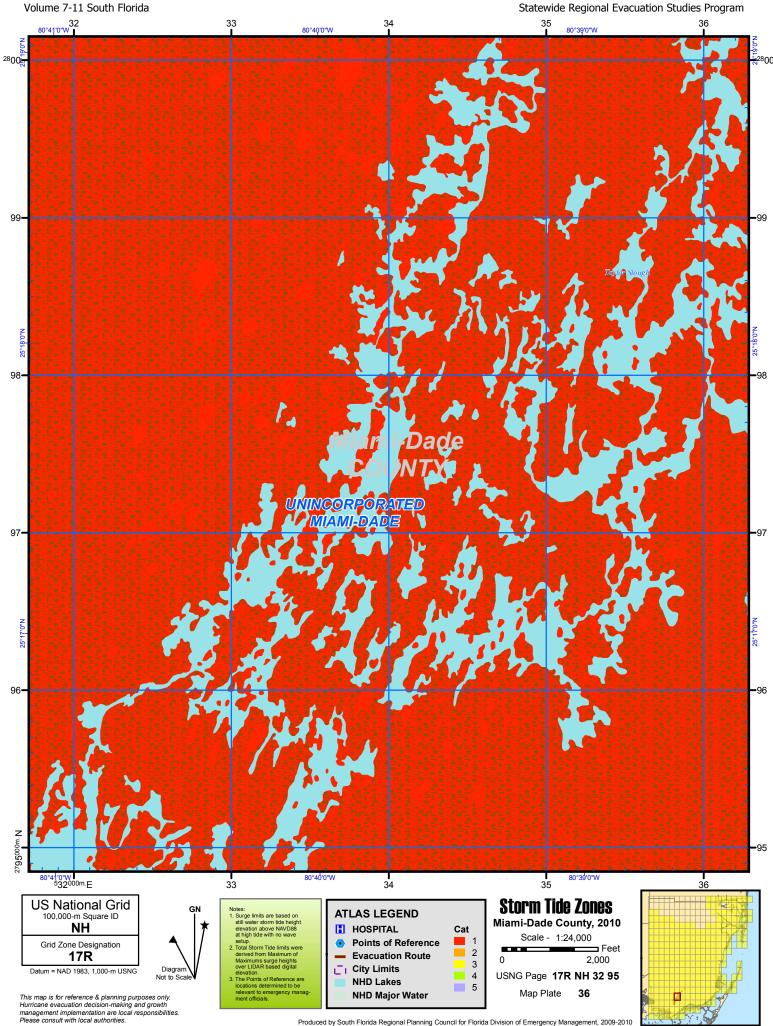


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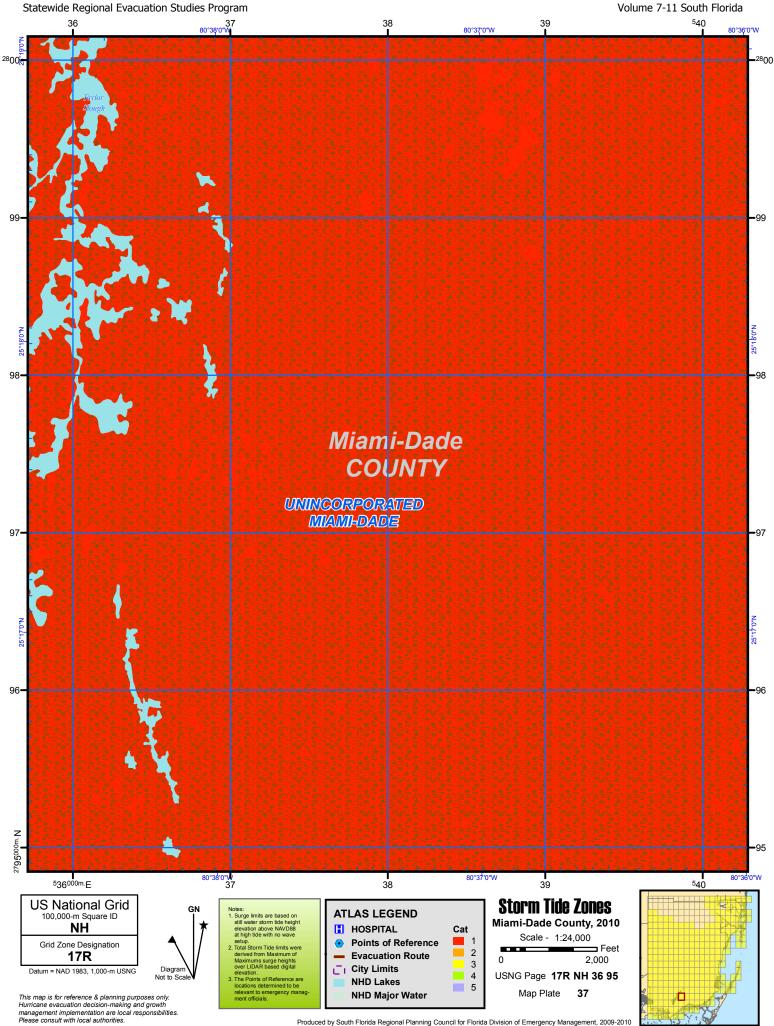


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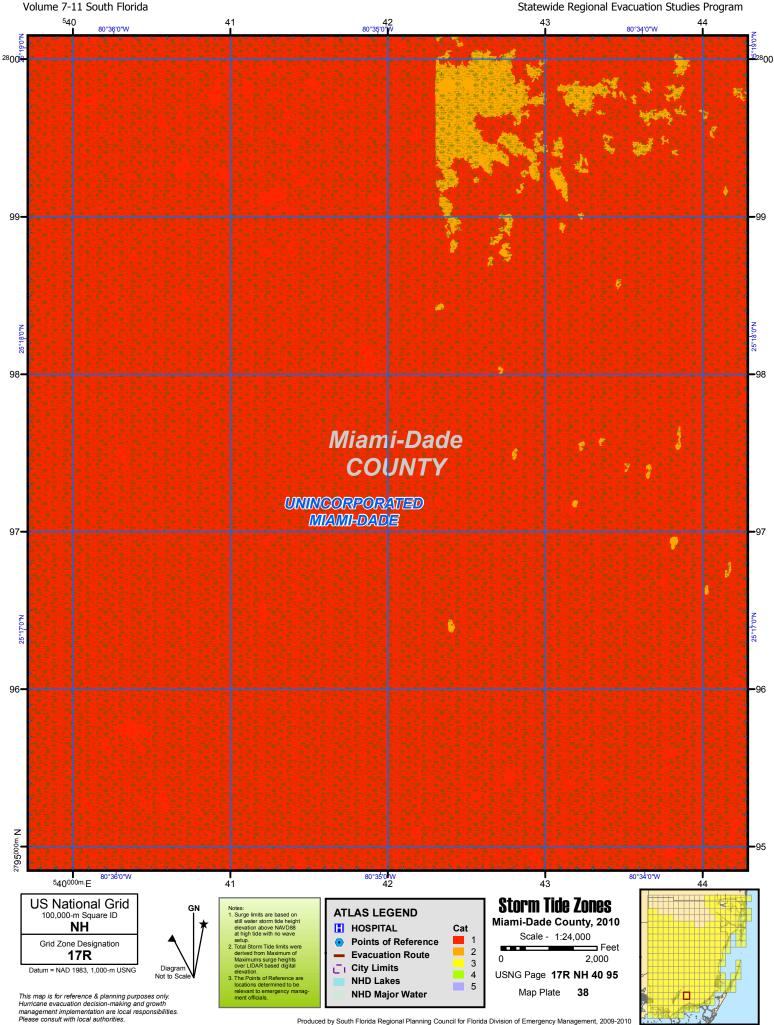


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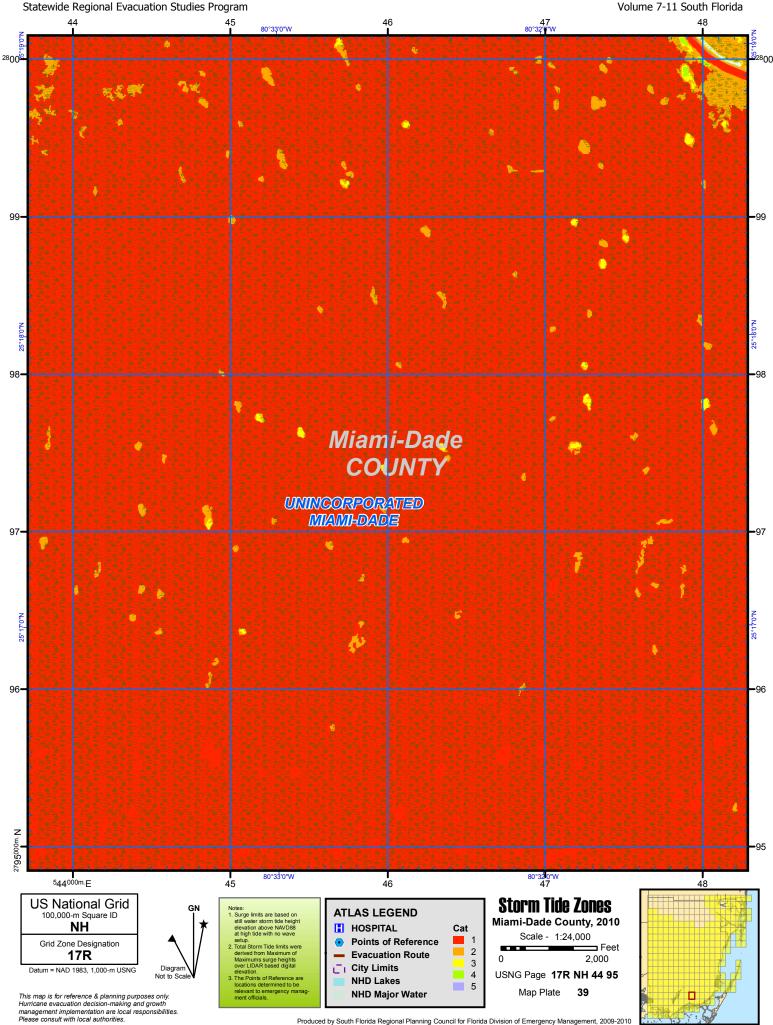


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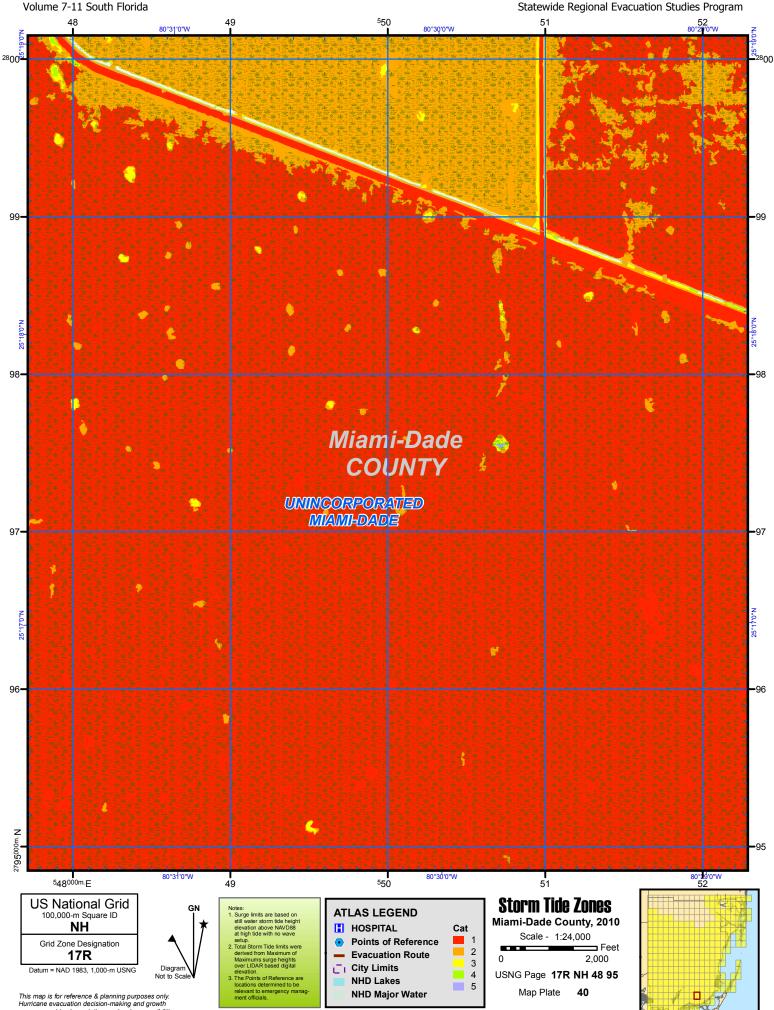


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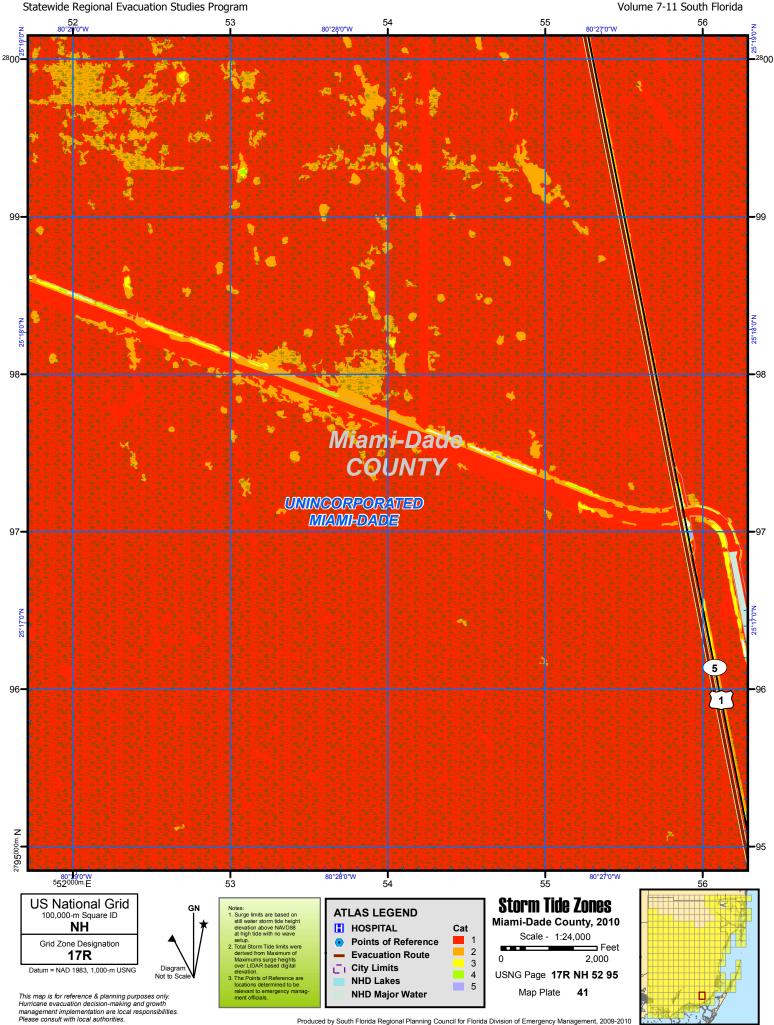


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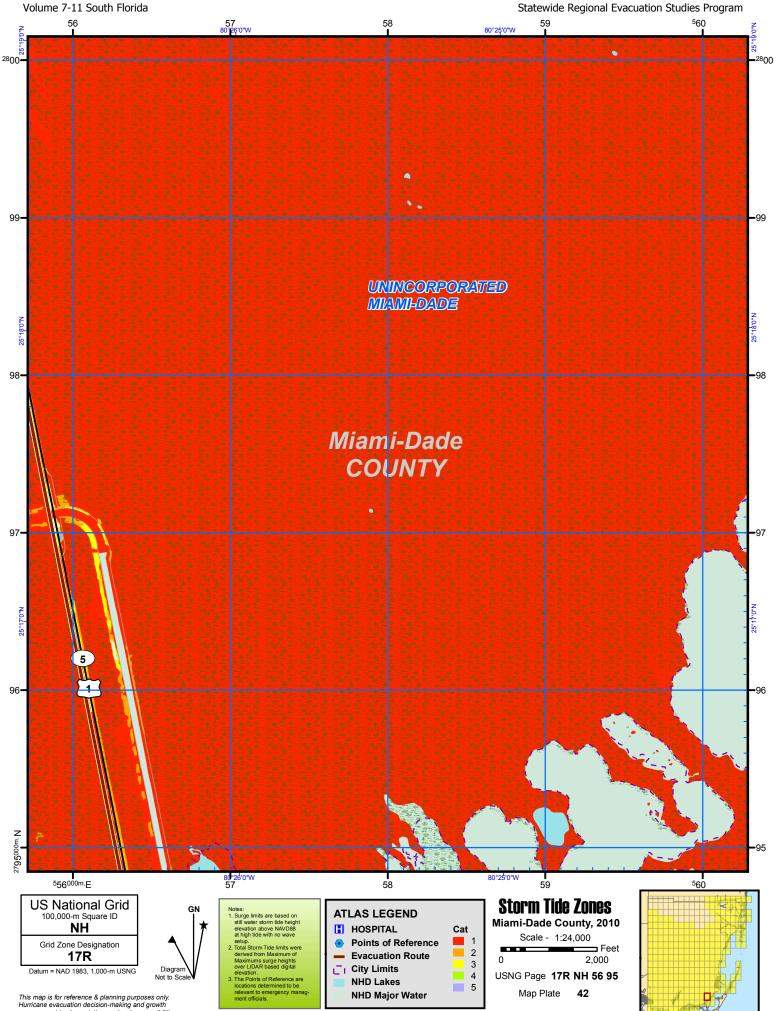


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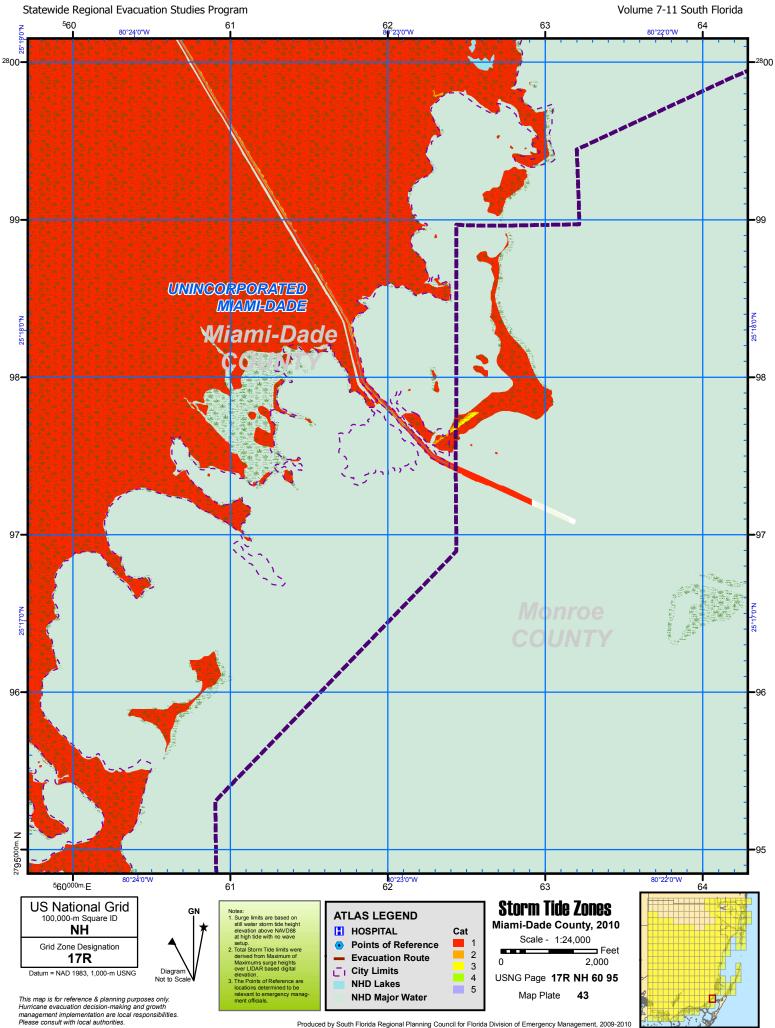
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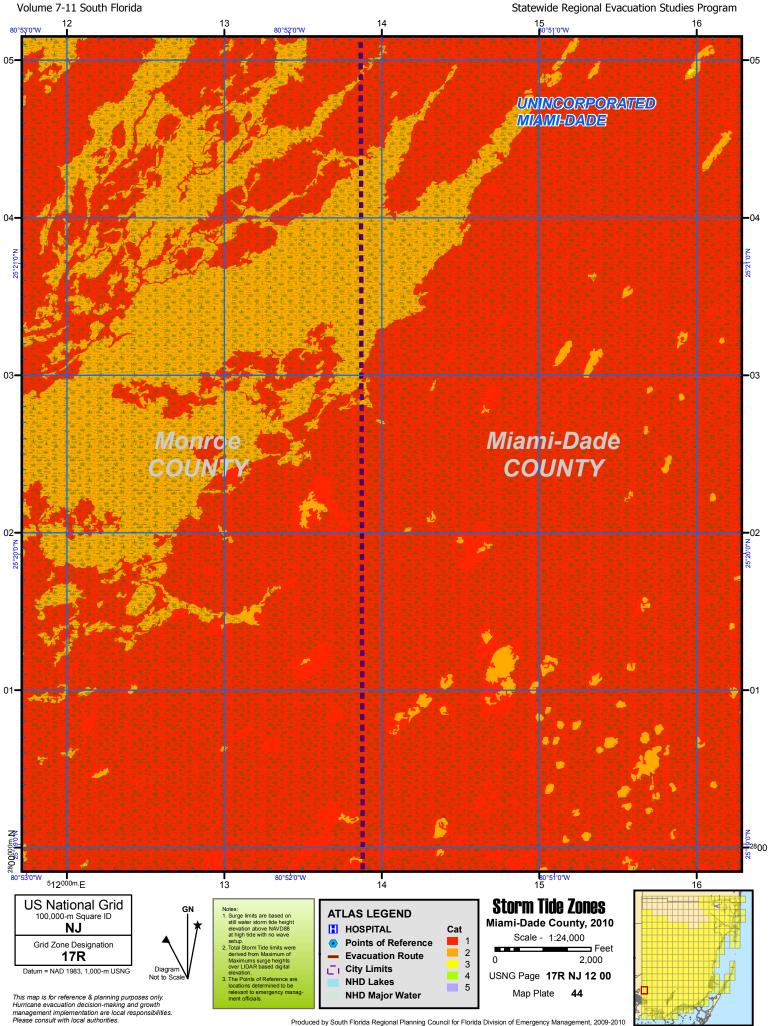
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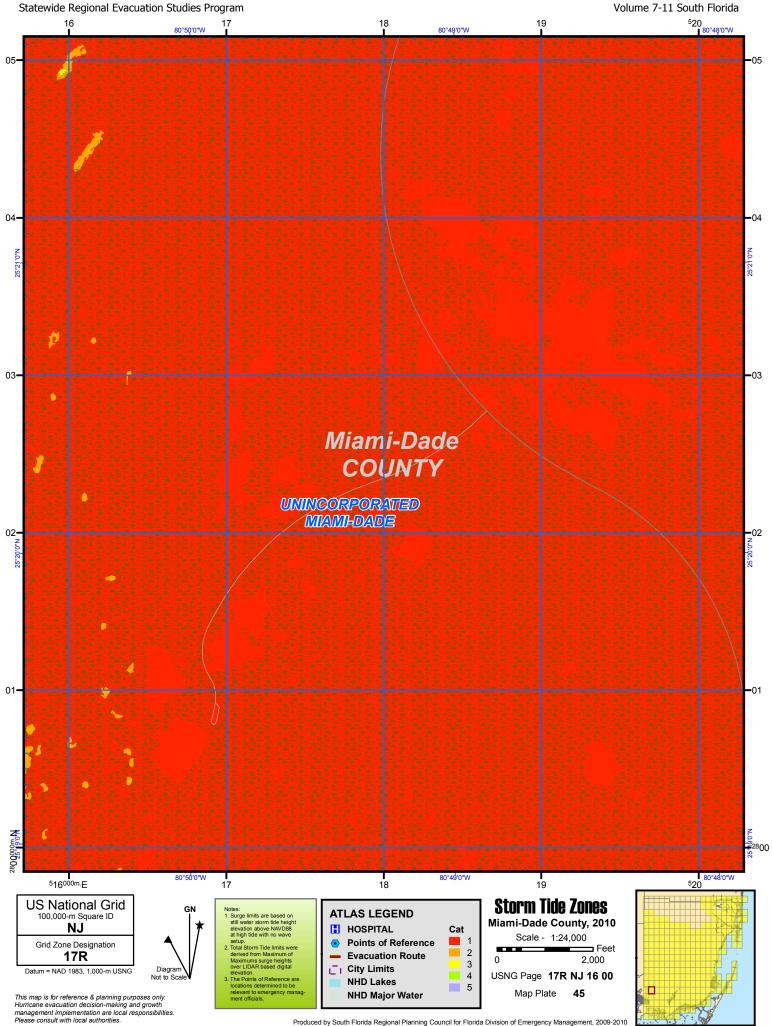
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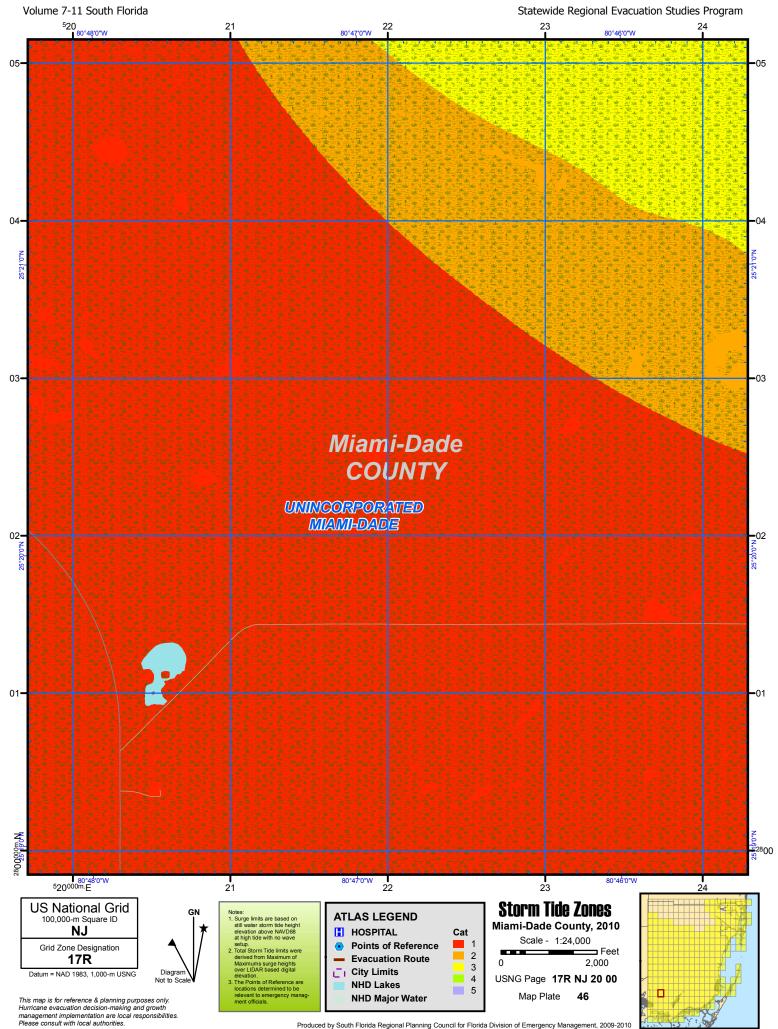
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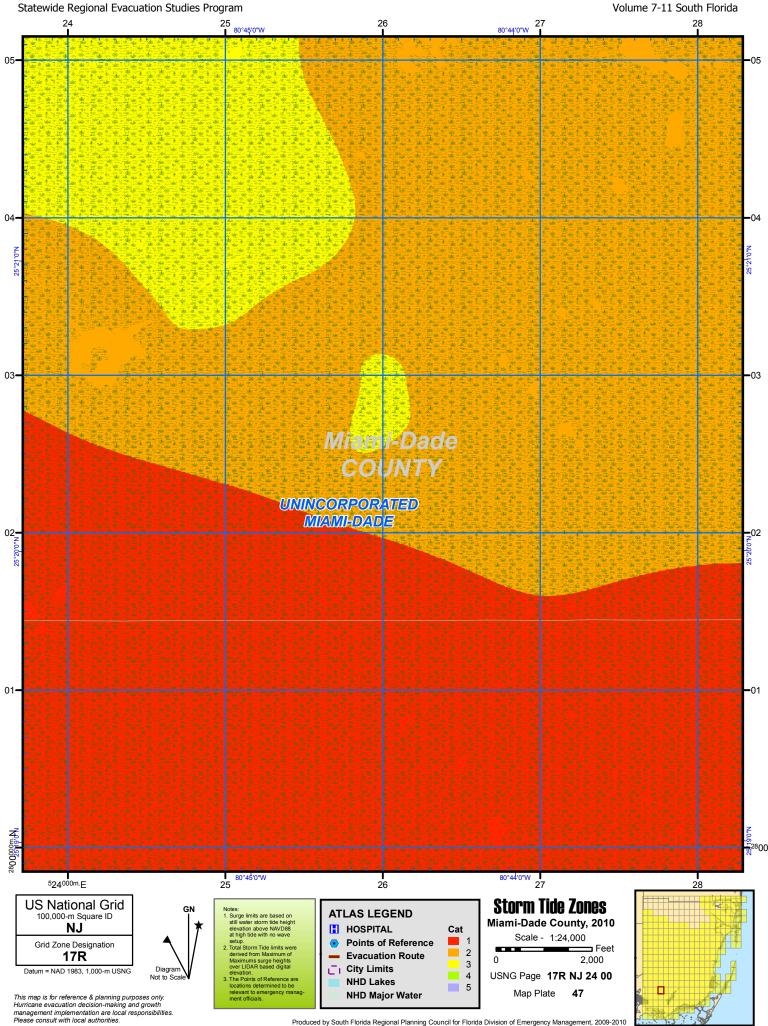
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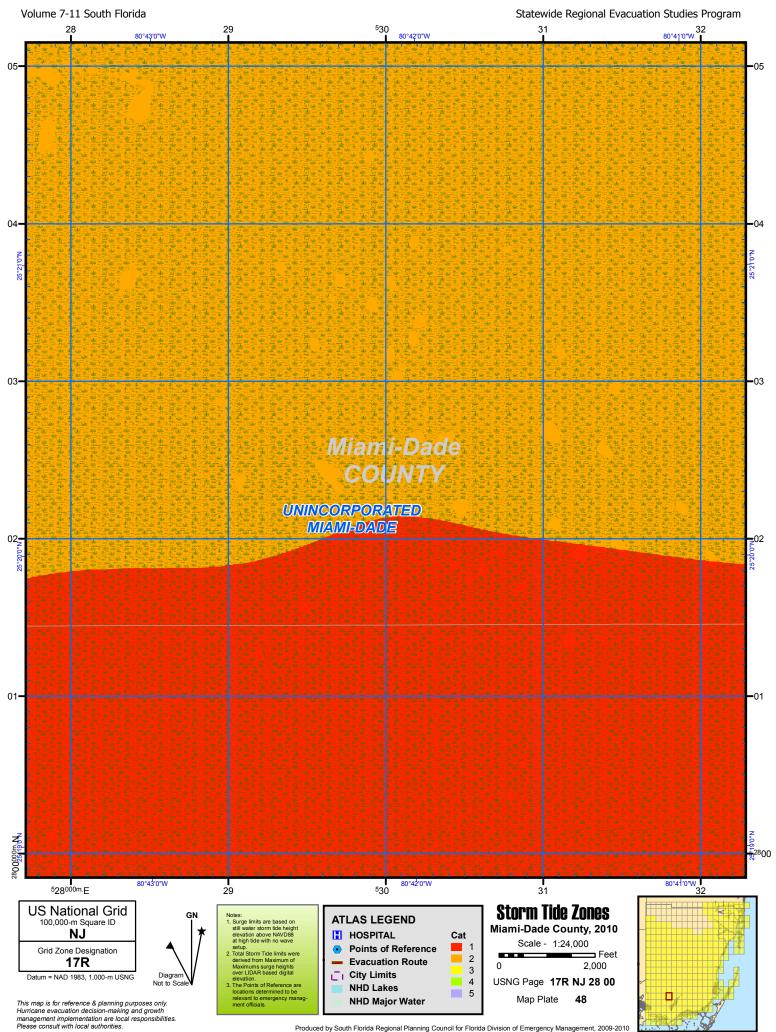
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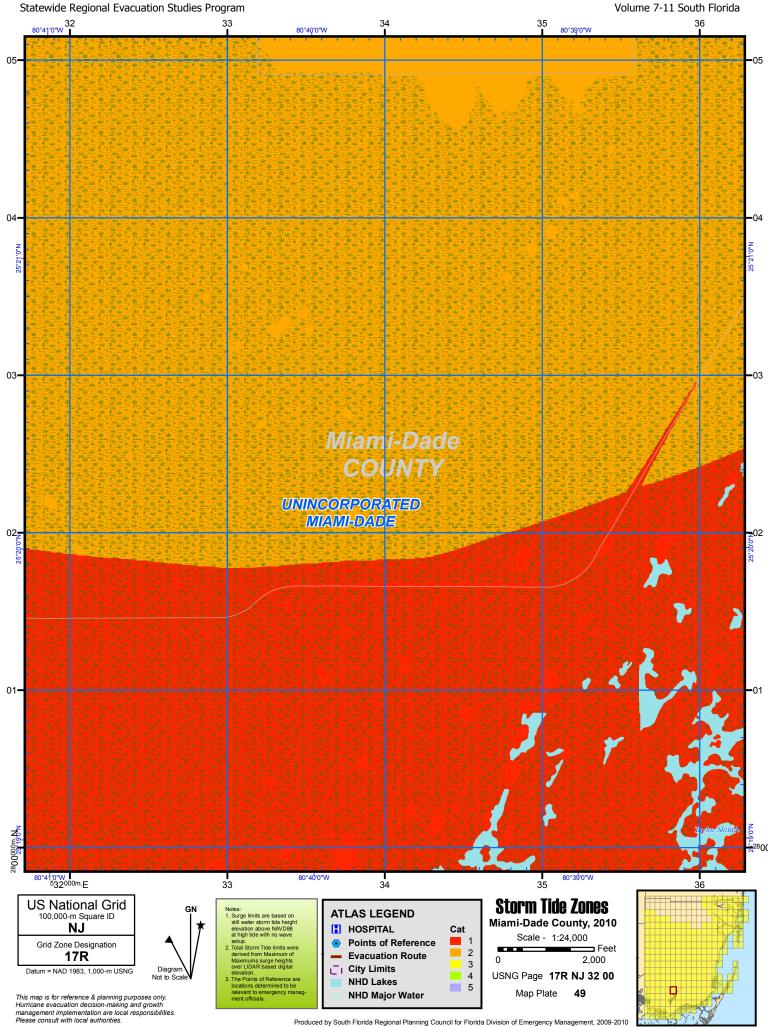
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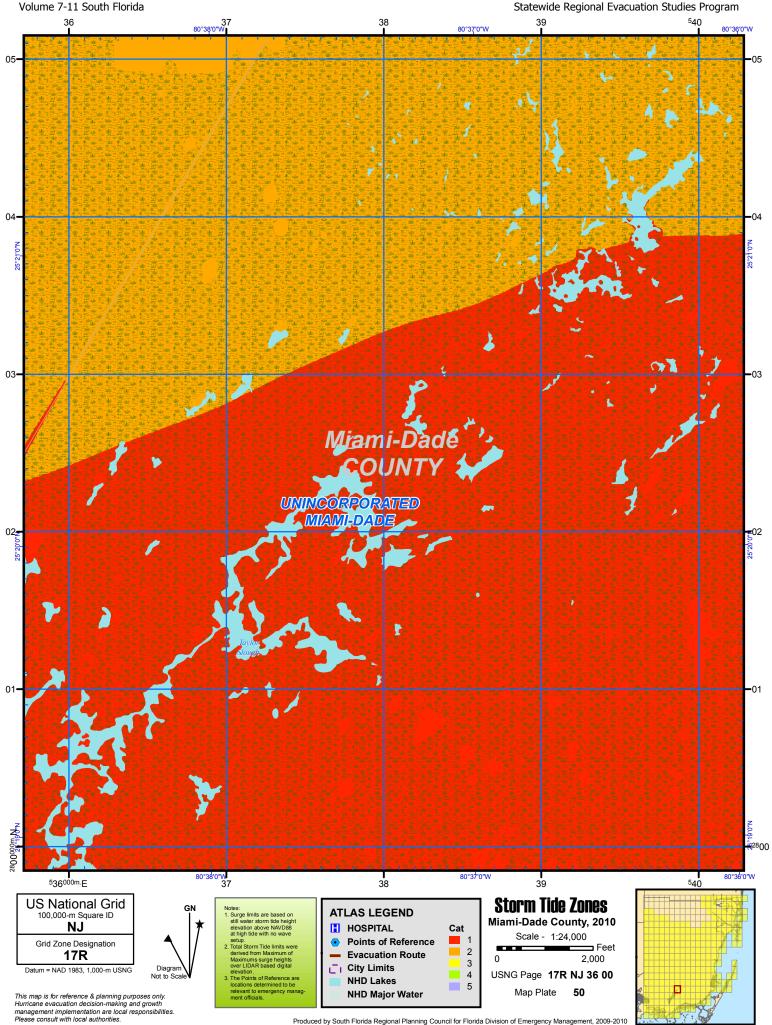
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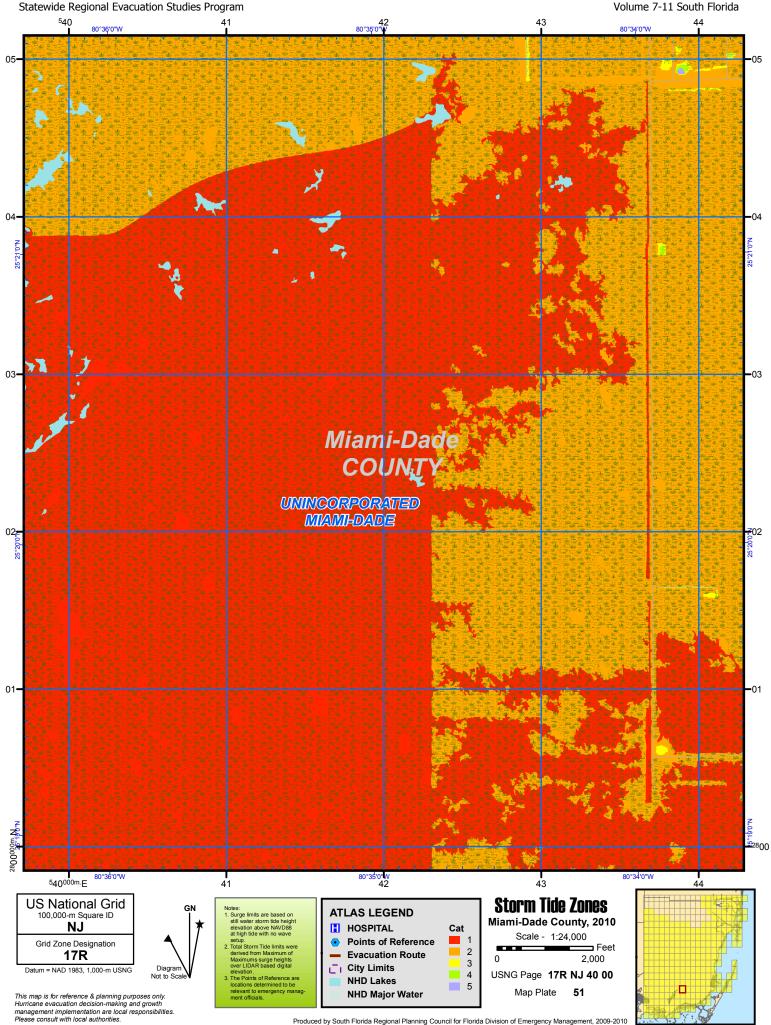
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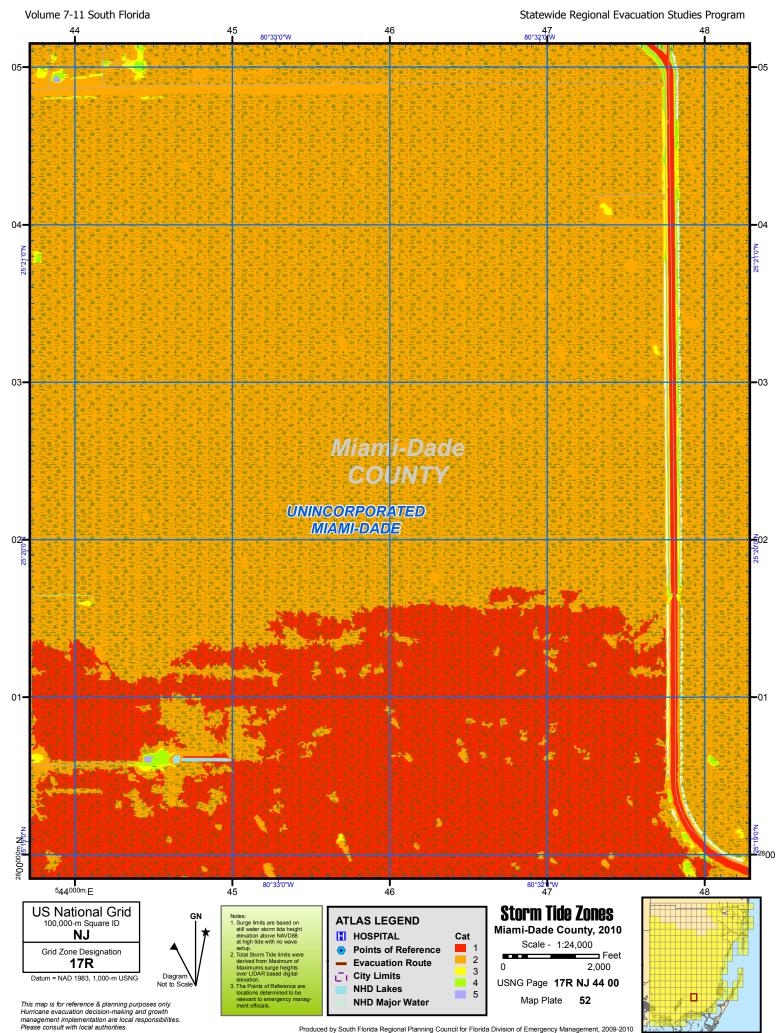
Please consult with local authorities. Storm Tide Atlas - Miami-Dade County



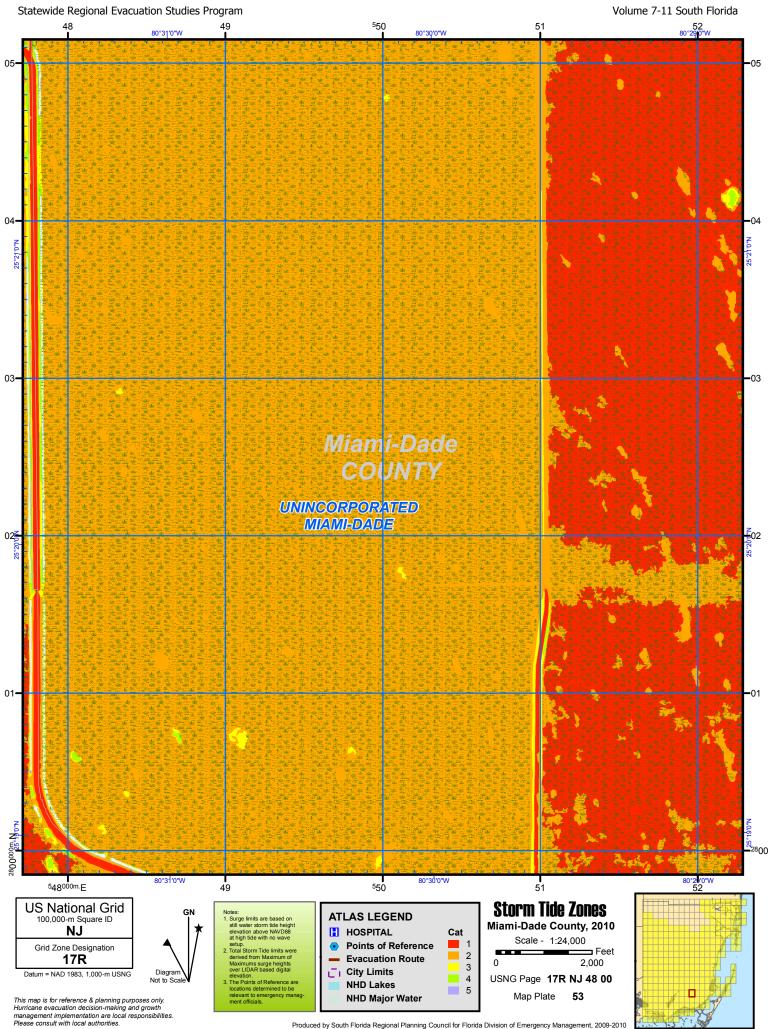
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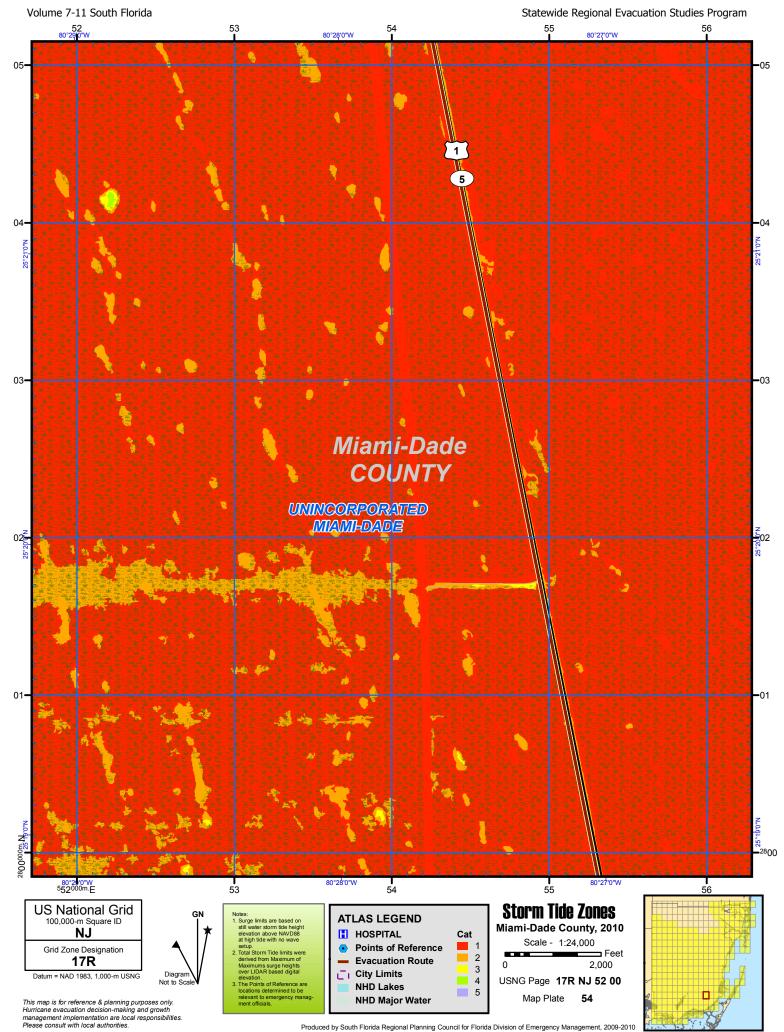
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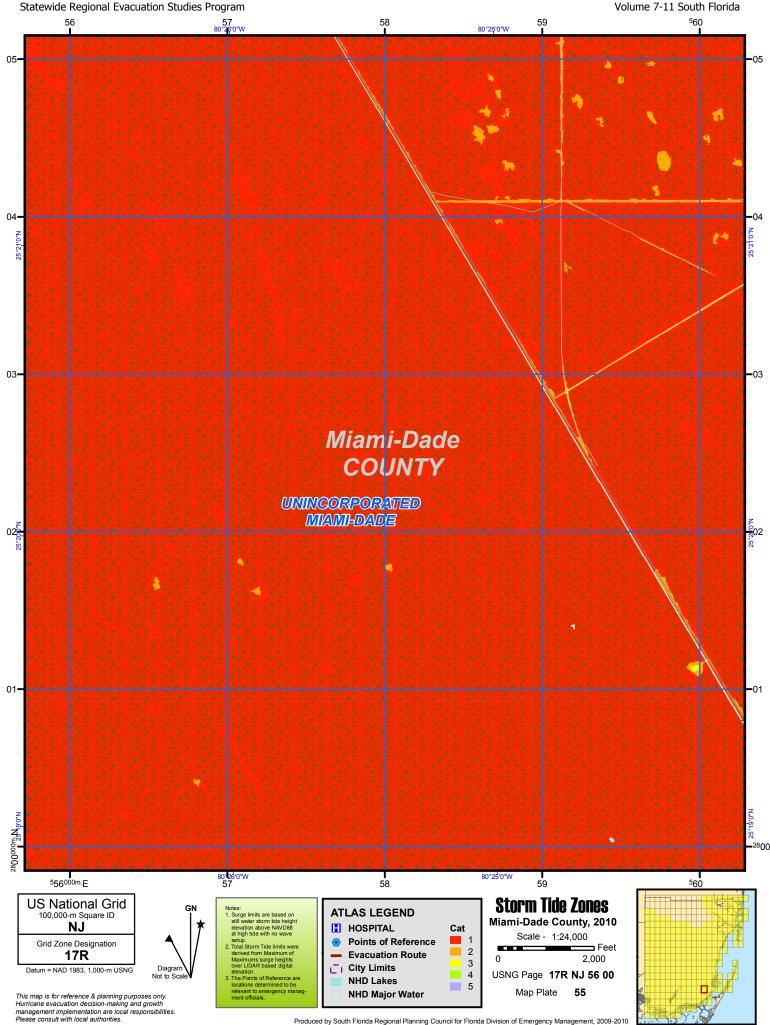


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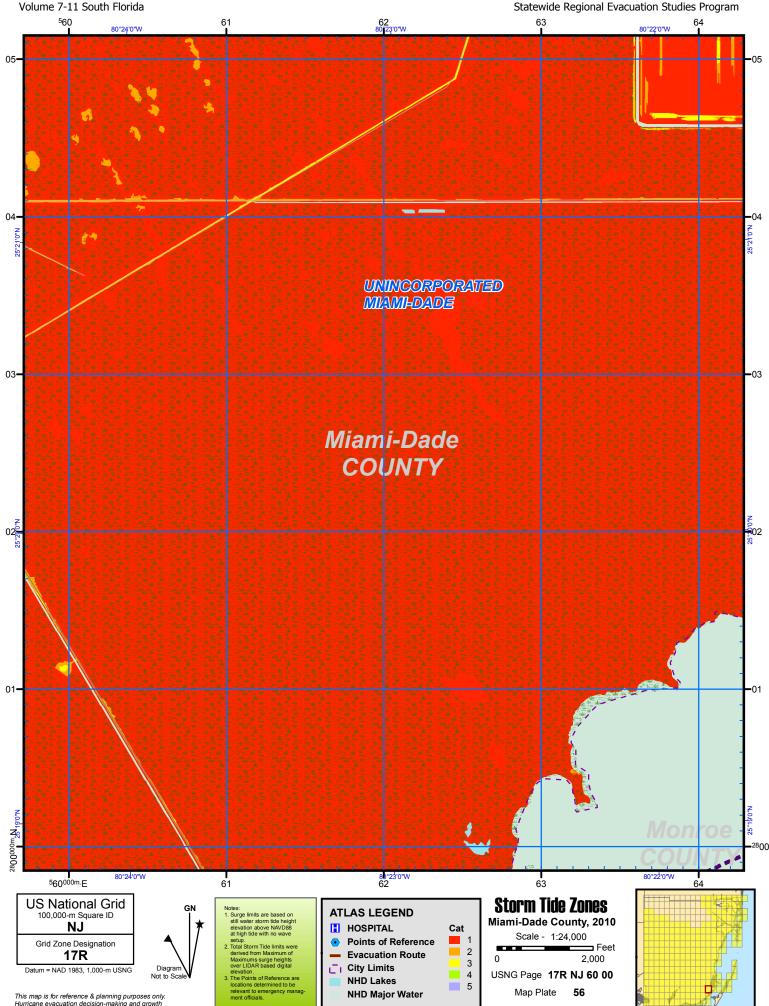


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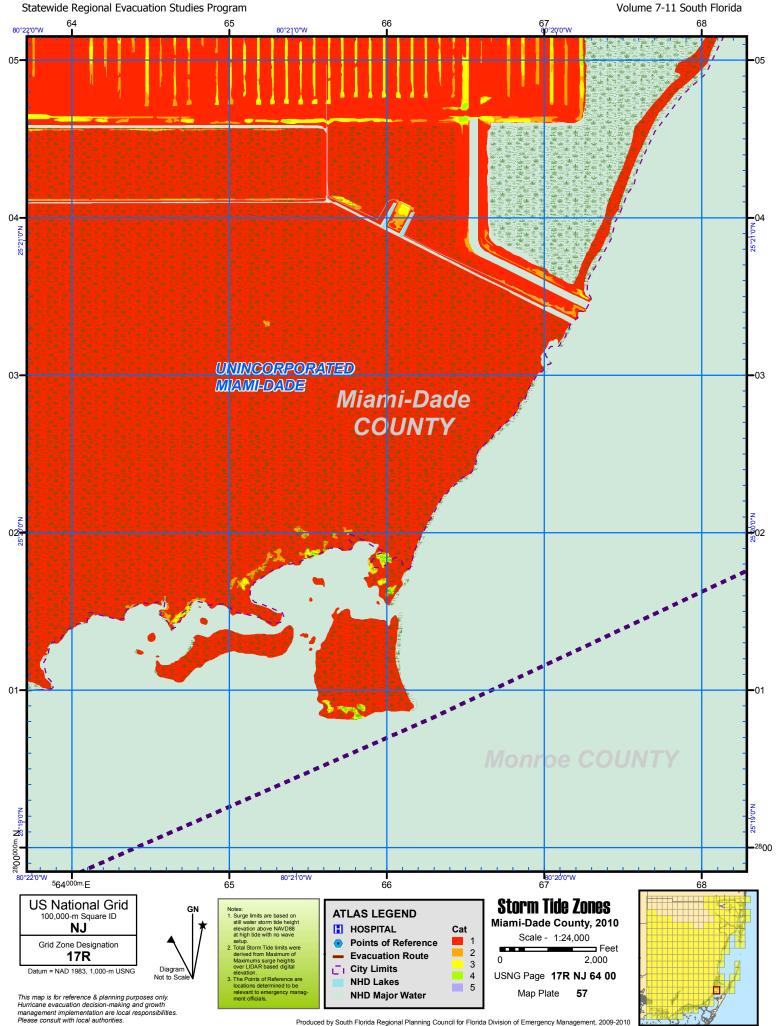
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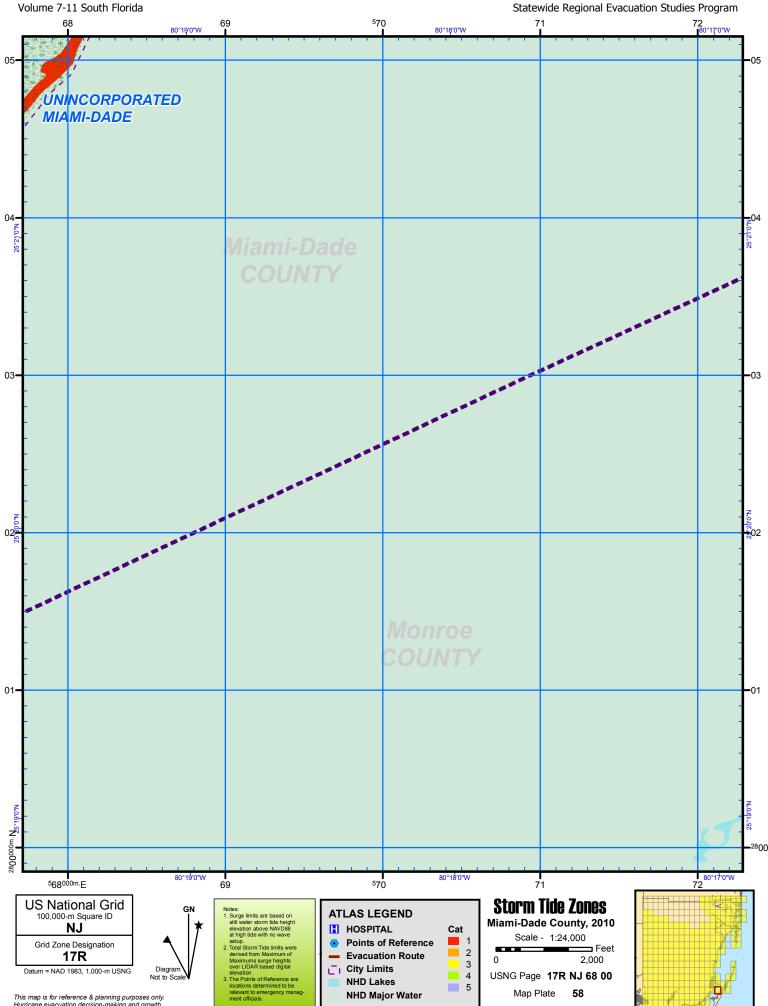
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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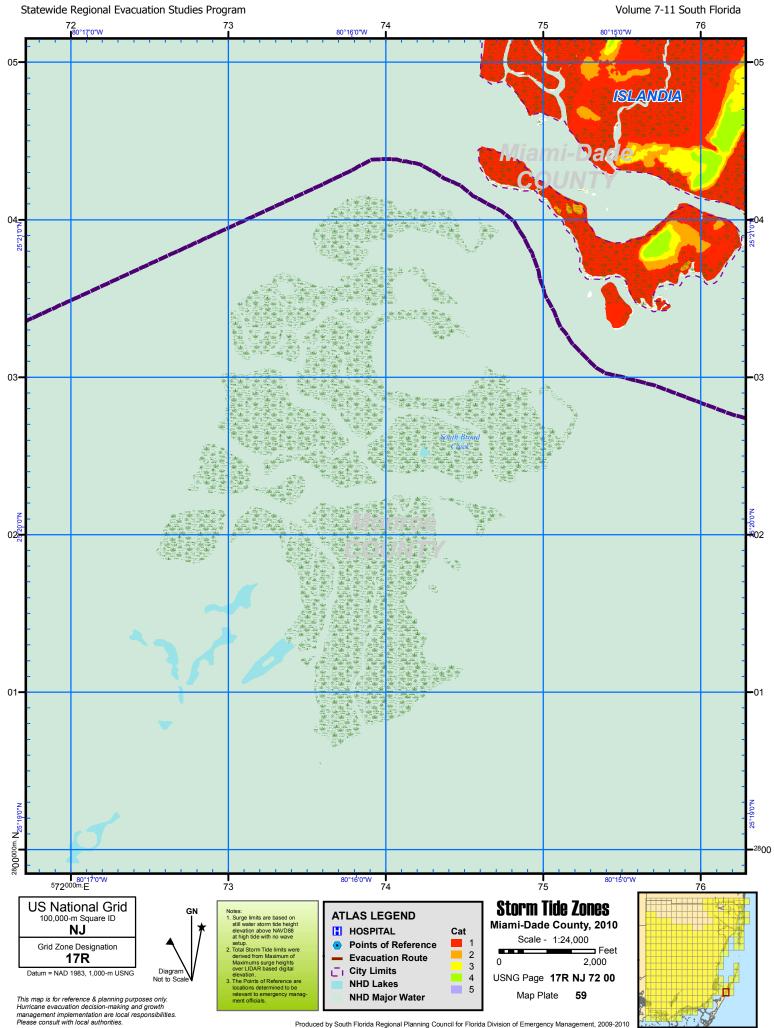
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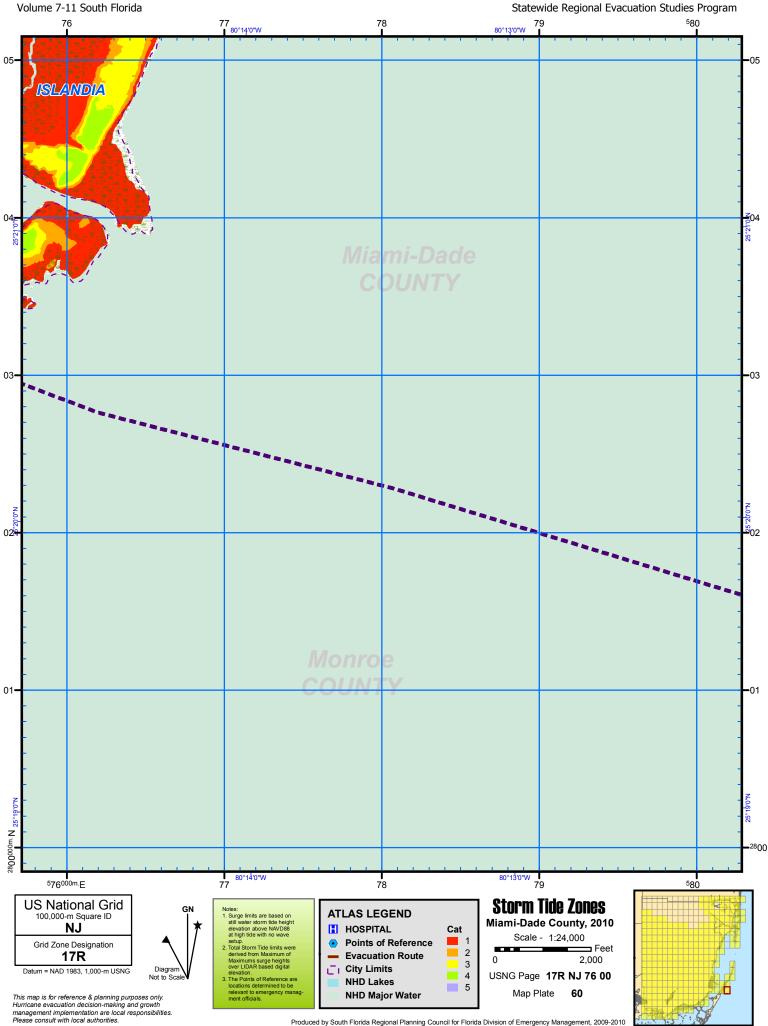
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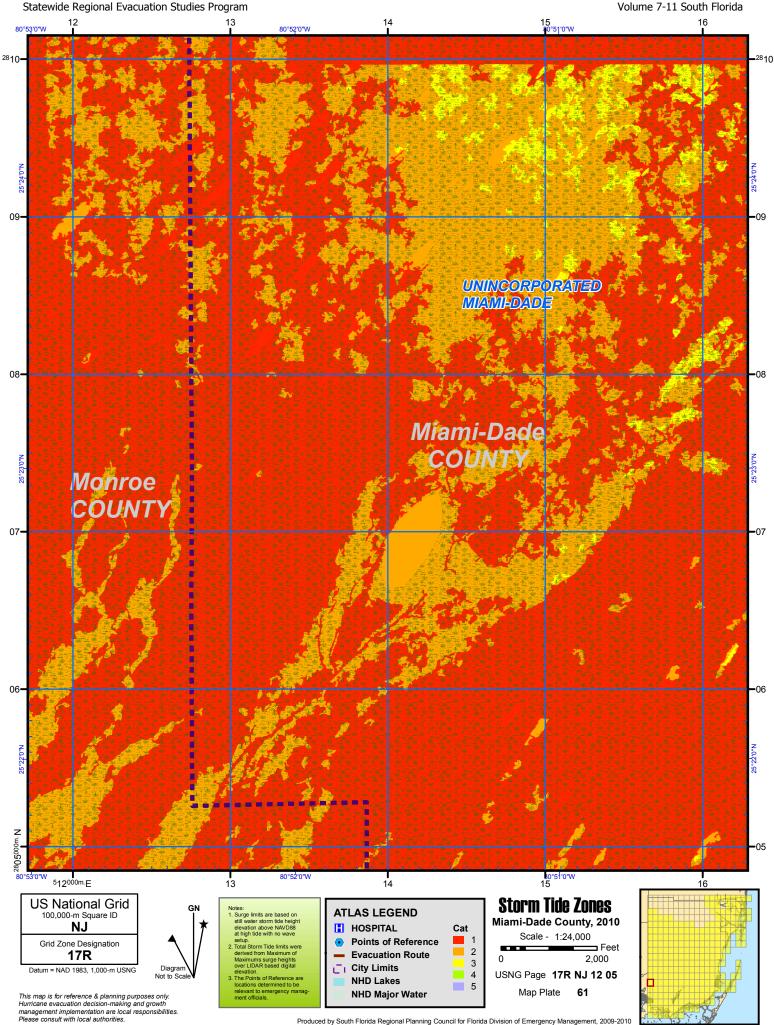
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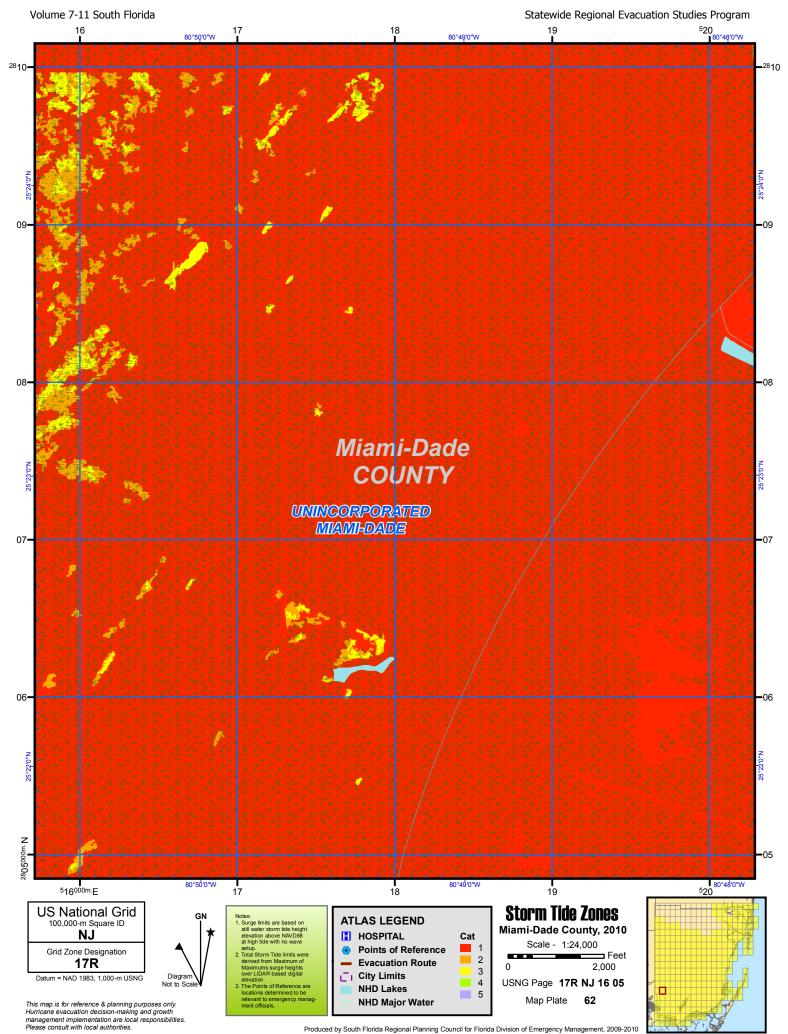
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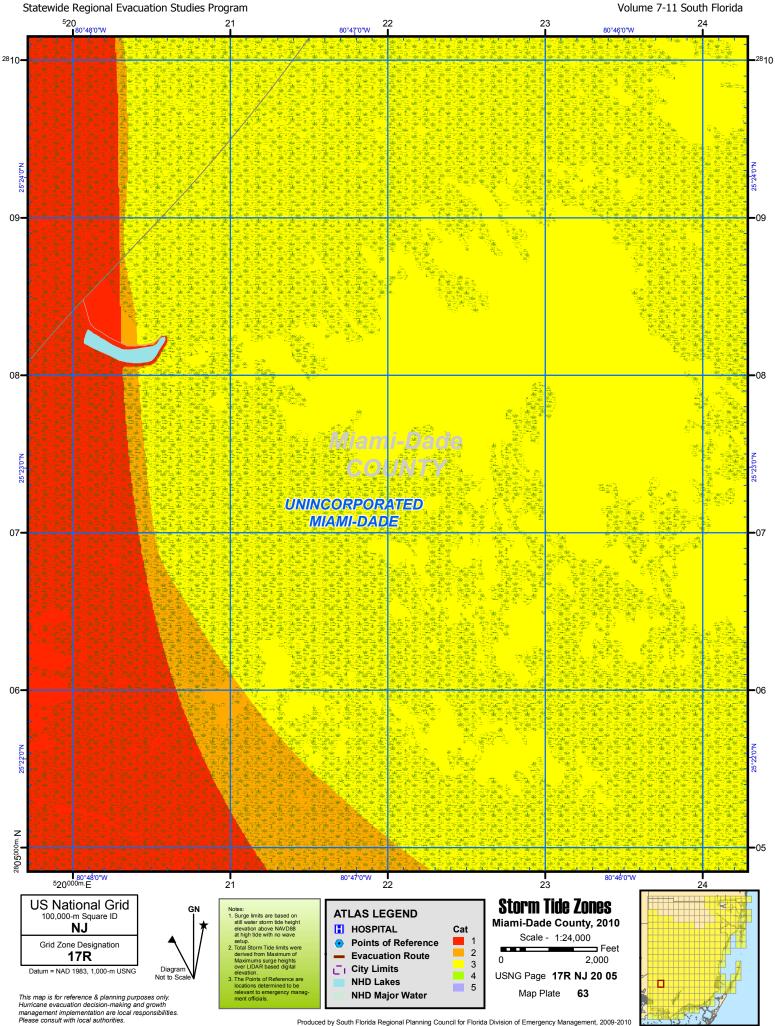


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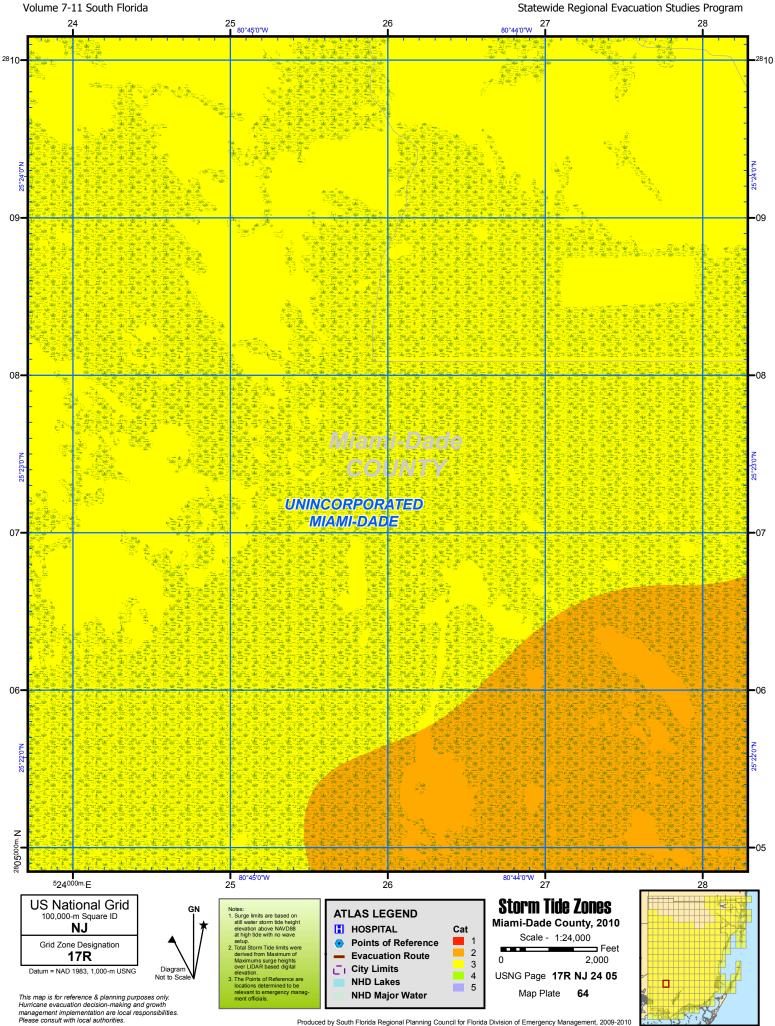


