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Background Data and Analysis*

*This document serves to provide background data and analysis for the Coastal Management Section. It is intended to meet the requirements of Chapter 163.3177(1)(f) and is non-adopted material.

This document only includes items not already included as part of the Coastal Management Section. For example, maps propped to be adopted are not repeated here, but are utilized as part of the data and analysis.

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Existing Land Use

Existing land uses within the coastal planning area are illustrated on the Existing Land Use Map. These land uses include residential, commercial, industrial, public facilities, natural, agricultural, vacant and mining.

Residential: An analysis of the existing land uses indicates residential land use (single, multi-family) covers 27.16% or 43,295 acres of the total existing land uses within the county's coastal planning area. Primary concentrations of residential uses occur in the Town and County, generally described as the land mass south of Gunn Highway, south to Tampa Bay, Palm River/Clair Mel located south of the Palm River and west of I-75, Riverview/Gibsonton located along the Alafia River, and the Ruskin Wimauma area in the very southern portion of the county.

Many of the areas are often either on low, flood prone uplands, or on land made as the result of dredge and fill operations. Concentrations of this type of development are especially prevalent in the areas of Town and County, Clair Mel City, Apollo Beach, and Bahia Beach. Problems that are common to these areas are periodic flooding, cumulative adverse impacts to wetlands, soil erosion, non-functioning septic systems, and reduced public access to the shoreline.

Although additional development is anticipated, areawide planning process requirements will mitigate the impacts to public facilities and concentrate growth in defined limits.

Commercial: Commercial development in the unincorporated County's coastal planning area is not extensive, encompassing only 8,863 acres or 5.63% of the total coastal planning area. Most commercial uses are neighborhood in scale and do not serve as an attraction for future development in the coastal zone; rather, it has followed the demand created by residential development.

Community Facilities: Approximately 35.01% or 55,090 acres of the land uses within the coastal planning area are devoted to public/semi-public uses within the broad category of community facilities. General uses include facilities such as electrical power generating and transmission facilities, wastewater treatment and disposal facilities, governmental complexes, schools, churches, recreation and open space lands, streets and rights-of-way. In terms of acreage, the largest single land uses within this category are electrical generating and transmission facilities followed by recreation and open space lands, both of which are primarily water-dependent land uses. Recreational and open space uses include both passive pursuit of nature and active forms of recreation, such as fishing and boating. Natural parks, such as Upper Tampa Bay Park on S.R. 580, feature primarily the former type of activity. Boating and fishing are pursued wherever the Bay meets the land.

Agricultural: Agricultural and vacant lands occupy a significant portion of the County's coastal planning area, but urban growth is steadily displacing these land uses, forcing agricultural activities to move to more inland parts of the County. As noted in **Error! Reference source not found.**, agricultural lands accounting for 17.66% of the predominant agricultural uses in terms of total acreage are general agriculture, row crops and fenced pastureland.

Industrial: Much of the County's heavy industrial development is located in the coastal planning area, primarily due to the maritime history of Hillsborough County and its subsequent development in port-related activities. This heavy industry accounts for approximately 10,202 acres or 6.48% of all industrial activity within the coastal planning area. The balance of the industrial uses take the form of light industrial and warehouse and distribution uses and are generally located inland from the waters of

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Tampa Bay. The Port of Tampa's historic evolution is detailed within the City of Tampa's Coastal Management Element; however, the Port's activities have spread from the inaugural Port Tampa area, on the southwest shore of the Interbay peninsula in Tampa, along the east shore of Hillsborough Bay. Heavy industrial land use designations on the land use map trace the Port's development.

Natural Areas: Natural areas are more particularly defined as water, woodlands and wetlands which possess significant environmentally sensitive habitat. As noted on the existing land use table, these natural or environmentally sensitive areas account for approximately 3,248 acres or 2.06% of the coastal planning area within unincorporated Hillsborough County. These natural areas provide vital shoreline habitat and protect already developed areas from storm surge. It is anticipated that future development in natural areas will generally occur on the vacant parcels in urban areas as opposed to the displacement of woodlands and wetlands which is consistent with the County's continuing policy to achieve infilling of development. The development of the existing shoreline, where most of the recreational lands occur within the coastal zone, must be of sensitive design. The impacts of recreation use must be controlled to preserve the integrity and future viability of the natural systems.

The Future Land Use element identifies these areas of significant environmental importance to be set aside for primarily conservation purposes. Except for very limited compatible residential or educational use, all development is prohibited.

Mining: Of all the primary land uses within the coastal planning area, mining represents the least in real coverage. As of 2021, active mines, reclaimed mines and mined-out areas not reclaimed accounted for 646 acres or .41% of the total acreage within the coastal zone. However, mining becomes a significant competing land use issue due to the short- and long-term impacts upon both the physical and visual environment. Both active and mined-out areas of shell and dolomite pits exist within the coastal zone in South County.

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Table 1: Existing Land Use for Hillsborough County Coastal Planning Area

	Evac Zone A	Evac Zone A	Evac Zone B	Evac Zone B	Evac Zone C	Evac Zone C	Evac Zone D	Evac Zone D	Evac Zone E	Evac Zone E	All Evac Zones	All Evac Zones
Existing Land Use Description	Acreage	Percent of Total	Acreage	Percent of Total	Acreage	Percent of Total	Acreage	Percent of Total	Acreage	Percent of Total	Total Acreage	Percent Total
Agricultural	2,096	3.72%	1,195	8.73%	1,394	7.08%	5,903	16.79%	3,698	10.50%	14,286	46.82%
Educational	467	0.83%	437	3.19%	293	1.49%	558	1.59%	745	2.11%	2,500	9.21%
Light Commercial	2,068	3.67%	640	4.68%	778	3.95%	1,682	4.78%	2,204	6.26%	7,372	23.34%
Multi-Family	2,458	4.37%	766	5.60%	1,028	5.23%	1,147	3.26%	2,096	5.95%	7,495	24.41%
N/A	81	0.14%	37	0.27%	47	0.24%	101	0.29%	71	0.20%	337	1.14%
Public / Quasi-Public / Institutions	21,993	39.08%	2,419	17.68%	5,619	28.56%	7,394	21.04%	8,718	24.75%	46,143	131.11%
Public Communications / Utilities	1,815	3.23%	62	0.46%	164	0.83%	239	0.68%	1,443	4.10%	3,723	9.30%
Recreational / Open Space	377	0.67%	265	1.93%	137	0.70%	1,852	5.27%	618	1.75%	3,249	10.32%
Right of Way / Roads / Highways	1,027	1.82%	159	1.17%	684	3.48%	588	1.67%	266	0.75%	2,724	8.89%
Single Family / Mobile Home	12,074	21.45%	5,097	37.25%	6,394	32.50%	9,011	25.64%	10,174	28.88%	42,750	145.72%
Two Family	128	0.23%	68	0.50%	95	0.48%	66	0.19%	188	0.53%	545	1.93%
Unknown	74	0.13%	62	0.45%	84	0.43%	40	0.11%	113	0.32%	373	1.44%
Vacant	4,985	8.86%	1,152	8.42%	1,268	6.45%	3,311	9.42%	2,786	7.91%	13,502	41.06%
Light Industrial	1,609	2.86%	694	5.07%	855	4.34%	2,169	6.17%	911	2.59%	6,238	21.03%
Heavy Commercial	383	0.68%	92	0.67%	73	0.37%	506	1.44%	437	1.24%	1,491	4.40%
Mobile Home Park	669	1.19%	402	2.94%	667	3.39%	299	0.85%	636	1.81%	2,673	10.18%
Heavy Industrial	3,328	5.91%	136	0.99%	96	0.49%	282	0.80%	122	0.35%	3,964	8.54%
Mining	646	1.15%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	646	1.15%
Total	56,276	100.00%	13,683	100.00%	19,675	100.00%	35,150	100.00%	35,225	100.00%	160,009	

Source: Acreage from Parcel Data from Hillsborough County Property Appraiser (Accessed: June 21, 2021)

Shoreline Conflicts

When evaluating shoreline land uses it is important to identify existing conflicts between competing shoreline uses and related coastal features. Recognizing that there is limited space and carrying capacity within the coastal planning area to accommodate future development, a mechanism must be available to resolve these apparent conflicts and direct future development into areas most suitable to accommodate such development. As a result, Florida Statute Chapter 163.3178(c) specifically addresses

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the need for 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.

One of the primary conflicts between the natural processes inherent to the shoreline and the desire to develop along the shoreline is the issue of beach and shore erosion. While the conflict is experienced to a lesser degree in Hillsborough County due to the County's coastal area not being directly exposed to the wind and wave action of the Gulf of Mexico, certain areas have experienced erosion such as E. G. Simmons Park and Apollo Beach Nature Preserve.

Low elevation and the absence of topographic relief characterize much of the County's coastal planning area, also resulting in conflicts in achieving drainage and requisite building heights relative to established FEMA flood elevations. Examples of this conflict are most pronounced in the areas of Bahia Beach, Apollo Beach and lands abutting Old Tampa Bay north of the Courtney Campbell Causeway. Many of the County's coastal ecosystems have been disturbed or replaced as a result of massive filling of land or from the impacts of urban land use activities. Perhaps the greatest impact to marine habitat results from urban stormwater run-off which discharges directly into Tampa Bay and into the rivers and tributaries within the coastal area. This issue is discussed in further detail within the One Water Chapter and in the Environmental and Sustainability Section.

