

CASE STUDY

Planning the WUI in Hillsborough County, FL

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American Planning Association

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INTRODUCTION

Wildfire is emerging as a natural hazard risk for communities throughout Florida—a state far more familiar with dealing with the consequences of tropical storms, hurricanes, and other coastal events. Wildfires have always been common in the natural areas of Hillsborough County, but they rarely threatened development. Hillsborough County's hazard mitigation plan determines the probability of wildfire as high but considers potential impacts to be minor, even when factoring in the effects of climate change. According to the Florida Forest Service, from January 2010 to December 2014, Hillsborough County experienced 170 wildfires affecting over 3,600 acres of land (Local Mitigation Strategy 2015). The county recorded only three major wildfire hazard events from 1950 to 2008, the first occurring in 1999. Overall, these events resulted in two injuries, no deaths, and no structural or crop damage (LMS 2015). This includes a wildfire in May 2006 that shut down part of Interstate 75 in southern Hillsborough County for six hours and required 130 emergency workers to fight the blaze. It resulted in the evacuation of thousands of people, as well as producing a brush fire that spread an additional 50 acres (NOAA 2006). However, the county had recently completed routine fuel management in the nearby Golden Astor Scrub Preserve, thus mitigating the severity of the wildfire (Community Wildfire Protection Plan 2016).

Where wildfires once may have been a regenerative event for areas of dense vegetation, they will now represent a nuisance or threat to nearby homes and businesses. Persistent and severe periods of drought linked to climate change could exacerbate the occurrence and intensity of wildfire events (Community Wildfire Protection Plan 2016; American Planning Association 2018). The local hazard mitigation plan notes that population growth is pushing residential development into natural and forested areas where most wildfires occur. The county expects the scale of local preparedness and planning interventions to expand in order to match population growth and future development in unincorporated communities (LMS 2015). In other words,

the challenge will be addressing wildfire risk and vulnerability in the Wildland-Urban Interface (WUI).

Current leadership, and the effects of historical governance, influence the land-use patterns that characterize the county. The natural terrain, including topography and climate, is a less controllable variable that also affects land in the Wildland-Urban Interface. The residents, their livelihoods, and their relationship with places in their community are unmeasurably valuable to the future of the area. Balancing human settlement and the built environment with local ecology is an evergreen conundrum; but as communities continue to feel the effects of climate change, the need for local officials and staff to enact solutions is urgent. While recognizing these aforementioned planning complexities that characterize the county, this case study will attempt to review the community's suite of planning tools addressing wildfire.

The first step for WUI communities is measuring, identifying, and protecting existing development and natural lands in the Wildland-Urban Interface (APA 2018). This case study will explore the extent to which Hillsborough County has undertaken this step. Additionally, WUI communities should enact long-term solutions, such as challenging unwise land use and development patterns that will proliferate the number of people at-risk in the Wildland-Urban Interface. Planning interventions and tools can provide the appropriate regulations and standards to ensure development in the WUI is safe and sustainable, or, where possible, continue to limit development. Hillsborough County has already taken some measures to mitigate wildfire through these tools, which this case study will discuss further in the following sections.

COMMUNITY CONTEXT

Hillsborough County is located on the western coast of central Florida. Tampa, the third most populous city in Florida, is an incorporated city in the county that fronts Tampa Bay. Plant City and Temple Terrace are the two other incorporated cities

in the county. Hillsborough County is bordered by Pinellas County to the east, Pasco County to the north, Polk County to the west, and Manatee County to the south. Local legislation requires these five counties, in addition to Hernando County, to exercise regional cooperation through membership on the Tampa Bay Regional Planning Council.

To establish the local context of Hillsborough County, the following subsections will discuss land use, local governance, population and demographics, housing, geography, climate, and vegetation.

Land Use

According to the Land Use Acreage Matrix (Hillsborough County 2015), the most prominent land uses in Hillsborough County are agricultural (27 percent), public or quasi-public institutions (23 percent), and single-family/mobile homes (21 percent).