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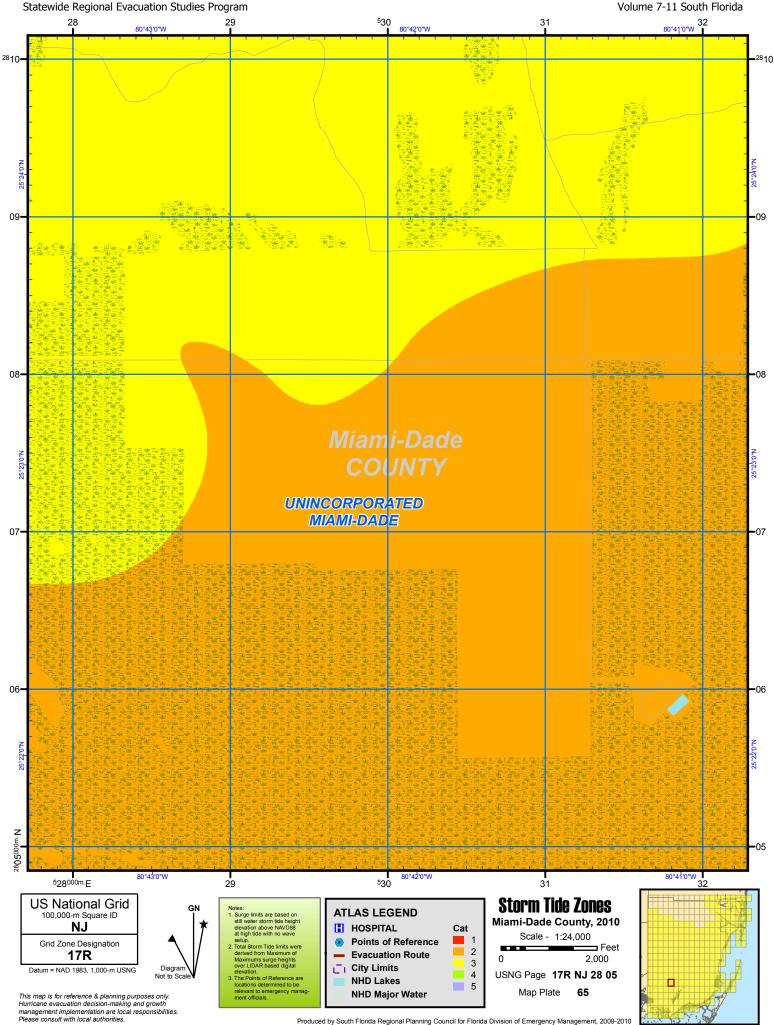




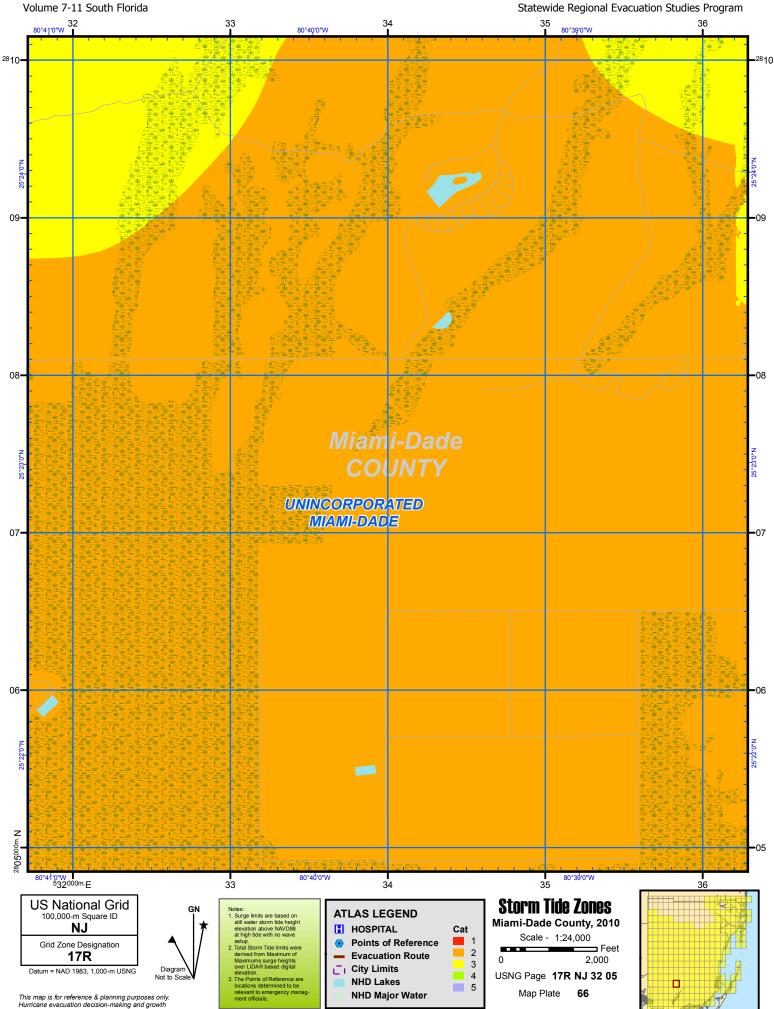
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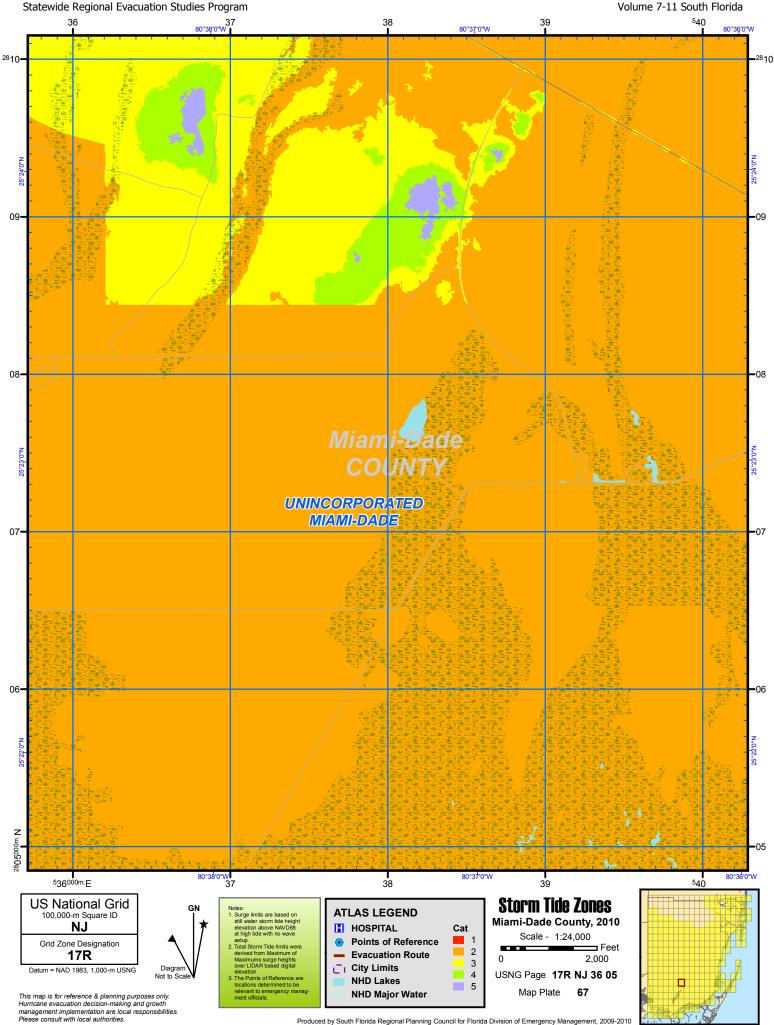


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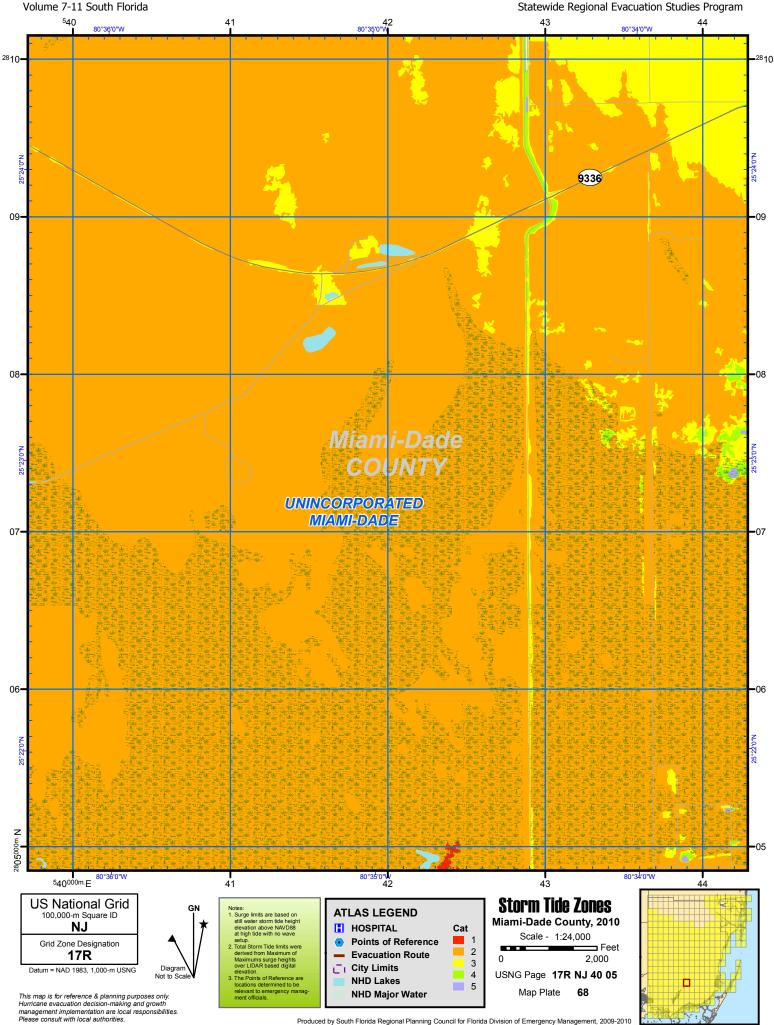


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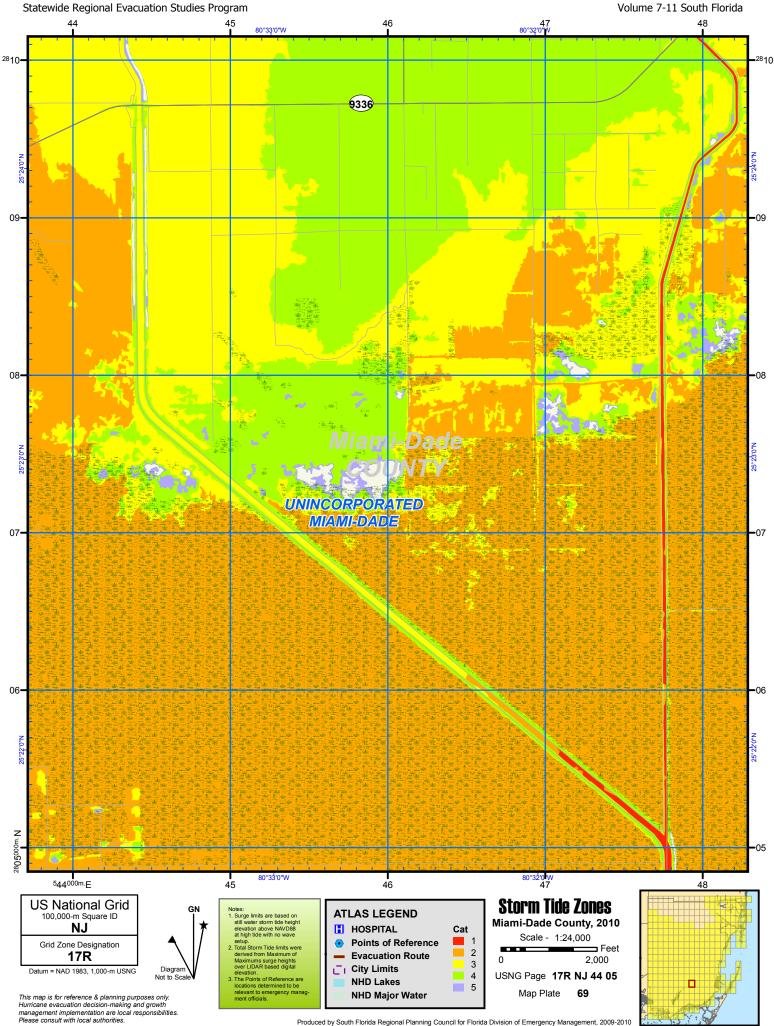
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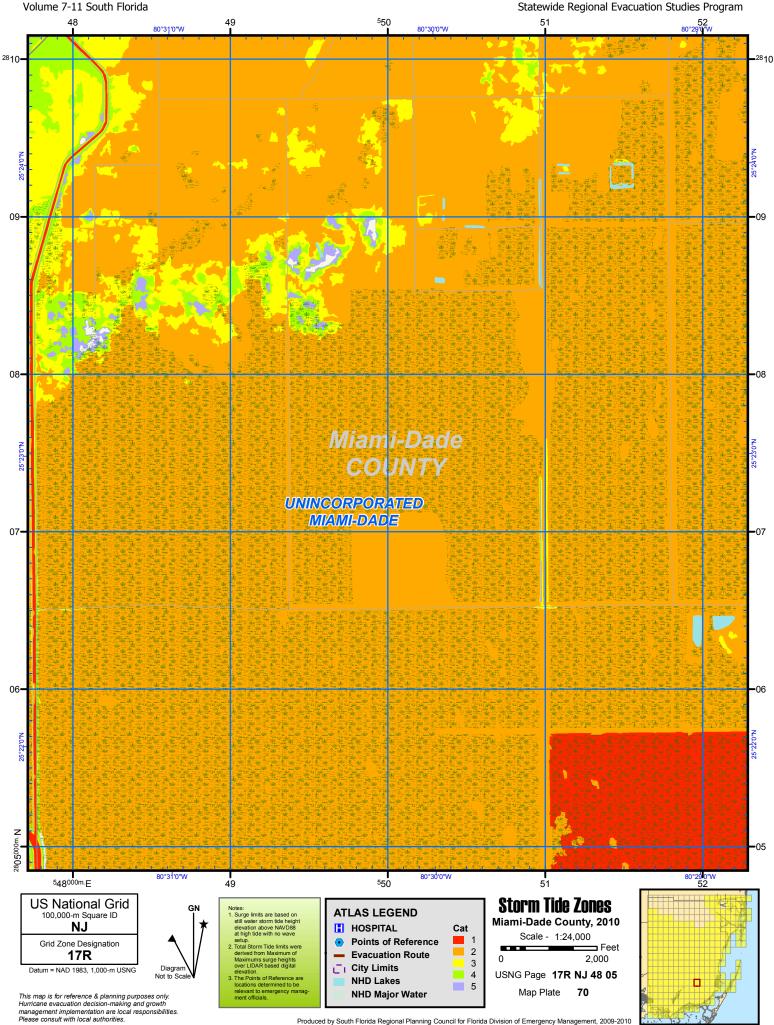
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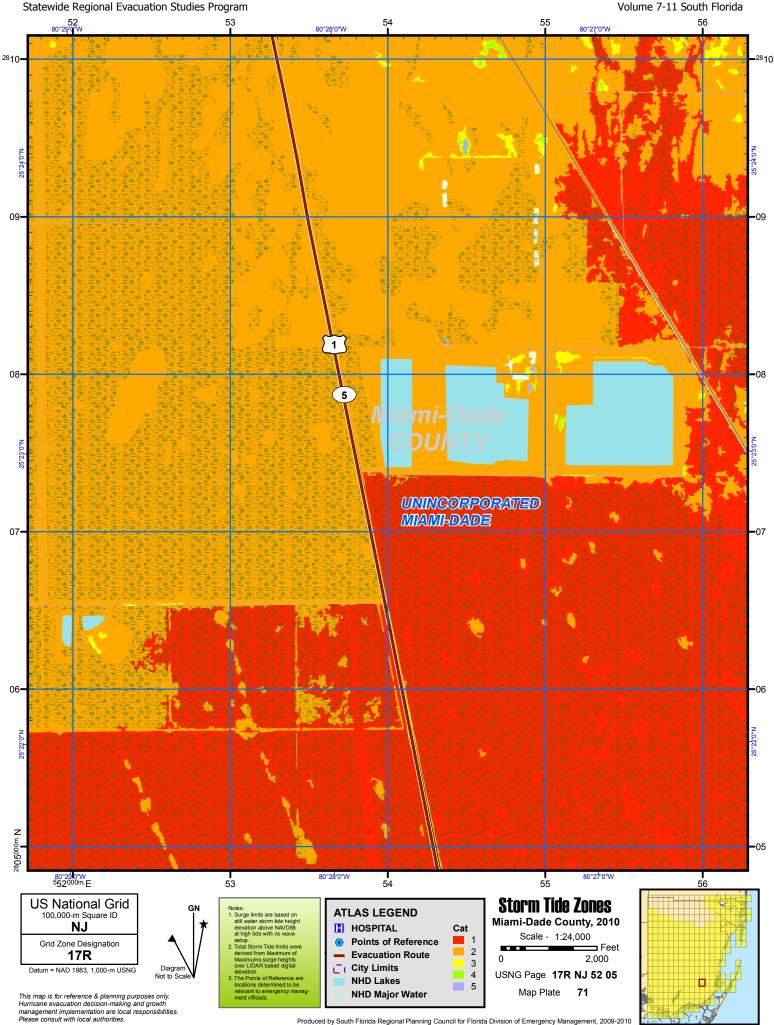
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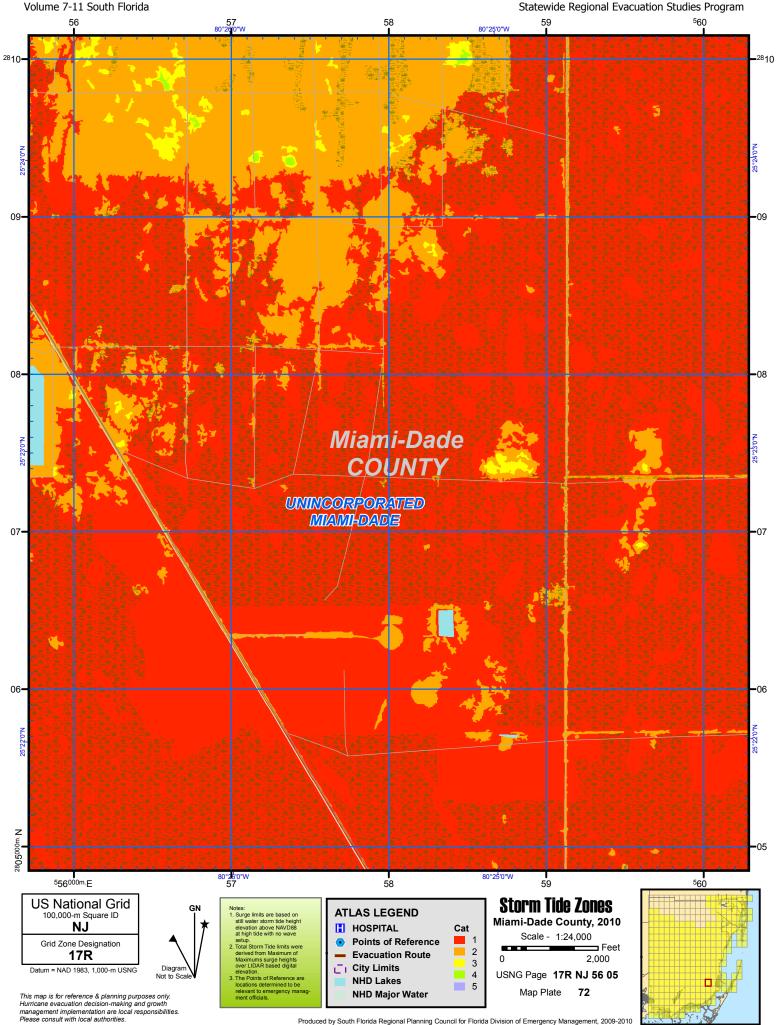
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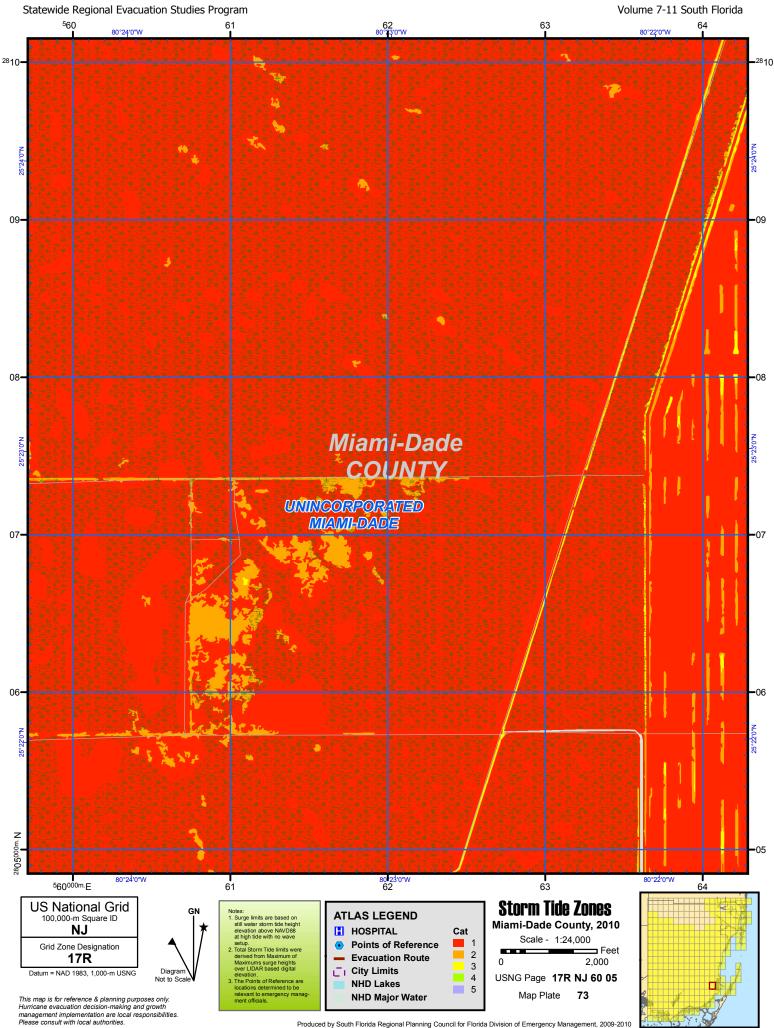
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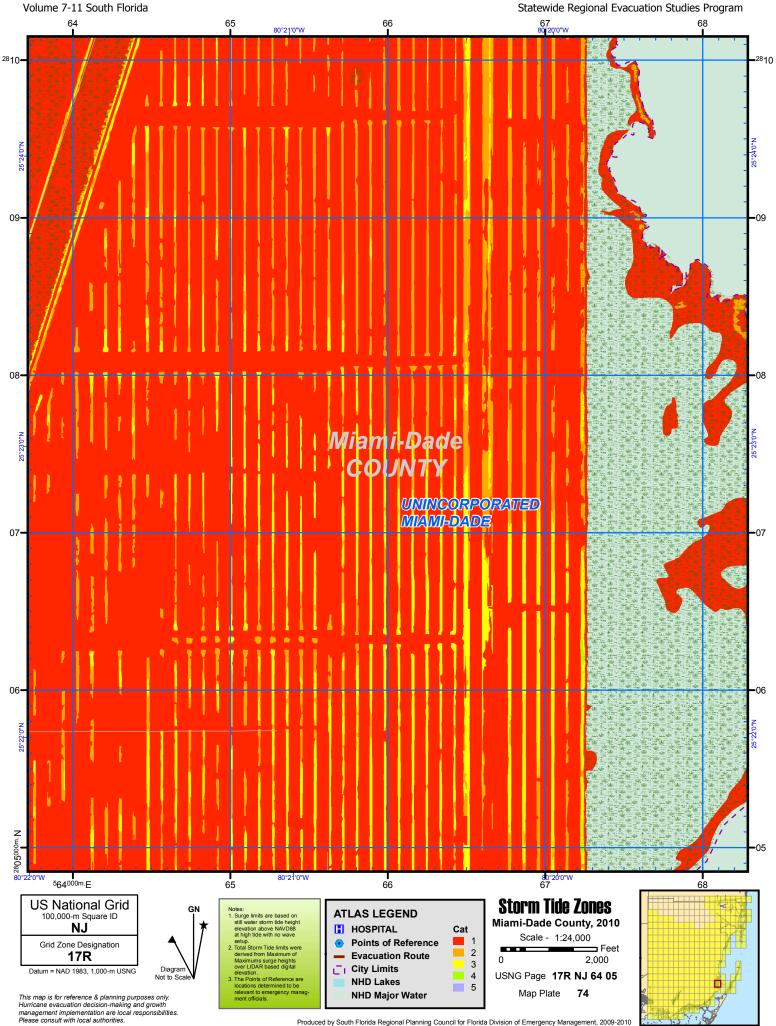
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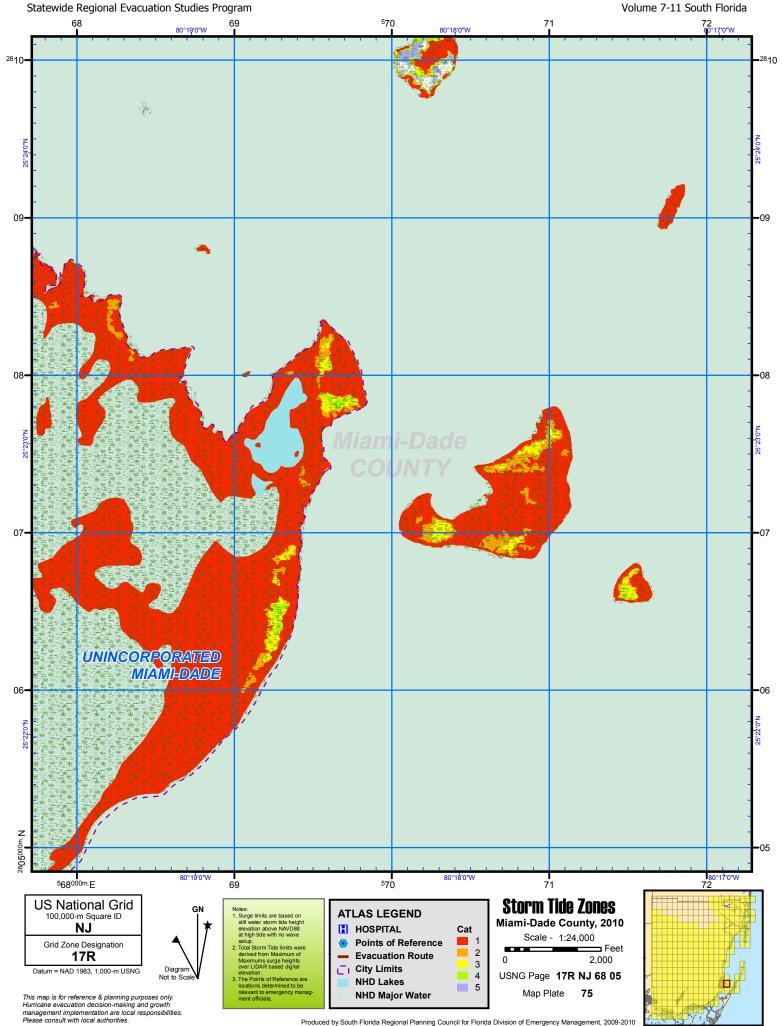
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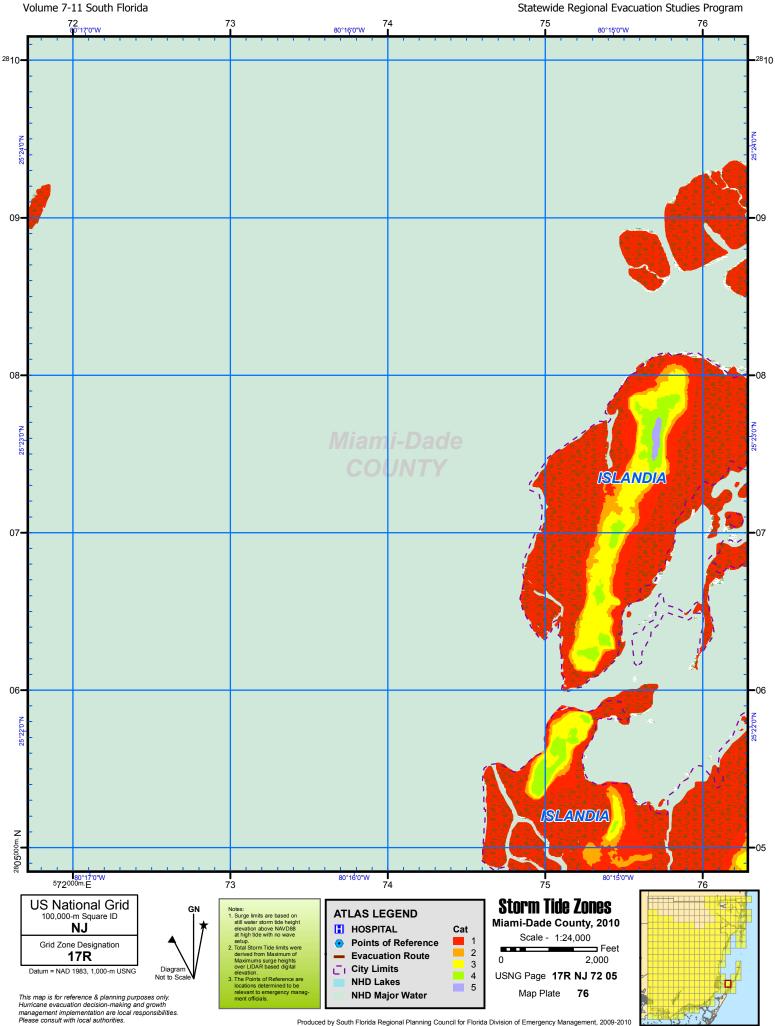
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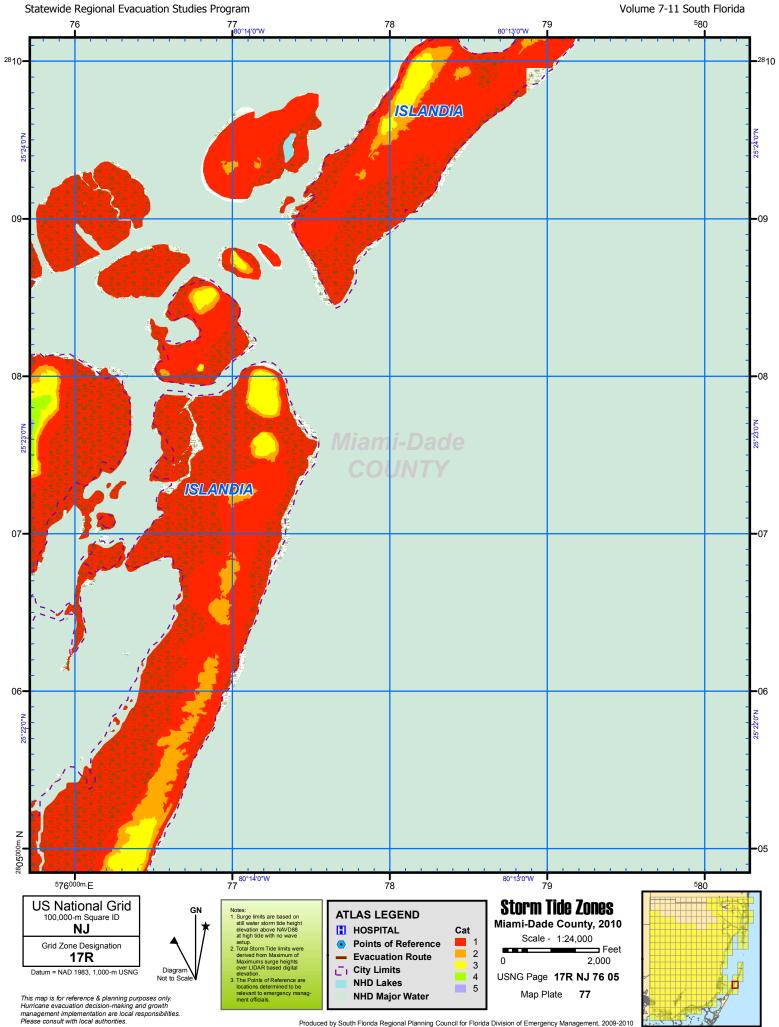
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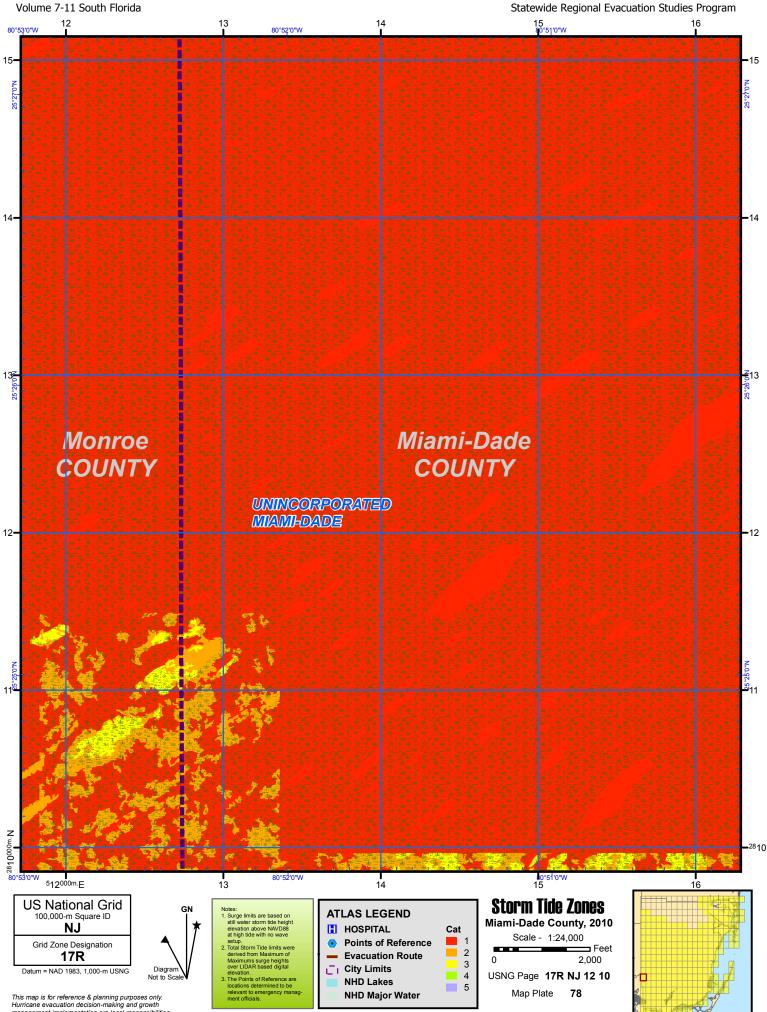
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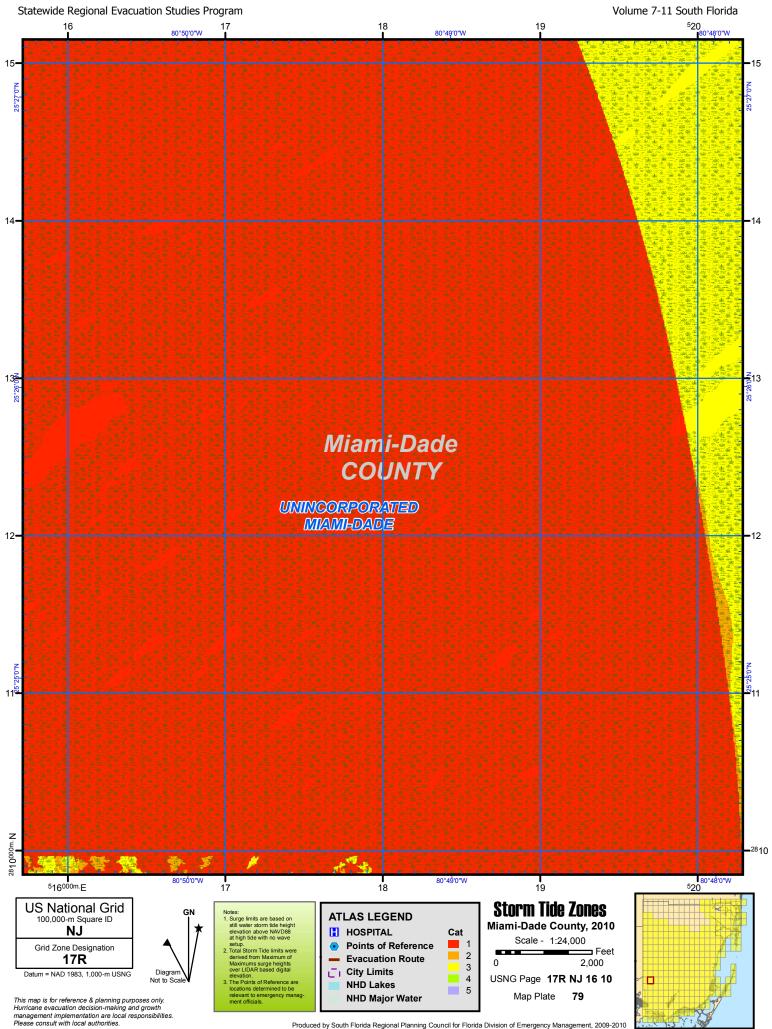
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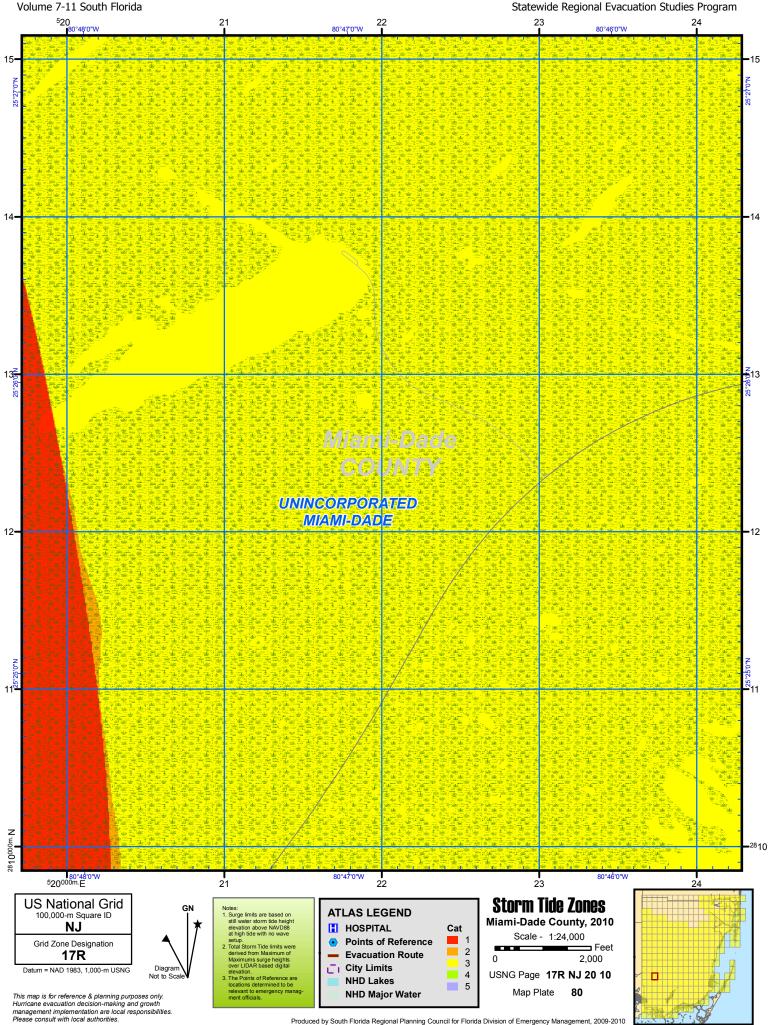
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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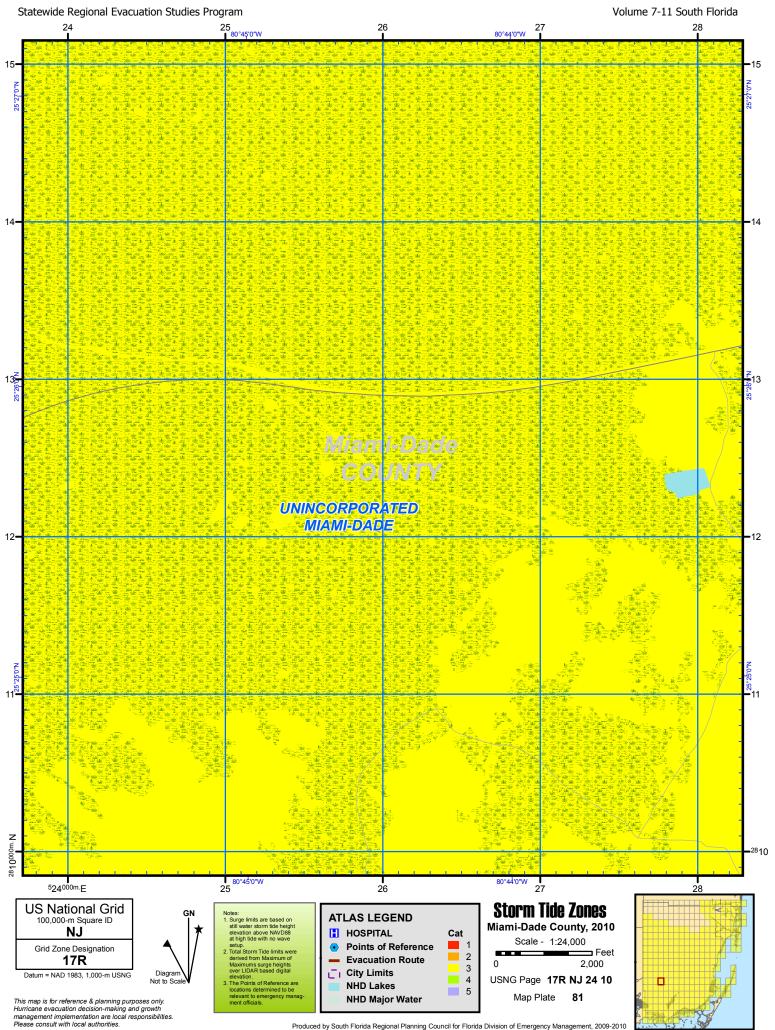
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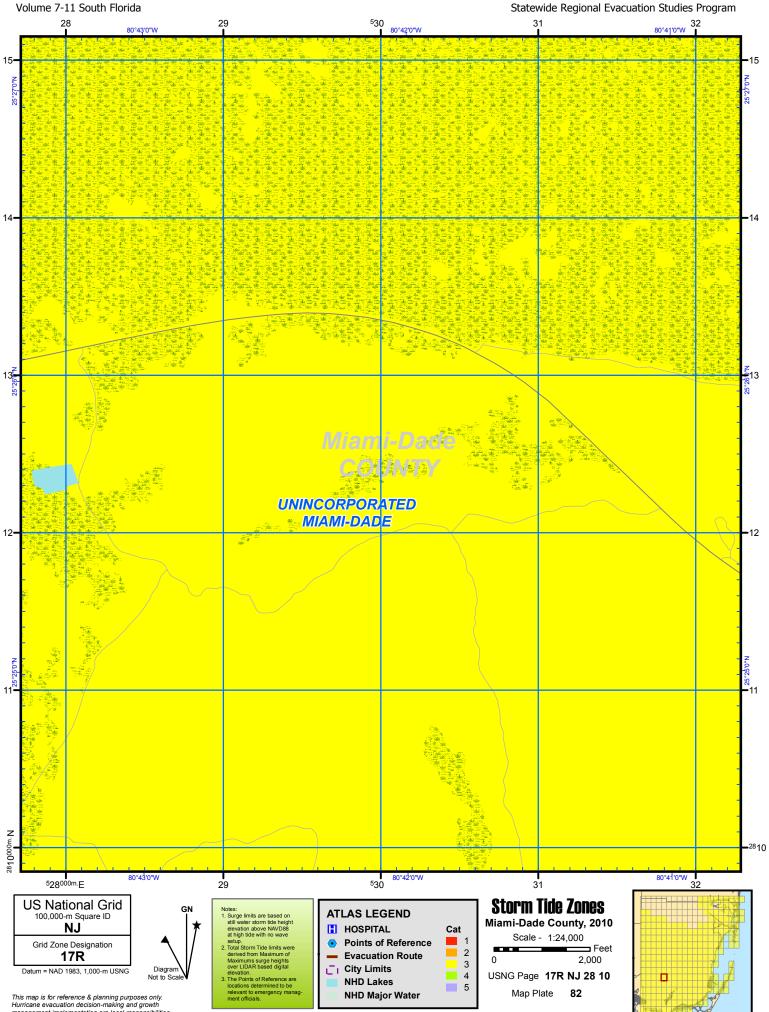
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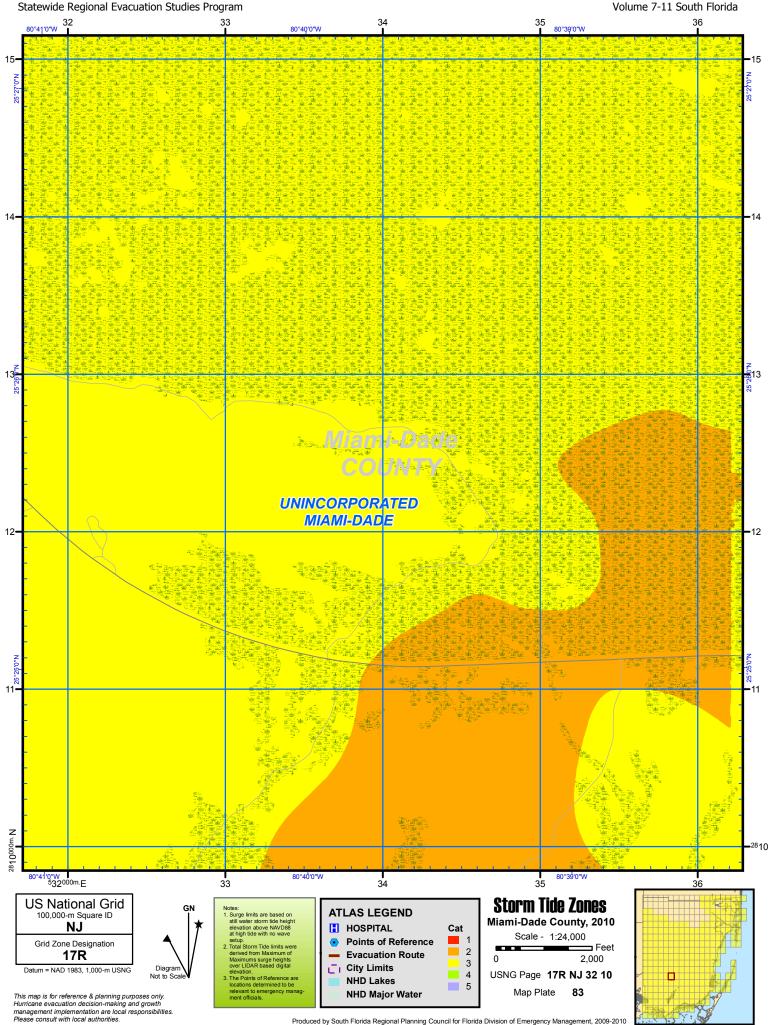
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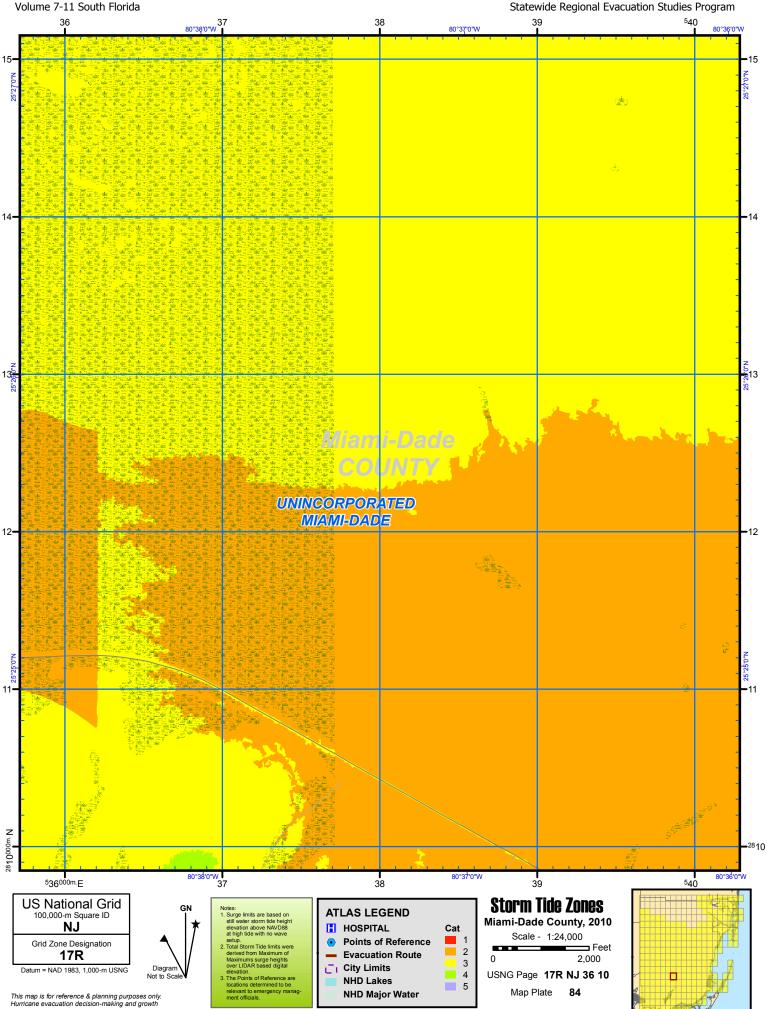
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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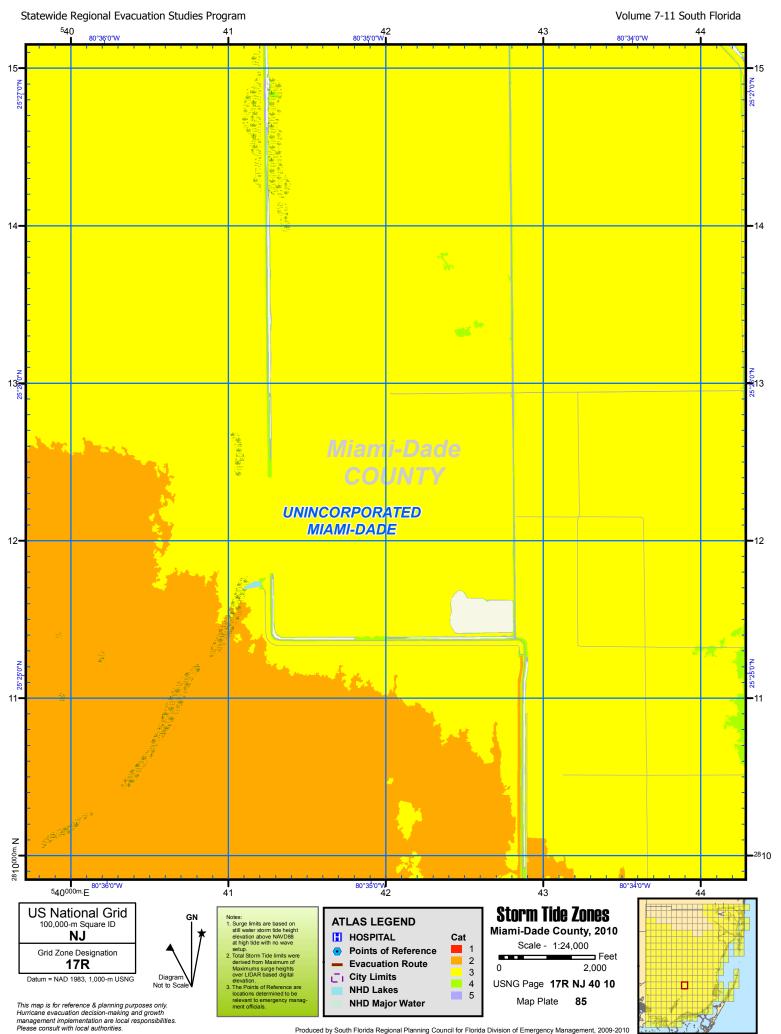


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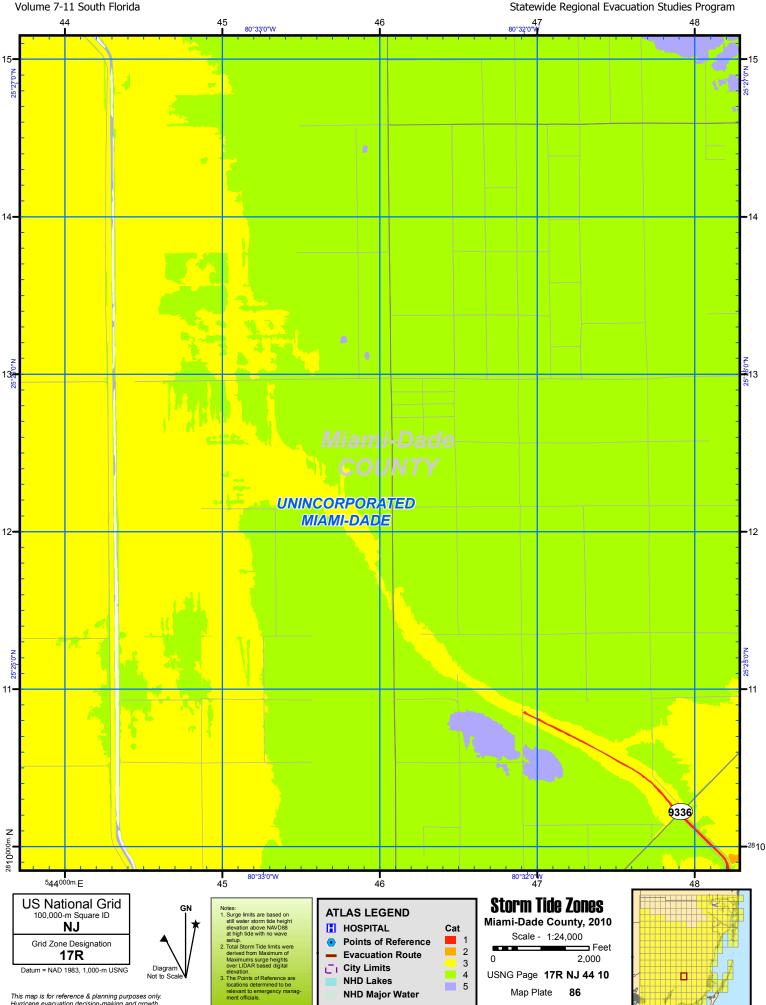


This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities. Book 2 - Page 104

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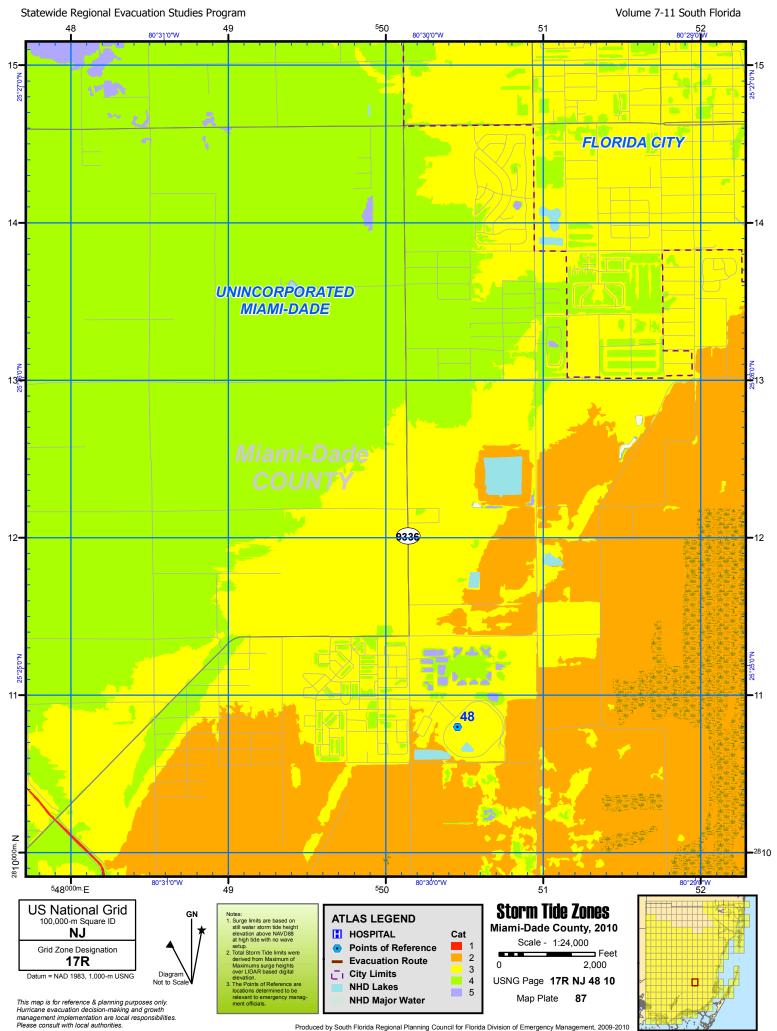
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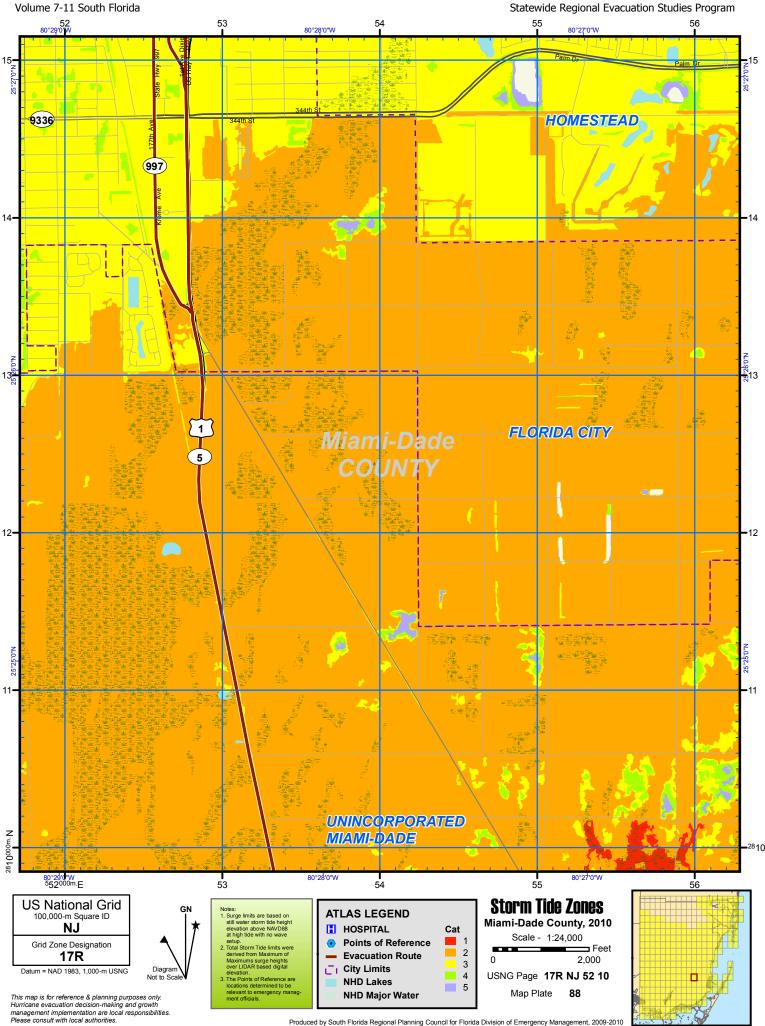
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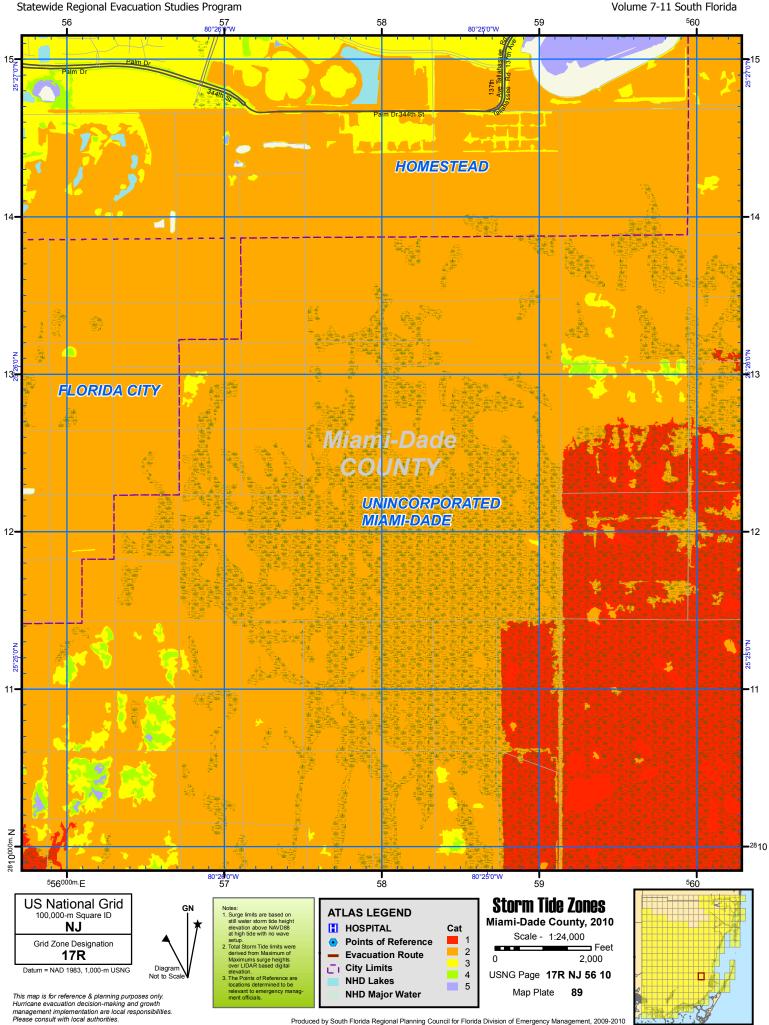
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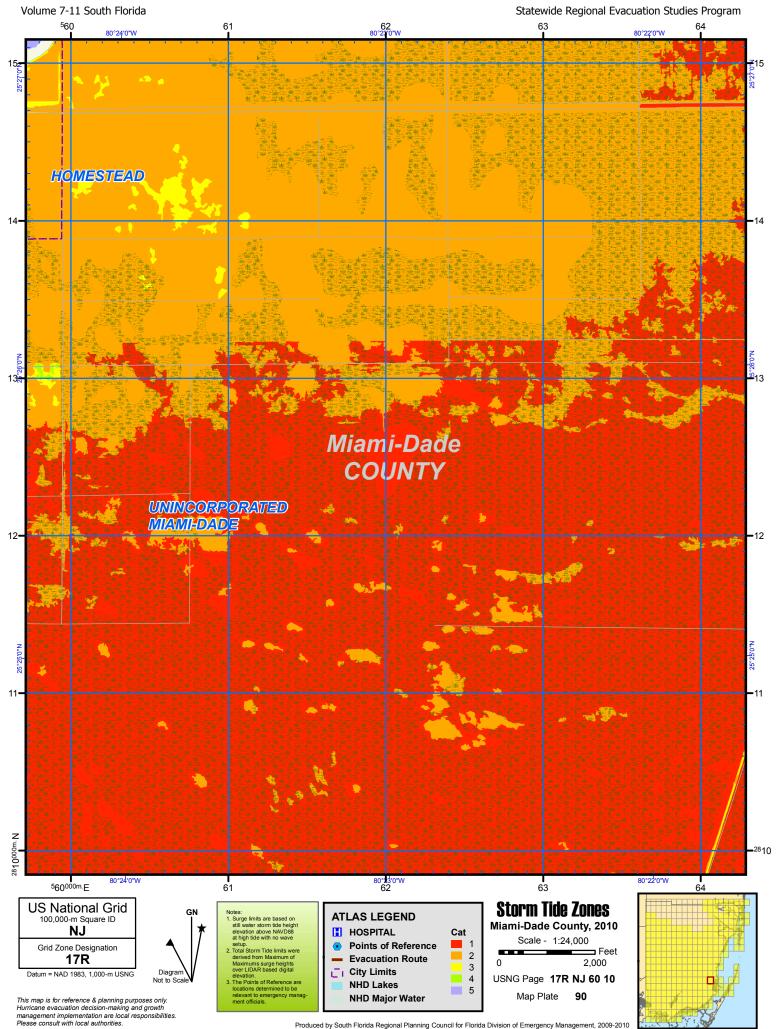
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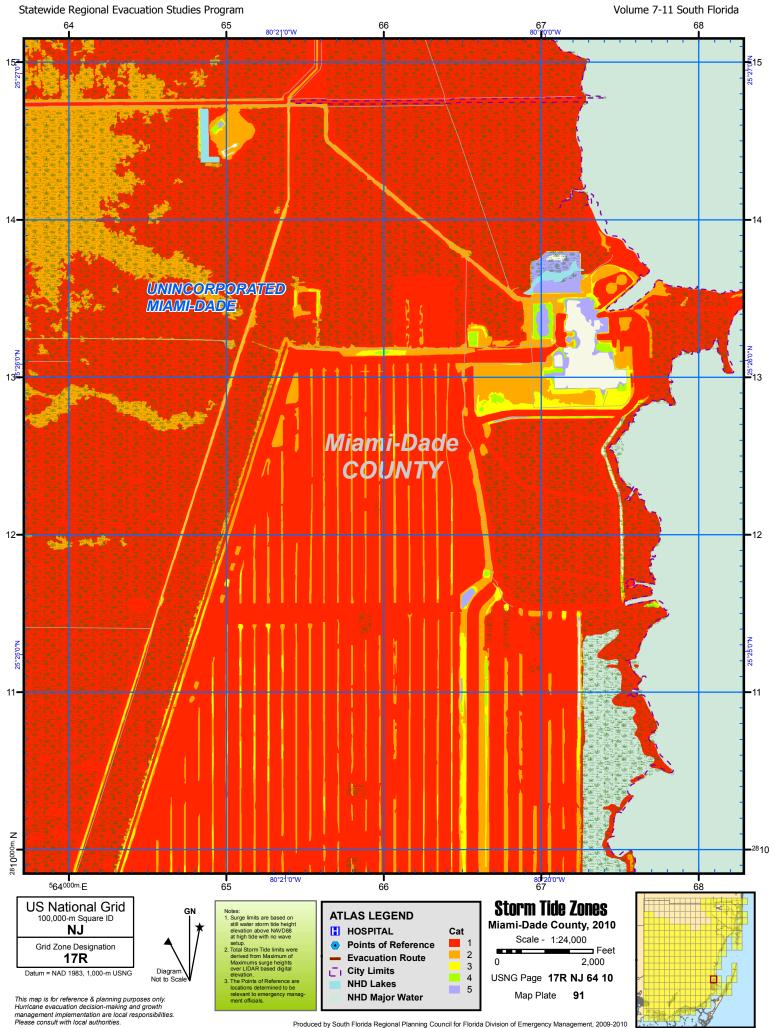
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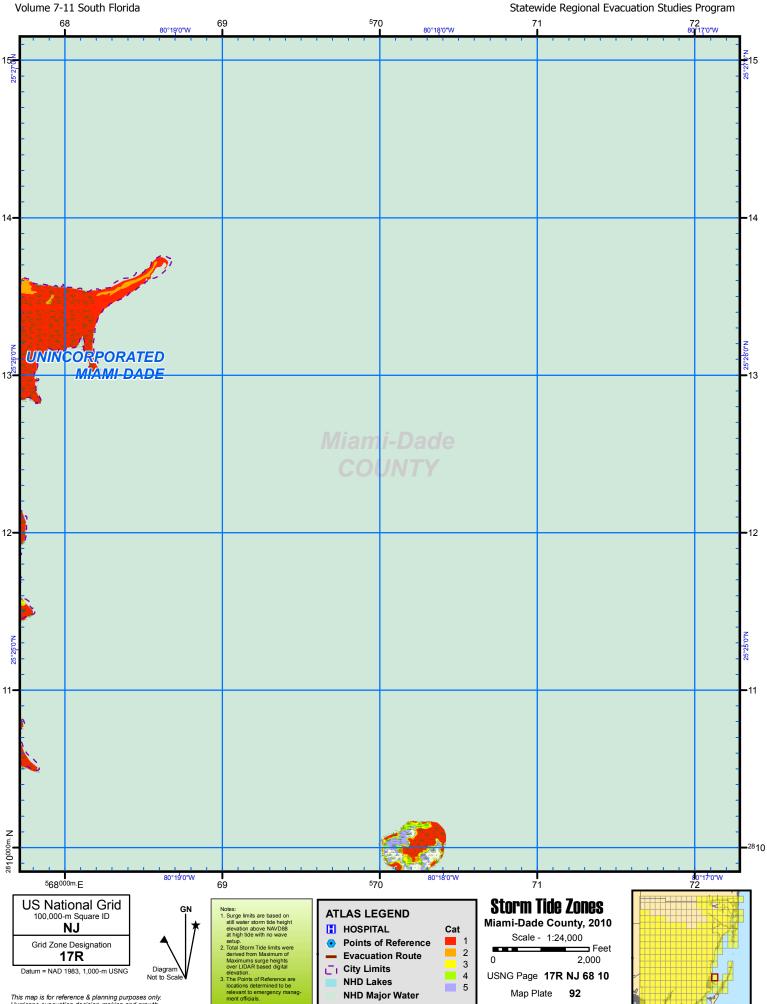
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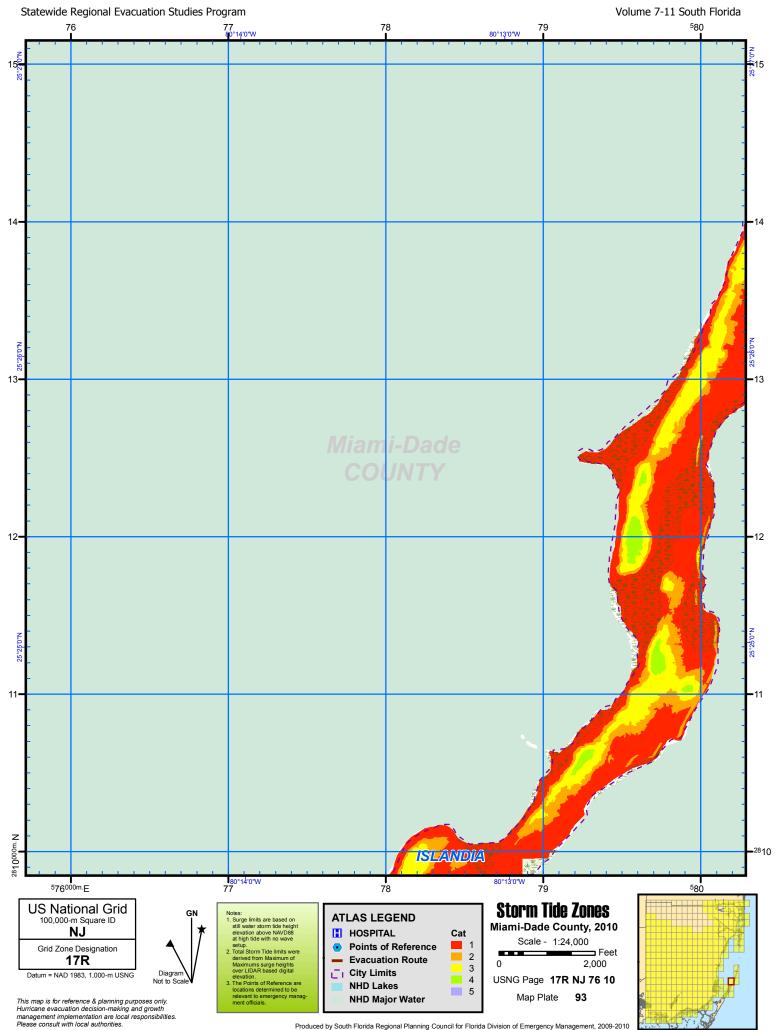


