City of Hallandale Beach Vulnerability and Adaptation Plan

TASK 5: PROJECTED CHANGES IN SHORELINE

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Prepared by RS&H, Inc. at the direction
of the City of Hallandale Beach

RS&H

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1. SHORELINE CHANGE OVERVIEW

Climate change will threaten coastal areas in a variety of ways. Beyond threats of increased frequency or intensity of storm events, coastal areas can expect to be impacted by rising sea levels, increases in precipitation, and warmer ocean temperatures. Rising sea level poses a particular threat to the resiliency of Florida beaches and has the potential to contribute to shoreline recession throughout the state.

Shoreline recession (also referred to as coastal erosion) is the process by which local sea level rise, strong wave action, and coastal flooding wear down rocks, soils and/or sands along the coast. Typically, this is experienced during storms and other natural events. The adverse effects of climate change can exacerbate this process via sea level rise[i]. This is of concern to the City of Hallandale Beach, where the City's beaches provide recreation opportunities for residents and are an important draw for tourism.

Since 1986, the Florida Department of Environmental Protection (FDEP)has been identifying and monitoring beaches that are critically eroding and in danger of critically eroding. As of 2019, the State identified approximately 420 miles of critically eroded beach, including beaches located in Broward County.[ii] Table 1illustrates the status of Broward County's beaches. Beach segments are delineated by the use of numerical Reference Monument landmarks, denoted by the letter "R". Hallandale Beach's shoreline is among those listed in critical erosion condition, located from R124-128 of the R86-R128 segment.

TABLE 1: LOCATIONS OF CRITICALLY AND NON-CRITICALLY ERODED BEACHES ADAPTED FROM FDEP CRITICALLY ERODED BEACHES

Eroding Shoreline	Erosion Condition	Critically Eroded Beach *(miles)*	Non-Critically Eroded Beach *(miles)*
R6-R23	Critical	3.2	0
R25-R77	Critical	10.0	0
R86-R128*	Critical	8.1	0

Source: Adapted from FDEP Table 1, Locations of critically eroded beach and inlet shoreline, and non-critically eroded beach and inlet shoreline, in Florida east coast counties, as of June 2019.

The effects of shoreline recession result in both environmental and economic losses. In the United States, coastal erosion is responsible for approximately $500 million per year in damages to structures and loss of land. Mitigation efforts by the federal government, such as beach nourishment and erosion control measures cost an average of $150 million every year. Additionally, the United States is experiencing an average loss of 80,000 acres of coastal wetlands annually.[ii] Despite the cost, these expenditures are deemed necessary to protect the high economic, social and environmental value of shorelines to communities like Hallandale Beach.

2. BASELINE CONDITIONS

To understand how climate change may affect sea level rise and lead to shoreline recession, it is useful to establish a baseline by looking at historic averages and variability. Other aspects of a baseline include recent storm events in the City that caused erosion, and how Hallandale Beach has tracked and reacted to these events.

2.1 EXISTING CONDITIONS AND OBSERVED CHANGES – SEA LEVEL

Changes in local sea level result from a combination of global, regional, and local change. At a global scale, global sea level has risen about 7 to 8 inches since 1900, with approximately 3 inches occurring since 1993. These changes are mainly due to melting of glaciers and ice sheets and thermal expansion of water as it warms.[iii]

In low-lying areas of the Southeast, National Oceanic and Atmospheric Administration (NOAA) tide gauges have shown as much as 1 to 3 feet of local relative sea level rise over the past 100 years. As a result of rising sea levels, many areas in the Southeast now experience high tide coastal flooding. Annual occurrences of high tide coastal flooding have increased 5- to 10 fold since the 1960s[iv]. Many cities in the Southeast are projected to experience more than 30 days of high tide flooding by 2050.

The closest NOAA tide gauge to Hallandale Beach which tracks sea level trend is located at Virginia Key, Miami. From 1920 to 2020, the gauge shows a relative sea level trend of 2.92 millimeters (mm) per year with a 95% confidence interval of +/- 0.22 mm per year, which is equivalent to a change of 0.96 feet in 100 years (Figure 1).