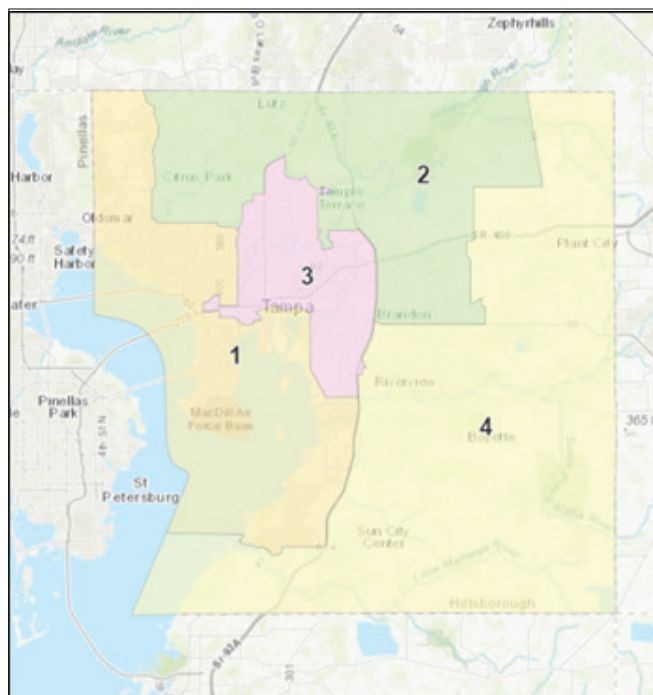
Other land uses include heavy commercial, heavy industrial, light commercial, light industrial, multi-family, mobile home park, mining, natural, public communities and utilities, roads and highways, recreational and open space, educational, two-family, and water. The county also uses vacant, unknown, and not classified as land use categories.

The Future Land Use Element of the comprehensive plan for unincorporated Hillsborough County includes Sustainable Growth Management Strategy, which includes three primary components: an environmental overlay, an urban service area and a defined rural area. The county plans for rural areas to remain used for long-term agriculture, mining, or large lot residential development. Limiting urban sprawl is a guiding objective in the Future Land Use element. It also includes an environmental overlay to preserve natural ecosystems and mitigate exposure of natural hazards in both rural and urban areas. Finally, it establishes the presence of the Urban Service Area Boundary to limit urban development, promote efficient land use, and contain urban sprawl.

In the Southern Wildfire Risk Assessment Summary Report, the southern part of the county consistently has the highest number of wildfires per year. Population growth is pushing housing developments further into natural and forested areas where most of these wildfires occur.

Governance

The Board of County Commissioners serve as the governing body for the community. There are seven members of the board, four of which represent single-member districts (Figure 1) and three of which are at-large commissioners. The Board oversees and funds the local planning agency, Plan Hillsborough, which provides land-use, transportation, and river planning services across all incorporated and unincorporated areas



District Map showing the four electoral districts of Hillsborough County, each with one representative on the Board of County Commissioners. Districts 5, 6, and 7 are at-large districts. Adapted by author from Hillsborough County GeoHub.

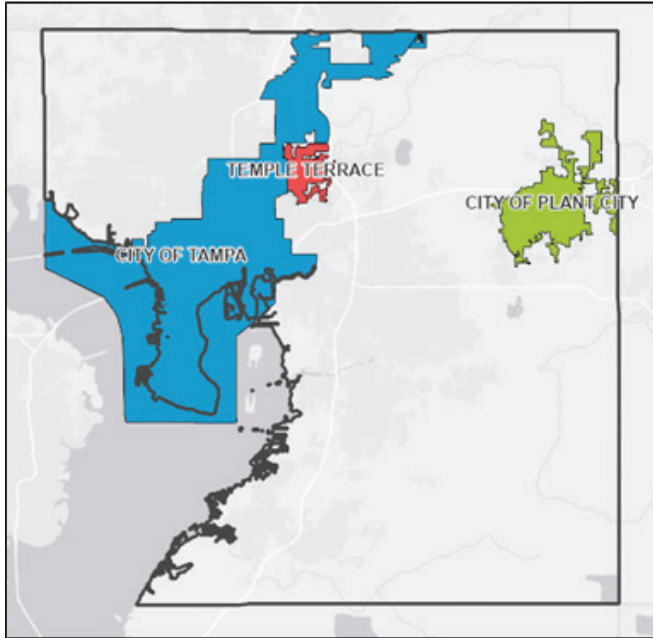
of the county and staff support to the City-County Planning Commission, the Hillsborough County Metropolitan Planning Organization, and the Hillsborough River Interlocal Planning Board (Plan Hillsborough 2020).