Because of the desire to utilize the County's shorelines for recreation, commercial, residential and port-related industrial activities, the transportation system necessary to accommodate coastal activities becomes a key component of the coastal area and can be a source of conflict. The existing transportation system is adequate to accommodate traffic generated within the coastal area. Of critical importance is the need to maintain adequate levels of service on designated hurricane evacuation routes and to balance the need for future residential development with the ability of the roadway system to operate without serious conflicts adjacent to land uses.

Finally, economic factors must be considered as they pertain to the ability of certain land uses to generate income consistent with development costs and underlying land values. The coastal area, especially those areas which are commercial or tourist related (e. g. Apollo Beach, Bahia Beach, public parks, marinas, etc.), must not deteriorate to the extent that a conflict arises with respect to abutting or nearby properties, thereby adversely affecting the economic vitality of the coastal area. As suitable sites for commercial/tourist uses continue to diminish, the need to ensure the economic vitality of existing uses becomes more critical. Therefore, economic conflicts between existing land uses must also be viewed from a perspective of improving and redeveloping existing coastal uses, where appropriate.

Water-Dependent and Water-Related Uses

Shoreline Access: As previously mentioned, shoreline access problems result from demand by incompatible or competing land uses for coastal locations. The coastal planning area is limited and has historically been the first area to be developed. As demand for land grows, shoreline property is the first to appreciate in value due both to its unique characteristics and to its relative scarcity. For this reason, and to minimize conflicts, coastal planning area land uses must be prioritized with regard to the

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necessity of shore access. Those activities that require deep-water access, such as port facilities, or large amounts of salt water (electrical generating facilities or aquaculture projects) should be assured that the coastal land they need will not be usurped by a land use that could be accommodated at an inland location. As such, water-related uses are defined below to minimize conflicts in the coastal planning area.

- **Water-Dependent Uses** - activities which can be carried out only on, in or adjacent to water areas because the use requires access to the water body for: waterborne transportation including ports or marinas; recreation; electrical generating facilities; or water supply.
- **Water-Related Uses** - activities which are not directly dependent upon access to a water body but which provide goods and services that are directly associated with water-dependent or waterway uses.
- **Water-Independent Uses** - activities including, but not limited to, intense urban residential, industrial and commercial uses which could function just as well inland as in a coastal location.

Economic Base of Coastal Area

In the coastal planning area of Hillsborough County, Retail Trade, Finance Insurance & Real Estate (FIRE), and Services businesses total 21,736 locations (67% of all businesses) and employ 282,962 (74% of total employment). Government (358 locations, 17,572 employees) only accounts for 1 percent of the non-residential locations and 5% of the employment. In Retail Trade, the single largest subsector is "Eating and Drinking Places" with 1,688 locations (30% of retail locations) and 28,271 employees (35% of retail employees). In the FIRE sector, the largest subsector is Real Estate (53% of FIRE establishments and 35% of employees). In the Service Sector, the predominant subsector is Educational Institutions. They comprise nearly 60% of the service establishment and 47% of service employees.

Sources: Business Summary Report. ESRI Business Analyst. July 21, 2021.

Source: Copyright 2021 Data Axle, Inc. All rights reserved. Esri Total Residential Population forecasts for 2021."

Date Note: Data on the Business Summary report is calculated using Esri's Data allocation method which uses census block groups to allocate business summary data to custom areas.

Electric and Wastewater Services: Electric and wastewater services represent adjunct components of the economic base of the coastal zone area.

The Big Bend Station electric power plant is located roughly ten miles south of the City of Tampa in unincorporated Hillsborough County. The plant is situated along the eastern shore of Tampa Bay in the coastal area of the County. The siting of the power station along the Tampa Bay shoreline is advantageous from a cost perspective. The Bay serves as a source of cooling water needed to operate the plant. In theory, the reduced cost alternative afforded by the Tampa Bay siting of the Big Bend Station translates into reduced costs of electric power services supplied to local residents and businesses in Hillsborough County.

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The Northwest Hillsborough Wastewater Consolidation Program is currently under construction to retire two aging wastewater plants and consolidate treatment at the Northwest Regional Water Reclamation Facility. Overall, the program will improve wastewater service in Northwest Hillsborough County, improve reliability and save money for all County customers. Further discussion on wastewater treatment is found in the One Water Chapter.

Impacts of the Future Land Use Plan on the Economic Base: The implementation impact of the future land use plan for Unincorporated Hillsborough County should affect most, if not all, components of the coastal planning area's economic base.

The implementation of the future land use plan may limit the growth of industrial, business, professional and personal services, as well as wholesale and retail trade, in the County's coastal zone. Potential negative impacts on the economic base of the County's coastal zone could be felt in the loss of land uses such as motor freight transportation; warehousing and light manufacturing, including light machinery, communication, and electronic equipment; and other miscellaneous research and development (R&D) and high-tech industrial sectors. The primary contributor to the potential loss in these sectors is the large amount of development potential for these types of industries and services within the I-75 Corridor.

Most of the growth among favorably impacted components of the economic base should occur in the southern and eastern sub-areas of Hillsborough County's coastal zone, including the area between I-75 on the east and Tampa Bay on the west. The area within the northwest section of the County, generally described as the lands south of the proposed Linebaugh Extension and Old Tampa Bay to the County line, is showing a trend from agricultural to low/medium density residential and supporting commercial development.

The growing desire for people to live and recreate along the coast will increase the demand for coastal access. Sensitive design and engineering of restricted recreational development along the abundant natural shoreline and tidally influenced tributaries of Hillsborough County will enable the growing population to access these areas. Through understanding of and education about the value of these systems, the general population's environmental awareness may lead to a higher quality of life for existing and future residents of Hillsborough County.

Estuarine Management

The entire shoreline of Hillsborough County borders on the Tampa Bay estuary. Closely associated with the Tampa Bay estuary are the tidal freshwater habitats that occur immediately above the upper limits of salt water. These ecosystems are vitally important as nursery and spawning areas for many anadromous fisheries. Seaward from the estuary, measurable dilution of sea water by land drainage can be traced for considerable distances offshore. Moreover, considerable acreages of vegetated wetlands, including seagrass meadows, salt marshes and mangrove forests, occur along the shallower bottoms and peripheral fringes of the estuary. Together with the open water estuary, these important transition zones comprise the entire Tampa Bay estuarine system.

Because of their unique physical and chemical properties, estuaries are among the most biologically diverse and productive ecosystems in the world. Tidal wetland vegetation at the headwaters of estuaries trap silt and absorb excess nutrients resulting from land drainage, thus buffering the coastal

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ecosystem somewhat from upland sources of pollution. Tidal wetland vegetation also protects upland areas by stabilizing coastal sediments and preventing erosion from storm events.

The real importance of estuarine plant communities such as mangrove forests, salt marshes, and seagrass beds lies in the vital functions they perform in the aquatic ecosystem. First and foremost is their role in converting sunlight and nutrients into food usable by marine animals, thus forming the base of the aquatic food chain. Although relatively little of this plant material is eaten directly by higher animals, it is broken down into detritus by micro-organisms and consumed by small crustaceans and other animals which are, in turn, eaten by larger fishes and so on up the food web.

In addition to serving as a food source, estuarine wetland vegetation provides shelter and nursery areas for the young of many economically important species such as shrimp, seatrout, mullet and red drum (redfish). Although the majority of species do not spend their entire lives within estuaries, it is estimated that nearly 98 percent of the most economically important fisheries species taken along the Gulf of Mexico coast are directly dependent upon estuarine habitat during some portion of their life cycle.

Tampa Bay is Florida's largest open water estuary, with a total surface area of almost 400 square miles. The Tampa Bay estuarine system has been geographically subdivided into seven named subunits including: Old Tampa Bay, Hillsborough Bay, Middle Tampa Bay, Lower Tampa Bay, Boca Ciega Bay, Terra Ceia Bay, and the Manatee River.

Wetland Habitat: The EPA defines wetlands as “areas where water covers the soil or is present either at or near the surface of the soil all year or for varying periods of time during the year, including during the growing season” and can include coastal (saltwater) and inland (freshwater) areas (EPA, 2020). One of the most significant characteristics of wetlands is that they act like sponges, soaking up moisture. Wetlands also attenuate and store water, mitigating flooding effects following heavy rainfall. They help filter out pollutants, which naturally improves water quality. Wetlands within urban areas are extremely valuable because they can reduce the volume of surface-water runoff from pavement and buildings (Whitney et al., 2004). Wetlands provide additional watershed functions, such as habitat for plant and animals, soil erosion control, and delivery of complete organic matter to the food web (TBEP, 2020). Areas that are affected by both sea-level rise and storm surge, such as Double Branch Bay, can suffer from compounding effects threatening its health. Any areas affected by storm surge can become inundated with saltwater during a storm, threatening the wetlands found there. Wetland areas have also been diminished due to urban growth.

Three major types of vegetative wetland communities occur within the Tampa Bay estuarine system, including seagrass beds, salt marshes, and mangrove forests. The critical roles that estuarine wetlands play with regard to shoreline stabilization, pollutant assimilation and fisheries production was previously discussed and cannot be underestimated.

Seagrasses: Between 1996 and 1999 (years that included a strong El Niño rainfall event), seagrass coverage decreased by 839 Hectares (ha), followed by recovery and expansion of 883 ha between 1999 and 2004. Bay-wide, seagrass coverage in Tampa Bay in 2004 was the highest observed since 1950, but still 5,512 ha lower than 1950 coverage. As of 2015 seagrasses covered over 40,000 acres of Tampa Bay.