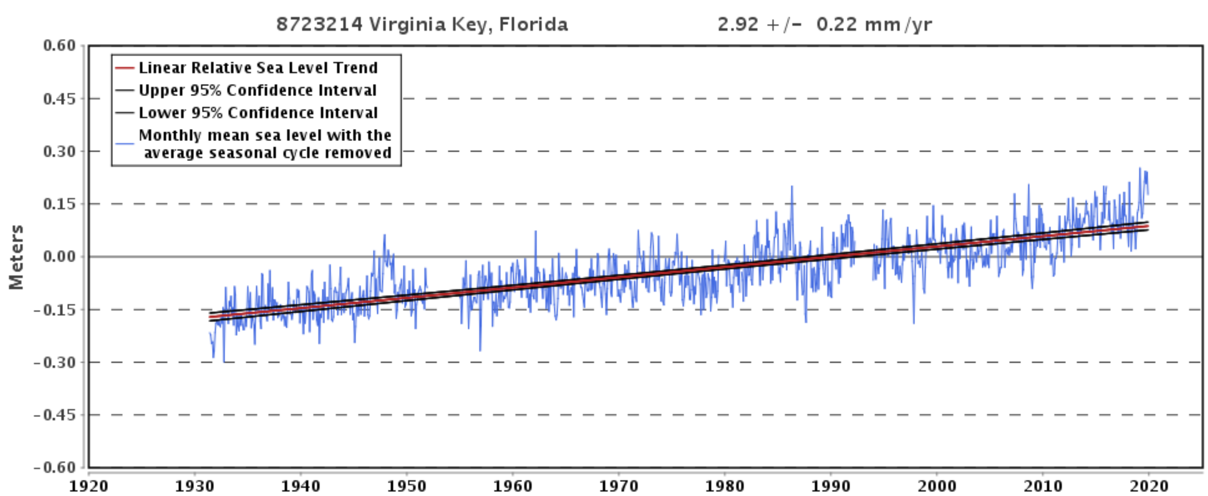

FIGURE 1: SEA LEVEL TREND AS MEASURED AT VIRGINIA KEY, MIAMI

2.2 EXISTING CONDITIONS AND OBSERVED CHANGES – SHORELINE RECESSION

Broward County, Florida completed a Beach Management Study in September 2015 for Segment III of their beaches. This document is the most detailed source of information for existing and historical shoreline conditions of Hallandale Beach. Segment III is the southernmost portion of the Broward County Atlantic Ocean coastline between the Port Everglades south jetty and the Miami-Dade County line (Reference Monument R85-R128). Due to the direct and indirect influence of the Port Everglades Inlet and its associated jetties, as well as the Federal navigation channel, the Segment III shoreline has the highest sand loss rates in Broward County. Figure 2 provides an overview of the Segment III management areas. Note that Hallandale Beach is located between R124 and R128 and is comprised of approximately 4,350 feet of the Segment III beaches.

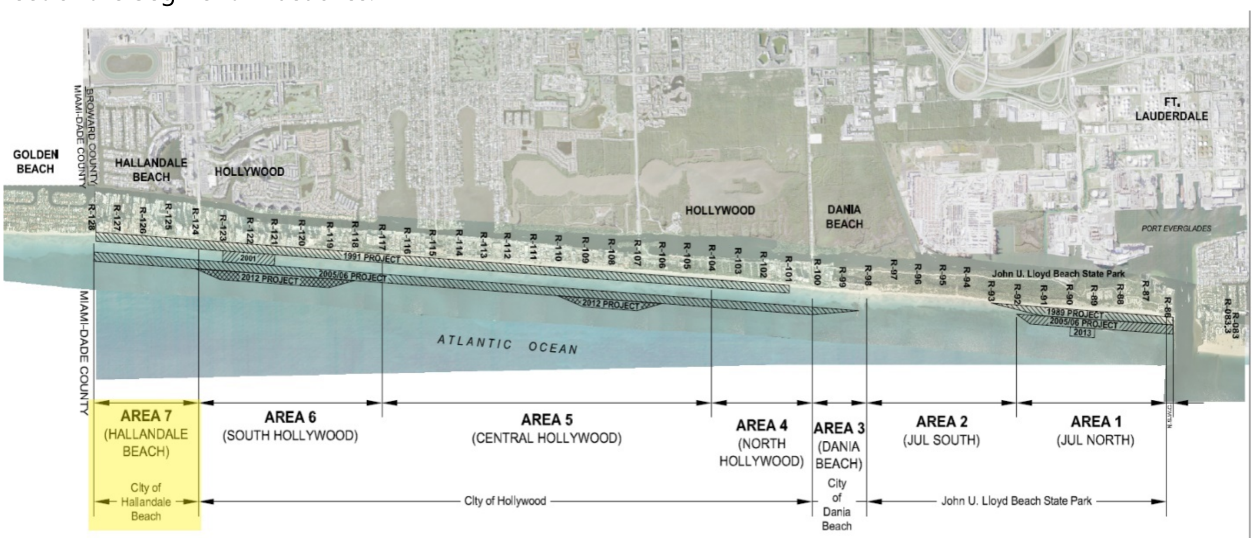

FIGURE 2: HALLANDALE BEACH SEGMENT BETWEEN R124 AND R128

2.2.1 Beach Width

To measure the extent of shoreline recession, beach widths and shoreline volume change area are analyzed. Beach width is defined as the distance between the seaward limit of development and the Mean High Water Line (MHWL).

