

Emergency Response Plan for

Miami, Florida

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Emergency Response Plan

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History

By the time the Spanish entrada arrived in 1513, the native inhabitants of Florida numbered roughly 250,000. Ponce de Leon was the first European to spot Miami while he was sailing in Biscayne Bay. It is not known whether de Leon actually went ashore and met the Tequesta Tribe residing there. In the span of 250 years, the native population was wiped out due to disease, war, and dislocation. During the 1800s, three Seminole wars were fought, Spain sold Florida to the United States for \$5 million in restitution, and in 1822 Florida became a territory. America's longest and bloodiest battle with its indigenous people, the Second Seminole War, was fought in southern Florida



between 1835 and 1842. The war caused a large-scale exodus from Miami and an army build up to protect the remaining settlers at the end of the 1830s.

The Village of Miami was established on a portion of that abandoned plantation soon after the Second Seminole War ended. William English, the nephew to the original plantation owner Richard Fitzpatrick, began selling plots adding buildings to the plantation near the southbank of the Miami River. After selling many plots, English left his uncle's plantation at the beginning of the 1850s to chase the dream of gold during the California Gold Rush.



Discouraged emigrants were reticent to settle in the Miami area even though this final Indian war was fought on a much smaller scale. So lackluster was its growth that by the beginning of the 1900s, the population of Miami was only 1,000 persons. The official founding of Miami occurred the same year that the first railroad train arrived in 1896. At that time, the town



occupied both sides of the Miami River and the heart of its retail district resided on Avenue D, later known as Miami Avenue. The mid-1920s brought rapid changes to the Miami area. With the annexation of neighboring cities in 1925 and bootlegging came a dramatic increase in deaths in Miami and Dade County. That same year more than 100 persons were killed and thousands of homes were destroyed when hurricane winds of 125 miles per hour blew into the Miami Area.

With the advent of World War II, Miami's economy rose sharply due to the deep pockets of the U.S. Armed Services. A large training base was opened in Miami that included other parts of Dade County.

Hundreds of thousands of soldiers were trained there. From the Port of Miami, the United States Navy operated a submarine chaser school, also known as the "Donald Duck Navy." The Navy's Gulf Sea Frontier Established their naval headquarters in the region and the U.S. Army Air Force Transport Command occupied the municipal airport located on Northwest 36th Avenue. With the end of the war came the veterans who had grown fond of "Sand in their shoes," setting



up households in Miami as permanent residences. Veterans flooded the University of Miami taking advantage of the G.I. bill, as the institution scurried to keep pace with record enrollments. A record number of winter tourists flocked Florida, especially Miami, seeking escape from the winter cold of the nation's Northeastern and Midwestern Regions.

Residents referred to their city as "Miamah," just as earlier residents had. With Fidel Castro's takeover of Cuba in 1959, the city became an international havens for refugees fleeing Marxist rule. The first Cuban refugee contingent consisted of mostly well-educated persons, who had left behind successful careers and businesses. During the 1960s, Miami served as a center of international activities involving the Central Intelligence Agency as they prepared to overthrow Fidel Castro's Rule. With the unfortunate failure of the Bay of Pigs Invasion in 1961 and the satisfactory agreement



between the United States and the Soviet Union During the Cuban Missile Crisis, resident Cubans thought less of their newly adopted U.S. government. Also during that time, massive airlift transports of Cuban refugees during the "Freedom Flights" beginning in 1965, led to an increase of 150,000 Florida Residents to mainly Miami and its surrounding areas.

The 1970s were tumultuous times for Miami residents, especially when Dade County passed a law regarding sexual orientation. After an ordinance was passed making it forbidden to discriminate against person based on their sexual orientation, Florida orange juice spokesperson and entertainer, Anita Bryant, led a successful anti-homosexual campaign against the ordinance. While her campaign received national attention, she also successfully led campaign to outlaw adoptions by gays. The law was eventually repealed in Dade County some 20 years later in 1998, along with the reinstatement of the law forbidding discrimination based on sexual orientation. In a national backlash, gay activists launched a somewhat successful campaign to defame not only Bryant but also Florida orange juice. In a case of police brutality involving Miami police officers in the fatal beating motorcyclist Arthur McDuffie, one the worst race riots in America was spawned in response to an all-white jury acquittal of the officers involved. The Liberty City Riots broke out in December 1979, killing 18 people during that three-day period. Other survivors included a fierce drug war that killed approximately 20 persons in the Liberty City area during 1998 and national involvement in the immigration/custody battle of six-year-old Cuban Elian Gonzalez.



Background

Located at 25°83'N, 80°27'W is Miami, Florida, on the southern part of the state on the Gulf Coast. It is on the mouth of the Miami River, and is bordered on the east by Biscayne Bay which is off the Atlantic Ocean. Year-round, Miami has a semi-tropical climate that stay consistent for the most part throughout the whole year. They have a warm summer, and a dry winter. Miami, Florida is the second most humid city in the United States, and through the whole year they have high humidity. The average temperature there is 76°F with an average annual precipitation of 56 in.

Highest Elevation: 6.562 ft

Lowest Elevation: 0 ft

Coastline: 84 mi

Major Bodies of Water:

- Miami River
- Biscayne Bay
- North Atlantic
- Gulf Of Mexico

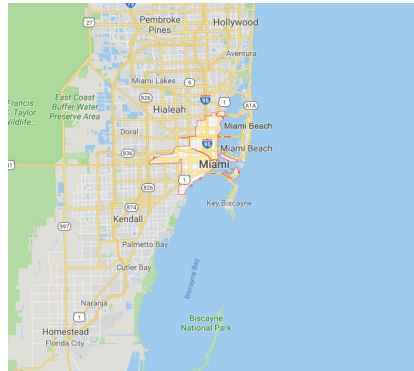


Figure 1

Climate data for Miami Beach, 1981–2010 normals													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	87 (31)	89 (32)	92 (33)	94 (34)	98 (37)	97 (36)	98 (37)	98 (36)	96 (35)	95 (33)	92 (30)	86 (30)	98 (37)
Average high °F (°C)	73.8 (23.2)	74.9 (23.8)	76.3 (24.6)	79.4 (26.3)	82.8 (28.2)	86.5 (30.3)	88.1 (31.2)	88.5 (31.4)	87.0 (30.6)	83.7 (28.7)	79.3 (26.3)	75.7 (24.3)	81.3 (27.4)
Daily mean °F (°C)	67.6 (19.8)	68.9 (20.5)	70.8 (21.6)	74.3 (23.5)	78.4 (25.8)	81.7 (27.6)	83.2 (28.4)	83.6 (28.7)	82.4 (28.0)	79.2 (26.2)	74.4 (23.6)	70.0 (21.1)	76.2 (24.6)
Average low °F (°C)	61.4 (16.3)	63.0 (17.2)	65.3 (18.5)	69.2 (20.7)	73.9 (23.3)	77.0 (25.0)	78.3 (25.7)	78.6 (25.9)	77.7 (25.4)	74.7 (23.7)	69.5 (20.8)	64.3 (17.9)	71.1 (21.7)
Record low °F (°C)	32 (0)	37 (3)	32 (0)	46 (8)	58 (14)	65 (18)	66 (19)	67 (19)	67 (19)	54 (12)	39 (4)	32 (0)	32 (0)
Average rainfall inches (mm)	2.09 (53)	2.33 (59)	3.00 (76)	3.20 (81)	4.98 (126)	8.27 (210)	4.35 (110)	6.37 (162)	7.88 (200)	4.47 (114)	2.74 (70)	2.05 (52)	51.73 (1,313)
Average rainy days (≥ 0.01 in)	6.7	6.0	6.9	6.0	8.9	14.5	12.1	14.0	14.9	11.2	8.1	6.9	116.2

Figure 2

Miami is the most popular county in Florida. Its population is 463,347 as of 2017 and as you move to the coast, the population gets more dense.

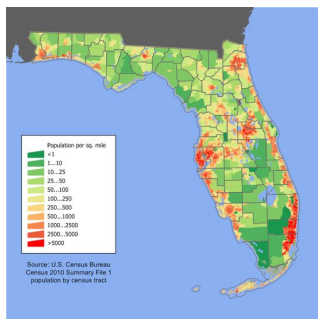


Figure 3

Miami Population Pyramid 2019

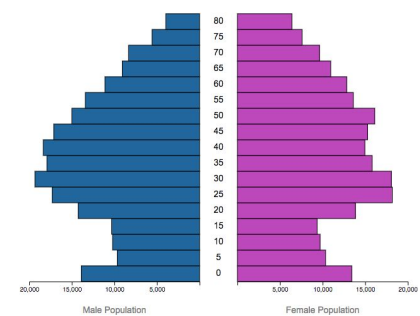


Figure 4

Transportation

In Miami, there are 5 major interstates. These include interstates 4, I-4, I-10, I-75, I-95

Although for airports, there are many throughout Miami. The different airports are: Miami International Airport, Fort Lauderdale-Hollywood International Airport, Miami Executive Airport, Miami Opa Locka Executive airport, Broward County Aviation - Fort Lauderdale-Hollywood International Airport, Miami Homestead General Aviation Airport, Southwest Florida International Airport, Mac's Field Airport, Lindbergh's Landing Strip, Richard's Field, Signature Flight Support MIA - Miami International Airport, Dade-Collier Training and Transition Airport, Concourse J Miami international airport

The most popular public transit includes a free metro system that runs through downtown. You can reach it in Miami from the Tri Rail Metrorail station or by an express bus from the Miami Airport. Other than that there are buses and trains that many people without personal transportation use.

Data on commuters:

- Car 1.24 per household in 2016
- Metrorail Over 10 million people ride the
- Metromover 31,100 people rode the Metromover in March 2018

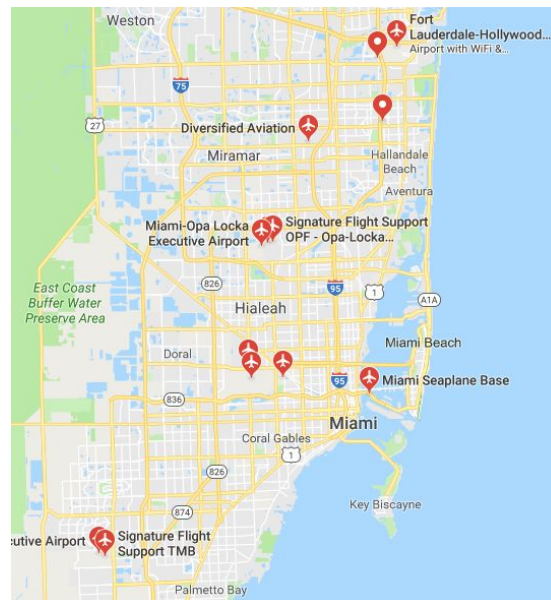


Figure 5



Demographics

Miami, Florida's female to male gender ratio is 223,998 to 219,009. That is 50.56% to 49.44%, and the median age for both genders is 40 years old right now. Although, the average life expectancy is 81 years old. Out of all the ages, 70.0% of the total population speaks Spanish, 23.0% speaks English, 6.1% speaks other Indo-European, and the rest of the population speaks other languages, which is shown in figure ten.

Marital Status:

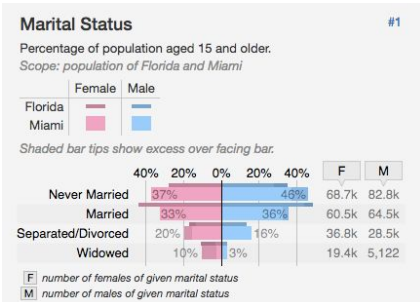


Figure 6

Education:

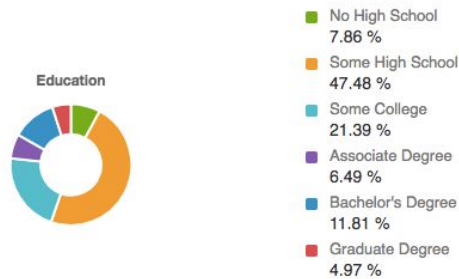


Figure 7

Employment:

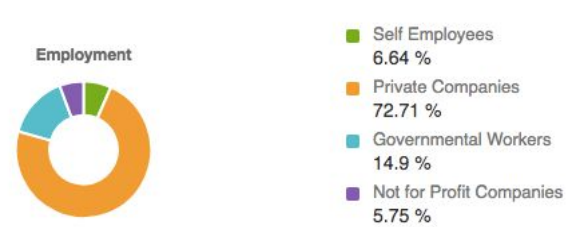


Figure 8

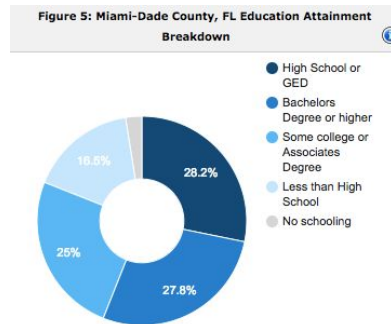


Figure 9

Figure six through nine shows different factors of demographics for Miami, Florida. Figure six shows the marital status of the city, the majority being never married at 39%, and close in percentage is those who are married at 37%. Figure seven then shows education and how far in education the population has gotten to, and to go along with that, figure nine shows the percentages of how much of the population has gotten their high school GED, and how many have gone on to college to get a degree, as well as a percent of how many have no schooling. Figure eight pictures the employment rates, how much of the population is self employed, how many are working for private companies, what percentage of the population are governmental workers, and how many are working for non profit companies.

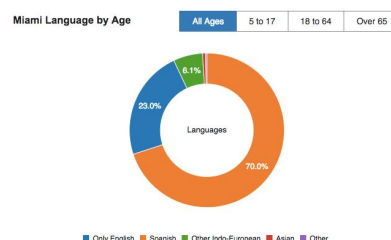


Figure 10

As for the different ethnicities in Miami, there is a large range:

- White: 72.6% (non-Hispanic: 11.9%)
- Black or African American: 19.2%
- Asian: 1.0%
- Native American: 0.3%
- Pacific Islander or Native Hawaiian: 0%
- Two or more races: 4.2%
- Other race: 5.4%
- Hispanic or Latino of any race: 70%

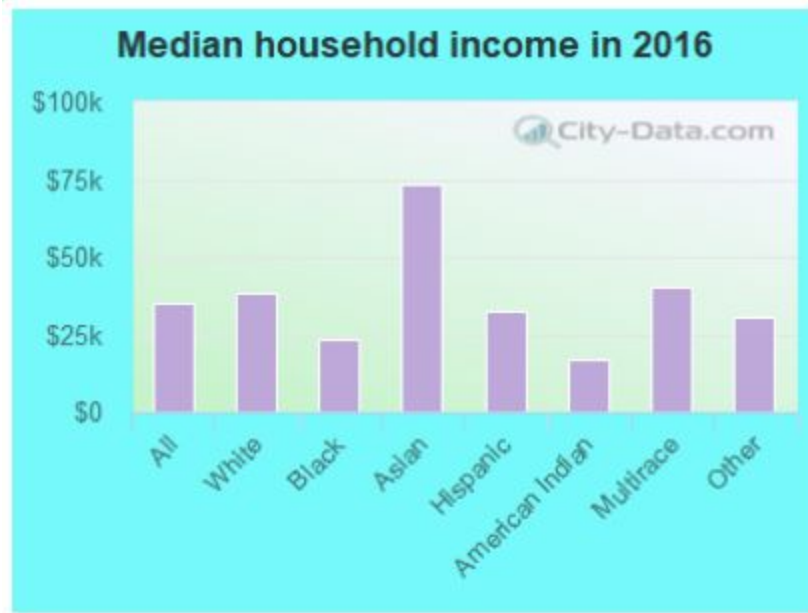


Figure 11

This image shows the median household income of Miami based on ethnicity.

