

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

INTRODUCTION

The Town of Palm Beach lies entirely within the coastal zone. Consequently, this Element incorporates the Coastal Management and Conservation Elements into one comprehensive inventory, and analysis of the Town's coastal and natural resources.

The purposes of this Element are to plan for and, where appropriate, restrict development activities where such activities would damage or destroy coastal resources; to protect human life; to limit public expenditures in areas subject to destruction by natural disaster; and to promote the conservation, use, and protection of natural resources.

This Element of the Plan has been updated based upon:

1. Analysis of existing land uses in the coastal area as of April 2016; conflicts among shoreline uses; need for water dependent and water related uses; areas in need of redevelopment; and, the economic base of the coastal area;
2. Analysis of the effect of future land uses on natural resources;
3. Analysis of the impacts of development on historic resources and sites;
4. Analysis of estuarine pollution conditions;
5. Analysis of natural disaster planning concerns;
6. Analysis of beach and dune conditions;
7. Analysis of public access facilities;
8. Analysis of existing infrastructure;
9. Analysis of pertinent natural resources in the community;
10. Analysis of existing commercial, recreational, and conservation uses of these natural resources; potential for their conservation, use, or protection; and, known pollution problems;
11. Analysis of current and projected water needs and sources.

EXECUTIVE SUMMARY

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While all of the comprehensive plan elements required by F.S. 163 have been inventoried and analyzed, the built-out landscape of Palm Beach limits concern to but a few specific issues and problems. These are chiefly associated with natural resource protection.

HAZARDOUS WASTES

The Town will continue to protect its soils and groundwater through existing prohibitions on industry, standard operating procedures, and intergovernmental coordination with appropriate agencies.

DRAINAGE

The natural drainage patterns of the Town have been altered by urban development. Stormwater is either held in retention areas or routed to Lake Worth. In 1986, all new construction and major renovations have been required to retain the first inch of rainfall per the Town's code in conformance with requirements of the South Florida Water Management District. However, this requirement was increased to two inches in 1992. More detailed inventory and analysis of drainage and related infrastructure are contained in the Infrastructure Element.

FLOODPLAINS

The Town of Palm Beach can experience flooding from Lake Worth, the Atlantic Ocean, or from surface accumulation of rainwater. Map V-2, in the companion volume *Supporting Documentation*, shows areas in the Town which are subject to flooding during a "one hundred-year storm", as identified on the Flood Insurance Rate Maps (FIRM) prepared by the Federal Emergency Management Agency (FEMA). Land along the Atlantic is also subject to tidal surge and wave velocity in the event of a major storm, although no structures lie within the velocity zone. Nearly all of the flood-prone area is already developed.

GROUNDWATER

The Town promotes recharge through its stormwater retention requirements, and through minimum landscaped area requirements, which ensure pervious areas for water percolation into the aquifer. In addition, there are few septic tanks in the Town, no existing or known potential problems with hazardous waste contamination, and no known sources of potential aquifer contamination or depletion. In the event that the Town chooses to use the surficial aquifer more extensively, measures should be taken to protect the aquifer from salt water intrusion.

POTABLE WATER

Potable water resources, needs, and conservation methods are explored in the Potable Water sub-

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element of the Infrastructure Element. Specifically, water sources are discussed under the heading "Facilities, Treatment, and Capacity"; needs and water quantity under "Present and Future Needs"; water quality under "Potable Water Quality"; and, conservation under "Water Conservation."

NATURAL RESOURCES

Vegetation and Wildlife

A variety of mammals, reptiles, birds, aquatic species, and other animals live in and around Palm Beach. These are generally attracted to specific vegetational and aquatic communities. The Atlantic Ocean and its associated beaches, dunes and nearshore reef outcrops support a variety of animal life and marine species. Chart V-1 summarizes and describes the various ecological communities in terms of their vegetation, wildlife and ecological needs.

Most native wildlife in Palm Beach is centered around remaining natural communities. However, there are also a variety of species which have adapted to the urban environment. Among these are the red fox, possum, raccoon, squirrel, rat, mouse, songbirds (including a flock of wild parrots), and shore birds. The Town is a dedicated Bird Sanctuary.

A patchy series of nearshore and offshore reefs or rock outcrops lies parallel to the Town's Atlantic coastline. Offshore areas are subject to variability. Some nearshore areas can have a very limited diversity or density of species due to naturally high sedimentation rates and low rock relief. Others may support relatively rich populations of plant and animal life. As a rule, diversity and abundance of species increase with greater water depth and distance from the shore. However, site specific studies need to be conducted to determine the ecological value of any given offshore environment.

The Lake Worth Lagoon supports a rich variety of wildlife. The spoil islands in the Lagoon serve as bird rookeries for ibis, reddish and snowy egrets, anhingas, great blue herons, night herons, and tricolor herons, many of which are listed as threatened or endangered species by State or Federal agencies. Fisherman's Island, Hunter's Island, John's Island, and Bingham Island are leased by the Audubon Society specifically as rookeries and bird sanctuaries. Native wetland areas along the shore of the Lake Worth Lagoon serve as roosting areas for these birds, and also provide food and shelter for a variety of small mammals.

Although the Florida Department of Environmental Protection (FDEP) has prohibited shellfishing in the Lake due to its poor water quality, shellfish beds are located on tidal flats and around the periphery of spoil islands. One species of oysters live on the prop roots of red mangroves. A unique sub-specie of clam, native to the area, lives in the sand of the Lagoon.

Air and Other Physical Conditions

The Town of Palm Beach has very good air quality. There are no point sources of pollution within

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the Town. Increased mobile pollution sources, including automobiles and air traffic, will continue to cause a concern. Air quality is enhanced by the Town's location on the coast, where it benefits from regular sea breezes. Air quality is also improved by the profuse vegetation in the Town, which naturally purifies the air.

The Town should continue to maintain its good air quality by preventing industries from operation in the Town; discouraging increased commercialism; and, maintaining and encouraging rich vegetation on both public and private properties.

The Florida Mining Atlas identifies two potentially valuable mineral resources in Palm Beach: coquina and sand. However, the exclusive residential nature of the Town and subsequent high real estate values preclude any mining of these resources, either presently or in the future.

The Town addresses wind borne soil erosion due to demolition or construction through its Fugitive Dust and Blowing Sand Ordinance, which requires exposed soils and fill to be stabilized with webbing. In addition, the Town requires unvegetated vacant areas to be sodded.

	ATLANTIC OCEAN	ATLANTIC BEACH & DUNES	BARRIER ISLAND INTERIOR	LAGOONAL WATER'S EDGE	LAGOON	MANATEE ISLAND
2	Zone begins 3 miles east of the MHW line & extends west through the breaking surf to the MHW lines.	Area extends from the MHW line of the beach to the trough behind the dune zone.	West of dunes to the edge of the Lake Worth Lagoon.	Wetland Bordering Lake Worth Lagoon	Lake Worth	Various spoil islands
	Submerged, unconsolidated sand; coquina outcroppings from reefs.	Well drained sand and shells.	Moderately drained sand, and urban fill.	Well drained sand and shells overlying organic layer of poorly drained peat.	Submerged, unconsolidated sand	Compositional from mixed shells to mat
	Plankton, sarragassum, seaweed, red and brown algae.	Salt tolerant dune grasses, herbaceous plants, vines, shrubs, and stunted trees.	Live oak, slash pine, cabbage palm, saw palmetto; invasion by Australian pine, Brazilian pepper.	Black, red & white mangroves, salt marsh grass; invasion of Brazilian pepper & Australian pine.	Sea grass beds	Red and many mangroves, Australian, Brazilian, upland some hardy native island
	Brown pelican. Sea turtles (see Beach and Dunes). Sea Gulls.	Atlantic loggerhead turtle Atlantic green turtle Leatherback turtle Atlantic hawksbill turtle Atlantic Kipp Ridley turtle Sea lavender Prickly pear		Roseate tern Least tern Atlantic saltmarsh snake Snowy egret, reddish egret Southern Kestrel Southern bald eagle Great Blue heron, Little	West Indian Manatee	Roseate Least Atlantic Snow Southern

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		Roseate tern Least tern Osprey Sea Oats Sea Grape		Blue heron, other herons Other shorebirds Anhingas Cormorant Osprey		Great Blue heron Least tern White ibis Osprey
	-Marine habitat -Moderation of climate	-Wind & wave protection for island -Shoreline maintenance -Interface between marine & terrestrial wildlife -Shallow aquifer recharge (dunes)	-Wildlife habitat -Shallow aquifer recharge in elevated areas -Vegetation purifies air	-Shoreline stability -Maintenance of water quality -Wildlife habitat -Detrital source -Important nursery area for marine wildlife	-Feeding area for manatees -Source of detrital food web -Vital nursery habitat for larval & juvenile stages of marine life -Maintenance water quality	-Habitat for rookeries of birds -Maintenance water quality -Maintenance of marine life -Detrital source
	-Good water quality	-Natural beach profile -Uninterrupted littoral drift -Natural dune form -Hardy vegetation -Good water quality	-Vegetation -Good water quality	-Healthy and profuse vegetation -Good water quality	-Good water quality -Natural circulation -Undisturbed bottom	-Healthy vegetation -Good water quality -Minimal disturbance by man
	-Water pollution (oil residue & garbage)	-Intense development of primary dune area -Removal of foredune & replacement with bulkhead -Breaches of dune due to pedestrian and vehicular activity	-Most of area heavily urbanized. Native vegetation replaced with exotic landscaping	-Most of wetland edge filled and elevated for residential development and cleared of natural vegetation -Shoreline hardened -Invasion of exotic vegetation	-Some areas dredged for boat channels -Seagrass loss due to poor water quality, dredge and fill -Habitat loss for marine organisms	-Invasion of exotic vegetation -Litter -Disturbance by boaters, trespassers

Moved to Conservation Element

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EXECUTIVE SUMMARY

Coastal Management is a Federal, State and local requirement of coastal communities. The fundamental goals are to preserve, protect, enhance and restore, where possible, the coastal resources of the nation's coastal zone. In the Town of Palm Beach, as a barrier island, coastal management has broad implications to the community's social, economic, and environmental fabric. Recognizing the importance of managing its beach resources, in 1986, the Town of Palm Beach prepared the initial Comprehensive Coastal Management Plan (CCMP).