There are two definitions of minimum beach width relevant to Hallandale Beach. The first is the Federal beach width or Erosion Control Line (ECL). It was determined using Federal shore protection project planning guidelines.

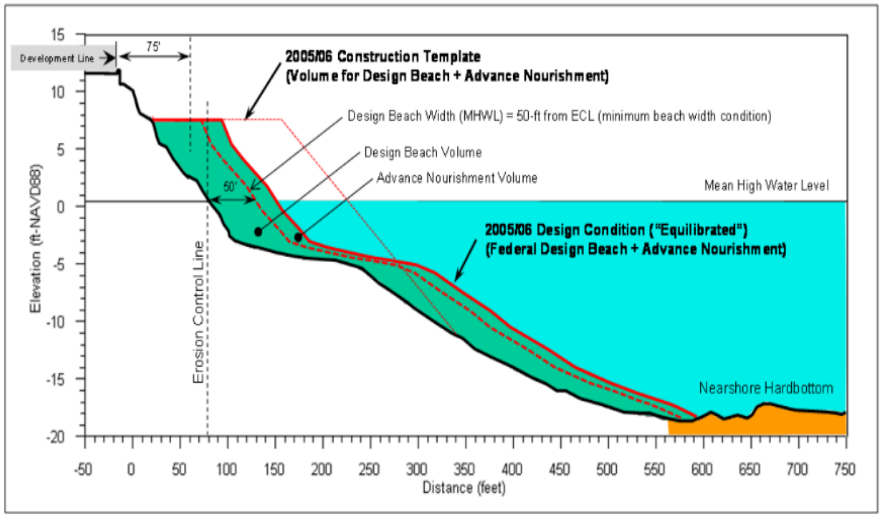

FIGURE 3: TYPICAL FEDERAL DESIGN AND CONSTRUCTION BEACH PROFILE DEFINITIONS

For Hallandale Beach, the design width is 50 feet seaward of the ECL, as shown in Figure 3.

As a general measure to protect beaches from storms and to maintain recreational beach areas and habitats, Broward County has adopted a second definition of beach width. The County's "Environmental Benchmark" establishes a minimum beach width of 75 feet measured from the seaward development to the MHWL. Beach widths narrower than 75 feet are considered critically eroded.

The 2015 Beach Management Study for Segment III documented the MHWL under four different conditions:

- The Federally authorized design MHWL
- The existing MHWL, which was the average shoreline position measured between April 2011 and July 2013
- The historic MHWL, which consisted of the average shoreline position between October 1993 and July 2013
- The minimum MHWL, computed as the landward most occurrence of MHWL at each R-monument between October 1993 and July 2013

The results of this analysis for Hallandale Beach (R124-128) is summarized in Table 2.

TABLE 2: BEACH WIDTHS FOR THE CITY OF HALLANDALE BEACH

		Beach Width (Feet)		
Monument	Federally Authorized Design Beach	Existing *(2011/2013)*	Average Position *(1993 to 2013)*	Most Landward Position *(1993 to 2013)*
R124	76.9	136.2	126.1	51.4
R125	87.1	135.4	131.1	83.3
R126	49.8	119.4	119.1	86.6
R127	57.1	88.7	102.9	49.1
R128	93.0	108.0	124.5	100.4

Source: Broward County Segment III Beach Management Study, 2015

Most of Hallandale's beach widths are within the Environmental Benchmark set by the County, with a few exceptions. During the 2011-2013 period, there were instances where R124 and R127 were narrower than the 75-foot County benchmark.

2.2.2 Shoreline Change

The 2015 Beach Management Study for Segment III analyzed beach profile surveys completed since 1993 to compute average annual MHWL change rates along the shorelines in Broward County. The study calculated the estimated change in shoreline for two periods. The values listed for the first period (1993 to 2013) represent values without beach renourishment projects to understand what conditions may have been in the event that the beach fill in 2006 was not completed. This provides a best guest estimation of a shoreline change had the County not completed beach renourishment project. The second values listed for the second period includes the effects of the 2006 and 2012 projects. Change rates for Hallandale Beach are summarized in Table 3.