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However, between 2018 and 2020, the bay saw an estimated decline of 5,411 acres of seagrass, according to reviews from the Southwest Florida Water Management District.

The early catastrophic loss of seagrasses in Tampa Bay has been attributed to numerous causes, including propeller damage from boats, dredging, and water quality degradation. While the first two causes have undoubtedly resulted in significant direct destruction, the third is probably the most important factor affecting the health of seagrasses in Tampa Bay. Studies show that increasing nutrient enrichment, or eutrophication, of estuarine waters from untreated wastewater plants and stormwater runoff is responsible for the production of phytoplankton blooms in the water column and excessive epiphytic growth of macroalgae on the leaves of seagrasses. These nuisance species decrease the amount of light available to seagrasses for growth and reproduction (Lewis et al., 1985). In addition to eutrophication, widespread temporary increases in water column turbidity due to large scale harbor and channel deepening projects have also reduced the light available to seagrasses, thus resulting in significant seagrass destruction. The biggest area of concern today is Old Tampa Bay, where a type of algae known as *Pyrodinium* has bloomed in recent years. Old Tampa Bay is a spot where stormwater outfalls increase nutrients and the Courtney Campbell Causeway contributes to sluggish water circulation, which decreases flushing of the bay during low tides.

Emergent wetlands occur primarily along the natural intertidal zone that rims much of the bay and its tidal tributaries, and to a lesser extent along filled intertidal areas created by urban and port development. As sea level rise affects these ecosystems they will retreat further inland, making coastal uplands critical for accommodating the landward migration of emergent tidal wetlands in response to sea level rise.

Quantities of mangroves are predicted to increase with sea-level rise and warmer temperatures. According to the TBEP, mangroves will migrate inland as current stands die and other habitats are overtaken. Since mangroves are fast adapting, they will increase while marshes and other coastal habitats that are not as adaptable will decrease with saltwater intrusion (TBEP, 2016). Notable areas lacking in mangrove forests include in front of Apollo Beach, west and east coasts of South Tampa, and McKay Bay. This can cause reduced storm surge protection for these areas, making them more vulnerable to the effects of storm surge compared to if they had adequate mangrove coverage. One of the compounding effects of sea-level rise is that, in areas where adaptation to sea-level rise is limited, there is potential for habitat loss, especially for the black mangrove, which does not sustain itself in a terminally inundated condition. Mangroves also help to reduce sediment erosion, so as they migrate inwards, there is potential for land loss as their roots will not be collecting and holding sediment in that area. Another area of concern is the Port Redwing area north of Apollo Beach. Since they are planning on bringing larger ships into this area, there will be increased wave action; these waves can further degrade natural buffering systems and change the bathymetry of the natural system, leading to further environmental loss. Of note is the Manatee River, which is predicted to gain mangrove stands. Terra Ceia Bay, however, is predicted to lose 86% of its existing mangroves (Tampa Bay Estuary Program, 2020).

A salt marsh is a grassland between the forest and the sea (Whitney et al., 2004). According to TBEP, this is the most critical area in peril for the Tampa Bay due to sea-level rise. Habitats will migrate landward as saltwater moves inland, forcing out the salt marsh environment in favor of mangrove forests or open water (TBEP, 2016). Salt marsh coverage is estimated to reduce to 10-14% of the estuary ecosystem and their associated salt barren habitats are estimated to diminish to less than 1% (Sherwood & Greening,

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2013). Juncus marsh, primarily found in freshwater marshes, has been shown through predictive modeling to be especially vulnerable to sea-level rise (TBEP, 2016). Because of hard edge development, habitat migration options are limited. A natural balance of coastal areas is critical to overall ecosystem health; marshlands also represent important ecosystems such as acting as a significant carbon sink and reducing storm energy through friction (TBEP, 2020). TBEP predicts a 69% loss in South Bay, 53% loss in Middle Bay, and a 61% loss in Old Tampa Bay (TBEP, 2020). The largest saltwater marsh in the region is along the Manatee River, which is impounded for water supply. This area is under threat by both storm surge and sea-level rise, posing a significant vulnerability (TBEP, 2020).

Living Marine Resources: Tampa Bay was once the State's most productive and diverse estuarine system. Inventories performed in the late 1960's have shown that the recorded diversity and abundance of marine life in Tampa Bay is not exceeded by any other estuary between the Chesapeake Bay and the Laguna Madre of Texas.

The richness of Tampa Bay's marine life has been attributed to the geographic position of the estuary between temperate and subtropical waters. As a result of the Bay's location, winter water temperatures rarely fall to levels which could kill tropical organisms, and summer water temperatures are moderate enough to be tolerated by many of the temperate species. Another contributing factor to the diversity and abundance of Tampa Bay marine life is that salinity is typically in the range of 25-35 ppt over most of the estuary, without the wide fluctuations and significant vertical stratification that characterize many other estuaries. As a result of the stability of the salinity regime, many oceanic species can coexist with typical estuarine species.

The productivity of Tampa Bay in terms of commercially valuable fisheries has, however, declined dramatically due to anthropogenic influences on the Bay.

Shellfish: Five economically important shellfish species occur in Tampa Bay including, in order of commercial value, the following: bait shrimp, stone crab, blue crab oysters and quahog clams. The bay scallop once flourished in Tampa Bay but since the early 1950's it has been virtually eliminated from the estuary due to degraded water quality conditions.

Currently, only four areas are approved or conditionally approved for shell fishing in Tampa Bay. Due to poor water quality conditions (e.g. high bacterial counts), these areas are now virtually all restricted to Lower Tampa Bay, where better flushing conditions prevail. The Cockroach Bay Aquatic Preserve area, although conditionally approved, is permanently closed.

Fishes: The Tampa Bay estuary and contiguous coastal waters serve as home, feeding ground, and/or nursery for more than 270 species of resident and migrant fish. Approximately 80 fish species are found in at least one life stage within the Tampa Bay estuary, with about 25 of these species considered to be economically important. Of special concern are spotted seatrout, red drum and snook which constitute the bulk of the recreational finfish landings in Tampa Bay. Available statistics indicate that these species, all of which spend most of their lives in estuaries, are declining in numbers both locally and statewide. Accordingly, the Florida Department of Environmental Protection has recently placed greater restrictions on the commercial and recreational harvest of these species. As stated above, vegetated tidal wetlands, especially seagrass beds, play a critical role as nursery habitat for larval and juvenile fishes. It is felt that the significant decline in both seagrasses and emergent wetlands has had a

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corresponding adverse impact on fishery stocks; however, long term quantitative studies on fishery stocks in Tampa Bay are not available to confirm this.

Reptiles: Only two species of marine reptiles are common in Tampa Bay, the diamondback terrapin and the mangrove water snake. Both are common in localized areas but have not been well studied. However, because of the reduction of intertidal habitat and adjacent upland areas due to coastal development, these species may be threatened. Loggerhead turtles are occasionally observed in the Bay. According to the Florida Fish and Wildlife Conservation Commission, in 2020, 96 loggerhead nest sites were identified in Hillsborough County.

Birds: Seabirds and wading birds are a very visible and important component of the animal life of Tampa Bay. 83 species of birds are associated with marine habitats in the Bay. Many of these not only use certain Bay habitats for nesting and raising young, but also wade in the shallows or dive in deeper waters to feed on fish and invertebrates.

Marine Mammals: Only two species of marine mammals are normally found within Tampa Bay, the bottlenose dolphin and the West Indian manatee. The bottlenose dolphin is a year-round resident, with a local population estimated at 400 individuals, generally found in small herds of 3-6 animals. Little research, beyond aerial surveys of local populations, has been done on this species in the Bay.

Historic and Archaeological Resources

The protection, preservation, and restoration of historic resources is an integral part of the federal Coastal Zone Management Act. The best available information is that provided by the Florida Master Site Files and the National Register of Historic Places.

Historically Significant Structures in the Coastal Planning Area:

- M. Lamb House, 2410 West Shell Point Road, Ruskin
- A.P. Dickman House, 120 Dickman Dr. SE, Ruskin
- George H. Elsberry Farmhouse, 6212 S. R. 674, Wimauma
- George McA Miller House, 503 S. Tamiami Trail, Ruskin
- Giants Motel, 9815 US 41 S, Gibsonton
- Kep-Rite Tourist Court Office, 9839 US 41 S, Gibsonton
- L.L. Dickman House, 312 US 41 S, Ruskin
- Lewis Good Gulf Service, 8102 CR 39 S, Alafia
- Ruskin Vegetable Corporation Bldg., 5909 US 41 S, Ruskin

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- U.S. Phosphoric Products Bldg., 8813 US 41 S, Gibsonton
- W.B. Moody House, 10606 W. Hackney Dr., Riverview
- Wimauma Church of the Nazarene, 5730 SR 674, Wimauma
- Providence Baptist Church, 5416 Providence Church Rd., Riverview
- James L. Hackney House, 10605 W. Hackney Dr., Riverview
- Providence Cemetery, 5416 Providence Road, Riverview

Sites of Local Significance for Unincorporated Hillsborough County

- 102 College Avenue East, Ruskin;
- 601 4th Ave. SW, Ruskin; Dr.
- Beaudette House, Ruskin
- Grubbs House, Gibsonton.

Hillsborough County does not contain many built historical resources; rather, the predominant historic resources are archaeological sites. Because a significant portion of unincorporated County's archaeological sites are in the coastal zone, special consideration should be given to those resources and continuing efforts to achieve the long-term goal of historic preservation.