Miami Income by Household Type



Figure 12

Figure 12 has graphs representing data of the Miami income based on household types which include married families, families, and non families.

Financial

Demographics

As of 2017, the population of Miami, Florida is 463,347, and as you move towards the coast that population density gets higher. It is a very desired place to live in due to the warm weather year round, views, beaches, and activities. The median life expectancy of Miami is 81 years old, but right now the current median Miami age is 40 years old. As for the marital status, 37% of the female population, and 46% of males have never been married whereas 33% girls and 36% males are married. When it comes to those who have been separated or divorced, those numbers are 20% females and 16% males. Marital status can affect the financial aspect of a disaster because if someone is living on their own and sustain a lot of damage, they will need a lot of aid to get back on their feet.

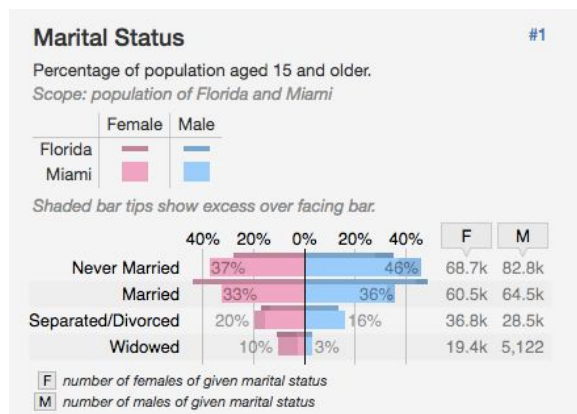


Figure 13

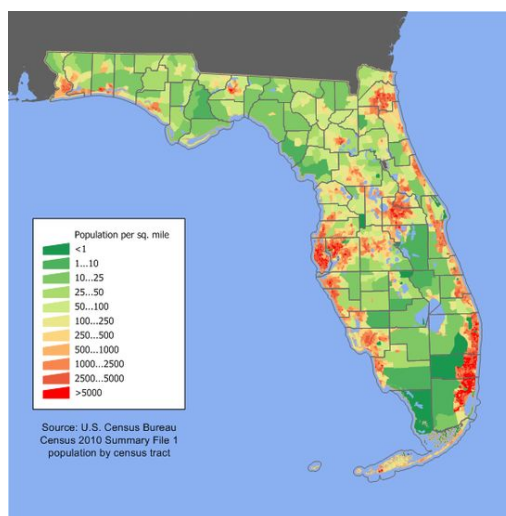


Figure 14

Economy

The average income of a Miami resident is \$21,724 a year, which is a bit less than the U.S. average which is \$28,555 a year. The median household income of a Miami resident is \$30,858 a year which is quite a bit less than the U.S. average- \$53,482 a year. Below is a picture that shows Miami average income based off of household type. Based off of the household type graph, it makes sense that it shows that married families make the most money of 200k, and non families make the least money which is under 10k. Of Miami population, the employment rate is 3.9 percent as of 2018, and for recent trends it looks like it's decreasing. This is because this city has seen the job market increase by 1.7% over the last year, and future job growth over the next ten years is predicted to be 38.1%, which is higher than the US average of 38.0%. When looking at taxes, the sales tax rate for Miami is 7.0% and that is one percent more than the U.S. average.

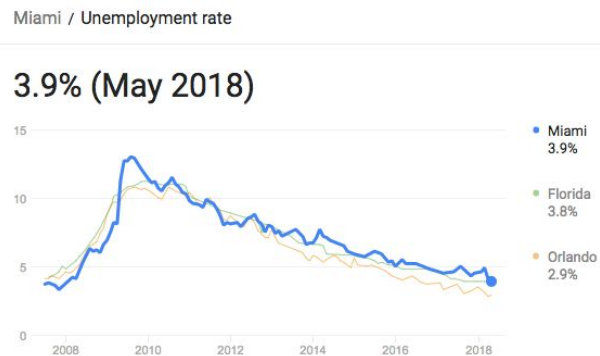


Figure 15

Miami Income by Household Type



Figure 16

Disasters

Hurricane Irma-

- The total cost in damages of Hurricane Irma specifically was 100 billion dollars. (1.2 billion in crops)
- The median home value in Miami is \$338,900 and they have gone up 4.7% over the past year. People think that they will rise again a total of 3.9% just within the next year.
- 300,000 square miles was covered by hurricane Irma’s cloud field. Lots of land was affected by the storm, not just in Florida, but also Cuba, Turks and Caicos, the Dominican, and British Virgin Islands.

1997 Miami Tornado-

- \$525,000 in damages to property.
- The median home value in Miami is \$338,900.

Land O’Lakes Sinkhole-

- The property value average as of today in that area is \$255,000, and the sinkhole took place in 2017. In just a year, the property value has gone up 5.3%.

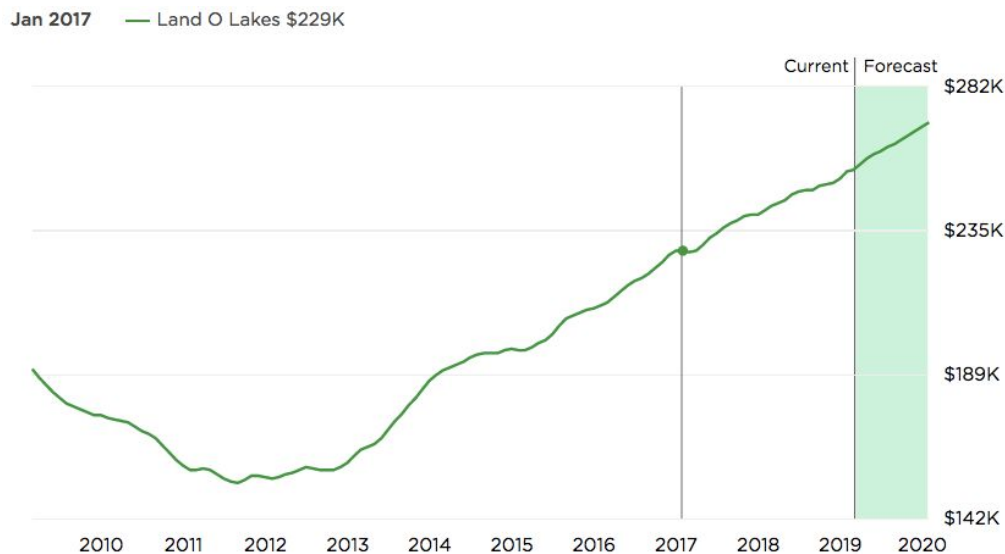


Figure 17

Insurance

Sinkhole (Homeowners Insurance): \$2,000 - \$4,000 A Year

A sinkhole loss must include structural damage that includes the foundation.

Structural damage must involve foundation movement that exceeds an acceptable variance in the building code, and it must cause the structural systems to be unable to support the loads they were designed for.

There is a 2-year limit for filing sinkhole damage claims.

Homeowners who accept a rebate from a contractor after filing a claim risk having their sinkhole insurance voided and having to repay the rebate.

Time limits for testing by the policyholder, signing of repair contracts, and repair completion were established.

Hurricane (Homeowners Insurance): \$3,000 - \$8,000 A Year

Hurricane Damage Caused by Flood. Private homeowners insurance policies typically do not cover flood damage. However, if a hurricane's wind damages your roof, and rain gets in as a result, you may find that homeowners insurance offers some protection if your policy includes coverage for wind.

Tornado (Renters/Homeowners/Landlord Insurance): \$1,993 A Year

If you have renters insurance, that policy will cover damage to your belongings, but the landlord's property insurance will cover structural damage. If water damages your residence during a tornado, your policy may or may not cover that. Damage caused by flooding isn't covered by a homeowners or renters policy.

Local Government

The United States is a democratic republic. A democracy is a government of the people with elected officials. The legal system has 5 different laws, civil, common, customary, religious, and mixed. The Civil Law is the system of law concerned with private relations between members of a community rather than criminal, military, or religious affairs. The Common Law is the law system based on English common law at the federal level; state legal systems based on common law except Louisiana, which is based on Napoleonic civil code; judicial review of legislative acts. The Customary law, is the unofficial law. Basically, it is the standards of a community or certain location. The Religious law is when a law refers to ethical and moral codes taught by religious traditions. Finally the Mixed law is a mixed legal system is one in which the law in force is derived from more than one legal tradition or legal family.

The branches of government are executive, legislative, and judicial. Within these three branches there are jobs that have to happen before. In the executive branch there are five jobs: chief of state, head of government, cabinet, elections or appointments, election results. The chief of state is currently, President Donald J. Trump , and Vice President Michael R. Pence, the president is both chief of state and head of government. The head of government is President Donald J. Trump and Vice President Michael R. Pence. The cabinet is appointed by the president, approved by the Senate. The Elections or appointments are run by the president and vice president indirectly elected on the same ballot by the Electoral College of electors chosen from each state, president and vice president serve a 4-year term. The election results from this year for example are; Donald J. Trump elected president was by electoral vote. Donald J. Trump who was a republican party, 304, Hillary D. Clinton who was a democratic party, 227, other 7 percent of direct popular vote (Hillary D. Clinton 48.2%, Donald J. Trump 46.1%, other 5.7%). The legislative branch drafts proposed laws, confirms or rejects presidential nominations for heads of federal agencies, federal judges, and the Supreme Court, and has the authority to declare war. This branch includes Congress (the Senate and House of Representatives) and special agencies and offices that provide support services to Congress. American citizens have the right to vote for Senators and Representatives through free, confidential ballots. The senate have two elected Senators per state, totaling 100 Senators. A Senate term is six years and there is no limit to the number of terms an individual can serve. The house of representatives have 435 elected representatives, which are divided among the 50 states in proportion to their total population. There are additional non-voting delegates who represent the District of Columbia and the territories. A representative serves a two-year term, and there is no limit to the number of terms an individual can serve. In the judicial branch they interpret the meaning of laws, applies laws to individual cases, and decides if laws violate the constitution. It's comprised of the supreme court and other federal courts. The supreme court is the highest court in the United States. The justices of the supreme court are nominated by the president and must be approved by the senate. Nine members make up the supreme court, a chief justice and eight associate justices. There is a minimum or a minimum of six justices to decide a case. If there is an even number of justices and a case results in a tie, the lower court's decision stands. There is no fixed term for justices. They serve until their death, retirement, or removal in exceptional

circumstances. The federal courts and judicial agencies is when the constitution gives congress the authority to establish other federal courts to handle cases that involve federal laws including tax and bankruptcy, lawsuits involving U.S. and state governments or the constitution, and more.

The communication from landline users is 119.902 million. Their comparison to world rank is 2. The amount of cellular users is 395.881 million there comparison to world rank is 4. There broadcast media is controlled by 4 major TV networks, thousands of TV stations broadcasting, multiple national radio networks with many affiliate stations, National Public Radio has 900 some member stations, over 15,000 operating radio stations. Internet users are 246,809,221 internet users. The percent of population is 76.2% and their comparison to world rank is 3.

When the local government is faced with a disaster their four actions are to, socialize the economic/ infrastructure, provide environmental needs, help to provide support in a disaster, and finally request assistance from the state. When the state government is faced with a disaster that may lead to a federal declaration their actions are too, reviews and evaluates the local situation, determines if the situation is beyond the capability of the state, proclaims a state of emergency, and requests federal assistance. When the federal aid is requested by state the three responsibilities of the federal government is to, let the president decide if he should veto the legislation created by congress and nominates heads of federal agencies, or congress confirms or rejects the president's nominees and can remove the president from office in exceptional circumstances, then the Justices of the Supreme Court, who can overturn unconstitutional laws, are nominated by the president and confirmed by the Senate. The common action phases of a disaster response at the state level of government is to First, prevent: focuses on preventing human hazards, primarily from potential natural disasters or terrorist (both physical and biological) attacks. Preventive measures are designed to provide more permanent protection from disasters; however, not all disasters can be prevented. The risk of loss of life and injury can be limited with good evacuation plans, environmental planning and design standards. Second, preparedness; is a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action. Training and exercising plans is the cornerstone of preparedness which focuses on readiness to respond to all-hazards incidents and emergencies. Third, response; is comprised of the coordination and management of resources (including personnel, equipment, and supplies) utilizing the Incident Command System in an all-hazards approach; and measures taken for life/property/environmental safety. The response phase is a reaction to the occurrence of a catastrophic disaster or emergency. Fourth, recovery; consists of those activities that continue beyond the emergency period to restore critical community functions and begin to manage stabilization efforts. The recovery phase begins immediately after the threat to human life has subsided. The goal of the recovery phase is to bring the affected area back to some degree of normalcy. Finally, mitigation; is the effort to reduce loss of life and property by lessening the impact of disasters and emergencies. Mitigation involves structural and non-structural measures taken to limit the impact of disasters and emergencies. Structural mitigation actions change the characteristics of buildings or the

environment; examples include flood control projects, raising building elevations, and clearing areas around structures. Non-structural mitigation most often entails adopting or changing building codes.

In Florida, one thing that a disaster response role that is unique to this government is when that they are first responders and get to the disaster scenes before anyone else. Some actions that must be taken at the State government level before Federal resources are available for the disaster response is to first, let the state government serves the agents for the local jurisdictions if federal disaster assistance is needed within the natural disaster, then when the local jurisdiction doesn't have the proper resources that is needed the state government can step in to help, and finally proclaiming a state of emergency from the governor. When federal aid is requested the first three responsibilities of the Federal government is to first, coordinate and support the Federal response by serving as an information source. Second, help access and coordinate needed resources. Third, recovery. The common action phases of a disaster response at the State level of government is to, mitigation and second response. A mitigation action is a specific action, project, activity, or process taken to reduce or eliminate long-term risk to people and property from hazards and their impacts. Implementing mitigation actions helps achieve the plan's mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process. Taking sustained actions to reduce or eliminate long-term risk to people and property from hazards and their effects Building the emergency management function to respond effectively to, and recover from, any hazard. Conducting emergency operations to save lives and property by taking action to reduce the hazard to acceptable levels. Evacuating potential victims; providing food, water, shelter, and medical care to those in need; and restoring critical public services. Rebuilding communities so that individuals, businesses, and governments can function on their own, return to normal life, and protect against future hazards

Response is a generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems. Any of the following actions taken in school buildings in response to the asbestos hazard emergency response act are to reduce the risk of exposure to asbestos removal, encapsulation, enclosure, repair, and operations and maintenance. Monitoring and Situational Awareness. Advance Evaluation. FDRC and RSF Activation or Deployment. Recovery Support Strategy (RSS) Report Development. RSS Report Implementation. Recovery happens while there are five main stages they can also be divided into early, middle, and late stages of recovery. The priorities addressed in the later phases of recovery may focus more on rebuilding damaged relationships. The short-term phase typically lasts from six months to at least one year and involves delivering immediate services to businesses. The long-term phase, which can range up to decades. Requires thoughtful strategic planning and action to address more serious or permanent impacts of a disaster. Investment in economic development capacity building becomes essential to foster economic diversification, attain new resources, build new partnerships and implement effective recovery strategies and tactics. Communities must access and deploy a range of public and private resources to enable

long-term economic recovery. The five steps in the disaster recovery process starts with, first, determine terms of assistance in the FEMA/State agreement. Then, prepare for the Federal/State meeting. After that relay disaster information to the public through the joint information center. Then, conduct alleviation efforts by, establishing the interagency mitigation team, completing the mitigation report. Then, beginning the hazard mitigation grant program. Finally, produce the state hazard mitigation plan.