TABLE 3: HALLANDALE BEACH AVERAGE ANNUAL RATE OF CHANGE

Monument	*MHWL Rate of Change (ft/yr)* 1993-2013 *(Fill Removed as Practical)*	2006-2013
R124	-9.0	-13.5
R125	-5.3	-7.9
R126	-5.6	-10.6
R127	-5.0	-5.9
R128	-2.1	-4.3

Source: Broward County Segment III Beach Management Study, 2015

Compared to the rest of the County, shoreline recession rates were high in Hallandale Beach and these highest rates were reflected in the 2006-2013 period. Although the highest rate of shoreline change in the study was located in Dania Beach (-33.7 feet per year), Hallandale Beach, specifically at R124 and R126, has had the second and third highest rates of shoreline change at -13.5 feet per year and -10.6 feet per year respectively.

2.2.3 Beach Volume Change

Beach volume changes calculated in the Broward County Segment III Beach Management Study were based upon a quantitative comparison of beach profile conditions at beach monitoring areas along the Segment III shoreline and are calculated from the seaward face of a bulkhead or vegetation line to the seaward limit of the active beach system. The numbers presented in the report do not include the effects of the 2005/06 or the 2012 renourishment projects to capture the volume changes in the absence of beach fill placement. Two time periods are represented in the table: a long-term average annual volume change, 1993 to 2013, and the most recent post-construction period, 2006 to 2013. The average sectional volumetric change rates for Hallandale Beach are included in Table 4.

TABLE 4: HALLANDALE BEACH AVERAGE ANNUAL VOLUMETRIC RATE OF CHANGE

	Sectional Volume Change Rate (cy/ft/yr)	
Monument	1993-2013	2006-2013
R124	-3.9	-5.0
R125	-0.3	-0.3
R126	-0.6	-2.7
R127	-2.0	-0.4
R128	-0.4	1.0

Source: Broward County Segment III Beach Management Study, 2015

Compared to the rest of the County, Hallandale Beach, specifically R126, has some of the highest rates of erosion. The highest rate of erosion in Segment III was -5.1 feet per year in Dania Beach, however, R124 was a close second with -5.0 feet per year[v].

2.2.4 Storm Events

Besides sea level rise, storm events are a large contributor to the erosion of the City's beaches. The National Climatic Data Center indicates that Broward County was affected by 11 major climatological incidents that resulted in beach erosion from 1998 to 2016. The Broward County Emergency Management Local Mitigation Strategy, dated 2017, noted the following significant storm events that added to the erosion of the shoreline:

- Tropical Storm Mitch (November 1998)
- Hurricane Floyd (September 1999)
- Coastal Flooding from Hurricane Michelle (November 2001)
- Hurricane Frances (September 2004)
- Hurricane Jeanne (September 2004)
- Nor'easter (2004)
- Hurricane Katrina (August 2005)[vi]

More recently, Hurricane Irma made landfall in September 2017 in areas of South Florida. As a major hurricane, Irma brought significant storm surge on both sides of the coast in South Florida. Although Broward County had minor beach erosion conditions as a result of the storm, beach renourishment measures have occurred throughout the county to address lost sand on the beaches [vii].

2.3 BEACH RENOURISHMENT PROGRAM

The beaches in Broward County provide significant support to the local economy through development, recreation and tourism. For over 50-years, the County has managed beaches with help from state and federal agencies by completing beach nourishment projects, enhancing natural dunes, and providing attention to regional sediment management.

Beach renourishment is a method to retain and rebuild eroding beaches. It has been the preferred method of protecting receding shorelines in South Florida and consists of bringing in beach-quality sand from borrow areas or upland sand mines and placing them along the coastline to restore eroding beaches.

2.3.1 Historic Beach Renourishment

Segment III has made significant efforts to improve beach conditions since the 1960s with the authorization of the Broward County Federal Shore Protection Project. To proactively address shoreline recession, a locally funded 0.8-mile restoration project began along Hallandale Beach in 1971. Since then, Broward County has actively worked to improve, manage, and maintain the Segment III shoreline through restoration and nourishment efforts. Approximately 7.2 million cubic yards of sand has been placed onto Segment III beaches. Table 5 adapted from the Segment III Beach Management Study, lists the history of beach nourishment and sand placement[viii].