Impacts of Future Land Use on Historic Preservation

The County's historic resources are located within suburban and rural development areas which will accommodate their continued use. Future land use designations have not created non-conformity of structures.

Hillsborough County, in an attempt to manage its diverse growth, has adopted an Urban Service Area. The Urban Service Area emphasizes three principles: the type of development; the location of development; and the services required for development. These three principles should be properly coordinated to promote a rational transition from urban to rural land uses within the County.

The Urban Service Area concept provides an infrastructure system coordinated with the Comprehensive Plan land use categories and the County's Capital Improvements Program to provide urban service delivery. Urban services may include public water, wastewater, roadways, stormwater, fire and police protection, parks, and transit.

The Urban Service Area provides some order and reliability to the land development process, and its implementation can have a positive impact on historic resources. The historic resources that are located in the designated Urban Service Area should make these structures attractive for continued use.

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Conversely, structures that are located outside the USA may not experience development pressures to be converted to subdivisions.

The Future Land Use Element also contains policy provisions which set up the framework for the preservation and reuse of historic structures within Hillsborough County, including those that lie within the coastal planning area.

Water Quality: Water quality is essential for an environment that protects human health and supports a diverse community which is reliant on the Tampa Bay. The Environmental Protection Commission maintains a network of over 250 surface water stations throughout the County and Tampa Bay, many of which date back to the 1970's.

Most water bodies in Hillsborough County fall under the Class III designation and are subcategorized as marine or freshwater (Figure 3). The Hillsborough River from the City of Tampa's (COT) reservoir dam at Rowlett Park upstream to Flint Creek and Cow House Creek from the Hillsborough River to its source are classified as Class I waters. Class II waters in Hillsborough County include Old Tampa Bay north of the Howard Frankland Bridge up to and including Mobbly Bay, a portion of Middle Tampa Bay south of Gadsden Point, along the eastern shoreline of Middle Tampa Bay south of Apollo Beach to the Hillsborough-Manatee county line, and the Hillsborough County waters west of the Sunshine Skyway bridge excluding the shipping channel. There are currently no waterbodies within Hillsborough County that fall under the Class IV or Class V designations.

As Beck et. al. (2019) describe, Tampa Bay is the largest open-water estuary in Florida and the second largest estuarine embayment in the Gulf of Mexico. Current water quality in Tampa Bay is dramatically improved from the degraded historical condition. In 1972 a long-term monitoring program was institutionalized through State legislation by the creation of the Environmental Protection Commission of Hillsborough County, which has collected water quality data consistently since 1974. Results show Chlorophyll-a in Tampa Bay has decreased over the 40-year record and total nitrogen concentrations

have similar trends. The improvement in water quality can be attributed to habitat restoration activities and water infrastructure improvements related to point and non-point source controls. (Beck, Marcus W., Edward T. Sherwood, Jessica R. Henkel, Kirsten Dorans, Kathryn Ireland, and Patricia Varela.

FIGURE 1: TAMPA BAY WATER QUALITY

Year	Old Tampa Bay	Hills. Bay	Middle Tampa Bay	Lower Tampa Bay
1991	Green	Yellow	Yellow	Yellow
1992	Yellow	Green	Yellow	Yellow
1993	Yellow	Green	Yellow	Yellow
1994	Yellow	Yellow	Red	Red
1995	Red	Yellow	Red	Yellow
1996	Yellow	Green	Yellow	Green
1997	Yellow	Green	Red	Yellow
1998	Red	Red	Red	Red
1999	Yellow	Green	Yellow	Yellow
2000	Green	Green	Yellow	Yellow
2001	Yellow	Green	Yellow	Yellow
2002	Yellow	Green	Green	Green
2003	Red	Yellow	Green	Yellow
2004	Red	Green	Green	Yellow
2005	Green	Green	Yellow	Yellow
2006	Green	Green	Green	Green
2007	Green	Green	Green	Green
2008	Yellow	Green	Green	Yellow
2009	Yellow	Yellow	Green	Green
2010	Green	Green	Green	Green
2011	Red	Green	Yellow	Green
2012	Green	Green	Green	Green
2013	Green	Green	Green	Green
2014	Green	Green	Green	Green
2015	Yellow	Green	Yellow	Green
2016	Yellow	Green	Green	Green
2017	Yellow	Green	Green	Green
2018	Yellow	Green	Green	Green

Source: Tampa Bay Estuary Program State of the Bay Program Accomplishments: 2016-2018

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"Assessment of the Cumulative Effects of Restoration Activities on Water Quality in Tampa Bay, Florida." Estuaries and Coasts, no. 42 (August 5, 2019): 1774-91 <https://doi.org/10.1007/s12237-019-00619.>

Further discussion on water quality can be found in the One Water Chapter and the Environmental and Sustainability Section.

Sediment Pollution: The sediments of the Tampa Bay estuary are generally uniform in character. They are mostly composed of reworked terrace quartz and near shore sand and biogenic carbonate detritus. The mean size of the sediments increases from the upper to the lower reaches of the estuarine system. Organic sediments and clays are prominent, primarily in the upper portions of Hillsborough Bay and in other isolated portions of the Bay complex. Because of their greater binding capabilities, pollutants such as heavy metals are generally more concentrated in the fine-grained sediments of Hillsborough and Old Tampa Bays.

The Florida Department of Environmental Protection (FDEP) analyzed sediment quality in Hillsborough Bay during its comparative study of estuarine sediments in deep-water ports. In general, sediments in and around the port and urban areas of Hillsborough Bay contain elevated levels of metals, including cadmium, lead, zinc and mercury. The combined metals data indicate anthropogenic (man-induced) impacts most likely caused by urban stormwater runoff.

Point Source Pollution: Stormwater, industrial operations and domestic wastewater treatment are major sources of pollutants discharged into the waters of Hillsborough County. The Environmental Protection Commission, in cooperation with the Florida Department of Environmental Protection, uses a permit process as the primary tool for controlling water pollution from the industrial and domestic sources. Stormwater management is also addressed through a permitting process, which is administered by the Southwest Florida Water Management District.

Tampa Bay is the second largest estuarine embayment in the Gulf of Mexico, and improvement in condition over the last four decades is one of the most exceptional success stories for coastal water quality management ([Greening and Janicki 2006](#); [Greening et al. 2014](#)). In 1980, point sources contributed 190 billion gallons of water, carrying 2.35 and 3.58 million pounds of phosphorous and nitrogen, respectively, to the Bay. Among the four major rivers contributing to Tampa Bay, the Alafia River contributed 75% of all water discharged from permitted point sources. This volume is attributed to the extensive phosphate mining operations in Polk and Hillsborough Counties. Although this is a high volume, the greatest nutrient loads were discharged by municipal wastewater treatment plants discharging directly into Tampa Bay. Wastewater treatment plants accounted for 78% and 84% of the annual phosphorous and nitrogen loadings, respectively, in 1980. As of 1996, all wastewater went through advanced wastewater treatment, a process that can reduce nitrogen loading from effluent by as much as 90%. Cumulative effects of over 900 restoration projects, relative to broad watershed-scale management efforts, have had positive changes that have originated from management efforts to reduce point source controls on nutrient pollution ([Beck et al. 2019](#)).

Non-Point Source Pollution: Non-point source pollution encompasses those sources of water pollution which are diffuse in nature, and generally refers to urban stormwater runoff. Sources of urban stormwater pollution have been identified as trash and litter deposited on streets and parking lots; erosion of exposed ground due to construction, lawn and landscape maintenance; domestic pet litter;

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automobile emissions; and atmospheric pollution. Following a storm event, these non-point sources of pollution are concentrated by stormwater collection systems and transported to a point of discharge.

Nitrogen contributions of point and nonpoint sources to Tampa Bay were 60.3 and 23.9%, respectively, of the total nitrogen loadings in the 1970s. By the 2000s, the relative contributions were inverted, with point sources contributing about 19.5% and nonpoint 57.4% to nitrogen discharges into the bay. Major nonpoint sources in the Tampa Bay watershed include urban areas, phosphate mining, and agricultural land use ([Greening et al., 2014](#)).

Tributaries: Freshwater discharges to an estuary are critical to the maintenance of good circulation and flushing, as well as the salinity gradient required by numerous estuarine-dependent fisheries. Four major rivers, the Hillsborough, Alafia, Little Manatee and Manatee, flow into Tampa Bay. Another, the Palm River, once drained lands between the Hillsborough and Alafia Rivers, but has been completely channelized and controlled since 1970 and is now called the Tampa Bypass Canal. All but the Manatee River occur in Hillsborough County. The Hillsborough and Manatee Rivers are impounded as municipal reservoirs. Some of the flow of the Little Manatee is withdrawn for power plant cooling water, but it is otherwise regarded to be the least disturbed river flowing to Tampa Bay. The Alafia has been affected by phosphate mining and processing and is impounded at places.

Numerous lesser tributaries and three major flood control channels also drain into Tampa Bay. Many unrated creeks and streams drain 879 square miles of coastal watershed between river basins; several of these have been channelized, filled, or modified beyond rehabilitation. Other tidal streams entering into rivers have not been modified as much as the urban streams.

Circulation and Flushing: Circulation refers to the paths taken by water currents and their constituents due to tidal forces, runoff, wind, and other effects. Flushing is the net retention or export of water or waterborne material after circulation has occurred over a given period of time. Both circulation and flushing in estuaries are largely determined by the relationship of freshwater inflow to tidal volume. In Tampa Bay, freshwater inflow from rivers, wastewater treatment plant discharges and rainwater runoff contribute some localized flushing. This, however, is exceeded by the tidal volume by a factor of 500 or more, making Tampa Bay a comparatively sluggish estuary with regard to both circulation and flushing.