Flow Chart

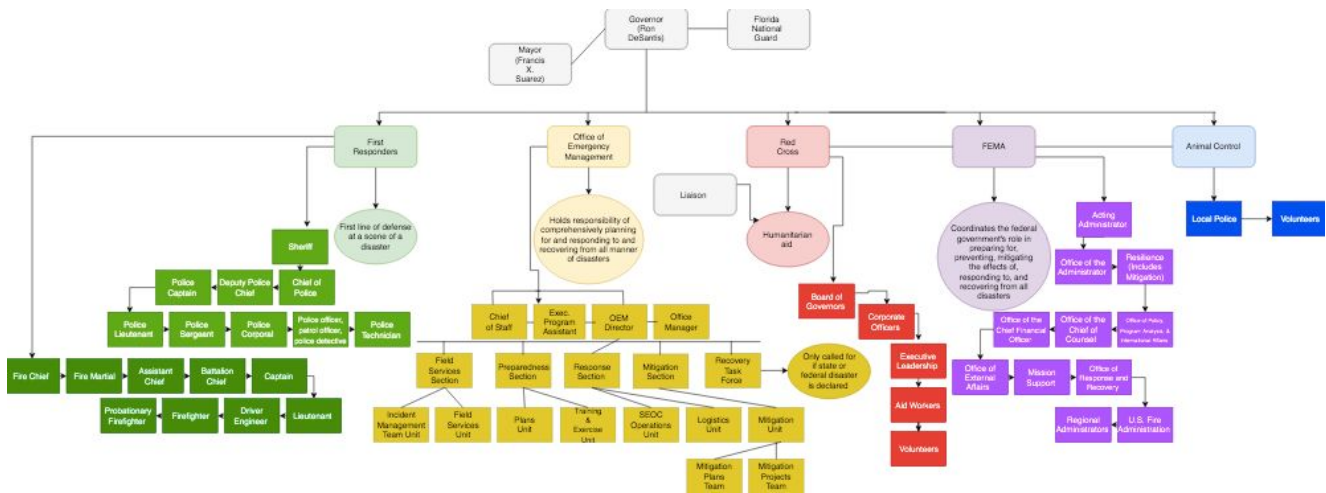


Figure 18

The Miami disaster flowchart consists of five different sections. Each section plays a role in helping to manage the city when disaster strikes. Each section does fall under two main headers: the governor, Ron DeSantis, who is helped by the mayor when necessary, and the Florida National Guard. After that falls FEMA, who works with the Red Cross. There is also first responders and Office of Emergency Management. These five organizations all go to the cities aid when there is a disaster and they are in need of help. The first responders include the fire and police departments, and their role is to be the first line of defense. They get there first when a disaster occurs and they are typically the ones who start directing people, sending rescue missions, and setting up triage centers. There is also animal control who works with first responders and local police to rescue and evacuate abandoned or stranded animals. As for the Office of Emergency Management, they start to plan how to handle all aspects of a disaster, and are not necessarily on the scene of the disaster. Then, there is the Red Cross who are the humanitarian aid; raising money, sending food, water, and doing anything they can to help get people and families back on their feet. The Red Cross sometimes works with FEMA, they work the prepare and recover from all aspects of any type of disaster.

Hurricane

A hurricane is a giant ocean storm with strong winds that are created near the equator. The warm and moist air over the ocean starts to rise, which in turn causes an area of low air pressure right below. Then, from the surrounding areas which have a high air pressure, they start to push in towards the low pressure area. This causes the air to become hot and moist, and hot things always rise. So, as that air is rising, surrounding air is swirling around it to take the place of the warm air that is rising. The warm air rises, then cools, and falls back down. That cycle continues to repeat which then created a little cloud, and slowly advances to create a major cloud above the water. This process is what takes place when a hurricane is formed. Climate change also plays a major role in creating hurricanes. A major part of this is due to global warming. Research has proved to us that the rising temperatures in the atmosphere causes the ocean water to heat even more. The circulation of the moist air and warm waters causes the hurricane to form faster with stronger winds from a tropical storm that is carried along the subtropics. Then, the damages from the disaster are also worse because of the fact that sea levels are rising which makes the power of the wave even stronger, in the end making even more destruction. The advancement of satellite technology in the 1970s made it possible to more consistently track hurricanes of where they are heading. There is also a hurricane category system that classifies hurricanes from least damaging (1) to catastrophic (5). The warning signs of a hurricane are strong winds, dark clouds, blowing debris and sea levels start to rise, barometers starts to drop, cirrus clouds start to appear roaring noises and waves start to form white caps. With technology, people can also track where tropical storms are heading which can indicate that a hurricane could be approaching.

Tornado

Most tornadoes form due to thunderstorms. Tornadoes are caused by warm air from the Gulf of Mexico and cool air from Canada. When these two air masses meet, they create instability in the atmosphere. A tornado is a violent rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of destruction with wind speeds of up to 300 mph. They can destroy large buildings, uproot trees and hurl vehicles hundreds of yards. They can also drive straw into trees. Damage paths can be in excess of one mile wide to 50 miles long. In an average year, 1000 tornadoes are reported nationwide. Some warning signs are, a dark, often sky, wall clouds/approaching cloud of debris, large hail, wind may die down and the air may become very still. Despite efforts that were made in meteorology that help us understand and predict tornadoes, there are still unknown variables. Advance warning and proper precautions are the only certainties. Tornadoes can occur at any hour, but usually strike during the late afternoon and early evening. Most move southwest to northeast, but can move in any direction. They have an average speed of 30 mph, but speeds can vary from nearly stationary to 70 mph. Normally a tornado will stay on the ground no more than 20 minutes, however, one tornado can touch the ground several times in different areas. They use radar to track the path of thunderstorms that might create tornadoes. It is still not possible to detect a funnel cloud by radar and predict its path, touchdown point, and other important details. They use the doppler radar most of the time to track a tornado. Forecasters and storm spotters have learned to recognize certain thunderstorm features and structure that make tornado formation more likely. Some of these are visual cues, like the rear-flank downdraft, and others are particular patterns in radar images, like the tornadic vortex signature (TVS). Storm spotters have been trained to recognize tornado conditions and report what they see to the National Weather Service. Storm spotters can be emergency managers or even local people with a keen interest in severe weather who have taken formal storm spotter training in their community. Computer programs, called algorithms, analyze doppler radar data and display it in ways that make it easier for forecasters to identify dangerous weather. A storm with a tornado observed by radar has certain distinguishing features and forecasters are trained to recognize them.

Sinkhole

A sinkhole is really a big hole that forms in the ground from the land collapsing, and it swallows everything that is on top of it. Although sinkholes can be caused due to human causes, natural sinkholes will occur because of areas of land that have large deposits of carbonate rocks, such as limestone gypsum, that are located underground start to dissolve from groundwater. When you research about it, you'll find that there are two main types of sinkholes: a cover-subsided sinkhole, (which develops slowly over time), and a cover-collapse sinkhole, (appear suddenly). The bedrock of a cover-subsided sinkhole gets exposed to water, and overtime the rock wears down. Eventually, the holes that it creates underground fill with water and become like a pond. As for a cover-collapse sinkhole, the same basic process happens. Natural occurring cracks under the ground get covered by a thin layer of sediment, and when the water soaks in the crack will get bigger and create a sinkhole. When determining when a sinkhole is going to take place can be somewhat challenging because there's no exact way of knowing. Some signs to look for are cracks in the foundations of houses and buildings, cracks in interior walls, cracks in the ground outside, depressions in the ground, trees or fence posts that are tilting, and doors or windows that become difficult to open or close. Sinkholes do not cause other weather to occur, but weather does play a major role in causing sinkholes to actually happen. Overtime, heavy rain and strong winds can play a role in causing cracks in the ground which can eventually lead to a sinkhole. One case study also shows the climate change, global warming more specifically, might play a role in forming sinkholes, or the cracks in the ground. An article says that located in Florida, the number of sinkholes that occurred increased during the time of drought because the rainfall evaporates quicker, and there is a decrease in groundwater which means that those cracks in the ground start to form. Because of the fact that sinkholes are happening more often, researchers are trying to find ways to track them. NASA says that they may have found a way to do so by using radar technology. Radar technology transmits electronic pulses so that they can see how the earth's crust is shifting. This will help them to detect whether or not a sinkhole could occur and where.

Planning For Disaster

Hurricane- Before

Before a hurricane could potentially take place there are some things that you can do to prepare for it. First, get insurance. Private homeowners insurance policies typically do not cover flood damage. However, if a hurricane's wind damages your roof, and rain gets in as a result, you may find that homeowners insurance offers some protection if your policy includes coverage for wind. To help protect your house, you can build it up on stilts, and have storm shutters in place to hopefully reduce the damage. When it comes to outdoor items, make sure that you can easily secure them if there is a hurricane watch or warning. Always be paying attention to local news or radio stations so that you are aware if there is a hurricane warning. In your house, it would be a good idea to have a designated room to go to in case of a hurricane. This should be a room with no windows and sturdy walls. Other than that, you need to come up with a plan to be prepared. If you have family, come up with a communication plan and a reunification destination if you are unable to get to your house. If told to do so by authorities, immediately evacuate the area that you are in. Be aware of evacuation routes in your city, listen to directions given by authorities, and know to pay attention to signs of whether or not certain roads are closed. When it comes to your car, you should make sure that you have a full tank of gas, and have extra fuel in your car as you might not have access to a gas station. As for a communication plan, it can consist of having a radio that you can listen to for updates, and being able to get in touch with your family. Walky talkys are also a good tool to have in case of an emergency. You also need to have a 72 hour kit available that is easy access. This will include items that are only necessary in order to survive.

The warning signs of a hurricane are strong winds, dark clouds, blowing debris and sea levels start to rise, barometers starts to drop, cirrus clouds start to appear roaring noises and waves start to form white caps. These are things you should always be aware of and looking for so that you can be prepared in the situation that there actually is a hurricane.

Have a 72 hour kit available with easy access to it. Your kit should include:

- Food (canned/non perishable & high energy)
- Can opener
- Water (at least one gallon per day per person)
- First aid kit
- Blankets
- Prescription medications
- Toilet Paper
- Battery operated radio, flashlight, batteries for both
- Cash (\$500+)
- A map of the area that you are in
- Whistle
- Pet food and extra water if necessary
- Copies of all important documents (birth certificates, insurance policies, identification).
Make sure they are laminated or in a waterproof case
- Matches in waterproof container
- Feminine supplies and personal hygiene items
- Complete change of clothes for each person

- List of household contents
- Cell phone and charger
- Multi-purpose tools
- Emergency contact information

Hurricane- During

If you are caught in the middle of a hurricane, you need to stay in a secure room, away from windows. In case of flooding, you should unplug all electrical devices and appliances, and keep the refrigerator door shut to insulate the cold so that food doesn't spoil as fast. Keep clothes and your 72 hour kit in a trash bag to make sure that water does not get to it so that it stays dry. Use a flashlight if the power is to go out, not candles as it can be unsafe. The entire time you should be monitoring weather and civil service bulletins on either regular or NOAA radio. Make sure that you have your 72 hour kit on hand in case you are to need anything out of it. Remain indoors when the storm moves over your area because it can always return back to where you are. Do not leave your safe location unless told to do so by officials.

Hurricane Preparation

Keep all trees and shrubs well trimmed.

Place valuables and personal papers in a waterproof container on the highest level of your home.

Cover windows with hurricane shutters or pre-cut plywood.

Bring in all outdoor furniture and anything else that is not secured.

Create a Ready kit with enough supplies for at least three days, consider needs of children, pets and elderly.

Develop an evacuation plan and where to reconnect with family.

ready.ga.gov

Set refrigerator to the coldest setting.

Fill gas tank.

 Ready. Georgia



Tornado- Before

To prepare before a tornado hits, the first thing that you want to do is get insurance. If you have renters insurance, that policy will cover damage to your belongings, but the landlord's property insurance will cover structural damage. If water damages your residence during a tornado, your policy may or may not cover that. Damage caused by flooding isn't covered by a homeowners or renters policy. Other than that, know what a tornado looks like. It includes funnel clouds, heavy winds, rain, thunder (loud roars). Also, know what risk your city is at for tornados, the southeast part of the U.S. is at a greater risk for tornados than the rest of the country. You should also have access to weather, news, or radio stations that can update you if there is a tornado watch. If there is a watch then that only means that there is a possibility for a tornado and you need to be on the lookout. If there is a tornado warning, that means that there actually is a tornado and you need to take shelter. Also, you can prepare for a tornado by practicing going into a safe shelter while you are at home, work, school, or any other places that you frequently visit. The best places to be during a tornado are storm cellars or basements, an interior room or hallway on the lowest floor possible, stay away from windows, doors and outside walls, stay in the center of the room and away from corners because they attract debris. If in a vehicle, try to get inside a building since cars and mobile homes don't provide good protection. If shelter is not available, lie in a ditch or other low-lying area, but do not go under an overpass or bridge. Plan to stay in your safe location unless the storm has passed or officials tell you to do so. You also need to create a communication plan and reunification destination with your family in case you do get seperated. Have your phone, radio, or walky talky on hand so that you can get in touch with other people. Also, make sure you have emergency contact information in case it becomes necessary. When preparing for a tornado, you can also create an emergency kit.

Warning signs that you should be looking for include wall clouds or a cloud of debris, dark and often greenish colored skies, large hail or heavy rain, and right before the tornado touches down, the air may become very still. Also, be paying attention to thunder or loud roars that sound similar to a freight train. Radios and other broadcasts stations will alert you for a tornado warning that is issued by national weather forecasting agencies to warn the public.

Get a kit with emergency supplies to have with you

- Water and canned or dried food – families should set aside one gallon of water per person per day, to last three days, and a three-day supply of food per person. The food should be nonperishable items that don't need to be cooked, such as tuna and crackers. If there's an infant in the house, include formula and baby food.
- Battery powered radio
- Flashlight
- Extra batteries for the radio and flashlight
- Prescription medications
- First-aid kit
- Birth certificates
- Ownership certificates (autos, boats, etc.)
- Social security cards
- Insurance policies

- Will
- Extra pet food and water if necessary
- Household inventory:
 1. List of contents of household; include serial numbers, if applicable
 2. Photographs or videotape of contents of every room
 3. Photographs of items of high values, such as jewelry, paintings, collection items

Tornado- During

If a tornado in your area takes place, get your family and emergency kit and go to your designated safe room. Stay away from windows and take cover. You can cover yourself with pillows, mattresses, and/or blankets, and to help even more you can wear a helmet. If you are told by officials to evacuate your home, do so and take your emergency pack. Do not return until you are told that it is safe to do so. If you are in a car, do not try to drive away from the tornado, and do not plan to stay in your car. Vehicles do not give good protection, and they can be flung by high winds or crushed by debris caused from the tornado. If you are outdoors when a tornado appears and don't have access to a shelter, find a field or ditch away from items that can fly through the air. Lie down as flat as you can and do not move until the storm has fully passed.

Tornado Shelter Tips

Safest place.
Basement
or interior room,
stairwell or
hallway on
a low floor.



Worst place.
Avoid windows,
doors and
outside walls.

Cover yourself with
blankets or a mattress
for protection. A
helmet can be used
for added protection
against head injuries.

ready.ga.gov


Ready. Georgia

Sinkhole- Before

You have be ready to evacuate your home at a moments notice if necessary. Create a family plan for where you will go, and a meeting place in case you are separated. Prepare a bug-out binder that contains copies of important documents especially insurance policies. If you are in an area of sinkhole danger, contact your insurance company and ask about coverage in the event of a sinkhole. Be sure to include any pertinent health information as well as the names and numbers of your family physician, attorney and next of kin. Other items you may want to include are: A credit card Spare car keys and/orkeys to another residence A journal of computer passwords in case all of yours are memorized on your computer you should always take if you believe a sinkhole exists on your property is to keep away from it. In particular, make sure you keep children away from the possible sinkhole area. Locate any animals you may have and keep them away as well.