The Town updated the CCMP in 1998 to identify the necessity, sequencing and requisite actions by the Town and the neighboring municipalities to effectively manage the shoreline of Palm Beach. Proper sand management practices at the inlets which separate Palm Beach from the neighboring shorelines were identified as critical to ensure that the Town's beaches were afforded the proper level of storm protection. Additionally, the CCMP identified and located the suitable sand resources to conduct beach restoration and renourishment activities within the Town essential for the long-term success of the plan.

In 2018, the Town of Palm Beach entered into a Beach Management Agreement (BMA) with the DEP, in conjunction with the Florida Fish and Wildlife Conservation Commission (FWC) to coordinate beach management activities. Annual BMA stakeholder meetings are held at Town Hall to make any necessary updates to programming and/or lists. The BMA was last updated in 2021 and a public hearing on the agreement was recently held in August 2023, and no changes were made to the BMA. The BMA process establishes the regulatory responsibilities of the DEP with other state and federal agencies, and the public to create a streamlined program to protect the environment and to provide net ecosystem benefits.

In July 2019, a Coastal Flood Vulnerability Assessment was conducted to provide guidance for prioritizing and planning future flood mitigation projects and adaptations to improve coastal resilience now and into the future. The recommendations provided for methods to ensure that public infrastructure projects are designed to last decades or more, factoring future risk into design criteria. Ultimately, the assessment has assisted the Town to improve coastal resilience while also aiding in minimizing costly flood damage and future repairs of infrastructure.

COASTAL MANAGEMENT IN THE UNITED STATES

In 1972, U.S. Congress recognized the importance of meeting the challenge of continued growth in the coastal zone by passing the Coastal Zone Management Act (CZMA). This act, administered by NOAA, provides for the management of the nation's coastal resources, including the Great Lakes. The goal is to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." The term "coastal zone" means the coastal waters

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(including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches. 1

The CZMA outlines three national programs, the National Coastal Zone Management Program, the National Estuarine Research Reserve System, and the Coastal and Estuarine Land Conservation Program (CELCP). The National Coastal Zone Management Program aims to balance competing land and water issues through state and territorial coastal management programs, the reserves serve as field laboratories that provide a greater understanding of estuaries and how humans impact them, and CELCP provides matching funds to state and local governments to purchase threatened coastal and estuarine lands or obtain conservation easements.2

STATE REQUIREMENTS FOR THE COASTAL MANAGEMENT ELEMENT

Pursuant to Section 163.3177(b)(g), for those units of local government that are abutting the Gulf of Mexico or the Atlantic Ocean, the preparation of a Coastal Management Element is required. In addition to the requirements of Section 163.3177(b)(g), the Coastal Management Element must also meet the requirements of Section 163.3178, F.S., which is solely dedicated to coastal management.

The Coastal Management Element objectives set forth in Section 163.3177(b)(g) provides the principles, guidelines, standards, and strategies to guide the local government's decisions and program implementation. The objectives include the following.

1. Maintain, restore, and enhance the overall quality of the coastal zone environment, including, but not limited to, its amenities and aesthetic values.
2. Preserve the continued existence of viable populations of all species of wildlife and marine life.
3. Protect the orderly and balanced utilization and preservation, consistent with sound conservation principles, of all living and nonliving coastal zone resources.
4. Avoid irreversible and irretrievable loss of coastal zone resources.
5. Use ecological planning principles and assumptions in the determination of the suitability of permitted development.
6. Limit public expenditures that subsidize development in coastal high-hazard areas.

1 <https://coast.noaa.gov/czm/act>

2 Ibid

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7. Protect human life against the effects of natural disasters.
8. Direct the orderly development, maintenance, and use of ports identified to facilitate deep-water commercial navigation and other related activities.
9. Preserve historic and archaeological resources, which include the sensitive adaptive use of these resources.
10. At the option of the local government, develop an adaptation action area designation for those low-lying coastal zones that are experiencing coastal flooding due to extreme high tides and storm surge and are vulnerable to the impacts of rising sea level.

As stated, the Florida Statutes contains specific regulations that only pertain to coastal management in Section 163.3178, F.S. Within this statute, the Florida Legislature recognized there is significant interest in the resources of the coastal zone of the State. Further, the Legislature recognized that, in the event of a natural disaster, the State may provide financial assistance to local governments for the reconstruction of roads, sewer systems, and other public facilities. Therefore, it has been the intent of the Legislature that local government comprehensive plans restrict development activities where such activities would damage or destroy coastal resources, and that such plans protect human life and limit public expenditures in areas that are subject to destruction by natural disaster.

Pursuant to Section 163.3178(2), each Coastal Management Element is required to be based on studies, surveys, and data that are consistent with coastal resource plans prepared and adopted pursuant to general or special law; and contain the following.

- (a) A land use and inventory map of existing coastal uses, wildlife habitat, wetland and other vegetative communities, undeveloped areas, areas subject to coastal flooding, public access routes to beach and shore resources, historic preservation areas, and other areas of special concern to local government.
- (b) An analysis of the environmental, socioeconomic, and fiscal impact of development and redevelopment proposed in the future land use plan, with required infrastructure to support this development or redevelopment, on the natural and historical resources of the coast and the plans and principles to be used to control development and redevelopment to eliminate or mitigate the adverse impacts on coastal wetlands; living marine resources; barrier islands, including beach and dune systems; unique wildlife habitat; historical and archaeological sites; and other fragile coastal resources.
- (c) An analysis of the effects of existing drainage systems and the impact of point source and nonpoint source pollution on estuarine water quality and the plans and principles, including

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existing state and regional regulatory programs, which shall be used to maintain or upgrade water quality while maintaining sufficient quantities of water flow.

- (d) A component which outlines principles for hazard mitigation and protection of human life against the effects of natural disaster, including population evacuation, which take into consideration the capability to safely evacuate the density of coastal population proposed in the Future Land Use Plan Element in the event of an impending natural disaster. The Division of Emergency Management shall manage the update of the regional hurricane evacuation studies, ensure such studies are done in a consistent manner, and ensure that the methodology used for modeling storm surge is that used by the National Hurricane Center.
- (e) A component which outlines principles for protecting existing beach and dune systems from human-induced erosion and for restoring altered beach and dune systems.
- (f) A redevelopment component that outlines the principles that must be used to eliminate inappropriate and unsafe development in the coastal areas when opportunities arise.

In 2015, Section 163.3178(20)(f), was adopted via Florida Senate Bill 1094 (S.B. 1094) that recognized the priority to integrate sea level rise into local government planning. Florida former-Governor Rick Scott signed S.B. 1094 in May 2015, amending Section 163.3178(2) to include subsection (f). The law stipulated local governments that are required to have a Coastal Management Element in their comprehensive plan include a redevelopment component to “eliminate inappropriate and unsafe development in coastal areas”.

The 2015 Bill became effective on July 1, 2015, and required coastal management plans to include the reduction of flood risks and losses. The law also created new requirements related to redevelopment to include flood elevation certificates and revised requirements related to flood insurance. The specific principles include the following.

- Development and redevelopment principles, strategies, and engineering solutions that reduce the flood risk in coastal areas which results from high-tide events, storm surge, flash floods, stormwater runoff, and the related impacts of sea-level rise.
- Encourage the use of best-practices development and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real property from flood zone designations established by the Federal Emergency Management Agency.
- Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in this state.
- Encourage the use of best practices development and redevelopment principles, strategies, and engineering solutions that will result in the removal of coastal real property from flood

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zone designations established by the Federal Emergency Management Agency.

- Identify site development techniques and best practices that may reduce losses due to flooding and claims made under flood insurance policies issued in this State.
- Be consistent with, or more stringent than, the flood-resistant construction requirements in the Florida Building Code and applicable flood plain management regulations set forth in 44 C.F.R. part 60.
- Established minimum standards for construction activities seaward of the coastal construction.
- Encouraged local governments to participate in the National Flood Insurance Program Community Rating System administered by the Federal Emergency Management Agency to achieve flood insurance premium discounts for their residents

PALM BEACH COUNTY COASTAL MANAGEMENT PROGRAM

The major forces in the shaping of the Palm Beach County coastline are the combined effects of the wind, waves, tides, and sea level rise. During storm conditions, these forces increase and pose a threat to structures and property bordering beaches of insufficient width and slope to provide natural protection. In addition, coastal currents and inlet dynamics exacerbate the erosion problem.

Comparison of Palm Beach County beach and offshore surveys between the years 1929 and 1977 showed substantial recession and advance of the shoreline, with advance occurring primarily as a result of impoundment north of the county's four (4) inlets and as a result of local beach nourishment projects. In 1986, in an attempt to address growing concerns of beach erosion throughout the State, the Florida Department of Environmental Protection (FDEP), Division of Water Resource Management, was charged with the responsibility to identify those beaches of the State which were critically eroding and to develop and maintain a comprehensive long-term management plan for their restoration. An initial list of erosion areas was developed and continues to be updated and maintained, as necessary.³

Palm Beach County has adopted a Local Mitigation Strategy (LMS). The LMS is a unified, coordinated effort among County and municipal governments to reduce the county's vulnerability to the impacts of identified natural and man-made hazards. Among its primary missions, the Strategy serves as a basis for comprehensive mitigation planning, project identification and prioritization, and provides assistance to project sponsors in securing and allocating available federal, state, local, and other disaster mitigation assistance funds. The revised Palm Beach County Local Mitigation Strategy Plan (LMS) was adopted in 2019, by unanimous vote by the Town

³ Palm Beach County Emergency Management Plan 2020

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Council of the Town of Palm Beach.



According to PBC's Comprehensive Emergency Management Plan updated in 2020, 60 storms of hurricane intensity have passed within 125 miles of the County since 1886. Hurricanes and tropical storms directly impacted Palm Beach County and Palm Beach's shoreline protection and erosion control, among other impacts. Today, various plans are in place in Palm Beach County to manage coastal areas and protect dunes and beaches, including the Palm Beach County (PBC) Shoreline Protection Plan, FDEP's Strategic Beach Management Plan, PBC's Shoreline Enhancement and Restoration Programs. These initiatives identify critical areas and prioritize and develop action plans to enhance and restore areas that are at risk.