The Environmental Protection Commission reports that a complete tidal cycle for Tampa Bay requires 14 and a half days in which a cycle of two high and two low tides predominates.

Eutrophication: Eutrophication is defined as the process of increasing dissolved nutrient concentrations (nitrogen and phosphorous) to a point where nutrient enrichment produces certain characteristic responses in a water body. These responses include algal blooms, noxious odors, decreases in water clarity, declines in dissolved oxygen, and periodic fish kills. Green infrastructure practices assist in mimicking the natural process to infiltrate, evapotranspiration or utilize stormwater or runoff on the site where it is generated. The One Water Chapter discusses this topic in addition to Low Impact Development which minimizes stormwater runoff and eutrophication from nonpoint source pollution.

Dredge and Fill: It has been estimated that the original surface area of the Tampa Bay estuarine system has been reduced by 3.6%, or 13.15 square miles, due primarily to the filling of shallow tidal wetlands for development. Of this acreage, about 11% was for the construction of causeways, 15% each for residential and commercial (power plants) development, and 60% for port development including channels, filled sites, and dredged material disposal sites. This development resulted in the filling or

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excavation of 44% of the Bay's marsh and mangrove habitat, and contributed, through direct destination or increased water turbidity, to the loss of 81% of the Bay's seagrasses.

Because of scientific documentation of the value of tidal wetlands as wildlife and fisheries habitat in the early 1970's, the type of large-scale dredge and fill projects which were routinely permitted by regulatory agencies in the 1950's and 1960's are no longer permitted, and any proposed project undergoes close scrutiny.

Freshwater Flows to the Bay: More than 60 years of marine research has shown conclusively that low-salinity estuarine water, combined with the physical protection and energy sources supplied by marine plants, constitutes the primary nursery habitat for most of the commercially and recreationally important fish and shellfish species in the Gulf of Mexico. In addition, freshwater flows into estuaries are critical to maintaining normal circulation and flushing patterns.

With the population of the Tampa Bay area growing rapidly, public demand for increased diversion of freshwater is expected to grow. It is critical that future plans to divert additional flows of freshwater away from the Bay receive careful biological study.

Fisheries: The health of Tampa Bay's fisheries is important to the economic and recreational value of the Bay. Thus, it is important that the enhancement and restoration of fishery stocks be identified as a key measurable objective for all future estuarine management efforts.

Available commercial landings data and anecdotal evidence strongly indicate that both finfish and shellfish stocks have declined in Tampa Bay since the early 1950's. The loss of wetland habitat (especially seagrasses) and degraded water quality are cited most often as the cause for these declines, although excessive commercial fishing pressure has also been identified as a contributing factor. More recently, the diversion of freshwater and the resulting alteration of critical low-salinity nursery areas has been cited as a potential problem for many estuarine-dependent fisheries.

The future of Tampa Bay's fisheries under the projected growth scenario will be primarily dependent upon the success of measures taken to control nutrient enrichment of the Bay, restore habitat and provide adequate freshwater flows.

Coastal Redevelopment Needs and Potential

Hillsborough County's coastal shoreline is a limited natural and economic resource and it is in the public interest to ensure the maximum beneficial and efficient use of coastal lands.

Because of the relative youth and viability of the existing development within Hillsborough County's coastal shoreline, there is not a major need for extensive areawide redevelopment efforts. In localized areas, however, there is a need for redevelopment of individual properties or small land areas. Shell mining located within the southern sectors of the County's coastal zone is a temporary enterprise, affording the opportunity for redevelopment/reclamation of the sites. The issue of immediate concern is the reclamation of existing mined-out areas. One possibility may be to require the creation of functional water bodies in former mine areas and the utilization of them as recreational areas and/or residential developments capitalizing on the amenity potential of the water bodies.

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Intergovernmental Coordination

Existing Regulatory Programs: Currently, management of the Tampa Bay estuarine system and adjacent coastal waters is fragmented amongst a multitude of federal, State and regional regulatory agencies, as well as seventeen local governments bordering the Bay. Management is accomplished through the implementation of various monitoring, permitting and regulatory programs. However, under the existing management framework, jurisdictions are often overlapping, interests are often conflicting, and no one agency has overview authority for the Bay, or manages it as a holistic natural resource.

The major agencies currently involved in the management of estuarine wetland habitat in the Tampa Bay region include the following:

Federal

- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)
- U.S. Environmental Protection Agency (EPA)
- U.S. Department of Commerce (NOAA)
- National Marine Fisheries Service (NMFS)

State

- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission (FWC)

Regional and Local

- Southwest Florida Water Management District (SWFWMD)
- Tampa Bay Regional Planning Council (TBRPC)
- Port Tampa Bay
- Environmental Protection Commission of Hillsborough County (EPC)
- Counties and Municipalities

Federal: The U. S. Army Corps of Engineers (USACE) has a broad range of regulatory and permitting authority for dredge and fill projects within estuarine waters. Jurisdiction and regulatory functions are based on Section 10 of the Rivers and Harbor Act of 1899 and Section 404 of the Clean Water Act of 1977. During the permitting process, the USACE solicits recommendations on the permissibility of projects from the U. S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the Environmental Protection Agency (EPA).

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The USFWS reviews and provides recommendations on the impact of projects on fish and wildlife habitat, pursuant to authority granted by the Fish and Wildlife Coordination Act (FWCA), Endangered Species Act, and the Marine Mammal Protection Act. The NMFS, under the Magnuson Fisheries Conservation and Management Act and the FWCA, is responsible for habitat protection and fisheries management for estuarine and marine fishes. The NMFS advises the USACE concerning the impact of projects on fish and wildlife habitat under these Acts and provisions of the Endangered Species Act and the Marine Mammal Protection Act. Although the EPA has the responsibility for establishing and enforcing national water pollution control standards, through the Clean Water Act and the National Pollutant Discharge Elimination System, the USACE is the permitting agency for dredge and fill projects and can veto permits under the authority granted in Section 404(c) of the Clean Water Act. The EPA provides comments to the USACE on the permissibility of projects with respect to water quality impacts.

In addition to providing comments on dredge and fill permit applications, the USFWS manages public use of three National Wildlife Refuges within the Tampa Bay Region, including Egmont Key, Passage Key, and the Pinellas Wildlife Refuge (six mangrove islands, including Tarpon Key in Boca Ciega Bay).

Within the U. S. Department of Commerce, the National Oceanic and Atmospheric Administration's Office of Coastal Zone Management (CZM) has a planning and review role in the coastal zone. Under the Coastal Zone Management Act, the CZM has the responsibility to preserve, protect, develop, and, where possible, restore and enhance the resources of the coastal zone. The CZM grants money to states with approved coastal zone management plans and has the responsibility for reviewing large projects for consistency with those plans.

State: Most of the regulatory and permitting authority for dredge and fill projects within estuarine waters of Florida is held by the Florida Department of Environmental Protection (FDEP). As part of the permit process, the FDEP solicits comments from affected parties and local governments. Comments are also received from either the Florida Fish and Wildlife Conservation Commission (FWC) concerning the effects of a project on fish and wildlife habitat and endangered or threatened species (as authorized by the Florida Endangered and Threatened Species Act of 1972).

The role of the FDEP in this process is also to administer and enforce regulations for use of submerged and tidal land belonging to the State, as authorized in Chapter 253, Florida Statutes, with administrative procedures in Florida Administrative Code, Rule 160-17. The FDEP comments on the use of State-owned submerged lands, but the title and administrative control is still held by the Board of Trustees of the Internal Improvement Trust Fund, currently represented by the Governor and Cabinet. Use of State-owned submerged land is typically not granted if the comments are unfavorable.

As part of the responsibility for the regulation and management of fish and wildlife habitat in marine and estuarine waters, FDEP manages the four Aquatic Preserves in the Tampa Bay region, including the Cockroach Bay Aquatic Preserve, the Pinellas County Aquatic Preserve, the Boca Ciega Bay Aquatic Preserve and the Terra Ceia Aquatic Preserve. Aquatic preserve designation limits the extent of dredging, filling and construction in the preserve, in accordance with Section 258.42, Florida Statutes. Basically, beyond "reasonable ingress or egress by riparian owners," only projects clearly in the "public interest" can be permitted in an aquatic preserve. The FDEP is also responsible for acquisition of lands for preservation as wildlife habitat and recreational areas.

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The FDEP is also responsible for the protection of water quality. The FDEP, through broad regulatory and enforcement powers defined by the Clean Water Act, has the permitting and enforcement responsibility to protect and improve water quality.

Regional and Local: The Environmental Protection Commission, in cooperation with the Florida Department of Environmental Protection, uses a permit process as the primary tool for controlling water pollution from industrial and domestic sources. Both the FDEP and the Southwest Florida Water Management District (SWFWMD) regulate the flow of surface water into Tampa Bay and coastal estuaries. The FDEP has delegated its authority for implementing stormwater regulations to the Southwest Florida Water Management District. The SWFWMD controls groundwater levels by issuing and monitoring Consumptive Use Permits (CUPs) and controlling discharges from upland canals. In addition, the SWFWMD permits construction within, and uses of, the waters of canal systems within their district, and sets minimum flow levels for coastal rivers and tributaries.