Some signs of a sinkhole

- Trees or fence posts that tilt or fall.
- Foundations that slant.
- New small ponds that appear after rain.
- Cracks in the ground.
- Sudden drainage of a pond.
- Rapid appearance of a hole in the ground.
- Dips, depressions, slopes that appear in a yard.

Get a kit with emergency supplies to grab on your way out

- A credit card and/or cash
- Spare car keys and/or keys to another residence
- A journal of computer passwords in case all of yours are memorized on your computer
- List of household inventory
- Copies of important documents (identification, birth certificate, etc...)

Sinkhole- During

The first step you should always take if you believe a sinkhole exists on your property is to keep away from it. In particular, make sure you keep children away from the possible sinkhole area. Making sure to use materials that are visible in both the daytime and nighttime, block the area of the sinkhole with fencing or rope. Contact your insurance company to make them aware of the situation as soon as possible. You may find that your insurance policy covers both assessment of the situation as well as repair. At the same time, you may find out that your

insurance covers neither. To know for sure if you have a sinkhole, you will need to obtain the results of latest by a licensed engineer with a professional geologist on staff or by geological testing firm, either of whom can perform an evaluation of your property. You may also find that your local Water Management District performs sinkhole assessments, and these may be less expensive than those performed by private companies. Continuously monitor the size of your sinkhole, making sure to remain at a safe distance from the sinkhole at all times. If you originally decided to stay in your home because you saw no signs of damage impact from the sinkhole, continue checking for signs of damage impact. Sinkhole dangers can evolve quickly, and you need to remain vigilant and be ready to evacuate your home at the first sign of damage. Dumping materials into sinkholes could possibly contaminate groundwater. Before putting anything into a sinkhole, await specific instructions from your local government agency and insurance company.



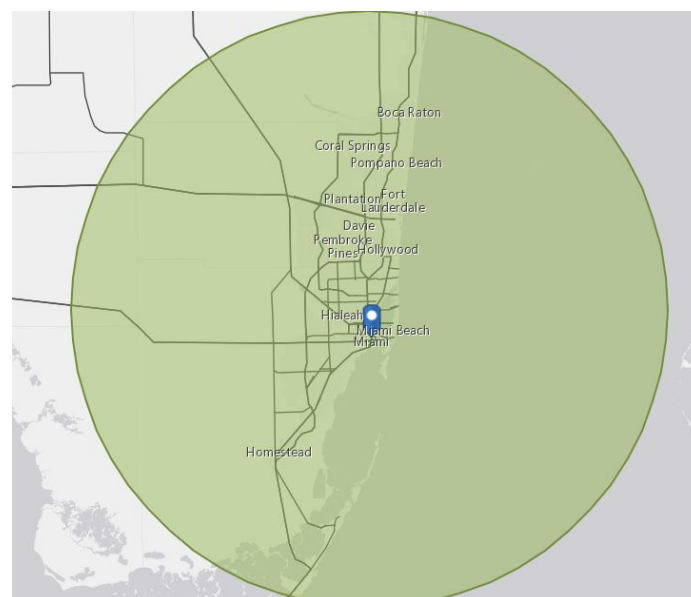
Communication Plan

Before

In advance to a hurricane hitting, citizens need to make sure their home meets or exceeds current model building codes for regions often impacted by hurricanes. You may also want to do the following: talk with your family members about what to do in case of a hurricane, and show your family members where electrical, gas and water shut-offs are and how to turn them off. Citizens may also want to install permanent wood or metal stiffeners on their garage doors. Something else that is helpful could be to make sure their roof covering and sheathing beneath it can resist high winds. They need to pay particular attention to weak or dead branches that could fall on their home or their neighbor's home. This gives them a better idea of how your property might be affected by a storm surge or tidal flooding. Before a hurricane hits, if conditions are right for a hurricane in your area, this is how you can prepare: stay tuned to local radio and TV for warnings, safety announcements or instructions, make sure all of your home's windows are covered with storm shutters or 5/8" marine plywood, cut to fit and ready to install. When the hurricane gets closer, they should also restock or gather things for a 72 hour kit, bookmark their city or county website for quick access to storm updates and emergency instructions, charge their cell phone so they will have a full battery in case they lose power, if they're not in an area that is recommended for evacuation, plan to stay at home or where they are and let friends and family know where they are, close storm shutters, and stay away from windows; flying glass from broken windows could injure you, turn your refrigerator or freezer to the coldest setting and open only when necessary; if you lose power, food will last longer. If there is a hurricane fast approaching, some things that the citizens need to know is they should only evacuate if told to do so. Otherwise, they need to find a storm shelter or room that can withstand high winds, and take cover.

Evacuation Routes

Figure 19

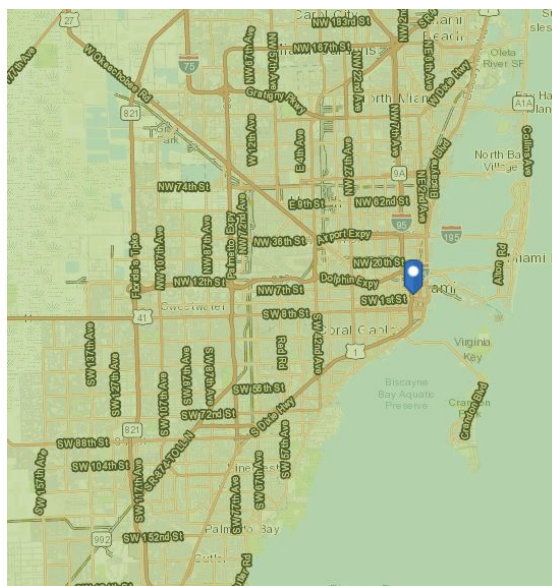


During

When the hurricane hits, you will be notified immediately on what to do. If local officials tell you to evacuate, then you should follow directions and do so immediately. Do not drive around barricades, for they are there for a specific reason of keeping you and other citizens as safe as possible. Listen to all officials, because they are the ones that are going to be directing people to specific areas and helping those who need it. If you are told by an official or see on the news that you are located in an area that does not need to be evacuated, but there are threats and high winds, then you need to go to a safe room which should have been decided earlier. Preferably, a FEMA safe room, ICC 500 storm shelter, or a small, interior, windowless room or hallway that is on the lowest floor possible but not subject to flooding. If you are trapped in a home or building that is flooding, you need to move to the highest level of the building. However, do not climb into an attic for you could become trapped by rising flood waters. Have a radio or phone on so that you can listen for current and updates emergency information and instructions. This is critical because it will help you be aware of what you need to do next. Know that you should use a generator or other gasoline-powered machinery only outdoors, and make sure it's away from any windows. Also note that you should NOT walk, swim, or drive through flood waters because roads underneath could be washed away and there will most likely be a lot of debris in the water which is unsafe and could injure you. Just six inches of fast-moving floodwater could sweep you and/or your vehicle away. Lastly, stay off of bridges that go over fast-moving water for they can be unstable and collapse.

World Transport

Figure 20

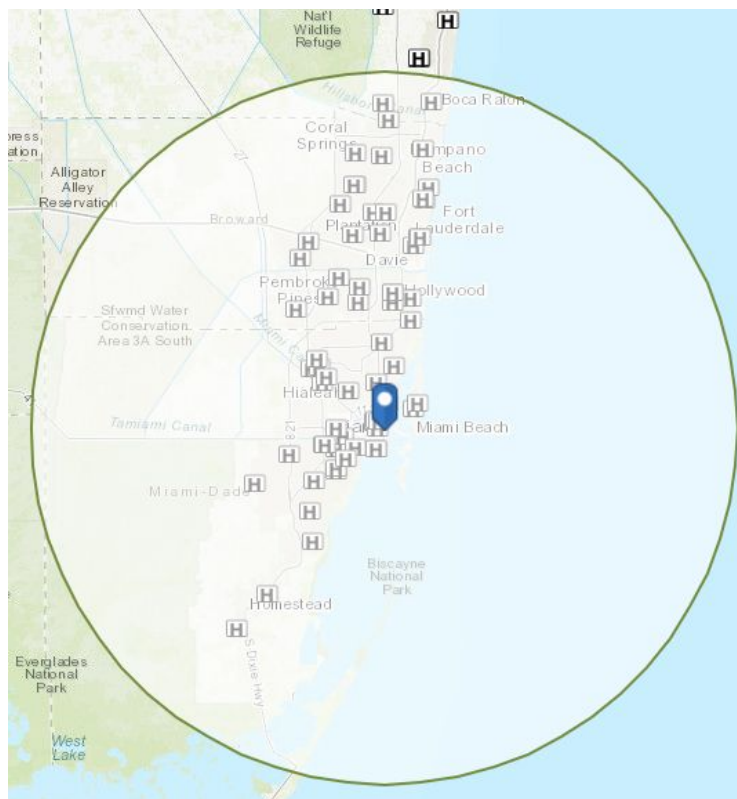


After

After the hurricane has passed, if you were in an evacuated area, you should not return home unless you are told that it is safe to do so by an official. You should also not walk through flood waters that go past mid shin or knee, for there could potentially still be debris and sharp objects that could injure you. Always be listening to authorities or a radio with a news station on to listen for information and special/further instructions. In the recovery and restoration/ clean-up process, always be careful. Wear protective clothing and work with another individual or group. You should NEVER touch electrical equipment if it is wet or if you are standing in water. Only if it is safe to do so should you turn off electricity at the main breaker or fuse box to help prevent electric shocks. Only use your phone when it is an emergency. This will help to save its battery life as well as the fact that phone systems are often down or busy after a disaster. Use text messages, which tend to be more reliable, or social media to communicate with family and friends. Make sure that you document any property damage with photographs, that way you can contact your insurance company for assistance in a more efficient way.

Hospitals

Figure 21



Radio Script

English:

Alarm Siren

Olivia:

This is not a drill

This is a warning for a category 4 hurricane in Miami, Florida

If you are in a 200 mile radius of Miami, get out of your house and collect your essential items

Kenna:

If you are outside of the evacuated area, board up your windows and get into a safe room.

Take the nearest evacuation route to you

Get out fast

Olivia: French

Ce n'est pas un exercice

C'est un avertissement pour un ouragan de catégorie quatre dans Miami, Floride

Si vous êtes dans un rayon de deux mille miles de Miami, sortez de votre maison et récupérez vos objets essentiels

Si vous êtes en dehors de la zone évacuée, montez vos fenêtres et allez dans une pièce sûre.

Prenez la voie d'évacuation la plus proche de chez vous

Sortir vite

Kenna: Spanish

Esto no es un taladro

Esta es una advertencia para un huracán de categoría cuatro en Miami, Florida

Si usted está en un radio de doscientos millas de Miami, salga de su casa y recoge sus artículos esenciales

Si estás fuera del área evacuada, cubre a las ventanas y entra en una habitación segura.

tome la ruta de evacuación más cercana

salga rápido

Pamphlet
English



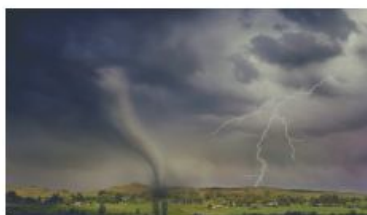
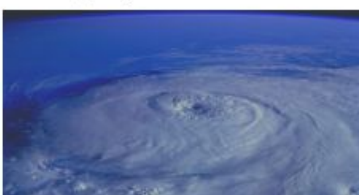
MIAMI FLORIDIA

Disaster Preperation

HURRICANE PREPARATION

72 HOUR KIT

- Food (canned/dyed foods)
- Can opener
- Water (1 gallon per day)
- First aid kit
- Blankets
- Prescription medications
- Toilet Paper
- Radio, flashlight (battery's)
- Cash (\$500+)
- A map of the area that you are in
- Pet food/water (if needed)
- Important documents (in a bag)
- Matches in waterproof container
- Clothes for each person
- Multi-purpose tools
- Emergency contact information



72 HOUR KIT

- Water and canned or dried food
- Water (1 gallon per day)
- Battery powered radio
- Flashlight
- Extra batteries for the radio and flashlight
- Prescription medications
- First-aid kit
- Birth certificates
- Ownership certificates (autos, boats, etc.)
- Social security cards
- Insurance policies
- Will
- Extra pet food and water if necessary



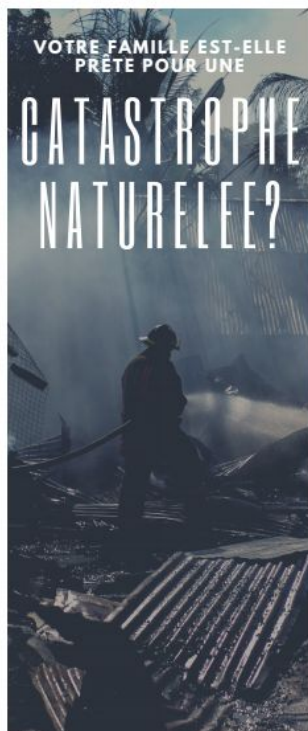
SINKHOLE PREPARATION

SIGNS/24 HOUR KIT

- Trees or fence posts that tilt or fall.
- Foundations that slant.
- Cracks in the ground.
- Sudden drainage of a pond.
- Dips, depressions, slopes that appear in a yard
- Get a kit with emergency supplies to grab on your way out
- A credit card and/or cash
- Spare car keys and/or keys to another residence
- A journal of computer passwords in case all of yours are memorized on your computer
- List of household inventory
- Copies of important documents



French



MIAMI, FLORIDE

Préparation aux Catastrophes

PRÉPARATION DES OURAGANS

KIT DE 72 HEURES

- Nourriture (en conserve/déshydraté)
- Ouvre-boîtes
- L'eau (un gallon par jour)
- Trousse d'urgence
- Couverture
- Médicament délivré sur ordonnance
- Papier toilette
- Radio, lamp de poche (piles)
- Argent (\$500+)
- Une carte des environs
- L'eau & nourriture pour animale de compagnie
- Documents importants (dans un sac)
- Allumette dans conteneur étanche
- Vêtements pour chaque personne
- Outils multi-usage
- Coordonnées d'urgence



KIT DE 72 HEURES

- Nourriture(en conserve/déshydraté)
- L'eau (un gallon par jour)
- Radio alimentée par batterie
- Lamp de poche
- Piles supplémentaires pour le radio et le lamp de poche
- Médicament délivré sur ordonnance
- Trousse d'urgence
- Acte de naissance
- Certificats de propriété (voitures, bateaux, etc.)
- Cartes de sécurité sociale
- Police d'assurance
- Testament
- L'eau & nourriture pour animale de compagnie

PRÉPARATION DE TORNADE

PRÉPARATION DE DOLINE

SIGNES/KIT DE 24 HEURES

- Arbres ou poteaux de clôture inclinés
- Fondations inclinées
- Des fissures dans le sol
- Des étangs qui se drainent rapidement
- Creux et pistes dans une cour
- Faire une trousse avec des fournitures d'urgence
- Des argent
- Clés de voiture et de autre maison
- Un journal des mots de passe de l'ordinateur au cas où tous les vôtres seraient mémorisés sur votre ordinateur
- Liste de l'inventaire du ménage
- Copies de documents importants



Spanish



MIAMI FLORDIA

Desatre Preperacion

PREPARDO POR UN HURACÁN

72 HORA EQUIPO

- Comida
- Suministros
- Agua
- Botiquin de primeros auxilios
- Manta
- Medicina
- Papel del baño
- Luz suministros
- Cargador
- Mapas
- Agua y comida del mascota
- Papeles importantes
- Ropa
- Numeros de emergencia



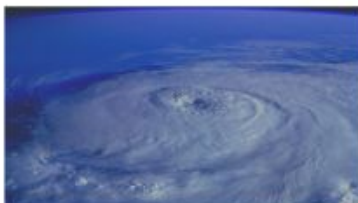
72 HORA EQUIPO

- Comida
- Suministros
- Agua
- Botiquín de primeros auxilios
- Manta
- Cobijas
- Medicina
- Papel del baño
- Luz suministros
- Cargador
- Mapa
- Agua y comida mascota
- Papeles importantes
- Ropa
- Numeros de emergencia

PREPARANDO POR UNA DOLINA

LETRERO/24 HORA EQUIPO

- El árbol y césped esta arriado
- Rajar en la terra
- No agua en el lago
- Abajo en el jardin delantero
- Dinero
- Llave del coche
- Articulos de casa
- Papeles importantes
- Ayuda a los enfermos
- Ayuda a los heridos
- La linterna
- Papeles de identificacion
- Escucha alertas
- Quedase calmado



PERPARDO POR UN TORNADO



Restoration Plan

Disaster: Hurricane

Short Term: (1-2 months)

Long Term: (1.5 years)

Financial Plan: \$32 billion in damages to property, buildings, cars, houses, etc...