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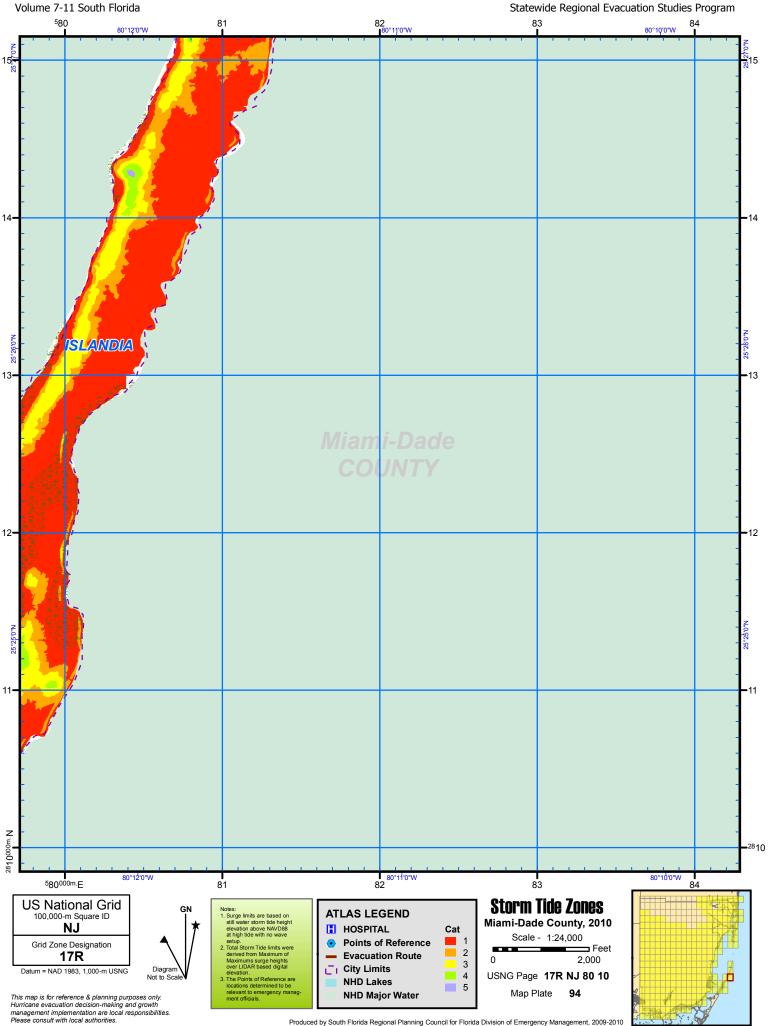


This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities. Book 2 - Page 112

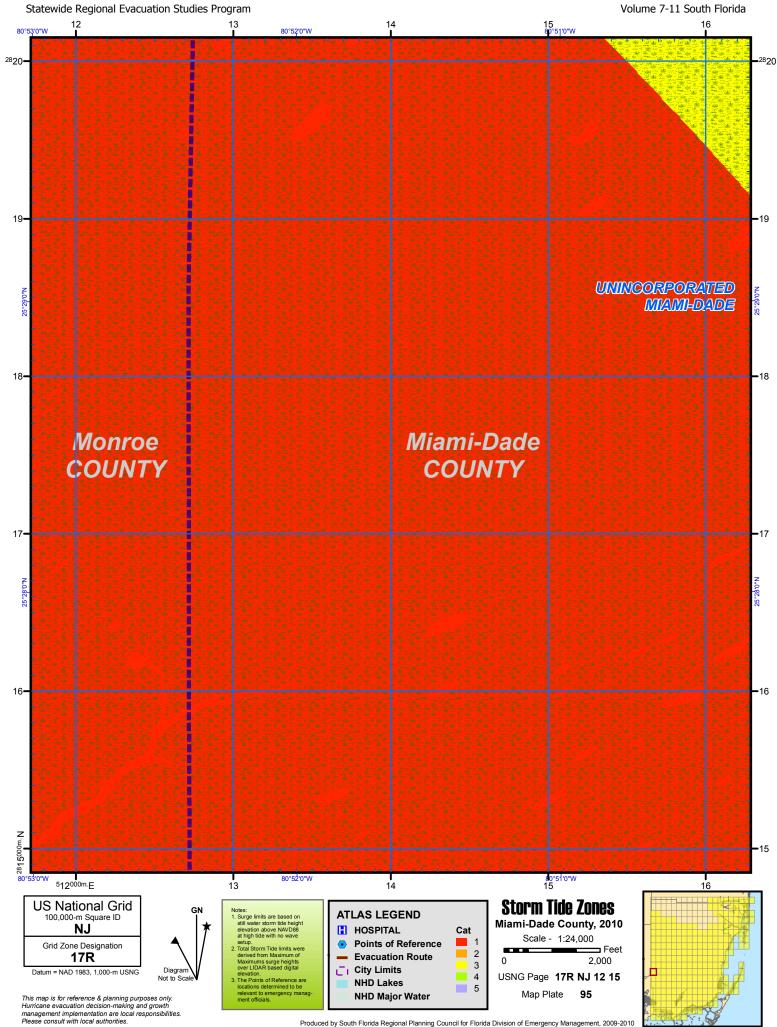
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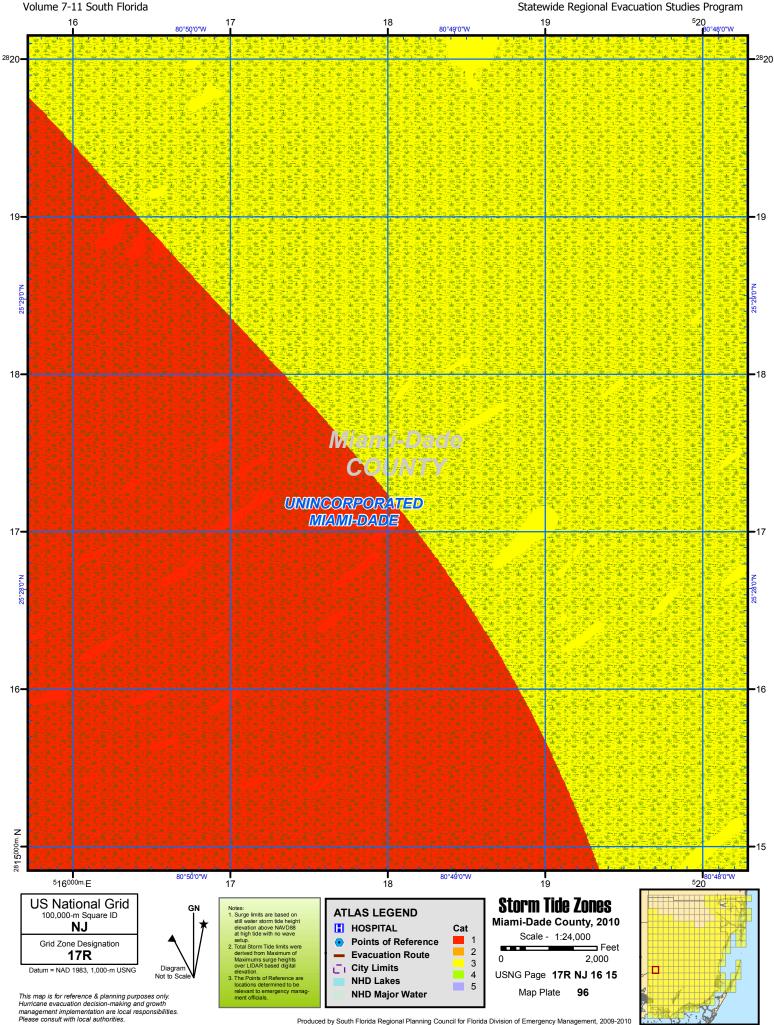
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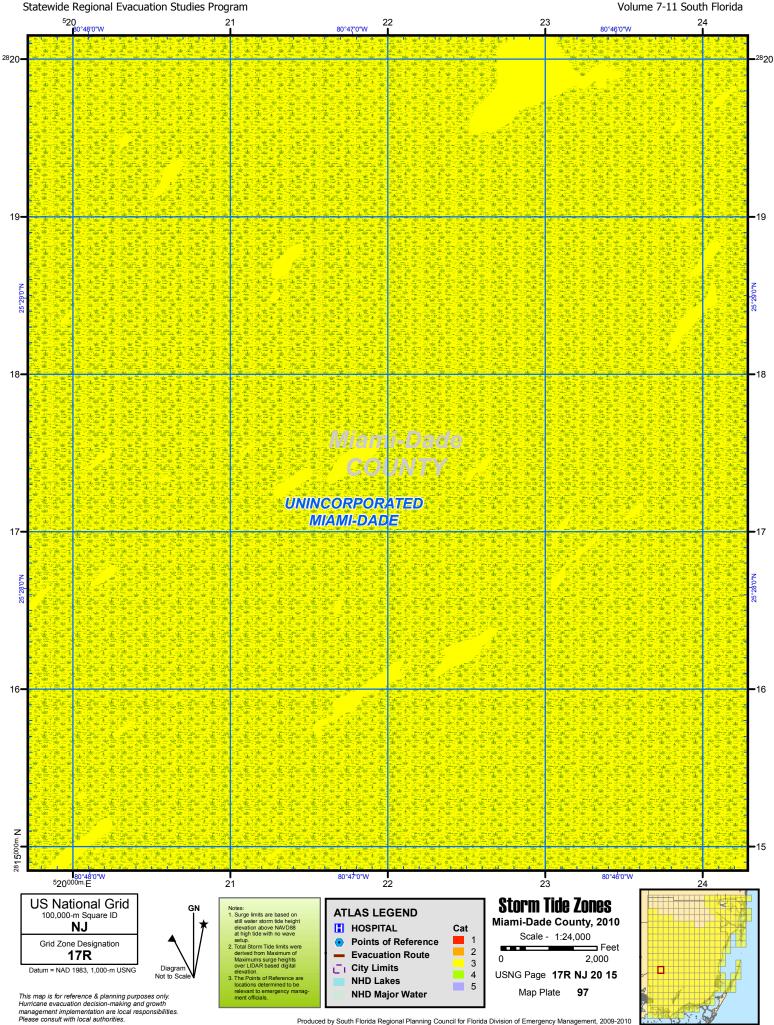
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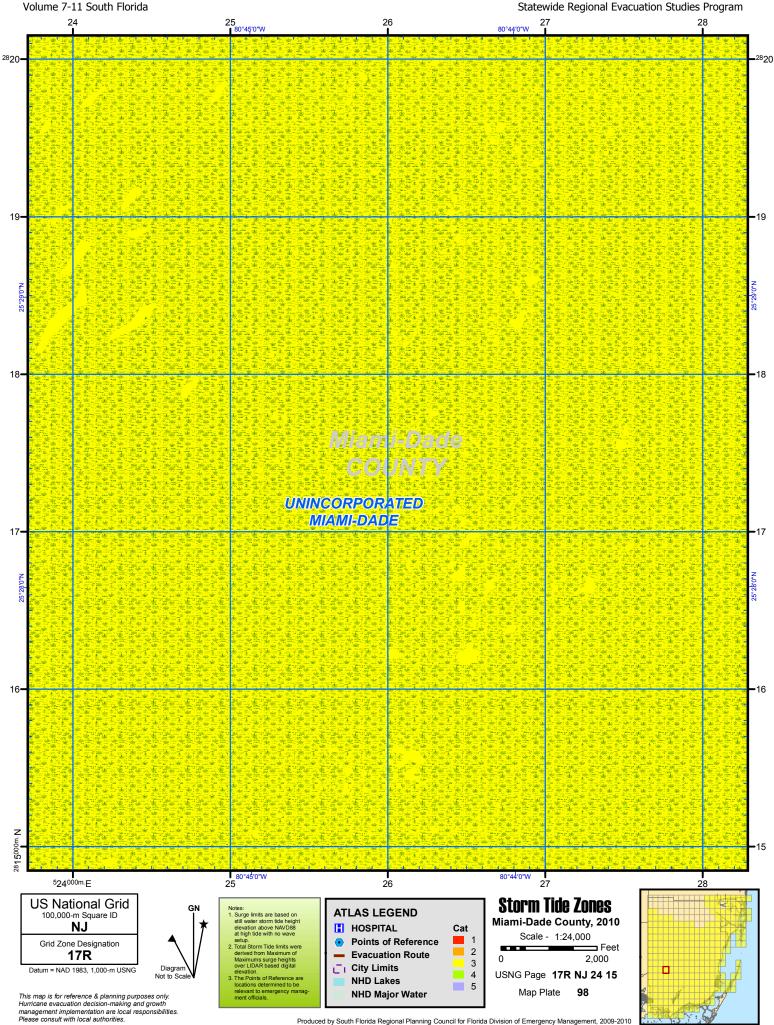
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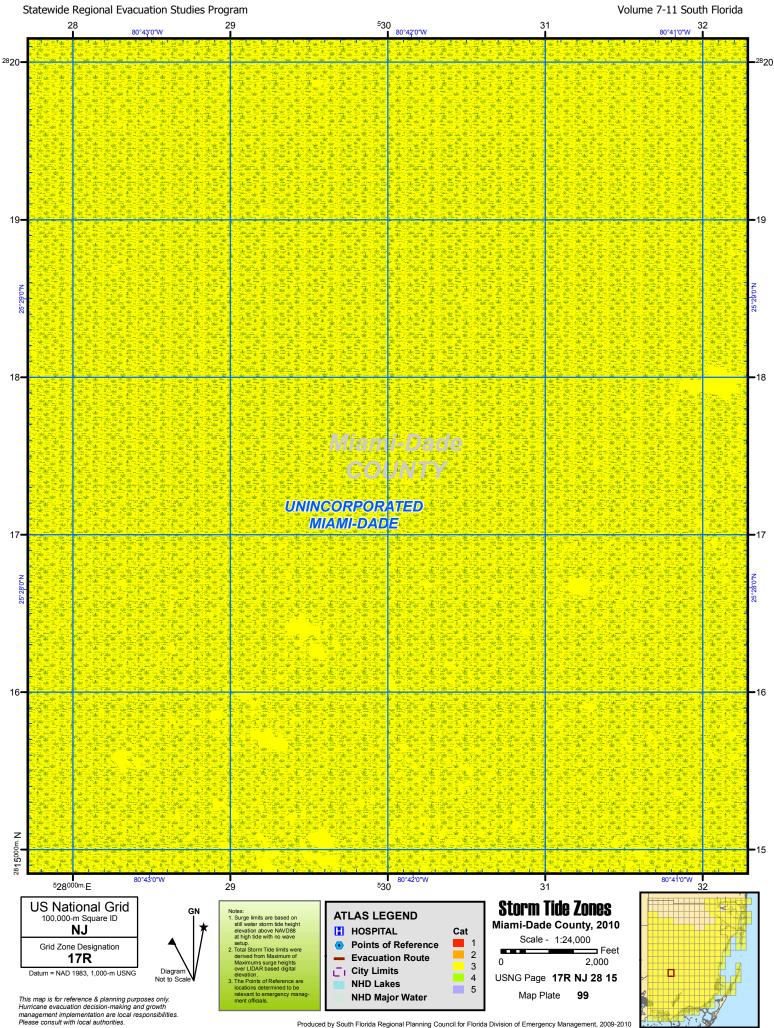
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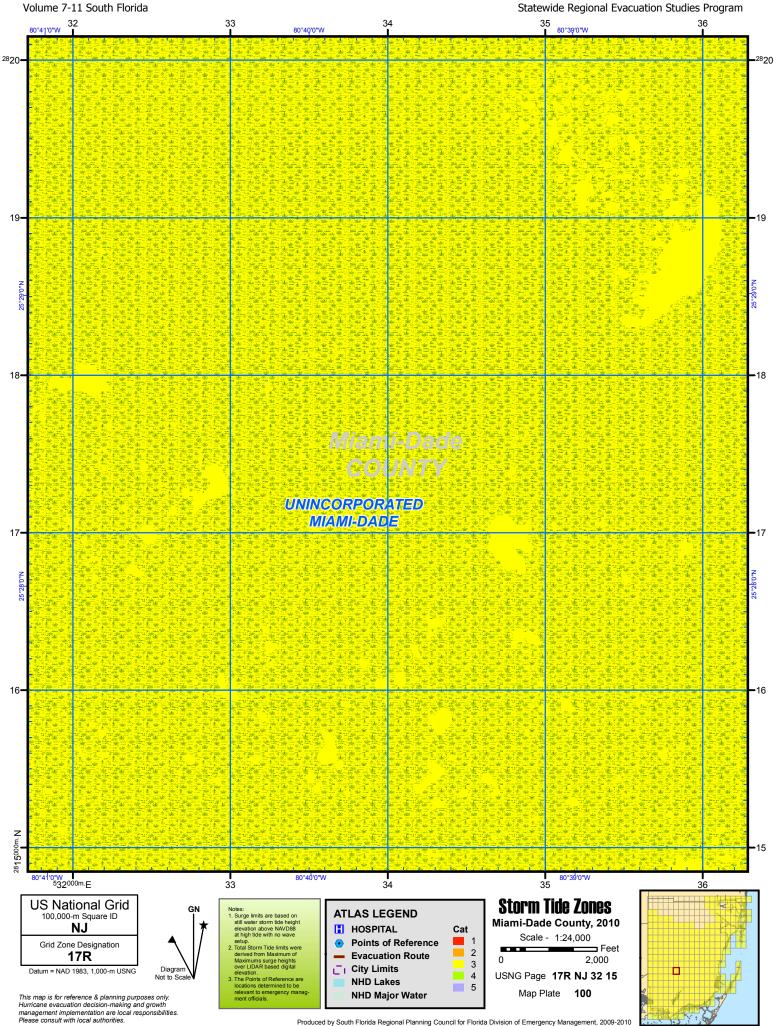
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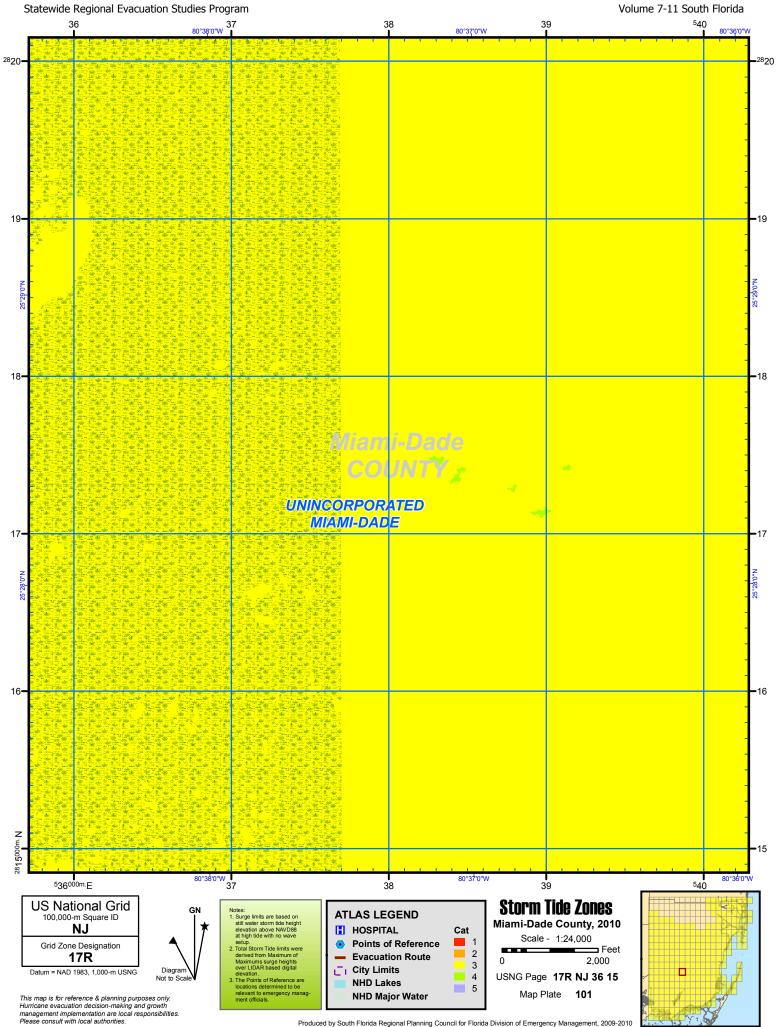
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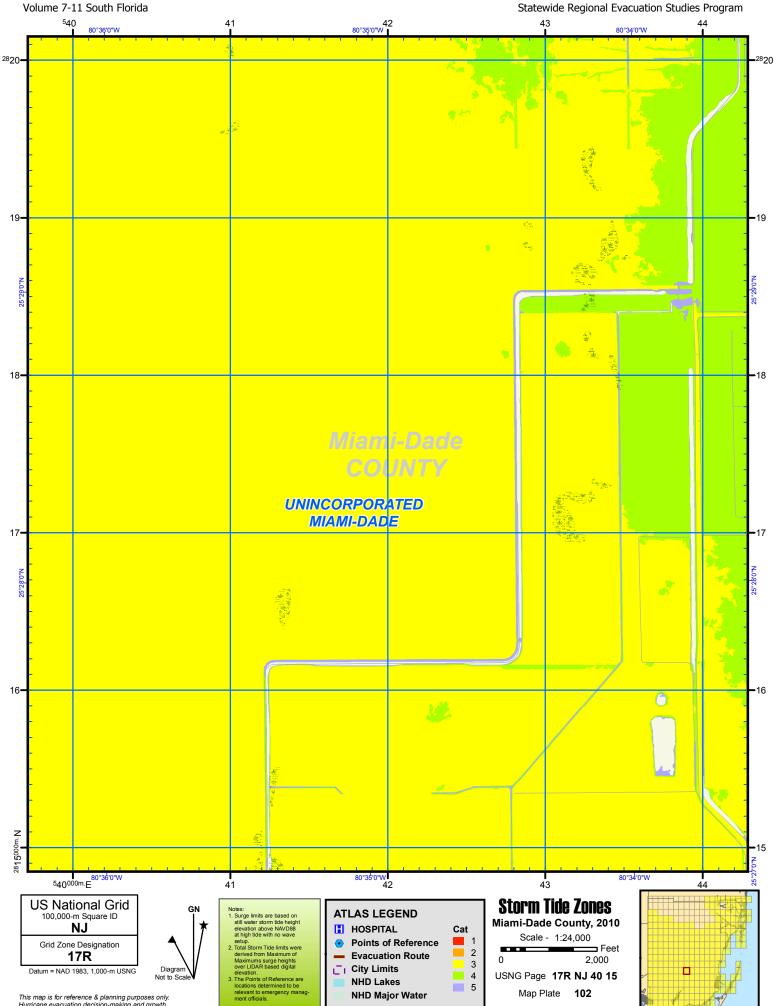
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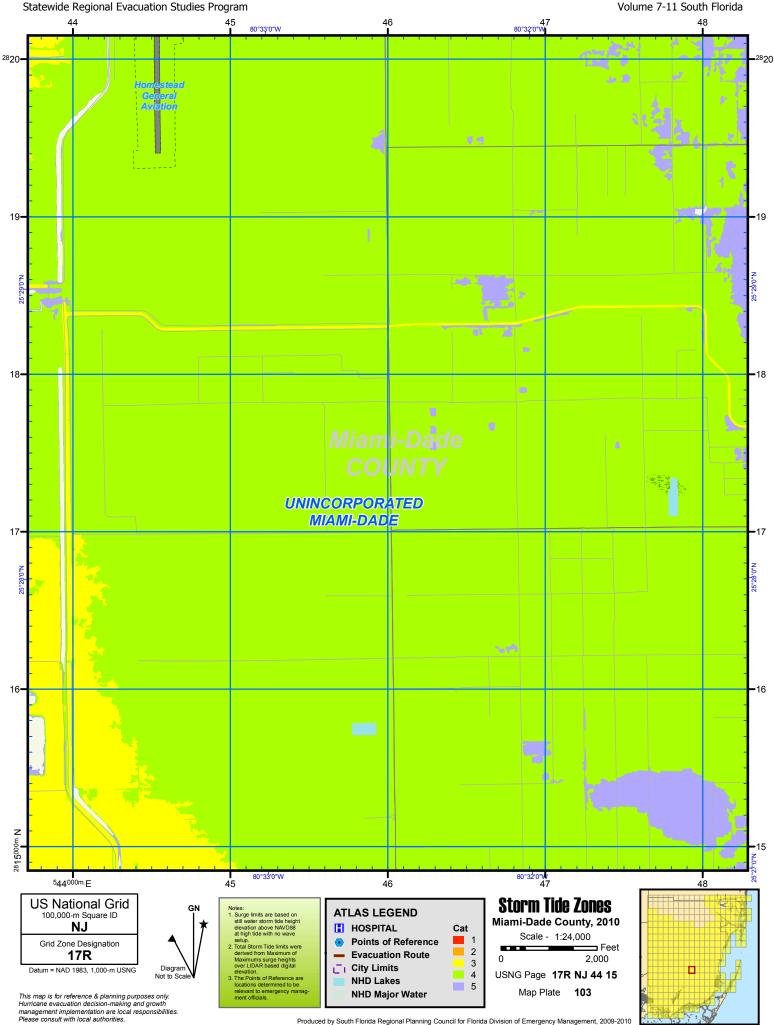
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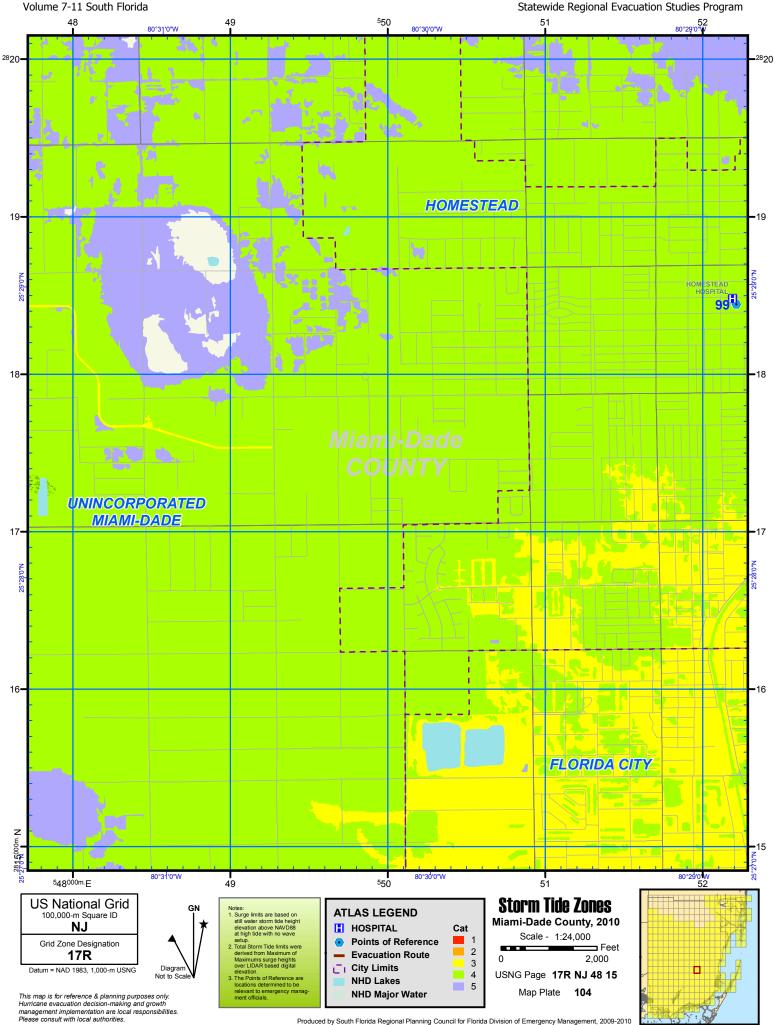
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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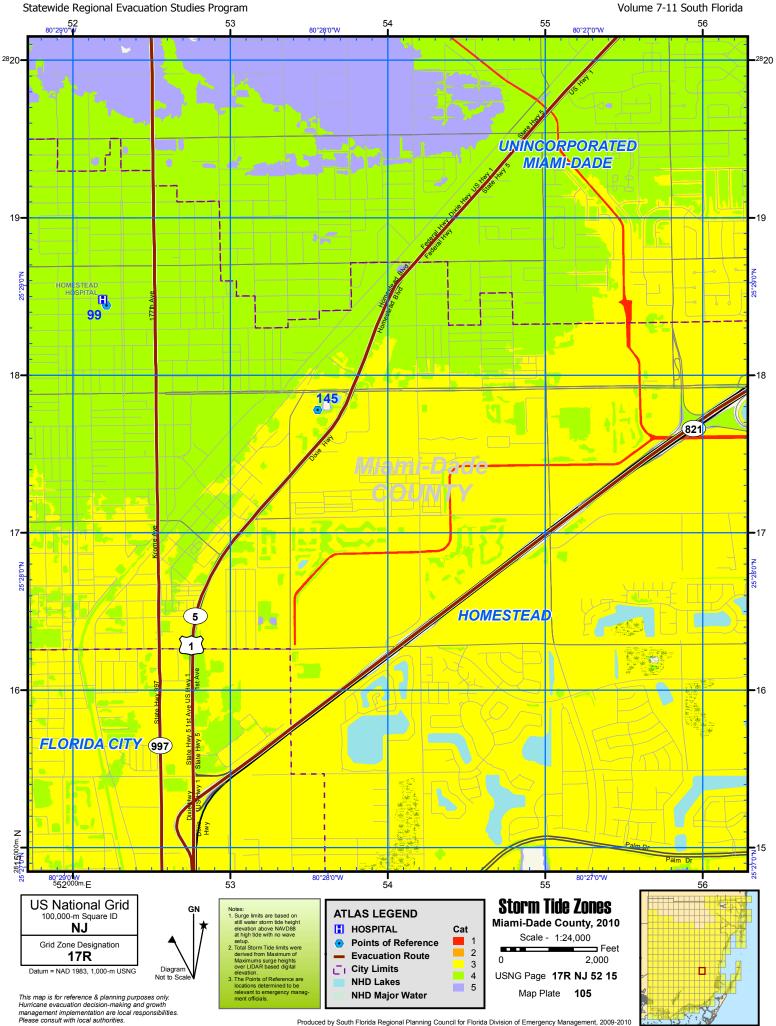
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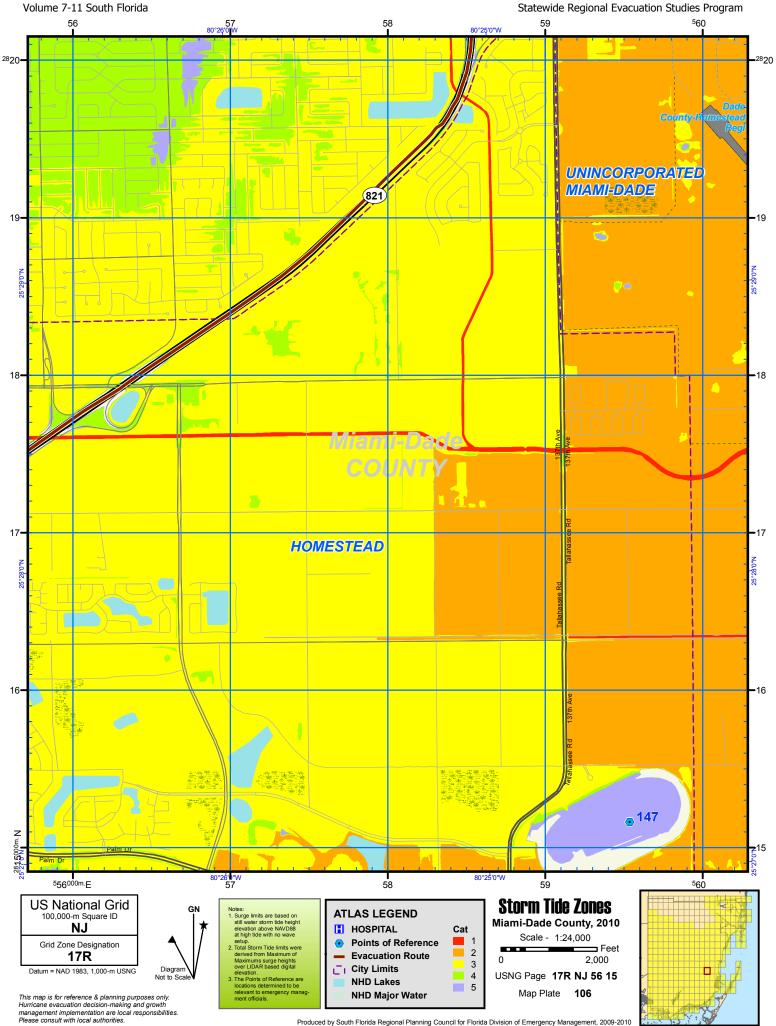
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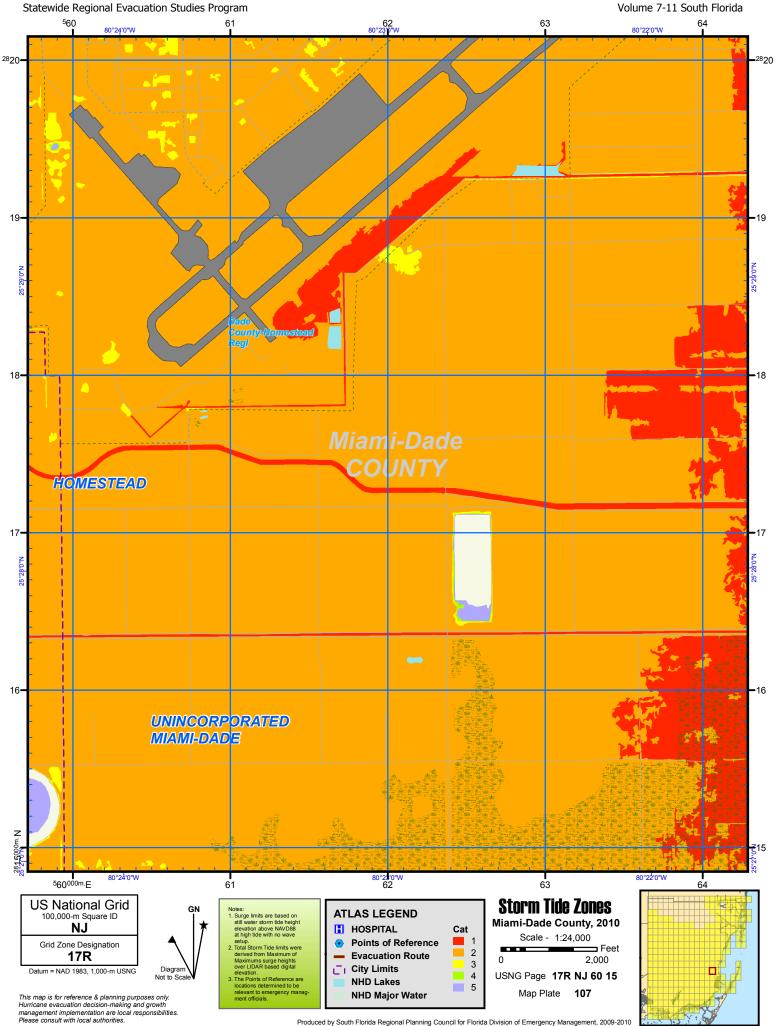
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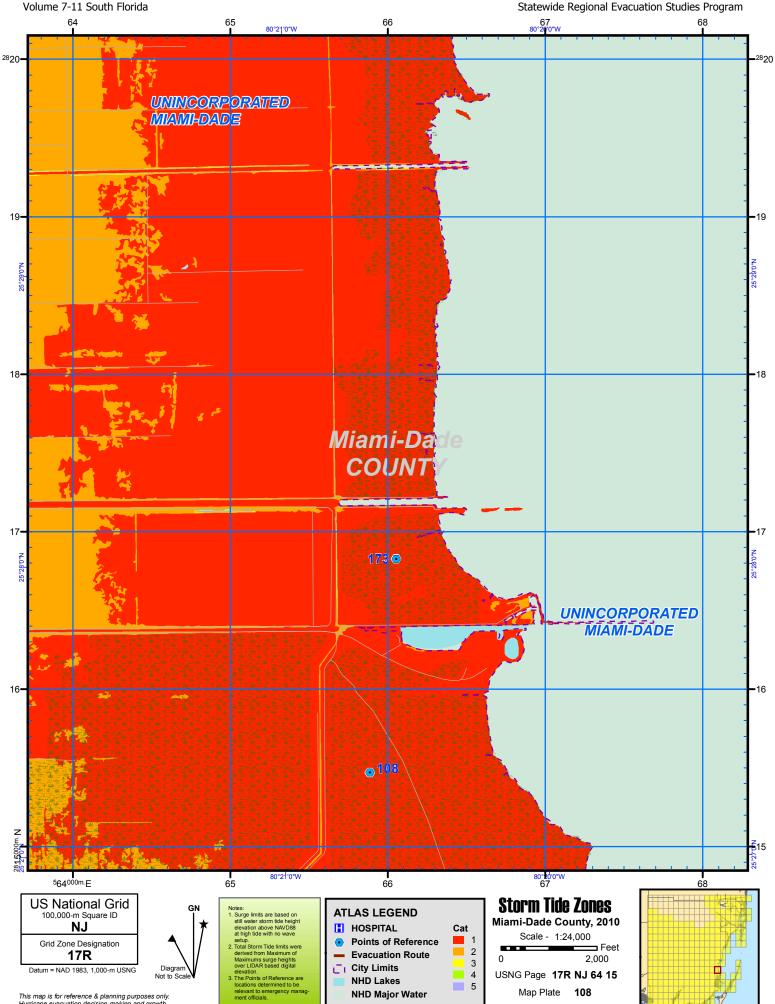
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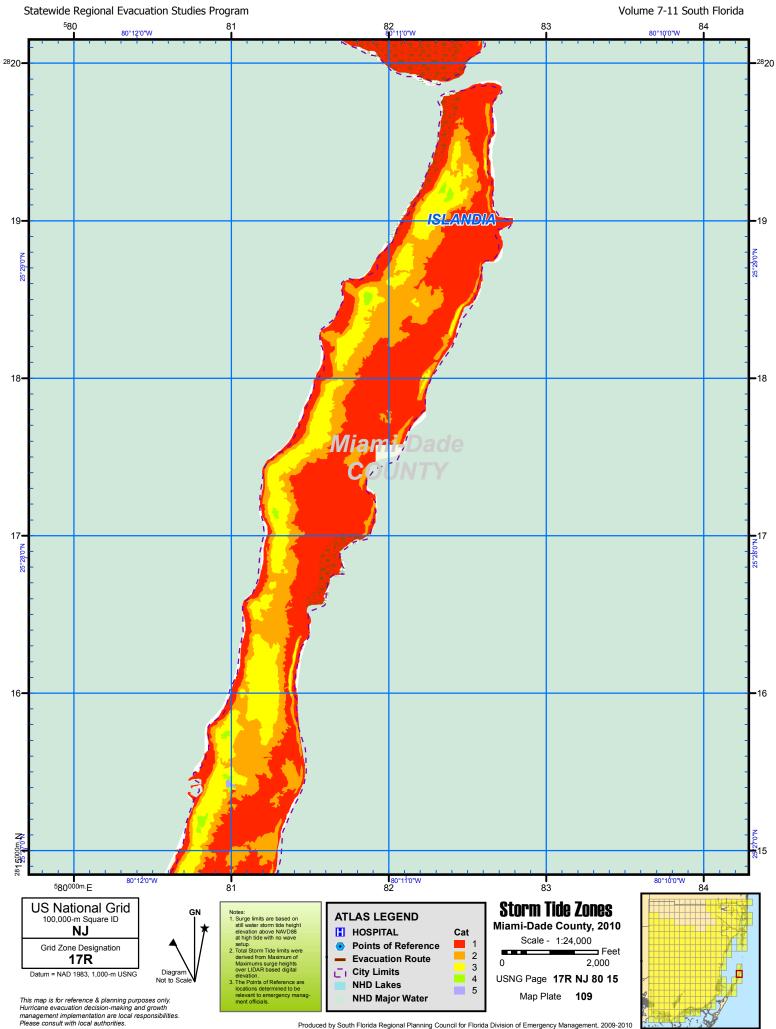
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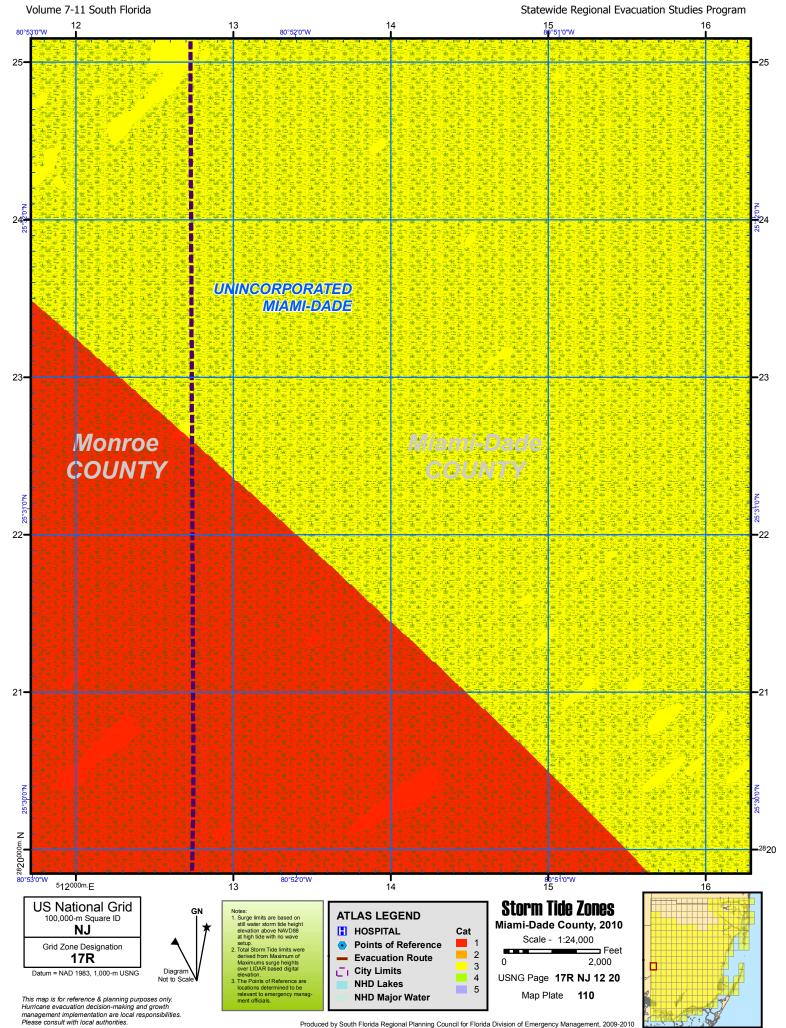
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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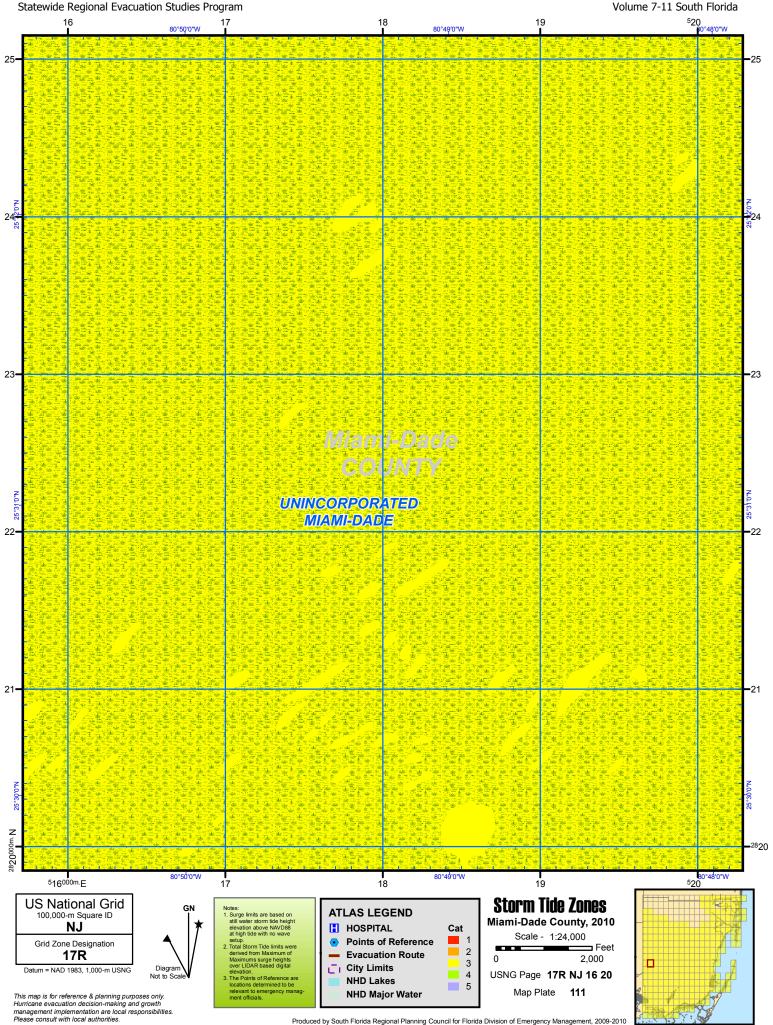
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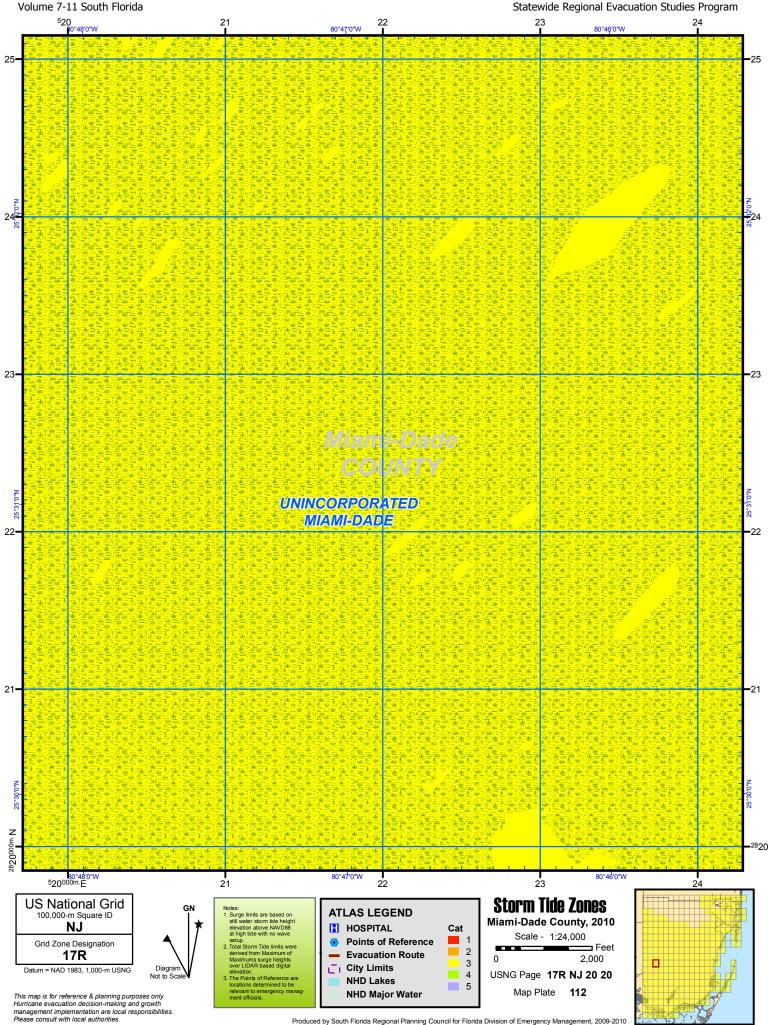
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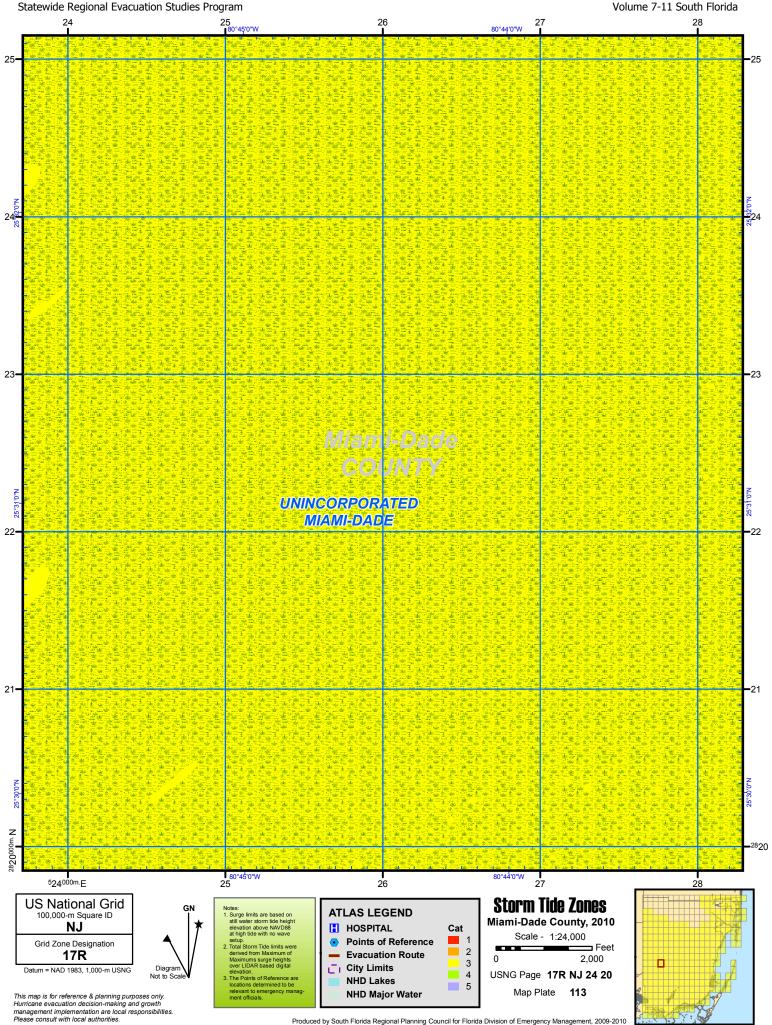
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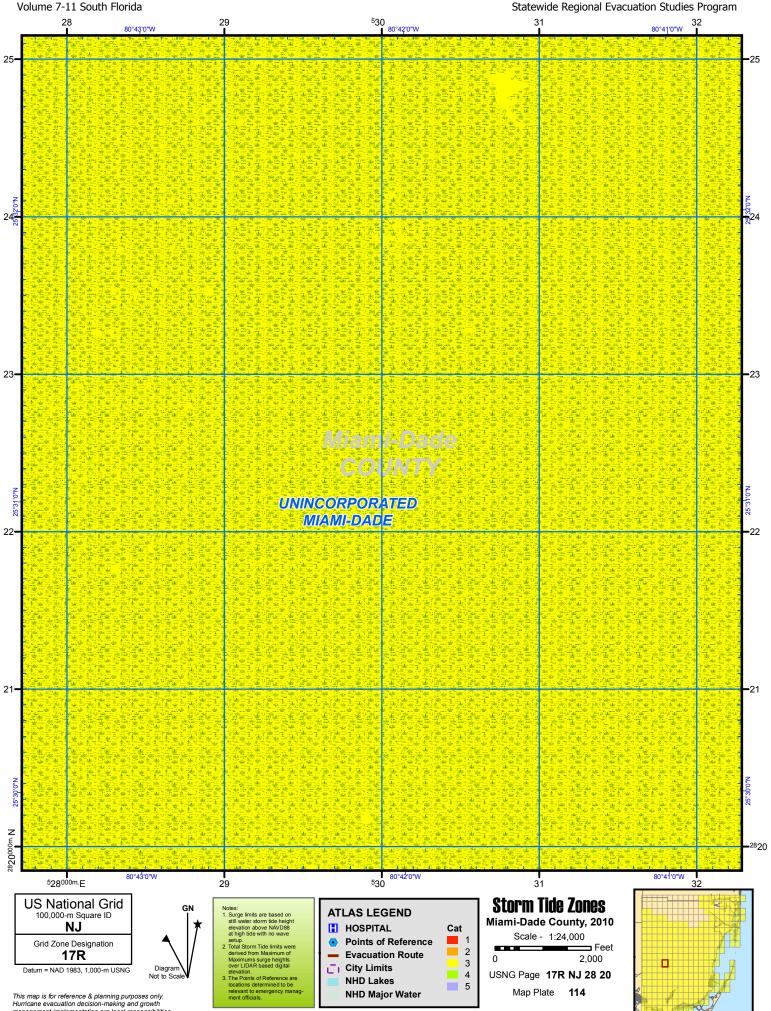
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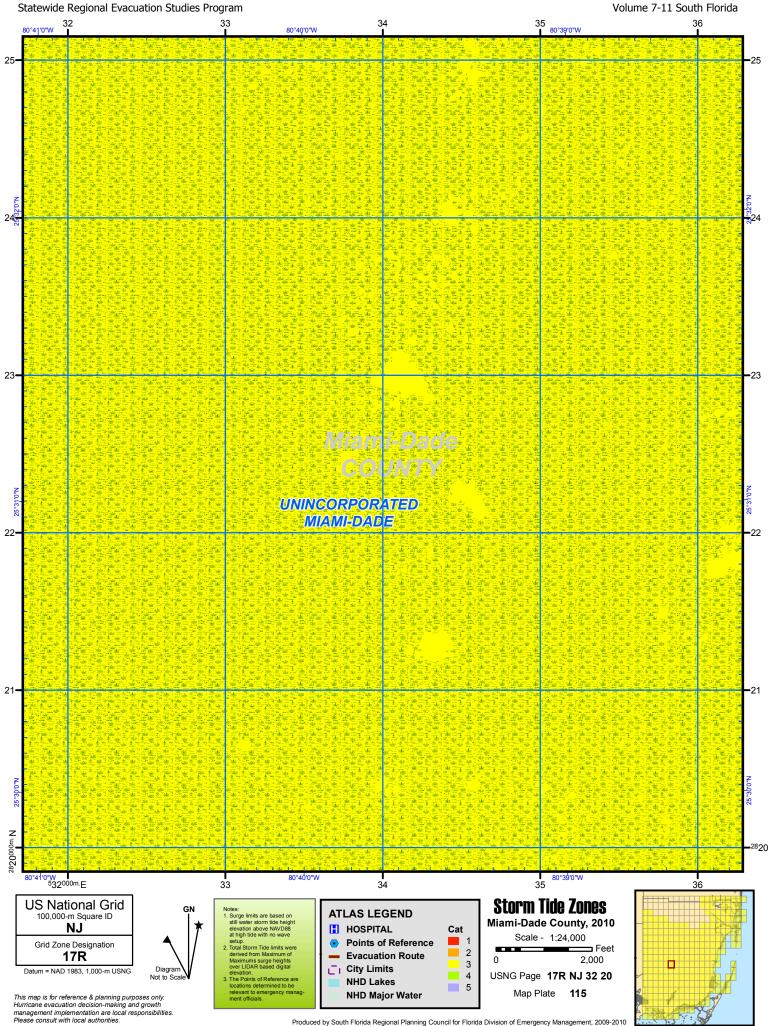
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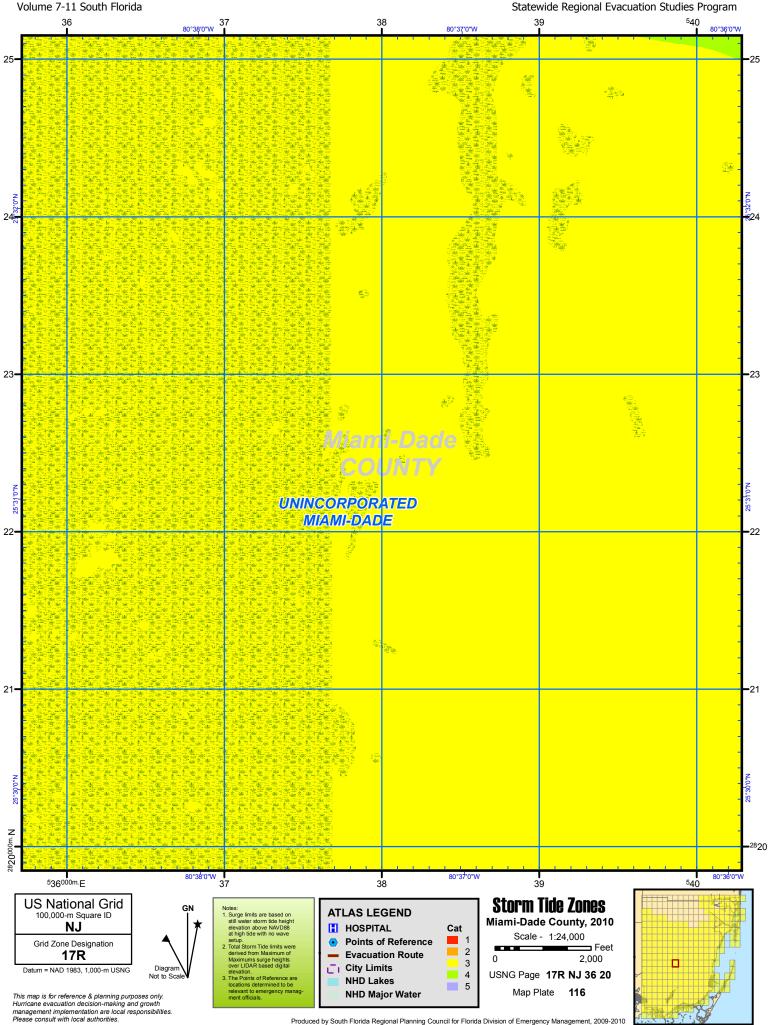
This map is for reference & planning purposes only. Hurricane evacuation decision-making and growth management implementation are local responsibilities. Please consult with local authorities.

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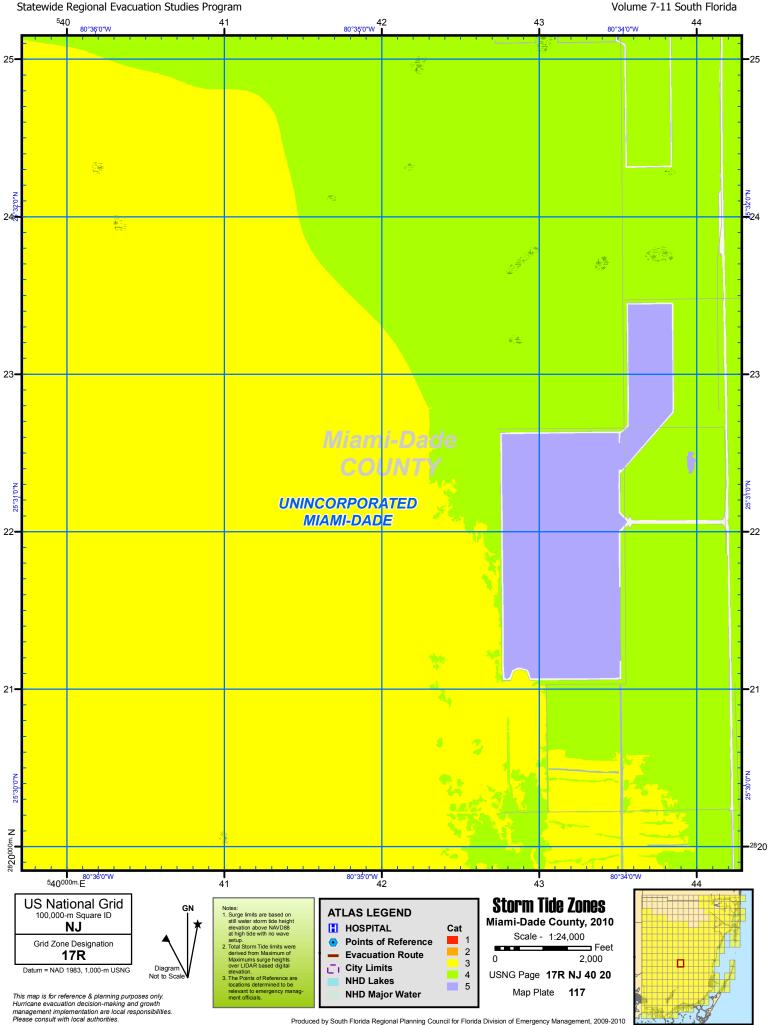
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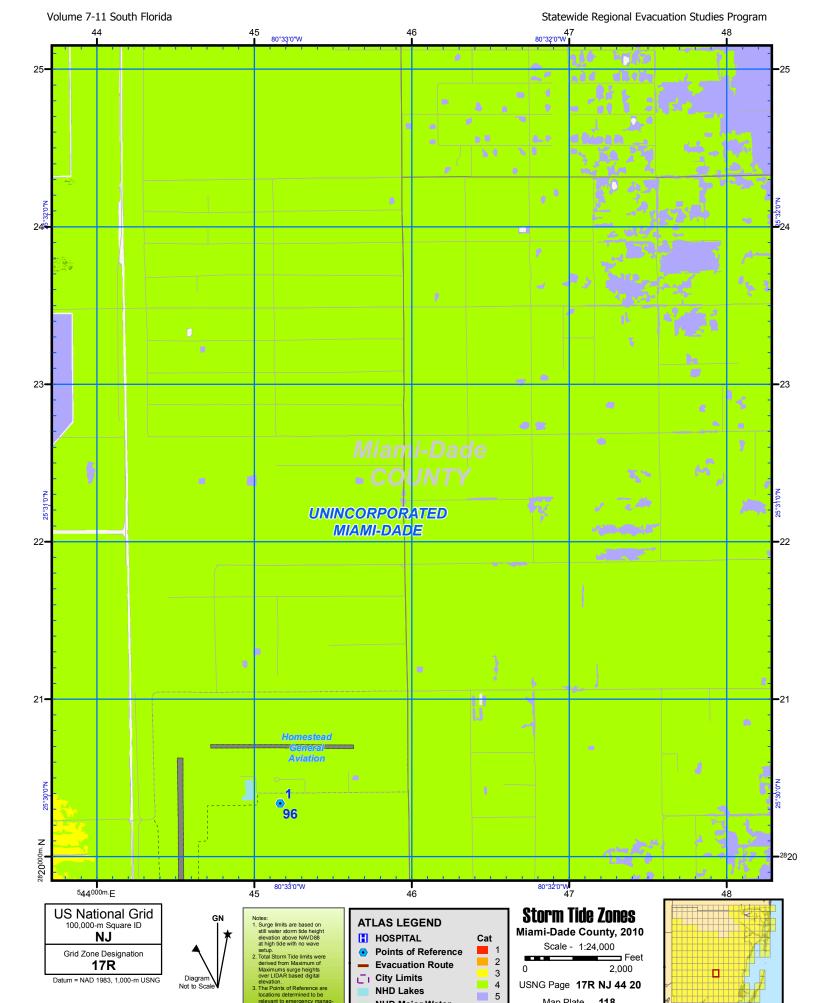
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Produced by South Florida Regional Planning Council for Florida Division of Emergency Management, 2009-2010



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NHD Major Water

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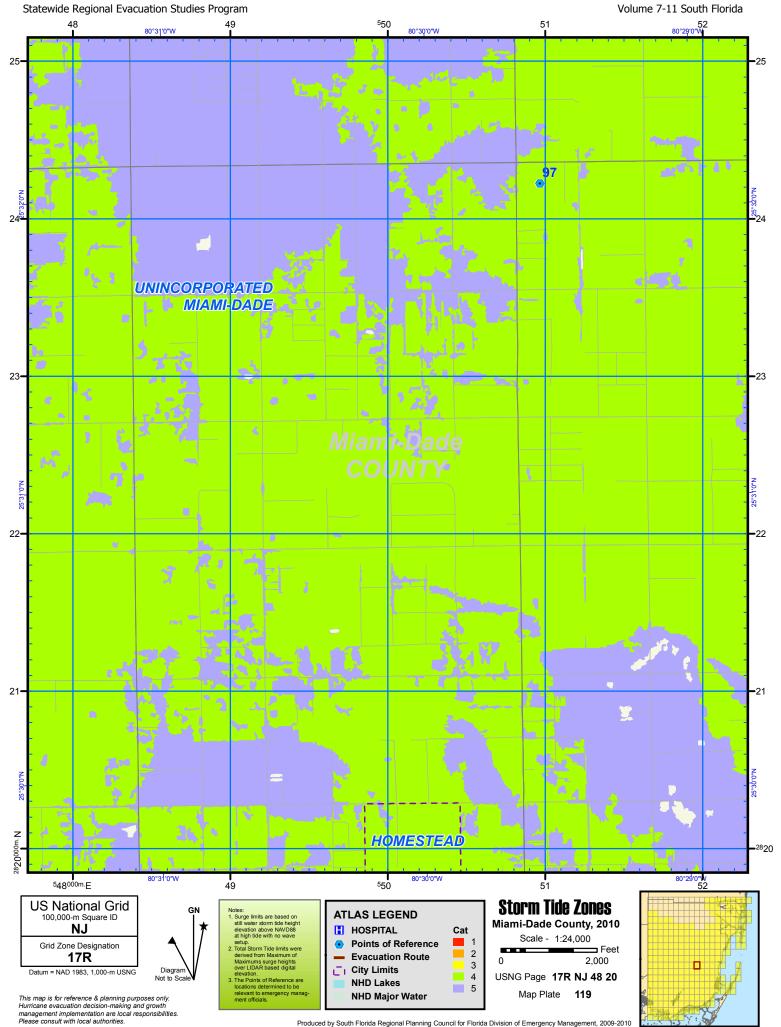
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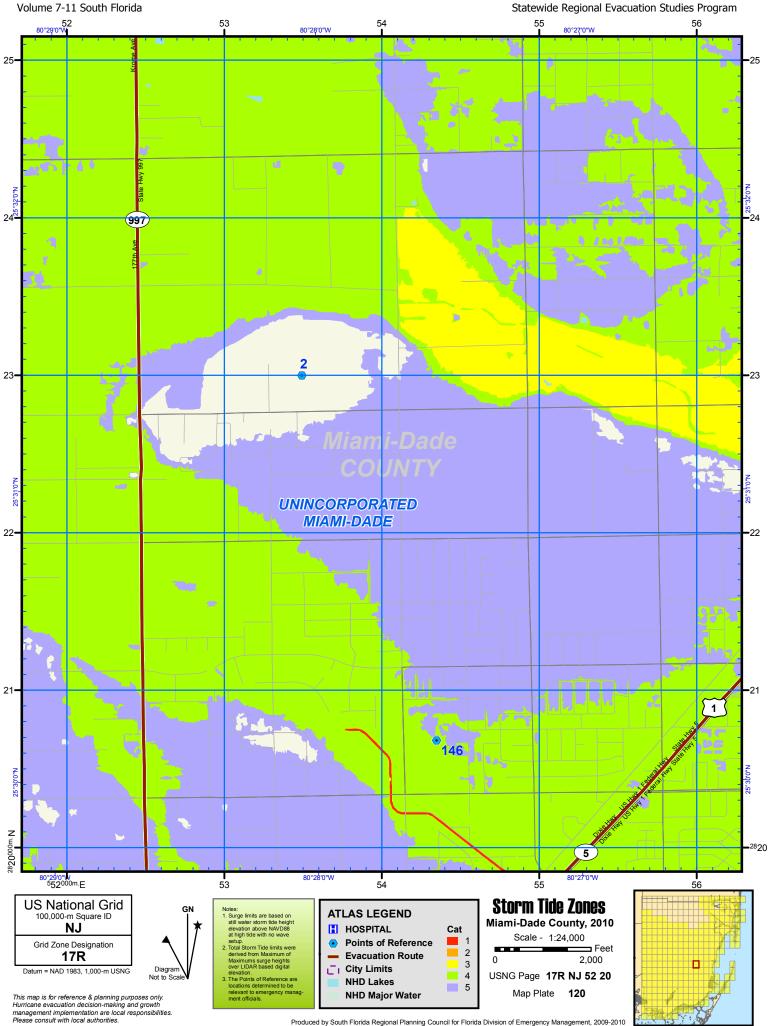
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Map Plate