The Tampa Bay Regional Planning Council (TBRPC) serves our citizens and member governments by providing a forum to foster communication, coordination, and collaboration in identifying and addressing issues and needs regionally. The TBRPC's specific duties include maintaining Future of the Region: A Strategic Regional Policy Plan for the Tampa Bay Region, environmental management, water quality and emergency preparedness planning, protection and restoration of the Tampa Bay estuary, economic analysis, coastal zone management, housing and infrastructure analysis, hurricane evacuation and recovery planning, development of regional impact review, local government comprehensive plan review, cross acceptance, dispute resolution, and review of transportation plans.

Port Tampa Bay (PTB) has permitting authority and jurisdiction pursuant to Chapter 84-447, Florida Statutes, Special Acts of 1984. The prime mandate of Port Tampa Bay is to promote and manage the navigable waters of Tampa Bay for port development. PTB sponsored the Tampa Harbor Deepening Project. Jurisdictional waters include all tidal waters of Hillsborough County, Lake Thonotosassa, Lake Keystone, the Alafia River, the Hillsborough River and the Little Manatee River. Involvement in dredge and fill projects includes assessments of the engineering, hydrographic, and biological aspects of various dredge and fill and construction projects by the PTB Environmental Affairs Department.

Most local government organizations in the Tampa Bay area have the opportunity to review and comment on applications during state and federal permitting processes. The TBRPC and county governments surrounding Tampa Bay (Hillsborough, Pinellas, and Manatee) comment on the permissibility of applications to the federal, State and local permitting agencies according to their local regulations. Hillsborough County receives money from Port Tampa Bay permit fees to pay for review of applications by the Environmental Protection Commission and The Planning Commission. The FDEP has delegated some responsibilities for water quality programs to county agencies, and most of the local governments have developed ordinances or policies aimed at controlling the impact of development on water quality. Manatee and Hillsborough Counties have conducted routine monitoring studies within Tampa Bay and its tributaries. Local governments have a limited role or jurisdiction over habitat management. The Environmental Protection Commission of Hillsborough County, however, issues a separate permit for dredge and fill projects in both tidal and isolated wetlands.

The responsibility for the management of coastal and estuarine resources in the Tampa Bay Region is fragmented along legal and political lines, and no ecosystem-level management exists at this time. Although numerous permits must be obtained before a proposed project can proceed, there is no

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overall plan to ensure consistency between agencies in the issuance of permits, nor are the overall cumulative impacts of several projects considered during the review process.

The Surface Water Improvement and Management (SWIM) Program

With the passage of the Surface Water Improvement and Management (SWIM) Act of 1987, the Southwest Florida Water Management District was mandated the responsibility for improving, maintaining, restoring and protecting Tampa Bay and its tributaries. As required under the Act, SWFWMD must identify surface water bodies in the Tampa Bay drainage basin for conservation and restoration and develop work programs to manage those activities. The programs are to be funded by the Legislature and staffed by SWFWMD.

On August 1, 1988, the SWFWMD published the Surface Water Improvement and Management Program for Tampa Bay. In this plan, five priority issues have been identified as critical to the management, restoration and preservation of the Bay, including:

- Water quality improvement;
- Habitat protection and restoration;
- Fisheries and shellfish management;
- Development and use of the Bay; and
- Legal framework for comprehensive management.

Coordination Potential- The Future:

The Tampa Bay Estuary Program was established in 1991 to assist the community in developing a comprehensive plan to restore and protect Tampa Bay. The landmark agreement establishing the Tampa Bay Estuary Program brought together Hillsborough, Pinellas and Manatee counties; the cities of Tampa, St. Petersburg and Clearwater; the Southwest Florida Water Management District; the Environmental Protection Commission of Hillsborough County; Florida Department of Environmental Protection; and the U.S. Environmental Protection Agency in a partnership committed to action.

The missions of the Estuary Program are: to set reasonable, achievable goals for the estuary's recovery; to coordinate the many new and ongoing bay management initiatives, from small-scale efforts that focus on individual segments of the bay to broad-based programs that address the estuary as a whole; and to determine how best to implement these programs in the future to avoid costly and ineffective duplication of efforts.

Additional roles of the Tampa Bay Estuary Program include evaluating potential options and costs of bay management strategies on a site-specific basis and developing scientific and economic models to help bay managers attain the goals of the management plan.

The Tampa Bay National Estuary Program has also published "Charting the Course for Tampa Bay" which is the basis for the "Comprehensive Conservation and Management Plan for Tampa Bay". The Comprehensive Conservation and Management Plan for Tampa Bay contains action plans that address the following areas:

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- Water and Sediment Quality
- Bay Habitat
- Fish and Wildlife
- Dredging and Dredged Material Management
- Spill Prevention and Response

Natural Disaster Planning

Hillsborough County is susceptible to a wide variety of natural disasters. In response to that susceptibility, Hillsborough County has prepared a Comprehensive Emergency Management Plan (CEMP) in cooperation with the incorporated cities, the Tampa Bay Regional Planning Council and the State of Florida Division of Emergency Management. The CEMP establishes: the procedures for disseminating warnings and reporting the severity and magnitude of any disaster; operational procedures for governments' and disaster organizations' response to disasters; a framework for expeditious, effective and coordinated employment of resources; procedures for requesting State and federal assistance; and a description of recovery and mitigation operations.

The Tampa Bay region, including Hillsborough County, has been identified by the National Weather Service as one of the most hurricane-vulnerable areas of the United States, with the potential for large scale loss of life and property. For purposes of this document, natural disaster planning will focus on a hurricane event.

The County's vulnerability to a hurricane is a result of several factors, including its location on Tampa Bay and the large number of people living in low-lying coastal areas and in mobile homes. The choice of individuals to live in coastal areas and/or mobile homes increases their susceptibility and vulnerability to the effects of the storm surge and high winds of hurricanes.

A hurricane is a regional phenomenon in terms of the geographic area affected by the hazards of a hurricane making landfall or closely approaching the coast of Florida. Just as a hurricane knows no political or jurisdictional boundaries, natural disaster planning must be carried out across jurisdictional boundaries and coordinated among local, State, and federal agencies.

Evacuation Zone Population

Evac. Zone	2010	2015	2019	2020	2045
A	145,195	156,753	167,241	169,740	183,893
B	66,482	71,341	81,119	83,049	106,149
C	78,437	88,834	103,939	107,206	125,341
D	83,305	93,654	101,911	105,617	143,702
E	138,847	148,235	160,018	161,772	199,846
Total	512,265	558,817	614,228	627,383	758,930

Sources:

2010-2020 Population Estimates from Table 1. Estimates of Population by County and City in Florida.
<https://www.bebr.ufl.edu/population>

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Jurisdiction-level estimates distributed to residential parcels. Parcel Data from Hillsborough County Property Appraiser (Accessed: February 2, 2021)

TAZ-level projections from 2025-2045 Long Range Growth Forecasts (Socioeconomic Data).

<http://www.planhillsborough.org/2045-long-range-growth-forecasts/>

Share of TAZ-level projection calculated using parcel-level housing units.

If population in the target area is 50% of TAZ population, then 50% of the projection is assumed to be inside the target area.

Parcel-level housing unit estimates from Parcel Data from Hillsborough County Property Appraiser (Accessed: February 2, 2021)

Data processing by Plan Hillsborough

Population estimates were distributed to residential parcels.

Hazard Vulnerability Analysis

Hazard vulnerability is the likelihood of a particular area to experience a natural disaster. For purposes of this discussion, a natural disaster is limited to a hurricane. The hazard vulnerability analysis includes information and data to identify the geographical area, the population, and the public facilities susceptible to the impacts of a 100-year or Category 3 hurricane event.

The hurricane vulnerability zone is defined as the area requiring evacuation in a Category 3 storm event. A Category 3 hurricane has winds of 111 to 129 miles per hour and storm surge 13 to 18 feet above normal. The hurricane vulnerability zone is shown graphically, and the designated evacuation areas are shown on the Hillsborough County Disaster Preparedness Guide. The Hurricane Guide also shows evacuation routes and designated shelters.

In addition to identifying the vulnerability zone, the coastal high hazard area (CHHA) must be defined. The CHHA is defined as the area defined in the most current regional hurricane evacuation study as requiring evacuation during a category one hurricane. The CHHA is graphically represented on the attached map to be adopted.

Evacuation

Evacuation is required in the event of a hurricane. Consequently, an analysis of the number of persons requiring evacuation, the number of public shelter spaces available, the number of public shelter spaces required, and evacuation route transportation constraints is required.

The number of persons requiring evacuation is calculated as “population-at-risk.” This is the total population within the Hurricane Evacuation Zones. It is important to note that this will not likely be the number of people who actually evacuate, because many who live in evacuation zones choose not to evacuate. In addition, some who are not in an evacuation zone will choose to evacuate (“Shadow Evacuation”). It is also important to note that the “population-at-risk” is not the population that will require public shelter space, as many will evacuate to other locations such as hotels and the homes of friends and family.

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Hurricane Evacuation Population by Evacuation Level, Base Planning Scenarios, 2015*					
Hillsborough County					
Level	A	B	C	D	E
	286,782	376,227	486,590	568,791	697,462

**Source: 2010 Statewide Regional Evacuation Study for Tampa Bay, Tampa Bay Regional Planning Council; August 2010.

*Note: Vulnerable population determined using SRESP behavioral data and county provided evacuation zones. Vulnerable population numbers are not inclusive, meaning population numbers listed for a higher zone are not included in the lower zone. For example, vulnerable population listed for Evacuation Zone B does not include vulnerable population listed for Evacuation Zone A.