The Hillsborough County Administrator serves as the county's chief executive officer and oversees the day-to-day operations of the county's departments. The WUI Planning Framework section of this case study will discuss the roles and responsibilities of some of these local agencies.

Population and Demographics

The 2018 American Community Survey estimates the population of Hillsborough County to be 1,436,888. The Bureau of Economic and Business Research at The University of Florida predicts that the Hillsborough County population will be 1,668,800 by 2035 (CWPP 2016).

Temple Terrace and Plant City are small cities of about 26,000 and 38,000, respectively (ACS 2018). Tampa has an estimated 376,000 residents. The remaining 70 percent of Hillsborough County residents live in unincorporated communities within census designated places which vary in size and population density. Most of unincorporated Hillsborough county is east of Tampa Bay, with a sizable pocket of communities located northwest of the City of Tampa.



This map of Hillsborough County shows the jurisdictional borders of the three incorporated municipalities. (Credit: Adapted by author from Hillsborough County GeoHub.)

In Hillsborough County, 22.9 percent of the population is under the age of 18 and 13.8 percent of the population is over the age of 65. The median age of the county population is 36.9, compared to 41.9 in the state of Florida. Furthermore, the median age of the population of Temple Terrace is considerably lower than other cities: 31.9, compared to 35.7 and 36.1 in Plant City and Tampa, respectively.

Hispanic or Latino of any race comprises 28 percent of the county population. Of the non-Hispanic population, 49.5 percent are White, 15.5 percent are Black or African American, 4 percent are Asian, and 0.2 percent are Native American. Residents identifying as two or more races comprise 2.4 percent of the population (ACS 2018). According to the 2019 Homeless

Count conducted by the Tampa Hillsborough Homeless Initiative, there are at least 1,650 people experiencing homelessness on any given night (Department of Housing and Urban Development 2019).

Housing

The Housing Element of Plant City's comprehensive plan (2015) indicates that the city faces unique problems in the county relating to housing rehabilitation. Plant City also recognizes multifamily housing to be an important investment for the future due to an aging population and demands for affordability. Tampa's Housing Element (2015) states that higher-density and rental housing is the most challenging for developers to incorporate into established neighborhoods due to hesitant long-term residents. Temple Terrace similarly anticipates a demand for higher density development to meet projected growth. The city highlights the need for a higher proportion of multifamily and mixed-use housing, as well as accessory dwelling units (2015). Housing affordability and the structural conditions of housing stock are two issues in unincorporated Hillsborough County (2008).

In 2018, there were just over 460,600 occupied housing units in Hillsborough County, which indicates an occupancy rate of 85.8 percent. Most units in the county are low density, single family homes. In 2010, 1-unit, detached housing accounted for 56.7 percent of total housing units. By 2018, this type of housing unit saw only a decrease of -0.3 percent. Mobile homes were the second most prevalent housing unit type in 2010, representing 10.9 percent of total housing. It saw a relatively sizeable decrease by 2018, down to 7 percent of total housing units. Additionally, large apartment complexes with 20 or more units jumped from 6.2 percent of total housing units in 2010 to 9.4 percent in 2018, thus becoming the second most prevalent housing type in the county today. This indicates some recent dedication to higher density housing, which is consistent with the general goals from the local comprehensive plans