Hurricanes that have impacted Palm Beach County's coastline since the seventies are listed below.

- 1979: Hurricane David
- 1984: Thanksgiving Day Northeaster
- 1992: Hurricane Andrew
- 1999: Hurricane Irene
- 2004: Hurricane Frances, Hurricane Jeanne
- 2005: Hurricane Wilma
- 2007: Tropical Storm Andrea; October Northeasters (unnamed); Tropical Storm Noel
- 2008: Tropical Storm Fay; September Storm (unnamed); Tropical Storm Hannah
- 2011: Hurricane Irene (swell only)
- 2012: Hurricane Sandy
- 2016: Hurricane Matthew
- 2017: Hurricane Irma
- 2022: Hurricane Ian
- 2022: Hurricane Nicole



Most of these storms resulted in significant increases in the amount of critically eroded beaches in PBC and surrounding coastal counties.

TOWN OF PALM BEACH COASTAL MANAGEMENT ELEMENT

The impact of shoreline protection and the defense of submerged lands is paramount to the continued quality of life for the Town of Palm Beach residents. Coastal management has broad implications from social, economic, and environmental issues as the Town of Palm Beach is a barrier island regulated and protected by federal, state, and local regulations.

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Beach and Dune Conditions

Beach erosion has been a continuing problem for the Town since 1924 when the Lake Worth Inlet was deepened and stabilized with jetties on either side. Sand immediately began to build up in the north jetty as the southerly littoral drift was interrupted. The beaches on the north side of the Inlet began to experience accretion, while those to the south, where the Town is located, suffered from erosion. Sand starvation caused by the Inlet has combined with other factors, such as the rising sea level and numerous storm events, resulting in a dramatic and continuing loss of beach. Through the years the Town has responded to beach erosion with shore protection structures, artificial beach nourishment, and a sand bypass program at the Inlet.

The Town has carefully controlled beach protection through a beach management plan, passed in 1935, which designates the locations, dimensions, and lengths of bulkheads and groins within the municipal limits of the Town. Since ~~1935~~ that time, protective structures have generally been placed in accordance with this Plan. Recognizing the importance of managing its beach resources, in 1986, the Town of Palm Beach commissioned a consultant, Cubit Engineering, to prepare the initial Comprehensive Coastal Management Plan (CCMP). The report contained eight (8) major objectives.

1. Replace the sand bypass plant at Lake Worth Inlet.

~~The Sand Transfer Plant ceased operation in May, 1990. The County, who operated the plant under an interlocal agreement, reported that its condition was beyond normal maintenance repair. The Town has funded the restoration of the Sand Transfer Plant which should provide enhanced transfer capability. Two new discharge pipes under the inlet, a new pump, motor and electrical system were installed in November, 1995.~~

~~The Town began a study of the Lake Worth inlet through the initiation of the Lake Worth Inlet Management Plan. The Plan, with 75% State funding, will explore the optimal way to move sand past the Lake Worth Inlet. The Plan has already recommended replacement of the transfer station with upgraded bypass capabilities. It is anticipated that the Plan will be completed in the near future. Upon completion, the Town will implement it with the assistance of the U.S. Corps of Engineers and Florida Department of Environmental Protection.~~

~~The Sand Transfer Plant was structurally and mechanically rehabilitated by the Town in late 2009 and early 2010. Following rehabilitation, the plant successfully bypassed sand until impacts from Hurricane Sandy damaged the plant's infrastructure in October 2012. The plant was operational again in mid-2013 and regularly bypassed sand until electrical connection issues persisted in 2015. The electrical connections were replaced and the Sand Transfer Plant has been in continual operation through much of 2016.~~

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~~In June 2016, by Resolution No. 94-2016, Town Council approved an interlocal agreement with Palm Beach County that details responsibilities for operation and maintenance of the Sand Transfer Plant until September 2035. The interlocal agreement obligates the County to operate and maintain the plant and obligates the Town to be responsible for repairs. This agreement was approved by the Palm Beach County Board of County Commissioners in August 2016.~~

2. Require all sand bypass plant discharge and beach quality maintenance dredge spoil to be placed south of Onondaga Avenue so that it will be of greatest benefit.

~~The Town manages the Sand Transfer Plant consistent with the FDEP adopted Lake Worth Inlet Management Plan (IMP) of 1995, the FDEP Palm Beach Island Beach Management Agreement (BMA) of 2013, and the FDEP Strategic Beach Management Plan updated in 2015. Both the IMP and BMA recommend lengthening the discharge pipelines and to allow for multiple discharge points to be located as far as 2,500 feet south of the south jetty. The State's strategy for inlet bypassing, which includes the combination of the operation of the sand transfer plant and beach placement of maintenance dredge material from the federally authorized navigation channel, to place all beach compatible material on the downdrift beaches of Reach 1 and in an extended beach placement in Reach 2. The FDEP Strategic Beach Management Plan details that an extension of the plant's discharge pipeline can be sited as far as 3,600 feet south of the south jetty.~~

3. Renourish the Mid-Town Public Beach to enhance that area and provide downcoast property protection.

~~The Town's Mid Town Beach Restoration project, with the construction of groins to stabilize the beach, began in October 1995, and was completed in March, 1996. Following the project, a dune vegetation project was initiated for approximately 4,000 feet of the project. Mid Town Beach was renourished in 2003 and 2006 following hurricanes Frances and Jeanne. A Mid Town Beach Renourishment Project was constructed in 2015.~~

4. Endorse the Department of Transportation revetment at Widener's Curve to Sloan's Curve. ~~The revetment is in place.~~

5. Maintain the seawalls to ensure that storm protection to upland property and infrastructure is provided.

~~Seawalls are maintained on an "as needed" basis. Construction of a replacement seawall fronting North Ocean Boulevard across from the Palm Beach Country Club in Reach 2 was completed in 2016.~~

6. Maintain the seawalls to ensure that storm protection to upland property and infrastructure is provided.

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~~The BMA included the repair, rehabilitation, or removal of groins in Reaches 2, 4, 5, and 6 as an authorized activity to maintain sand placement projects. In February 2015, a Town consultant completed a Groin Rehabilitation Execution Plan that outlines a multi-phased long term effort to maintain, modify, abandon, or remove groins, as necessary. The first phase of implementation may occur following Town Council direction after the federal permitting process has been completed.~~

7. Maintain and/or modify only those groins that are presently effective; abandon and remove all others as may be physically and financially practical.

~~The Phipps Ocean Park Beach Restoration was undertaken and completed in 2006 between Phipps Park and the Ambassador Hotel. A dune vegetation restoration project was also completed there in 2007. Nourishment of Phipps Ocean Park and Reach 7 was completed in 2016. This project extended beach nourishment from the Ambassador Hotel to Kreusler Park. Following the nourishment of sand, dune vegetation was planted along the entire Town portion of Reach 7, which extends from Sloan's Curve to Kreusler Park.~~

8. Monitor the Town's beach to develop a better data base of information concerning beach characteristics so that future planning decisions can be made."

~~The Town performs a yearly shoreline survey to design and monitor beach restoration and renourishment activities.~~

~~The Comprehensive Coastal Management Program (CCMP) includes a detailed schedule and budget. The scope and cost of the CCMP is reviewed annually by Town staff, the Shore Protection Board, and Town Council. The Town continues to implement the CCMP objectives.~~

~~The Town Council appointed a Shore Protection Board on July 11, 1995, to investigate and evaluate the Town's beaches and develop a plan to address the erosion of this piece of the Town's infrastructure. The Board met regularly for over three years. After investigating the broadest array of beach management options, the Board oversaw the production of the (CCMP) Update, dated September 1997, by Applied Technology & Management, Inc. Thereafter the Board oversaw a separate Peer Review of the CCMP. The Peer Review emphasized that uncertainty exists in the science of managing our coastal resources, and therefore recommended that the CCMP by Aubrey Consulting, Inc. (later referred to as Woods Hole Group, Inc.) be implemented in phases, thereby allowing for flexibility and adjustments through a process called "adaptive management." This process involves incorporating specific, measurable goals in each beach nourishment project and learning from the observed successes and failures, or outcomes of those projects when compared against the projects original expectations. Summarizing the process below:~~

- (1) — ~~Monitoring the implementation of each project in a manner meant to reveal any critical knowledge that was lacking in the project's original design,~~
- (2) — ~~Analyzing the outcome of each project against its original objectives, and~~

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- (3) — Incorporating these results into future decisions regarding the projects included in the adopted CCMP by means of appropriate mid-course corrections.

In January of 1999, the Shore Protection Board issued its final report, making a number of recommendations to the Mayor and Town Council, including the implementation of the CCMP through adaptive management.

The Town Council reviewed the CCMP, and held three public meetings throughout the Town to receive input into the decision-making process. The CCMP was further discussed at Town Council meetings over a number of months where public debate continued. Some citizens raised concerns about the environmental damage that might be caused by the projects, the method of apportioning the costs of the projects (having them spread among all property owners in the Town in contrast to just beachfront property owners), and the potential effects of creating the Erosion Control line on the privacy and property rights of the Town's residents. The Town Council adopted a sealed-back Coastal Management Plan on December 1, 1999. That action and the Town Council's subsequent actions on these projects substantially outweigh the potential negative impacts. The prevailing opinion expressed by the residents at the Community Forums in November 2001 strongly supported this determination.

The CCMP update of 1999 summarized the 1986 CCMP objectives and included the following key action elements:

- Implement the Lake Worth Inlet Management Plan;
- Construct sand retention structures and restore and maintain beaches along the designated Reaches;
- Implement a comprehensive coastal monitoring and modeling program;
- Maintain, restore and/or replace existing coastal structures; and
- Renourish restored reaches periodically to sustain project benefits.

With the above listed elements identified to be implemented over a 10-year period, the Shore Protection Board was sunset by Town Council in 1999.