**The population figures included in this document are Countywide totals, including unincorporated Hillsborough County and the three municipalities: Tampa, Plant City, and Temple Terrace.

Evacuees Seeking Public Shelter: In the hurricane evacuation planning process, an indication of shelter destinations sought by potential evacuees is useful for determining adequate public shelter capacity based on expected demand, as well as aiding in the computation of evacuation times. Population analyses and behavioral surveys indicate that ultimate evacuee destinations include a variety of choices: 1) friend's or relative's homes, 2) hotel/motels, 3) public shelters, or 4) out of the region.

Hurricane Public Shelter Availability: The Annual County Hurricane Guide identifies public shelters available for each hurricane season. The County, with state assistance, is attempting to add shelter space to address deficits.

The general response model, post-hurricane behavioral surveys of residents in the Tampa Bay region and past experience was used to determine public shelter demand. The number of evacuees who choose public shelter as their evacuation destination is based on demographic characteristics of the population including income and age, risk area and housing (mobile home vs. site built homes). The planning assumptions regarding anticipated shelter use were presented in the Regional Behavioral Analysis (See Chapter III, Appendices III-A, III-B, III-C, III-D), and were applied to the projected Hurricane Evacuation Population estimates.

There are several different assumptions regarding the evacuation population (See Chapter VI Evacuation Transportation Analysis):

- **The Base Scenarios** – which are used for planning and growth management purposes assume that 100% of the population-at-risk evacuates plus a (smaller) percentage of non-vulnerable population (shadow evacuation).
- **The Operational Scenarios** used in operations use the planning assumptions determined by the behavioral analysis which are assumed to be a more realistic set of assumptions. Although they do not reflect 100% evacuation of vulnerable residents, there is a significant percentage of shadow evacuation especially in the major storm threats.

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Public Shelter Demand for Hurricane Evacuation Hillsborough County Base Scenarios 2020					
Evacuation Level	A	B	C	D	E
60,911	23,658	26,858	34,693	51,116	68,117

Source: 2010 Statewide Regional Evacuation Study for Tampa Bay, Tampa Bay Regional Planning Council; 2017.

Public Shelter Demand for Hurricane Evacuation Hillsborough County Operational Scenarios 2020					
Evacuation Level	A	B	C	D	E
60,911	16,931	19,817	28,714	45,046	63,779

Source: 2010 Statewide Regional Evacuation Study for Tampa Bay, Tampa Bay Regional Planning Council; 2017.

It is important to note the table is for all of Hillsborough County. It is not broken down for individual jurisdictions.

Transportation Constraints

The Tampa Bay Regional Planning Council (TBRPC) has prepared transportation models to determine the best available evacuation routes for Tampa/Hillsborough County residents and visitors. These models identify several factors that contribute to determining the optimum evacuation route. These factors include areas-at-risk, public shelter location, inter-jurisdictional traffic impacts, and expected behavioral responses of the population at risk.

One of the most important factors in hurricane preparedness is the understanding of “evacuation time” which is defined as the amount of time prior to projected landfall that an evacuation order must be given in order to allow the completion of a safe evacuation. Evacuation time has two components: clearance time and pre-landfall hazards time.

Clearance time is composed of three contributing portions of time resulting from the response and relocation process: 1) mobilization time, or how long it would take a household to begin evacuation; 2) travel time, a function of the specific distances of the collective evacuation trips and attainable speeds; and 3) queuing delay time, or the time delay that occurs when the total volume of vehicles assigned to a roadway link exceeds that link’s capacity. Clearance times are used to allow the evacuation to be completed prior to the arrival of tropical storm force winds.

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2020 Hillsborough County Clearance Times for Base Scenario					
	Level A	Level B	Level C	Level D	Level E
Clearance Time to Shelter	21	22	24.5	35	43
In County Clearance Time	23	26	34.5	45.5	57
Out of County Clearance Time	23	26	34.5	45.5	57
Regional Clearance Time (TBRPC)	24.5	30	37	46	58

Source: 2010 Statewide Regional Evacuation Study for Tampa Bay, Tampa Bay Regional Planning Council; 2017.

2020 Hillsborough County Clearance Times for Operational Scenario					
	Level A	Level B	Level C	Level D	Level E
Clearance Time to Shelter	16.5	19	24.5	42	48.5
In County Clearance Time	18	22	31.5	45	55
Out of County Clearance Time	18	22	31.5	45	55
Regional Clearance Time (TBRPC)	18.5	23	34.5	51.5	55

Source: 2010 Statewide Regional Evacuation Study for Tampa Bay, Tampa Bay Regional Planning Council; 2017.

The clearance times (31.5 hours “in-county movements”, Category 3) for Hillsborough County are generally quite large, which means that typical hurricane watch and warning time frames will not allow all desired evacuation movements to take place. Specifically, this means that some evacuees who want to leave the region will have to take refuge locally.

Special Needs Population

A hurricane evacuation requires not only the evacuation of able-bodied, vehicle-owning residents but also a population consisting of elderly, handicapped, disabled, or individuals lacking personal transportation. Recognizing this special need, the Hillsborough County Office of Emergency Management has provided such residents the opportunity to register with the County regarding their special needs. Residents are encouraged to register with the County so that during an evacuation they can be safely evacuated.

In addition to special evacuation needs of individuals living in private residences in vulnerable areas, certain hospitals and nursing homes are vulnerable to hurricane storm surge. Two hospitals, Tampa General and MacDill Air Force Base Hospital, are subject to storm surge in a Category 1 storm event, and Kindred South Hospital and Town & Country Hospital are in a Category 2 storm surge zone. There are three nursing homes in the Category 2 storm surge zone and one in the Category 3 storm surge zone. Patients of hospitals and nursing homes which must evacuate will be transferred to like type facilities out of the evacuation zones. If any of these facilities have resource shortfalls to conduct evacuations, Hillsborough County Emergency Management Department will coordinate whatever resources are necessary.

Associated with special evacuation needs is the availability of public transportation in the event of a hurricane. Hillsborough County will utilize buses and vans from the School Board, Hartline, social service agencies and public and private ambulance services to meet the needs of the special evacuation population. The County has also established a system of bus routes to evacuate residents who need

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transportation to public shelter. Additional information regarding emergency transportation is included in the Comprehensive Emergency Management Plan (CEMP).

Hazard Mitigation

Recognizing that Hillsborough County is vulnerable to a hurricane storm event, the county government is responsible for ensuring that human life is protected and property damage is minimized in flood-prone and coastal high hazard areas; that land use and development patterns are consistent with the vulnerable nature of the coastal high hazard and inland flood-prone areas; and that natural systems and vegetation that serve to reduce the impacts of severe weather are protected and preserved. In order to accomplish these ends, Hillsborough County must consider available options to reduce or limit exposure in the coastal high hazard area; develop guidelines/procedures for development in the coastal high hazard area; propose alternatives to reduce clearance times or reduce deficit public shelter space; and develop methods to redirect population concentrations away from the coastal high hazard area.

One step in this process is the *Hillsborough County Multi-Jurisdictional Local Mitigation Strategy (LMS) 2020 Plan Update*. The LMS serves several purposes, including providing an explanation of how Hillsborough County and its three municipalities identify strategies to implement an effective, comprehensive countywide Local Mitigation Strategy.

The scope of the LMS is broad. The plan explains the way in which the communities implement mitigation activities within the county in coordination with local agencies. Additionally, as required by statute, the Risk Assessment portion of the LMS identifies natural hazards as well as technological and human-caused hazards. The Risk Assessment portion analyzes vulnerability of the county in countywide terms as well as results and capabilities at the municipal level.

Hillsborough County has adopted a flood management ordinance that is more restrictive than the model developed by the Southwest Florida Water Management District; the County's building code complies with Section 161.56 (1), Florida Statutes. In addition to these regulations, Hillsborough County has also adopted a sign ordinance which controls the maximum size of signs. In general, the County's Land Development Code exceeds minimum standards for flood protection as illustrated under 44 CFR.

Post-Disaster Redevelopment

Hillsborough County has an estimated 697,462 individuals (~47% of total population) vulnerable to the effects of a worst-case hurricane scenario. Therefore, a plan for how to deal with not only the mechanics of redevelopment (how much it costs to repair or replace damage or destroyed structures; what development standards should the redevelopment be required to meet; the post-disaster timetable; etc.) but also the more esoteric issue of whether redevelopment should occur at all, must be prepared.

A high concentration of structural loss has been projected for the coastal high hazard area during a Scenario A (Category 1) hurricane, thereby reflecting the vulnerability of those zones to both overland storm surge and high winds; the remaining zones are only vulnerable to winds in a Category 1 storm.

Although federal assistance is available to state and local governments in the event that a storm results in a Presidential disaster declaration, a precondition to receiving federal disaster assistance is that state and local governments agree to bear 25% of the total costs to repair or restore the impacted areas to

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pre-disaster conditions. The availability of this 25% match could be a critical issue depending upon the intensity of the storm.

In accordance with Chapter 129, Florida Statutes, Hillsborough County maintains a reserve for contingency fund that does not exceed 10% of the annual budget, the maximum permitted by law. Funds to meet the 25% match would be drawn from this account in the event of a disaster. The reserve for contingency fund would also be used in the unlikely event that a Presidential disaster declaration is not made. Moreover, if the funds in that account are not adequate to repair or replace public facilities, a reallocation of budgeted funds would occur. In the worst case scenario, when funding sources are depleted, the County would borrow the funds through a tax revenue anticipation note.