TABLE 5: HISTORIC BEACH NOURISHMENT IN SEGMENT III - PROJECTS

Year	Project	Location (Reference Monument)	Project Length (miles)	Sand Quantity (cubic yards)
1971	Hallandale	R124-R128	0.75	360,00
1976	John U. Lloyd Beach SP	South Jetty to R93	1.5	1,090,000
1979	Hollywood/Hallandale	R101-R128	5.2	2,000,000
1989	John U. Lloyd Beach SP	South Jetty to R93	1.6	604,000
1991	Hollywood/Hallandale	R101-R128	5.2	1,100,000
2001	Hollywood (Diplomat)	R121-R123	0.5	25,000
2005	Hollywood/Hallandale John U. Lloyd Beach SP	R98.3-R128 South Jetty to R92	6.8	1,300,000 550,000
2012	Southern Hollywood	R119-R124	0.75	69,000
2013	John U. Lloyd Beach (Beach Disposal)	R87-R90	0.75	116,000

Source: Broward County, Segment III Beach Management Study (2015)

As of 2013, approximately $78.22 million has been spent to maintain the shorelines of the Segment III beaches. Of this amount, about 55% ($41.5 million) was paid by the U.S. Army Corp of Engineers. The remaining amount is paid by non-federal cost-share partners (i.e. State, County, and shorefront communities). Broward County paid approximately $8.95 million since 2013.[viii] Table 6 lists the approximate costs for the beach renourishment program since 2013.

TABLE 6: HISTORIC BEACH NOURISHMENT IN SEGMENT III - COSTS

Year	Project	Location (Reference Monument)	Sponsor	Total Cost (M)	Federal Share (M)	State Share (M)	County Share (M)	City Share (M)
1971	Hallandale	R124-R128	Hallandale	$0.78	$0	$0.59	$0.15	$0.04
1976	John U. Lloyd Beach SP	South Jetty to R93	Broward	$2.96	$1.97	$0.85	$0.15	-
1979	Hollywood/Hallandale	R101-R128	Broward	$7.83	$3.33	$2.82	$0.88	$0.80
1989	John U. Lloyd Beach SP	South Jetty to R93	Broward	$5.68	$3.97	$1.71	-	-
1991	Hollywood/Hallandale	R101-R128	Broward	$9.47	$4.17	$3.88	$1.07	$0.35
2001	Hollywood (Diplomat)	R121-R123	Hollywood	$1.00	-	$0.50	-	

Year	Project	Location (Reference Monument)	Sponsor	Total Cost (M)	Federal Share (M)	State Share (M)	County Share (M)	City Share (M)
2005	Hollywood/Hallandale	R98.3-R128	Broward	$44.5	$26.6	$10.1	$5.7	$2.1
	John U. Lloyd Beach SP	South Jetty to R92						
2012	Southern Hollywood	R119-R124	Hollywood	$3.50	-	$1.75	-	$1.75
2013	John U. Lloyd Beach (Beach Disposal)	R87-R90	USACE	$2.50	$1.50	-	$1.0	-

Source: Broward County, Segment III Beach Management Study (2015)

2.3.2 Recent Beach Renourishment

Following the aftermath of Hurricane Irma, the U.S. Army Corp of Engineers approved plans to spend $9.7 million for beach restoration in the southern portion of Broward County. The program would truck in approximately 123,000 cubic yards of sand to replenish sand lost during the store. Not only would this project load more sand on areas where the shorelines have eroded, it will enable critical storm surge protection. [ix]

Currently, Broward County is in the pre-permitting, engineering, and design phase for implementation of the Segment III projects that incorporates recommendations from the 2015 Beach Management Plan. According to Broward County's website, the County anticipates construction to begin in late 2021.

The City of Hallandale Beach is currently in the process of codifying Section 2-109 "Beach Preservation Advisory Board". This City Commission finds it necessary to establish a board that will study and recommend policies and programs that address beach erosion, dunes, shorelines, cleanliness and improve natural resources. If signed, this ordinance will establish a committee of engaged residents and experts on the issues of erosion, resiliency, and dune and shoreline preservation.

3. FUTURE CONDITIONS

The future of shoreline recession in southeast Florida is dependent on the scale of future predicted climate changes. Because beaches and dune systems are integral components of the coastal system and represent valuable natural resources, they are integral to resilience to future climate impacts.