Per Ordinance No. 1-08, on July 8, 2008, the Town Council established that the Shore Protection Board "act in an advisory capacity to the Town Council and shall make recommendations to the Town Council on all matters relating to shore protection in the Town of Palm Beach." On December 9, 2008, Town Council appointed seven (7) members who held their first meeting on December 17, 2008. During their first year, the board developed goals and objectives. With eight (8) objectives identified, the board prepared an Objectives Plan which included data collection, fact-finding, short-term shore protection actions, and long-term coastal management solutions. While assessing the Town's coastal program through their Objectives Plan, the board also applied the twelve (12) conclusions, recommendations, and comments from the previous Shore Protection

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~~Board. Projects were prioritized and the Shore Protection Board concluded their first year of meetings with nine (9) specific recommendations to Town Council on November 10, 2009. In addition to the recommendations, the Shore Protection Board provided Town Council with a 10-Year Coastal Management Plan. Although the 10-Year plan was not adopted by Town Council, the document served as the framework for a plan later adopted by Town Council.~~

~~In June 2013, following more than one (1) year of peer review performed by Woods Hole Group, Town Council adopted a long term 10-Year Plan for the Town's Coastal Management Program. The plan called for implementation of specific projects and monitoring to occur between fiscal years 2014 and 2023.~~

~~The Shore Protection Board continues to meet at least four (4) times per year and reports to the Town Council annually. To facilitate civic involvement by its citizens the Town Council adopted Ordinance No. 06-2017 which will impose term limits for the Shore Protection Board members and add three (3) alternate members.~~ **UPDATED AND PROVIDED BELOW**

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

Following the initial CCMP, the Town updated the CCMP in 1998, which was prepared by Applied Technology & Management, Inc. (ATM). The purpose of the updated CCMP was to identify the necessity, sequencing and requisite actions by the Town and the neighboring municipalities to effectively manage the shoreline of Palm Beach. Proper sand management practices at the inlets which separate Palm Beach from the neighboring shorelines were identified as critical to ensure that the Town's beaches were afforded the proper level of storm protection. Additionally, the CCMP identified and located the suitable sand resources to conduct beach restoration and renourishment activities within the Town essential for the long-term success of the plan.

The updated CCMP provided a comprehensive conditions report and assessment of necessary implementation strategies to sustain a beach and shoreline for the long term. The Town has continued to implement the recommendations of the Plan that include the following.

- ✓ Acquiring and evaluating aerial photography, beach profiling, sand source and environmental resource data for the Land to perform beach profiles.
- ✓ Updating the coastal structures inventory along the shoreline and identifying structures on the Island.
- ✓ Revising the sediment budget for the Town to reflect existing management practices.
- ✓ Identifying distinct shoreline segments from Lake Worth Inlet to the Boynton Beach Inlet according to dominant coastal processes, upland development and environmental resources in order to develop improvement and management plan concepts and prioritize shoreline segments.
- ✓ Determining the location, comparative quality, and environmental constraints associated with existing sand sources for immediate and long-term requirements.
- ✓ Providing probable costs to construct the identified shore protection improvements.
- ✓ Evaluating regulatory requirements for beach management activities.
- ✓ Examining alternative beach-fill improvements.
- ✓ Developing and managing a coastal monitoring program and implementing a schedule for field investigations, permitting, funding, construction, and monitoring.

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

The Town of Palm Beach CCMPs of 1986 and 1998, segmented the Town's shoreline into "Reaches" to examine engineering plans for processes. For aid of longshore segment of a and impacts, such as littoral transport, etc. Town has divided its distinct Reaches. The consistent for the past 25

The 1998 revision from the southern limits limits of Palm Beach Town extended Reach 7 Reach 8, and now As illustrated on Exhibit

erosion problems and develop areas with similar coastal understanding, a Reach is a shoreline where influences wind direction, wave energy, mutually interact. 4 The shoreline into eight (8) Reaches have remained years, with slight revisions.

expanded the Reach concept of the Town to the southern Island. More recently, the into the northern section of includes the Lake Worth Pier. 8-1.

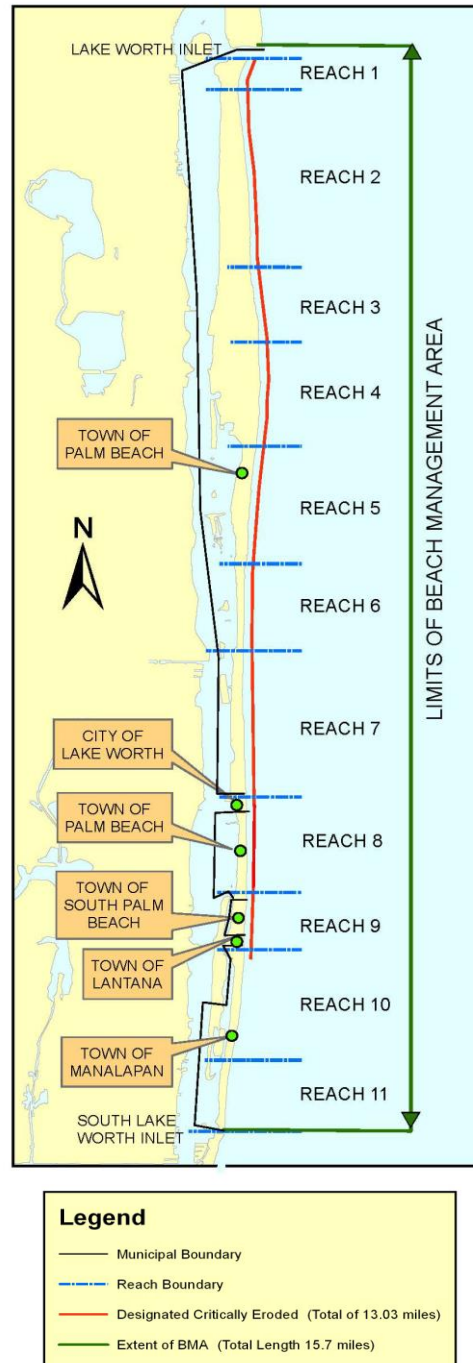


Exhibit 8-1 Reach Zones

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

The Comprehensive Coastal Management Program (CCMP) includes a detailed schedule and budget. The scope and cost of the CCMP is reviewed annually by Town staff, the Shore Protection Board, and Town Council. The Town continues to implement the CCMP objectives.

The Town Council appointed a Shore Protection Board on July 11, 1995, to investigate and evaluate the Town's beaches and develop a plan to address the erosion of this piece of the Town's infrastructure. The Board met regularly for over three years. After investigating the broadest array of beach management options, the Board oversaw the production of the (CCMP) Update, dated September 1997, by Applied Technology & Management, Inc. Thereafter the Board oversaw a separate Peer Review of the CCMP. The Peer Review emphasized that uncertainty exists in the science of managing our coastal resources, and therefore recommended that the CCMP by Aubrey Consulting, Inc. (later referred to as Woods Hole Group, Inc.) be implemented in phases, thereby allowing for flexibility and adjustments through a process called "adaptive management." This process involves incorporating specific, measurable goals in each beach nourishment project and learning from the observed successes and failures, or outcomes of those projects when compared against the projects original expectations. Summarizing the process below:

- (1) — Monitoring the implementation of each project in a manner meant to reveal any critical knowledge that was lacking in the project's original design,
- (2) — Analyzing the outcome of each project against its original objectives, and
- (3) — Incorporating these results into future decisions regarding the projects included in the adopted CCMP by means of appropriate mid-course corrections.

In January of 1999, the Shore Protection Board issued its final report, making a number of recommendations to the Mayor and Town Council, including the implementation of the CCMP through adaptive management.

The Town Council reviewed the CCMP, and held three public meetings throughout the Town to receive input into the decision making process. The CCMP was further discussed at Town Council meetings over a number of months where public debate continued. Some citizens raised concerns about the environmental damage that might be caused by the projects, the method of apportioning the costs of the projects (having them spread among all property owners in the Town in contrast to just beachfront property owners), and the potential effects of creating the Erosion Control line on the privacy and property rights of the Town's residents. The Town Council adopted a scaled-back Coastal Management Plan on December 1, 1999. That action and the Town Council's subsequent actions on these projects substantially outweigh the potential negative impacts. The prevailing opinion expressed by the residents at the Community Forums in November 2001 strongly supported this determination.

The CCMP update of 1999 summarized the 1986 CCMP objectives and included the following

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

key action elements:

- Implement the Lake Worth Inlet Management Plan;
- Construct sand retention structures and restore and maintain beaches along the designated Reaches;
- Implement a comprehensive coastal monitoring and modeling program;
- Maintain, restore and/or replace existing coastal structures; and
- Renourish restored reaches periodically to sustain project benefits.

With the above listed elements identified to be implemented over a 10 year period, the Shore Protection Board was sunset by Town Council in 1999.

Per Ordinance No. 1-08, on July 8, 2008, the Town Council established that the Shore Protection Board “act in an advisory capacity to the Town Council and shall make recommendations to the Town Council on all matters relating to shore protection in the Town of Palm Beach.” On December 9, 2008, Town Council appointed seven (7) members who held their first meeting on December 17, 2008. During their first year, the board developed goals and objectives. With eight (8) objectives identified, the board prepared an Objectives Plan which included data collection, fact finding, short term shore protection actions, and long term coastal management solutions. While assessing the Town’s coastal program through their Objectives Plan, the board also applied the twelve (12) conclusions, recommendations, and comments from the previous Shore Protection Board. Projects were prioritized and the Shore Protection Board concluded their first year of meetings with nine (9) specific recommendations to Town Council on November 10, 2009. In addition to the recommendations, the Shore Protection Board provided Town Council with a 10-Year Coastal Management Plan. Although the 10 Year plan was not adopted by Town Council, the document served as the framework for a plan later adopted by Town Council.