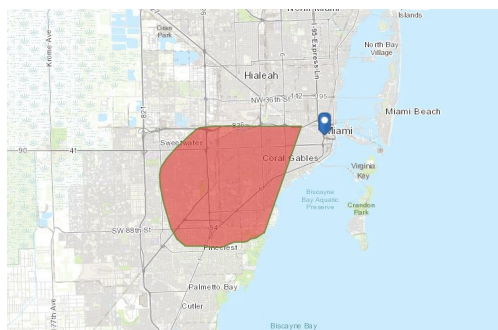
A huge hurricane comes through Miami, resulting in \$32 billion in damages. What are the next steps? Who will take care of what? What needs to be done? How long will it take? How can things go back to normal? These are all questions that will be asked from concerned citizens, worried parents, and scared children. These are all things that can be answered in a restoration and recovery plan once the storm is over.

Two major organizations will be helping with the restoration and recovery process; FEMA and Red Cross. Red Cross is there as humanitarian aid, ensuring that citizens are safe and evacuated, that there is food and water, managing shelters and giving a place where people can have a roof over their heads, restoring family links and reuniting friends and family. FEMA is there to provide grants to homeowners who are qualified for it, the grants are there to help repair and restore damages done by the storm, and they must apply for it. FEMA is also there to help first responders bring aid to citizens in the affected area from the disaster. Short term recovery will last one to two months; this includes citizens being supplied with food and water from Red Cross, volunteers, and donations. Another thing that plays a role is waiting for flood waters to go down and roads to be cleared of trash and debris so that those roads can be opened back up and people can return to their homes. Some people will be able to return home before others and it's all dependant on how much damage was caused to their home, and if it safe to return there. Schools and businesses will be shut down and opened back up at different rates depending on severity of the damages. These two organizations as well as local officials and first responders, animal control, and the office of emergency management will be helping affected cities the entire time through the recovery process of a disaster.

After a hurricane, in the short term recovery process, multiple shelters and triage centers will be set up. People who lost homes, or are injured can make their way to these areas, or will be escorted by first responder and rescue mission teams. Those who were in an area that did not have to evacuate can stay in their homes if told that it is still safe to do so by officials. Generally after a hurricane or any natural disaster, there will be an outpour of generosity. People from all over will be donating money and sending materials needed such as food and water. Volunteers, clean up crews, as well as people affected by the disaster will be helping to clean up the mess, send out rescue missions, and provide shelter for those who lost their

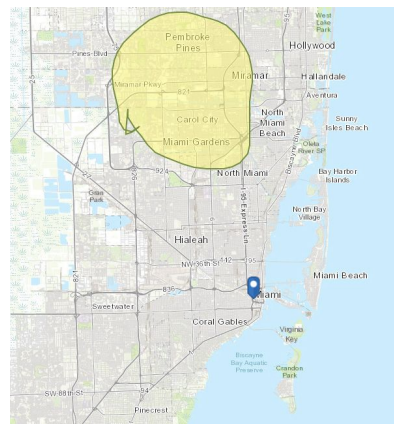
homes. Those who lost cars and/or homes or were injured and do not have insurance, can receive some support from FEMA. Go Fund Me pages can also be set up for people affected to raise money to help them and their families get back on their feet. Direct relief operations to address crucial emergency needs for medicine, medical supplies, and basic medical equipment will also be done.

When it comes to long term restoration and recovery, there is temporary housing available that people can stay in who struggle financially getting back on their feet. The U.S. Department of Housing and Urban Development can provide assistance through different programs and there are philanthropic sources — nonprofits, churches, businesses, individuals — that will help to provide relief to the citizens. Other than that, the process and labor of cleaning up and rebuilding will be ongoing for as long as it takes. Families and people will be moved around until their houses are clear of mold, flood waters, and minimal damage, or until they are in a new home. Schools, businesses, churches, hospitals, etc... based on damages will be shut down until they are rebuilt or safe to open again. Diseases for living in tight quarters will also be monitored because of the bacteria being spread around. If a certain disease does arise, that will be addressed. Financially, the long term plan is to make sure the city will be able to restore economic growth after a natural disaster. Also, the government needs to work on how to better prepare for and handle the next disaster. Building regulations needs to try to ensure that a larger proportion of the built environment is robust so that damage is less likely to be catastrophic. The more thought needs to be paid to civil defence programmes. Then in the aftermath of any major storm there is a need to better coordinate short, medium and long-term messaging priorities. Finally, there is a need to address the damaging impression of the region created by the consular and other failings of some countries and their tour operators, by agreeing jointly, time-lined evacuation protocols.

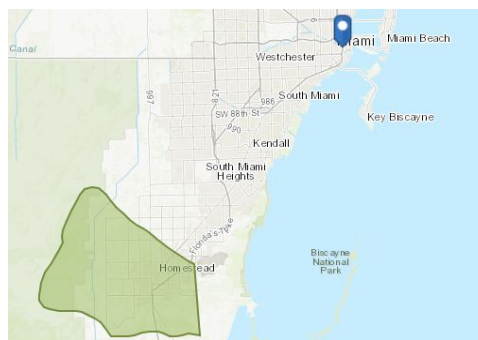


Affected Area
Figure 22

Safe Area #1
Figure 23



Safe Area #2
Figure 24



Appendices

Figure 1

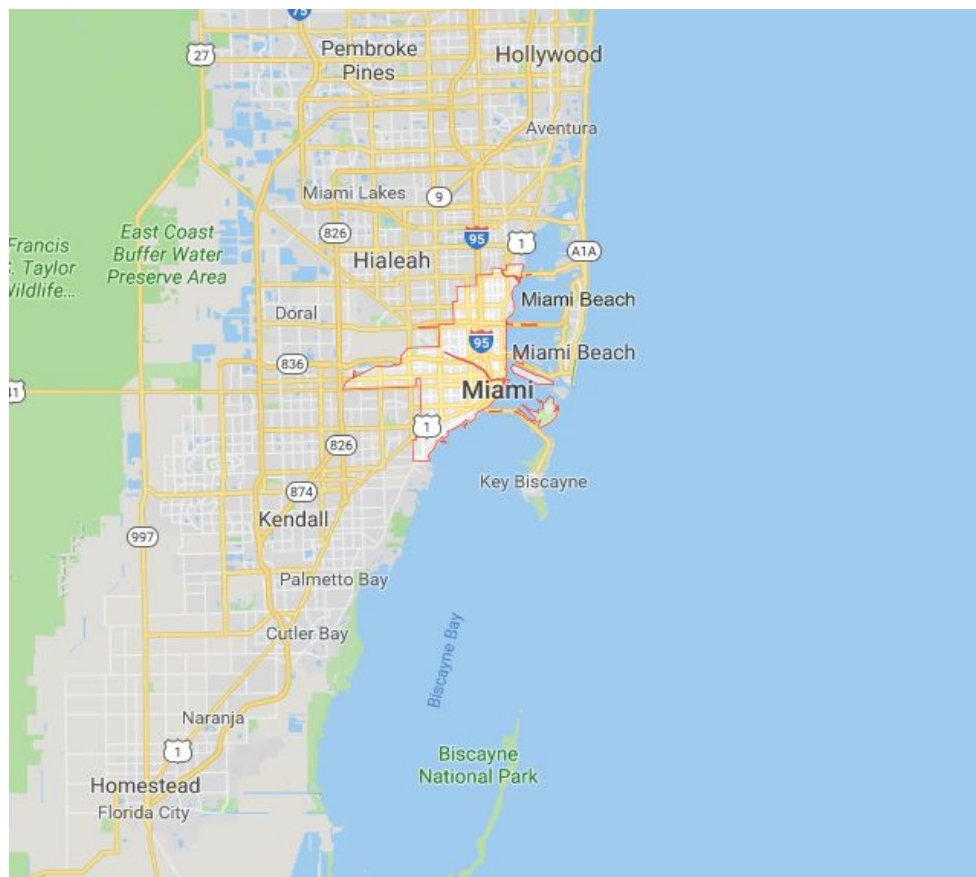


Figure 2

Climate data for Miami Beach, 1981–2010 normals													
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	87 (31)	89 (32)	92 (33)	94 (34)	98 (37)	97 (36)	98 (37)	98 (37)	96 (36)	95 (35)	92 (33)	86 (30)	98 (37)
Average high °F (°C)	73.8 (23.2)	74.9 (23.8)	76.3 (24.6)	79.4 (26.3)	82.8 (28.2)	86.5 (30.3)	88.1 (31.2)	88.5 (31.4)	87.0 (30.6)	83.7 (28.7)	79.3 (26.3)	75.7 (24.3)	81.3 (27.4)
Daily mean °F (°C)	67.6 (19.8)	68.9 (20.5)	70.8 (21.6)	74.3 (23.5)	78.4 (25.8)	81.7 (27.6)	83.2 (28.4)	83.6 (28.7)	82.4 (28.0)	79.2 (26.2)	74.4 (23.6)	70.0 (21.1)	76.2 (24.6)
Average low °F (°C)	61.4 (16.3)	63.0 (17.2)	65.3 (18.5)	69.2 (20.7)	73.9 (23.3)	77.0 (25.0)	78.3 (25.7)	78.6 (25.9)	77.7 (25.4)	74.7 (23.7)	69.5 (20.8)	64.3 (17.9)	71.1 (21.7)
Record low °F (°C)	32 (0)	37 (3)	32 (0)	46 (8)	58 (14)	65 (18)	66 (19)	67 (19)	67 (19)	54 (12)	39 (4)	32 (0)	32 (0)
Average rainfall inches (mm)	2.09 (53)	2.33 (59)	3.00 (76)	3.20 (81)	4.98 (126)	8.27 (210)	4.35 (110)	6.37 (162)	7.88 (200)	4.47 (114)	2.74 (70)	2.05 (52)	51.73 (1,313)
Average rainy days (≥ 0.01 in)	6.7	6.0	6.9	6.0	8.9	14.5	12.1	14.0	14.9	11.2	8.1	6.9	116.2

Figure 3

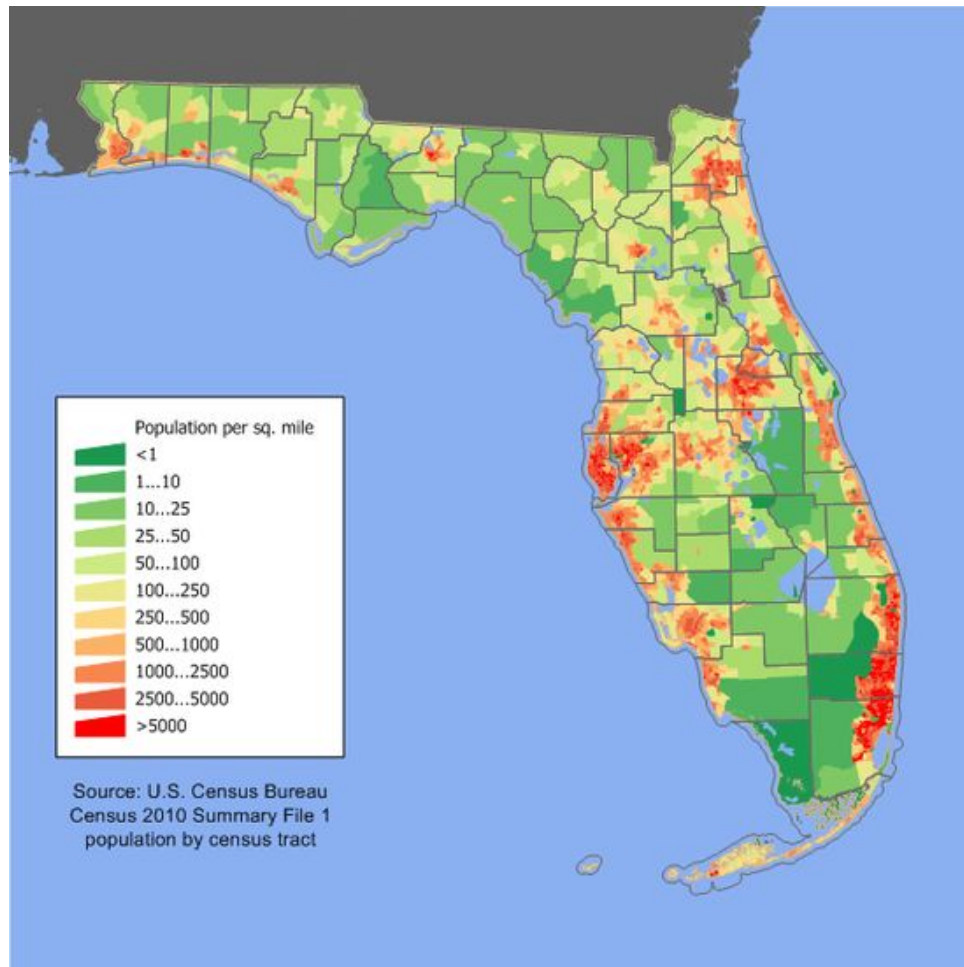


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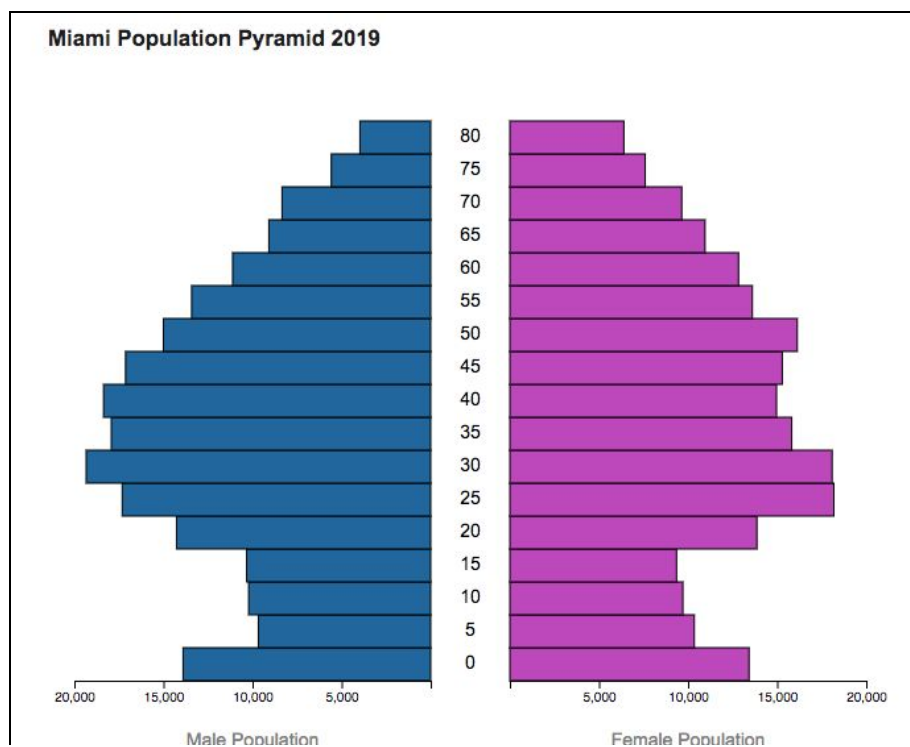