The Intergovernmental Panel on Climate Change (IPCC) has very high confidence that coastal systems and low-lying areas like Hallandale Beach will increasingly experience the adverse effects of coastal erosion due to sea level rise. Sea Level Rise Projections

Locally, the Southeast Florida Regional Climate Change Compact (SFRCCC) adopted a unified sea level rise projection for the Southeast Florida region that includes Broward County and Hallandale Beach. The unified sea level rise projections are as follows:

- Short term: 10 to 21 inches of sea level rise by 2040
- Mid-term: 21 to 54 inches of sea level rise by 2070
- Long-term: 40 to 136 inches of sea level rise by 2120

Sea level rise projections based on the emission scenarios are shown in Figure 5.

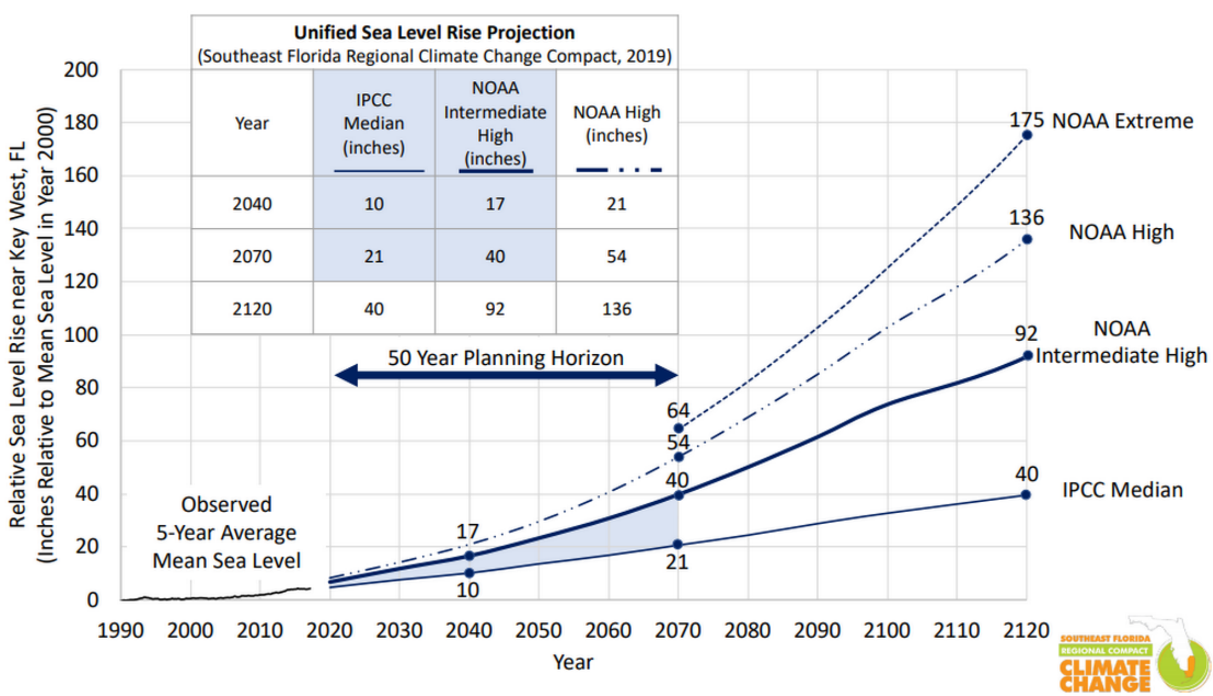

FIGURE 4: SFRCCC UNIFIED SEA LEVEL RISE PROJECTION

Source: Southeast Florida Regional Climate Change Compact, 2019

Sea level rise is an estimate of future events and is based on emissions scenarios and other drivers of global warming. As time passes, sea level rise projections may be revised based on improved scientific understanding or a change in global emissions pathways. Using the current adopted SFRCC unified sea level projection can assist Hallandale Beach in future adaptation to sea level rise.

3.1 STORM SURGE, EROSION, AND SHORELINE RECESSION

Future changes in sea level rise will also affect the intensity and scale of storm surges from tropical storms. Higher sea levels can cause storm surges to travel farther inland than in the past, causing damage to shorelines and increasing coastal erosion. The combined impacts of these events in the Southeast region have the potential to cost up to $60 billion per year by 2050[x]. Although there is high confidence that storm surges will be larger, the scale, intensity, and frequency of these events are still uncertain.