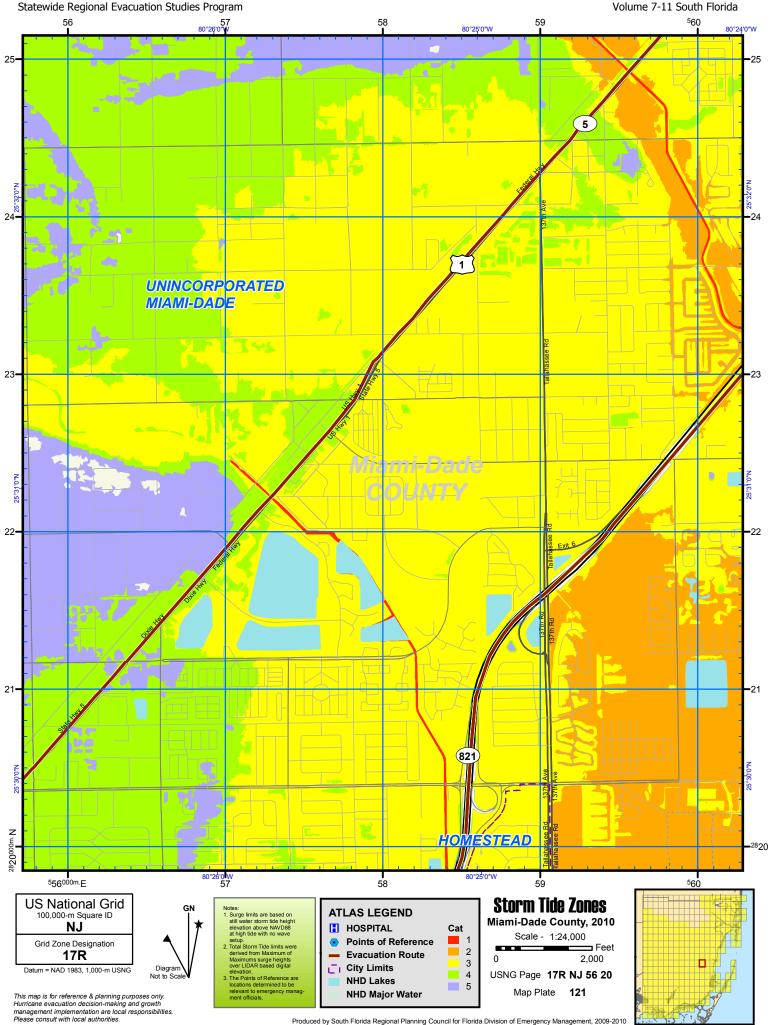
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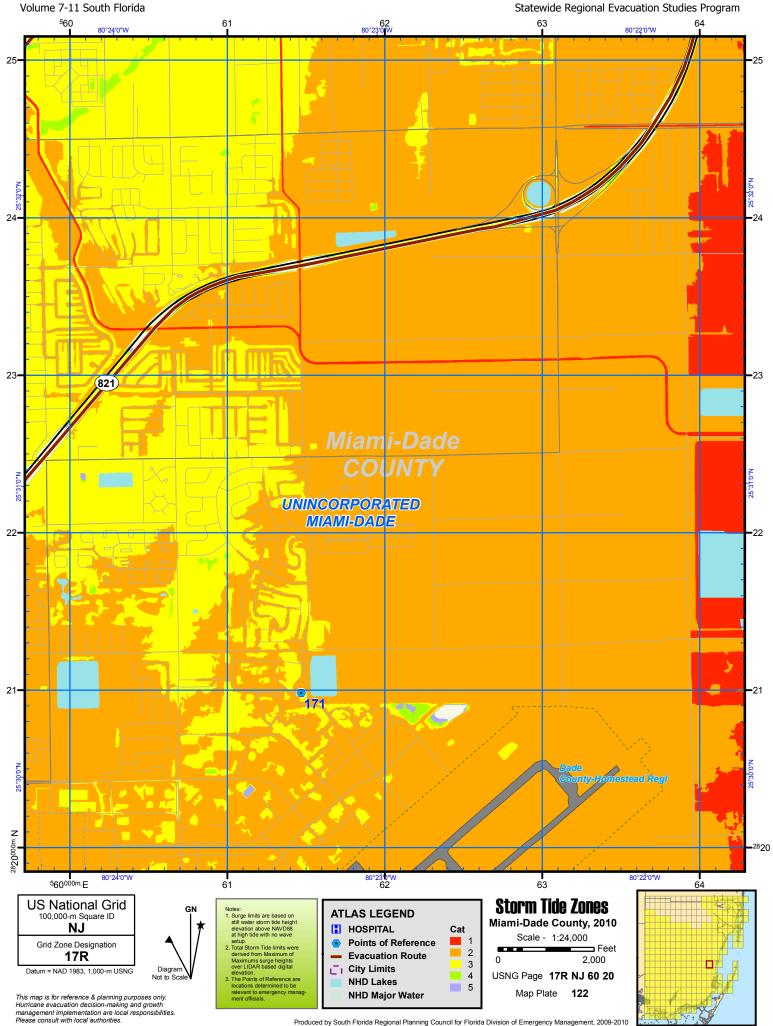
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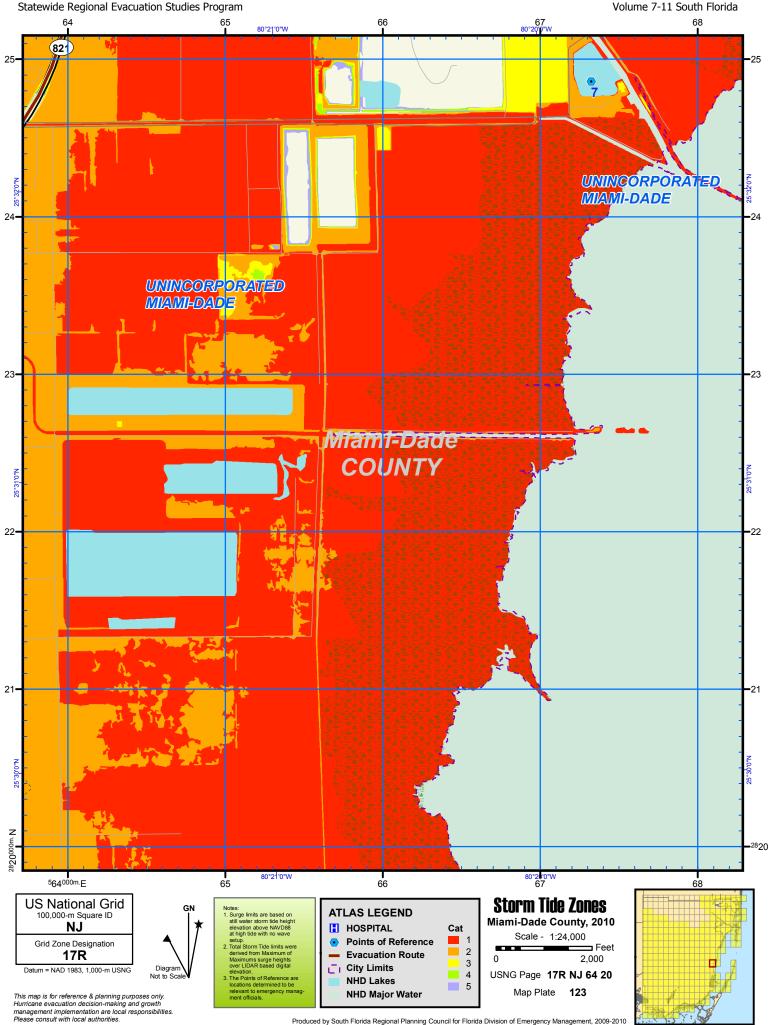
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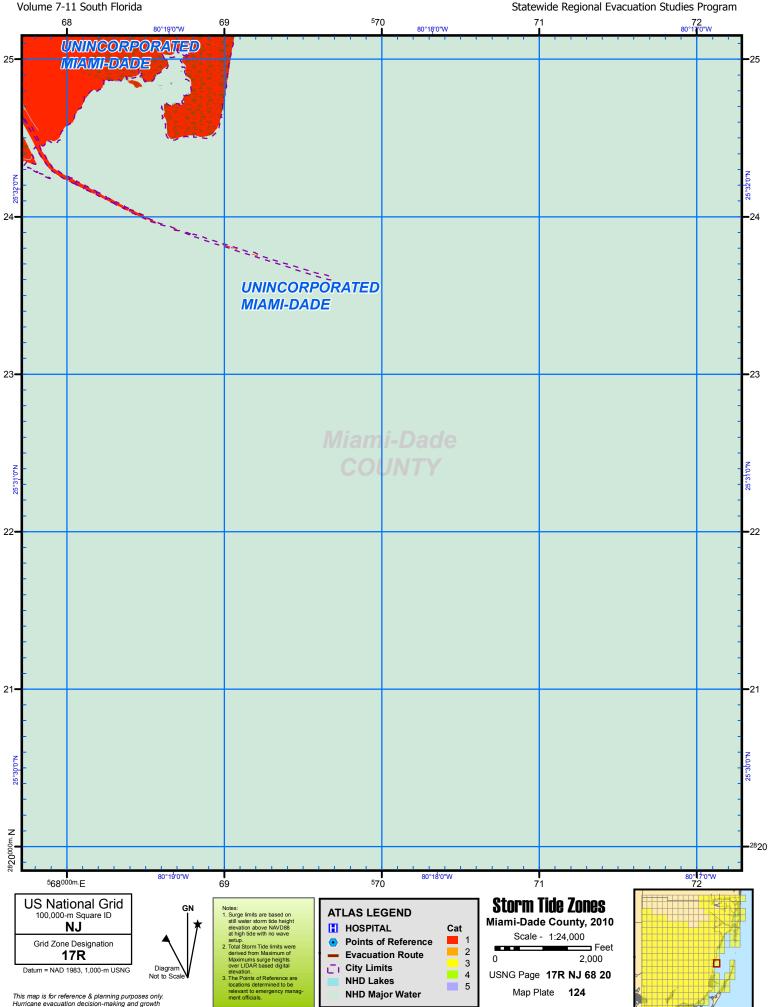
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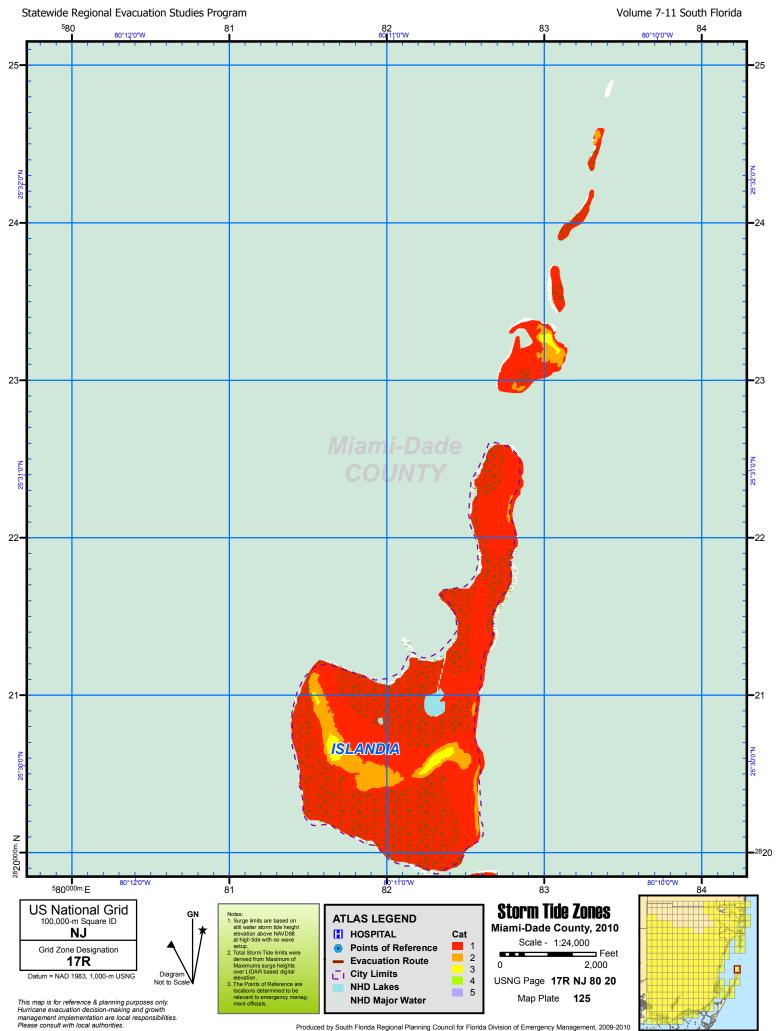
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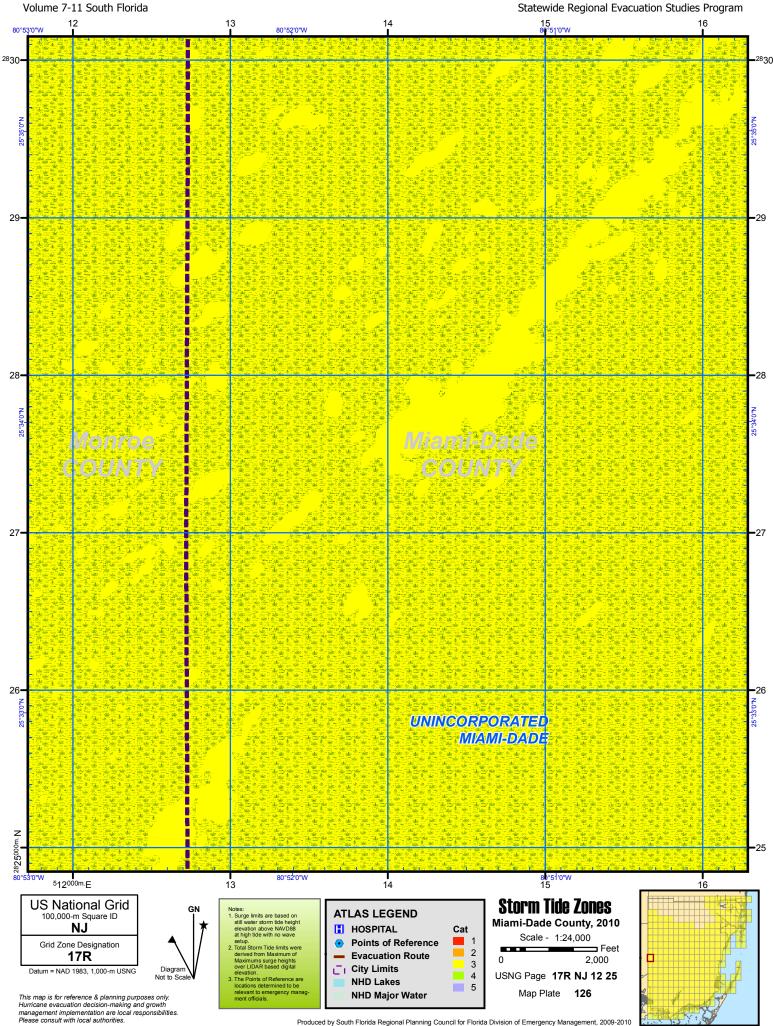
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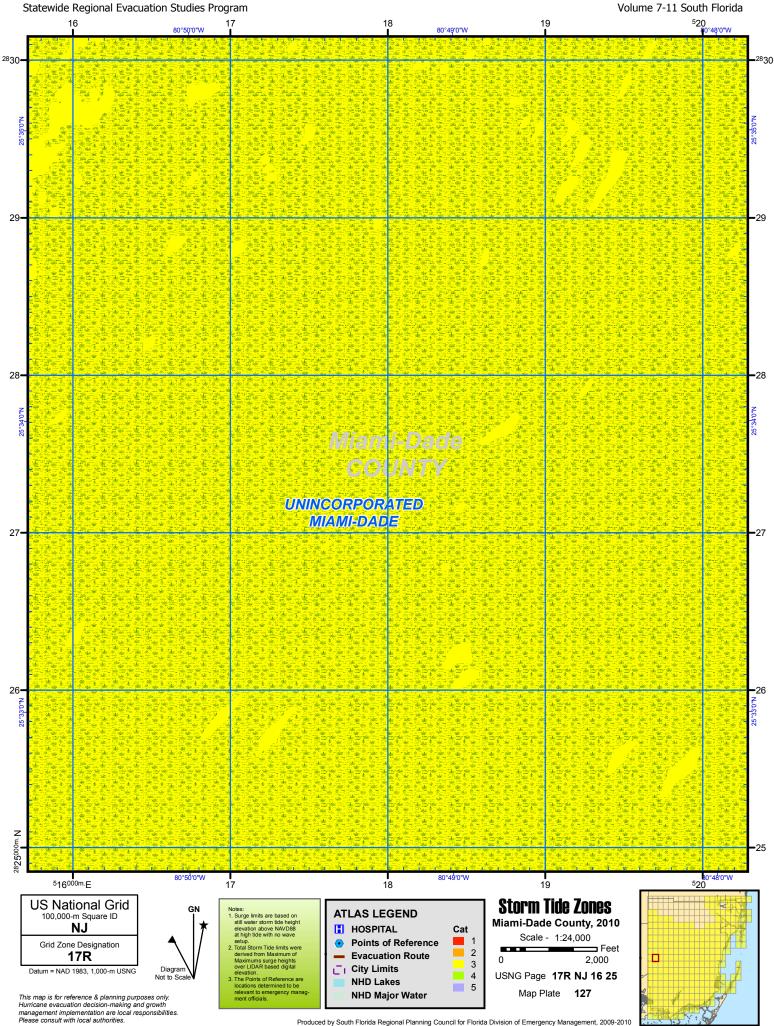
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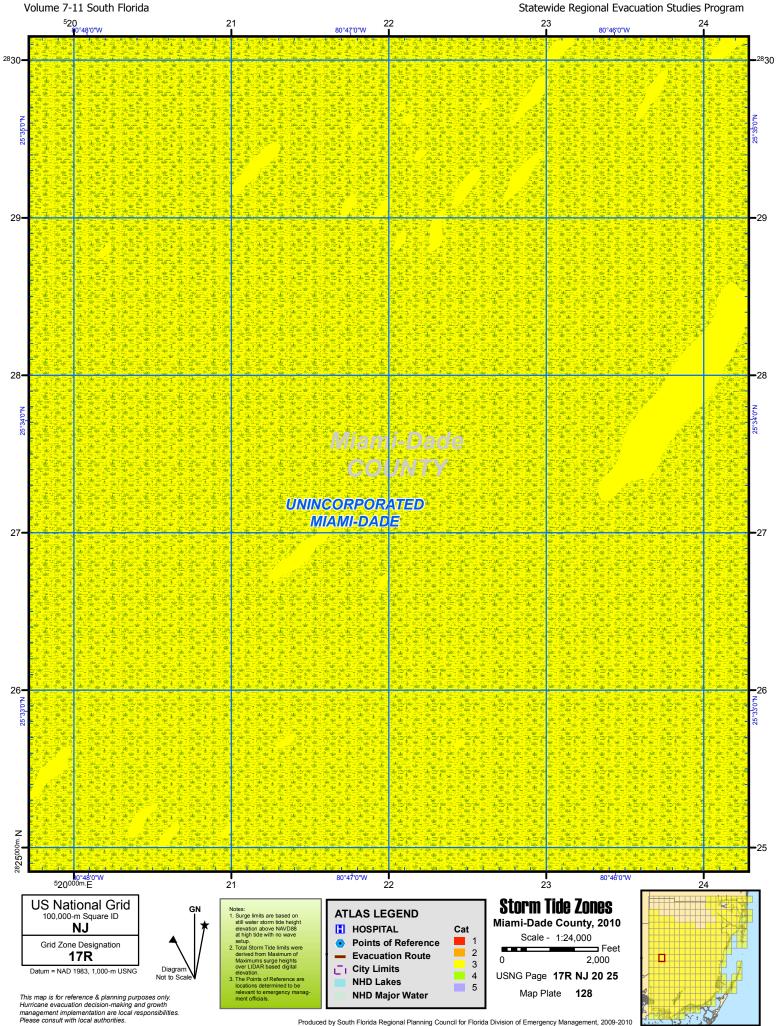
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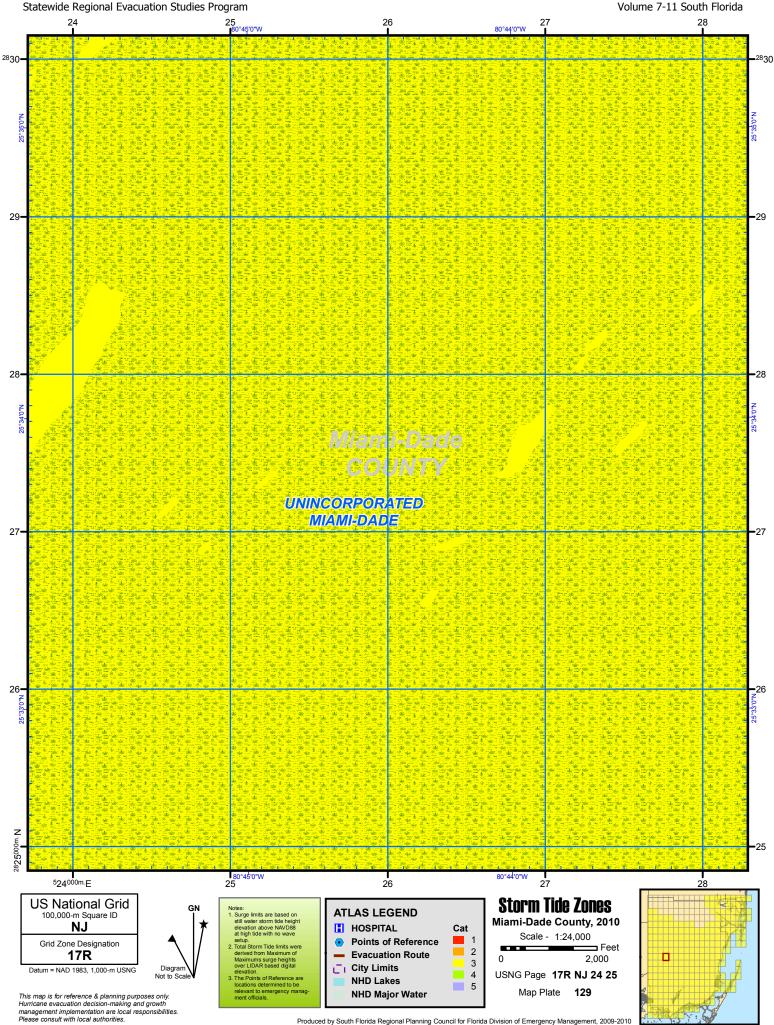
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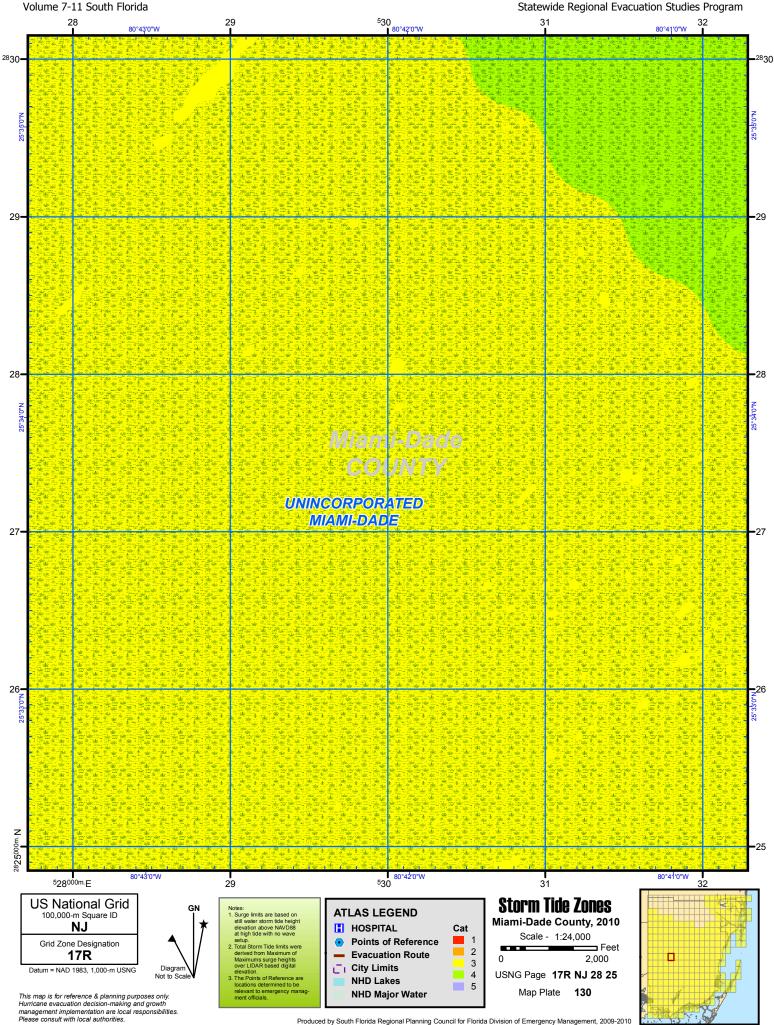
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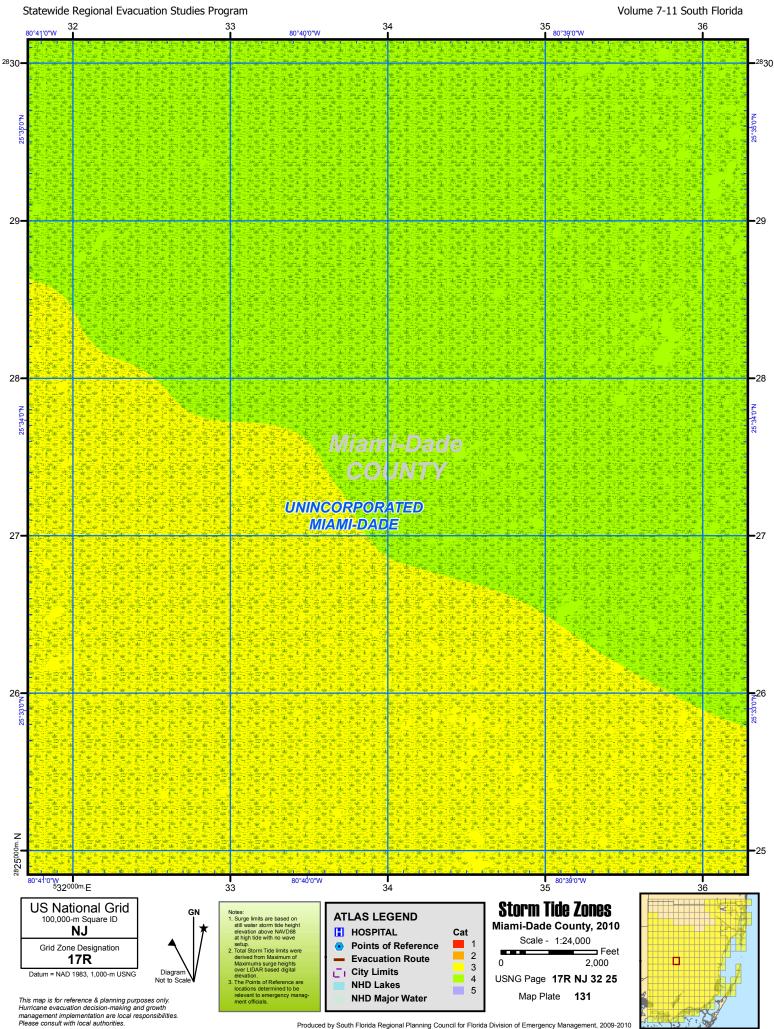
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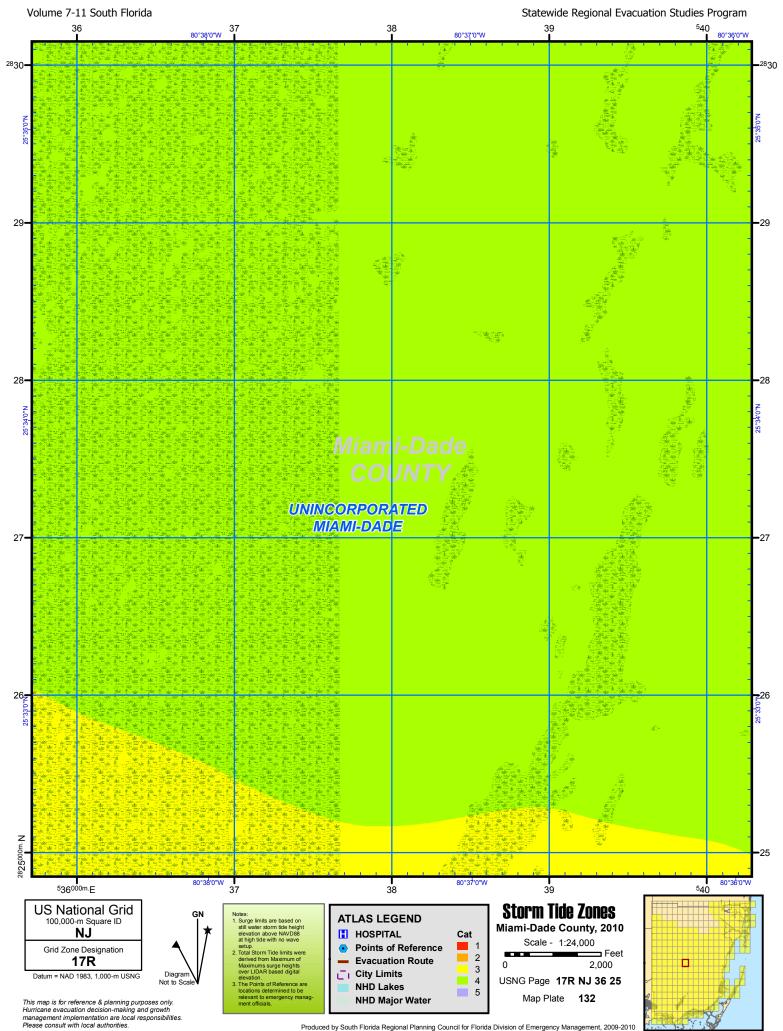
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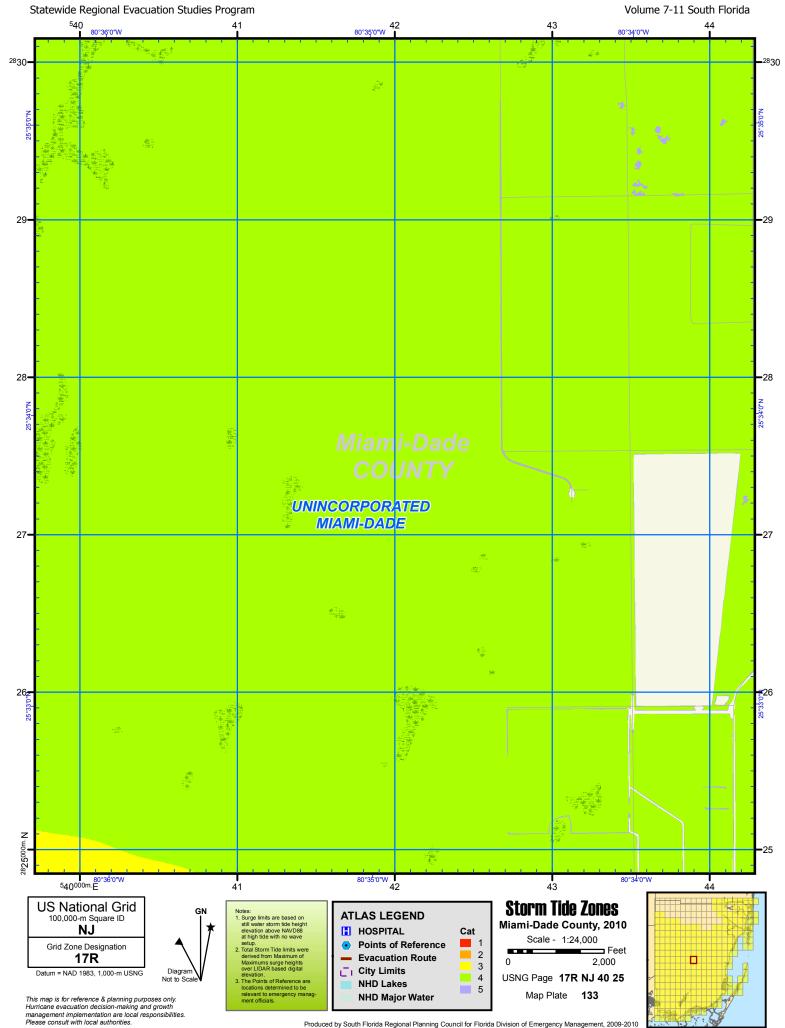
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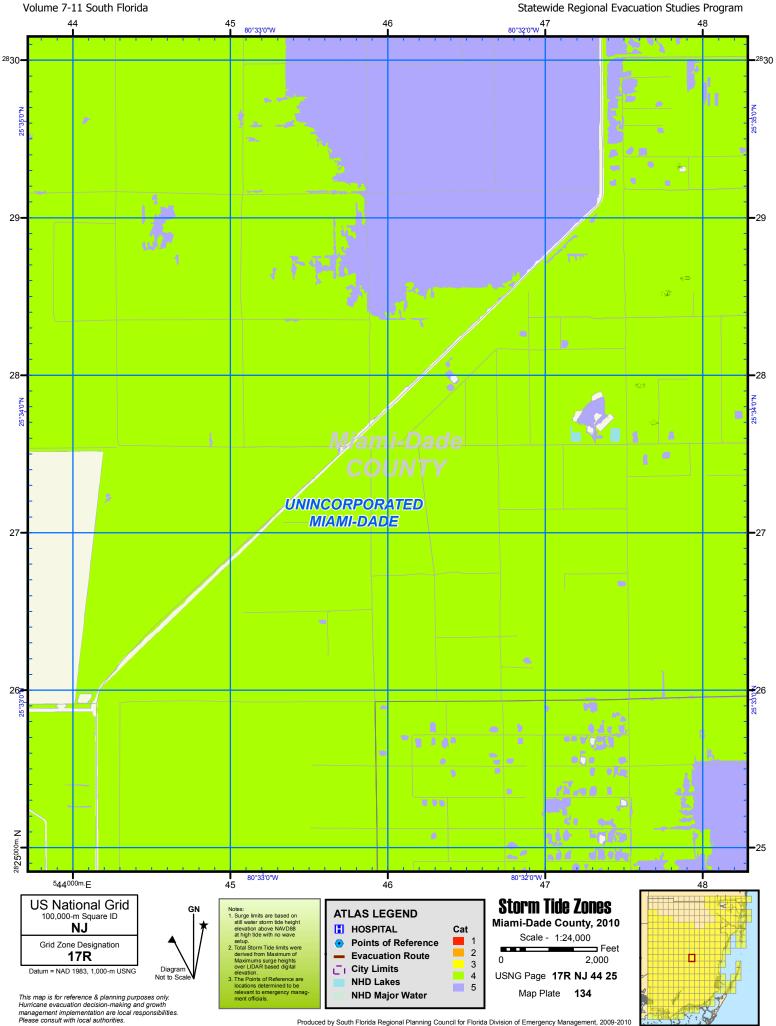
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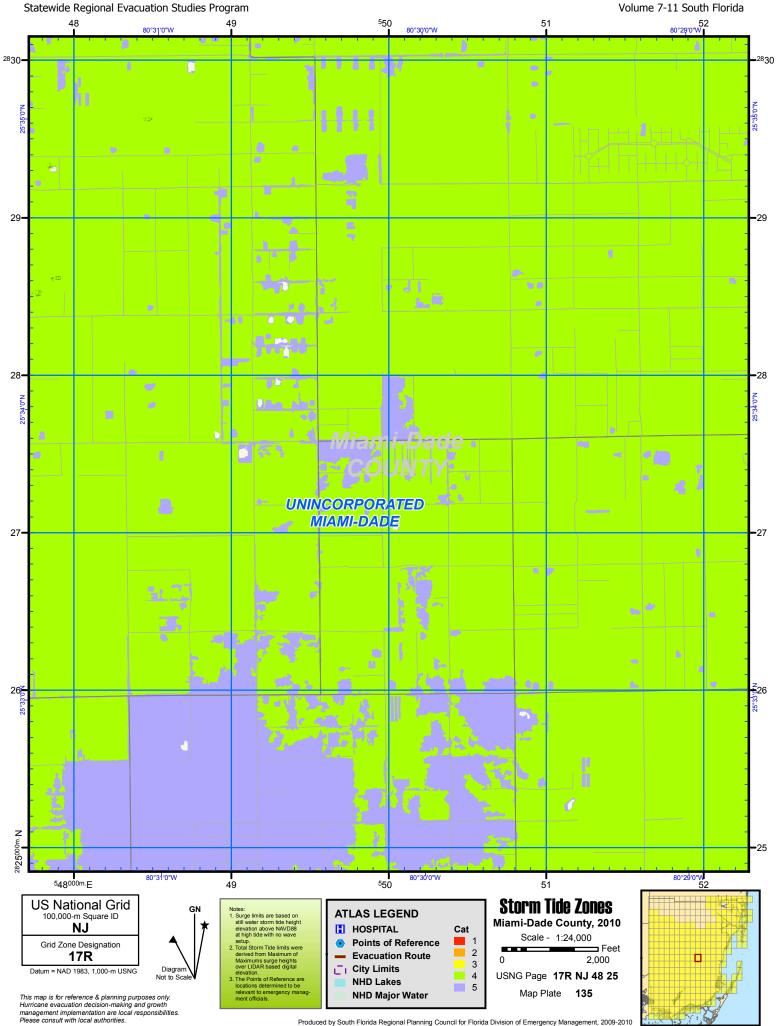
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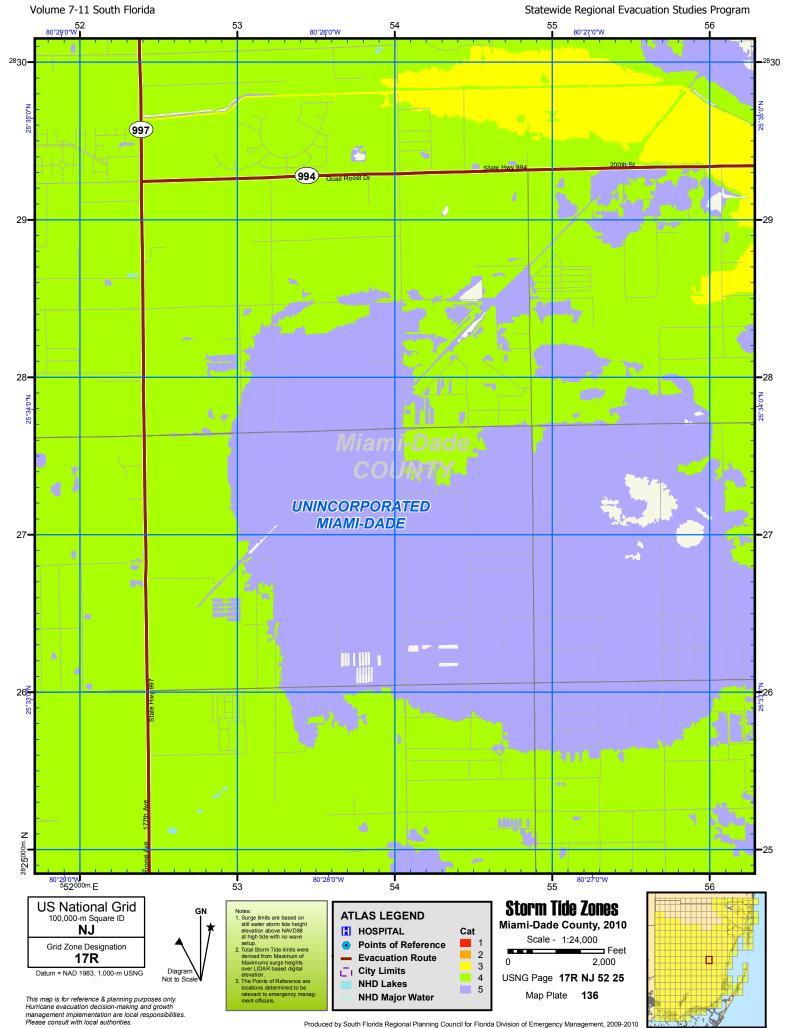
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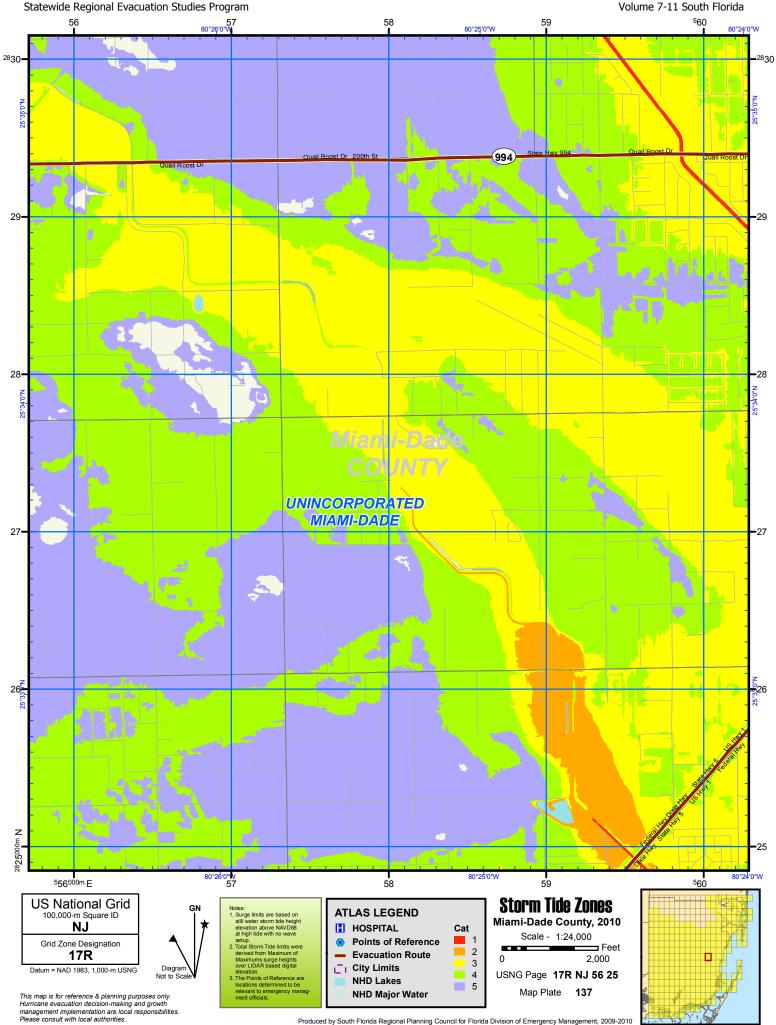
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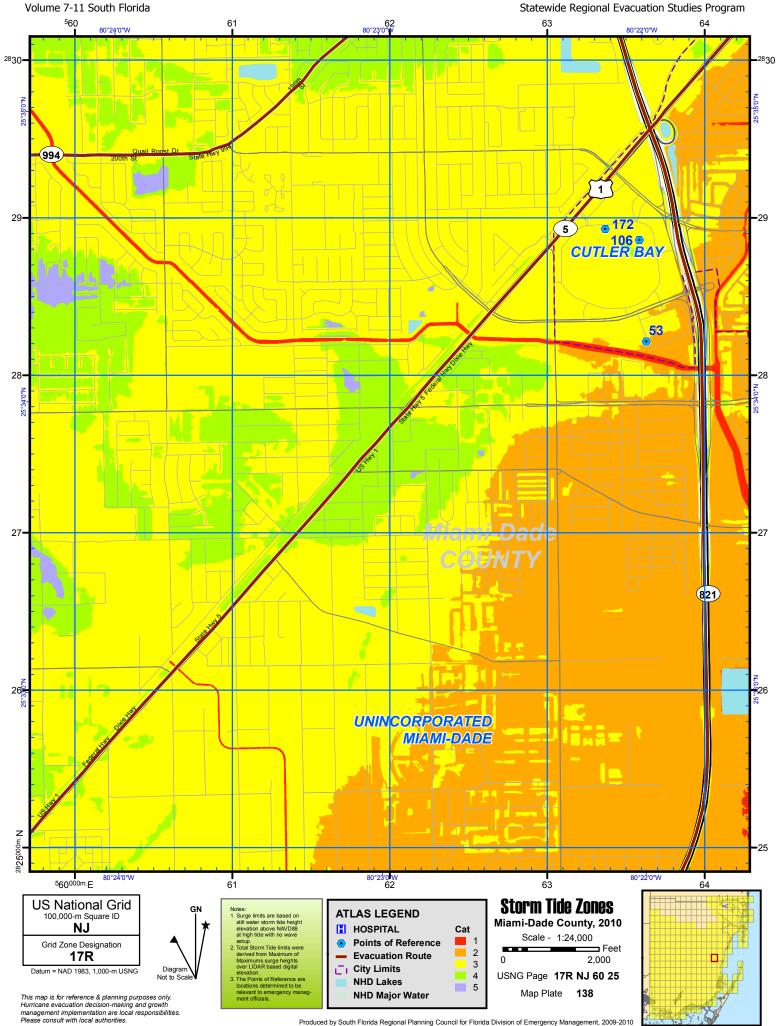
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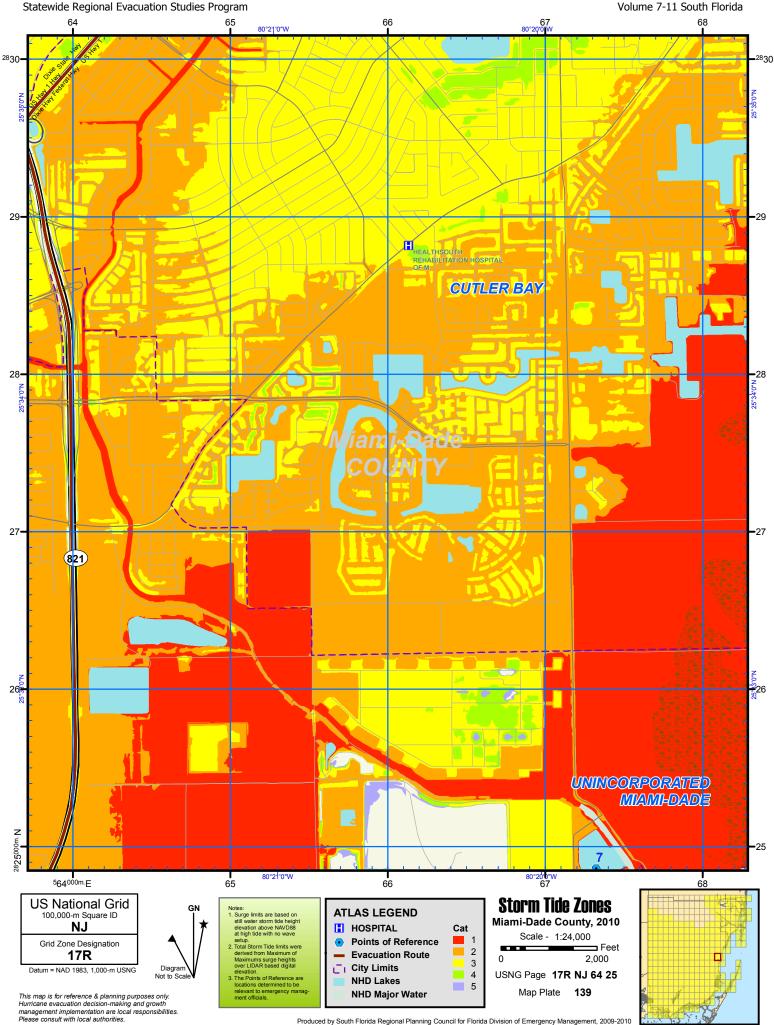
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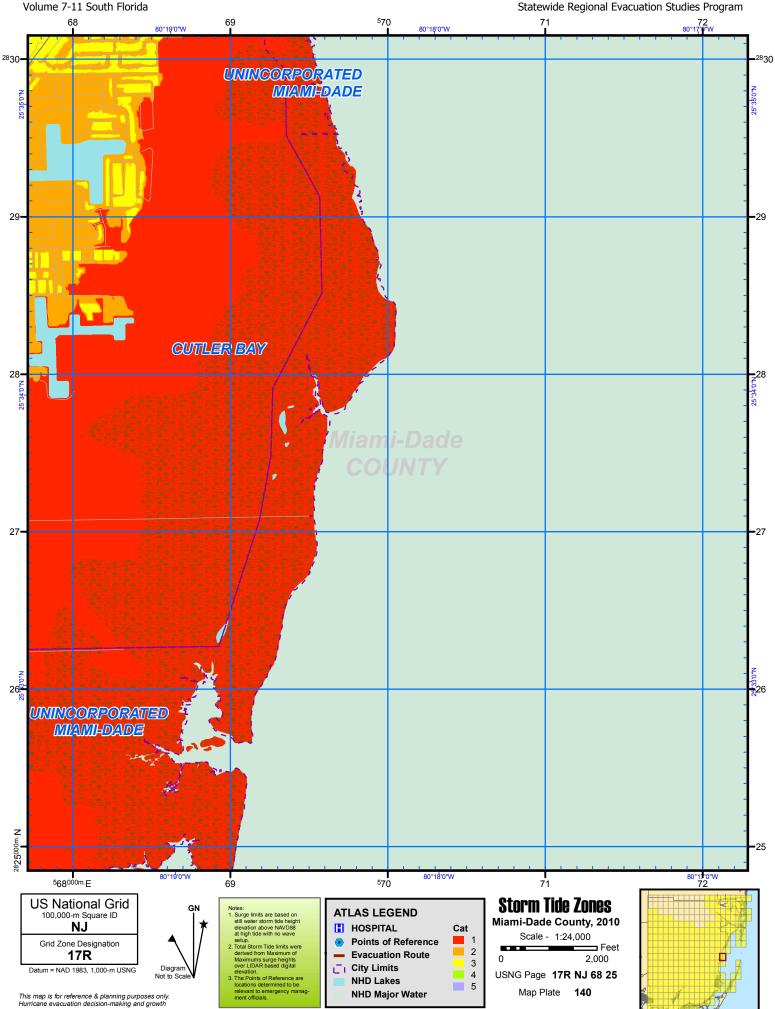
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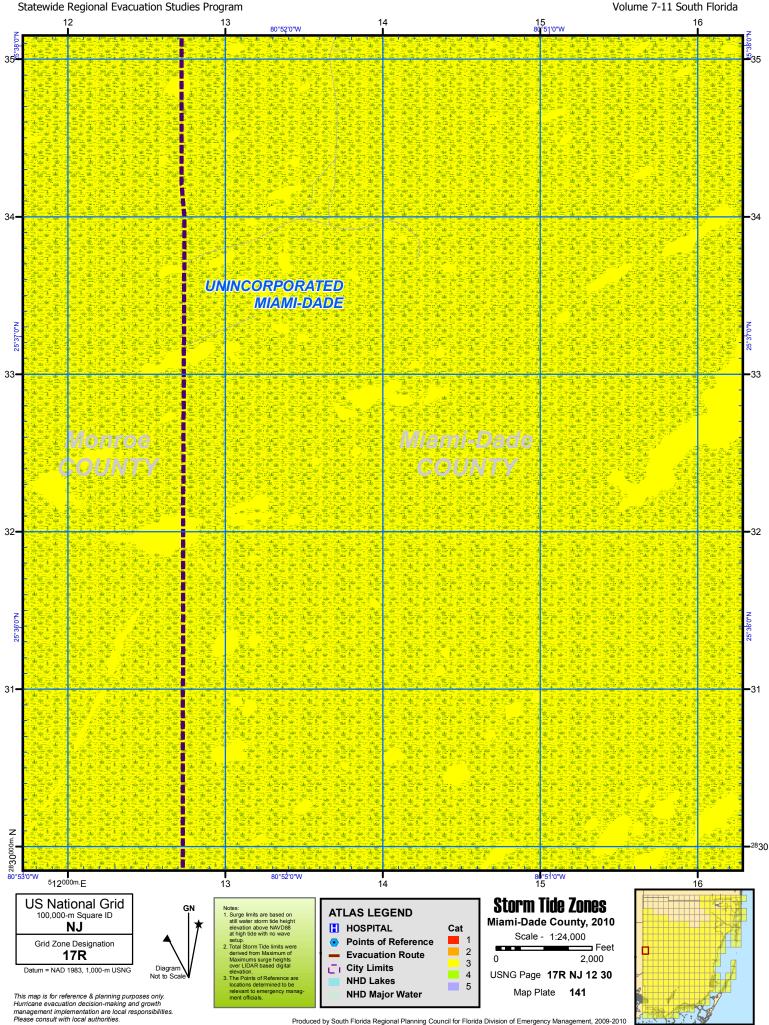
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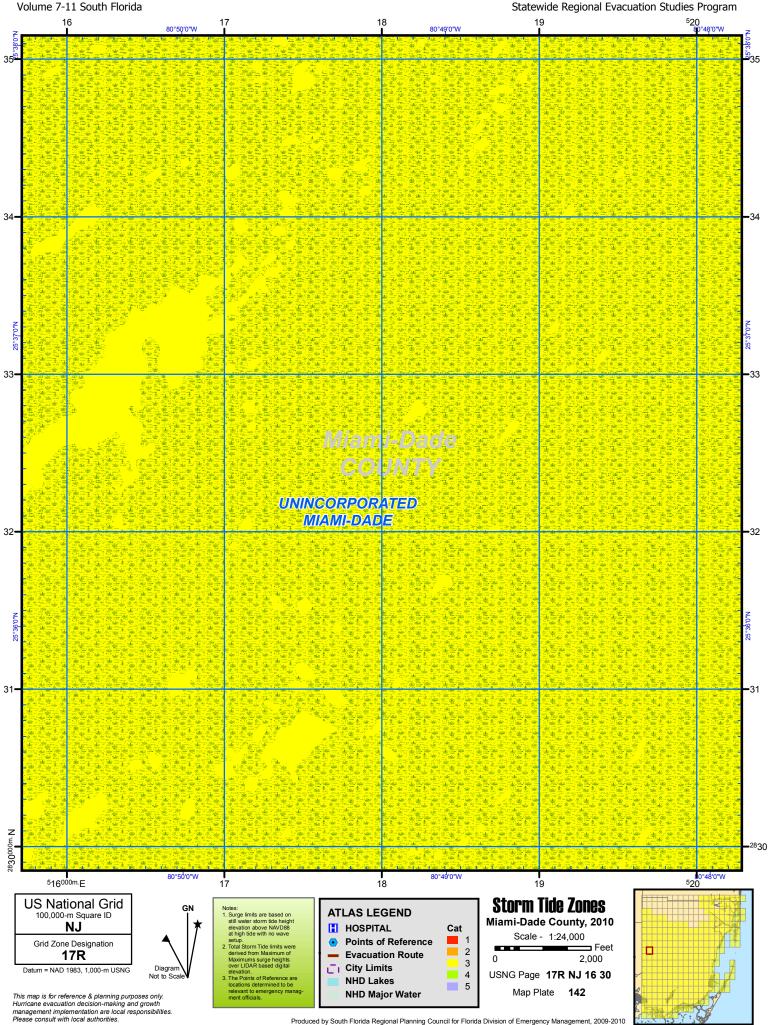
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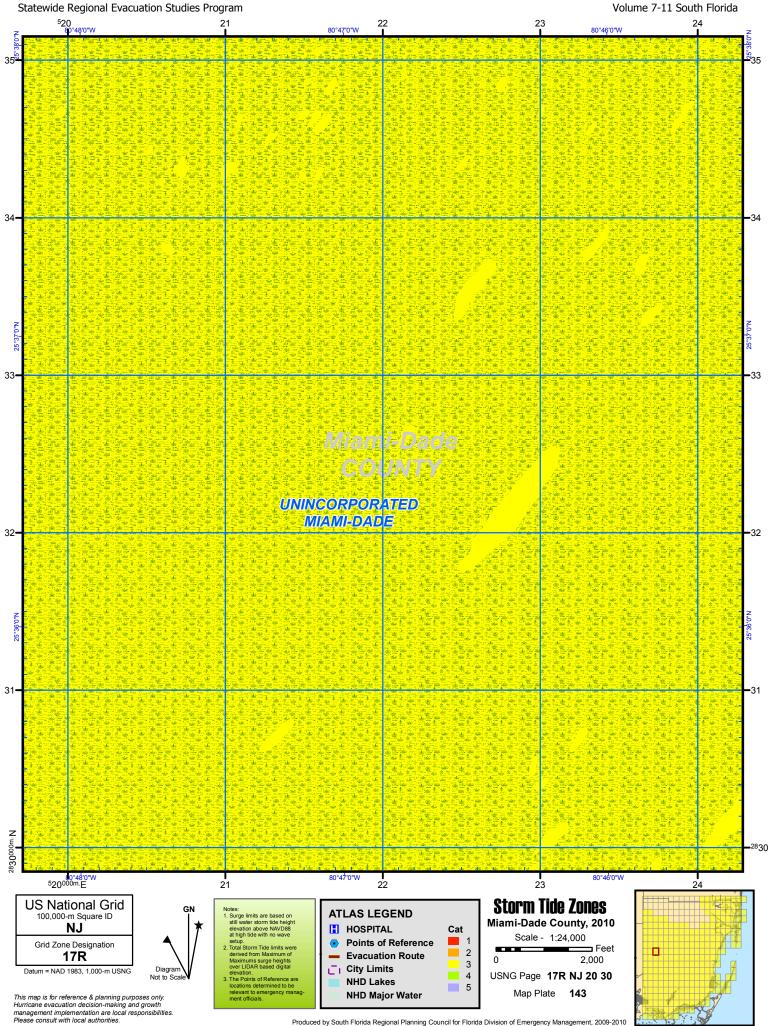
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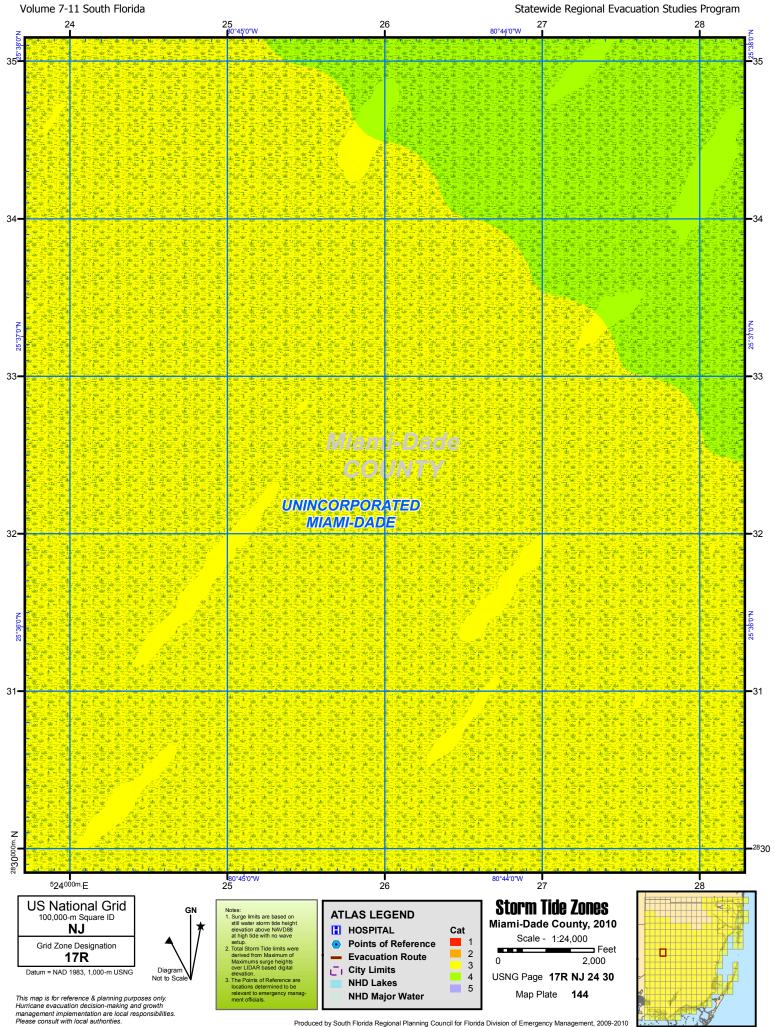
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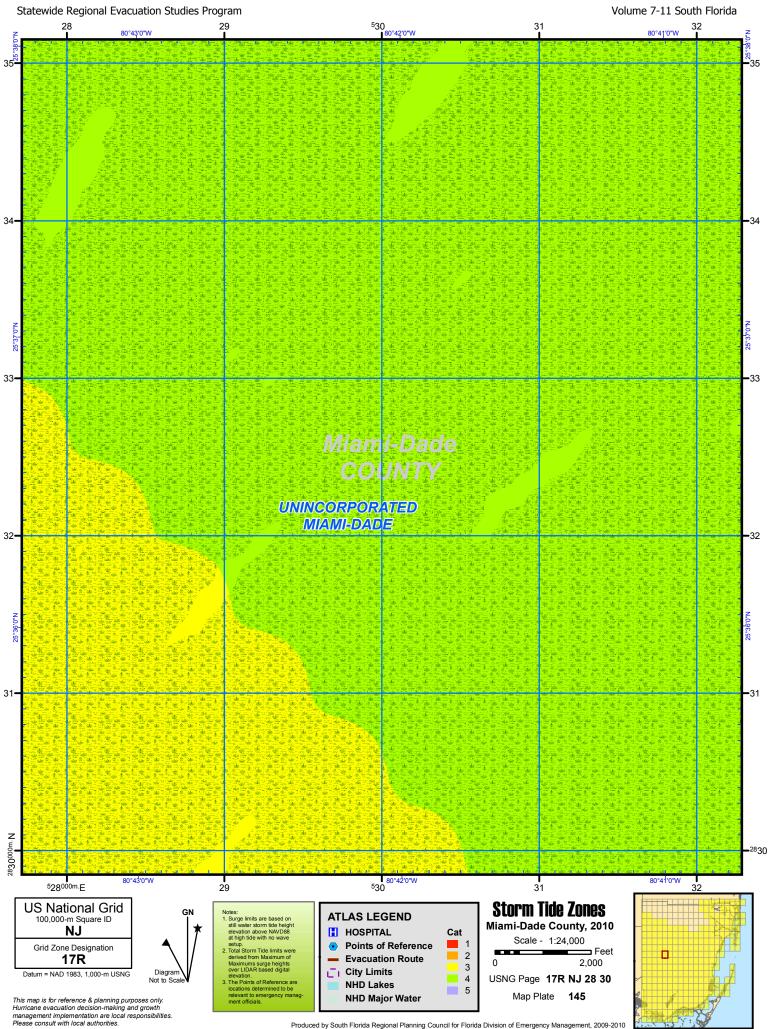
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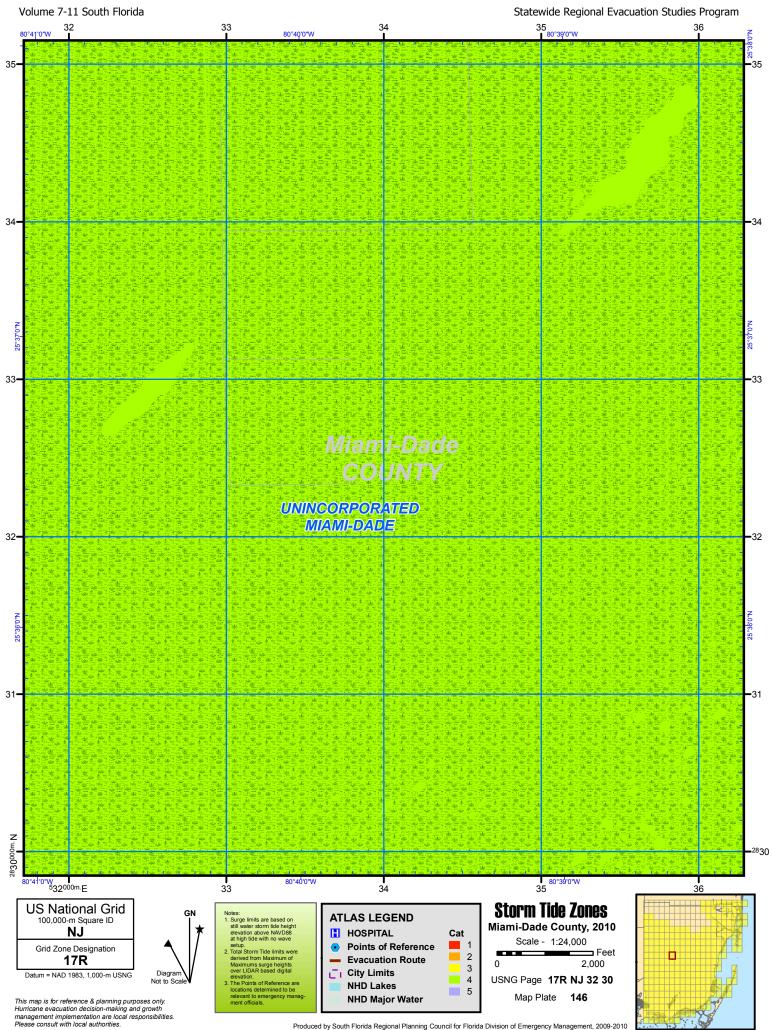
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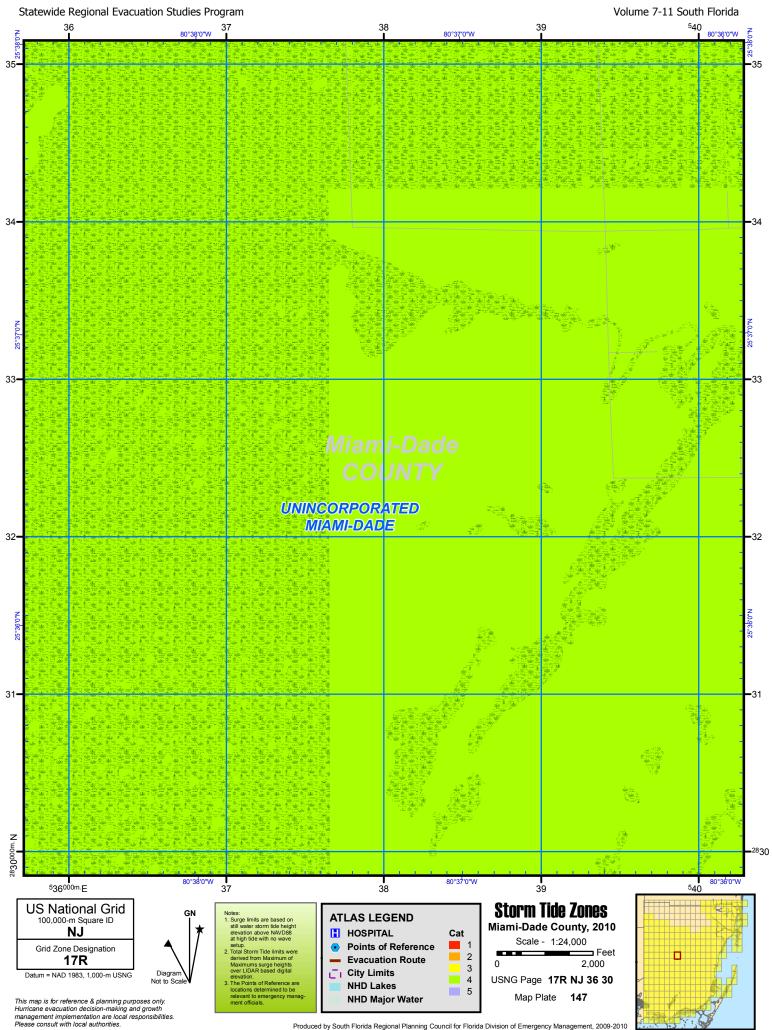
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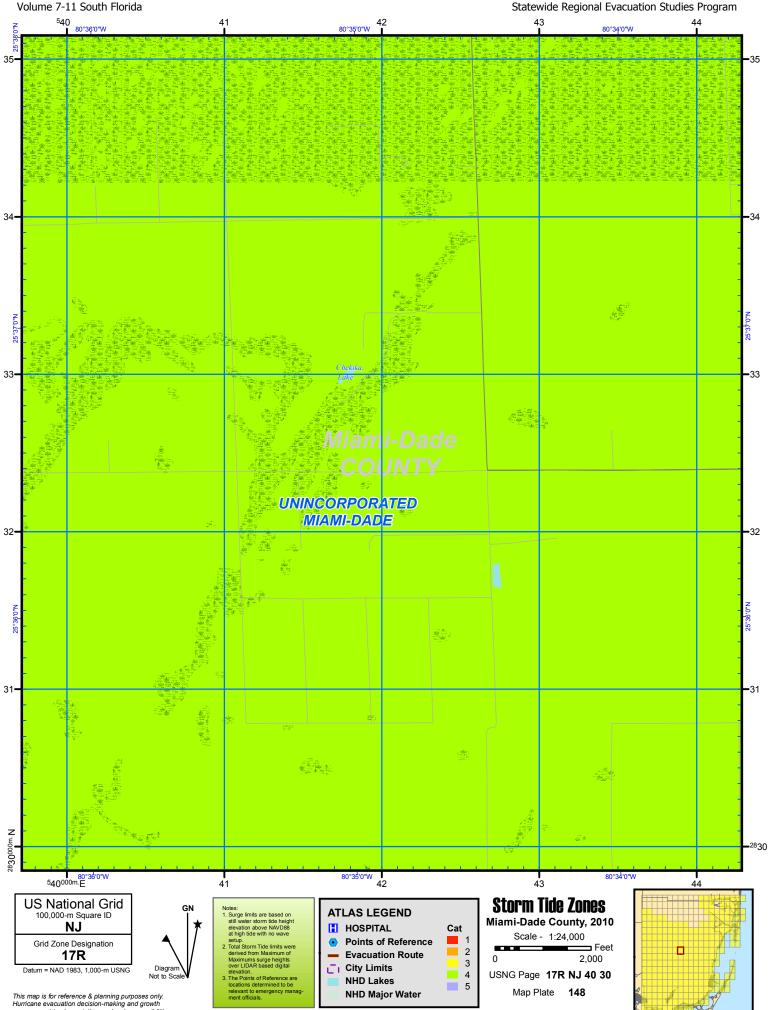
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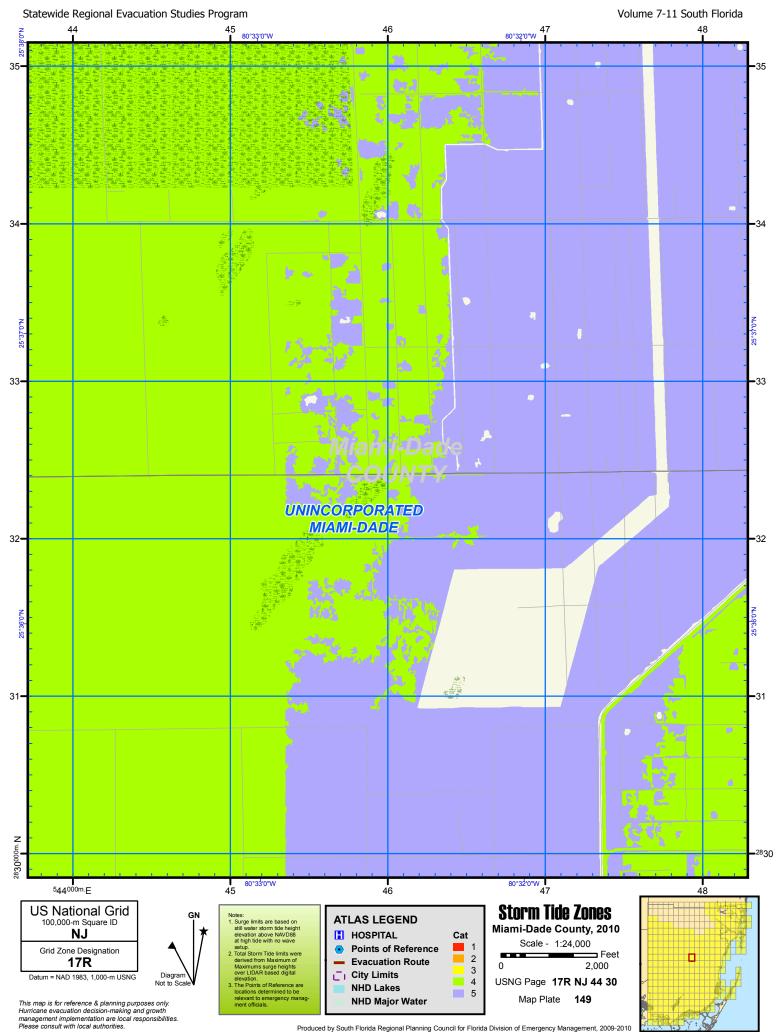
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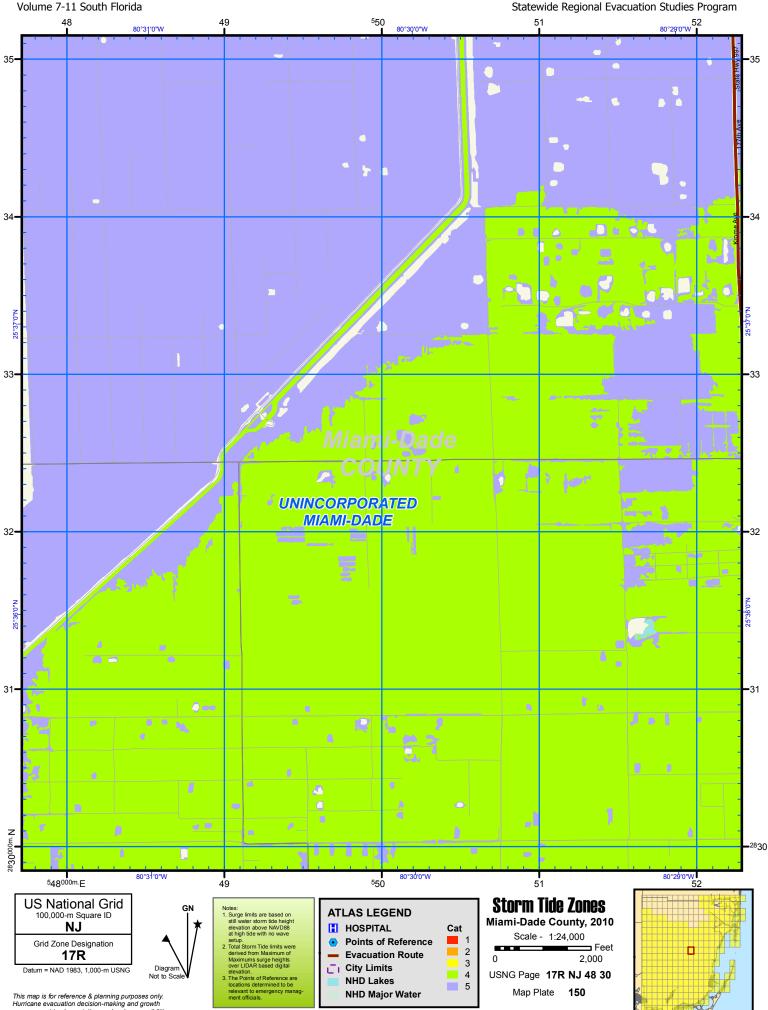
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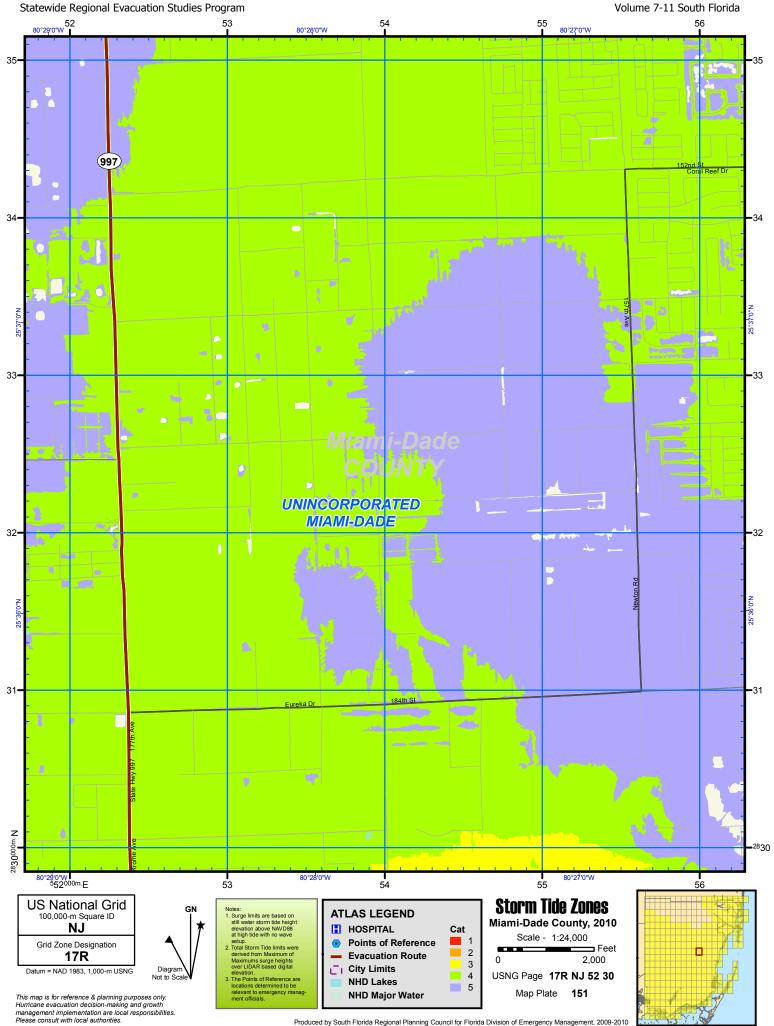
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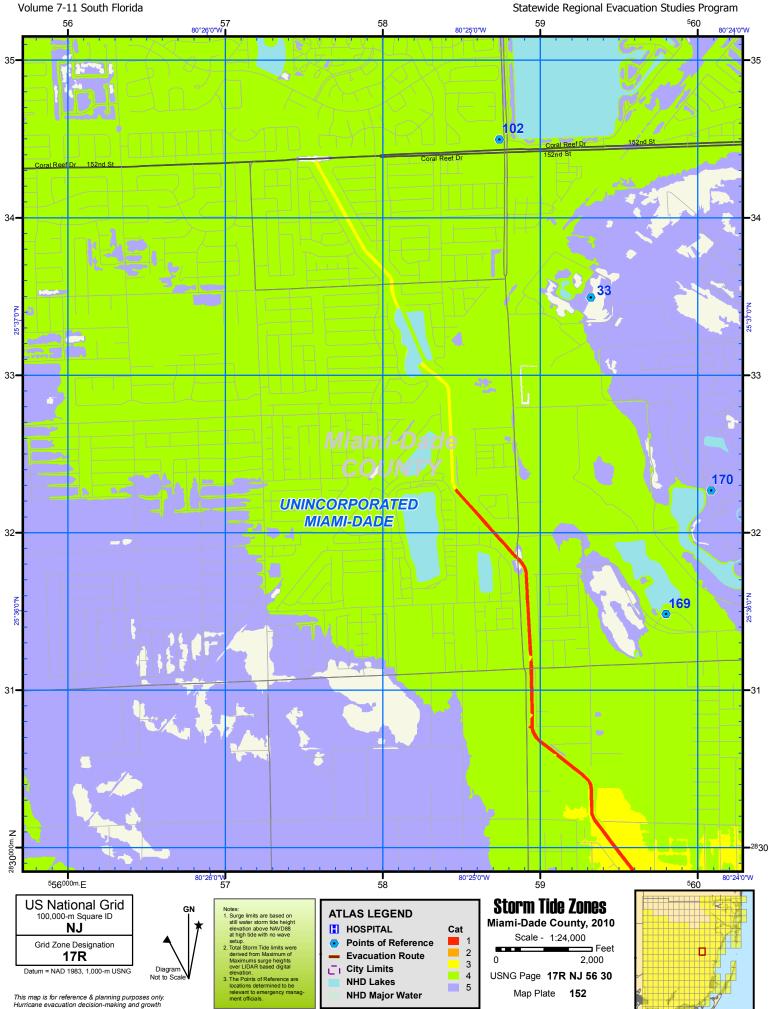
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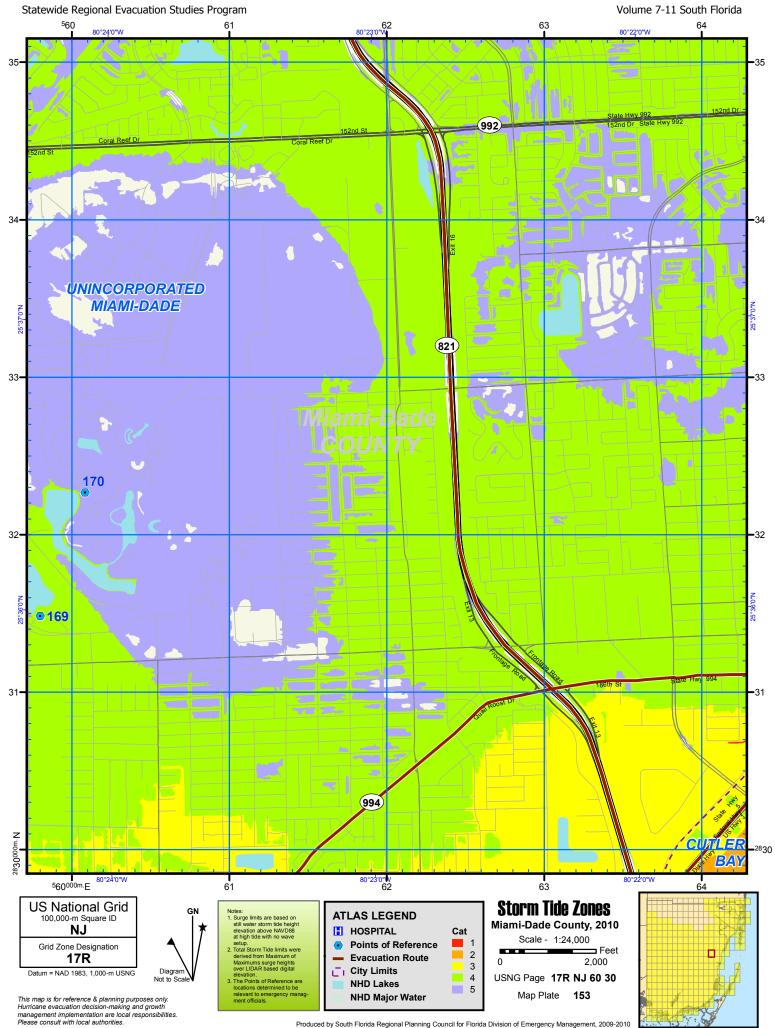