Figure 5



Figure 6

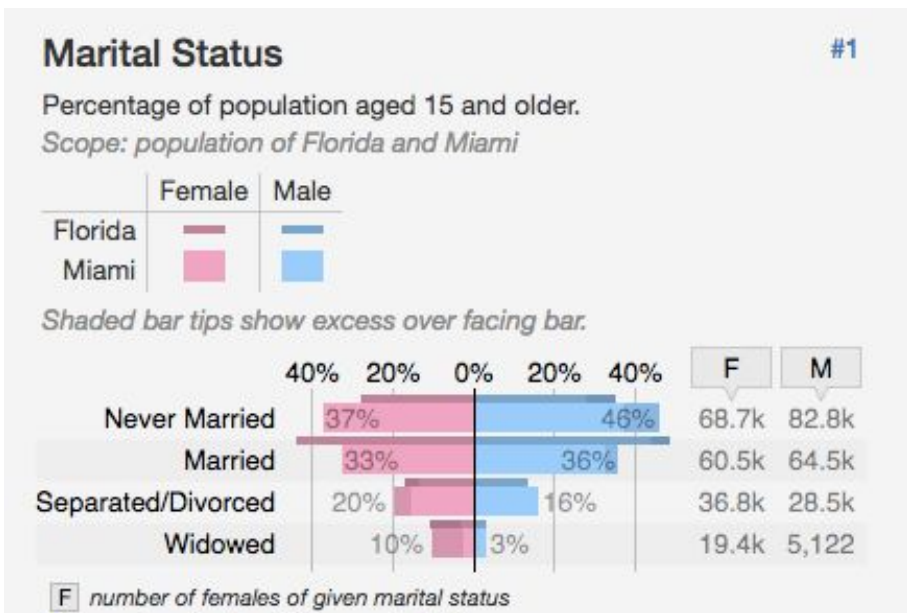


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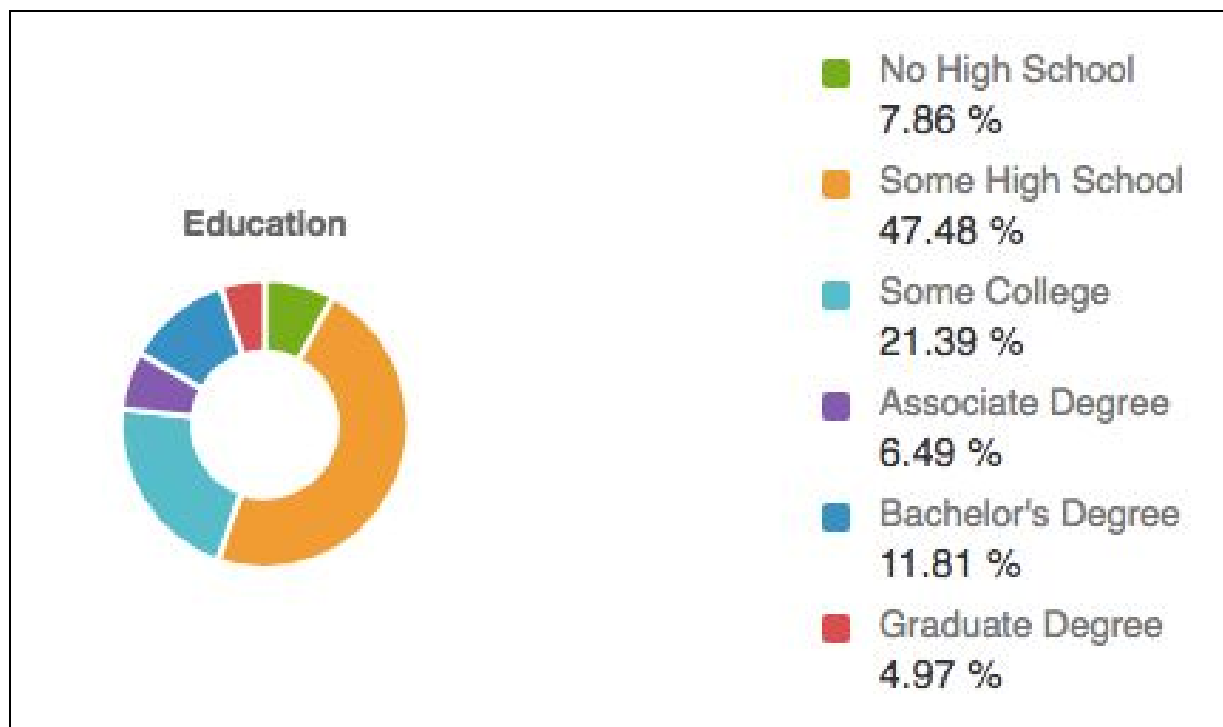


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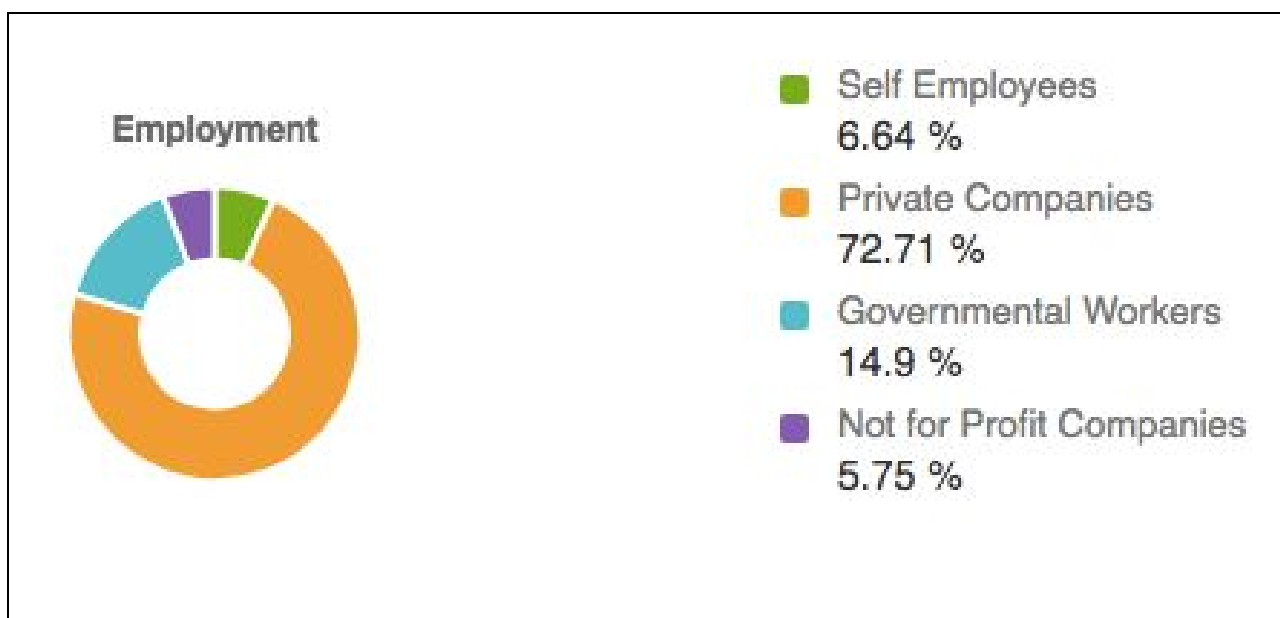


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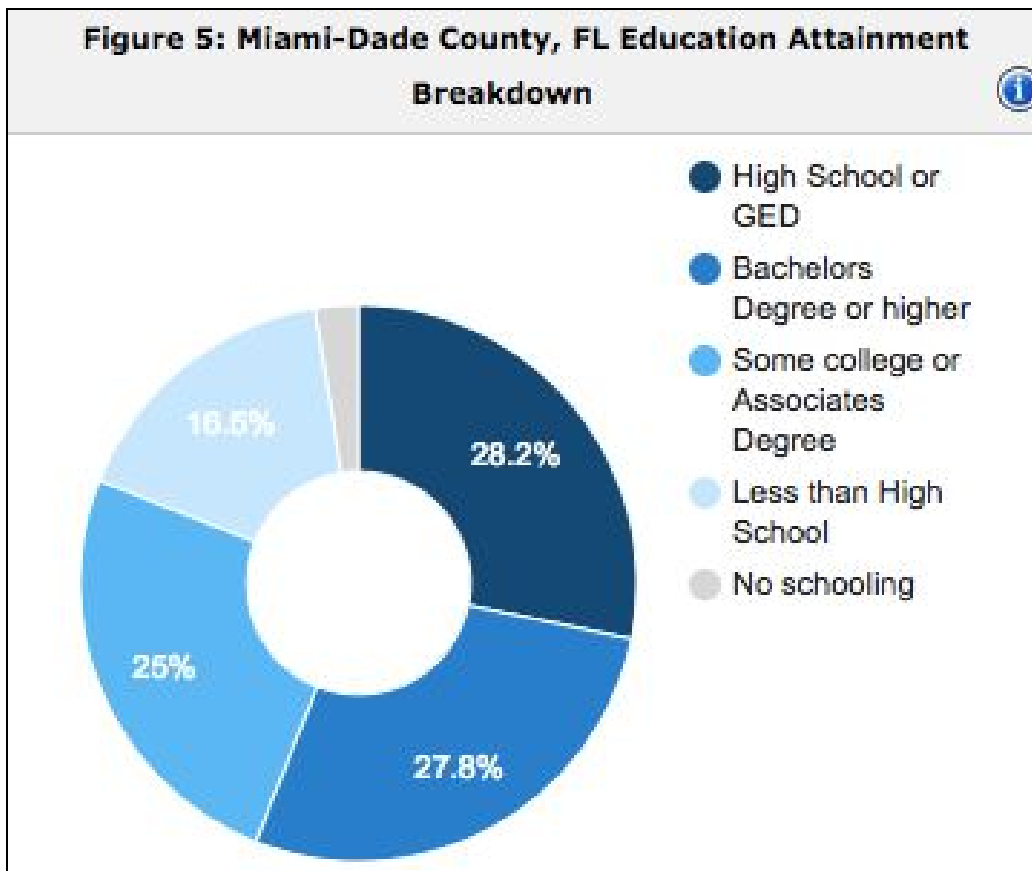


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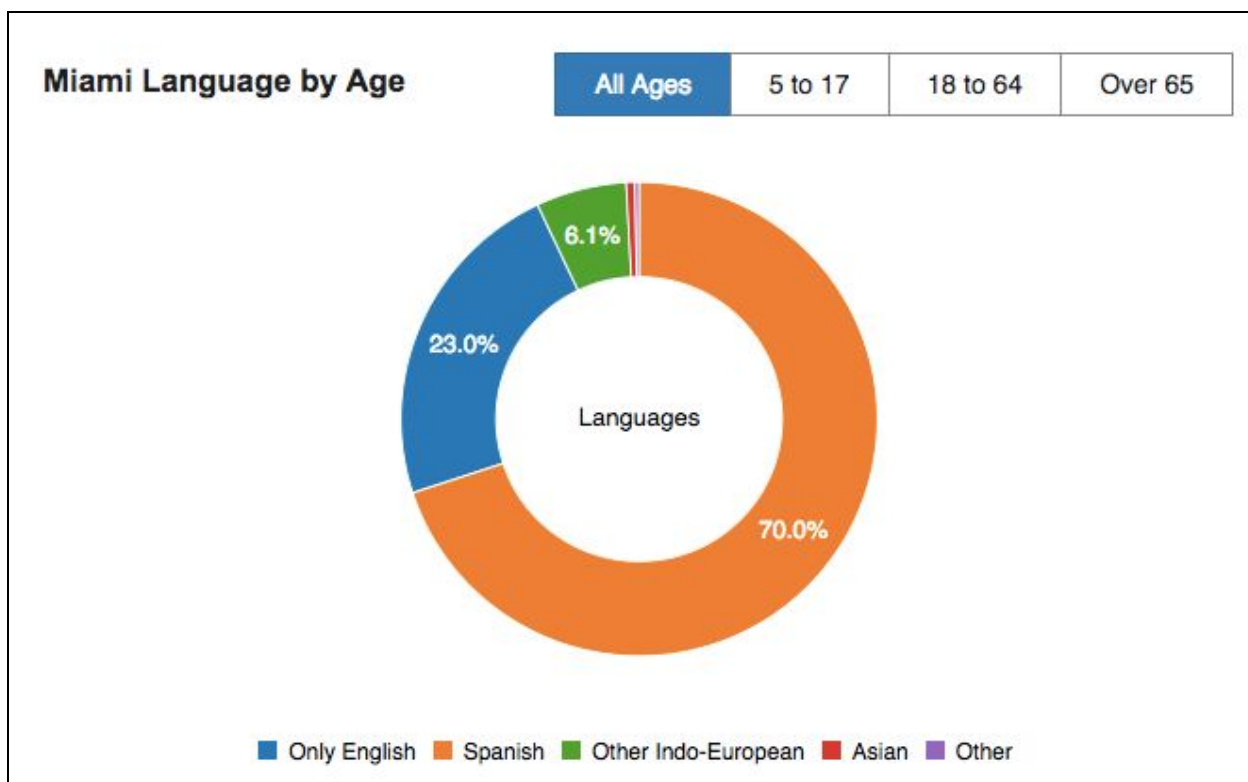