There is limited information on the rate of future shoreline recession in Hallandale Beach due to the high degree of variability in shoreline recession along the State of Florida's coasts. There are some areas in Florida with rapid erosion rates, such as Hallandale Beach, and some with net gain in sand over time.[xi] The Segment III Beach Management Study attempted to quantify the amount of sand loss for Hallandale Beach by quantifying an annual sand demand. The sand demand is assumed to be equivalent to the amount of sand lost form the beach profile due to erosion conditions on an average annual basis. The study concluded that Hallandale Beach will require approximately 11,000 cubic yards of sand per year to offset the gross loss rate.

Historically, the County's beach management program has benefited from the use of beach compatible sand located offshore of Broward County in close proximity to locations where fill is required. However, as the program has repeatedly drawn resources from these borrow areas, the supply of beach compatible sand locate in close proximity will likely not meet future projected demands for renourishment. As such, the County will likely require the use of more remote and costly sand resources in the future.

Broward County and Hallandale Beach have been experiencing erosion along the coastline for years and that trend is expected to continue. Climate scientists generally agree that future erosion is considered "likely." As most beaches in this are have been actively eroding, Broward County and Hallandale Beach can expect to continue to engage in beach renourishment projects every 10-12 years.[xii]

4. IMPLICATIONS FOR HALLANDALE BEACH

The implications of shoreline recession for Hallandale Beach include environmental, social and economic impacts on the City.

The beaches in Broward County and the City of Hallandale Beach provide critical nesting grounds for threatened and endangered sea turtles and are important habitats for shore birds and other wildlife.[xiii] Additionally, the beaches are a significant employment center for the City and County. They provide recreational opportunities for residents. Attracting more than 12.8 million visitors annually, the County's beaches contribute more than $6 billion to the local economy each year. The beaches also provide protection for more than $4 billion dollars of shoreline property, structures and infrastructure. Should these beaches continue to erode and the shorelines recess, the City can expect to lose a significant amount of economic activity.

While there are no local projections of increasing rates of shoreline recession as a result of sea level rise, it is clear that as this trend accelerates the beaches will be affected. In the short term, this may result in higher costs contributed by the City to beach renourishment programs. In the mid to long term, inundation of the City's beaches by rising seas could lead to legal complications between public beach access and landowners who property becomes part of the new shoreline. These challenges are likely to be faced by all local governments in Broward County.

5. PRELIMINARY RECOMMENDATIONS

RS&H has identified preliminary recommendations for the City to consider that will help to mitigate the risk posed by shoreline recession. This report presents only a high-level assessment of risk from climate-related changes to shorelines as a result of sea level rise. Further analysis will be needed to evaluate the vulnerability of specific infrastructure or facilities, community impacts, and thresholds where impacts would occur. It is also necessary to monitor emerging science and projections on the topic, since uncertainty exists regarding climate impacts.

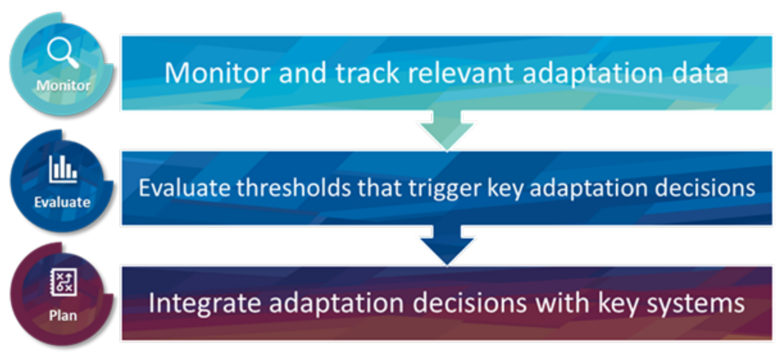

FIGURE 6: ADAPTIVE MANAGEMENT PLANNING APPROACH

For this reason, RS&H recommends an Adaptive Management planning approach (Figure 6). Adaptive Management is a systematic approach to managing uncertainty through flexible decision making informed by data. It can be used as a framework for addressing vulnerabilities, starting with the development of initial actions to mitigate climate change effects. Informed by adaptive management, the initial actions developed in this plan are classified into three categories, Monitor, Evaluate, and Plan.

5.1 MONITOR

- Monitor emerging climate and sea level rise projections. Sea level projections are subject to change due to improved scientific understanding and changes in emissions rates. Under current emissions trajectories, the trend has been for sea level rise projections to be revised upwards.

- Monitor rate of shoreline recession by tracking historic and modern shorelines using tools such as ArcGIS, NOAA CUSP, etc. In addition to monitoring the geographical shoreline change, monitor the amount of sand fill to Hallandale's beaches.

- Monitor emerging science related to the impacts of sea level rise on shoreline recession, including effects as a result of storm events and storm surge.