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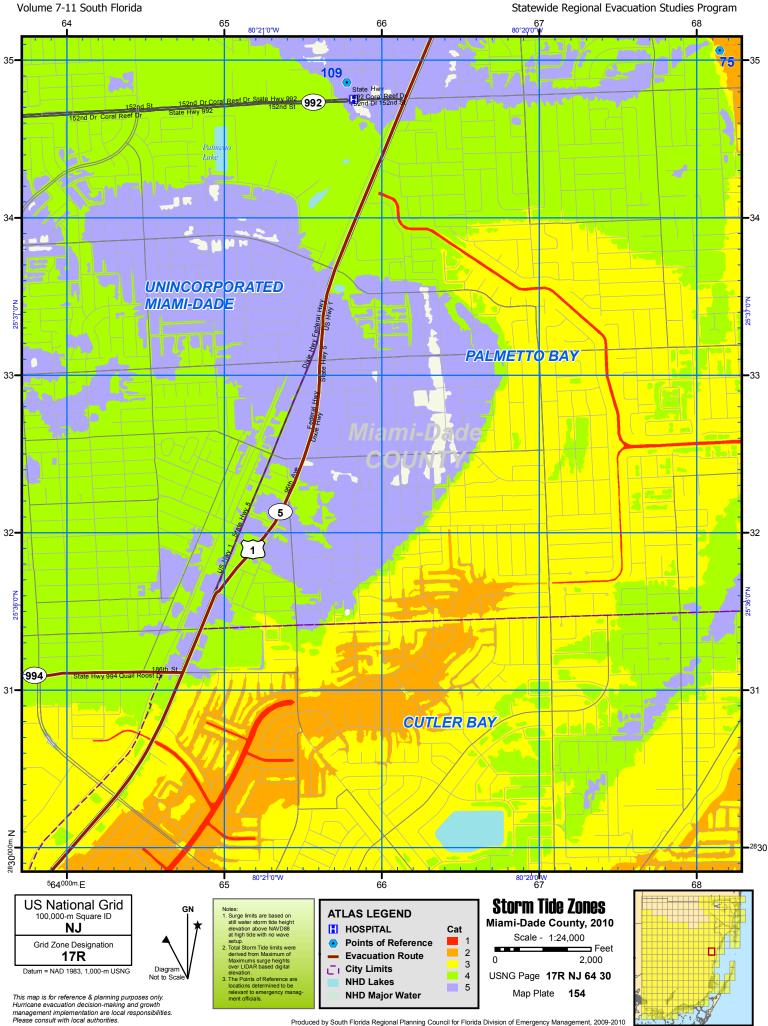


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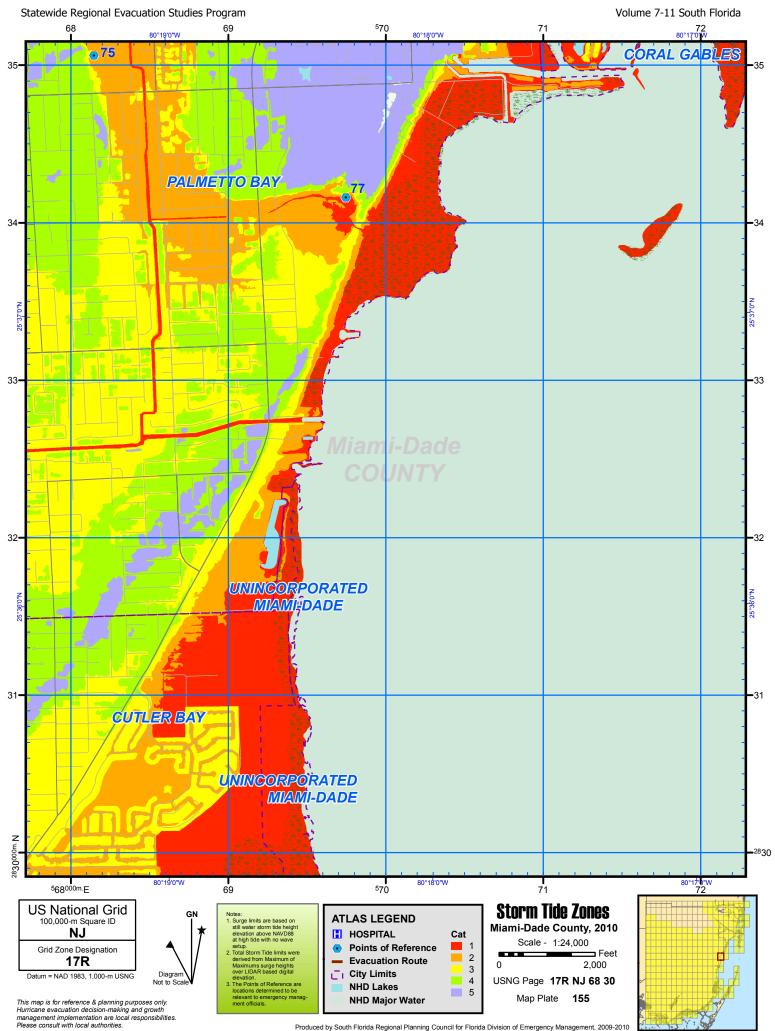
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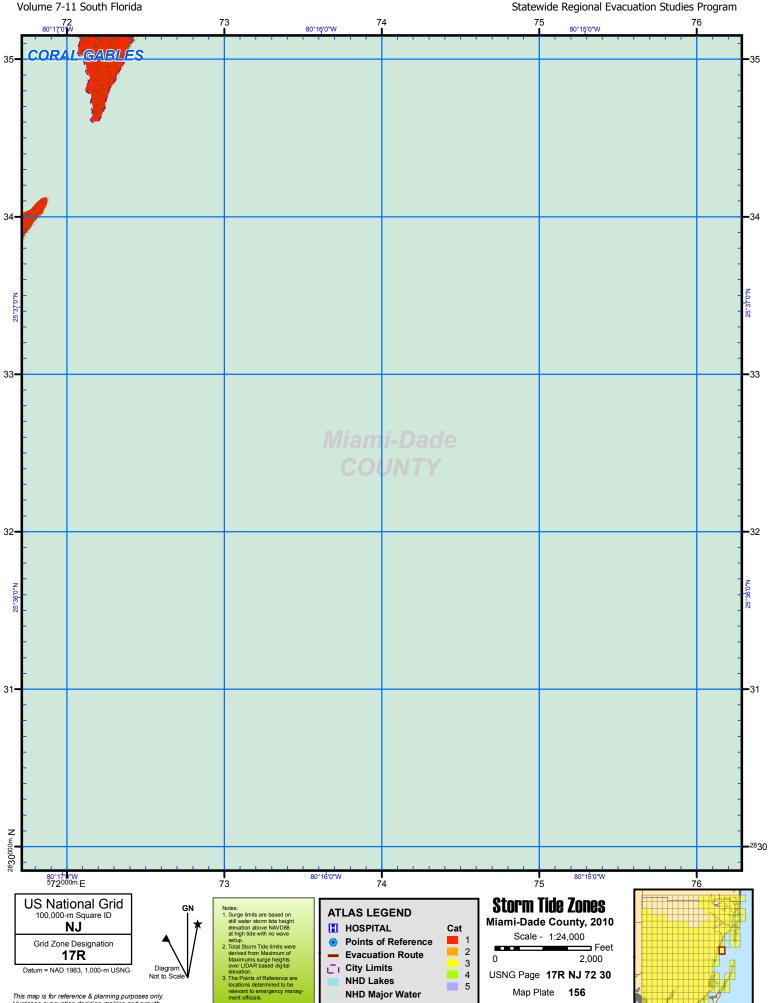
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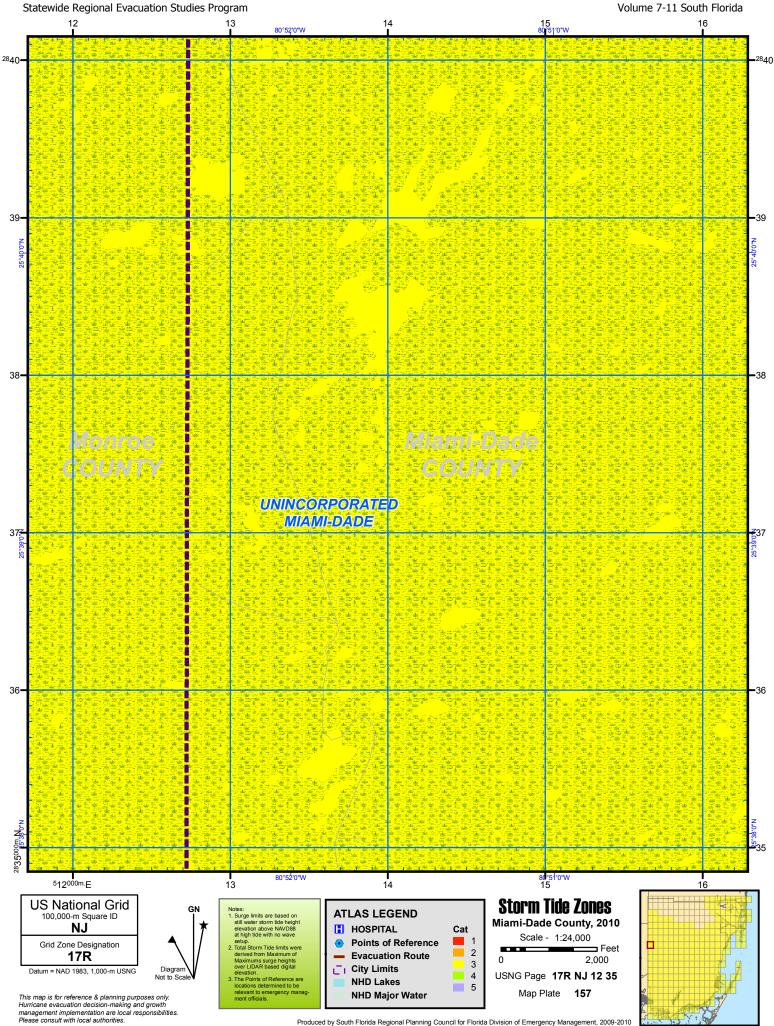
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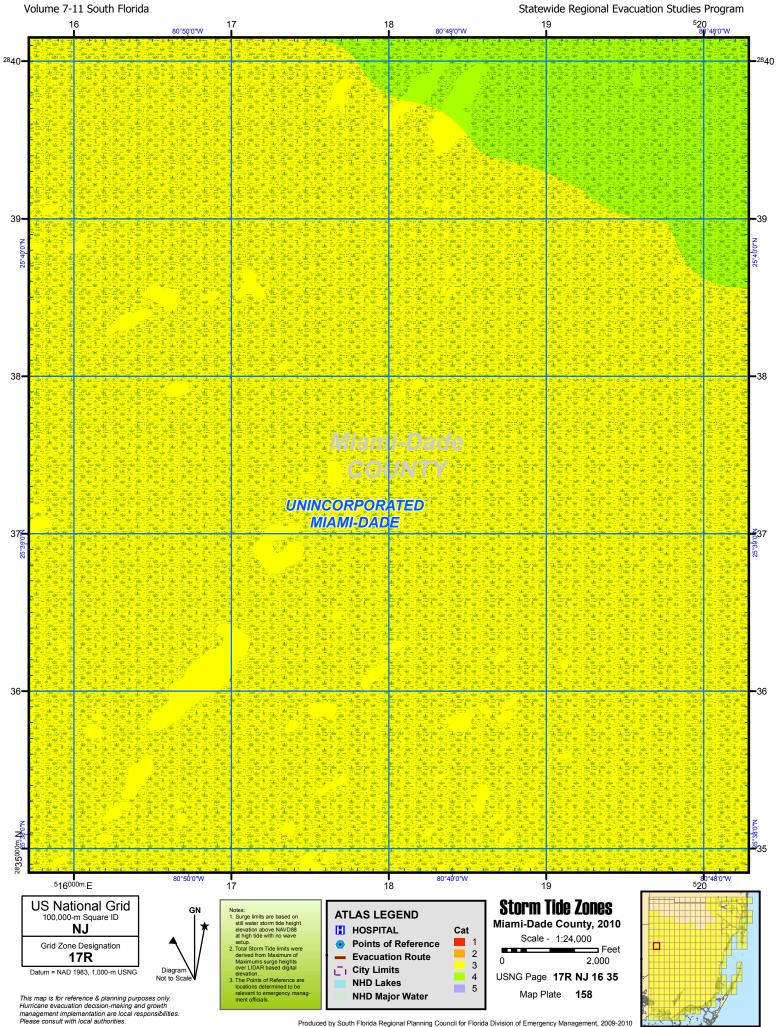
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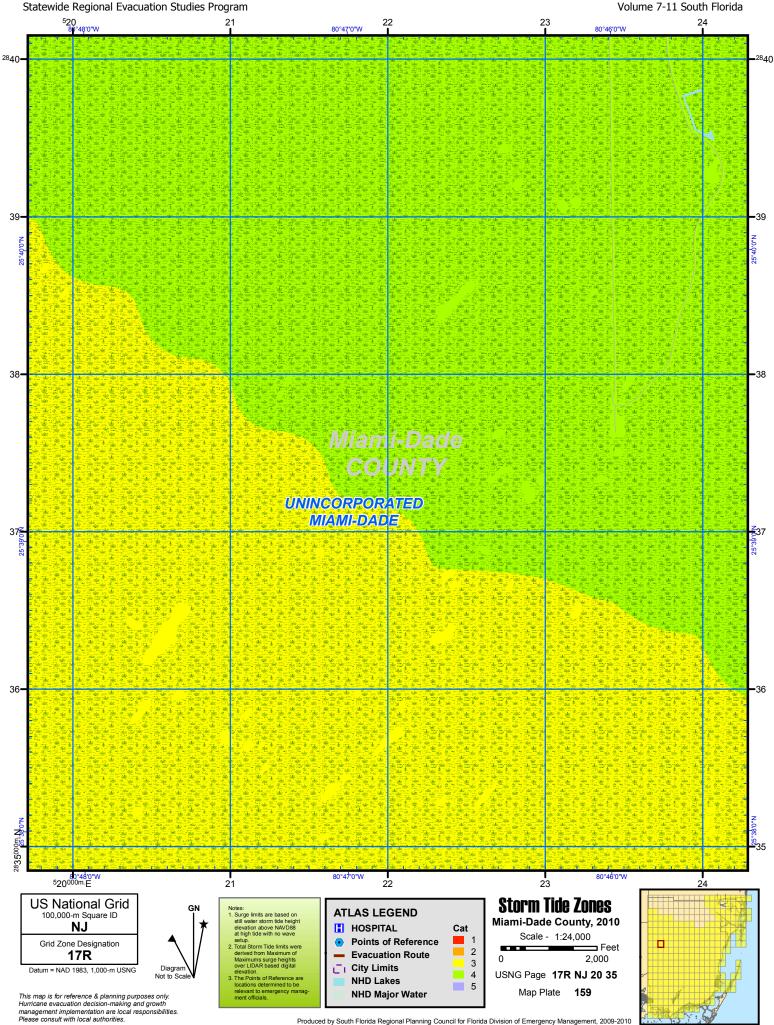
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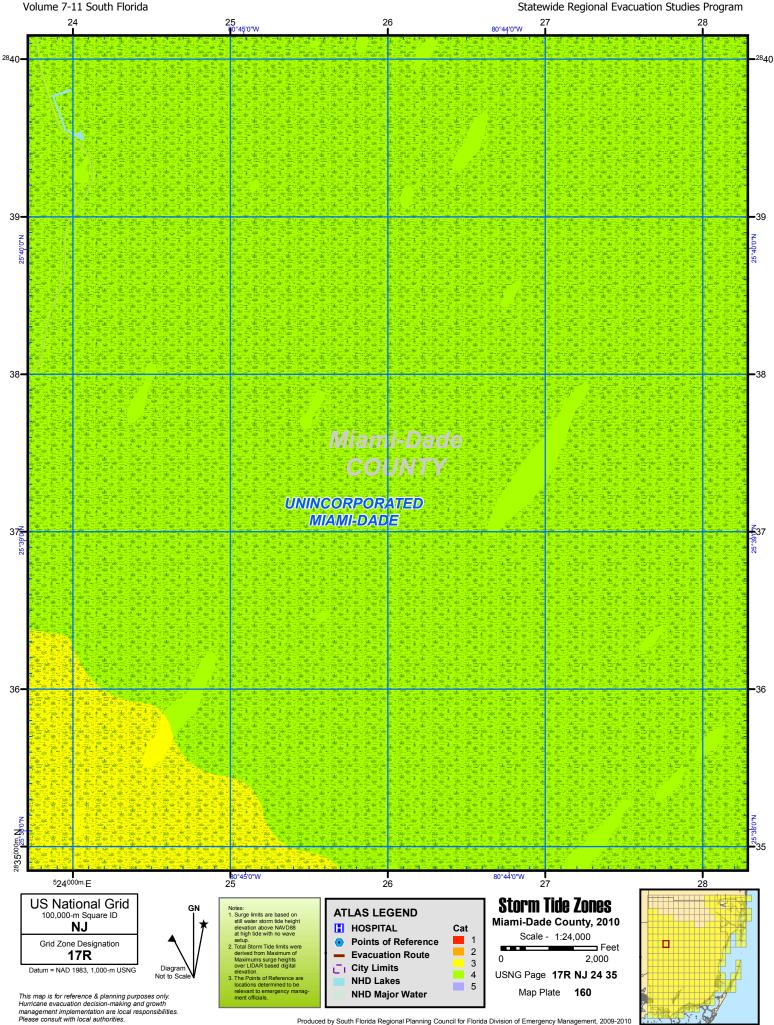
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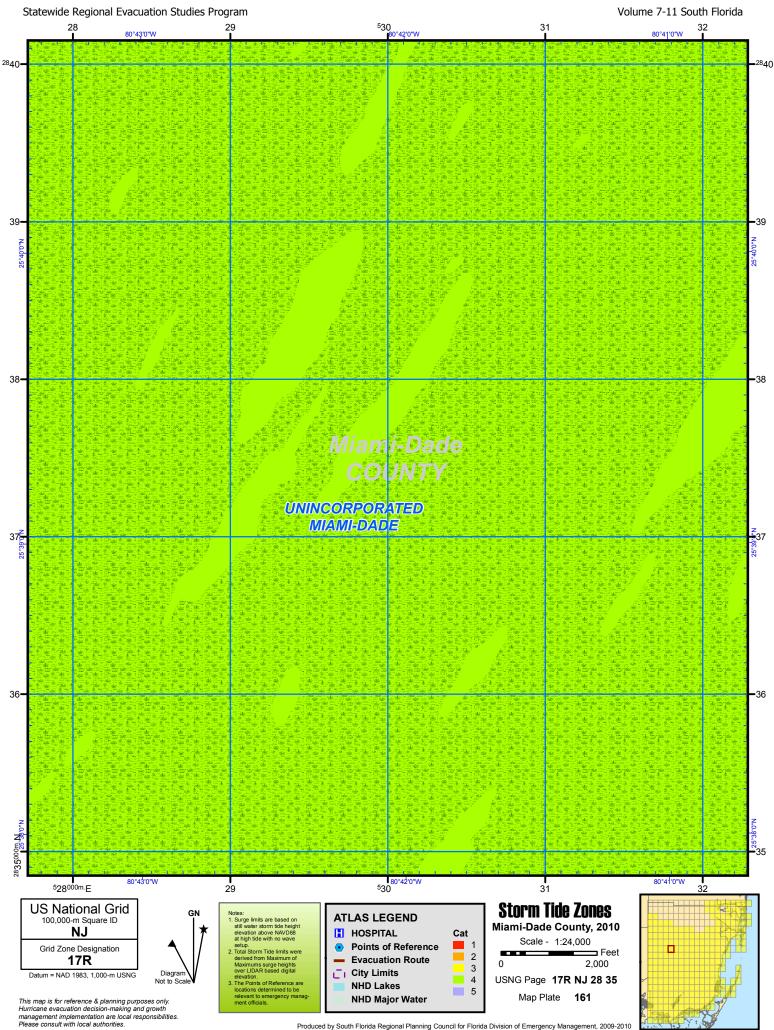
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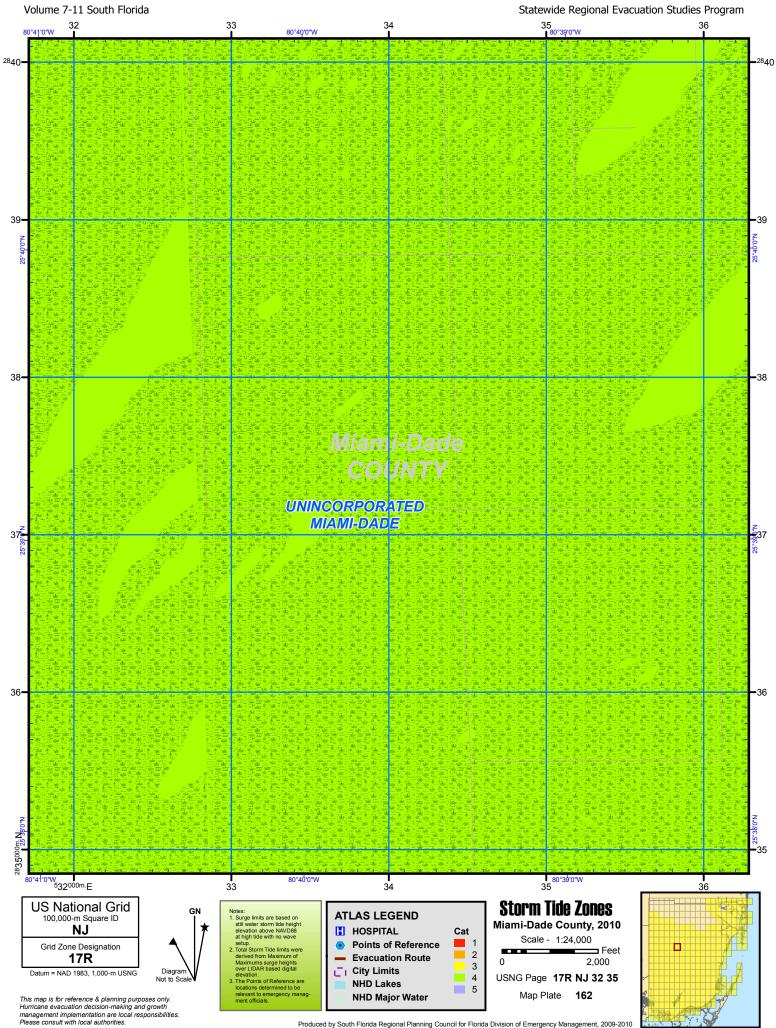
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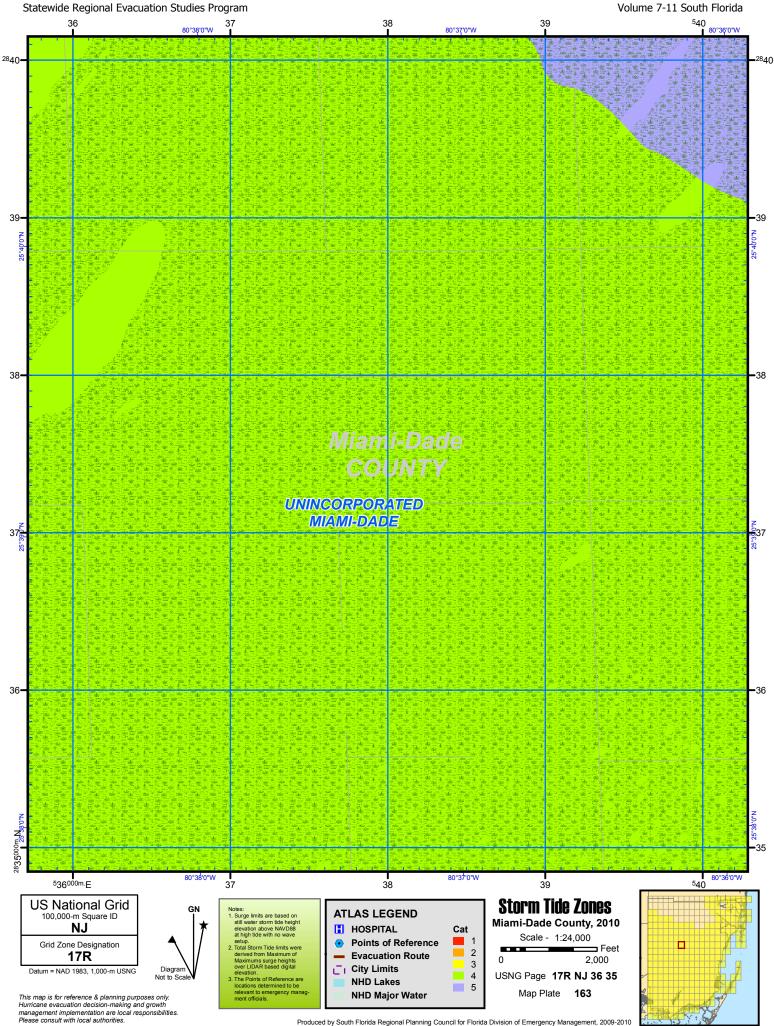
Please consult with local authorities. Book 2 - Page 180 Produced by South Florida Regional Planning Council for Florida Division of Emergency Management, 2009-2010 Storm Tide Atlas - Miami-Dade County