Figure 11

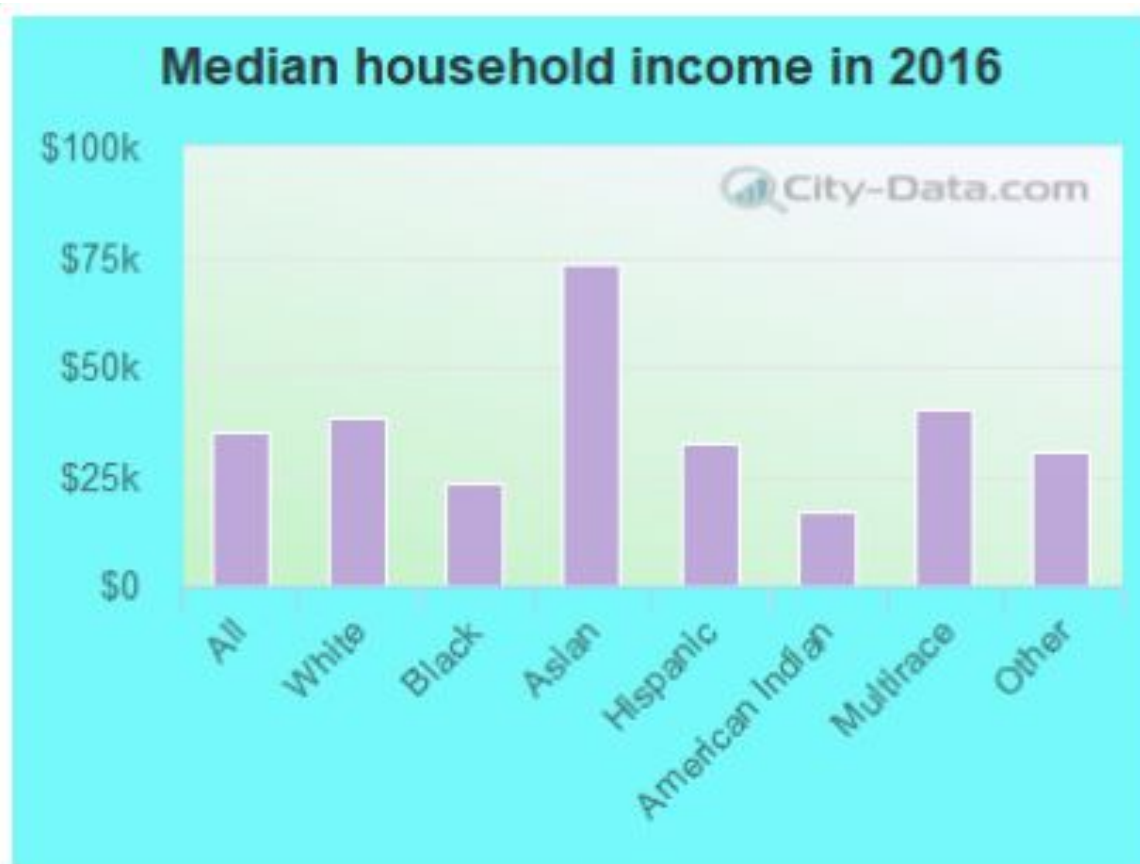
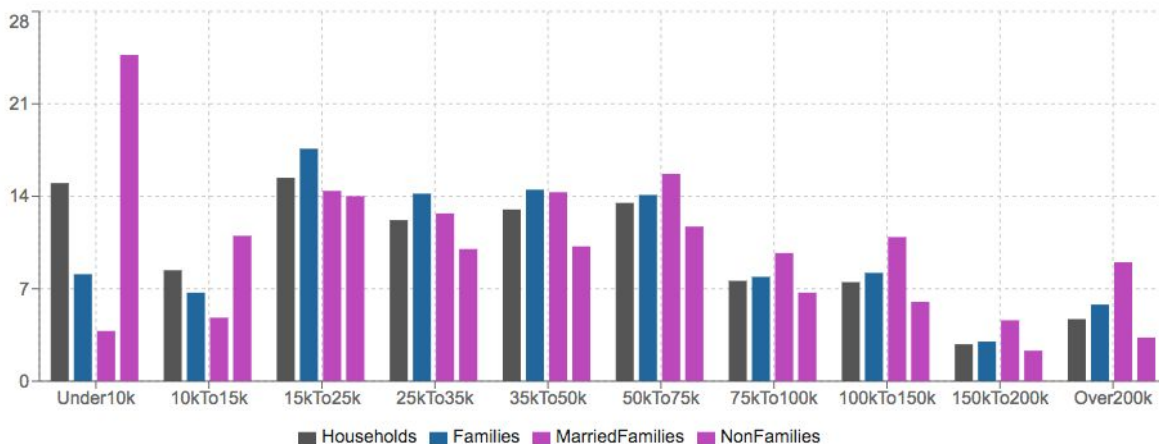


Figure 12

Miami Income by Household Type



Name	Median	Mean	≡
Households	\$33,999	\$60,341	
Families	\$38,048	\$66,956	
Married Families	\$49,955	\$85,873	
Non Families	\$25,233	\$49,708	

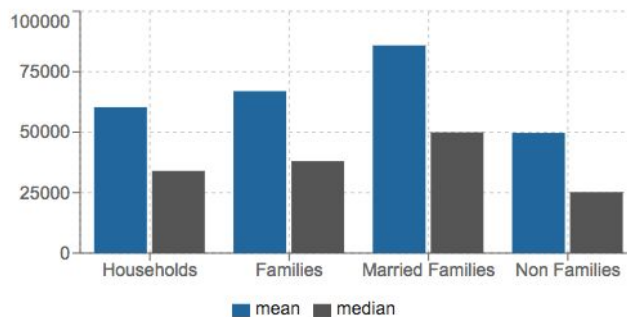


Figure 13

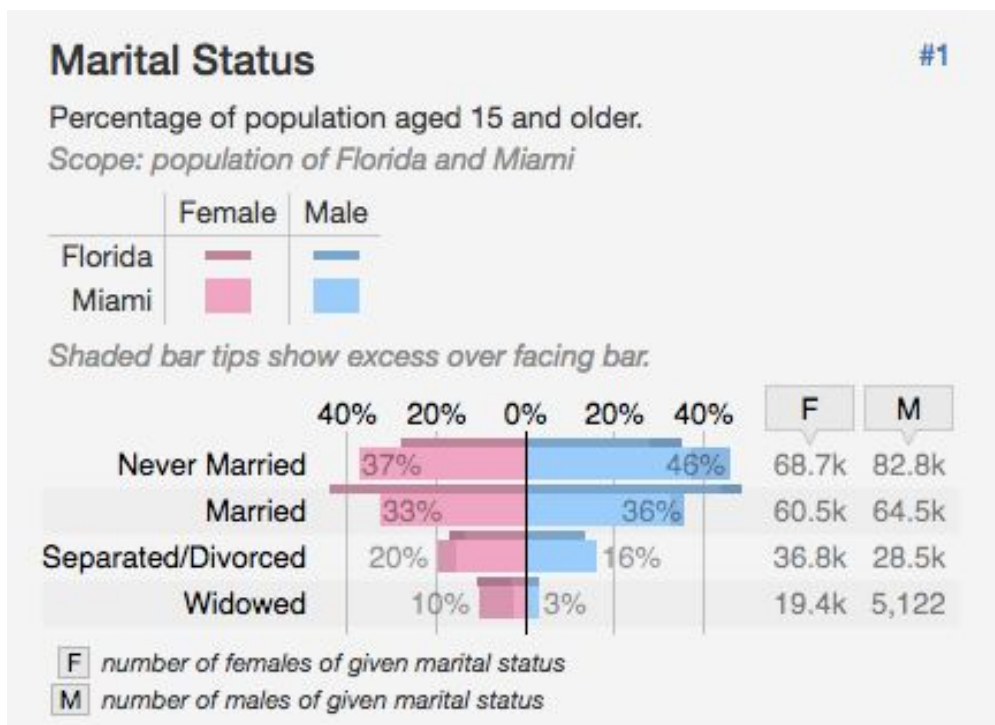


Figure 14

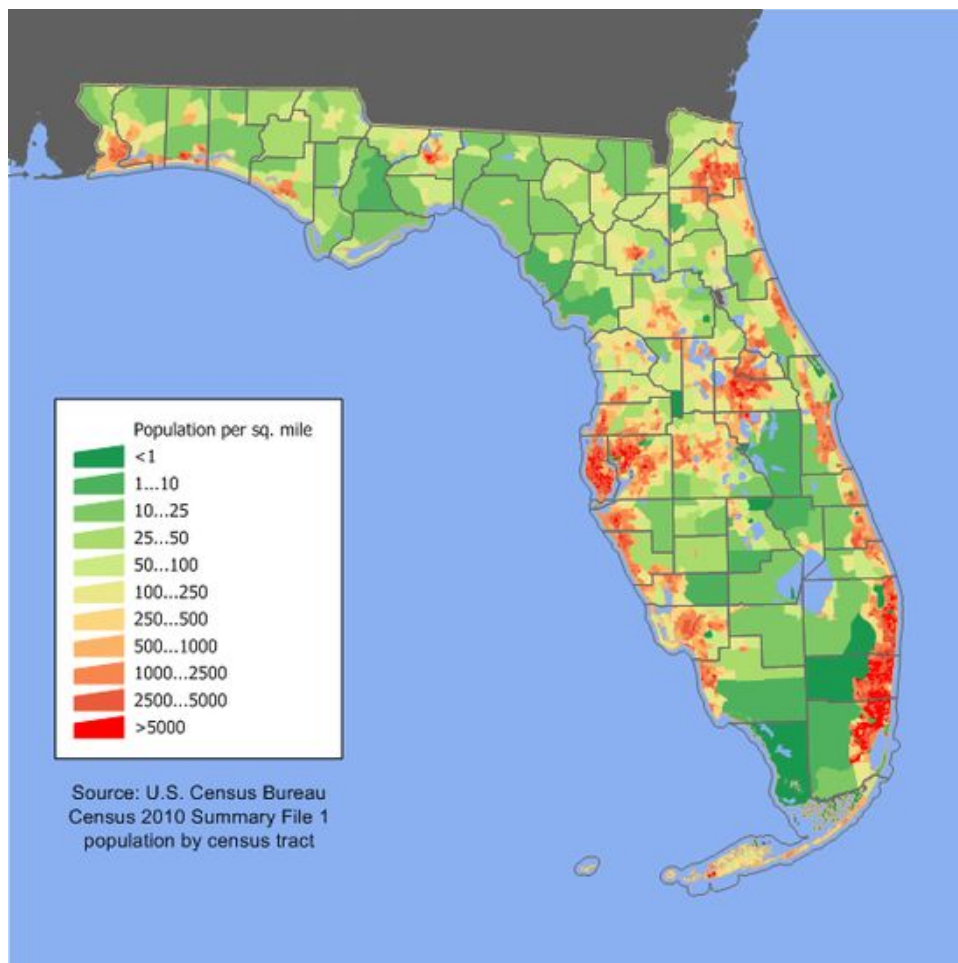


Figure 15

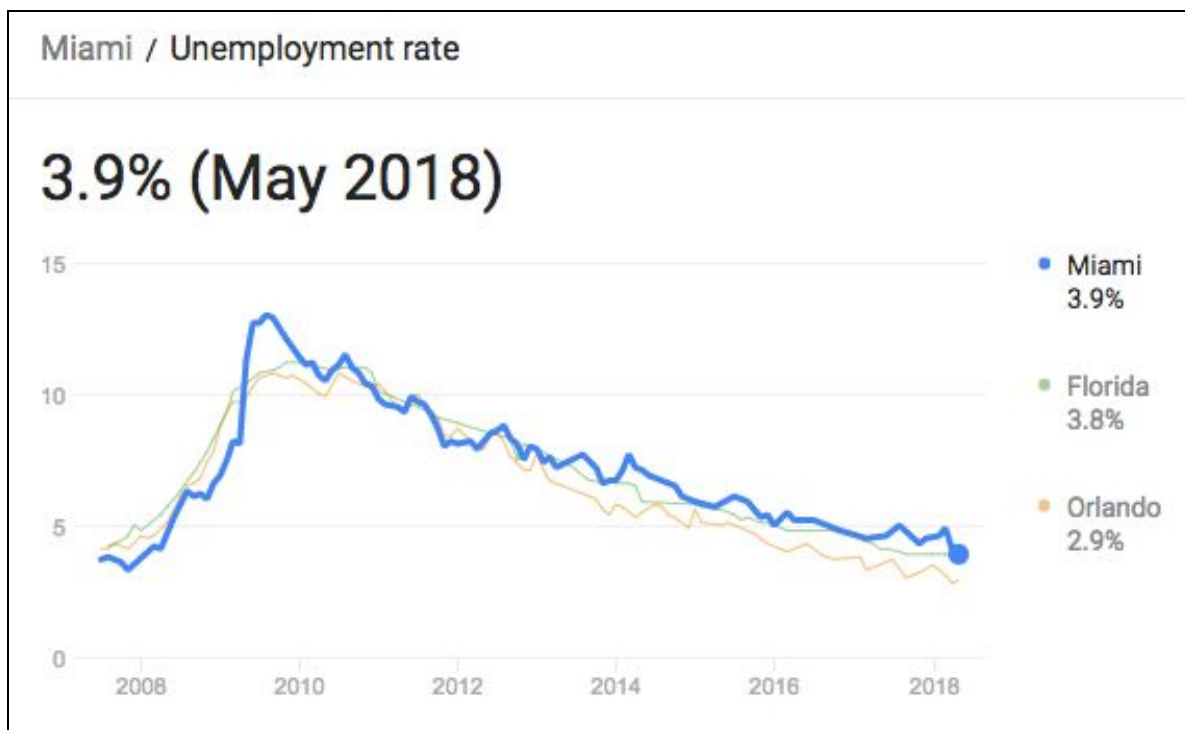


Figure 16



Figure 17

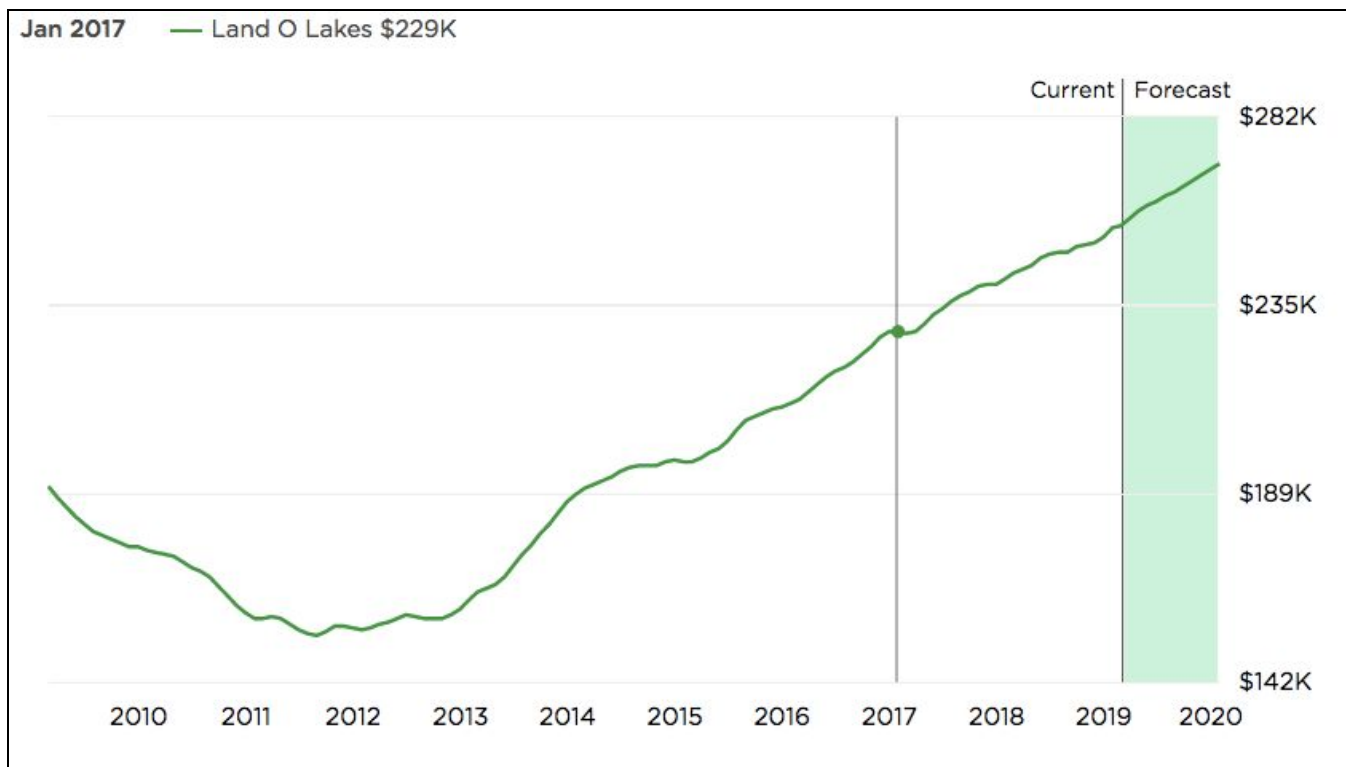


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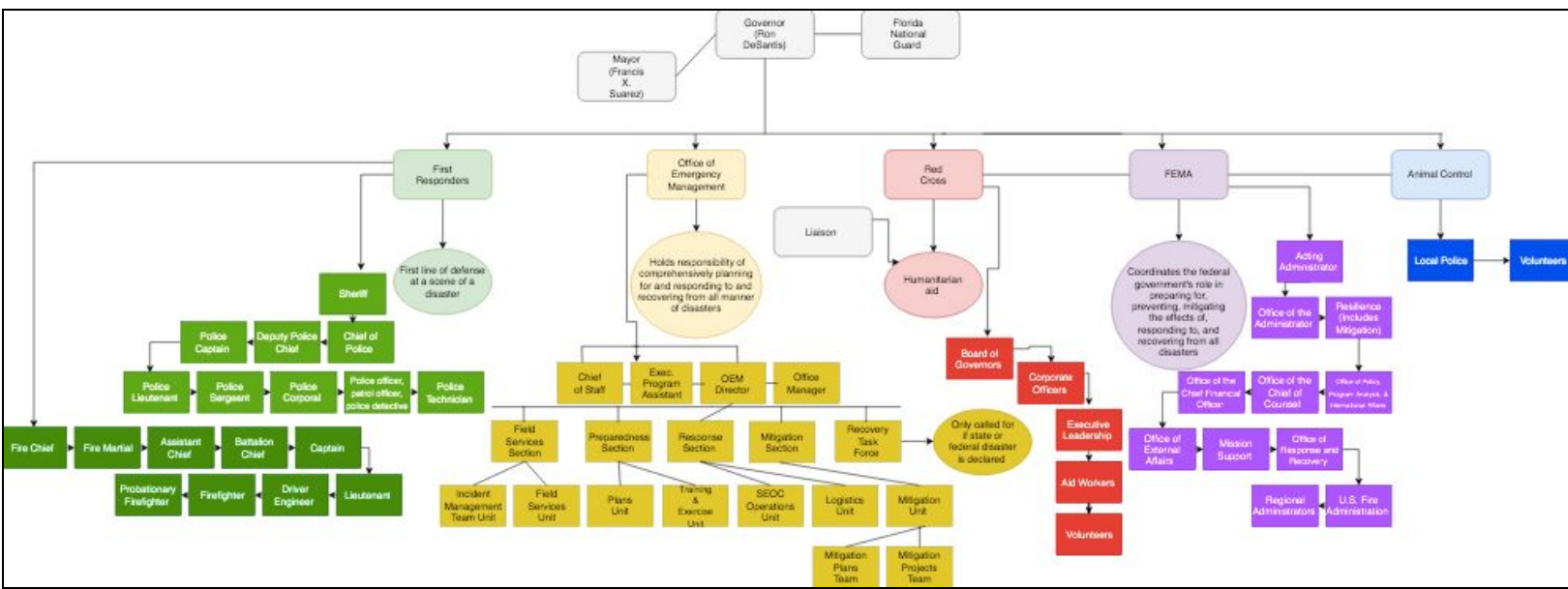