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UPDATED AND PROVIDED WITHIN THIS ELEMENT

Impacts of the Issue

The impact of shoreline protection and the protection of submerged lands is paramount to the continued quality of life, and perhaps even the survival of Palm Beach. This topic has broad

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

implications from social, economic, and environmental points of view. The issue is not new to Palm Beach since the Town has been dealing with beach nourishment and environmental protection issues for years. ~~Additionally, the recreational opportunities afforded by the Town's beaches and natural areas constitute the economic foundation for the living environment. It is anticipated that the issues outlined in this section will~~ Coastal management and shoreline protection will continue to receive the highest level of priority from the Town Council. As such, the Town's Comprehensive Plan and Zoning Code provide guidance as to the status of submerged lands located within the Town limits.

Submerged land beyond the physical shoreline of Lake Worth and the Palm Beach Inlet within the Town's corporate limits has a future land use designation of Conservation and no land development or redevelopment is allowed. This prohibition does not preclude Palm Beach County, Florida Inland Navigation District or the Army Corp of Engineers from creating spoil islands that would be designated Conservation on the Town's Future Land Use Map. Historically, since 1960 (Ordinance No. 3-60, prior to the Comprehensive Plan, as defined by the 1975 Growth Management Act, the Town's land development regulations have not allowed structures, other than docks, to be constructed over the waters of Lake Worth. The Town will continue to vigorously enforce these regulations.

~~Coastal High Hazard Area (CHHA) is defined as "[t]he area below the elevation of the category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model." This area is a narrow area along the coast of the island, and is delineated in the future land use map series. Future infrastructure and public and private development within the CHHA will be restricted except when doing so is not feasible. The Town is legally limited in its ability to restrict development of private properties located in the CHHA. However, the Town has long recognized the wisdom of limiting development densities and discouraging inordinate growth. The Town will continue to do so through the implementation of this Comprehensive Plan which has as one of its basic tenets the effort to lower the patterns of density wherever legally and practically possible.~~ **DISCUSS IN ANOTHER SECTION**

~~Unanticipated Changes in Circumstances~~

~~Although this high priority issue is ongoing, many unanticipated changes in circumstances routinely evolve throughout the implementation process. Funding, availability of federal, state and other revenue sources as well as multi-jurisdictional regulatory review processes affect the timing, scale and scope of these types of projects.~~

Resulting Problems or Opportunities

Policy 5.6 in the Town's Coastal Management/ Conservation Element identify the bulkhead line in Lake Worth as the mean high-water line (MHWL). However, the Town believes that in order to prevent future attempts at development of submerged lands in Lake Worth (with the exception of docks), lands west of the mean high-water line shall always be Conservation on the Future Land Use Map.

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Dunes are created when onshore winds move sand inland from the beach, forming mounds of sand which are trapped and stabilized by specially adapted grasses and herbaceous vines. Dunes are easily disturbed by pedestrian and vehicular traffic, which has the potential to destroy the delicate vegetative fabric vegetation holding the sand in place. Small disturbances often develop into large barren areas, or "blowouts", which can be self-perpetuating, ultimately resulting in gaps in the dunes that provide ~~which diminish landward property~~ protection to properties landward of the shoreline. Many of the dunes in Palm Beach have been built upon, landscaped as part of residential yards, or used as a roadbed. With a seawall fronting the dune, and its other surfaces covered by man-made improvements, the dune has often been transformed from a natural and dynamic element of the shoreline ecology to an essentially stable, topographic feature.

In some areas of the Town, construction has been limited to the top of the foredune (part of a sand dunes on the side nearest to the ocean) leaving the seaward slope of the dune principally unaltered. ~~Because these dunes cannot migrate away from the eroding beach, they often experience severe erosion. Examples are scattered throughout the Town but are most evident south of the Lake Worth Municipal Park. These 20' high dunes are experiencing erosion along nearly the entire stretch of beach. As erosion increases, dunes backed by a shore protection structure are likely to begin experiencing erosion as well.~~ Phipps Ocean Park has a healthy foredune slope, but is ~~similarly~~ stabilized on and behind the ridge by old State Road A1A, and picnic and parking areas. This dune is mainly vegetated by sea oats, with seagrasses growing on the upper part. Seedlings and pines are removed by the Town's Public Works Department before they damage the native dune vegetation.

Several dynamic dune systems remain. The Town-owned Par Three Golf Course fronts an undulating series of 15-to-20-foot dunes mainly vegetated by sea oats with scattered growths of low-lying herbaceous plants. The northern part of the Town, near the Lake Worth Inlet jetties, has a very low series of moderately vegetated dunes. This area receives the benefits of the Inlet sand transfer plant, and thus has a wide, gently sloping beach. Dunes are protected by Chapter 55, Natural Resource Protection, of the Code of Ordinances, which prohibits disturbance of dunes or dune vegetation without a special permit from the Town. The ordinance includes strict vegetation planting and trimming controls and includes a dune maintenance program.

Utilization of Natural Resources

~~The natural environment in the Town of Palm Beach is almost exclusively used for recreation and aesthetic enjoyment. No commercial fishing industries operate from Palm Beach. The Town is a dedicated bird sanctuary.~~

~~The majority of the Town's natural resources are concentrated along shoreline areas. The beaches are the focus of swimming, walking, snorkeling and surfing activities. Vistas to the Ocean and Lake Worth Lagoon are a valued accommodation. Lake Worth Lagoon is also used to moor boats~~

COASTAL MANAGEMENT/CONSERVATION ELEMENT

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and to obtain access to the Intracoastal Waterway.

Much of the Town's unique beauty arises from the prolific, lush vegetation growing around homes and along roads. This vegetation also improves air quality, reduces noise, and moderates the climate. Native species receive additional benefits, such as habitat for endangered wildlife, shoreline stabilization, and protection for coastal areas. Estuarine shoreline vegetation, such as mangroves and salt marsh, can also improve water quality.

The Town protects its unique vegetative environment with an ordinance requiring Town Council approval for trimming and removal of designated historic trees; another ordinance that prevents removal, and strictly controls trimming of mangroves; and, a general policy that discourages the removal of trees unprotected by these ordinances. The Town will be updating their regulations in 2017/2018 to further clarify tree removal and landscaping standards, prohibiting planting of pestilent exotics, and outlining ways in which ecologically beneficial communities could be created as part of revegetation projects.

The elimination of pestilent exotics is a major environmental concern. Gradual removal would prevent shock to surrounding native vegetation. Dead vegetation decomposes, becoming part of the natural system. This is an excellent, inexpensive method for isolated areas, such as spoil islands, where the cost and labor of removing exotic vegetation is prohibitive. Herbicide should be applied by professionals under advisement of a qualified biologist, and should not be applied during nesting season, as the birds are easily frightened by human disturbances. The Town requires removal of Brazilian Pepper and Australian Pine during site development.

MOVED TO THE CONSERVATION ELEMENT

EXISTING LAND USE AND RELATED LAND USE ISSUES

The Town Beach lies entirely within the coastal zone and is an urban, built-up area approaching saturation. Land uses are primarily in the form of residential, commercial, public, private group use, and conservation uses. There are no agricultural or industrial uses in the Town. More detailed discussion of land use patterns is provided in the Land Use Element.

Water dependent and water-related uses in the Town are identified and described on the map and table provided in the supporting documentation to the Plan.

Of the Town's twelve miles of shoreline, approximately 4,760 linear feet, or approximately 8%, is accessible for public bathing and recreational purposes. Of this, about 4,245 linear feet is in Town ownership, 515 linear feet is owned by the County. The City of Lake Worth's "Casino Complex" includes an additional 1,300 linear feet of public beach which is actually located between Kreusler Park and the southernmost 1.2 miles of the Town. There are also several street ends that provide public access to the beach in the northern part of Town.

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

FUTURE LAND USE AND DEVELOPMENT IMPACTS

Little or no affect is expected upon estuarine conditions as a result of development or redevelopment. The Town is essentially built out, and future development is limited. Redevelopment is possible in certain areas where, consistent with the Town's comprehensive plan and zoning regulations, The previous update to the comprehensive plan identified that estates could be subdivided into smaller parcels, however the recent trend has been combining lots to create larger parcels as opposed to subdividing.

While the Town generally considers any loss of remaining areas of estate character or increase in density to be undesirable, it is possible that new development or redevelopment could improve water quality, due to the requirement that such developments provide for on-site retention of the first two inches of rainfall.

The majority of remaining native shoreline vegetation is located on narrow undevelopable strips along State Road A1A, or on spoil islands in the Lagoon. Mangroves are protected by a Town ordinance, and by State and County regulations. The Army Corps of Engineers and the State Department of Environmental Protection also have authority if dredge and fill activity is involved.

In June of 2015, the Florida Department of Environmental Protection (FDEP) released a study, Critically Eroded Beaches, and noted the "area extending south of Lake Worth Inlet along the Town of Palm Beach (R76-R128) as 10.9 miles of critical erosion threatening private development, local parks, and State Road A1A.

As a result of that study a new policy has been added to explore the possibility of designating the Town as an Area of Critical Concern pursuant to Florida Statutes 380.05(3). The Areas of Critical State Concern Program was created by the "Florida Environmental Land and Water Management Act of 1972." According to the State of Florida Department of Economic Opportunity (DEO), the program is "intended to protect resources and public facilities of major statewide significance, within designated geographic areas, from uncontrolled development that would cause substantial deterioration of such resources." Based on the need to protect the Town's shoreline, natural and historic resources coupled with sea level rise and development impacts from adjacent municipalities and agencies, this designation should at least be explored as a way to protect and preserve the community.

REMEDIES FOR EXISTING POLLUTION

Stormwater discharge is a major water quality problem for the Town. Drainage improvements have focused on eliminating flood-prone pockets on the Island rather than on improving water requirements. New developments must retain the first two inches of rainfall to prevent any further degradation of water quality from this source. It is more difficult, however, to remedy existing sources of stormwater runoff since the high water table would require large surface areas for

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

retention. Given the fact that the Town is virtually fully developed, there is little or no opportunity to create new upland retention areas which would allow infiltration and settling prior to discharge into the Lake. Exfiltration drainage systems, which operate underground, are also limited by the highwater table.

The Town recognizes the importance of improved water quality in Lake Worth, but also realizes that any major retrofitting of the system will require study and time. The Town's National Pollutant Discharge Elimination System (NPDES) permit will require a number of preventative methods and techniques, structural controls, and public education to improve the quality of stormwater runoff from upland properties.