Once a decision that redevelopment will occur has been made, the standard at which redevelopment will occur must be determined. New construction in the coastal high hazard area must meet more stringent construction standards than did older development. Hillsborough County participates in the National Flood Insurance Program (NFIP), which requires that communities adopt minimum ordinances and regulations which address hazard mitigation and elevation requirements designed to minimize flood damage associated with hurricanes or other natural disasters.

Public Acquisition: The primary State land acquisition programs are the Florida Forever Program, Land Acquisition Trust Fund (LATF), and Florida Coastal Management Program. Although none of the existing acquisition programs are specifically directed toward post-disaster acquisition, the Coastal Management Program houses the Coastal Adaptation and Resilience Tools Initiative to assist coastal communities in planning for the future. Federal acquisition falls under Section 1362 of the National Flood Insurance Act of 1968, which states that property damaged by a storm or flood event can be purchased with federal money and donated to the local government.

Beach and Dune Systems

Existing Conditions

Beaches and dunes are built through the constant resuspension and deposition of weathered beach material (sand) along the turbulent land-sea interface known as the littoral zone. Beach and dune systems generally constitute the land masses associated with coastal barrier islands, and are thus a product of a high-energy wave environment.

Hillsborough County's one natural coastal barrier island on the Gulf of Mexico is Egmont Key, located at the mouth of Tampa Bay. This 300-acre island is the only coastal dune/strand vegetation in the County, and is an ecological showcase for the barrier island type environment. Egmont Key has been designated as a wildlife refuge by act of Congress (PL 93-341). As part of the National Wildlife Refuge System, Egmont Key is under federal jurisdiction (U. S. Coast Guard and U. S. Fish and Wildlife Service) which discourages any intensive recreational use.

The remainder of the Hillsborough County shoreline occurs along the low-energy waters of the Tampa Bay estuary. Although sandy beach formations can naturally develop along the more windward shorelines of bays and estuaries, their formation in Tampa Bay is relatively minor and limited due to the Bay's shallow depth. Consequently, no natural estuarine beaches of significance occur in Hillsborough County. There are, however, five major man-made and maintained sandy beaches in Hillsborough County and the City of Tampa, including three public and two private beaches.

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The southern-most public beach in the unincorporated County is at E. G. Simmons Park, north of Ruskin. Apollo Beach, north of Ruskin, is the largest private beach in the unincorporated County. Bahia Beach, north of the mouth of the Little Manatee River, is a spoil deposition beach with an associated motel and residential area.

In addition to the beach areas above, several small and large dredged spoil islands in lower Hillsborough Bay and Old Tampa Bay are exposed to significant wave action and have thus developed beachfronts, which are used extensively by boaters as anchorages and for picnicking. However, none of these islands are currently maintained as either public or private recreational areas.

Areas Subject to Erosion/Accretion

As stated above, most of the sandy beach areas in Hillsborough County face low-energy wave regimes typical of estuaries. Rapid erosion of beach and dune systems is not observed in Hillsborough County, however, due to sea level rise erosion is occurring and is affecting estuarine ecosystems.

Some of the man-made beach areas in the County are, however, subject to localized erosion problems. E. G. Simmons Park beach is subject to significant wave action, especially during winter months, when passing storm fronts approach from the northwest. In addition, the two prominent dredge spoil disposal islands, 2-D and 3-D, located in lower Hillsborough Bay have experienced considerable erosion along their western shorelines, due primarily to wave energy generated from passing ship traffic. There are no areas of significant sand accretion in Hillsborough County tidal waters.

Beach and Dune Protective Measures

Beach and dune systems are naturally in a state of dynamic equilibrium. The stability of these systems is often critically dependent upon the associated vegetative communities, which trap and bind sand particles with their root network. In addition, the stability of natural beach and dune systems is maintained by a constant source of sand, which is transported to and from the system by longshore currents. Although man-made structures (e.g. groins, jetties and breakwaters) may provide effective localized erosion protection and accretion, they often do so by disrupting the natural longshore flow of sand, thus causing reactive erosion problems downstream.

Man-made estuarine beaches, due to their low-energy environment, often do not have a natural source of sand to supplement erosion losses. Therefore, without either vegetative or structural stabilization, they are often subject to slow, regular erosion. Where feasible, beach and dune systems should be stabilized by enhancing natural vegetative communities.

Establishing new vegetative communities or supplementing existing growth may be feasible for several Hillsborough County beaches. Dune plantings would most likely benefit Apollo Beach, Apollo Beach Nature Preserve, E. G. Simmons Park and possibly Bahia Beach. Egmont Key, although currently possessing stable dune vegetation, is experiencing significant erosion and would benefit from additional plantings, especially around areas of heaviest erosion.

The erosion problems occurring on dredge spoil islands, especially 2-D and 3-D, have been analyzed by the Tampa Port Authority. Due to the slope and composition of the beachfront, as well as the adjacent deep water, it has been concluded that rock and/or concrete rip-rap would provide the most effective erosion control.

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Public Access

Public access includes boat ramps, fishing piers, beaches, and regional, district, neighborhood, and special parks.

Public access to the coastal area, either through publicly owned property or dedicated private easements, is an issue that is becoming increasingly sensitive as the pressure to develop coastal areas intensifies. Because 94 percent of the County's coastal area is in private ownership, those areas in public holdings should not be lost through sale, vacation or transfer. Moreover, existing public access locations should be enhanced to more completely take advantage of the limited resource.

[See the Public Access Map](#) for an inventory of existing public access facilities including beach areas, fishing piers, boat ramps, and parks. This inventory has been coordinated with the Recreation and Open Space Element. The Recreation and Open Space Element should be referred to for more detailed information with respect to parks and recreation facilities.

Unincorporated Hillsborough County has two public beach areas, E. G. Simmons Park and Apollo Beach Nature Preserve, however, no swimming is allowed at the latter. The remainder of the coastal shoreline areas contain mangroves, making those areas inaccessible to the public. Any development, whether public or private, shall be done in accordance with applicable environmental regulations.

Beach utilization and access problems are most acute in the growing coastal urban areas along Tampa Bay, where competition for use of coastal areas is greatest. A potential area of concern is the coastal area fronting on Hillsborough Bay; fortunately, growth pressures in this area are not as acute as those on other portions of Tampa Bay, and the County can have some control over future development.

As population increases, so does the demand for public access, while at the same time, the amount of available waterfront land for public use decreases. Since the amount of coastal shoreline suitable for public access is limited in unincorporated Hillsborough County and the provision of recreational facilities is a County-wide concern, not merely restricted to the individual units of government, Hillsborough County will continue to coordinate with the Cities of Tampa, Temple Terrace and Plant City to provide adequate public access in the coastal area for all County residents.

Coastal Public Infrastructure

Public infrastructure located in the coastal planning area is subject to hazards and damage that inland facilities do not experience. The following inventory and analysis summarizes the existing and projected infrastructure located within the coastal planning area and includes: roadways, bridges and causeways; sanitary sewer facilities; potable water facilities; and shoreline protection structures. In addition, although it is a for-profit utility, electric generating facilities and substations are inventoried and the potential loss of service analyzed.

Roadways, Bridges, and Causeways: Generally, level of service (LOS) "D" is used by Hillsborough County as the acceptable traffic operation standard. LOS D represents high-density but stable flow with speed selection and maneuverability severely restricted; substantial delays and significant decreases in operating speed result from small increases in flow.

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Based on the 2017 Existing Level of Service analyzed by the Hillsborough County Transportation Planning Organization, all evacuation routes located in the CHHA are currently operating at an acceptable LOS. However, the bridge approaches at U. S. 41/Alafia River and U. S. 41/Little Manatee River were previously identified as critical evacuation route points that are susceptible to flooding.

Wastewater Treatment Facilities: Unincorporated Hillsborough County does not have any wastewater treatment facilities located in the Coastal High Hazard Area. However, the City of Tampa's Hookers Point Advanced Wastewater Treatment Plant, serving both County and City residents, is located in the CHHA. Further information regarding Wastewater Facilities can be found in the [Non-Adopted One Water Chapter Background and Maps](#).

Potable Water Facilities: Unincorporated Hillsborough County does not have any major water facilities in the Coastal High Hazard Area. Further information regarding Potable Water Facilities can be found in the [Non-Adopted One Water Chapter Background and Maps](#).

Electrical Utility Facilities: Tampa Electric Company (TECO) has two (2) electrical plants (Gannon and Big Bend) and several substations located within the coastal planning area. Of these facilities, only the Gannon Plant is projected for service disruption (2 days) in the event of a Category 1 storm. In a Category 2 storm the Big Bend Plant and 15 of the County's total 114 substations are projected to experience disruption of up to 5 days. Moreover, in a Category 3 storm all three electrical plants (Hookers Point, Gannon and Big Bend) and 18 substations would experience service disruption, most for up to fifteen (15) days.

Shoreline Protection Structures: Seawalls are the primary man-made coastal protection structures in the County. The remainder of the shoreline in the coastal planning area is comprised of beaches and naturally-vegetated areas. To date, a comprehensive inventory of seawalls has not been completed for the County. Routine maintenance and redevelopment are accorded to both private interests and the County. It is recommended that repairs and reconstruction of any seawalls should be consistent with the standards required under [Chapter 62B-33, Rules and Procedures for Coastal Construction and Excavation](#) (FDEP, Division of Beaches and Shores).