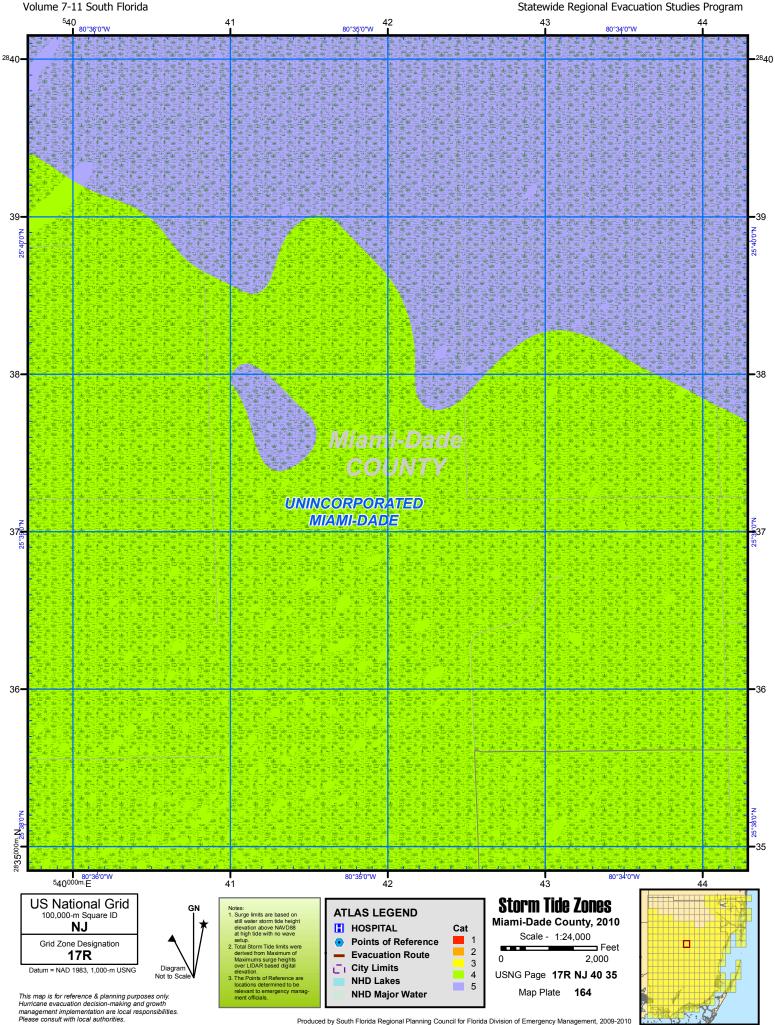
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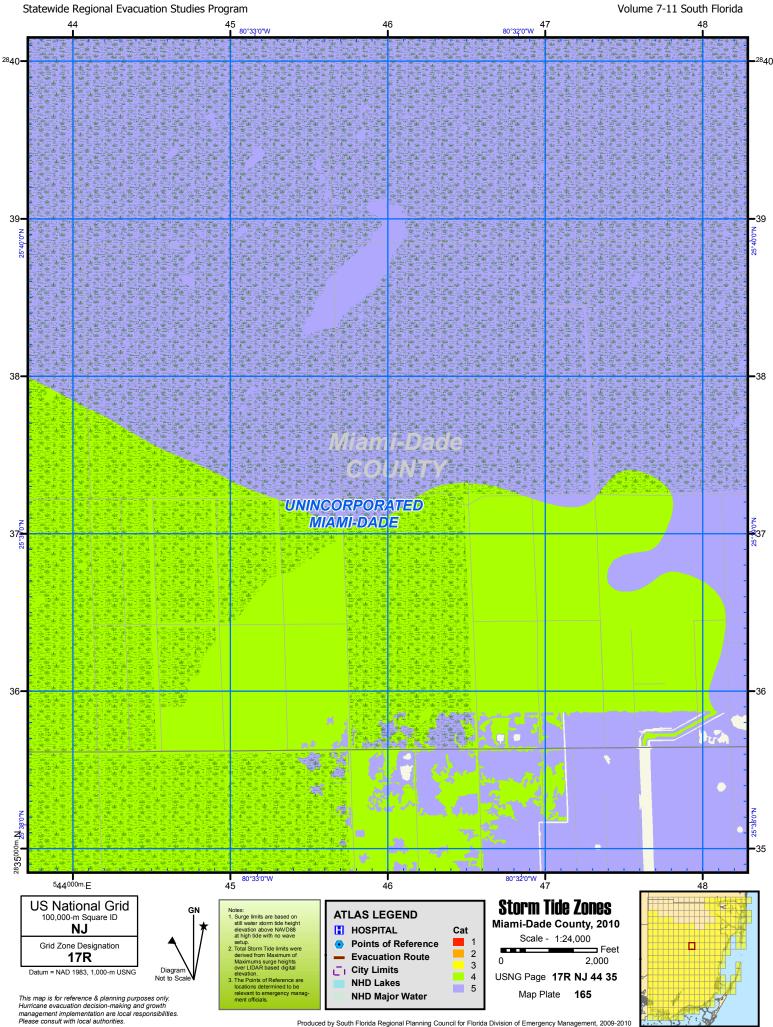
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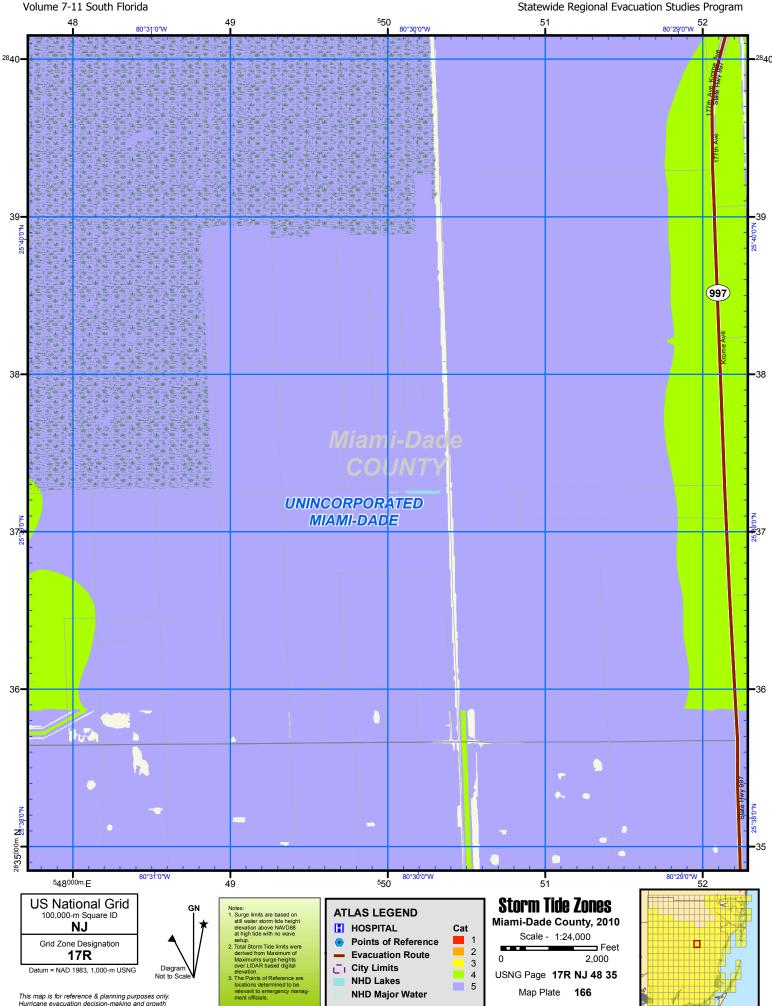
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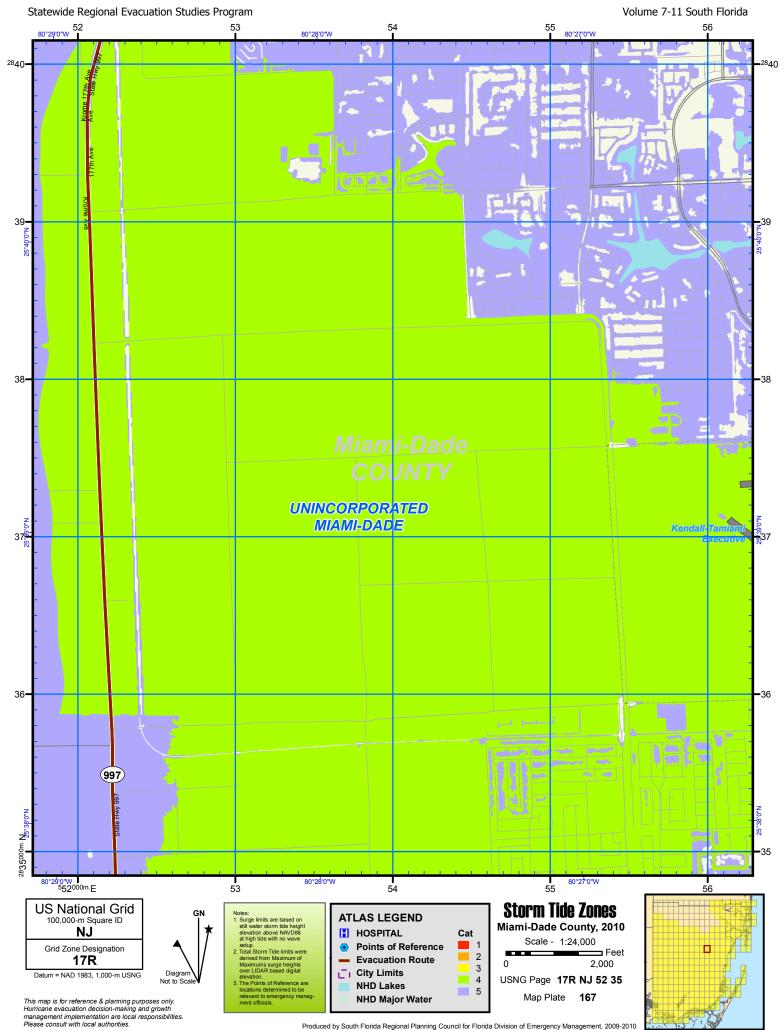
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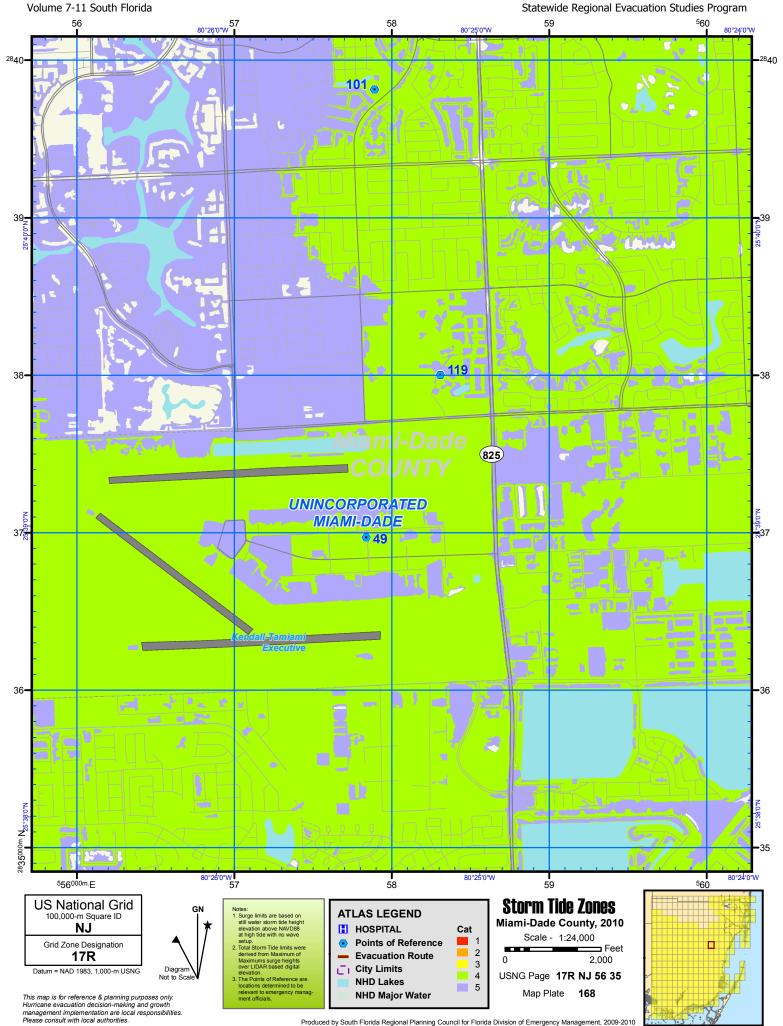
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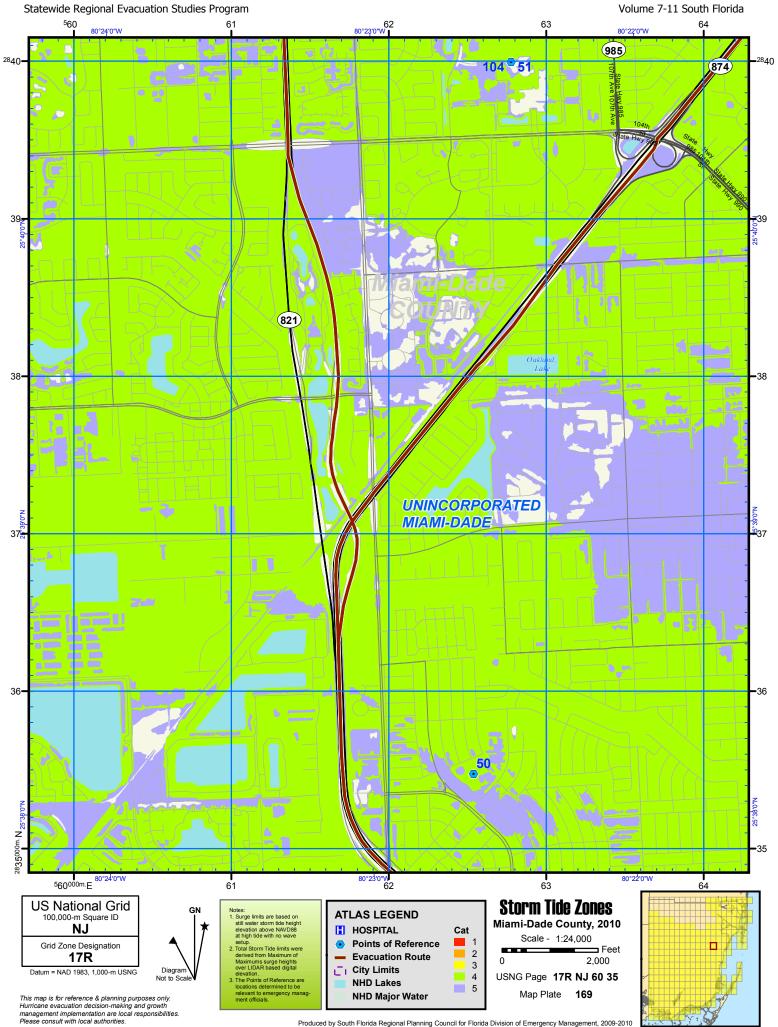
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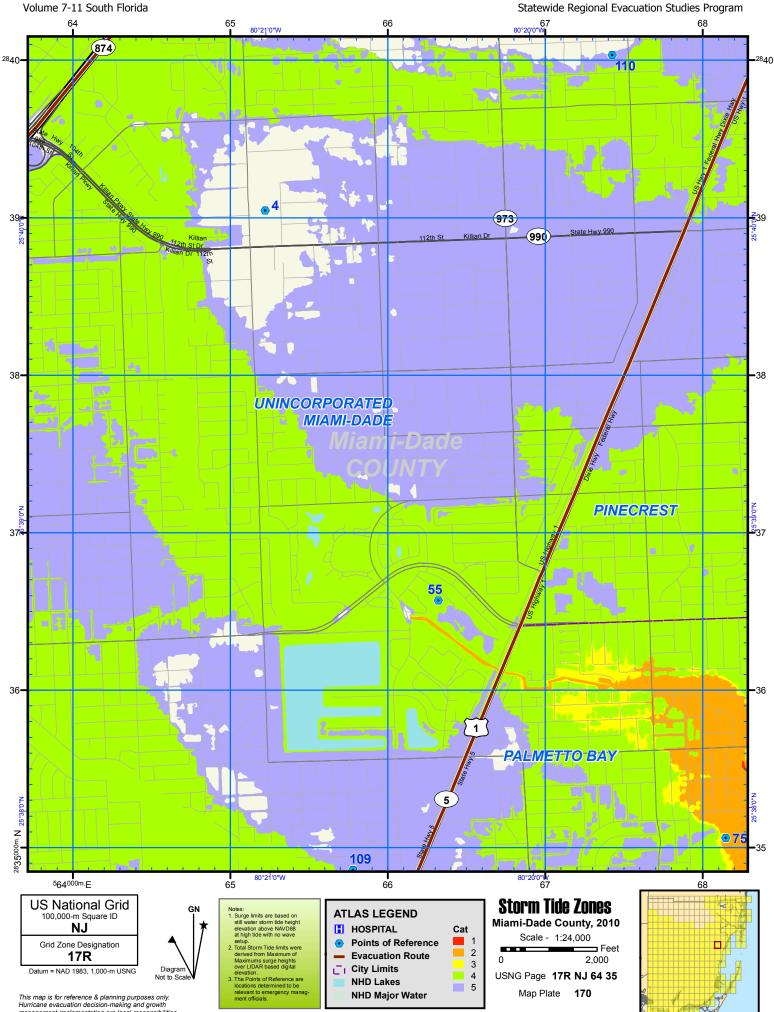
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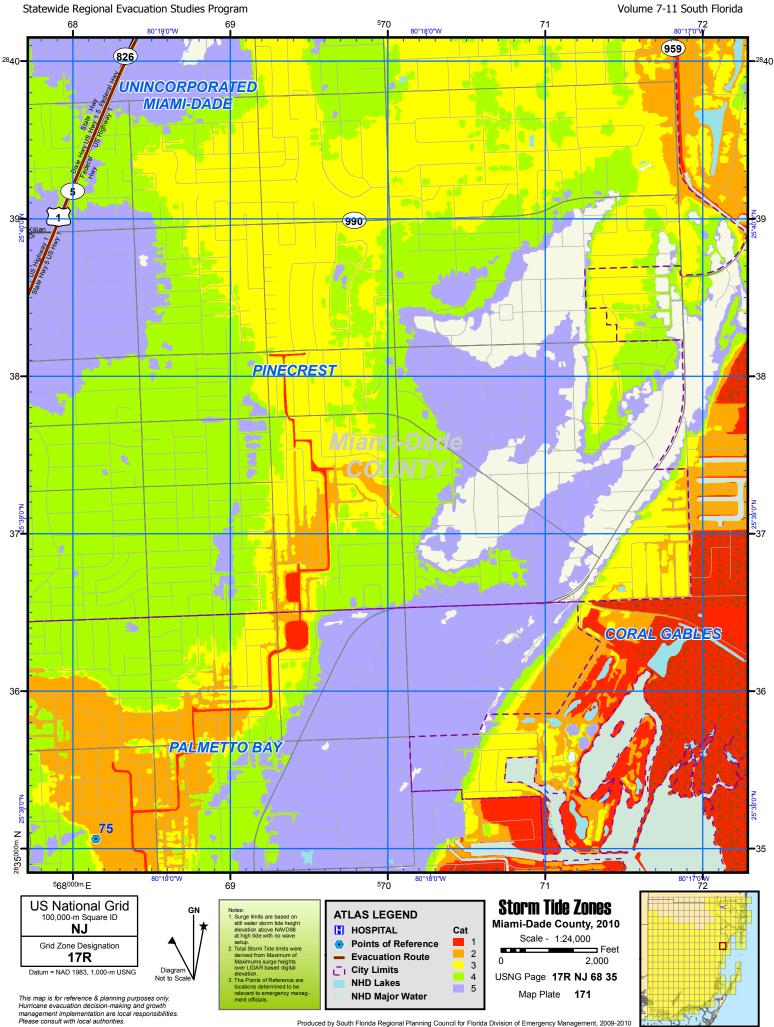
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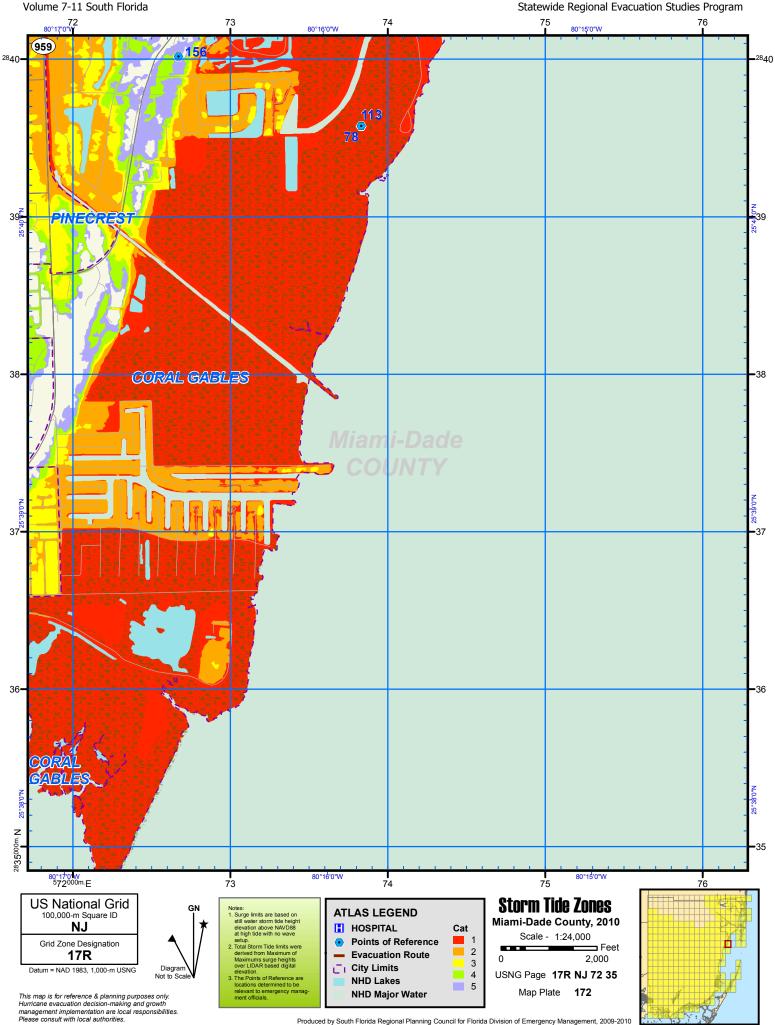
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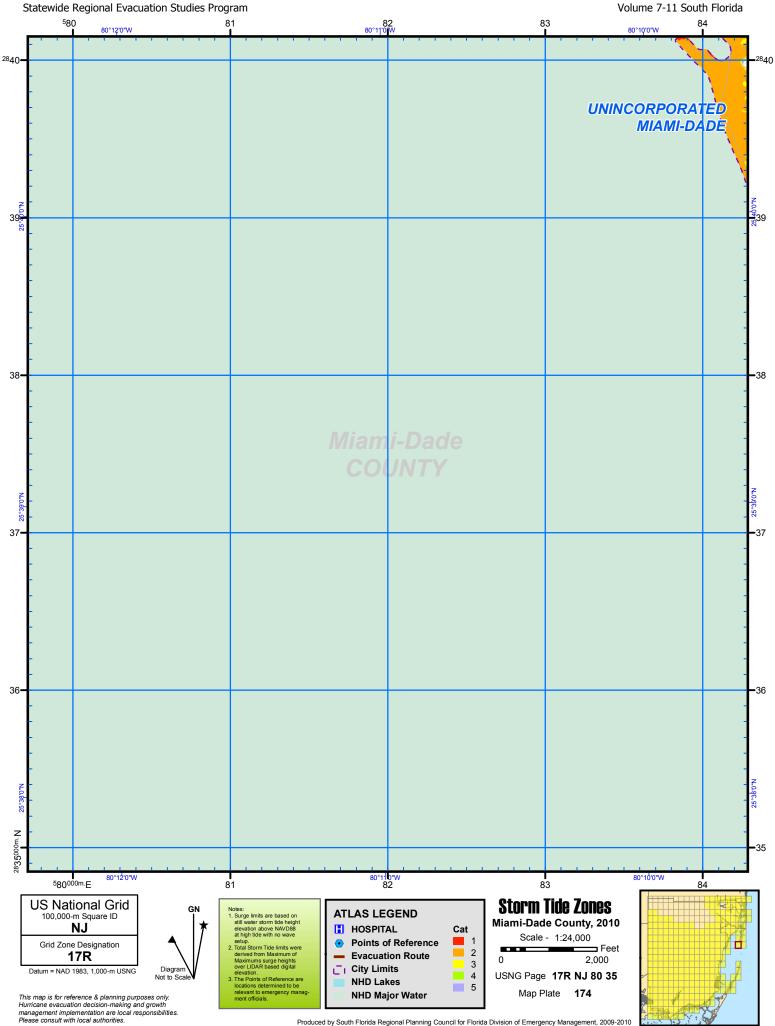
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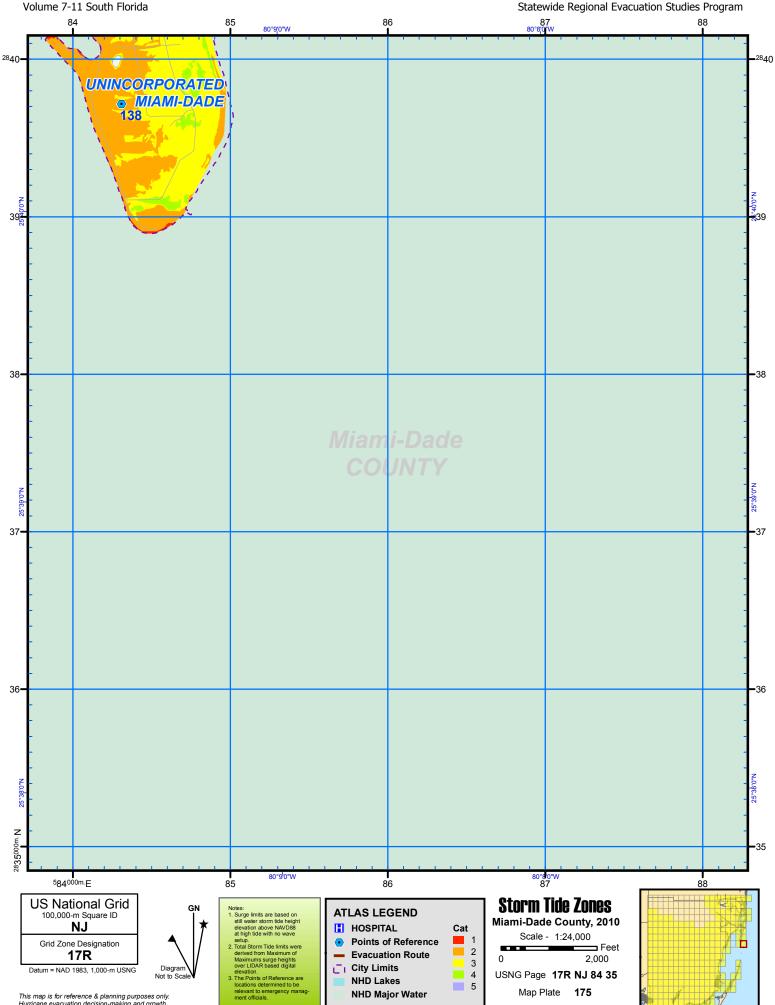
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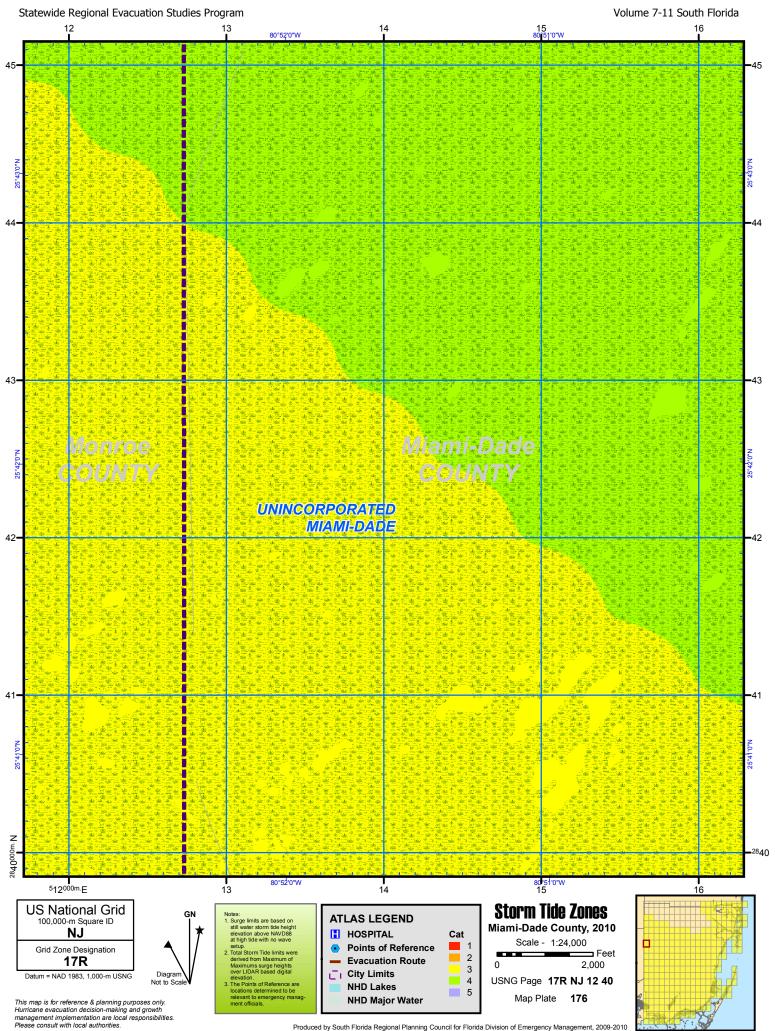
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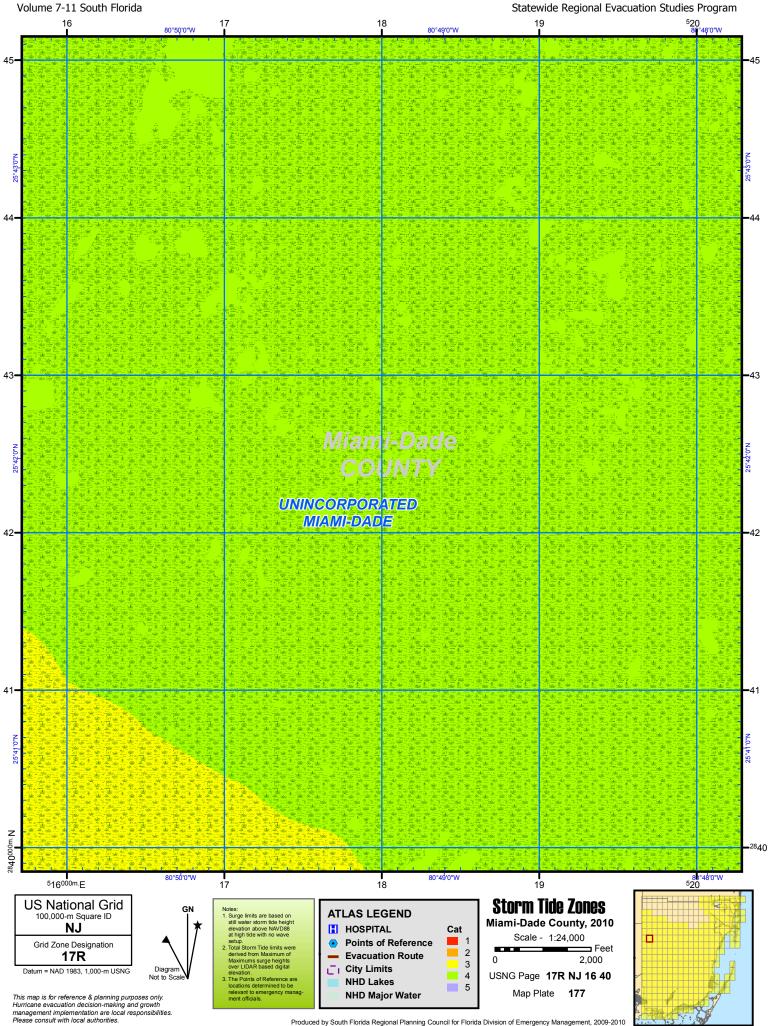
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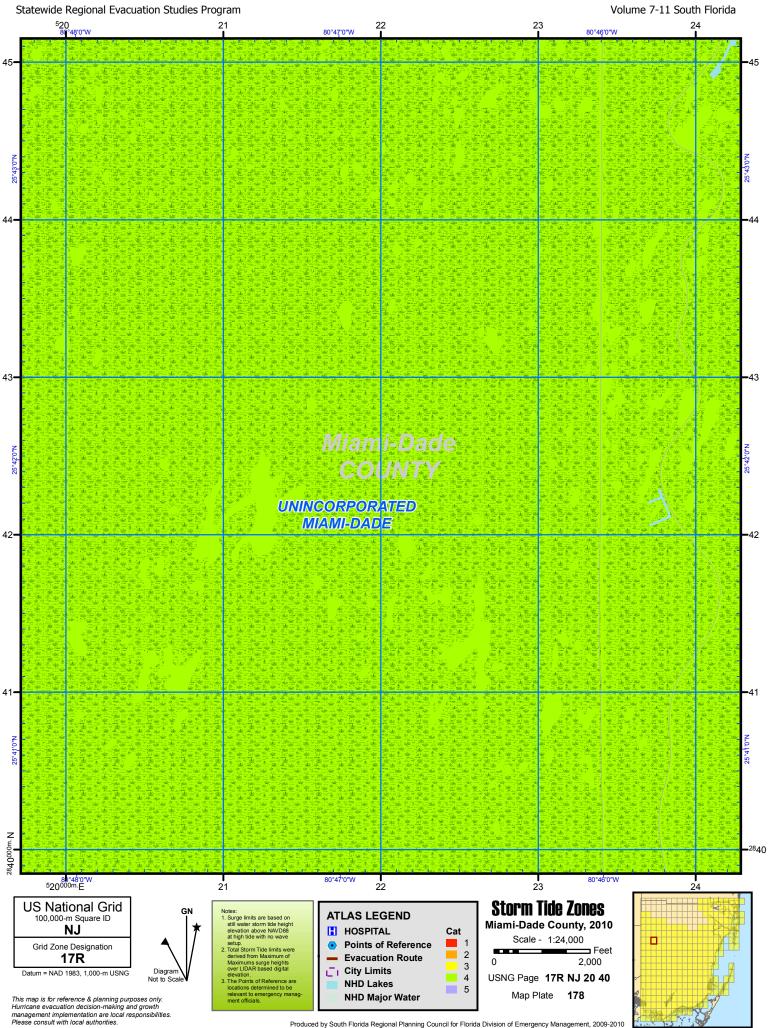
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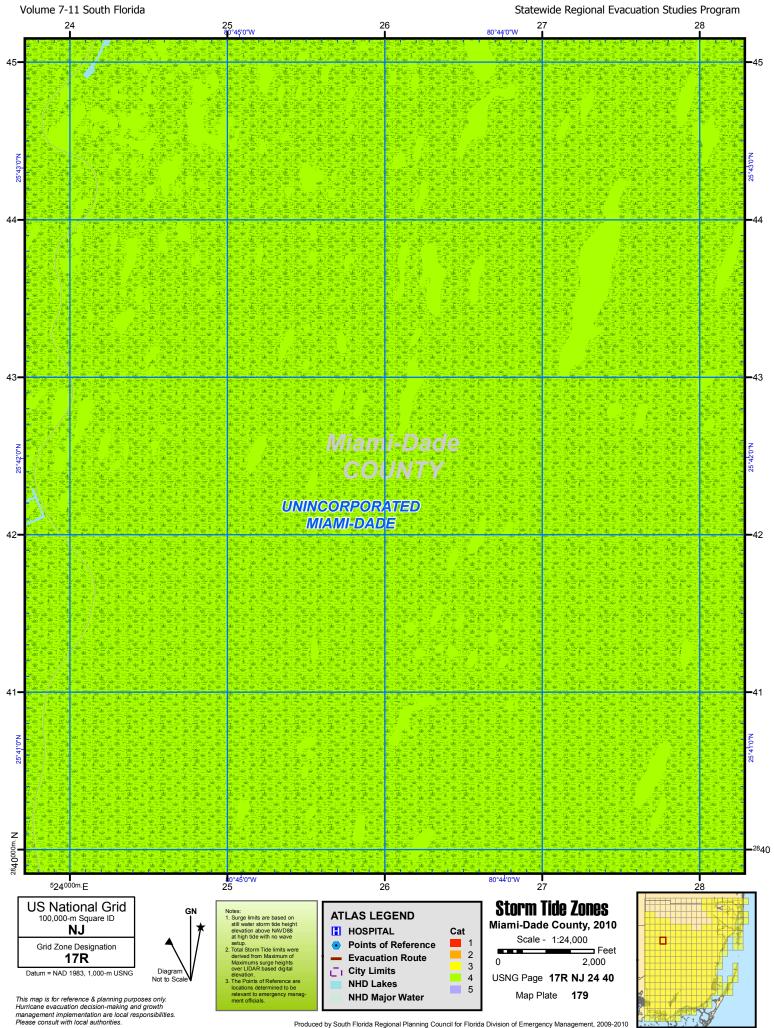
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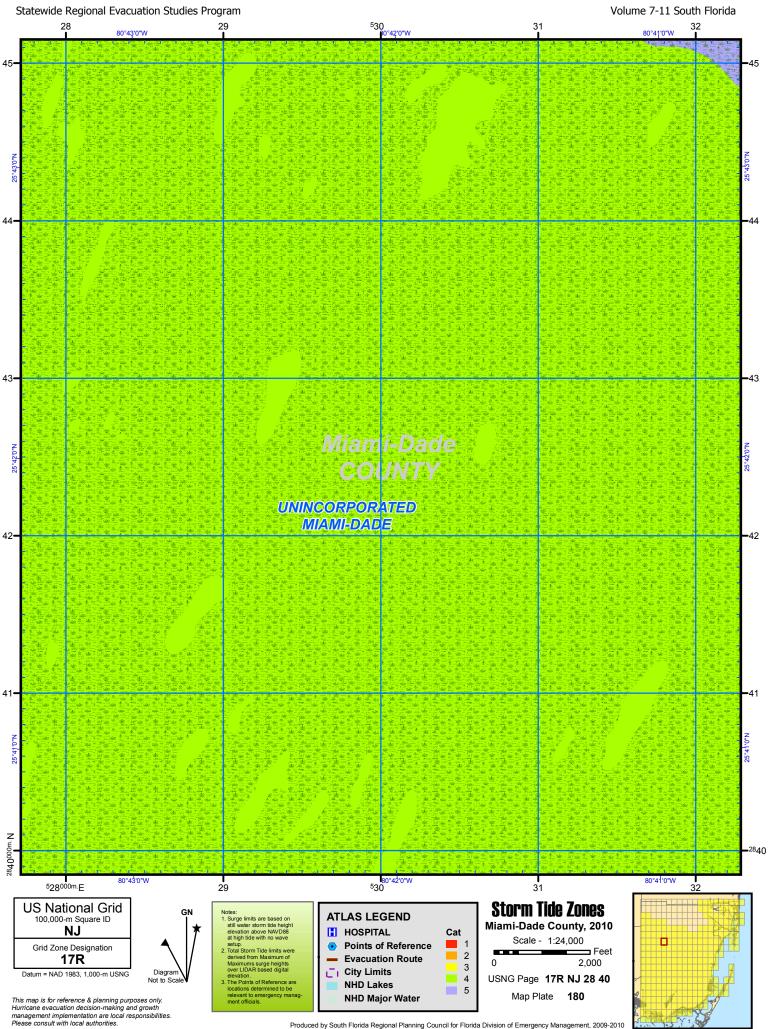
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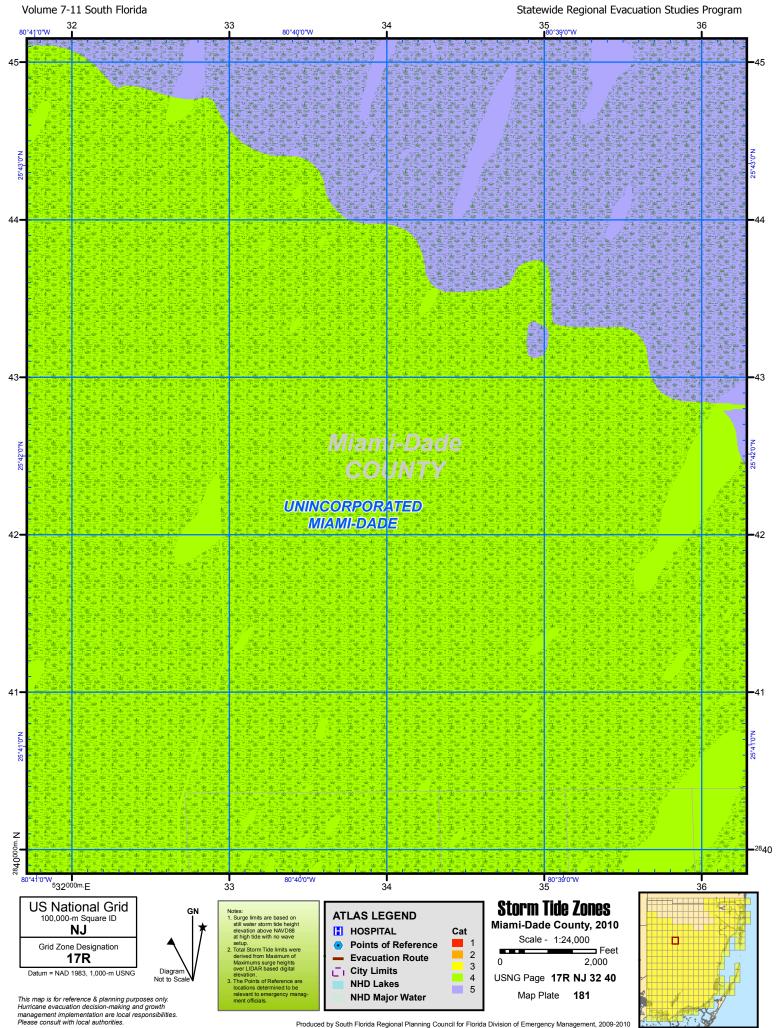
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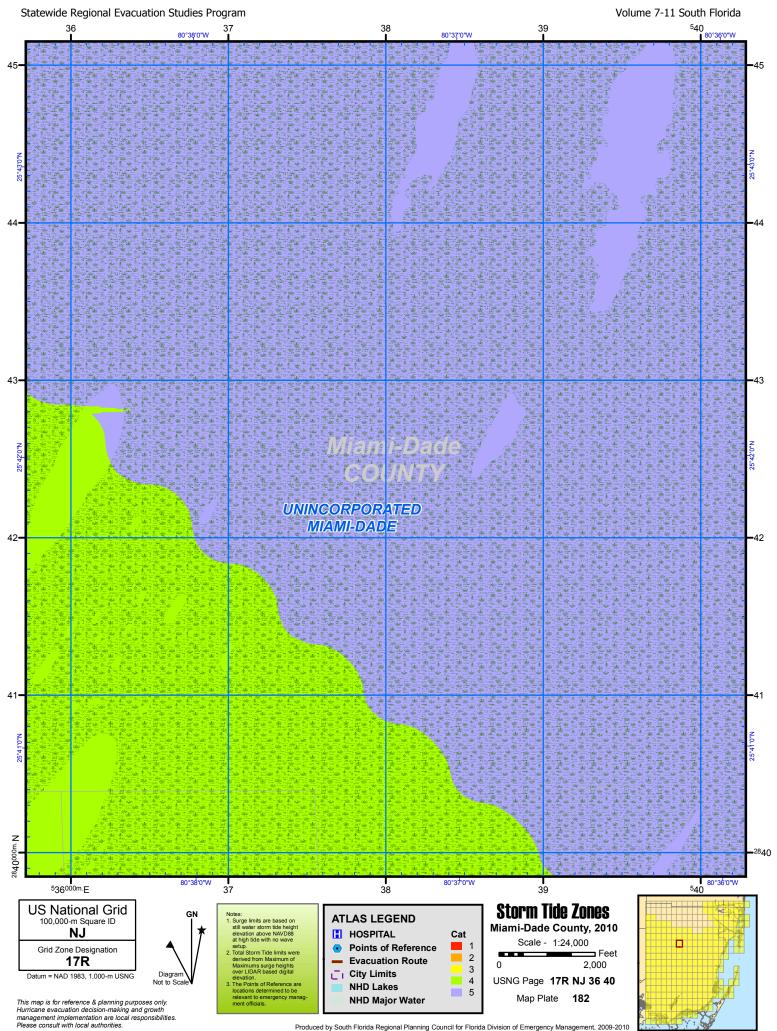
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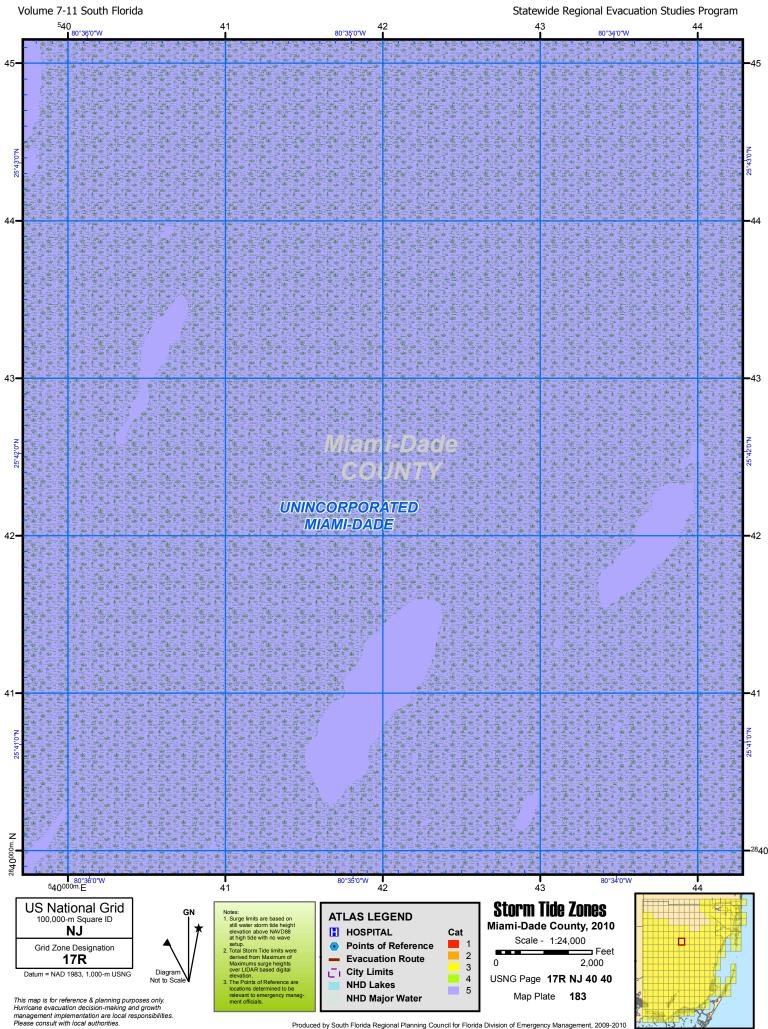
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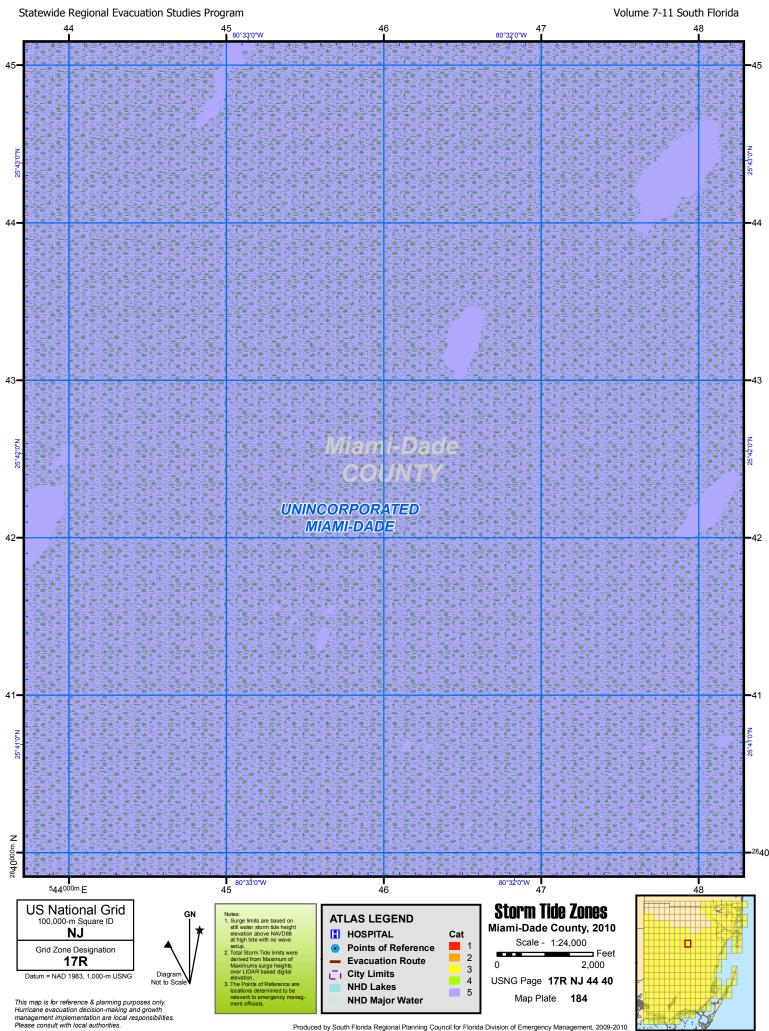
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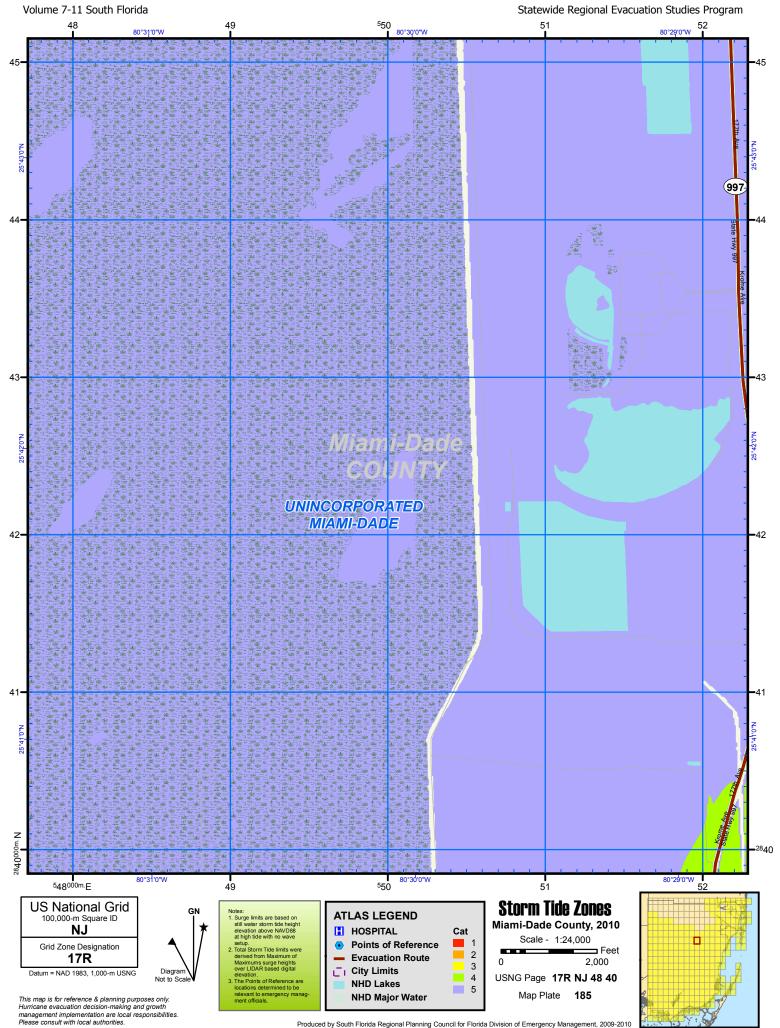
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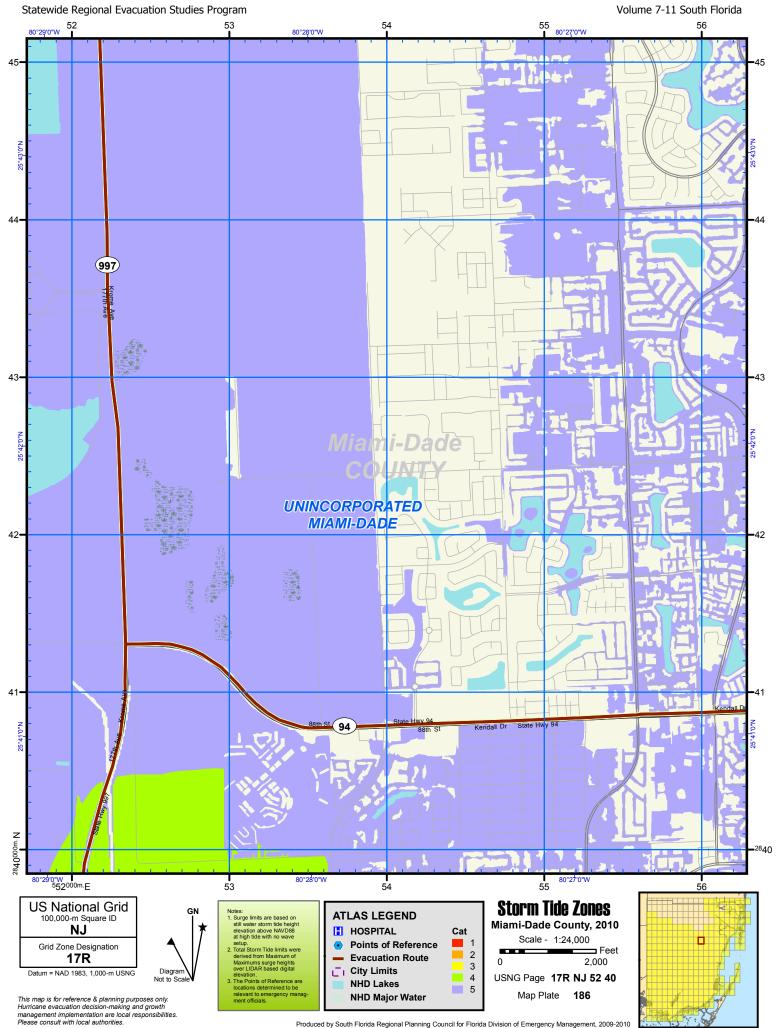
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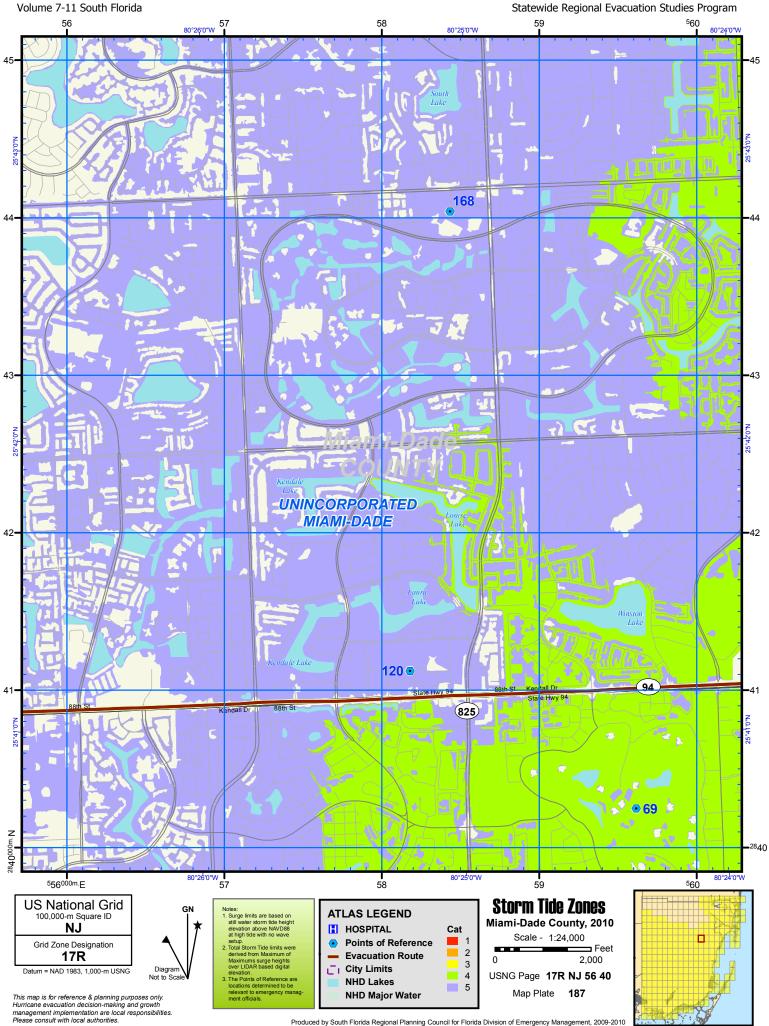
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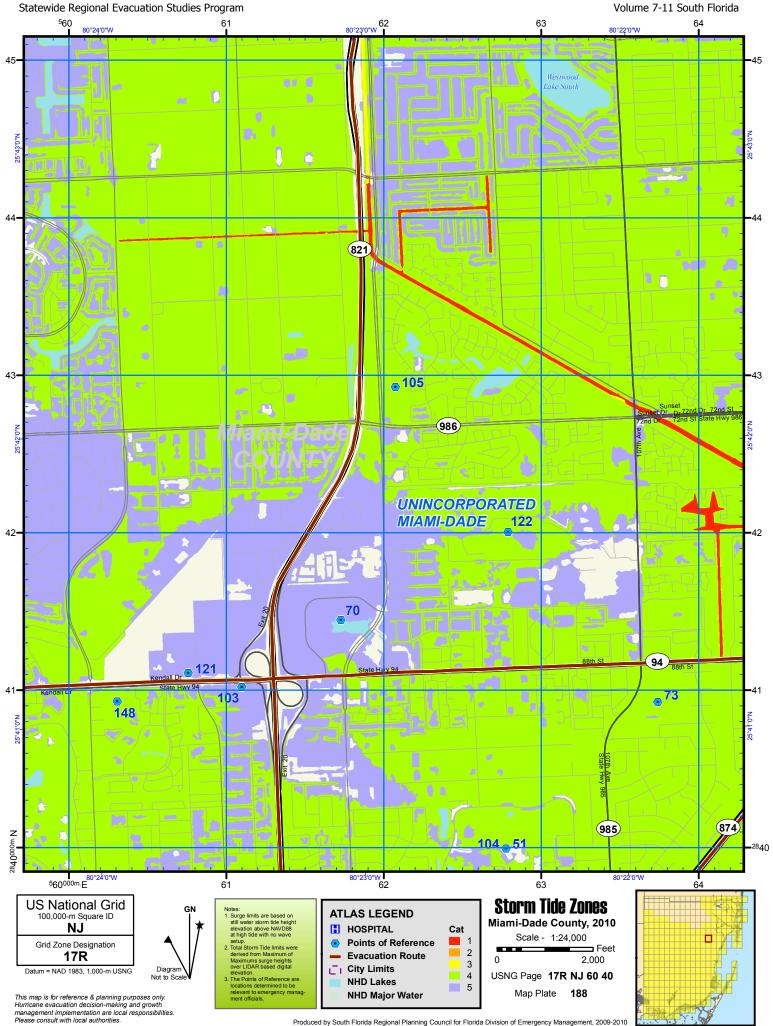
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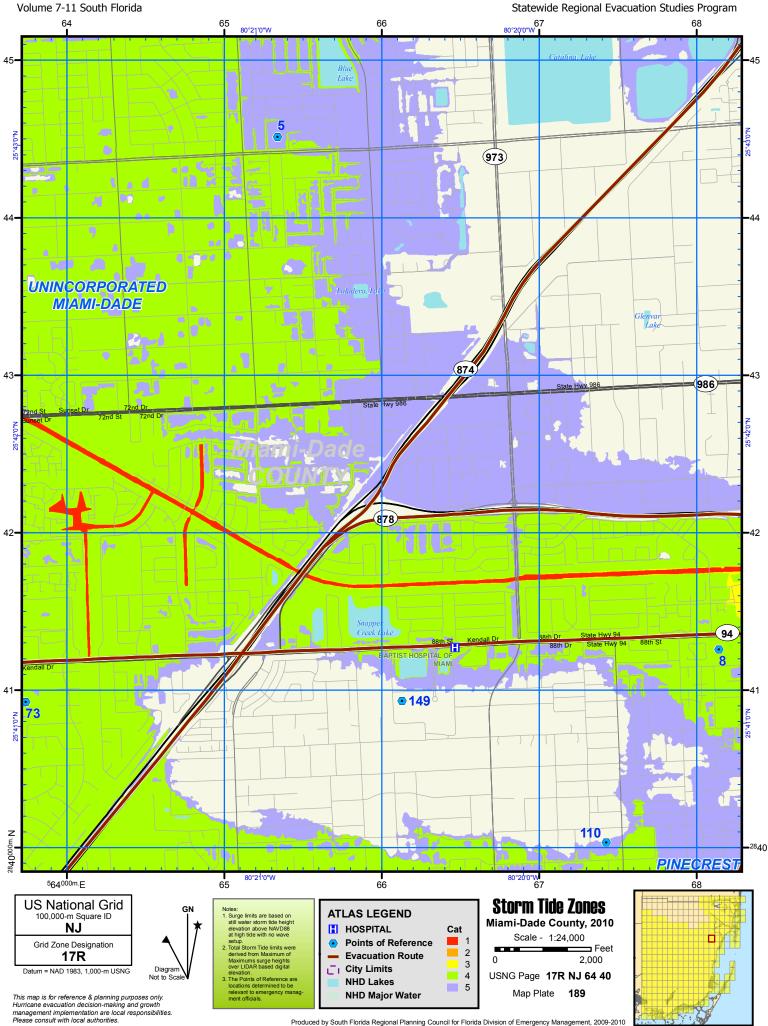
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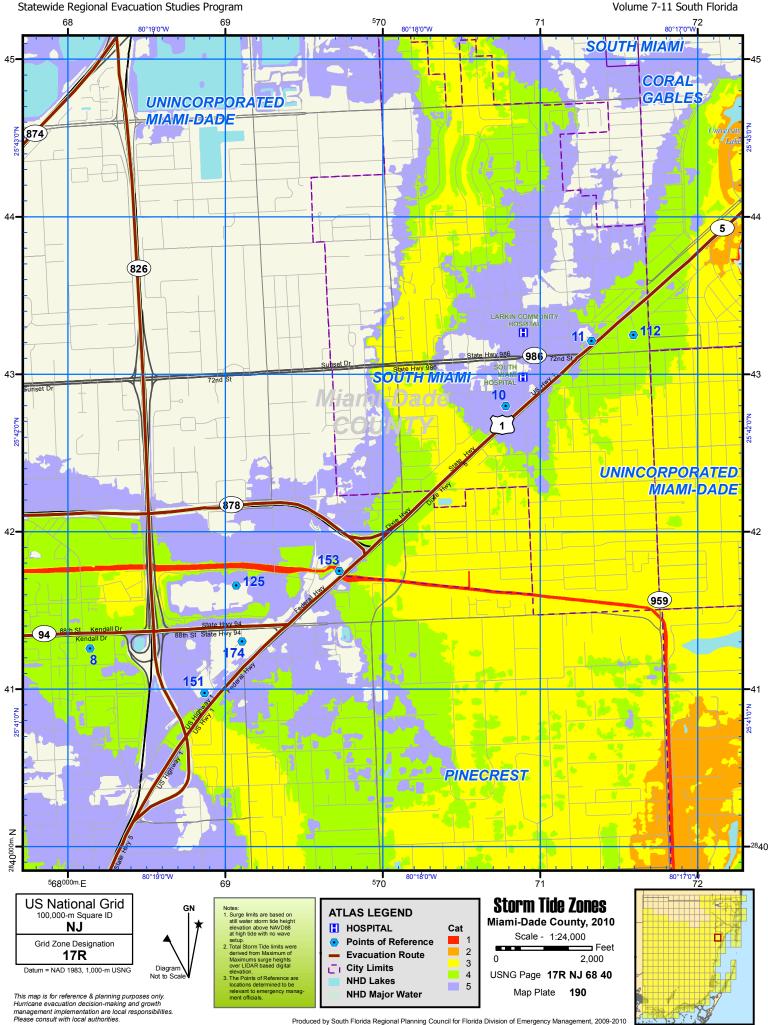
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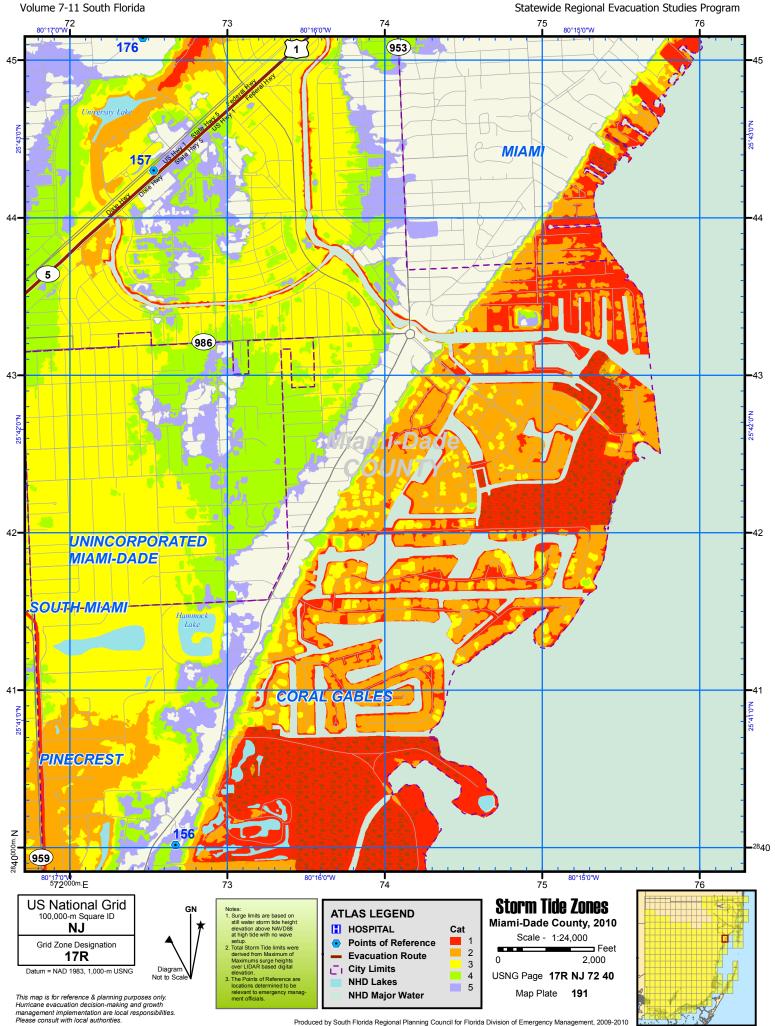
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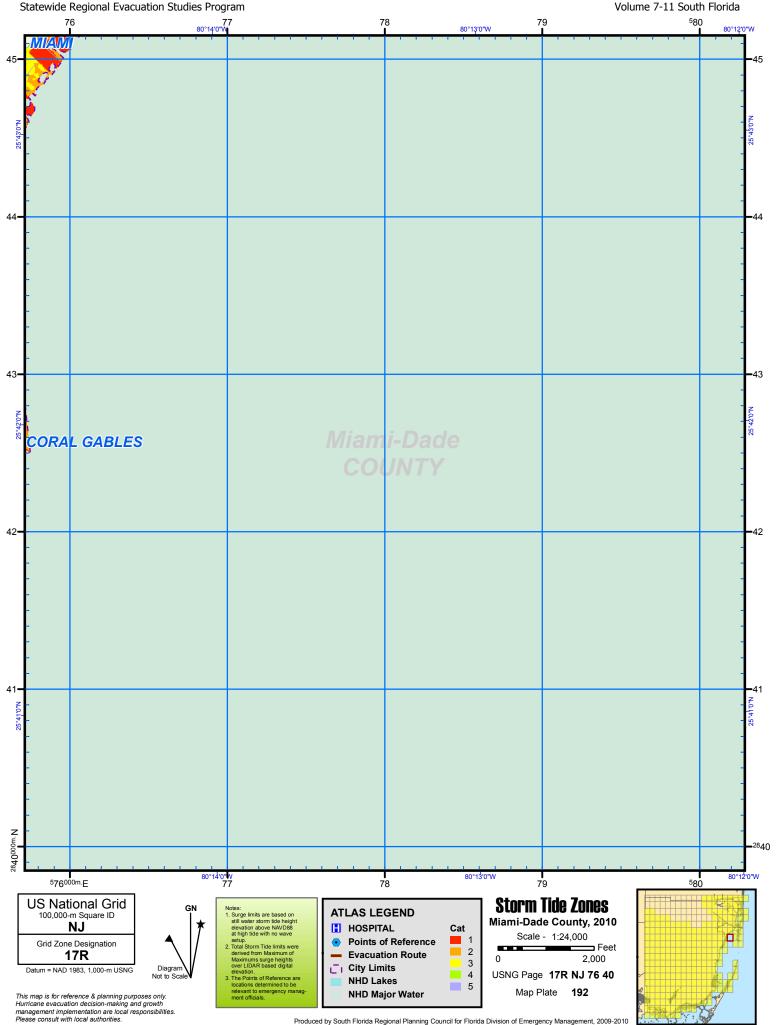
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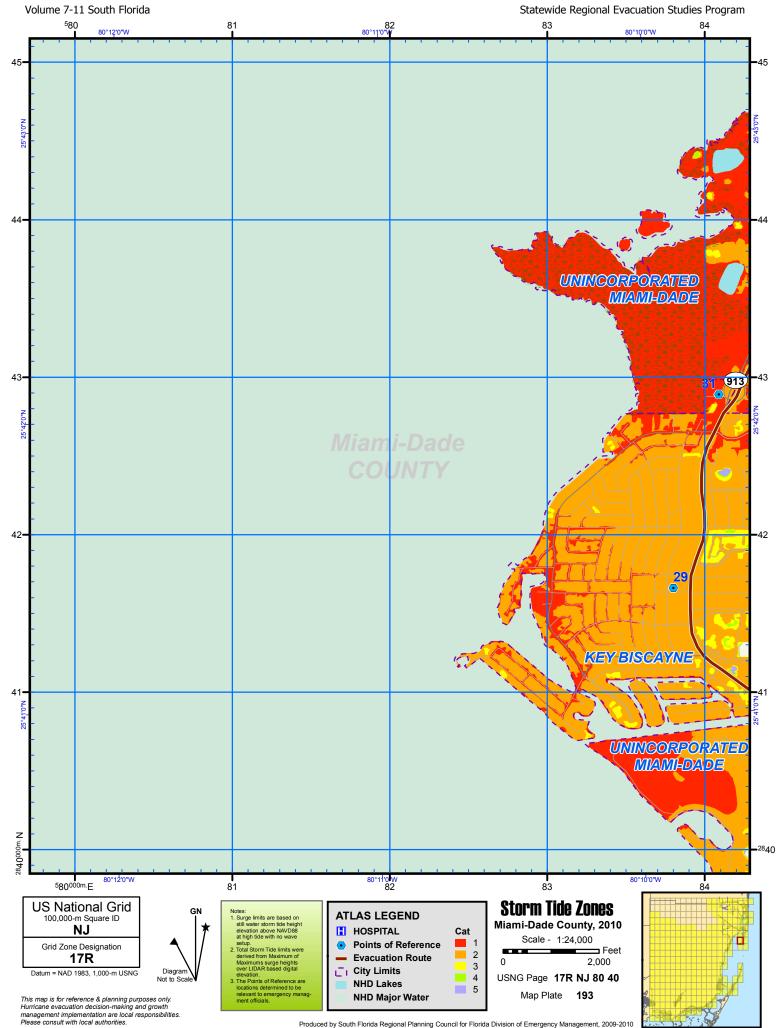
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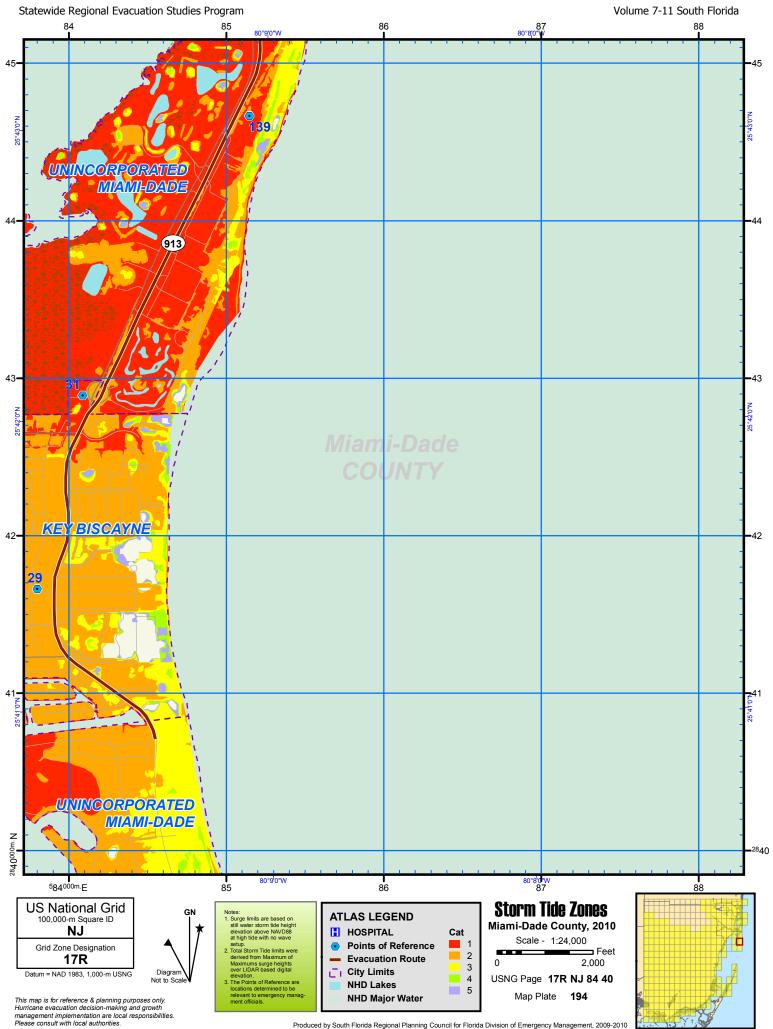
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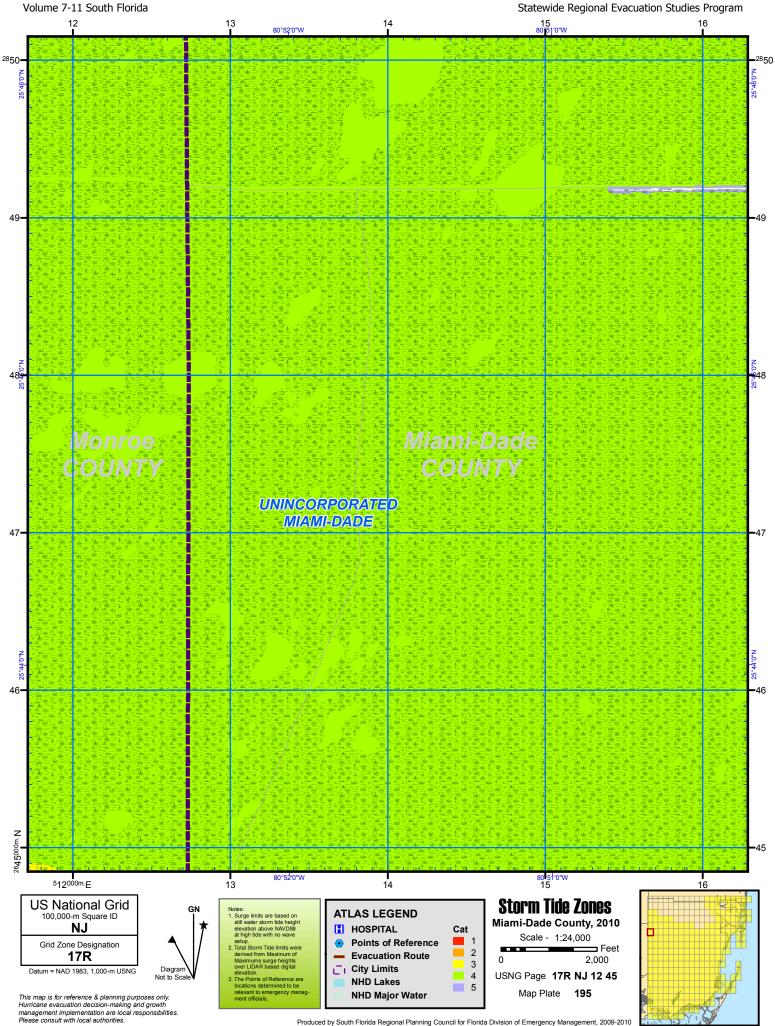
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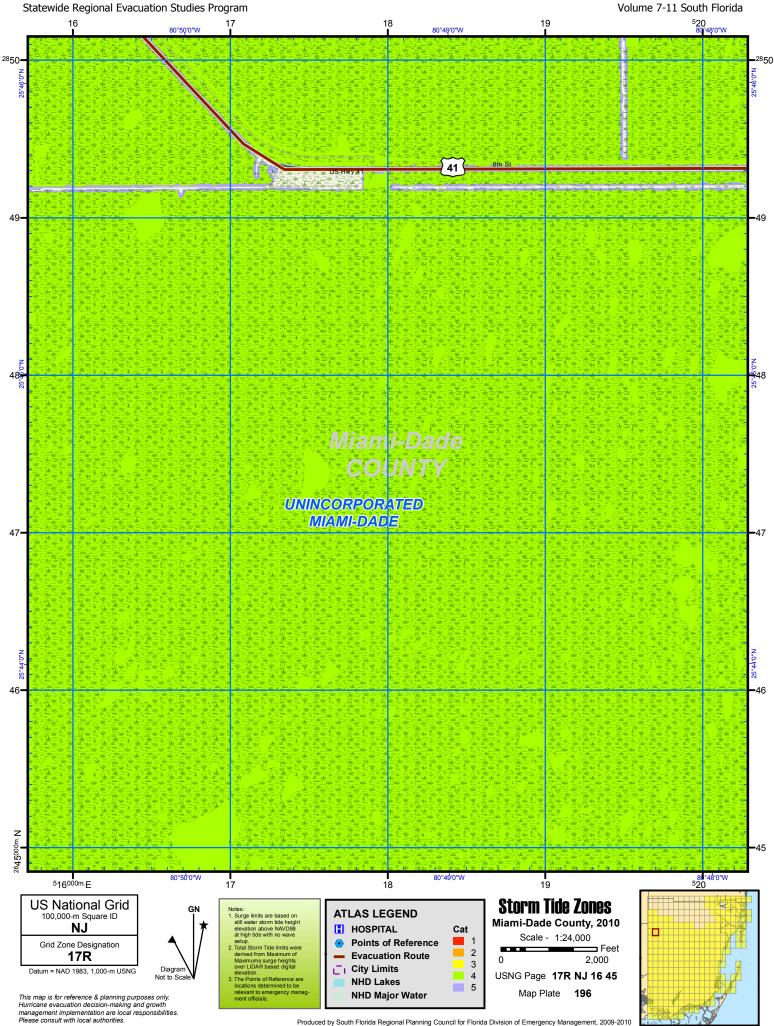
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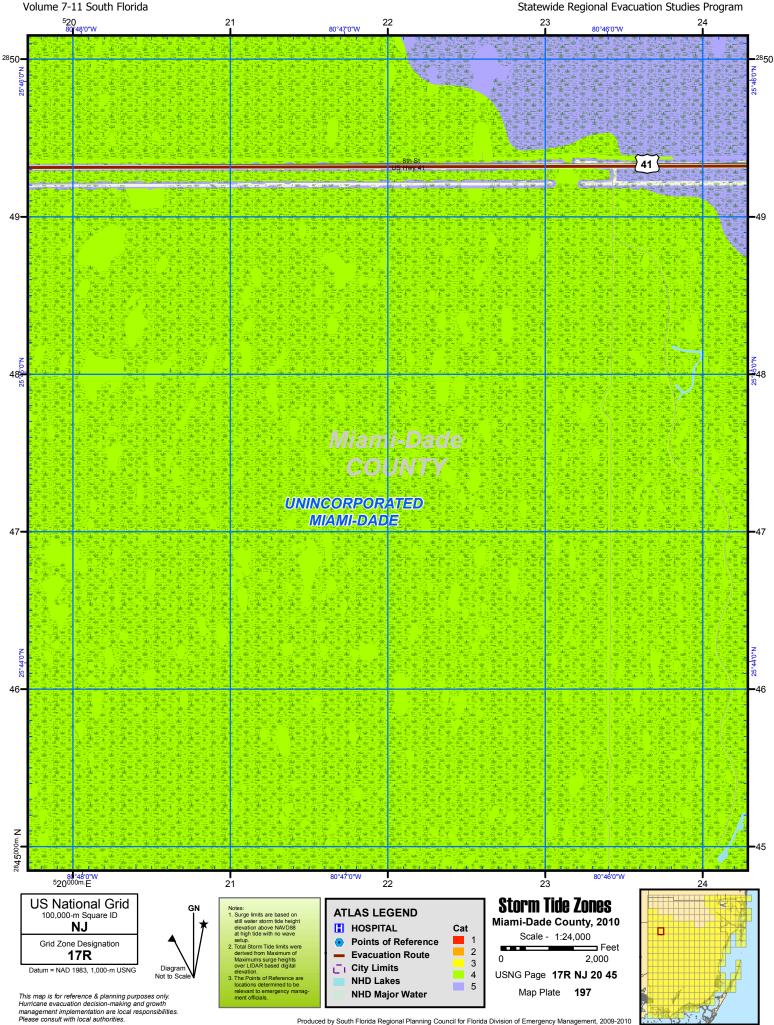
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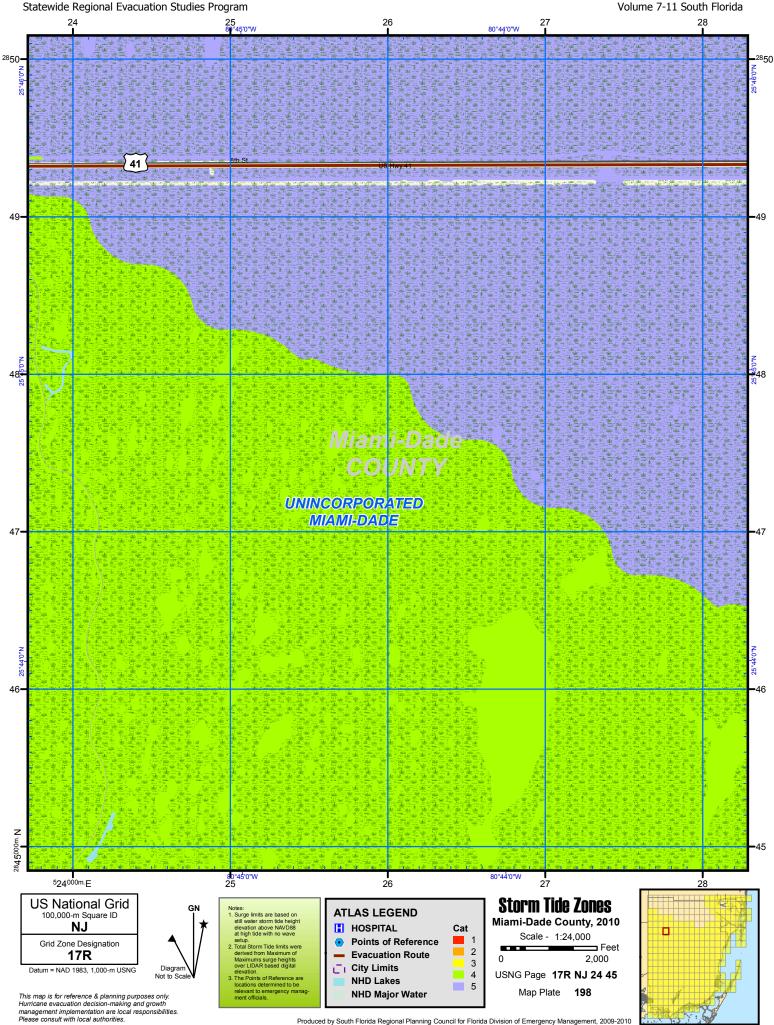
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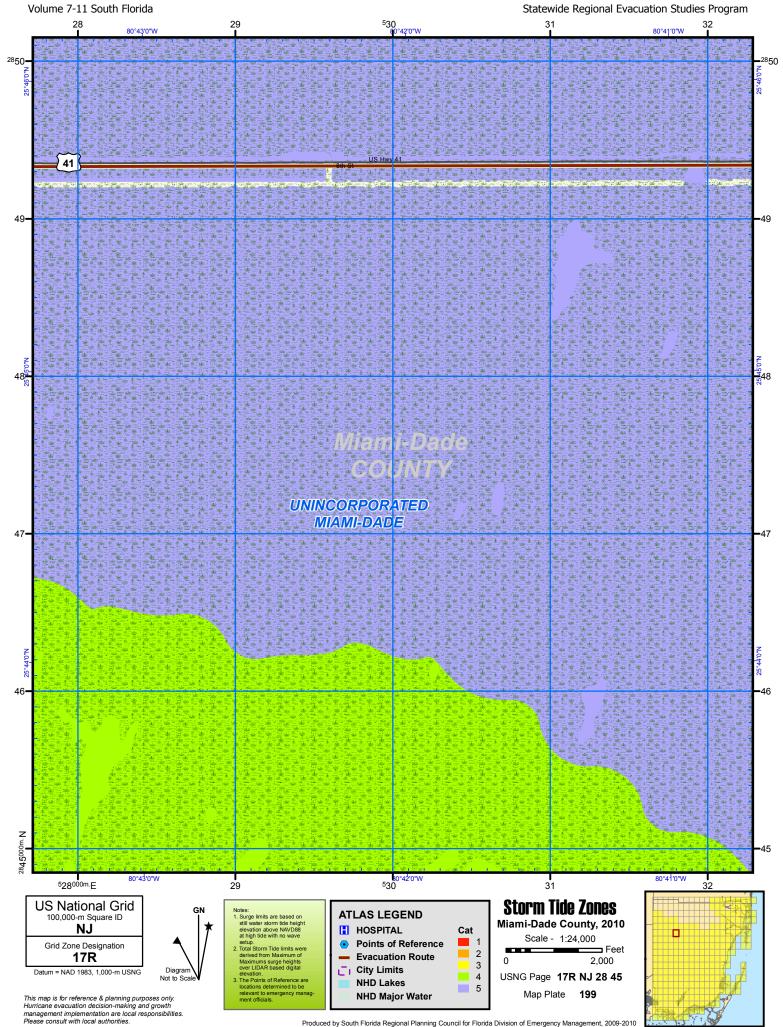
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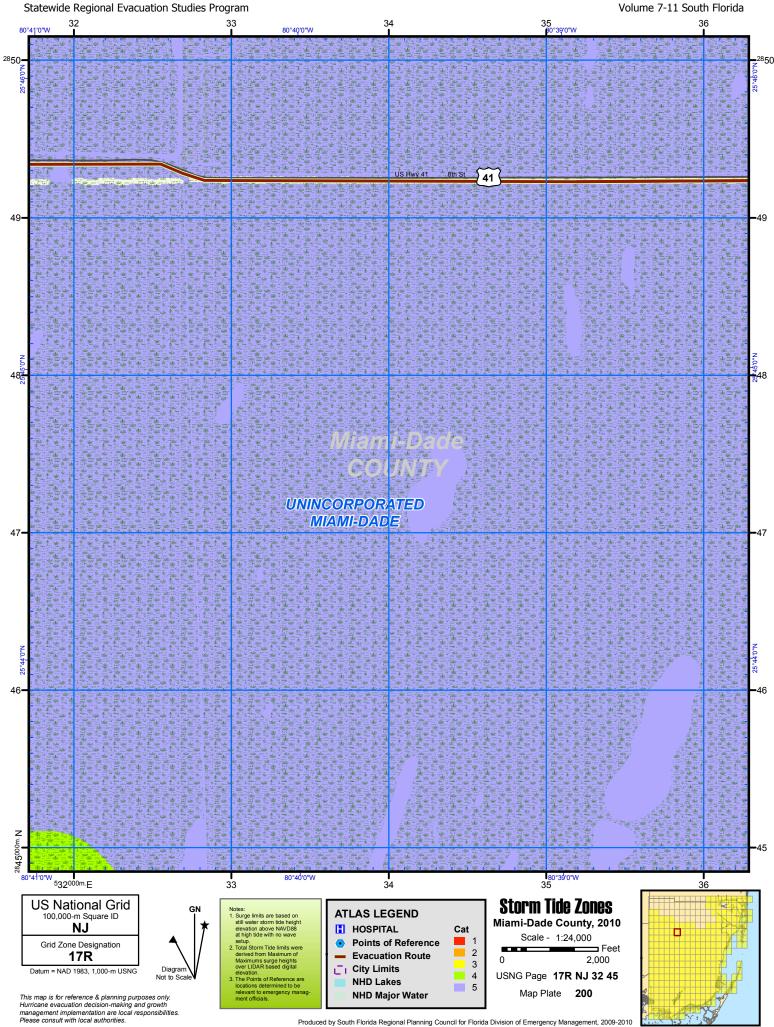
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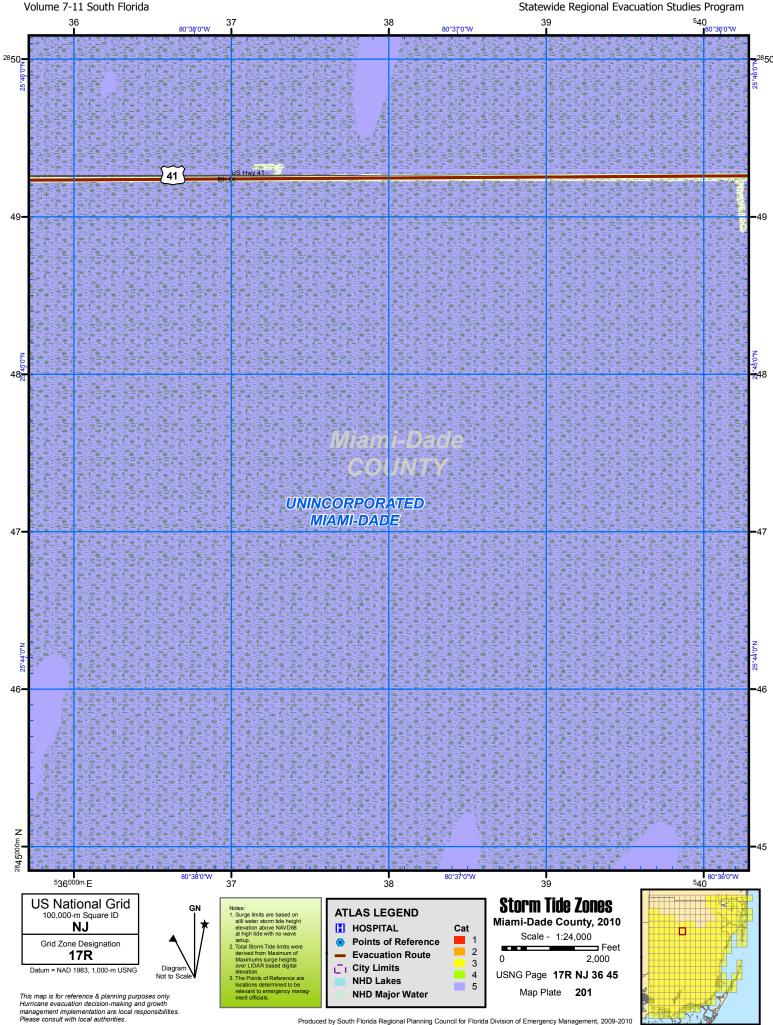


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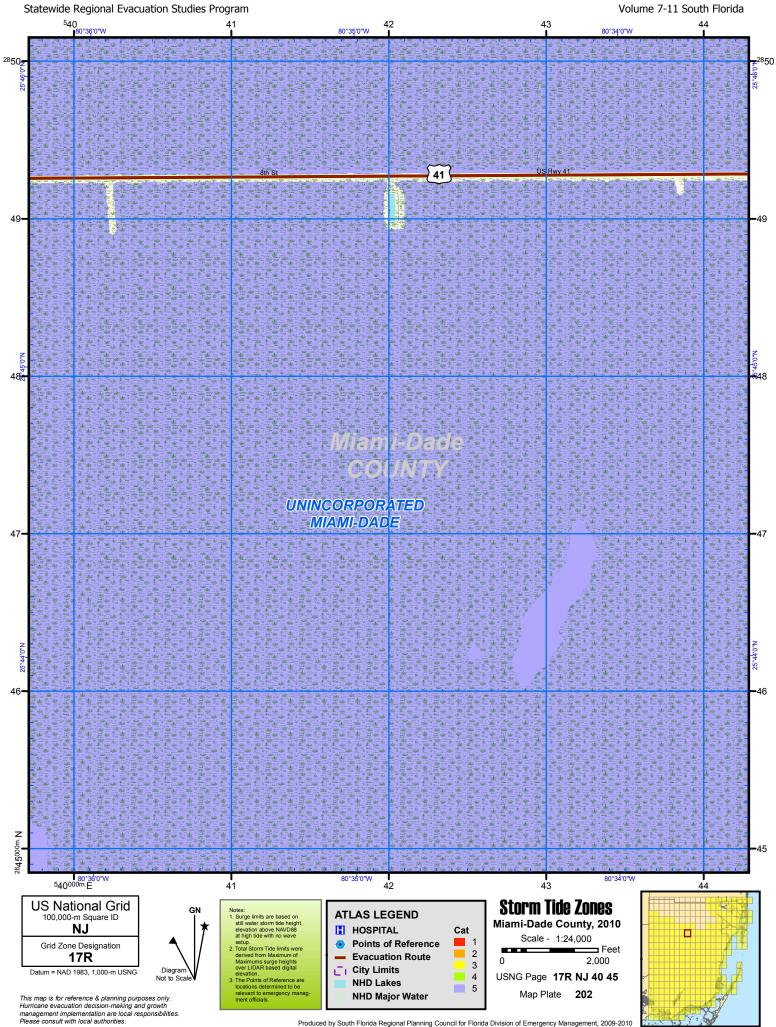


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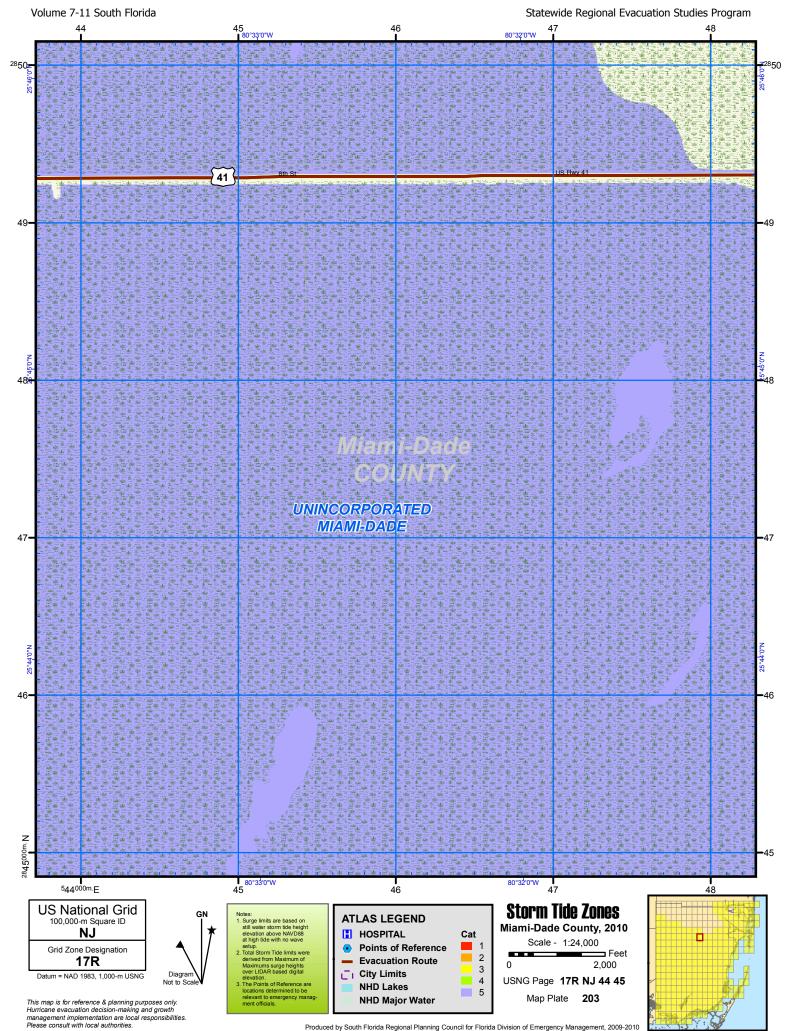