Table 1: Hillsborough County Statistical Summary

CATEGORY	HILLSBOROUGH COUNTY
Total Population	1,436,888
Population Density (<i>persons per square mile</i>)	1,367
Median Age	37.1
Number of Households (occupied housing units)	540,142
Number of Housing Units	590,847
Homeownership Rate	58.1%
<i>Source: ACS 2018 1-Year Estimates</i>	

Table 2: Percentage of cost-burdened homeowner population, 2010-2018

CATEGORY	HILLSBOROUGH COUNTY	PLANT CITY	TAMPA	TEMPLE TERRACE
With mortgage (2010)	44.1 percent	44.2 percent	49.3 percent	38.9 percent
With mortgage (2018)	29.4 percent	28.2 percent	31.1 percent	23.0 percent
Without mortgage (2010)	16.7 percent	18.4 percent	18.7 percent	11.6 percent
Without mortgage (2018)	13.3 percent	11.1 percent	13.1 percent	14.3 percent
Median value (2018)	\$198,000	\$154,300	\$217,400	\$205,200

Source: ACS 2010 5-Year Estimates and ACS 2018 5-Year Estimates

Table 3: Percentage of rent-burdened tenant population 2010-2018

CATEGORY	HILLSBOROUGH COUNTY	PLANT CITY	TAMPA	TEMPLE TERRACE
Rent-burdened (2010)	55.5 percent	57.7 percent	56.0 percent	58.6 percent
Rent-burdened (2018)	52.6 percent	46.2 percent	58.6 percent	45.8 percent
Percent Change	-2.9 percent	-11.5 percent	-1.9 percent	-12.8 percent
Median rent (2018)	\$1,094	\$958	\$1,082	\$1,091

Source: ACS 2010 5-Year Estimates and ACS 2018 5-Year Estimates

Table 4: Percentage of total housing structures by year built

YEARS	UNINCORPORATED HILLSBOROUGH	PLANT CITY	TAMPA	TEMPLE TERRACE
1959 or earlier	27 percent	16 percent	29 percent	11 percent
1960–1989	36 percent	36 percent	34 percent	58 percent
1990–2014	37 percent	48 percent	37 percent	31 percent

Source: ACS 2018 5-Year Estimates

In recent years, the homeowner population that is cost-burdened, or paying more than 30 percent of income towards housing, is significantly smaller than the tenant population that is rent-burdened (Table 2). The population of homeowners in Hillsborough County that are cost-burdened has decreased between 2010 and 2018, which indicates some progress towards general housing affordability in the county.

Geography

Hillsborough County covers roughly 1,051 square miles of land and 215 square miles of water. 87 percent of the county's total land area is unincorporated (Hillsborough County 2008). It has a flat topography and a relatively uniform distribution of four broad divisions of soil. Altitudes range from sea level near the coast to 160 feet above sea level near the Hillsborough-Polk County line.

Surface water features in the county include rivers, lakes, bays, creeks, sloughs, ponds, springs, and wetlands. Tampa Bay is the most recognizable natural feature in Hillsborough

County, and it is the largest open-water estuary in Florida. The comprehensive plan for unincorporated Hillsborough County emphasizes the importance of shoreline habitats; therefore, it prohibits almost all development on this land.

The Hillsborough, Alafia, and Little Manatee rivers are the three major rivers that flow through the County's borders. The Hillsborough River begins in neighboring Polk County and flows southwestward through northern Hillsborough County into Hillsborough Bay. The Alafia river begins in southern Polk County and flows westward through central Hillsborough County into Hillsborough Bay. The Little Manatee River begins in southeast Hillsborough County and also flows westward into Tampa Bay. Little Manatee is relatively unimpacted and thus more pristine than the Alafia and Hillsborough rivers; however, phosphate mining activities will continue to threaten it. The historical 100-year-floodplain covers over one-third of the land area in Hillsborough County.

The Floridan Aquifer is the largest and highest quality potable water aquifer in Florida. It has some of the richest

phosphate deposits in the world. Pebble and sand phosphate are present in southeastern Hillsborough County. These mineral deposits are part of the Central Florida Phosphate district. The resources are economically-valuable when converted into fertilizer, contributing to the local agriculture industry. Phosphate mining has land use implications in southeast and central Hillsborough County. Limestone is present in northeastern Hillsborough County and could potentially attract future limestone mining activities around Plant City, contributing to the production of road base, concrete, and asphalt.