Water quality can be improved by revegetating shorelines, as described earlier in this Element. Shoreline vegetation would supply nutrient absorption and moderate sediment stabilization. In addition, using County funds to place rip rap along bulkhead shores would reduce wave energies, and encourage new mangroves and seagrasses in those areas shallow enough to promote such growth. The Town and the County have entered into an Inter Local Agreement to provide environmental enhancement to Town-owned properties along the Lake Worth Lagoon. Projects are to include capping mud sediments, placement of hard structures to encourage oyster growth and planting grasses and mangroves.

RELOCATED TO CONSERVATION ELEMENT AND EDITED

INFRASTRUCTURE AND NATURAL DISASTER PLANNING

Since the Town is located entirely within the coastal zone, inventory and analyses of existing and needed public infrastructure are covered in detail in other Elements of this Plan.

All of Palm Beach is within the hurricane vulnerability zone; therefore, there are no suitable evacuation shelters within the Town. Consequently, Town residents must rely upon public or private shelters located in inland areas of the County. However, in 2012 Palm Beach County updated its mandatory evacuation maps whereby the Town is not under a mandatory evacuation.

Coastal High Hazard Area (CHHA) is defined as “[t]he area below the elevation of the category 1 storm surge line as established by a Sea, Lake and Overland Surges from Hurricanes (SLOSH) computerized storm surge model.” This area is a narrow area along the coast of the island, and is delineated in the future land use map series. Future infrastructure and public and private development within the CHHA will be restricted except when doing so is not feasible. The Town is legally limited in its ability to restrict development of private properties located in the CHHA. However, the Town has long recognized the wisdom of limiting development densities and discouraging inordinate growth. The Town will continue to do so through the implementation of this Comprehensive Plan which has as one of its basic tenets the effort to lower the patterns of density wherever legally and practically possible.

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

The area seaward of the Coastal Construction Control Line (CCCL) is the area of most significant exposure to natural disasters.

The development history of Palm Beach is punctuated by the occurrence of two types of severe storms: hurricanes and northeasters. The Town recognizes that rebuilding of privately owned structures which are located outside of the areas of major exposure to natural disasters must be permitted. Areas located seaward of the CCCL are those with greatest exposure to natural disasters. Therefore, following damage from a major storm, local government has a number of alternatives:

- The first is to decide the level of damage beyond which the Town will consider alternatives to reconstruction of the structure to its pre-storm state. The threshold most commonly used is 50% of the value of the structure. This is also the standard used in the National Flood Insurance Program.
- An alternative is to require reconstruction landward of the CCCL only if there is sufficient land to accommodate reconstruction in this area, or to allow reconstruction seaward of the CCCL if Florida Department of Environmental Protection (FDEP) standards are met.

In addition, it would be beneficial to require that all post-disaster redevelopment of properties, damaged greater than 50% of their pre-storm value, provide for on-site drainage retention.

The Town implemented a reverse 911 system several years ago but decided to eliminate the service due to high cost and little use. Instead, the Town has access to Palm Beach County's Reverse 911 program to make calls directly to Town residents in the event of an emergency situation. Other notification services, such as electronic alerts sent via email and text messages have been added over the last few years as a part of the Town's efforts to improve communications to its residents and business community.

The Town's Comprehensive Emergency Management Plan (CEMP) was re-written in 2012. The CEMP, which includes the Storm Emergency Response Plan (SERP) and Continuity of Operations Plan (COOP) is reviewed and updated annually (as needed). The Town's Emergency Planning Team (EPT) includes representatives from each department and is responsible for year-round planning efforts to ensure the Town is properly prepared to respond to emergency situations.

The Beach Management Agreement

In 2018, the Town of Palm Beach entered into a Beach Management Agreement (BMA) with the DEP, in conjunction with the Florida Fish and Wildlife Conservation Commission (FWC) to coordinate beach management activities. Annual BMA stakeholder meetings are held at Town Hall to make any necessary updates to programming and/or lists. The BMA was last updated in 2021

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

and a public hearing on the agreement was recently held in August 2023, and no changes were made to the BMA. The BMA process establishes the regulatory responsibilities of the DEP with other state and federal agencies, and the public to create a streamlined program to protect the environment and to provide net ecosystem benefits pursuant to §403.0752(2)(a), Fla. Stat..⁵

The BMA purpose is to coordinate and facilitate flexible permitting for beach management and to achieve net ecosystem benefits and related public objectives for the Town of Palm Beach and affected area. The BMA’s approach to authorizing projects and activities is centered on regional management of the coastal system rather than the conventional project-by-project permitting process. For this reason, the BMA improves comprehensive coastal management and results in a net ecosystem benefit to the coastal system through cell-wide monitoring of resources, improved inlet bypassing, and efficient use of beach quality sand.⁶

The primary goal of the BMA is to define mutually agreeable methods among the DEP, local municipalities, and stakeholders for coastal erosion control, natural community protection, and monitoring protocols in pursuit of regional management of Palm Beach Island's coastal system, while providing net ecosystem benefits to the “cell”, which encompasses all of the eight (8) Reaches. ⁷ Prior to the BMA, beach erosion control and inlet management activities are regulated, project by project, through the DEP’s Joint Coastal Permitting (JCP) Program. Beach erosion control activities, such as beach restoration and nourishment projects, require three (3) forms of authorization: coastal construction permits (Chapter 161, F.S.), environmental resource permits (Part IV Chapter 373, F.S.), and proprietary authorization to use sovereign submerged lands (Chapters 253 and 258, F.S.). The JCP consolidates these authorizations into one (1) permit and serves as the final determination of consistency with Florida’s Coastal Zone Management Program (CZM) and water quality certification under the Clean Water Act. The BMA seeks to improve techniques for managing the sand resources and beach erosion within Palm Beach Island.⁸

The BMA addresses State regulatory and proprietary approvals for managing sand resources and beach erosion within the BMA Area. It sets forth the procedures and criteria to be followed by the DEP, the FWC, and the BMA stakeholders for pre-application meetings and application submittal. The BMA also requires review and approval for individual projects within the Agreement Area, as well as coordination with federal agencies and notice to the public. The BMA ultimately sets forth annual cell-wide requirements to monitor the movement of sand, sea turtle nesting, shorebird nesting, and exposure and burial of hardbottom and to perform aerial surveys. ⁹

The DEP staff reviews the projects specifically described in the BMA to determine consistency with the substantive requirements of Chapter 161, Chapter 253, Part IV Chapter 373, and Chapter

⁵ Ibid

⁶ Ibid

⁷ Ibid

⁸ Ibid

⁹ Ibid

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

403, F.S., and their implementing rules, and for dune restoration, Chapter 161, F.S., and its implementing rules. This review must determine that cell-wide management of sand resources and beach erosion would result in net ecosystem benefits. 10

Prior to construction, individual projects must demonstrate compliance with the conditions of the BMA. The BMA then constitutes a certification of compliance with State water quality standards under Section 401 of the Clean Water Act, 33 U.S.C., and a finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act (CZMA).11

A significant component of the BMA is the constant monitoring. The BMA includes requirements for physical monitoring of projects and coastal system conditions. The BMA covers the coastal shoreline from Lake Worth Inlet to South Lake Worth Inlet, which expands approximately 15 miles. The area is sub-divided into 10 Reaches. However, for the Town of Palm Beach, the activity and annual monitoring is limited to the northern eight (8) Reaches, as illustrated in the Town of Palm Beach Reach Zones Map and consists of approximately 12.2 miles. 12 The adopted BMA has been incorporated into the Coastal Management Element by reference.

The Woods Hole Group Study – Coastal Flood Vulnerability Assessment

In July 2019, The Woods Hole Group completed a Coastal Flood Vulnerability Assessment. The assessment was intended to provide guidance to the Town for prioritizing and planning future flood mitigation projects and adaptations to improve coastal resilience now and into the future. As stated in the assessment public infrastructure projects are designed to last decades or more, these programs need to factor future risk into design criteria where coastal flooding is a risk. Ultimately, the assessment was intended to assist the Town to improve coastal resilience while also aiding in minimizing costly flood damage and future repairs of infrastructure.13

The methods applied are based on an award-winning, innovative and quantitatively advanced probabilistic vulnerability model. The methodology was developed by Woods Hole Group, in collaboration with more than 20 partners and peer reviewers, including Federal Highway Administration, Massachusetts Department of Transportation (Mass DOT), University of Massachusetts - Boston (UMass Boston), US Army Corps of Engineers (USACE), US Environmental Protection Agency (USEPA), U.S. Geological Survey (USGS), National Oceanic and Atmospheric Administration (NOAA), Woods Hole Oceanographic Institution (WHOI), and others. The team received a 2017 Federal Highway Administration Environmental Excellence Award, which recognized the method as “a gold standard for coastal resiliency work,” and “a blueprint that national and international agencies can mirror to better assess and design resiliency

10 Ibid

11 Ibid

12 DEP presentation August 24, 2023, at the Town of Palm Beach

13 Woods Hole Study – Coastal Flood Vulnerability Assessment 2020

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

options”. In its vision within the ongoing 10-year coastal management program, the TOPB is proactively planning to protect the citizens and community infrastructure.¹⁴

As stated in the Vulnerability Assessment, coastal storms threaten infrastructure in the Town of Palm Beach, a risk expected to increase in the future with changing sea levels and increasing storm intensities. Interruptions in community services are an inconvenience and impact the health and safety of the citizens. Predicting the most vulnerable assets under different future scenarios offers the opportunity to develop adaptations now to minimize damage and build coastal resilience against disruption in services that may occur in the future. Additionally, completing a vulnerability assessment meets the statutory requirement for designating Adaptation Action Areas, and forms the basis for complying with the “Peril of Flood” comprehensive plan requirements as found in Section 163.3178(2)(f)(1-6), Florida Statutes (Florida Coastal Management Program, Florida DEP, NOAA, 2018).¹⁵

The Town worked with Woods Hole Group to complete a vulnerability assessment for Town-owned assets, specifically addressing Step 2 and key parts of Steps 1 and 3, displayed in the Figure 8-1. The vulnerability assessment also provides the TOPB with the data and tools necessary to complete the remaining steps efficiently and effectively.¹⁶



Figure 8-1 Florida Adaptation Planning Guidebook 2018 Four-Step process

¹⁴ Ibid

¹⁵ Ibid

¹⁶ Ibid

COASTAL MANAGEMENT/CONSERVATION ELEMENT DATA & ANALYSIS

In 2021, the Woods Hole Group was commissioned to prepare a Coastal Resilience Implementation Plan, “Level-Up” (Level-Up Plan). The Implementation Plan provided recommended changes to the Coastal and Conservation Elements Goals, Objectives and Policies. With regard to the Coastal Management Element, the Level-Up Plan recommended the following amended and added Policies to the Coastal Management Element, shown below.