Figure 19

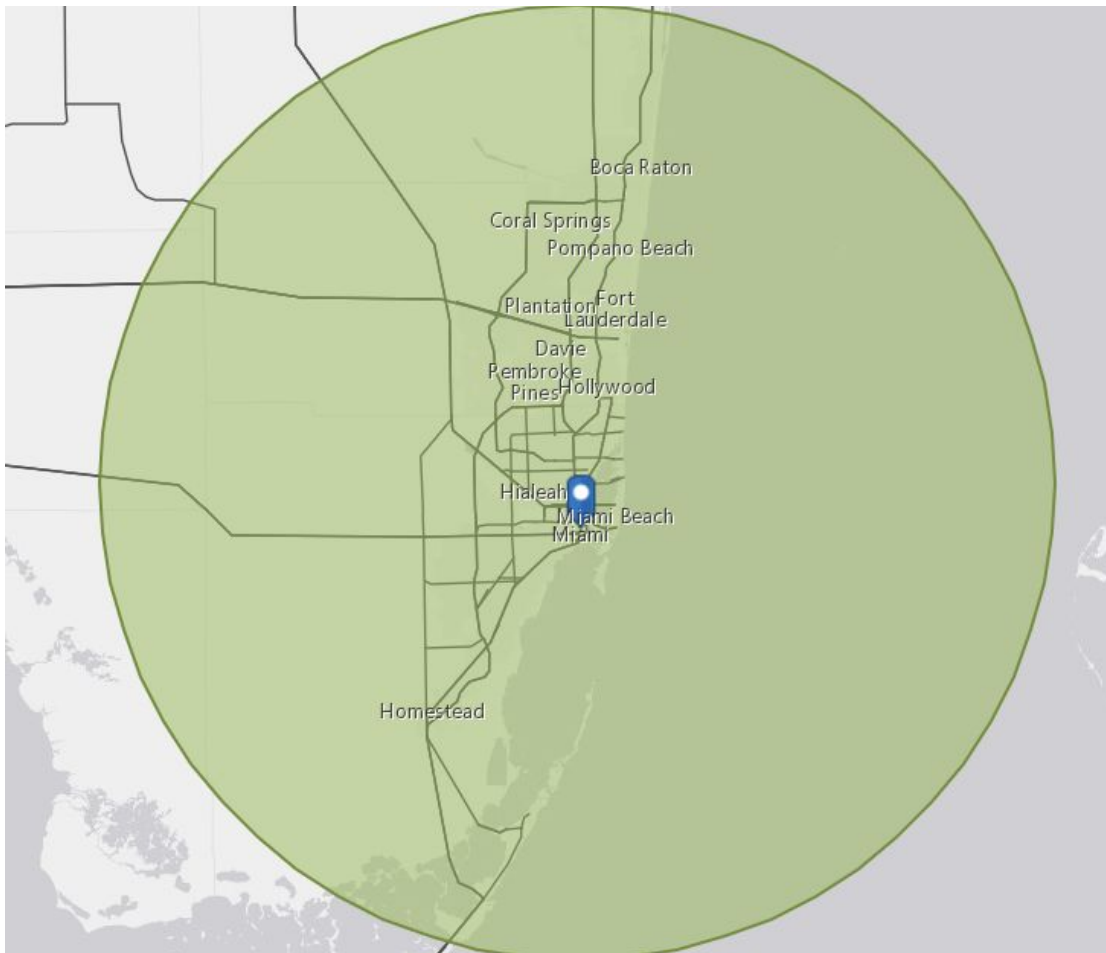


Figure 20

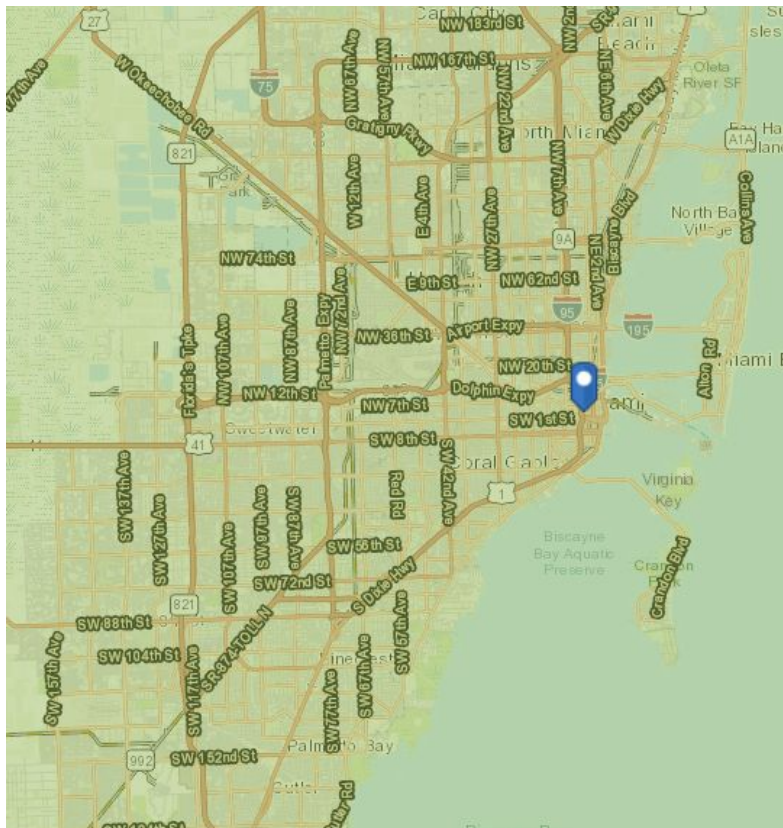


Figure 21

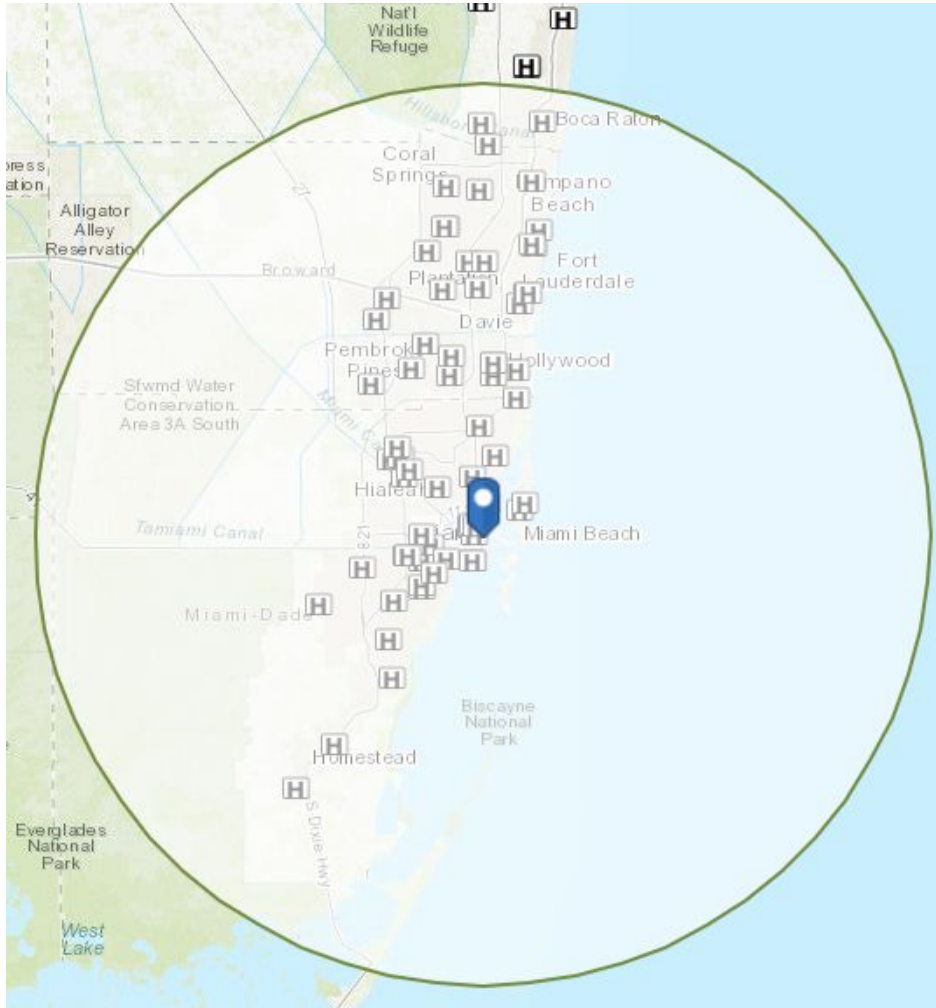


Figure 22

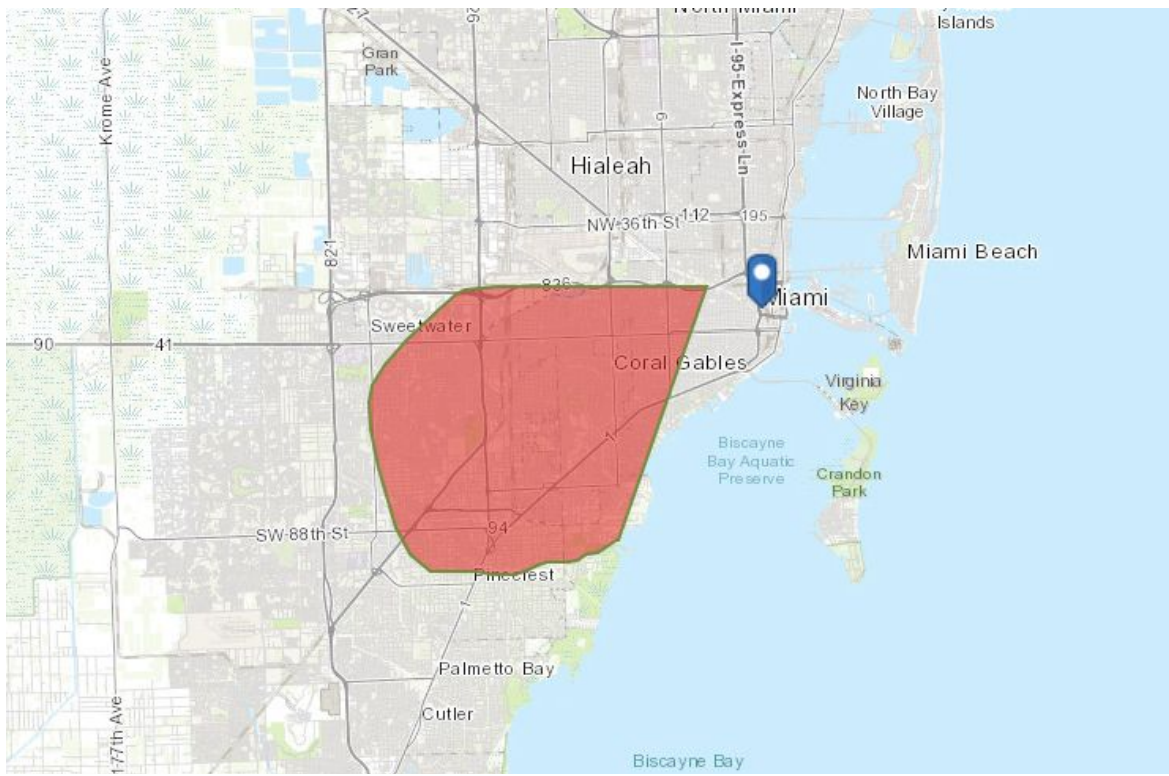


Figure 23

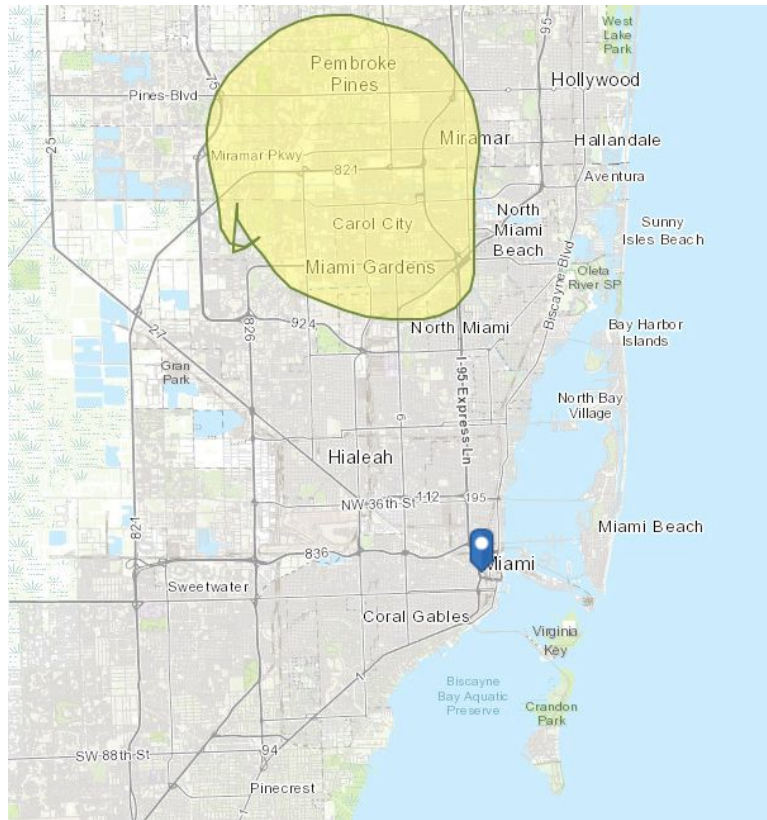


Figure 24