Climate

The county is located in a transitional climate zone, experiencing both a temperate and subtropical climate. The Environmental Protection Commission of Hillsborough County (EPCHC) considers climate adaptation issues such as sea level rise, extreme weather events, and changing average rainfall and temperatures to be crucial to plan for, due to concerns regarding safety, habitat migration, energy use, agriculture, and vector-borne diseases.

Vegetation

Upland forests communities include Pine Flatwoods, Sandhill, Sand Pine Scrub, Xeric Hammock and Mesic Hammock. In general, development has degraded the rich natural resources of the county. Some activities that have contributed to this degradation include: “the unregulated filling of wetlands, discharge of pollutants, mining of phosphate deposits, clearing of forests, dredging of bay bottoms, channeling of streams and rivers, and over pumping of groundwater supplies” (Hillsborough County 2015).

MULTI-HAZARD CONTEXT

The hazard mitigation plan (known as the Local Mitigation Strategy) for Hillsborough County uses an all-hazards, or multi-hazard, approach to mitigation. This plan is consistent with federal and state plans, as well as the County Comprehensive Emergency Management Plan (2015). The LMS identifies 11 natural hazards: erosion, major and minor hurricanes, drought, extreme heat, flooding, sinkholes, thunderstorms, tornadoes, tsunamis, wildland fires, and winter storms. For each of these natural hazards, the LMS defines which locations are more likely to experience the hazard, provides a history of events in the county, and lists impacts and county mitigation strategies. It also provides homeowner mitigation strategies for each natural hazard.

The county regularly experiences minor hurricanes, thunderstorms, and wildfires. Major hurricanes, erosion, flooding, and sinkholes are hazards with a moderate probability of occurrence. Northern and eastern areas of the county, including Plant City,

are more likely to experience sinkhole formations (LMS 2015). Droughts have a low probability of occurrence, but according to the county’s Community Wildfire Protection Plan, prolonged droughts have been increasingly concerning in the past five to 10 years. Winter storms, tornadoes, and tsunamis also have a low probability of occurrence. The Local Mitigation Strategy considers the effects of climate change when conducting risk assessments for wildfire, drought, erosions, and hurricanes.

In 2006, the Florida Department of Community Affairs (FDCA) assessed the risk to selected hazards of structures used for governmental, medical, educational, or institutional purposes. The most destructive hazards included storm surge, floods, sinkholes, and wildfires. The FDCA found that wildfire threatened 54.5 percent of all structures in unincorporated Hillsborough County that are susceptible to property damage and economic impact from natural hazards (Post-Disaster Redevelopment Plan 2010).

Erosion

Hillsborough County experiences both coastal and riverine erosion. The LMS defines erosion as the natural and gradual wearing down of the earth’s surface by wind and water. Beach degradation is a significant impact of coastal erosion, especially in the major bays of Hillsborough County. This type of erosion occurs exclusively on the western border of unincorporated Hillsborough County, including communities that border Tampa Bay, as well as the coastal areas of Tampa neighborhoods. The impacts of riverine flooding pose a more serious threat to development than coastal erosion, with expected impacts ranging from structural damage to collapse. The areas of greatest risk include Coastal High Hazard Areas discussed in the county’s comprehensive plans. The LMS states that seawalls protect most of the developed coastal shoreline in order to minimize erosion from minor and moderate flooding events.

Hurricanes and Tropical Storms

The combination of torrential rainfall, tidal flooding, and storm surge, as well as high winds that can spawn other hazards such as thunderstorms and tornadoes, comprises hurricanes and tropical storm events. The expected impacts of minor hurricanes (Category 1 and 2) and tropical storms includes structural damage of varying severity and agricultural damage to crops. Areas closer to the coast are more susceptible, but inland parts of the county can also experience strong and destructive winds. The impacts of major hurricanes (Category 3, 4, and 5) hurricanes and tropical storms are similar to minor hurricanes and tropical storms, but the LMS predicts impacts to be generally more severe, including the destruction of structures, infrastructure, and agricultural crops. Areas closer to the coast are more susceptible to experiencing these impacts, but strong storms have the ca-

pability to move inland. Florida's communities, like Hillsborough County, have extensive procedures, preparedness, and planning to deal with hurricanes and tropical storms.