- Coordinate with regional partners such as Broward County, the Florida Department of Transportation, the Florida Department of Environmental Protection, the Southeast Florida Regional Climate Change Compact and other municipalities in the region on analysis of shoreline recession and adaptation strategies.

- Monitor coastal development to ensure future developments do not encroach on Federally Authorized Design Beach or Environmental Benchmark lines.

- Partner with local universities to encourage collaboration and scientific research that improves understanding of sea level rise and shoreline recession issues.

5.2 EVALUATE

- Evaluate existing development patterns and identify means to promote resilient coastal development.

- Assess the City's existing Beach Renourishment Plan and begin planning now for the program to adapt to increased demand for sand from borrow areas that are further away than those accessed historically. Evaluate if existing infrastructure is sufficient to handle an increased demand. Assess if funding will be available to support these future conditions.

- Evaluate the potential to use local, reclaimed dredge material for beach renourishment to cut down on costs for sand and greenhouse gas emissions associated with transportation. A project in St. Lucie County, Florida was able to use material from the Intracoastal Waterway dredged for a project to improve navigation to replenish a critically eroded section of the county's beach, resulting in over $8.7

million in cost savings.

- » Assess the feasibility of implementing living shorelines in the City in some locations. Living shorelines stabilize coastlines using natural materials such as rocks, sand and vegetation. They may have aesthetic as well as shoreline protection benefits and unlike sea walls or other hardscape structures, they can grow over time. They may also cost less than infrastructure solutions.

- » Study the legal implications of shoreline recession and determine how the City will respond to property rights disputes that may result if the shoreline moves landward as a result of sea level rise.

5.3 PLAN

- » Develop and implement the Dune Protection Plan identified in the City's Sustainability Action Plan. The plan will address the design of the dune system and effective erosion control measures, recommend dune vegetation and planting guidelines, identify impacts to wildlife, and include an implementation plan and budget for improving the dune system.

- » Pursue mangrove restoration projects proposed in the 2018 Sustainability Action Plan. Mangroves have many important benefits, ranging from aesthetics to wildlife habitat and flood control. They also resist erosion and wave action, helping to stabilize shorelines. This City has proposed planting mangroves at the corners of the Golden Isles Bridges, along Layne Boulevard south of Church Street, and along the seawall north of the marina on the west side of Three Islands Boulevard.

- » Conduct education and outreach to the development community to inform them about the implications of a receding shoreline.

- » Participate in the Shoreline Resilience Working Group, a SRFCCC subcommittee coordinated by the Nature Conservancy which brings together experts from the regions' counties, municipalities, non-profit organizations, academic institutions and the for-profit private sector who have an interest in promoting nature-based solutions to coastal protection.

In addition to the recommendations listed above, RS&H recommends the City implement the Policies and Objectives related to this issue that were included in the 2018 update to its Comprehensive Plan.[xiv] These adaptation measures are detailed in Table 7 below.

TABLE 7: SHORELINE RECESSION ADAPTATION ACTIONS FROM THE 2018 COMPREHENSIVE PLAN

Adaptation Category	Comprehensive Plan Element	Policy / Objective	Description
Coastal Protection	Coastal Management Element	Policy 1.1.1	Review potential impacts of development plans on public facilities within the City's Coastal area.
	Coastal Management Element	Policy 1.1.2	Restrict construction or redevelopment in areas controlled by State Coastal Control Lines.
	Coastal Management Element	Policy 1.4.1	Participate in Federal, State, and County Renourishment Programs to replace beach sand deposits lost to erosion.
	Coastal Management Element	Objective 1.4	Coordinate with Broward County's DEP in protecting and enhancing dunes and coastal biological communities.
Local Coordination	Coastal Management Element	Objective 1.1	Work in conjunction with Broward County Department of Environmental Protection (DEP) to protect and conserve coastal resources.
	Coastal Management Element	Policy 1.1.2	Coordinate with representatives of all local coastal governments within two miles of the boundaries of the Hallandale Beach coastal area to discuss plans and strategies to protect coastal resources.
	Coastal Management Element	Objective 2.3	Cooperate with Broward County, the Broward County Planning Council, the Southeast Florida Regional Climate Change Compact, and other agencies.
Climate Change Monitoring	Coastal Management Elements	Policy 2.3.1	Identify potential adverse impacts and map areas vulnerable to impacts.
	Coastal Management Elements	Policy 2.3.2	Develop and Adaptation Action Area for low lying coastal zones.

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