Amended Policy 5.3 The Town shall require that all new development and redevelopment on the Atlantic shore restore dunes, where restoration potential exists and is necessary, as determined by the Town and FDEP. Primary dune restoration to a higher crest elevation and sediment volume along Reach 1 is a high priority for coastal flood control.

Added Objective 5: The Town shall adopt and implement policies that limit development and public expenditure within the Coastal High Hazard Area (CHHA).

National Flood Insurance Program (NFIP)

The United States Congress established a National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The NFIP is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal government. Should a community adopt and enforce a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal government makes flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an insurance alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

The NFIP provides federally backed flood insurance within communities that enact and enforce floodplain regulations. The Community Rating System (CRS) is a national program developed by the Federal Emergency Management Agency (FEMA). To be covered by a flood insurance policy a property must be in a community that participates in the NFIP. To qualify for the NFIP, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas.

In developing zone maps, FEMA focuses primarily on identifying the 1-percent annual chance floodplain (also known as the 100-year floodplain, Special Flood Hazard Area (SFHA). As a result, FEMA maps the areas with a 1% annual chance of flooding. The SFHA designation is important as it is the basis for floodplain management regulations for communities and because it decides whether a home is required to have flood insurance.

FEMA’s high-risk flood zones are those that make up the SFHA and are those that begin with the letters “A” or “V.” Homeowners located in A or V zones are required to purchase flood insurance

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if they have a mortgage from a federally-backed or federally-regulated lender. FEMA's low and moderate-risk flood zones are those outside the SFHA and begin with the letters "X," "B," or "C." Flood insurance is not required within these zones. These zones could still have flood risk as historically more than 20% of NFIP claims are made by policyholders in an X, B, or C zone. 17

The CRS Program recognizes, encourages and rewards communities that go beyond the minimum required by the NFIP. Under the CRS, the flood insurance premiums of a community's residents and businesses are discounted. A community receives a CRS classification based upon the total credit for activities such as Public Information, Mapping and Regulations, Flood Damage Reduction and Warning and Response. The Town of Palm Beach is part of the CRS Program, "Class 6" rating which allows residents to receive a discount of their flood insurance.

The NFIP's CRS was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Palm Beach County joined the National Flood Insurance Program's (NFIP) Community Rating System (CRS) in 1991. The CRS is the County's primary floodplain management program. It is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements.

Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

- 1) Reduce flood losses.
- 2) Facilitate accurate insurance rating.
- 3) Promote awareness of flood insurance.

The Town of Palm Beach participates in the NFIP and as stated, it affords Town property owners flood insurance. As a participant, the Town is required to adopt ordinances to manage development within 100-year floodplains to prevent increased flooding and minimize future flood damage. Flood Insurance Rate Maps, published by the FEMA, are used as the basis for delineating the 100-year floodplain and identifying regulated land. These maps have been made a part of the Map Series. To this end, the Town adopted two (2) ordinances in 2017 related to FEMA's updated flood insurance maps and flood hazard prevention. An update is anticipated in 2023, as such the FEMA Map will be adopted by reference in order to allow for the updated map immediately.

Development in flood zone areas must also meet the requirements of the NFIP. The Town contains various flood-prone areas (Zones A and V) with the majority being located along the Atlantic Ocean on the barrier island, the ICWW and fringe areas along the North and Northwest Forks of the Loxahatchee River.

17 <https://help.riskfactor.com/hc/en-us/articles/360048256493-Understand-the-differences-between-FEMA-flood-zones>

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There are 10 CRS classes that allows flood insurance premium discounts in CRS communities. They range from 5% to 45% and are discounted in increments of 5%. A Class 10 community is not participating in the CRS and receives no discount. A Class 9 community receives a 5% discount for all policies, a Class 8 community receives a 10% discount, all the way to a Class 1 community, which receives a 45% premium discount.

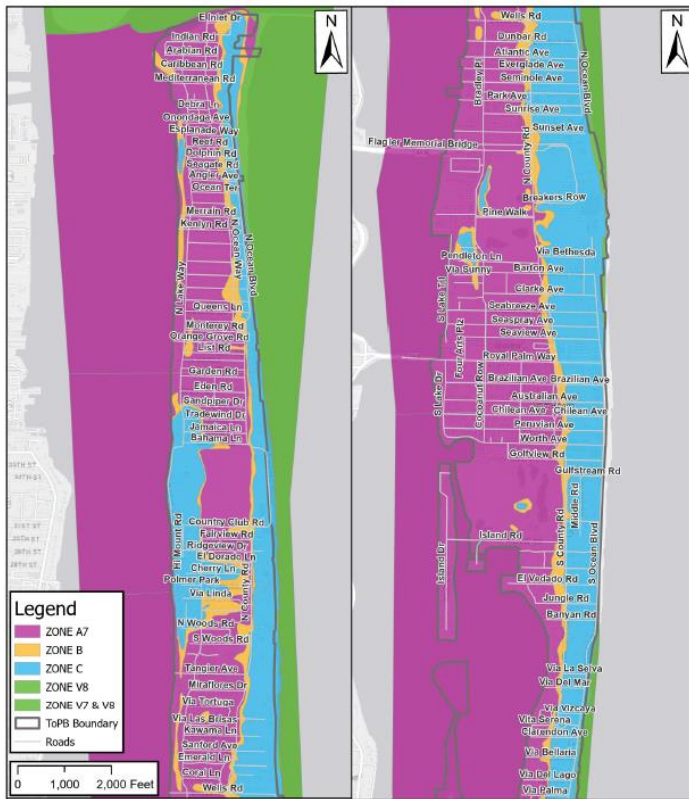
Classifications are based on the community's CRS credit points obtained in 19 creditable activities. The CRS activities are organized into the following four (4) categories.¹⁸

- Public Information
- Mapping and Regulations
- Flood Damage Reduction
- Warning and Response

In addition to State agencies, the Town's Planning, Zoning and Building Department regulates the building of structures in flood-prone areas so that flood damage can be minimized or avoided. The Town has continued to support these programs and work with residents and businesses in regard to program requirements. Moreover, the Town recently passed an ordinance related to FEMA's updated flood zone maps (displayed below and in the Map Series) and is considering an ordinance related to flood hazard prevention techniques that could increase the "freeboard" height requirements. The Town of Palm Beach participates in the NFIP and the Town Council will continue to meet the requirements of Title 44 Code of Federal Regulations, Sections 59 and 60, necessary for participation.

¹⁸ <http://fema.gov/floodplain-management/community-rating-system>

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Map 8-1 Flood Zone Map 2024



Map 8-1 Flood Zone Map 2024

REMOVING MAPS AS THEY ARE IN THE MAP SERIES

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As illustrated in Figure 8-2, freeboard refers to the height of a building above the Base Flood Elevation for a specific site. Florida regulations often require at least one foot of freeboard for elevated buildings. Each foot of freeboard (up to a maximum of three feet), lowers flood insurance rates significantly. Since elevations on FIRMs do not include sea level rise, freeboard will help keep structures above floodwaters as storm surge elevations increase, thus reducing flood insurance premiums. The graphic below shows an example of the Town's current freeboard requirement.

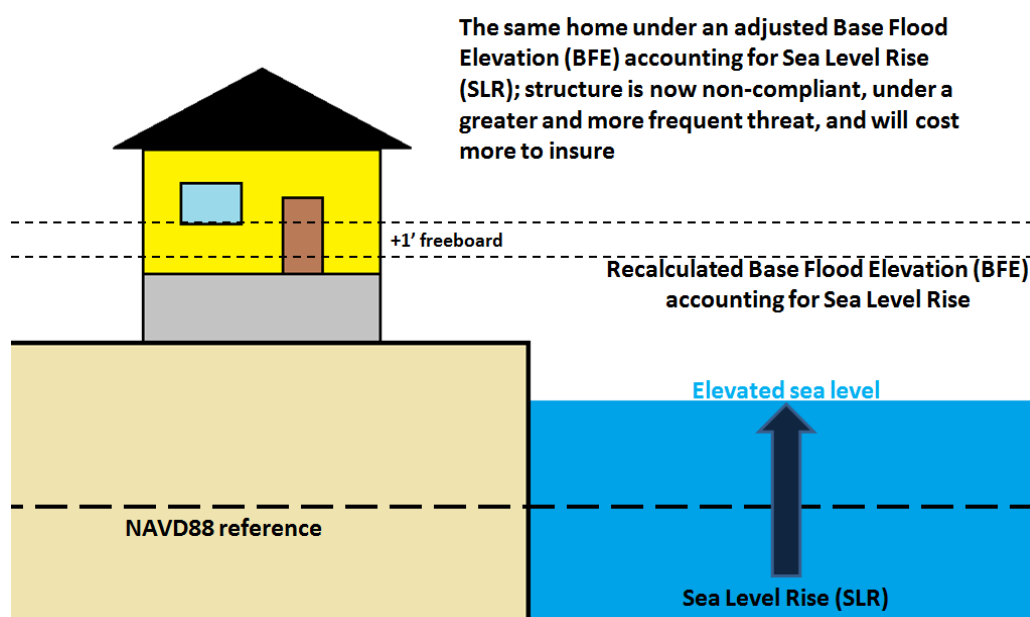


Figure 8-2 Adjusted Base Flood Elevation Accounting for Sea Level Rise

Future Land Use and Zoning Designations

Further protection is also granted to designated submerged land beyond the physical shoreline of Lake Worth Lagoon, the Lake Worth Inlet, and the Atlantic Ocean within the Town's corporate limits through the designation of a Future Land Use designation of Conservation. The corresponding Zoning District has also been established as Conservation. Pursuant to Code Section 134.1352, the Conservation Zoning District category does not permit any uses, with the exception of essential services and municipally owned and operated parks.