Thunderstorms

While thunderstorms occur countywide and regularly each year, they can sometimes produce deadly tornadoes, hailstorms, and intense winds. The major impacts of thunderstorms include damage to buildings localized flooding. Lightning is a common cause of wildfires.

Tornadoes

In addition to hurricanes, tornadoes produce severe winds and is the other main source of wind-related loss of life and property. Tornadoes develop when high-pressure and low-pressure weather systems interact. Florida experiences intense tornadoes in the winter due to climactic differences. Tornadoes can occur countywide. Tornado events in Hillsborough County are small in scale but can develop rapidly, limiting resident preparation time. Tornadoes present a considerable threat in mobile homes, which are most common in the eastern area of the county.

Flooding

Hillsborough County experiences inland, riverine, stormwater, and tidal flooding events. Inland flooding is a localized event that occurs after heavy rainfall. Riverine flooding follows extended periods of heavy rainfall events; the Alafia and Manatee rivers are more susceptible to this type of flooding than the Hillsborough River. Stormwater flooding follows short periods of heavy rainfall and is more common in urban areas. Tidal flooding results from the combination of wind and low pressure along coastal areas. Periods of high tide worsen this type of flooding. In general, flooding is a common part of life for residents who live near the coast, major rivers, or within the 100-year Special Flood Hazard Area. Despite usually just being a local nuisance, the impacts of flooding still have the potential to be catastrophic.

Winter Storms

The LMS defines winter storms as significant freezes or periods of low temperatures. Winters in the county usually range around 50 degrees Fahrenheit, but from December to February, the county expects a couple below freezing mornings each year. However, snowfall is very rare. Winter storms can occur simultaneously or following coastal flooding, strong winds, and wind-chill. These events do not have a large-scale effect on buildings. The main threat is to the local agriculture industry; power outages due to winter storms may impact commerce and transportation activities.

Droughts

The technical definition of drought is a water shortage caused by a deficiency of rainfall. Additionally, other factors can aggravate drought, such as high temperatures, high winds, and low humidity. Drought conditions may cause soil to compact, decreasing its ability to absorb water, and making areas more susceptible to flash flooding, erosion, and wildfires. The LMS classifies vulnerability across all four jurisdictions as moderate; thus, the county expects drought events to affect about 50 percent of population. Unlike hurricanes and wildfires, drought does not contribute directly to structural damage. Rather, drought poses social and economic risks, such as lack of potable water and limiting agriculture, landscaping, and recreation activities.

Extreme Heat

This natural hazard is commonly associated with summer months. It occurs due to substantially high air temperatures and/or relative humidity. Since 90 degrees Fahrenheit is the average high temperature for summer months, the National Oceanic and Atmospheric Administration (NOAA) considers temperatures above 100 degrees to be extreme heat events (LMS 2015). Extreme heat does not cause physical or structural damage; however, vulnerable populations such as infants, children, the elderly, and those with health conditions are at increased risk of illness and death.

Climate Change

The county expects climate change to impact various natural hazards, such as wildfires, flooding, and droughts. The county is using local mean sea level rise of Tampa Bay as an indicator of climate change. Besides the disappearing shoreline, the LMS identifies increases in storm surge, rainfall, and saltwater intrusion as potential impacts that might go undetected by residents but are still important to monitor. Sinkholes have a moderate probability of occurrence, yet most of them do not cause extensive damage. The main threat of large or multiple undetected sinkholes is the collapse of a structure.