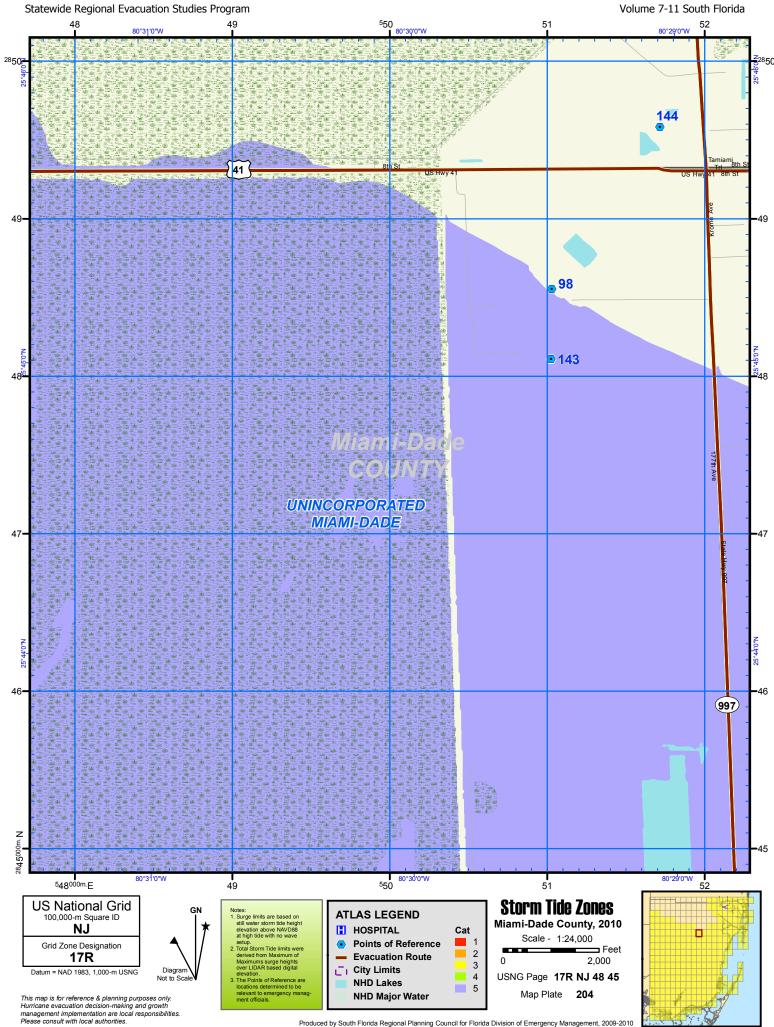
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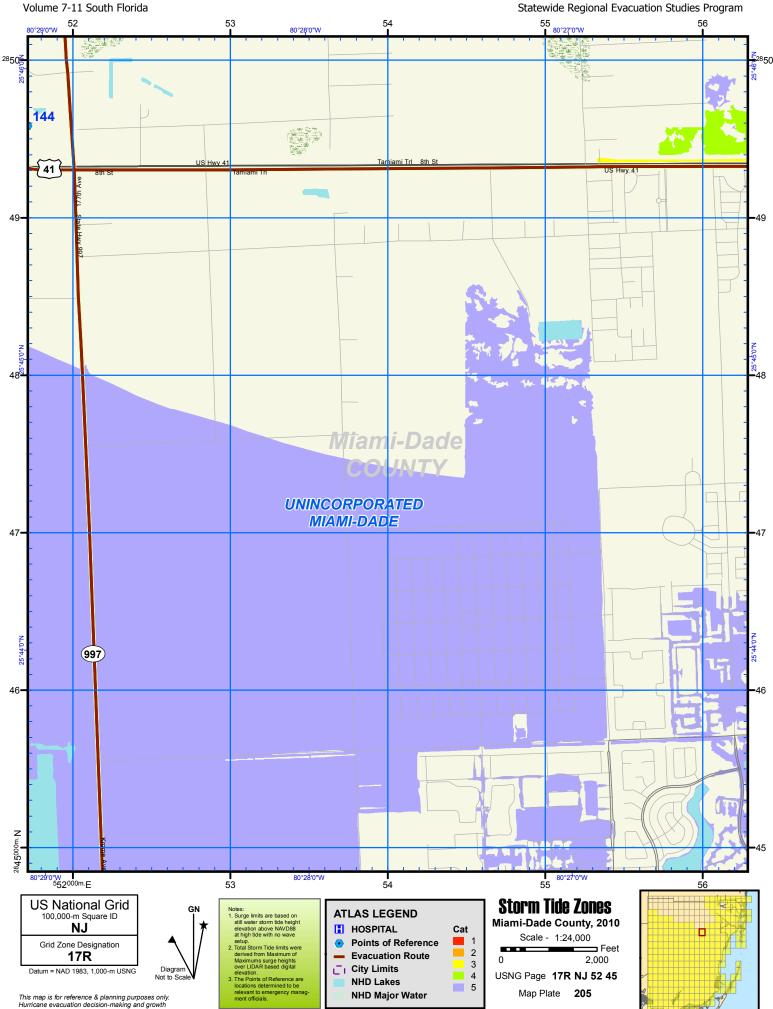
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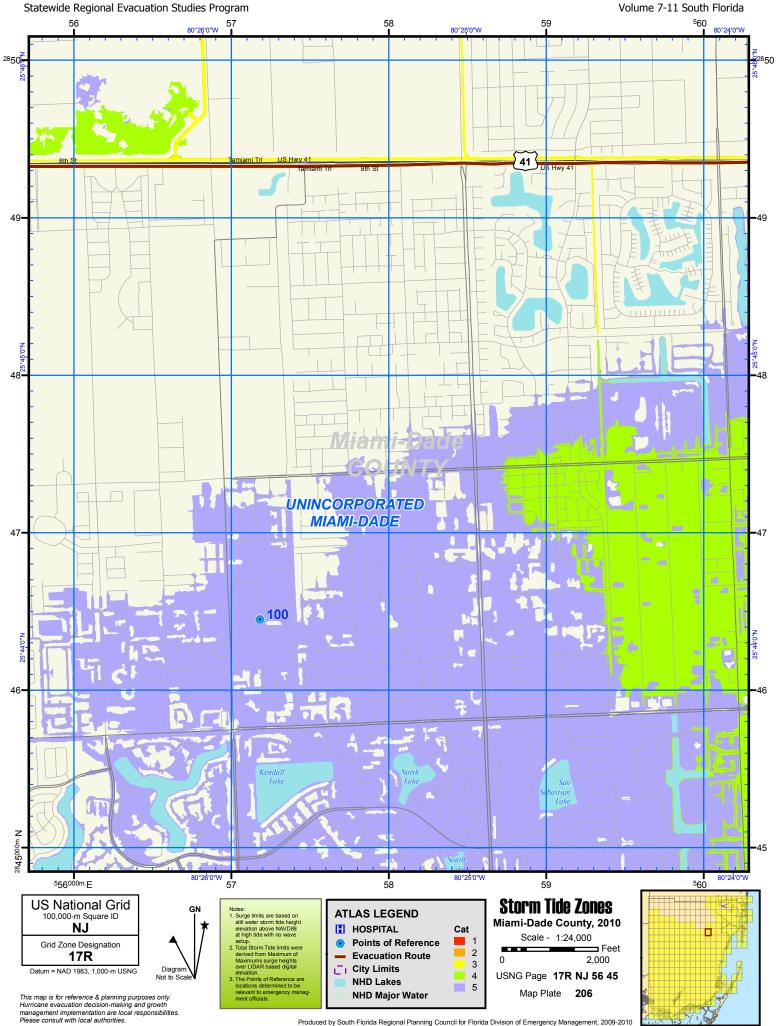
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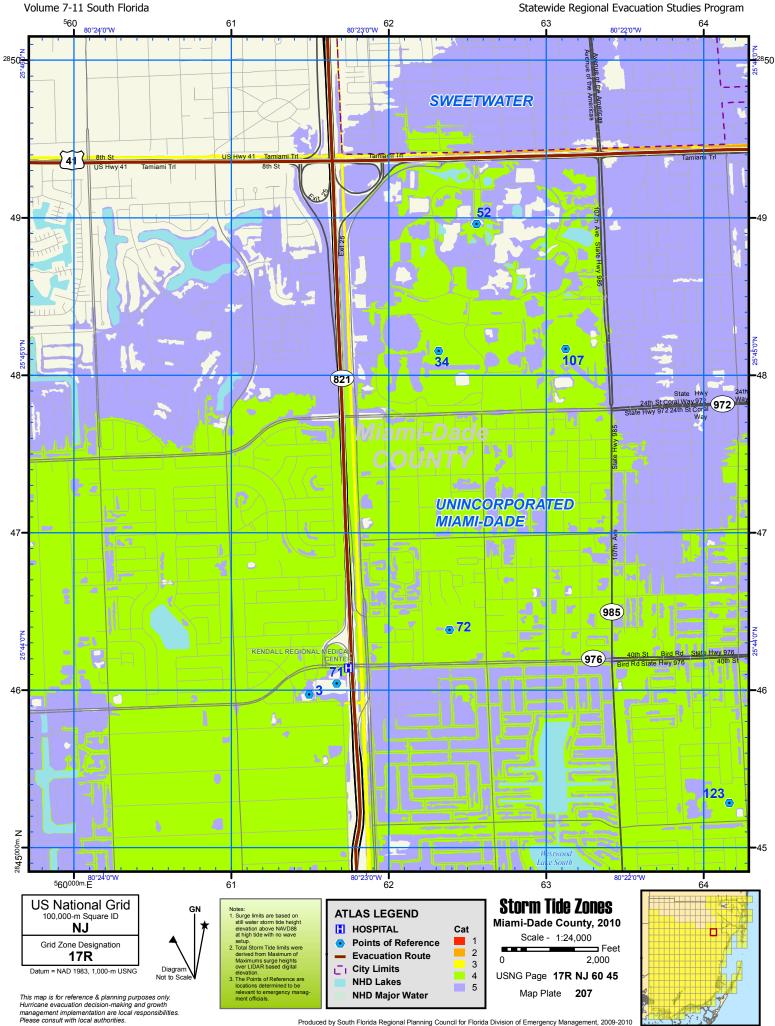
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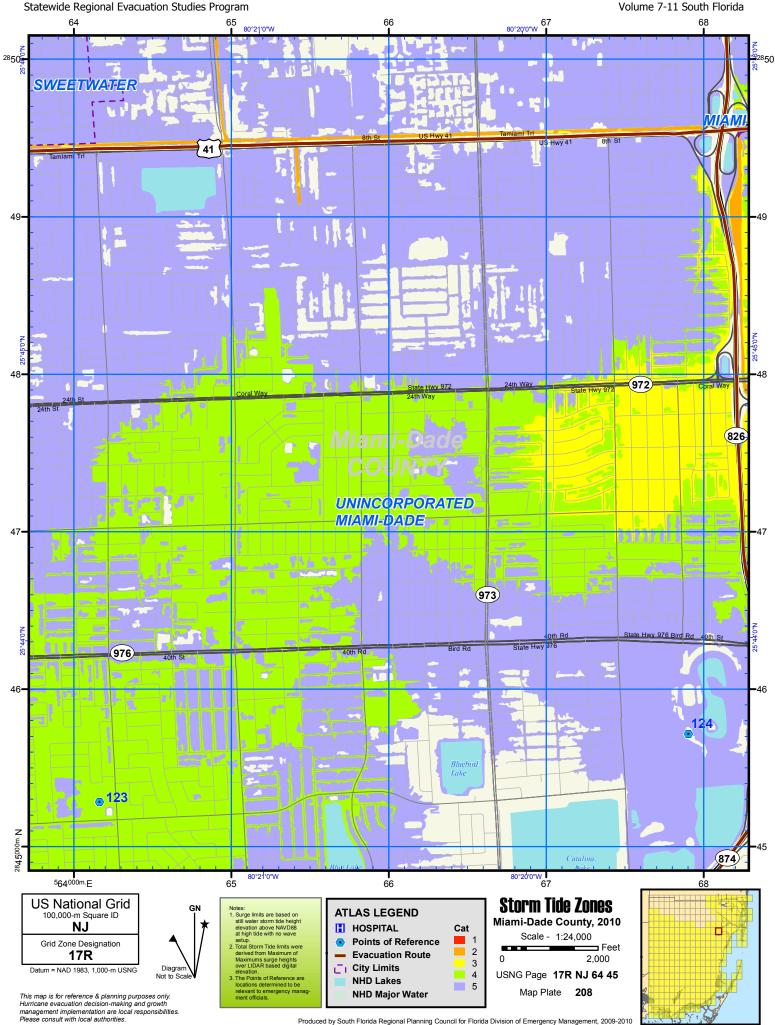
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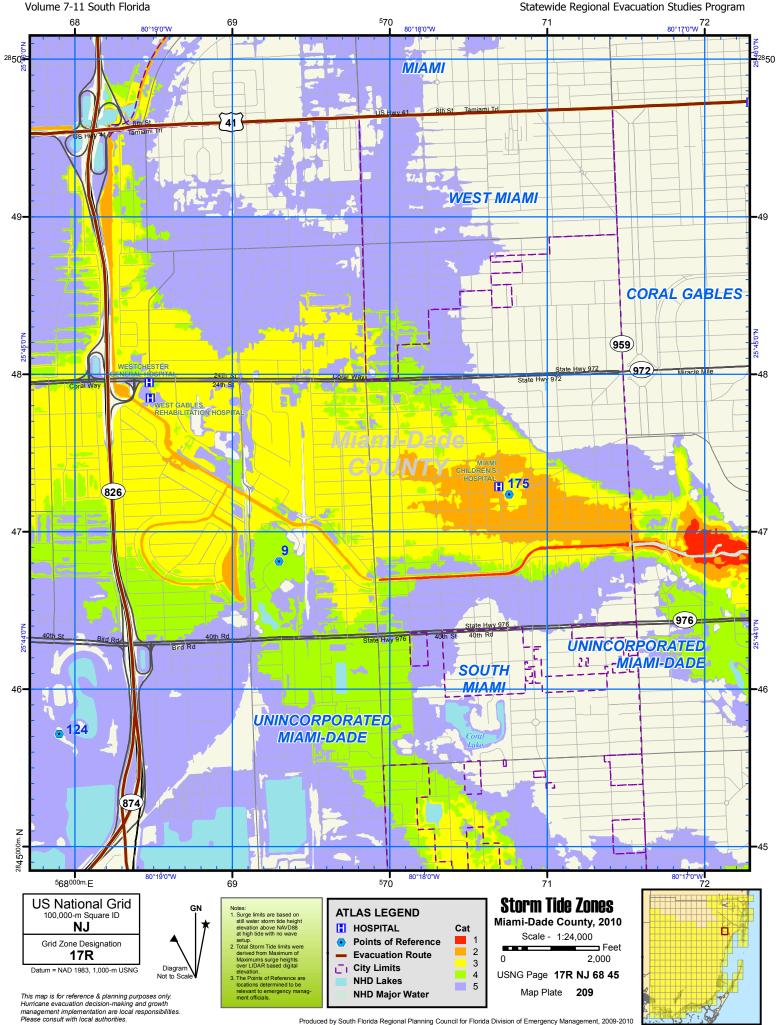
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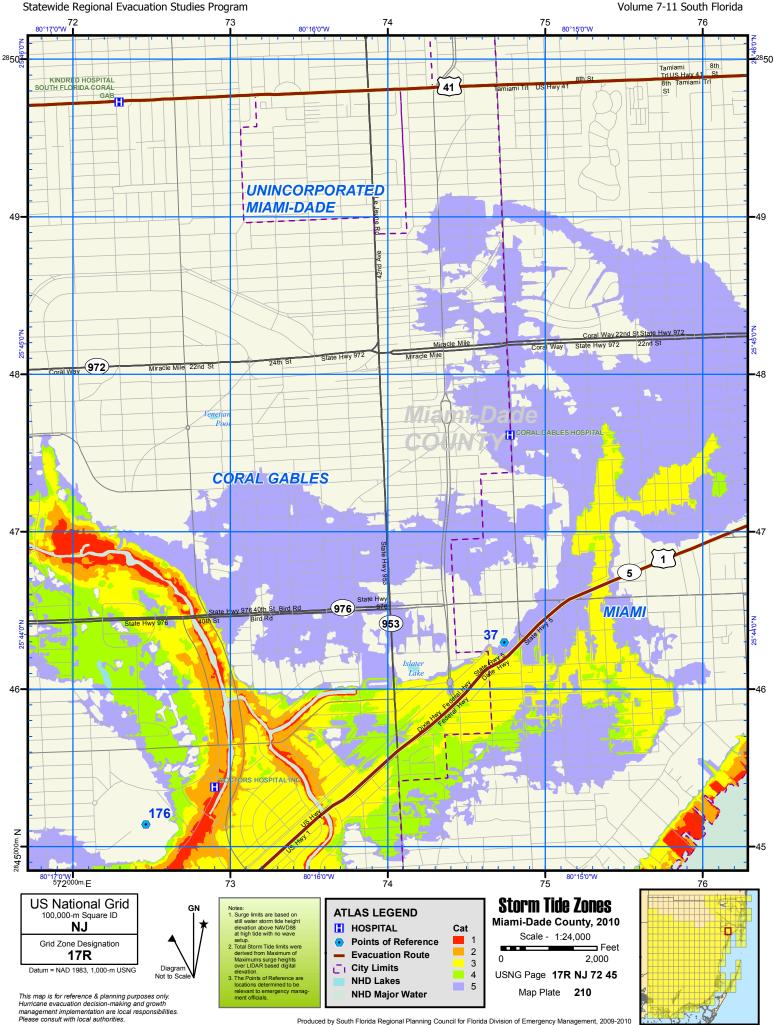
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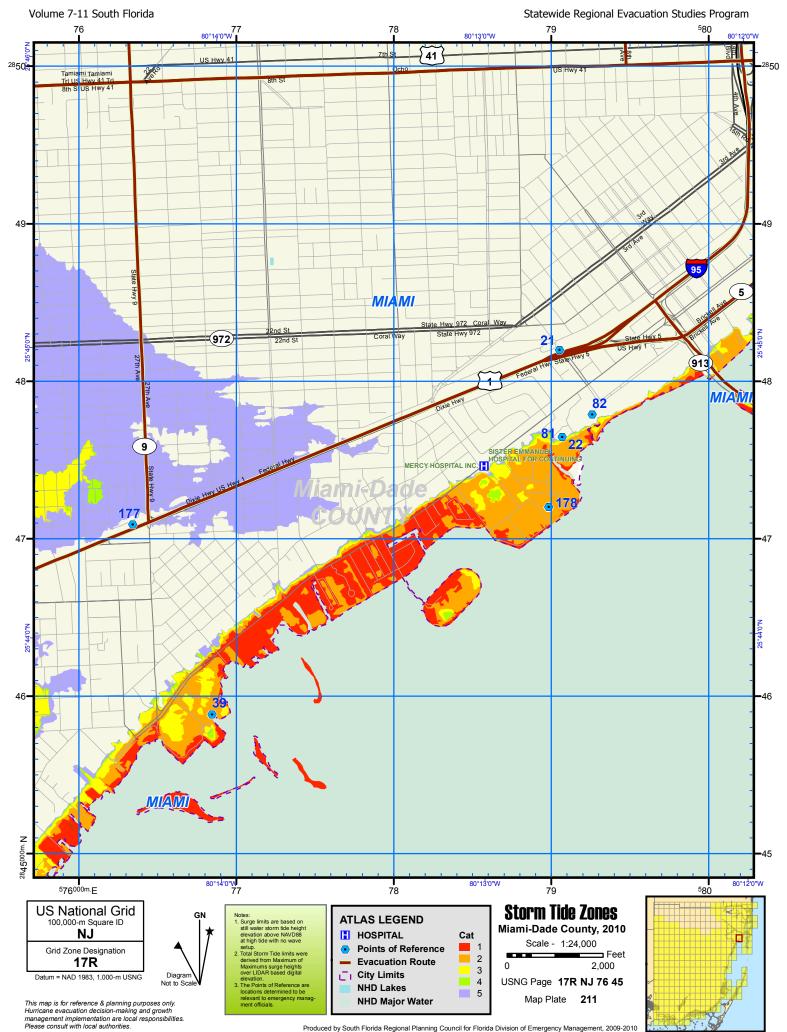
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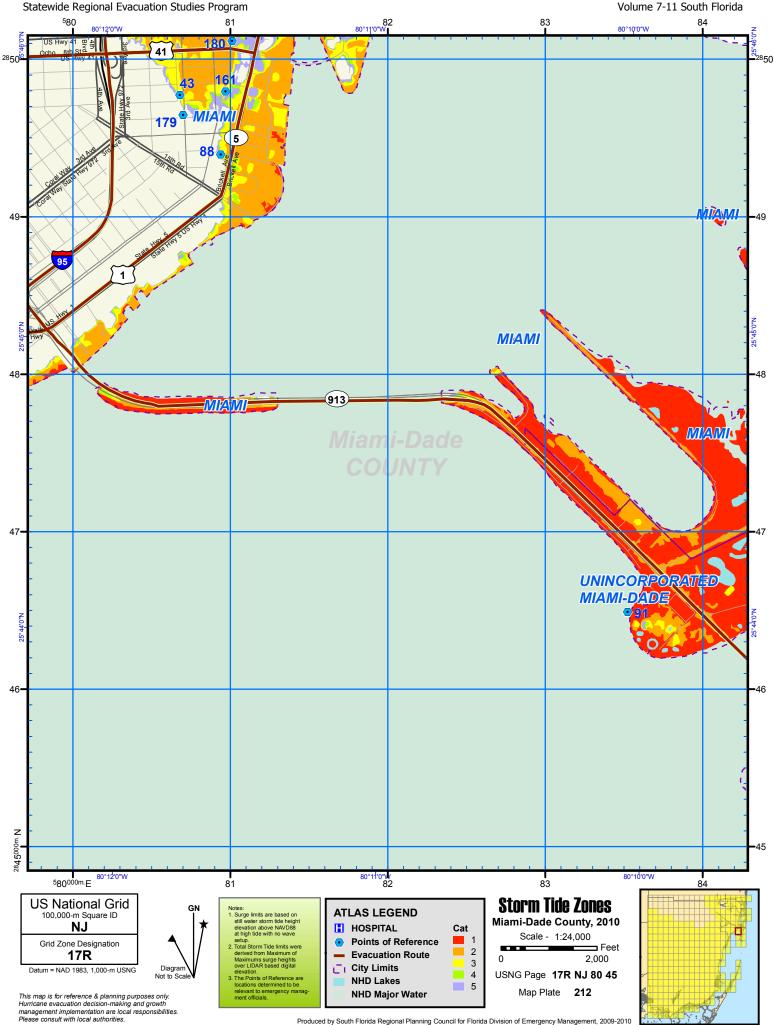
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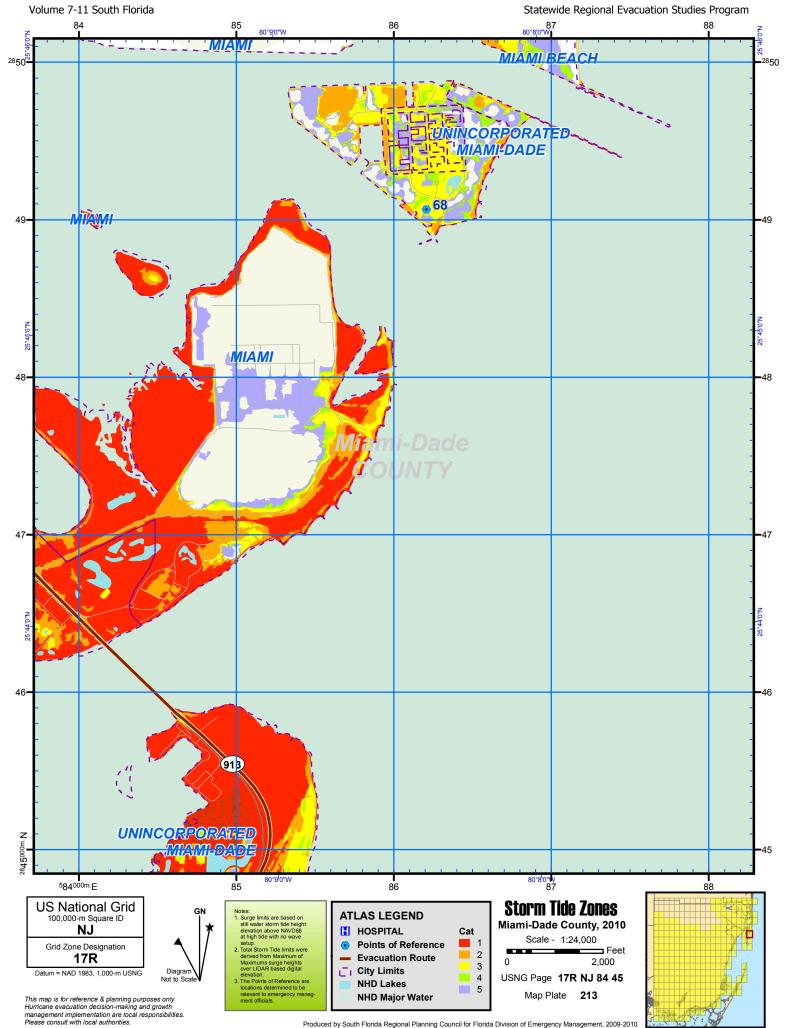
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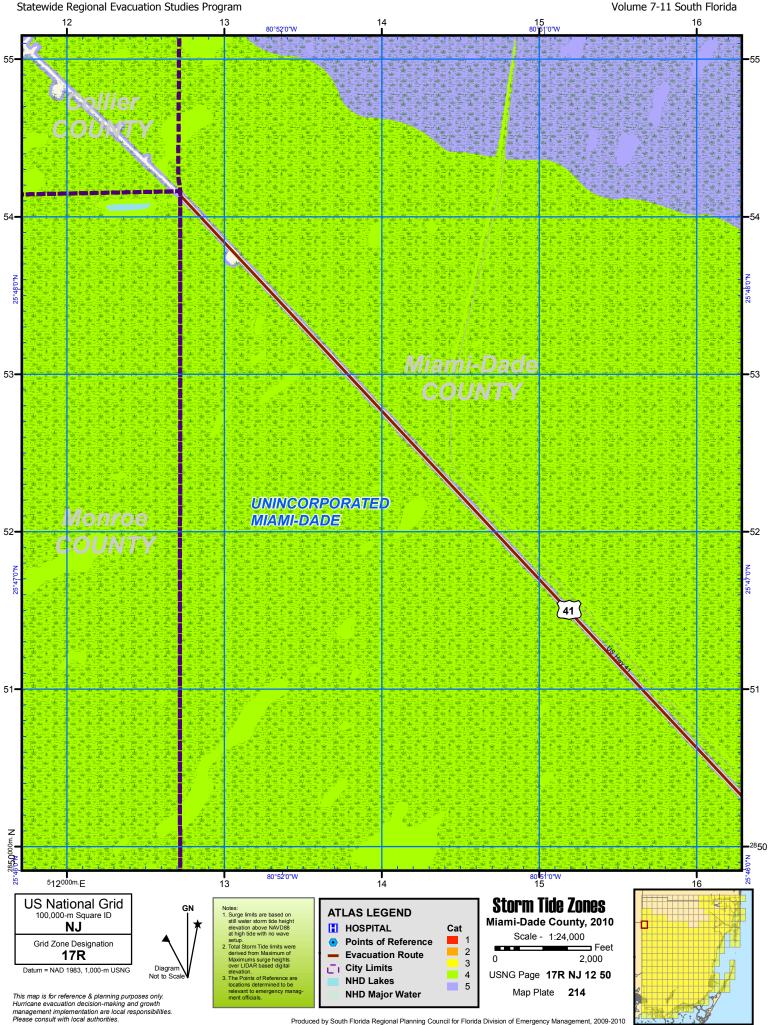
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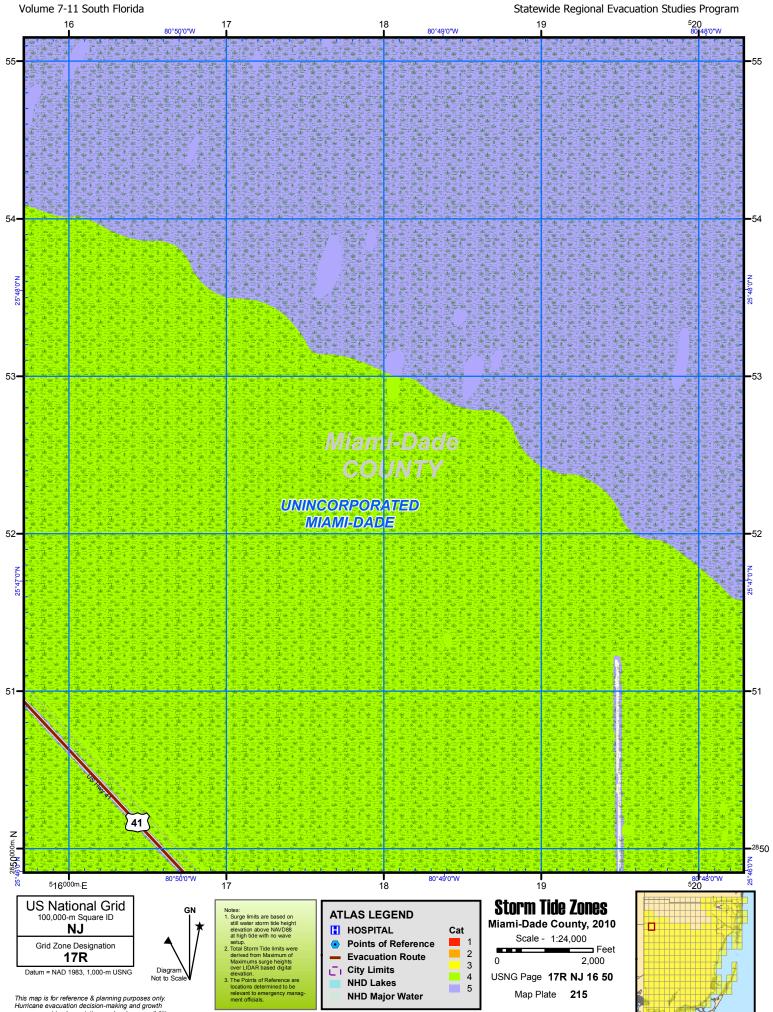
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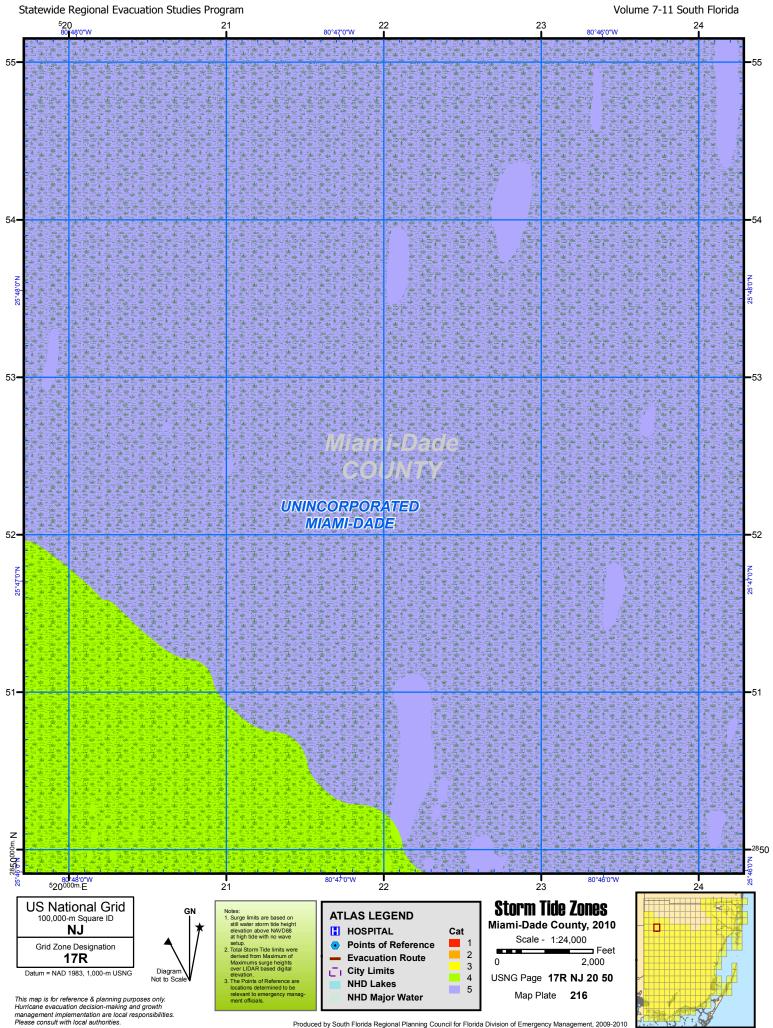
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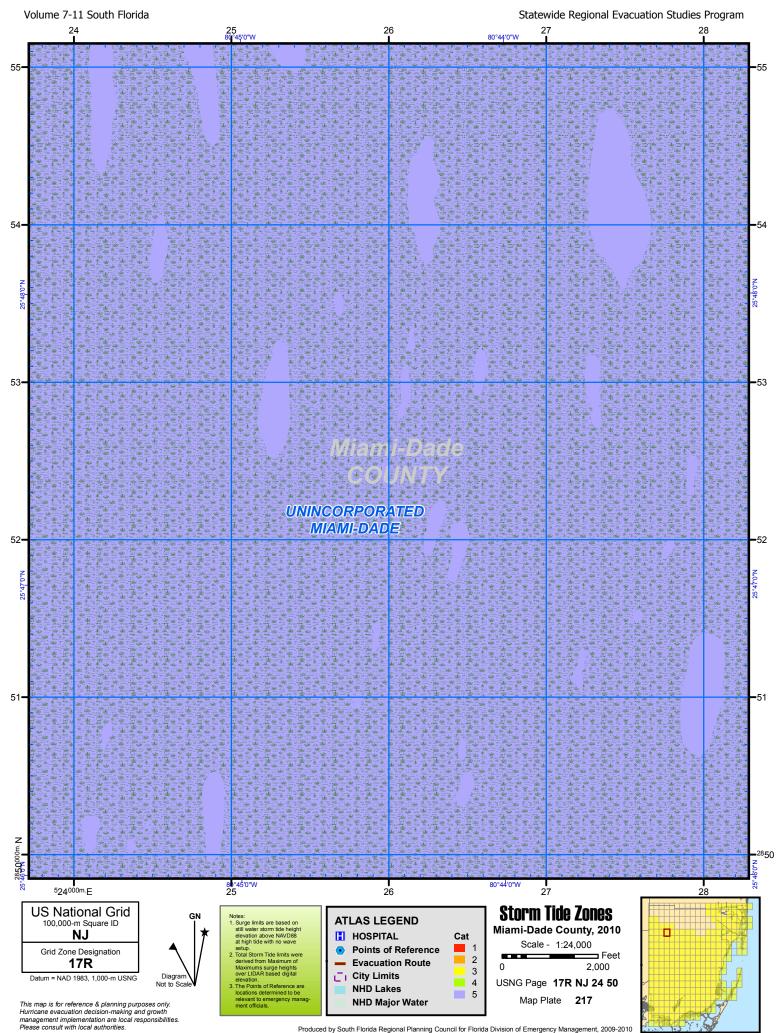
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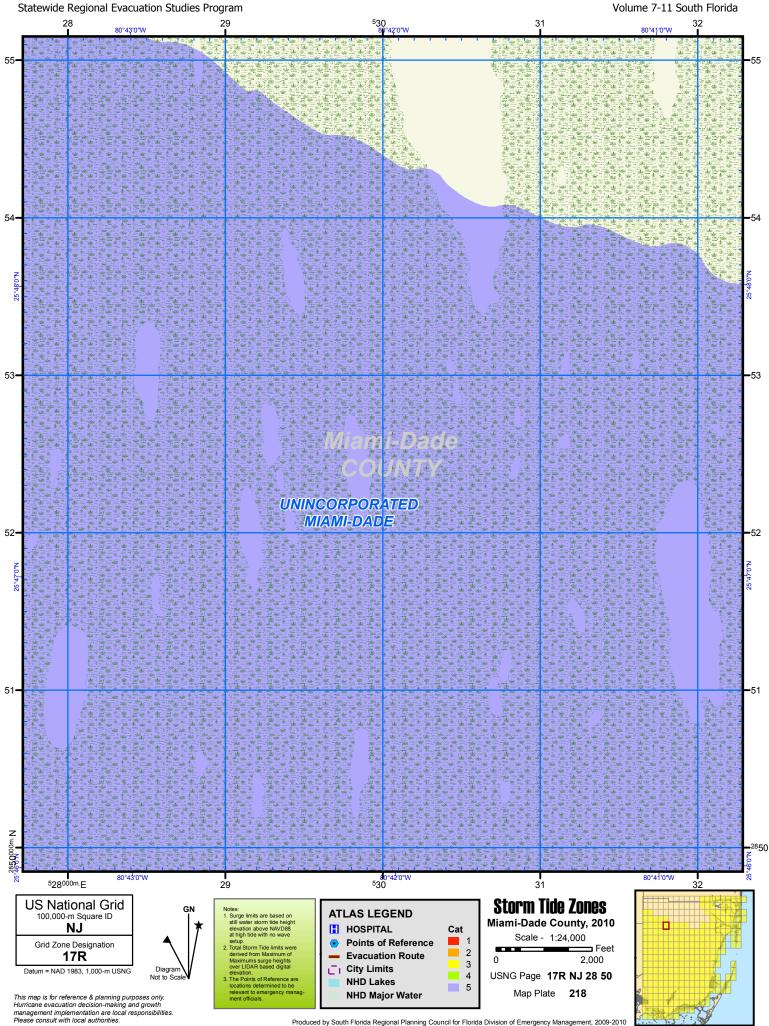
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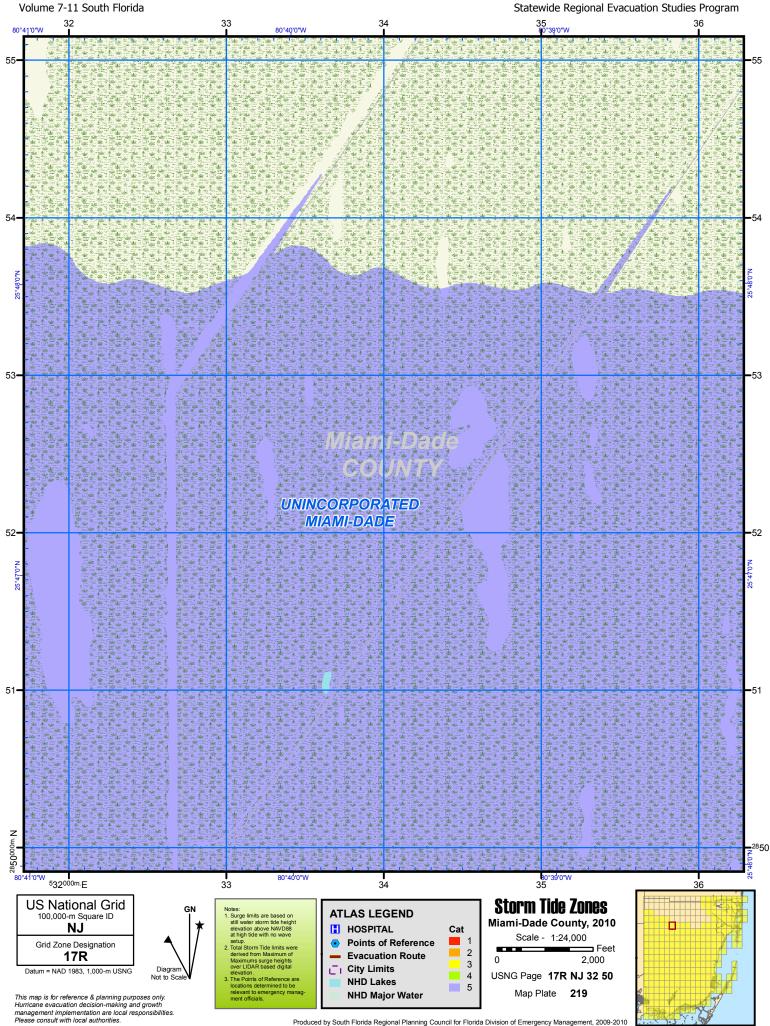
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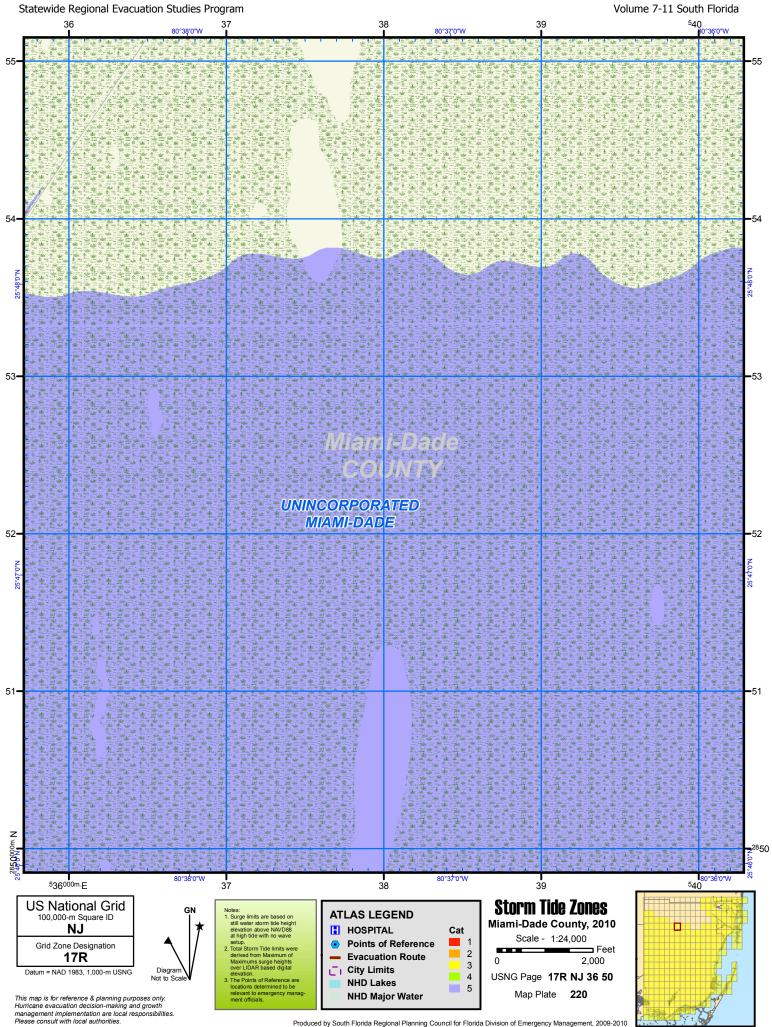
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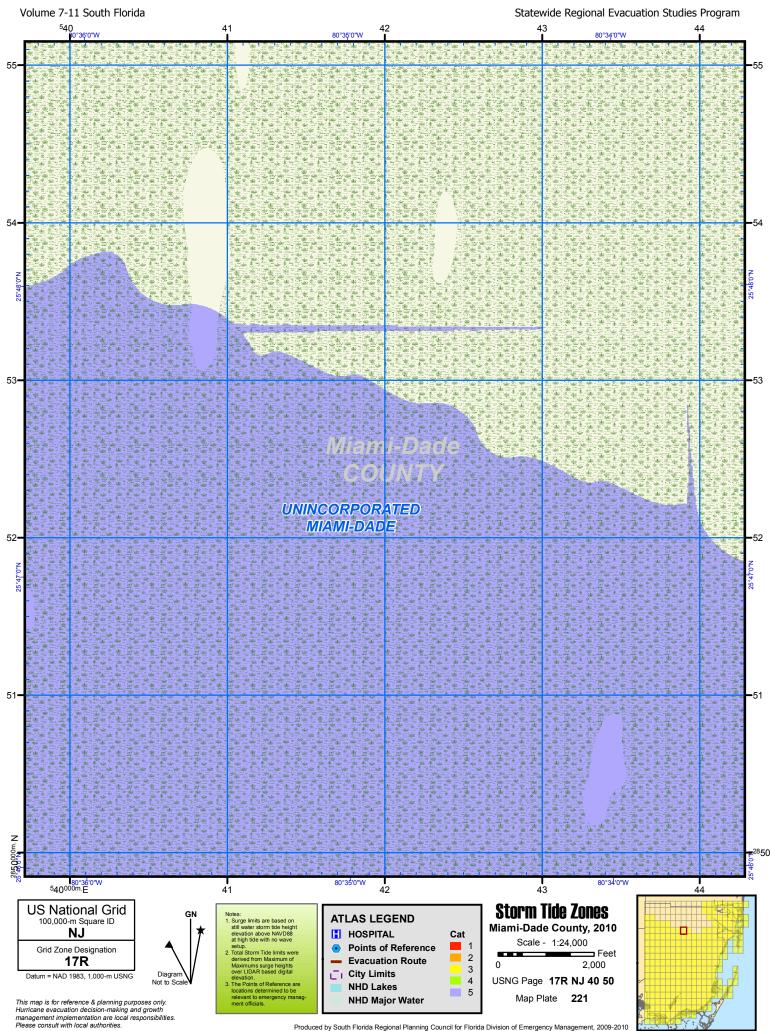
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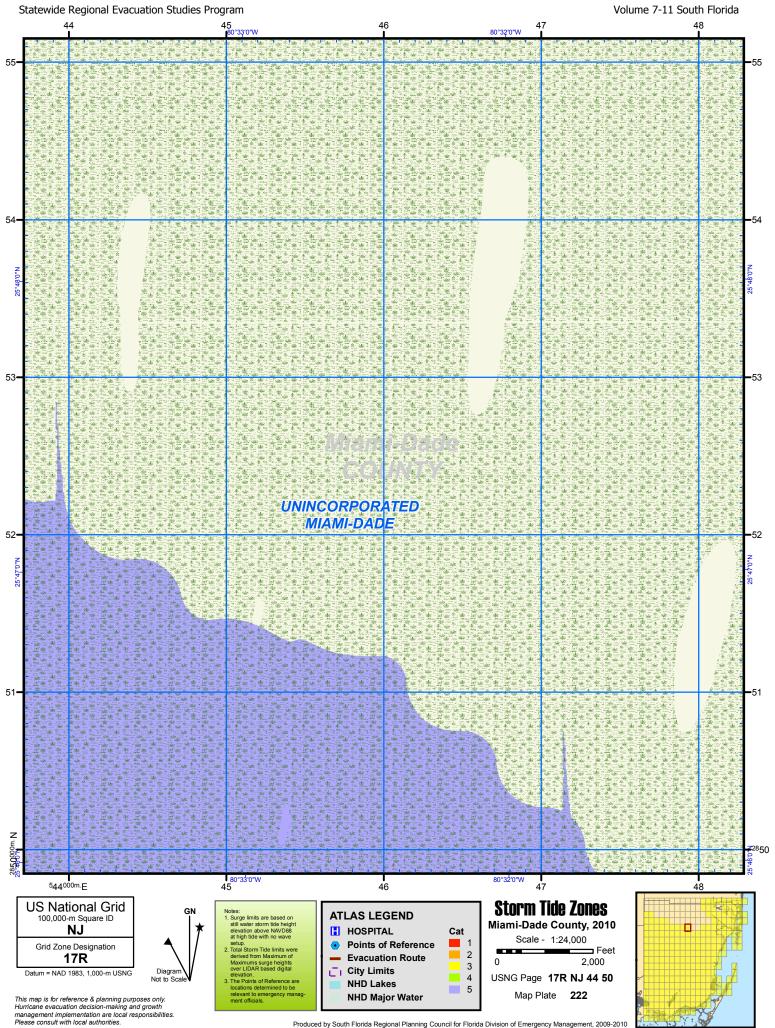
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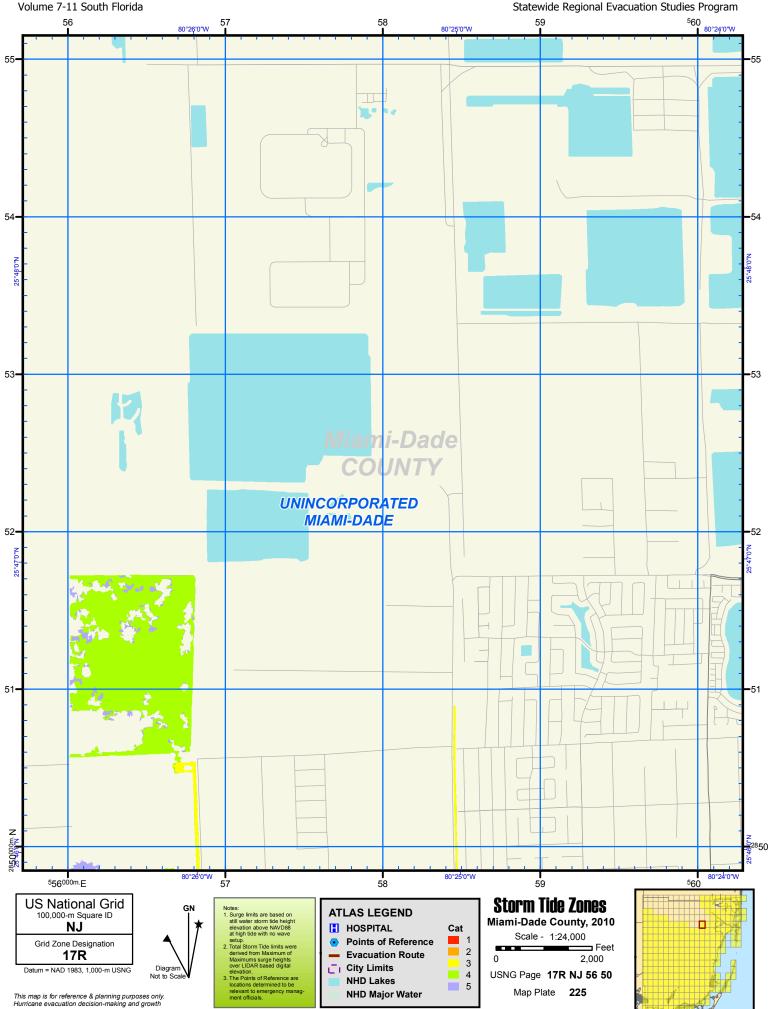
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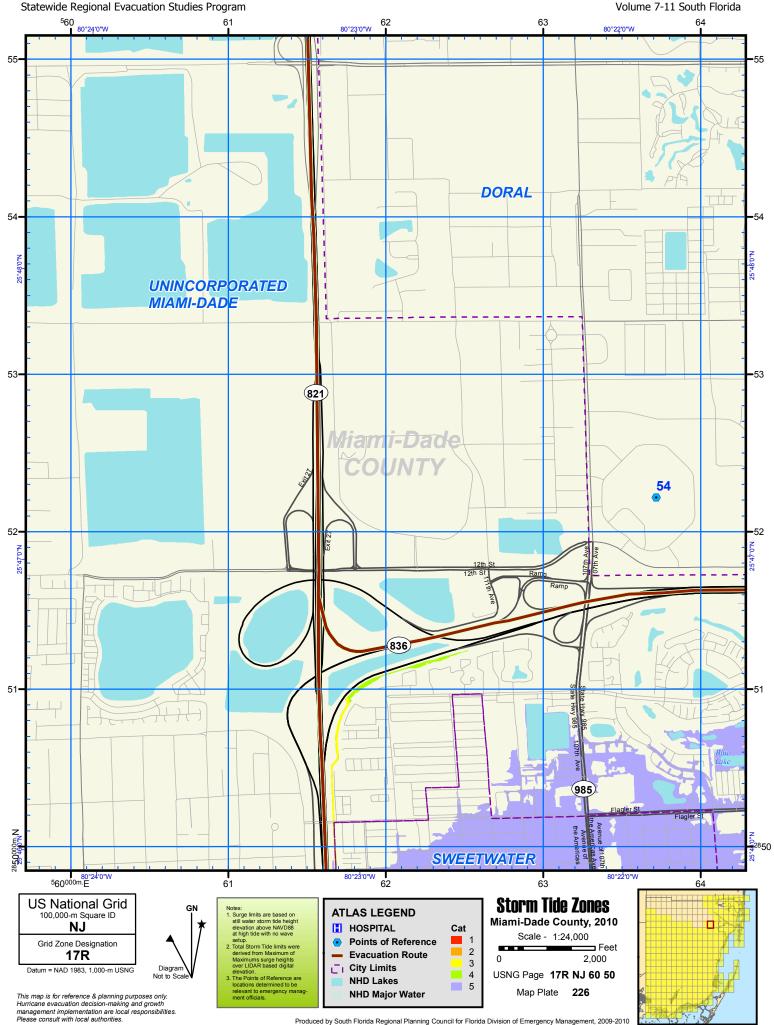


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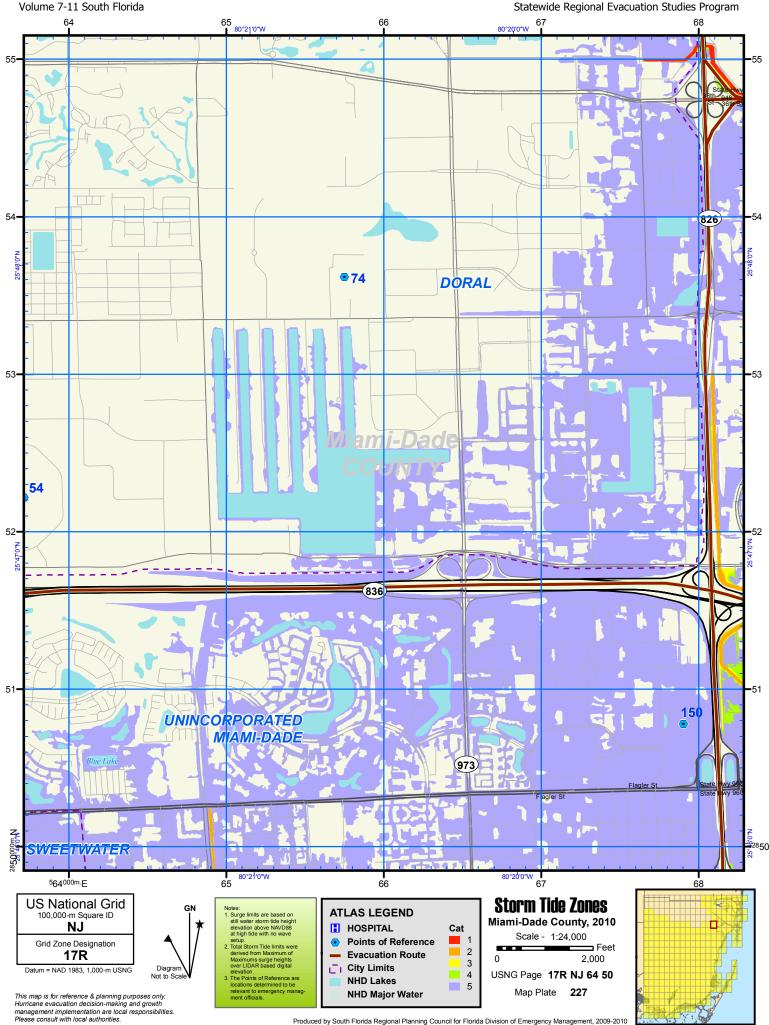