FUTURE LAND USE AND DEVELOPMENT IMPACTS MOVED TO CONSERVATION AND REWORDED

Little or no affect is expected upon estuarine conditions as a result of development or redevelopment. The Town is essentially built out, and future development is limited.

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~~Redevelopment is possible in certain areas where, consistent with the Town's comprehensive plan and zoning regulations, The previous update to the comprehensive plan identified that estates could be subdivided into smaller parcels, however the recent trend has been combining lots to create larger parcels as opposed to subdividing.~~

~~While the Town generally considers any loss of remaining areas of estate character or increase in density to be undesirable, it is possible that new development or redevelopment could improve water quality, due to the requirement that such developments provide for on-site retention of the first two inches of rainfall.~~

~~The majority of remaining native shoreline vegetation is located on narrow undevelopable strips along State Road A1A, or on spoil islands in the Lagoon. Mangroves are protected by a Town ordinance, and by State and County regulations. The Army Corps of Engineers and the State Department of Environmental Protection also have authority if dredge and fill activity is involved.~~

~~In June of 2015, the Florida Department of Environmental Protection (FDEP) released a study, Critically Eroded Beaches, and noted the “area extending south of Lake Worth Inlet along the Town of Palm Beach (R76-R128) as 10.9 miles of critical erosion threatening private development, local parks, and State Road A1A.~~

~~As a result of that study a new policy has been added to explore the possibility of designating the Town as an Area of Critical Concern pursuant to Florida Statutes 380.05(3). The Areas of Critical State Concern Program was created by the "Florida Environmental Land and Water Management Act of 1972." According to the State of Florida Department of Economic Opportunity (DEO), the program is “intended to protect resources and public facilities of major statewide significance, within designated geographic areas, from uncontrolled development that would cause substantial deterioration of such resources.” Based on the need to protect the Town’s shoreline, natural and historic resources coupled with sea level rise and development impacts from adjacent municipalities and agencies, this designation should at least be explored as a way to protect and preserve the community.~~ **Not a viable option**

Shore Protection Board

As stated, the importance of monitoring and active participation in the protection of the Town’s shoreline and coastal resources is paramount. As such, pursuant to Section 2-636, Town of Palm Beach Code of Ordinances, the Shore Protection Board was created to act in an advisory capacity to the Town Council and make recommendations to the Town Council on all matters relating to shore protection in the Town. These responsibilities include, but are not limited to, issues relating to the beaches and specific resiliency matters along the Town's Lake Worth Lagoon shoreline as directed by Town Council. In addressing these matters, the scope of the Shore Protection Board's duties includes long-term planning, public education, and assisting Town staff in applicable communication with the public.

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HURRICANE PREPAREDNESS IN THE TOWN OF PALM BEACH

With regard to response procedures for hurricanes and other natural disasters, Palm Beach County and the Town of Palm Beach coordinates in hurricane and disaster planning and management efforts. In addition, the ongoing management and coordination efforts continue to be redefined, as necessary, and have been implemented several times in recent years.

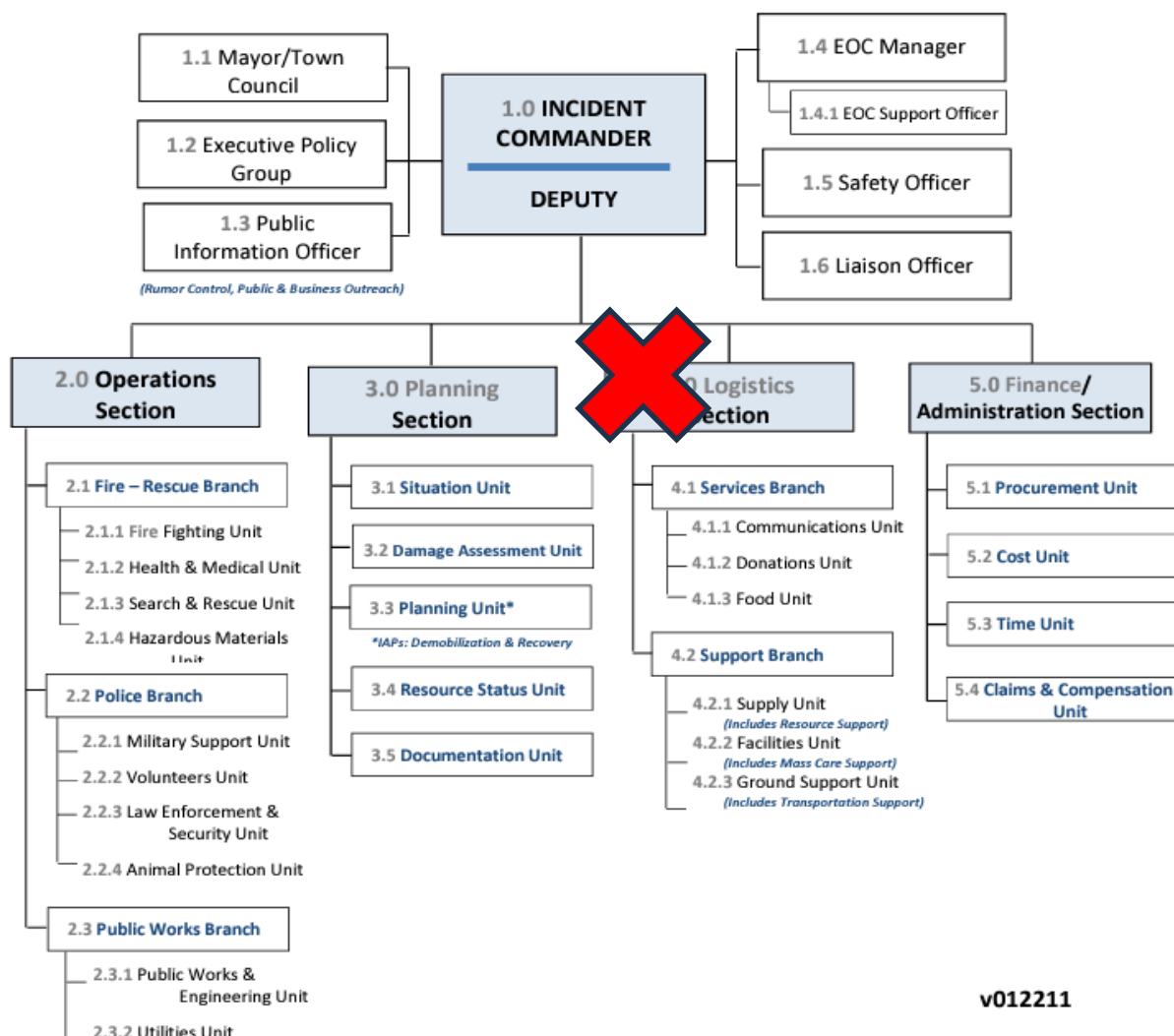
The official warning process for an approaching hurricane begins with issuance of a hurricane watch by the National Hurricane Center. A hurricane watch, alerts residents of a specified area to the potential of a hurricane and advises them to monitor hurricane advisories, which are issued every six hours. A hurricane watch suggests that residents begin preparations for a possible evacuation.

The legal authority for ordering and coordinating evacuations in the State of Florida resides with the Governor. The Governor has delegated this authority to local governments. Thus, an evacuation order may be issued by a municipality in the absence or an order by a higher level of government. However, an order issued by a higher level of government takes precedence.

As stated in the Public Safety Element, Chapter 18-33 of the Town Code of Ordinances designates the Fire Chief as the Emergency Management Director. The Town of Palm Beach will support the County and the Red Cross by assigning security and emergency medical personnel, if needed, to shelters as they are opened by the County. The Town of Palm beach Emergency Operations Center will serve as the nerve center for the coordination and control of the Town's response and recovery efforts. The EOC will be activated by the Emergency Management Director upon determination of a significant and immediate threat to life and property. ~~The below graphic indicates the incident command system organization structure in times of EOC initiation.~~

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Town of Palm Beach Emergency Operations Center (EOC) Incident Command System (ICS) Organizational Structure



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Evacuation order time is the time in hours prior to hurricane eye landfall by which an evacuation order must be issued in order to allow all evacuees to reach their chosen destinations. Determining the appropriate time to issue an evacuation order involves not only calculation of total evacuation time, or clearance time, but also consideration of the following: According to the Town of Palm Beach's Comprehensive Emergency Management Plan (CEMP), the Town uses a graduated response approach in responding to and managing emergencies and disasters such as hurricanes and tropical storms. As the potential severity of the emergency or the demand on local resources grow, there will be an increase in emergency response and coordination activities to meet

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increasing emergency demands. Readiness Levels will be determined by the Town Manager or Emergency Management.

PATH FORWARD**SUMMARY**

Due to its location along the coast, the Town and its resources are vulnerable to various natural disasters. The Coastal Management Element provides insight into the Town's coastal resources and emphasizes the importance of maintaining a resilient community to preserve and protect these resources and associated areas.

Increasing sea levels are expected to significantly challenge regional long-term planning for coastal communities in South Florida, including Palm Beach. In order to minimize the threat imposed by these challenges, it is imperative that the Town take necessary steps in adaptive planning and work to develop a policy framework that is integrated into its local planning system.

Steps to take include best management practices that address adaptation or sea level mitigation issues, ensuring consistency across all municipal operations and their guiding plans and programs. Additionally, it is suggested to include educational programming for residents and visitors on the importance of the challenges posed by storm surge and major flooding from rising sea levels, and finally, how to work as a community to address these challenges.

These steps lay the foundation toward building a more resilient community, and together with informed public and committed elected officials, reaching the community's established goals and strategies are achievable. As such, changes to the Coastal Management Element Goals, Objectives and Policies from the Woods Hole Study, Level-Up-Plan, are recommended.