Sinkholes

Rainfall causes sinkholes by eroding the underground limestone base present in the county, thus creating underground cavities that cause depressions of the ground surface. Another cause may be lowering of underground water levels due to lack of rainfall (LMS 2015). Across the county, sinkholes are a regular occurrence with minor impacts. Areas north of Tampa Bay and the Alafia River are more likely to develop sinkholes.

Wildland Fires

The Wildland-Urban Interface is the identified hazard zone for wildfires; it is primarily located in the south and eastern areas

of Hillsborough County (CWPP). The relatively flat terrain and abundant rainfall in Hillsborough make it the ideal topography for fighting fires. However, low rainfall associated with drought increases the likelihood of intense wildfires.

The county defines local fire season as the months of January through May. Dry conditions, low humidity, and high winds characterize this season. Wildfire can be localized on urban fringe areas, but generally occurs countywide due to natural vegetation. The palmetto trees and gallberry shrubs are fuels that account for about half of the total acres burned in Hillsborough County. The three ecosystems found in the county include Pine Flatwood (Extreme Wildfire Hazard), High Pine/Sandhill (Medium Wildfire Hazard) and Swamp (Medium Wildfire Hazard).

Unincorporated Hillsborough County has a moderate level of vulnerability to wildfire. Mobile homes and poorly built or maintained structures are most at risk of impacts. In comparison, Tampa, Temple Terrace, and Plant City all have a low level of vulnerability.

Hillsborough County generally recognizes wildfire to be a threat to community safety. The county's Post-Disaster Redevelopment Plan (2010), Local Mitigation Strategy (2015), and Wildfire Protection Plan (2016) are three aligned resources that guide the community's wildfire related activities. As the population continues to grow, it is crucial that the county balances development pressures with specific wildfire-related planning interventions, hazard mitigation and disaster risk reduction.

Tsunamis

Tsunamis develop as a result from earthquakes, which is a hazard that is rare in Hillsborough County; therefore, the risk to the Tampa Bay coast is minimal (LMS 2015). This is because Hillsborough County, as well as Florida as a whole, is not located near the convergence of tectonic plates. Emergency management professionals, however, intend to remain aware of tsunami related developments near the county.

WUI PLANNING FRAMEWORK

This section will explore the planning framework of Hillsborough County. It will begin with a brief overview of relevant federal and state legislation that guides local planning. Then, it will introduce relevant organizations that participate in land use, land management, and development activities in the WUI, as well as their planning or regulatory responsibilities. It will end with a summary of planning interventions and tools in Hillsborough County using the *Multihazard Planning Framework for Communities in the Wildland-Urban Interface*.

Federal and State Planning Requirements

Under the Disaster Mitigation Act of 2000, state and local governments must prepare hazard mitigation plans to

be eligible to receive federal hazard mitigation funding. The Hillsborough County Local Mitigation Strategy (2015) fulfills this requirement. Another relevant federal law is The Healthy Forests Restoration Act of 2003, which authorizes the production of a Community Wildfire Protection Plan. Hillsborough County's CWPP (2016) meets the minimum requirements of the Healthy Forests Restoration Act, thus giving the county priority status when applying for federal funding to implement wildfire mitigation projects.

Florida law requires each county and municipality to prepare a comprehensive plan (APA 2017). Comprehensive plans must include a coastal management element that addresses coastal storms, floods, and soil stability hazards. State legislation does not specify that local jurisdictions should address wildfire, drought, and other hazards in their comprehensive plans. Additionally, all coastal counties and municipalities must prepare a Post-Disaster Redevelopment Plan (PDRP).

Agencies and Responsibilities

Within the county, multiple organizations are engaged in land use, land management, and development activities in the WUI (CWPP 2016; Hillsborough County 2020).