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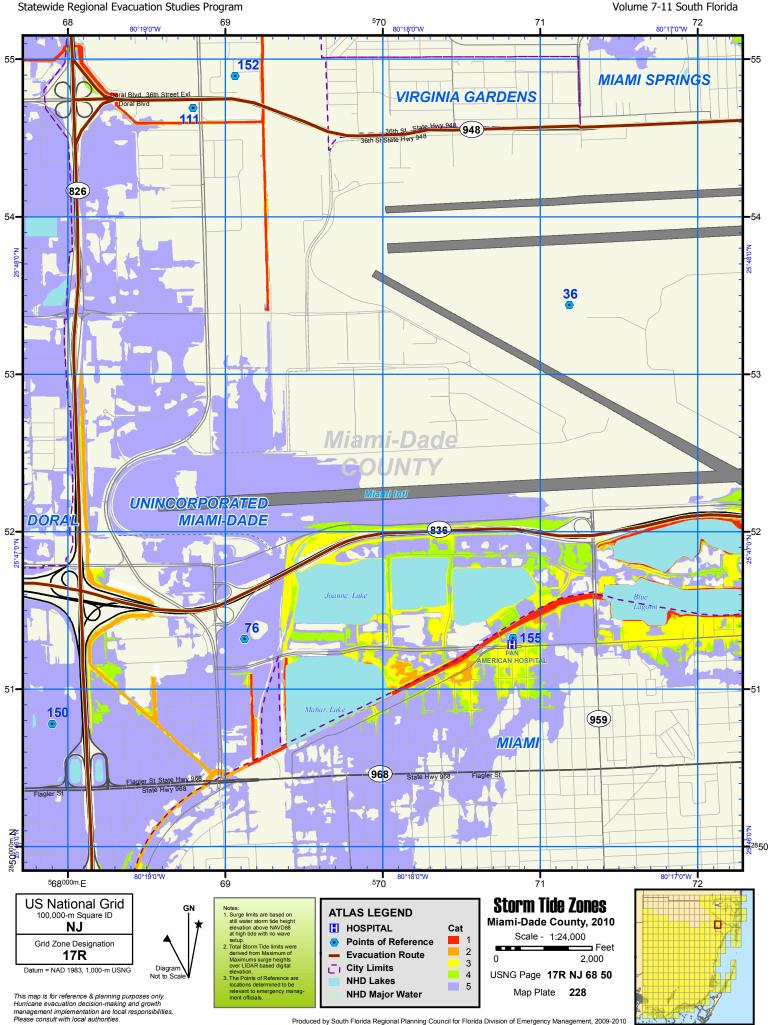
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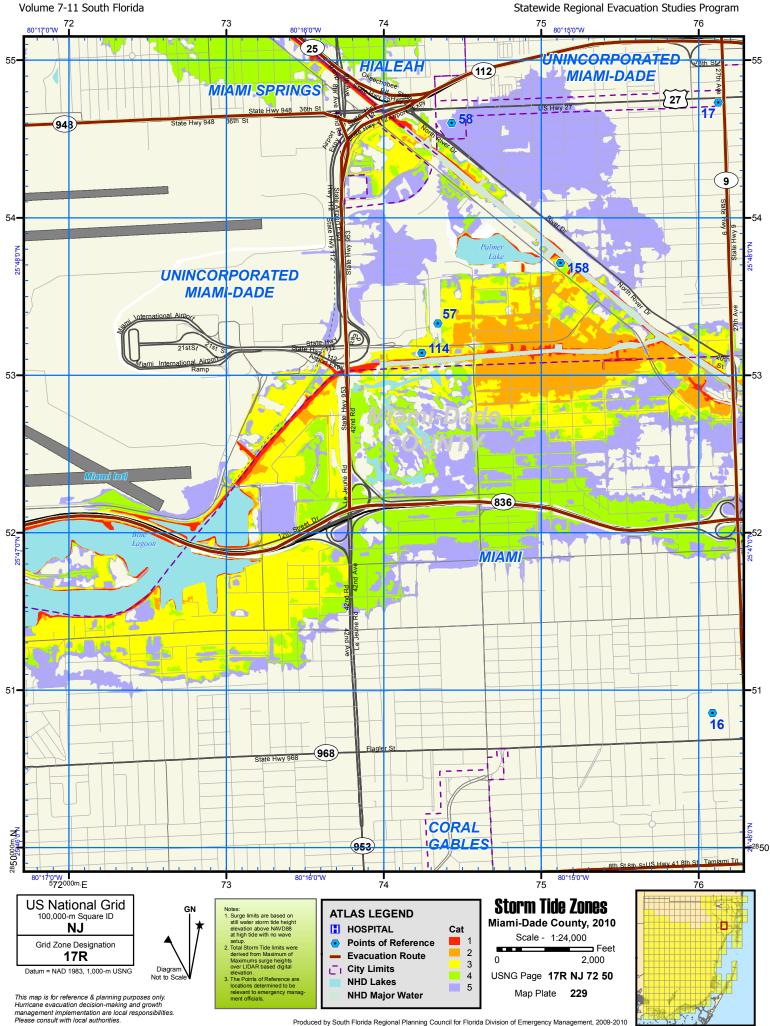
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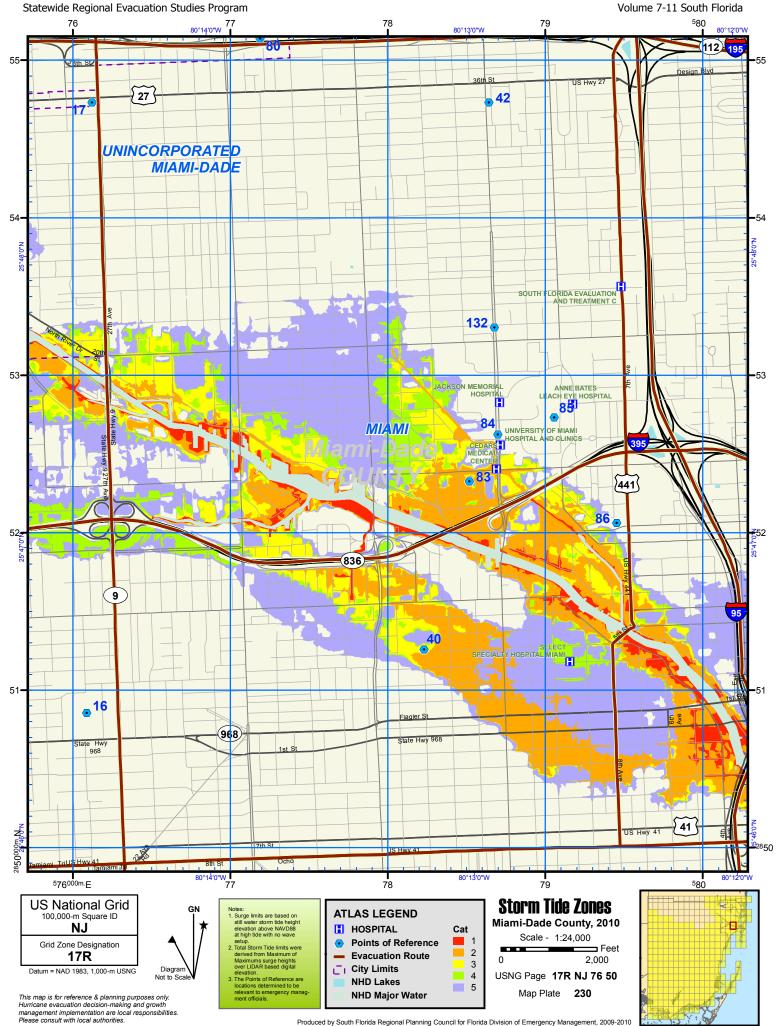
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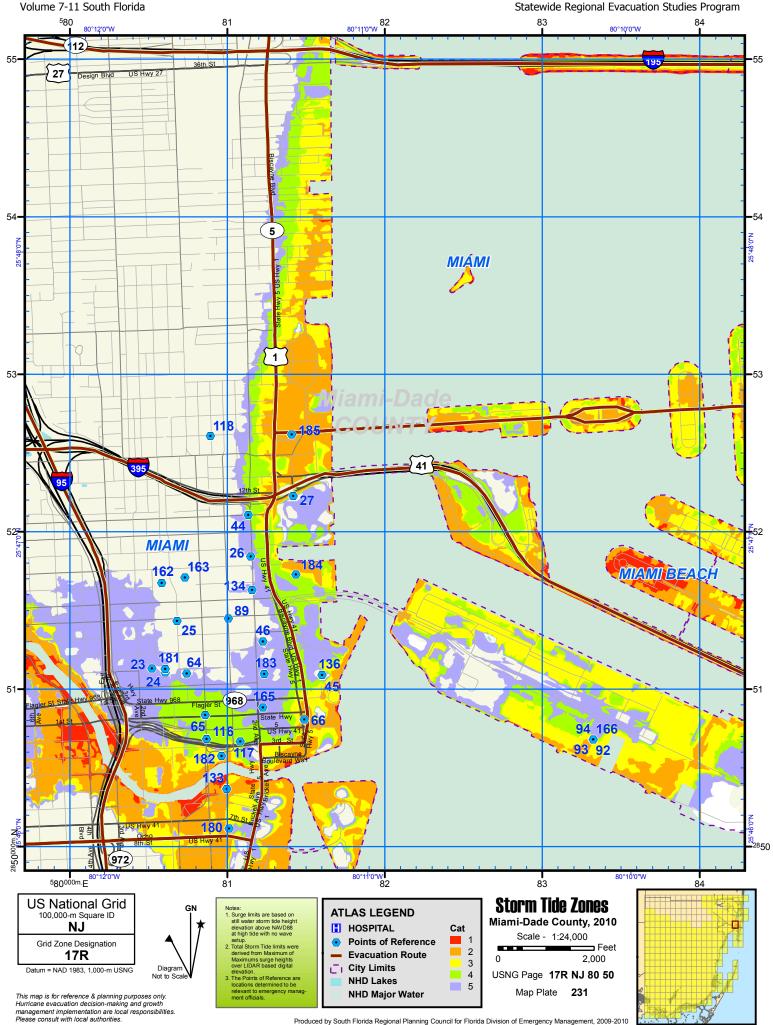
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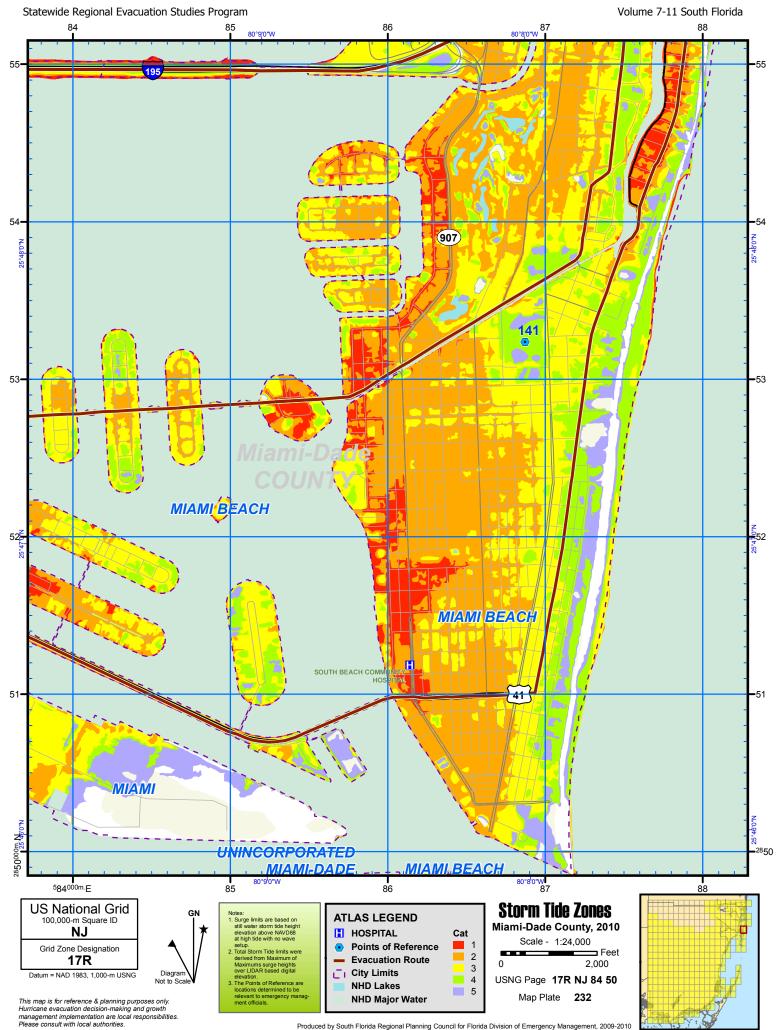
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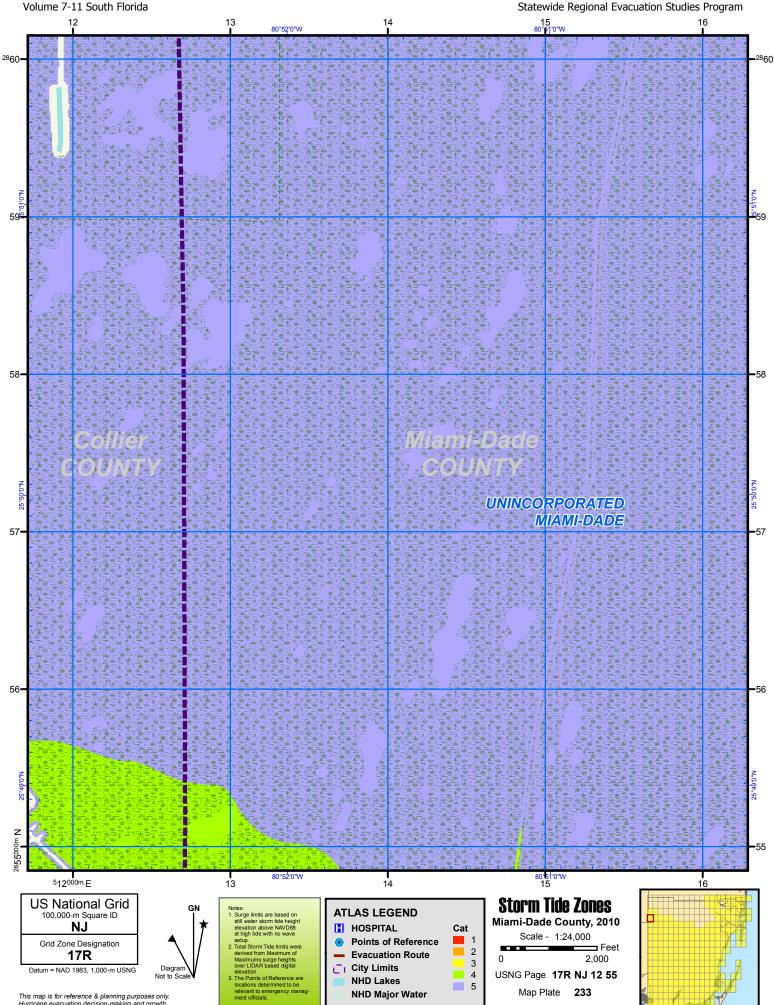
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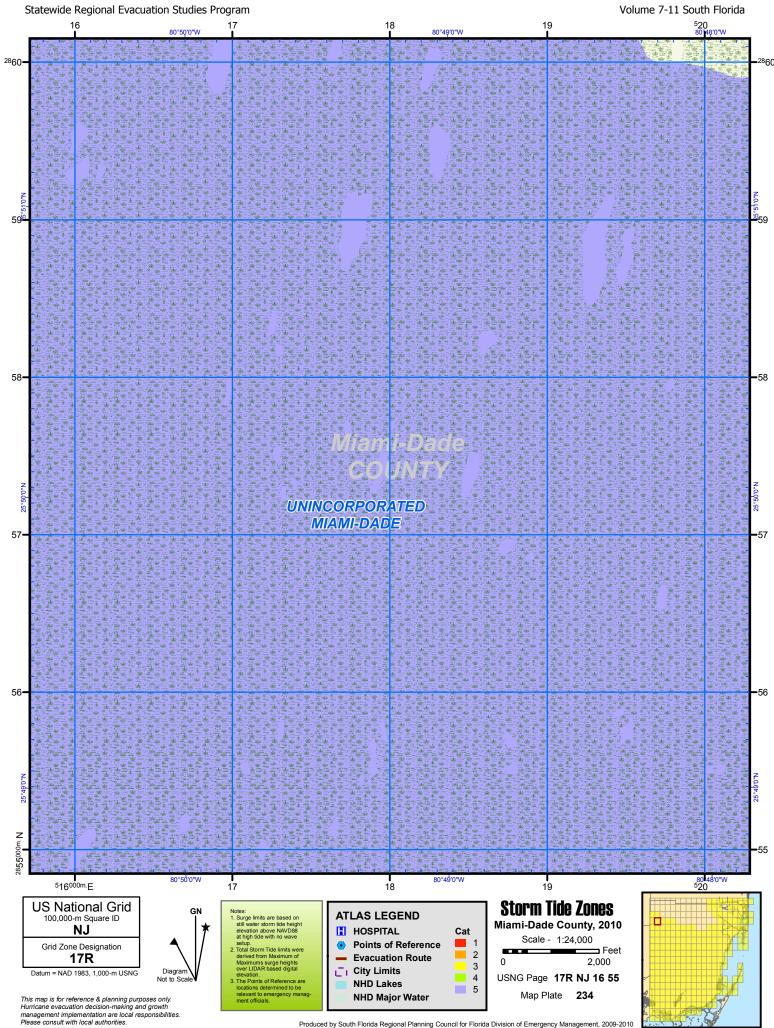
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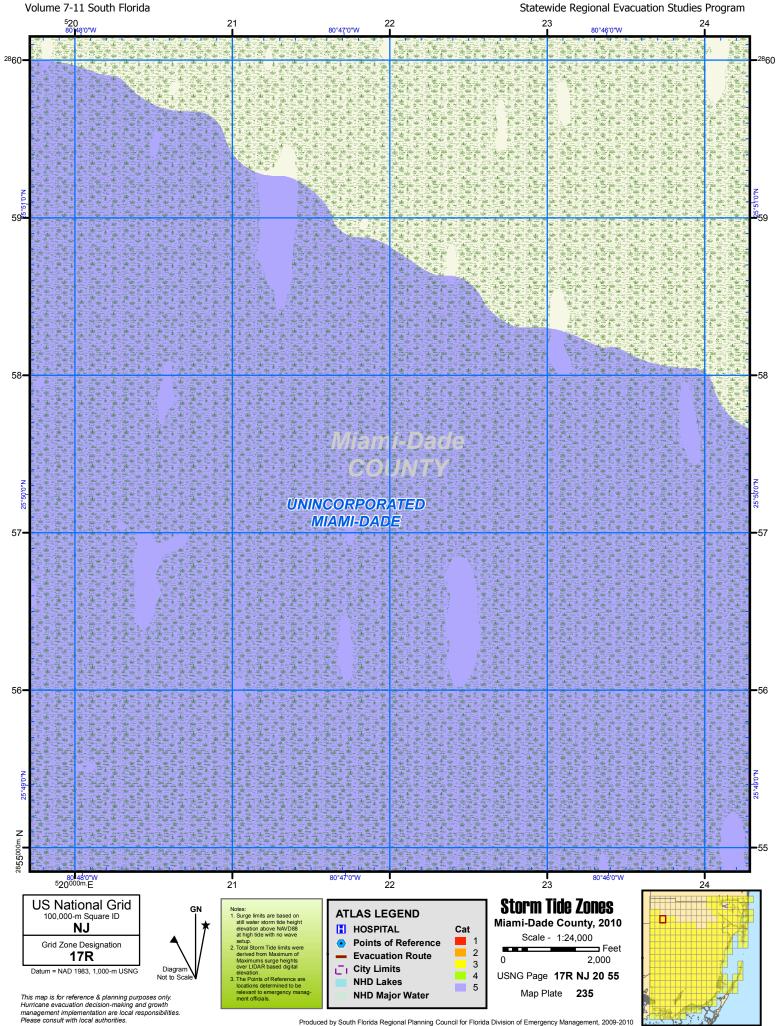
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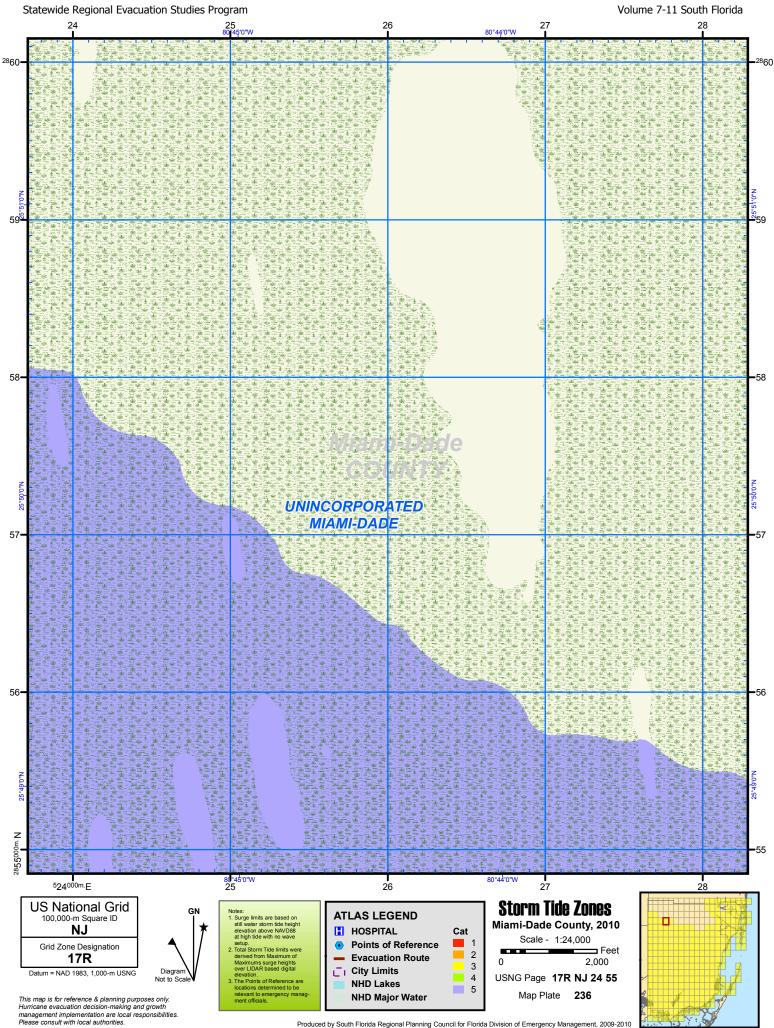
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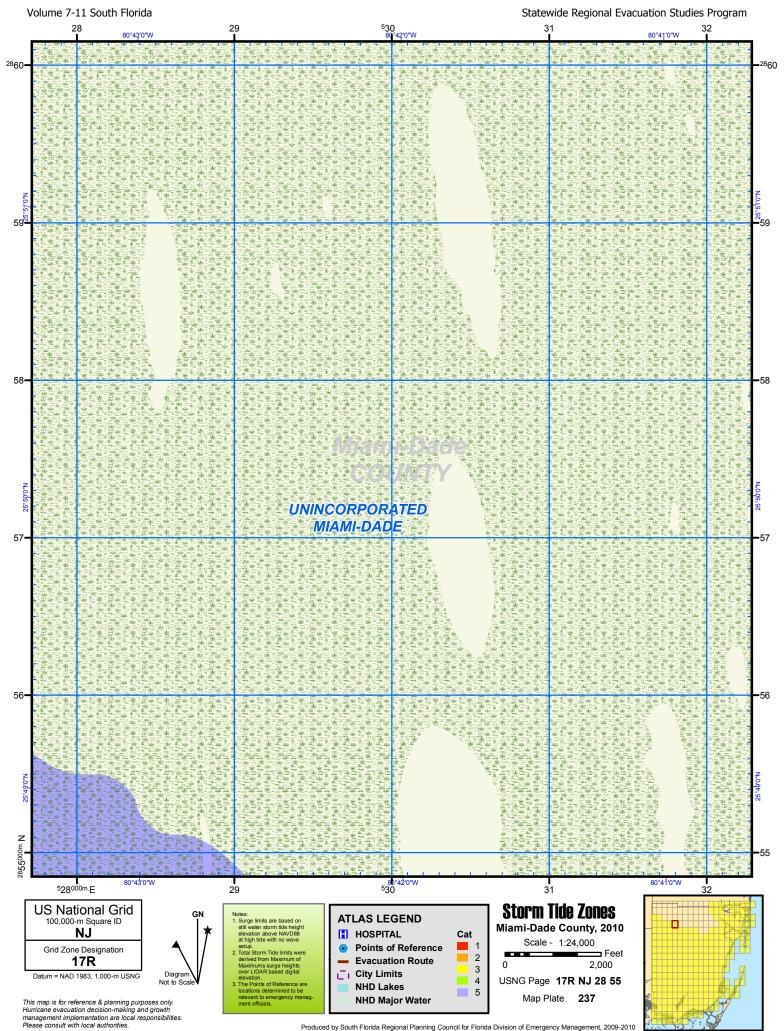
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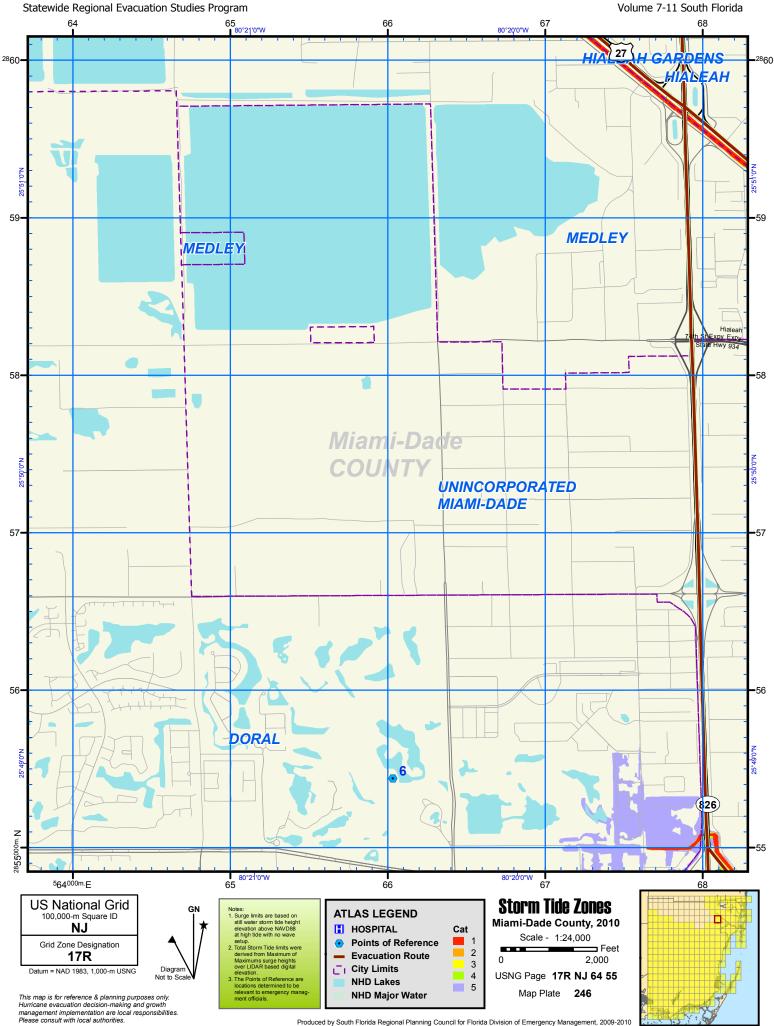
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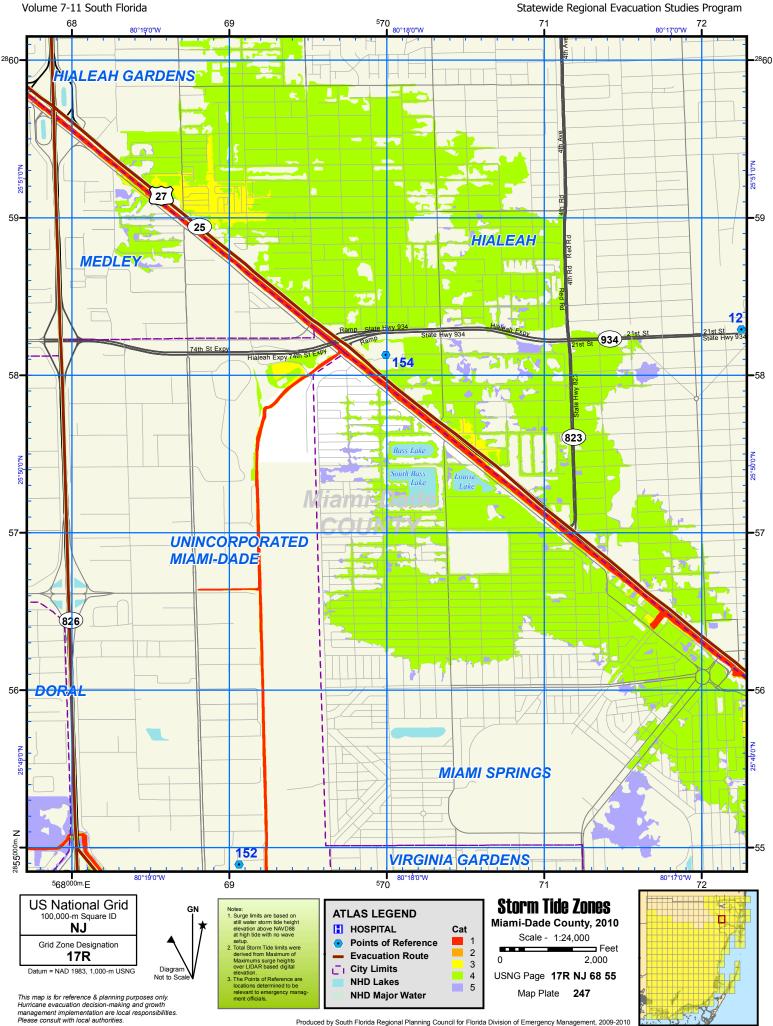
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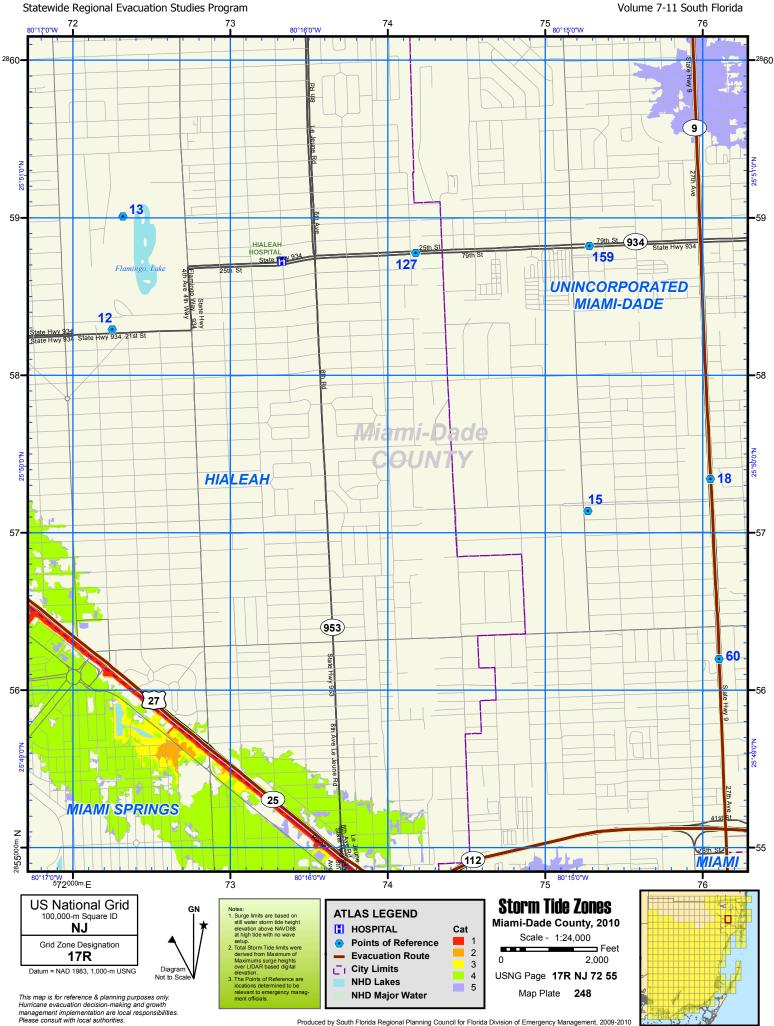
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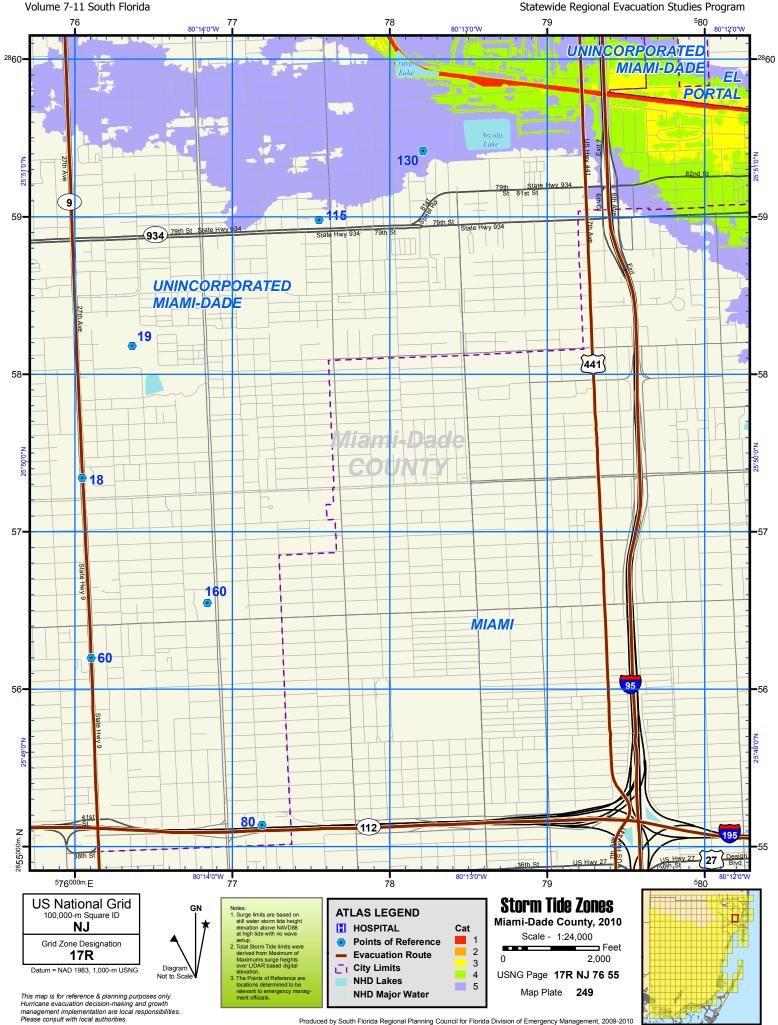
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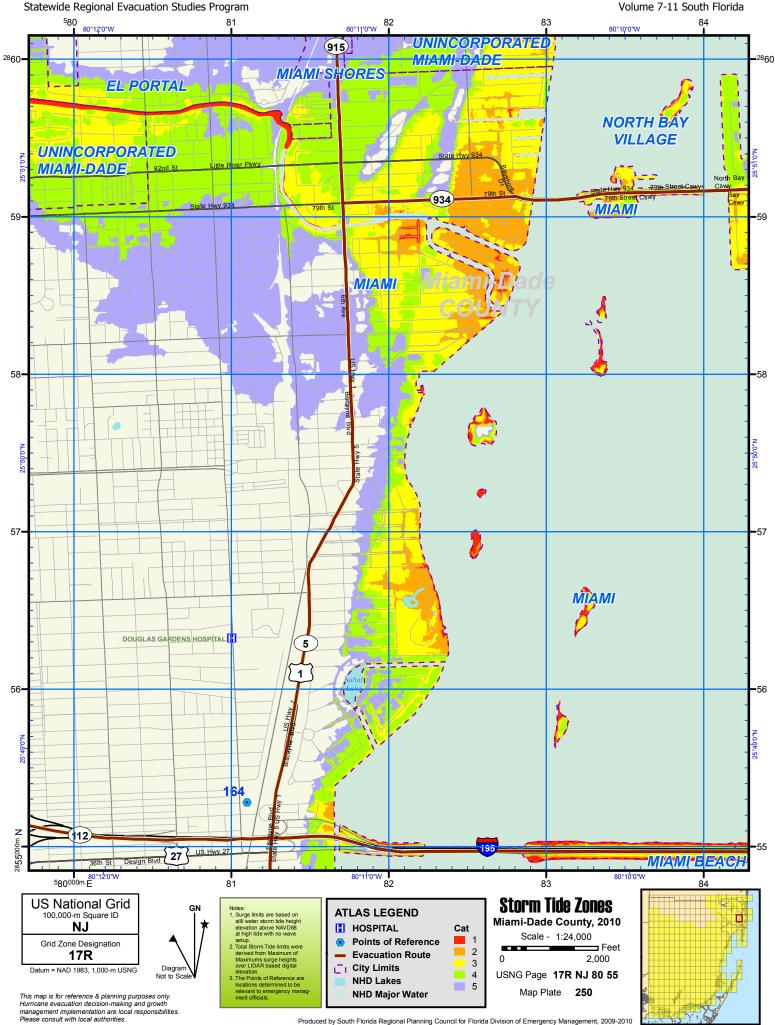
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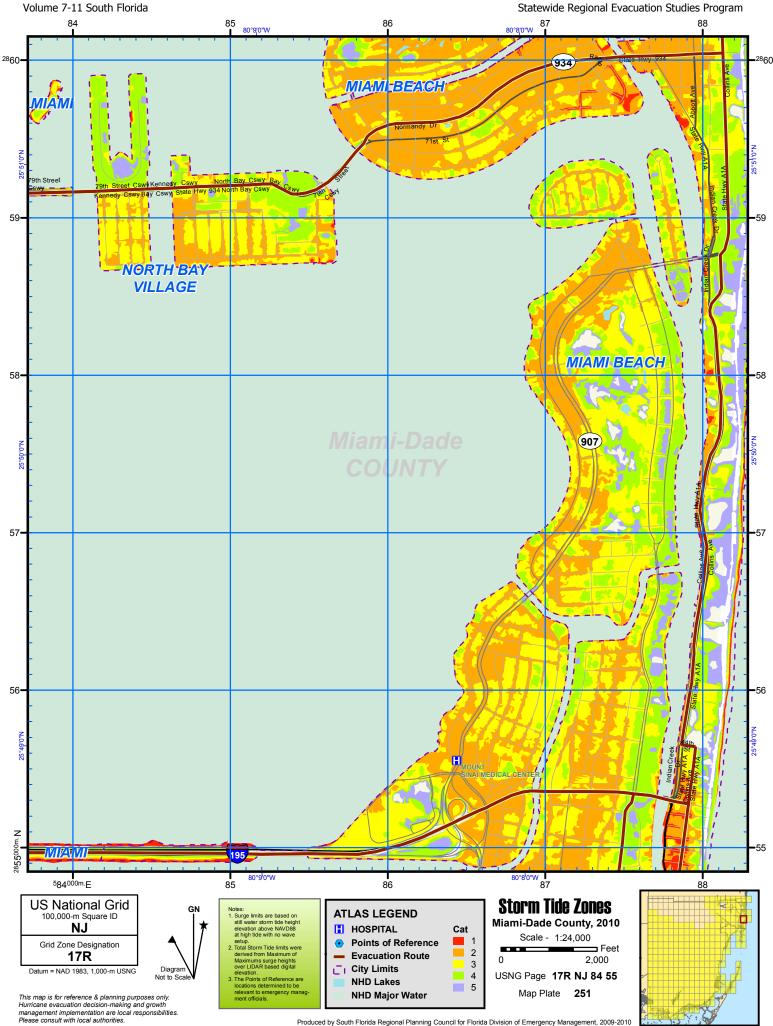
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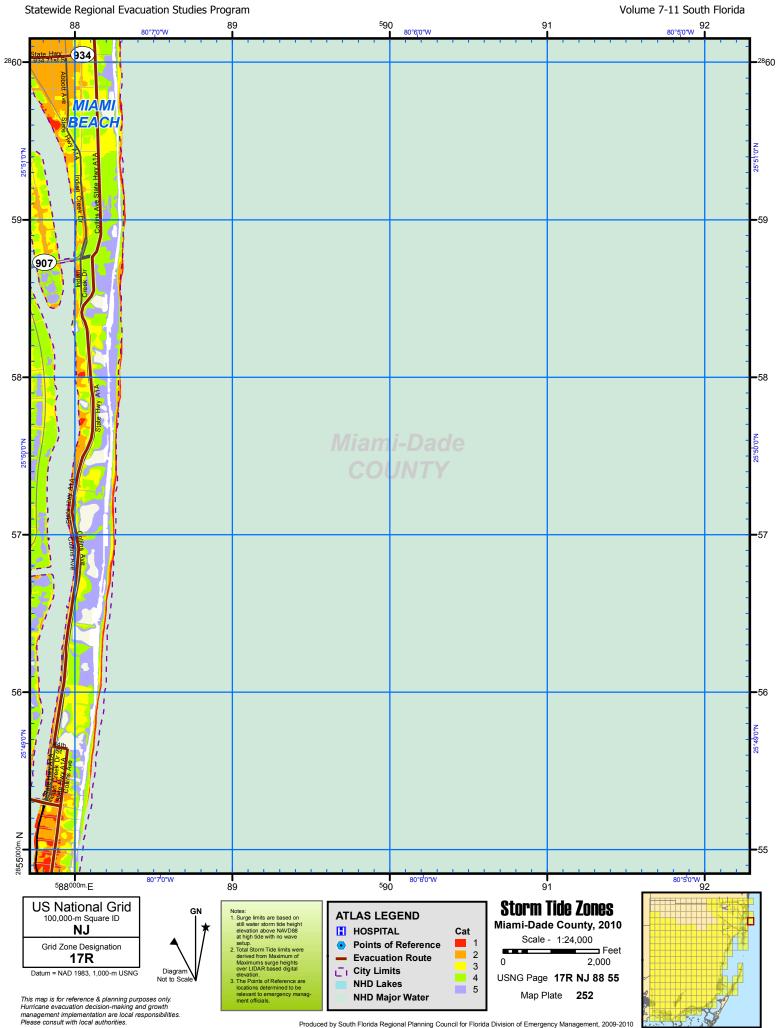
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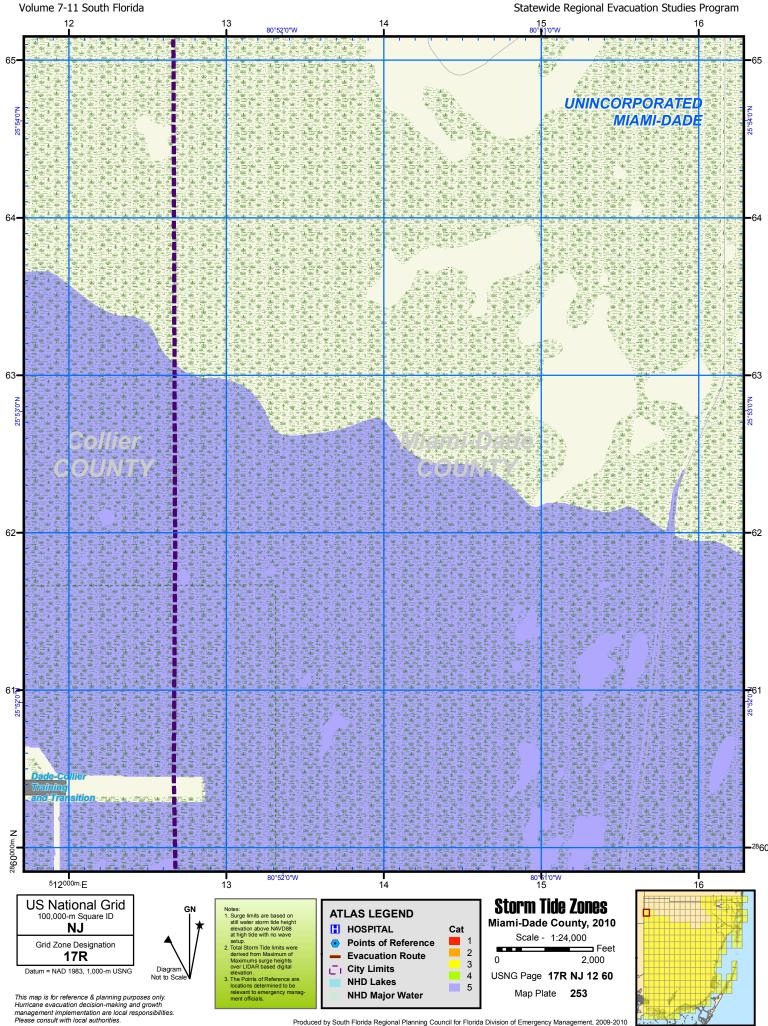
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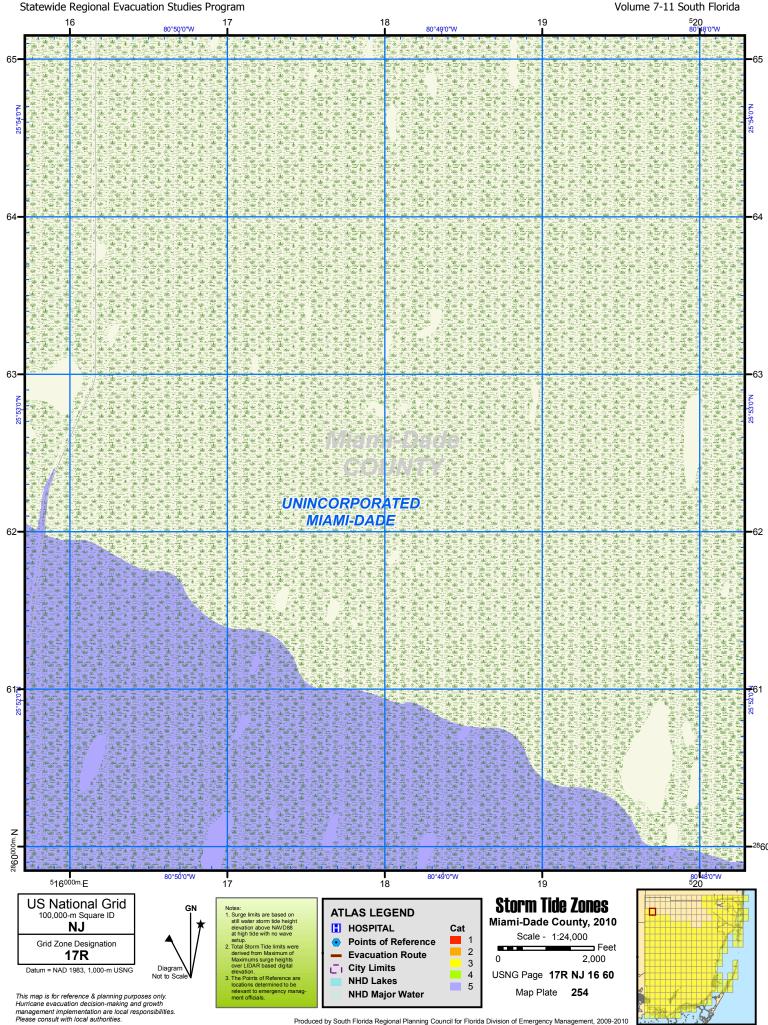
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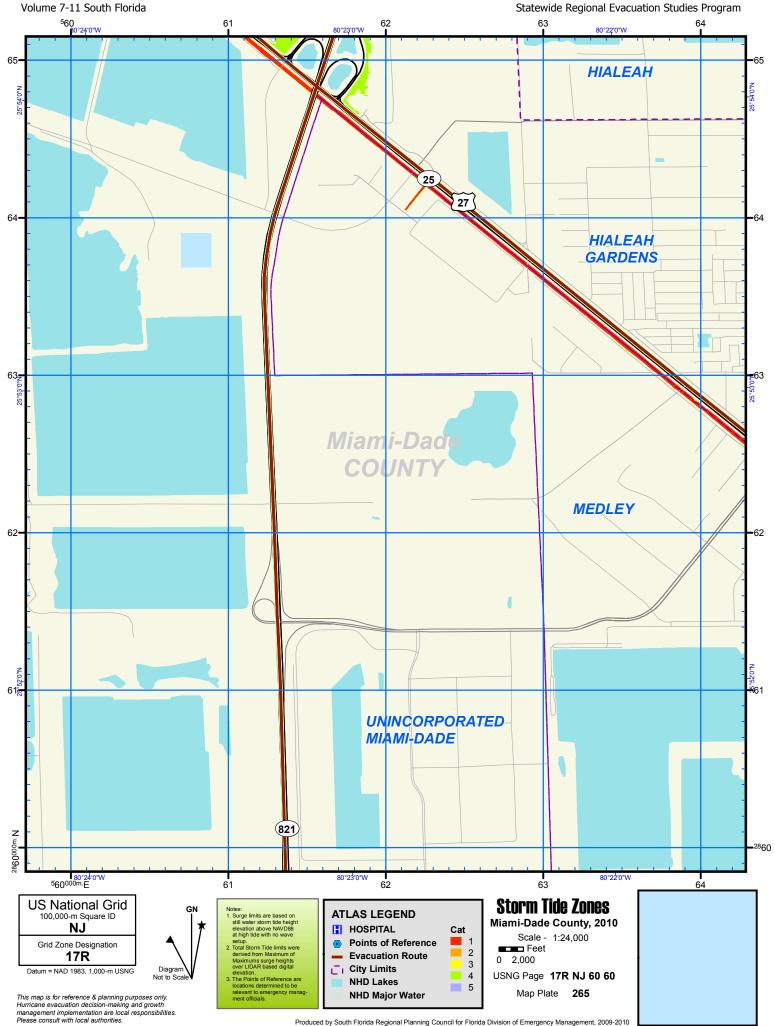
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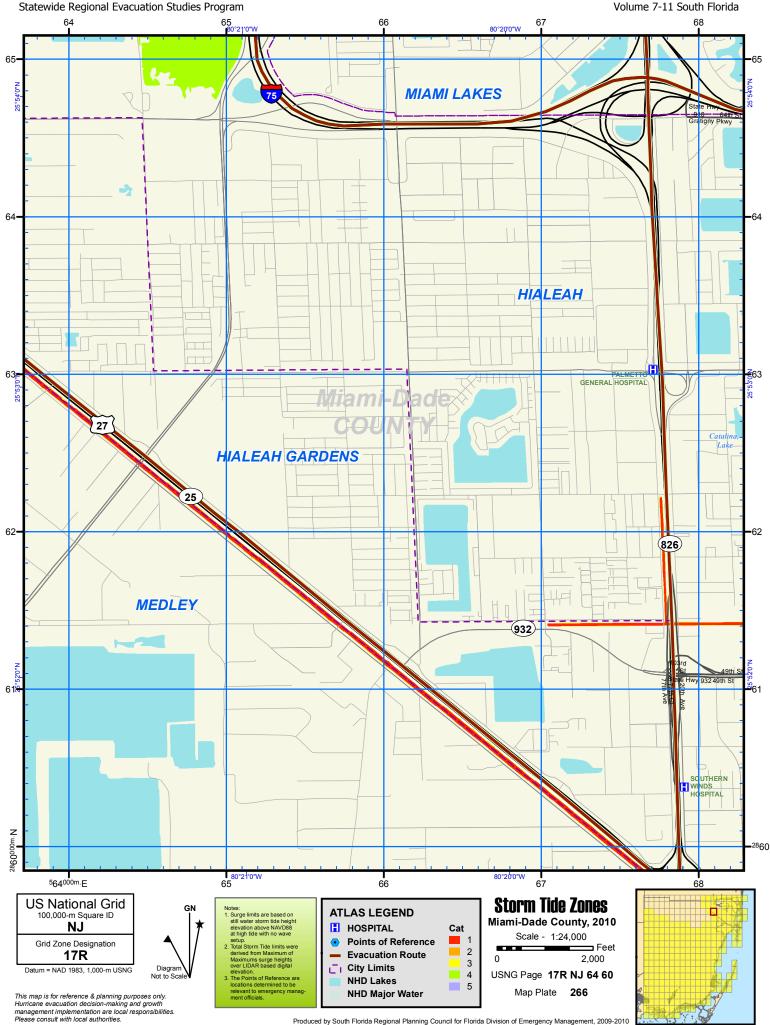
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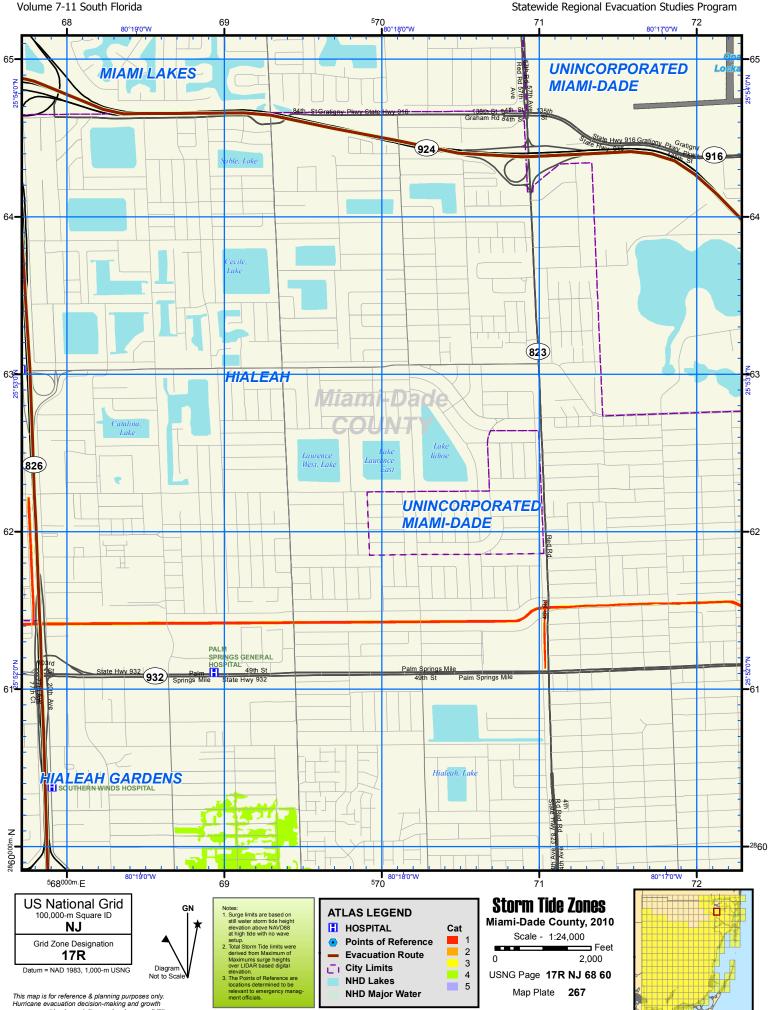
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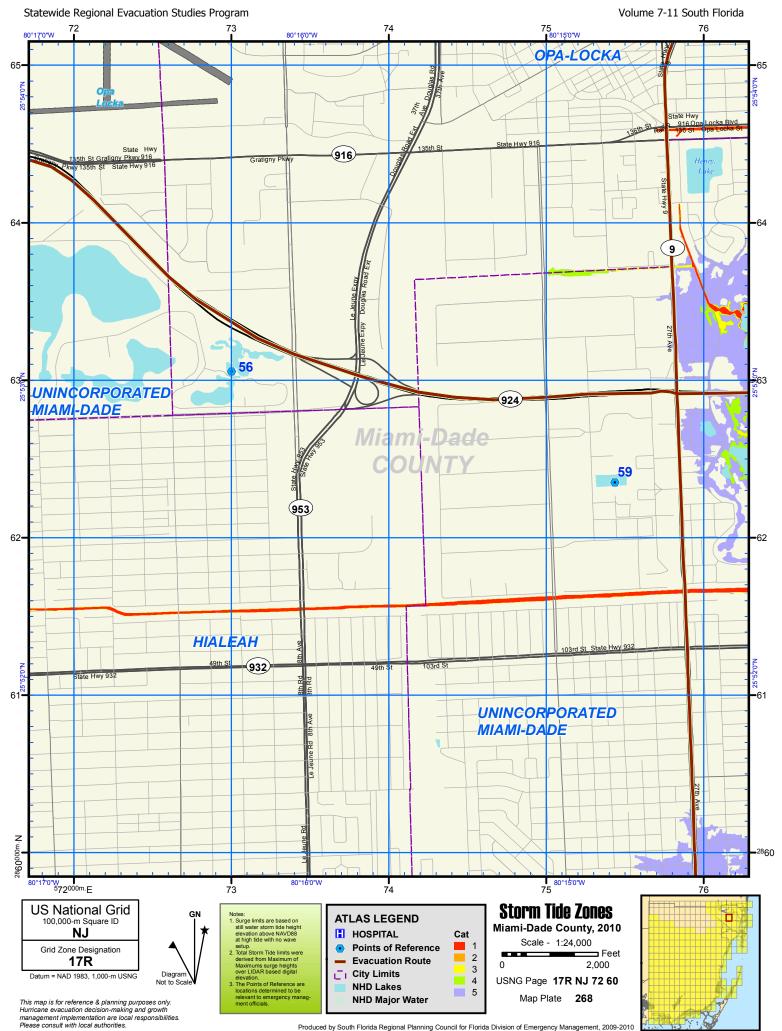
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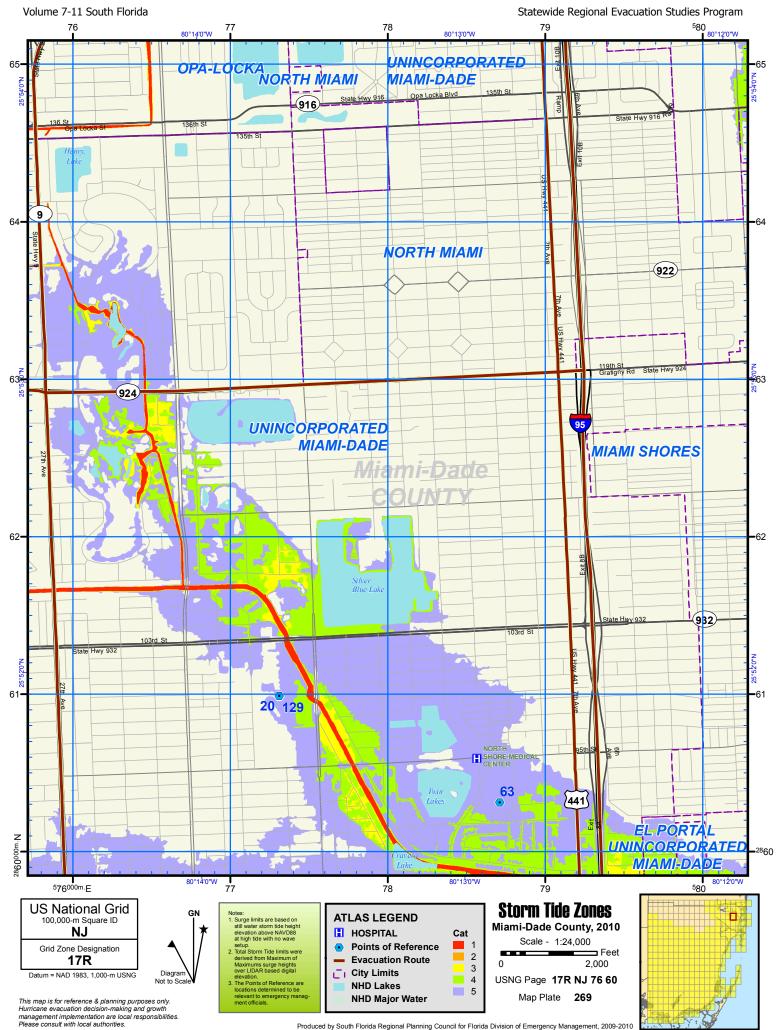
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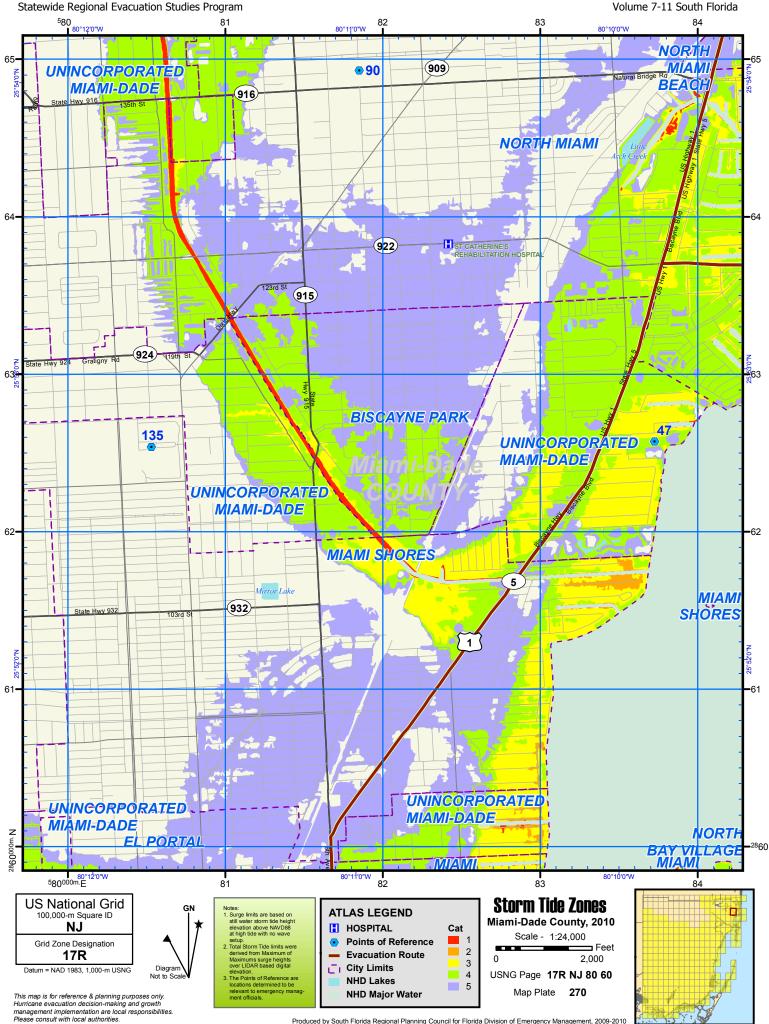
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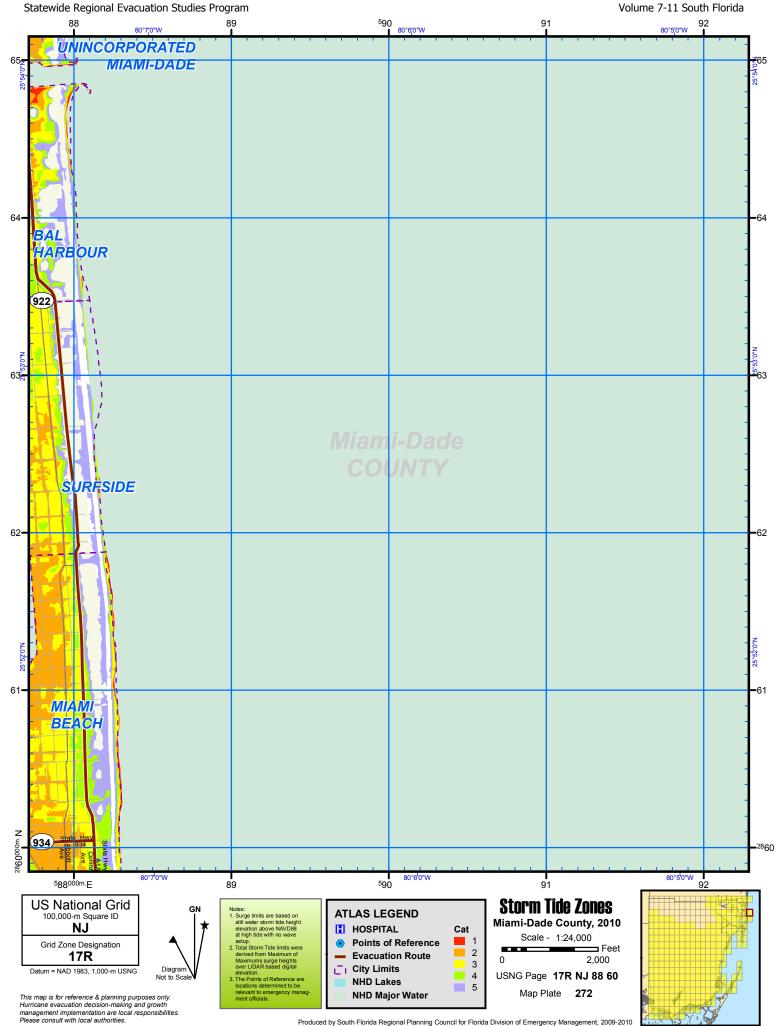
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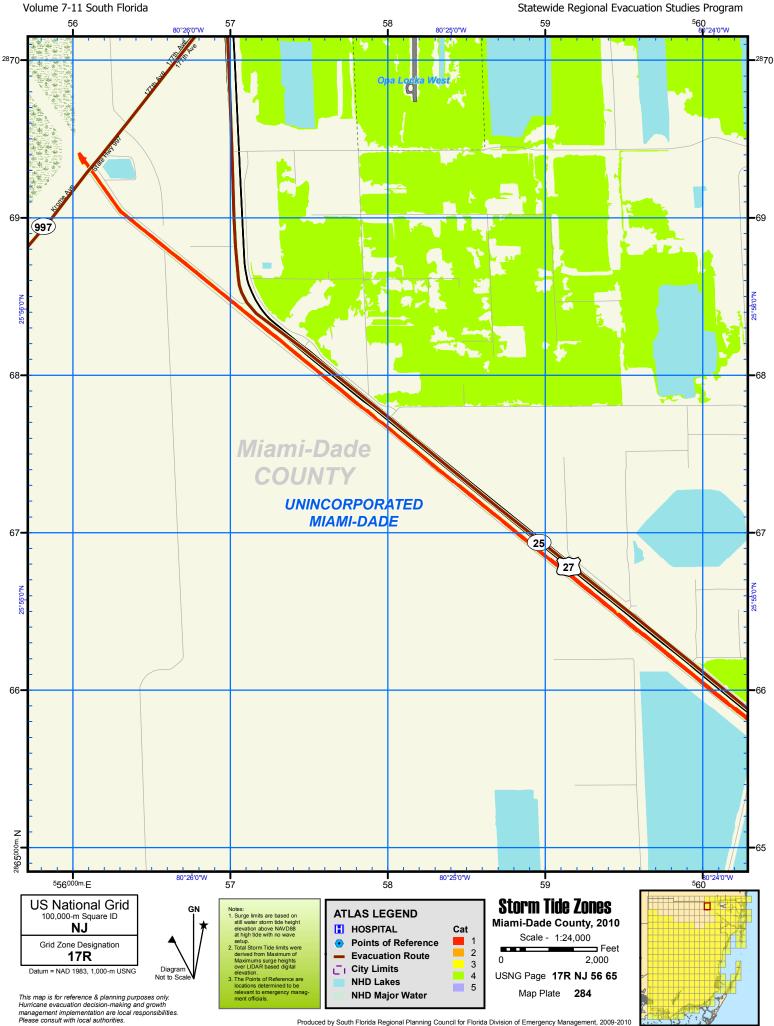
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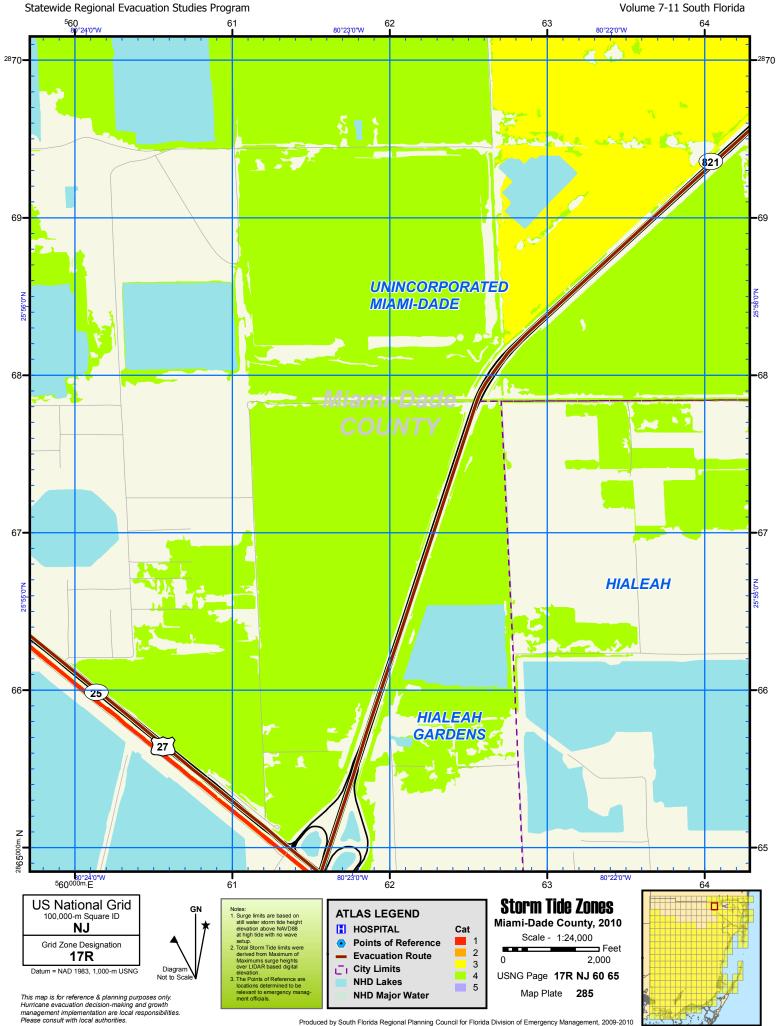
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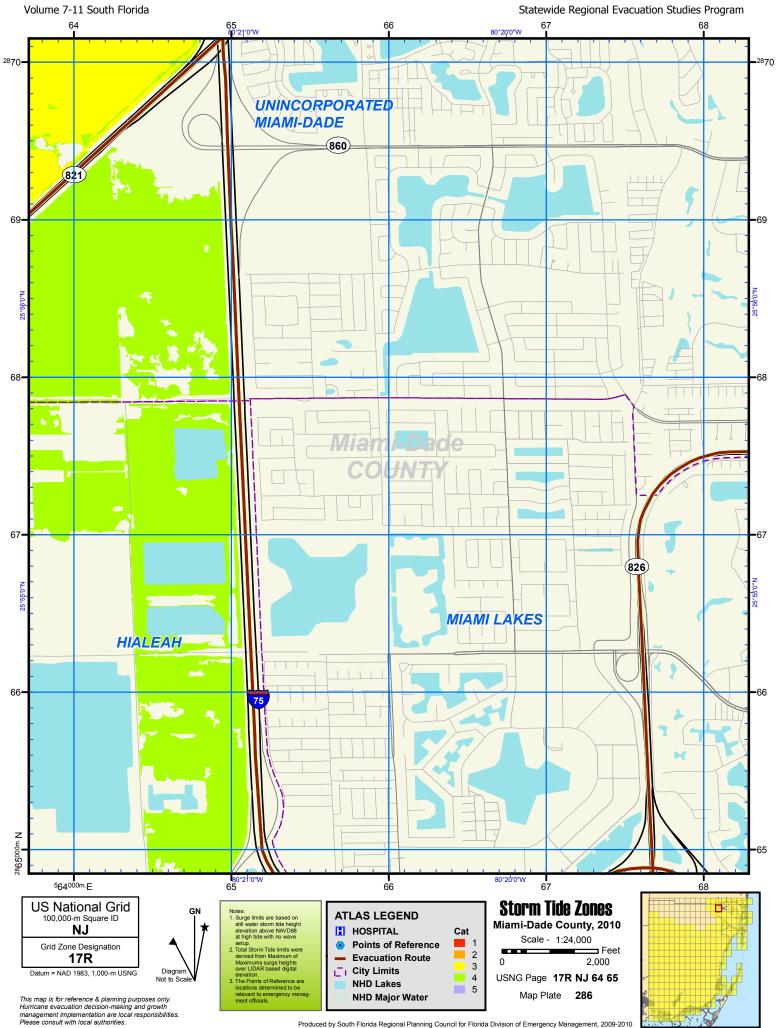
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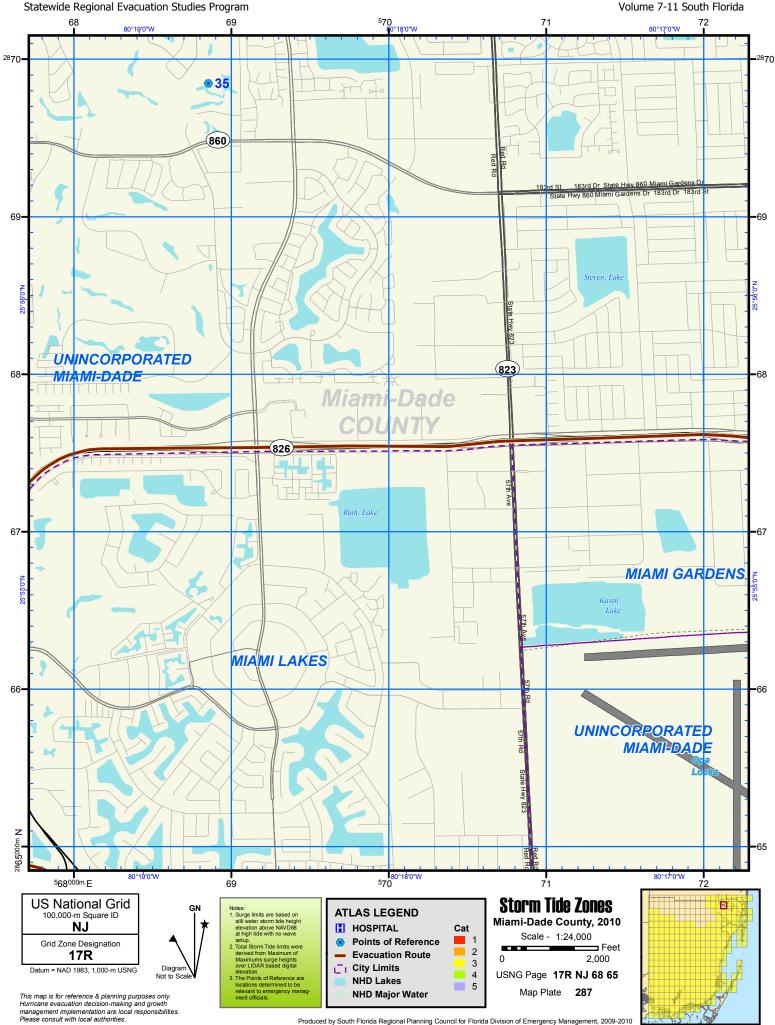
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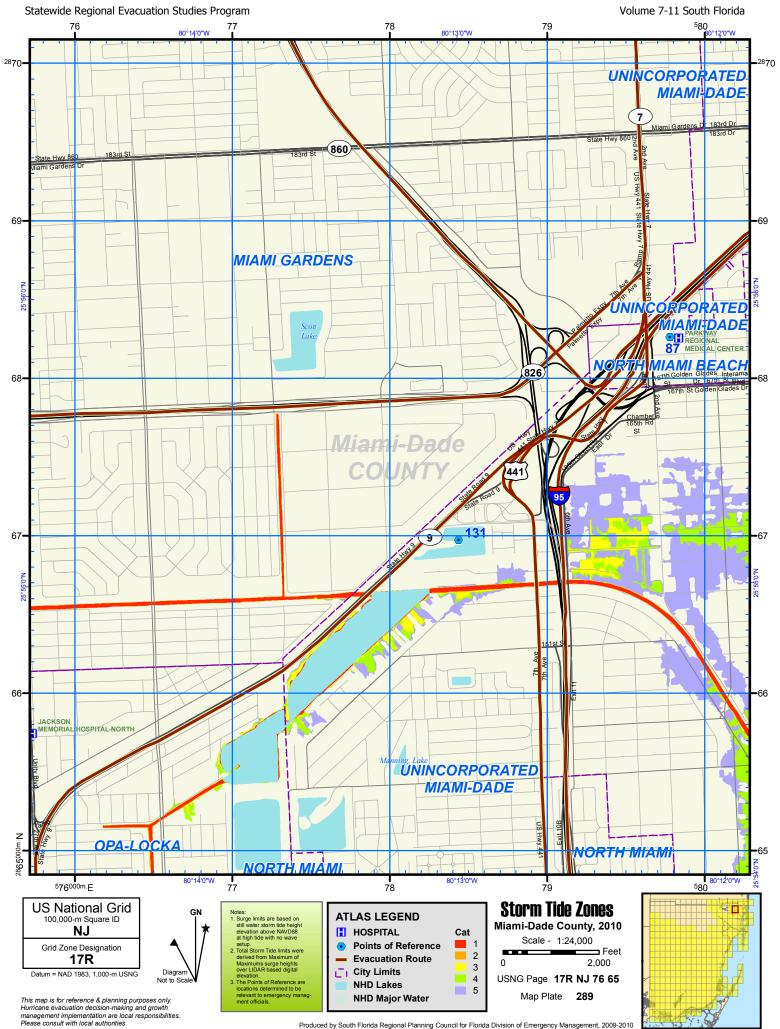
Please consult with local authorities. Book 2 - Page 274 Produced by South Florida Regional Planning Council for Florida Division of Emergency Management, 2009-2010 Storm Tide Atlas - Miami-Dade County



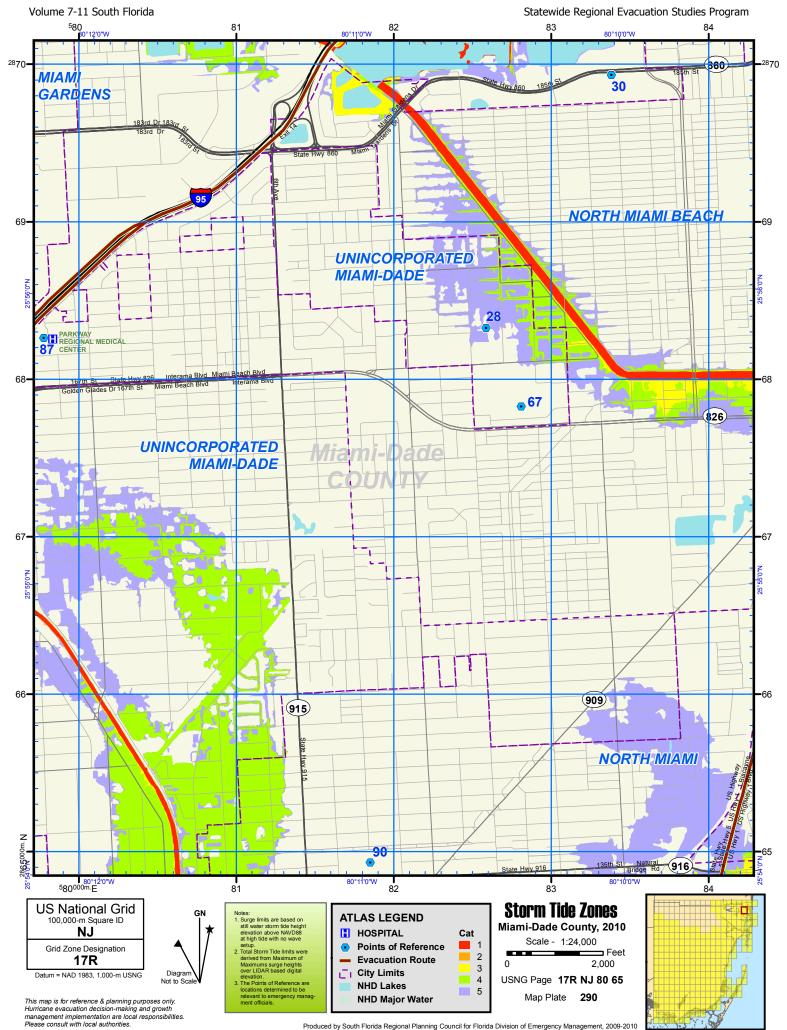
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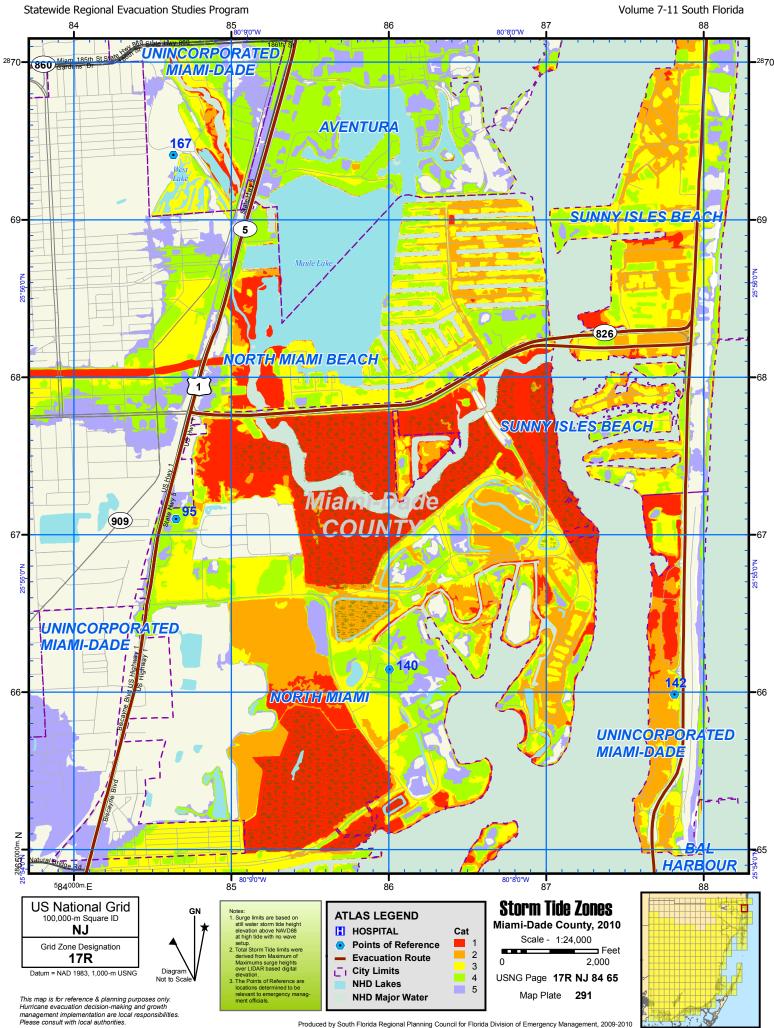
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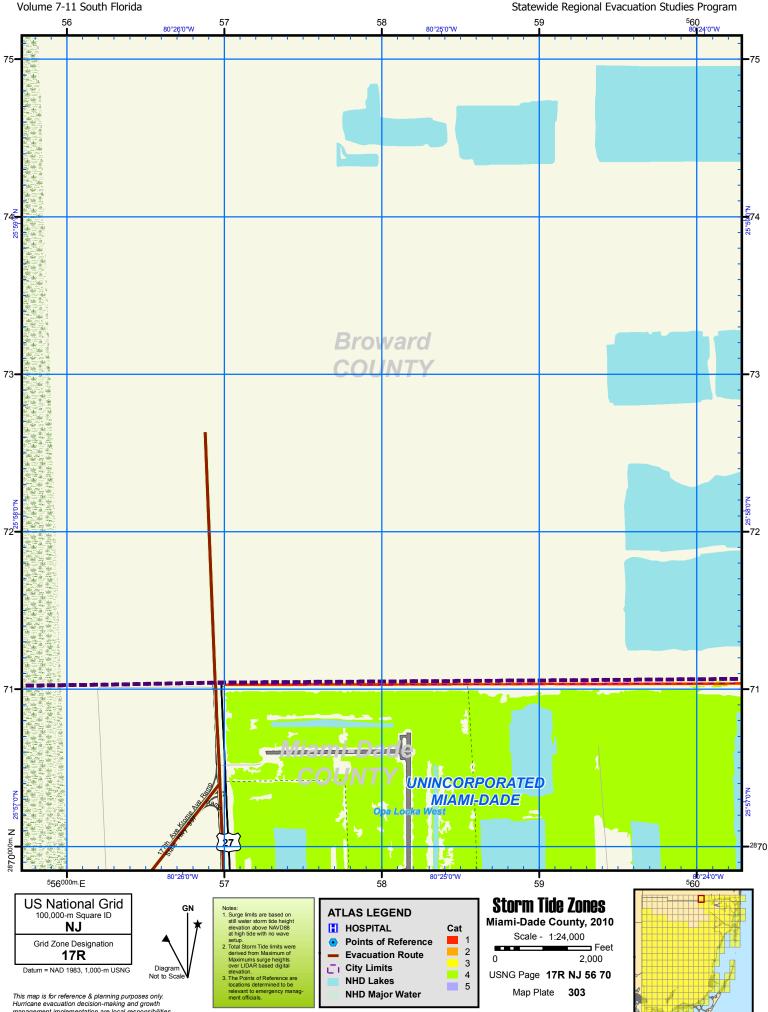
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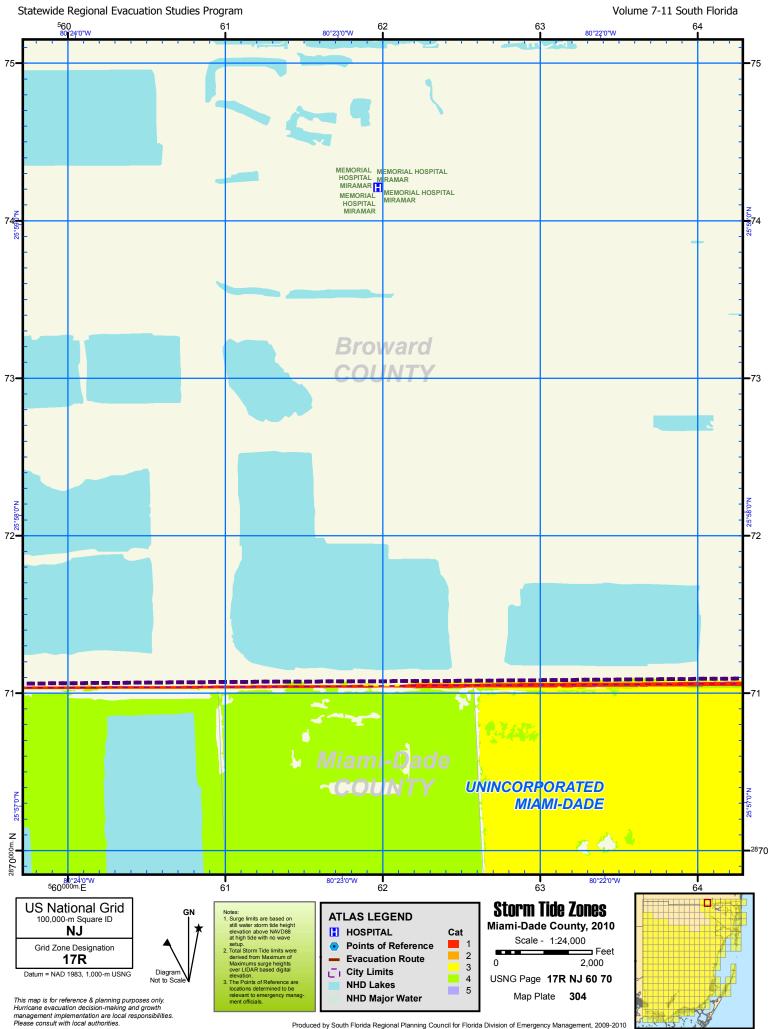
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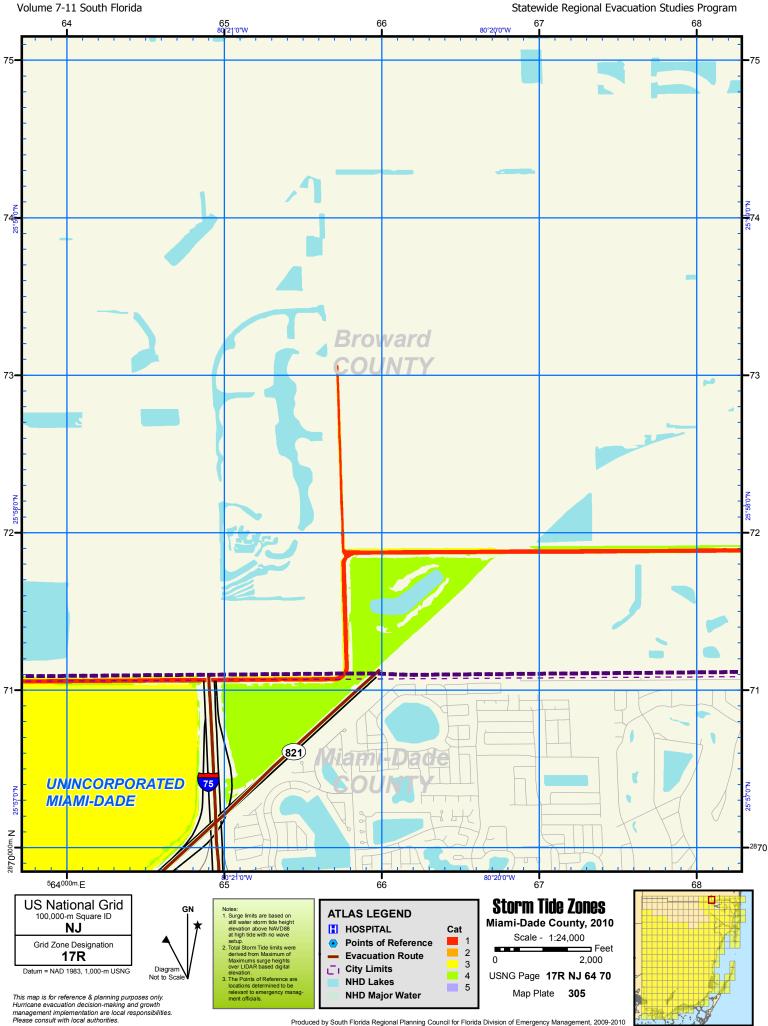
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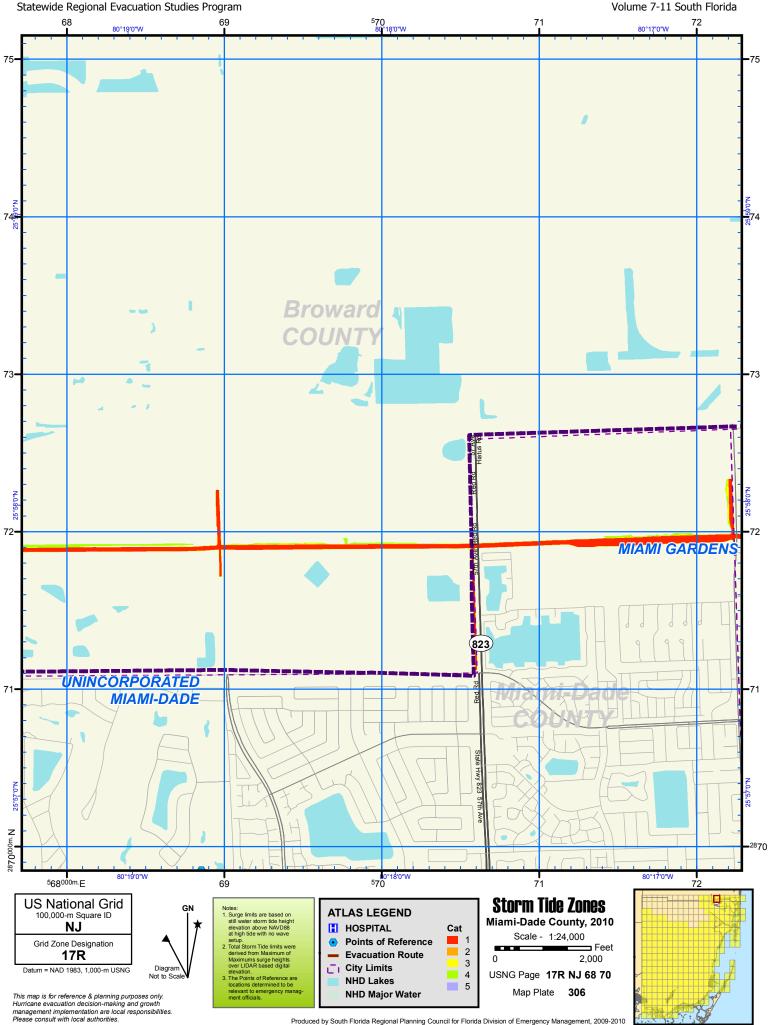


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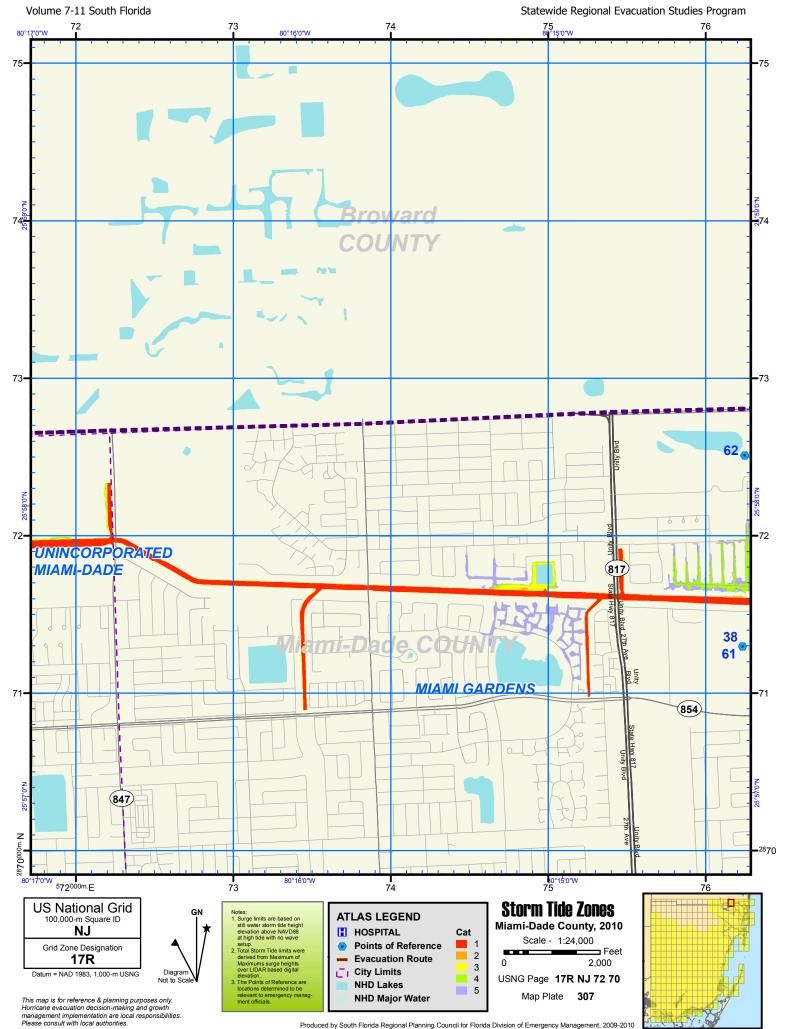


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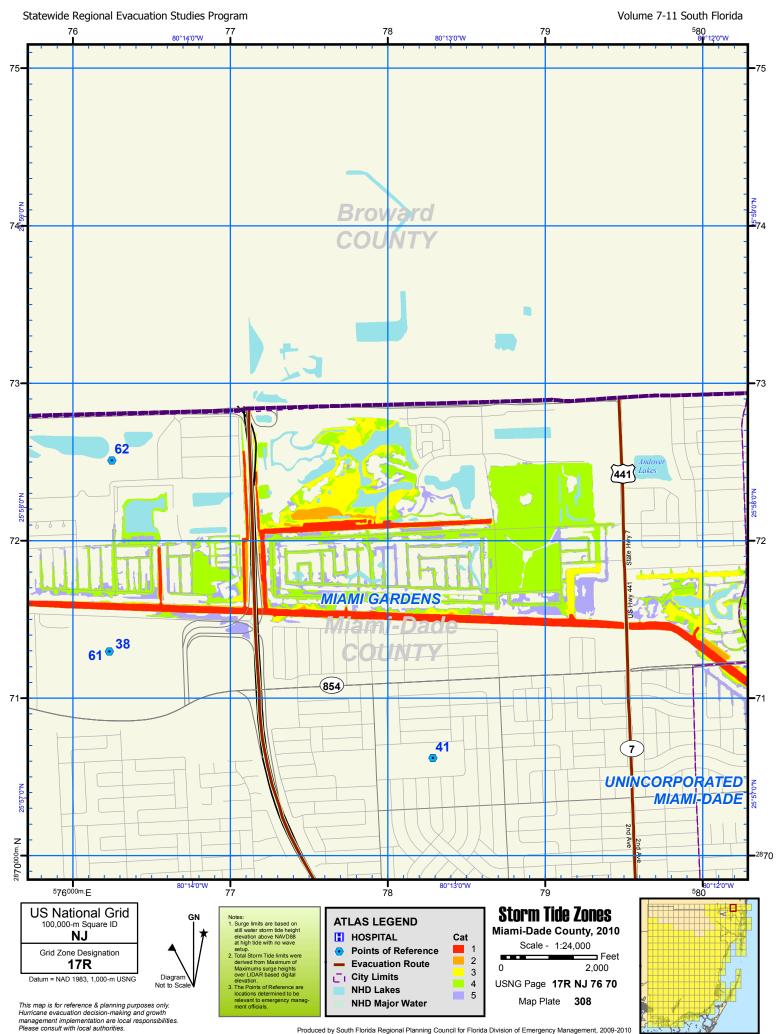


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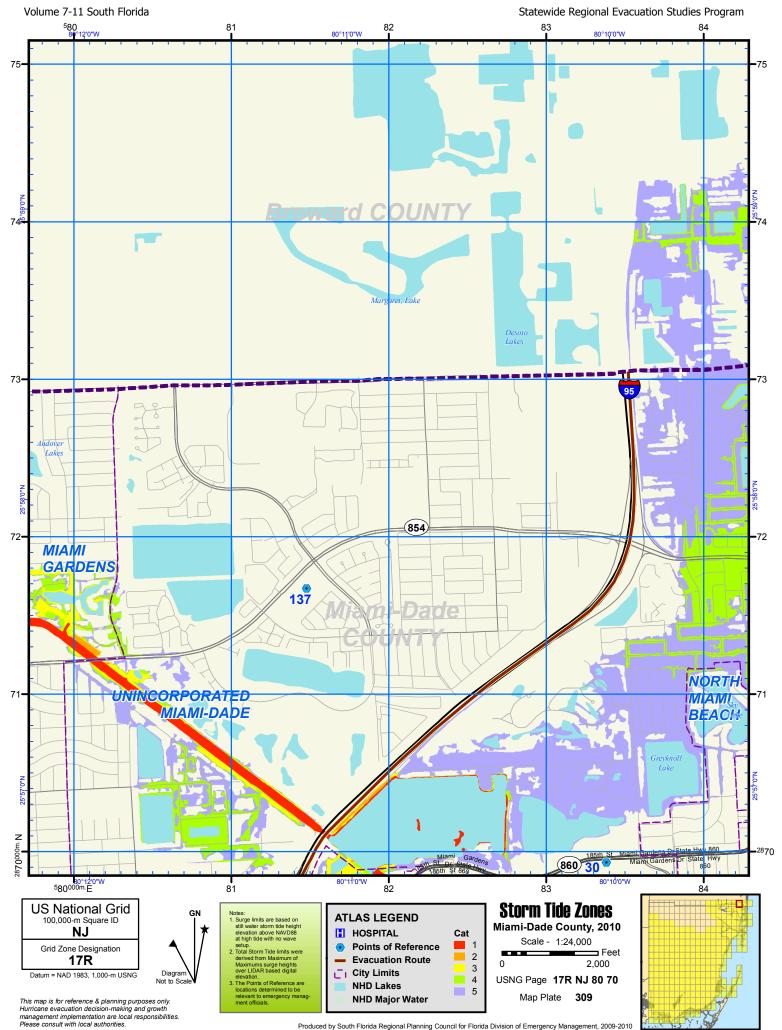


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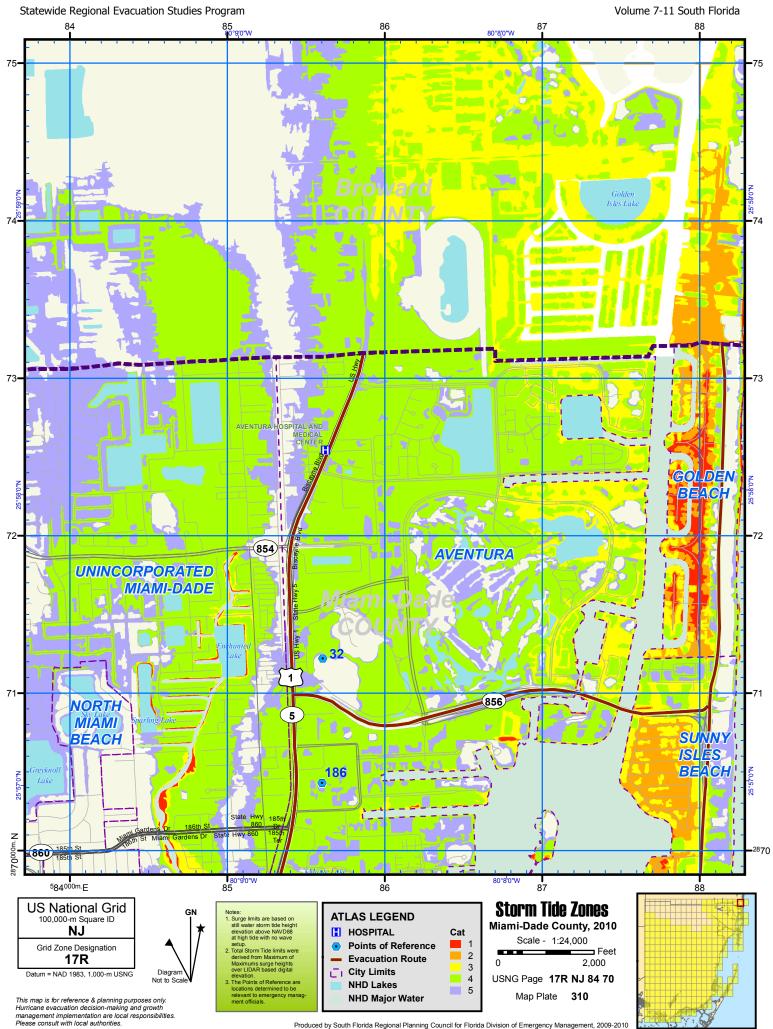


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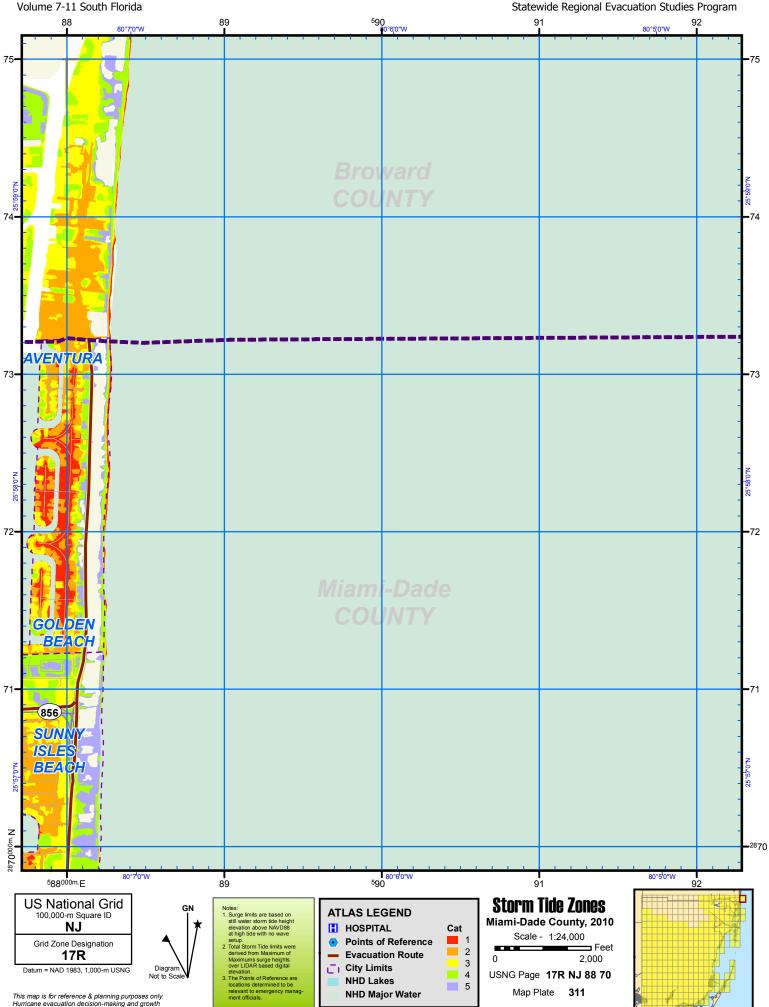


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Florida Division of Emergency Management David Halstead, Director 2255 Shumard Oak Boulevard Tallahassee, Florida 32399





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