The following departments and agencies operate at the county level:

- The **Conservation & Environmental Lands Management Department** manages more than 63,000 acres of environmentally sensitive land—specifically wildlife habitats and corridors acquired through Environmental Lands Acquisition and Protection Program. It is important to note that ELAPP is a citizen-led voluntary program, not a regulatory program. Wildfire-related land management responsibilities include prescribed burning.
- The **Geospatial and Land Acquisition Services Department** is responsible for land acquisition, disposition, technical services, vacating, and survey and mapping services such as plat reviews and contract management.
- The **Environmental Protection Commission** is a local environmental regulatory agency, enabled by a Special Act of Florida Legislature. The EPC's core functions are to monitor air, land and water quality and enforce the protection of local natural lands, particularly wetlands. The EPC does not explicitly mention wildlands, such as forests, in its organizational mission or strategic plan.
- The **Public Works Department** is responsible for maintaining and overseeing the implementation of the hazard mitigation plan. It plays a key role in the Local Mitigation Strategy Working Group.
- The **Development Services Department** provides development review, permitting, and inspection services. It also administers the county's Land Development Code.

- The **Office of Emergency Management** participates in the Local Mitigation Strategy Working Group, as well as producing the Post-Disaster Development Plan, Comprehensive Emergency Management Plan, and annual Disaster Planning Guide.

The following organizations operate at the city-county level:

- **Local Mitigation Strategy Working Group** produces the multi-jurisdictional plan that assesses county-wide vulnerability to hazards, as well as evaluating and implementing local mitigation efforts. Through adoption of the LMS, the county and its jurisdictions are eligible for federal funds to carry out their mitigation actions. The LMSWG is comprised of the County Hazard Mitigation Program (Public Works Department), County Office of Emergency Management, local OEM representatives from the incorporated cities, members of municipal departments, representatives from local education institutions and the private sector, as well as volunteer citizens.
- The **City-County Planning Commission** (Plan Hillsborough) develops and coordinates long-range comprehensive planning, growth management, transportation, and environmental protection.

The following organizations operate at the city level:

- The **Plant City Planning and Zoning Division** manages planning and zoning decisions for the jurisdiction.
- The **City of Tampa Planning and Development Department** provides historic preservation, urban design, construction, housing and community development, and land development services for the jurisdiction.
- The **City of Temple Terrace Planning and Development Division** implements the City's land development regulation and review process, as well as the comprehensive plan.

The following are active land-management agencies responsible for performing fuel management and producing management plans for their respective properties:

- The **Southwest Florida Water Management District** is a regional agency directed by Florida state law.
- The **Florida Fish and Wildlife Conservation Commission** is a state agency that operates in defined wildlife management areas. Hillsborough County is part of the Southwest Region of the FFWCC.
- **Florida State Parks** is a state agency, under Florida Department of Environmental Protection, that maintains five state parks in the county. Hillsborough County is in District 4.
- The **Florida Forest Service** is a state agency, under the Florida Department of Agriculture and Consumer Services,

that is responsible for implementing forestry programs. Hillsborough County is in the Lakeland District of Region 3.

WUI Planning Tools

Using the *Multihazard Planning Framework for Communities in the Wildland-Urban Interface* as a guide, this section lists the current planning tools and interventions used in Hillsborough County. The three types of planning intervention considered are plans, land-use and development regulations, and public investments. This section will evaluate the ability of these planning tools and interventions to manage or support decisions affecting wildfire hazard in the WUI.

It is important to note that within the framework, not all tools are appropriate for the specific context of Hillsborough County. This is due to considerations related to regional and local priorities, community capacity for planning and development activities, community buy-in, the local regulatory environment, and financing (APA 2018).

Regional Growth Management Plan

The Tampa Bay Regional Planning Council's Strategic Regional Policy Plan (2005) guides physical, social, and economic development across a six-county region. The Natural Resources element of this plan includes a goal to "minimize the conflicts between increased development and the wildland/urban interface." This element provides a section on Firewise Development with policies encouraging local governments to recognize the consequences of WUI development, as well as promoting defensible space and fire-resistant construction materials for developers and residents.

Countywide Watershed Management Master Plan

The individual Watershed Management Plans collectively comprise the Countywide Watershed Management Master Plan. There are 14 individual plans, but many do not address wildfire at all. The plans that do address wildfire discuss some of these topics:

- the natural fire cycle of forested wetlands
- the forested composition of watersheds
- alternative land-management practices
- the influence of invasive species on conditions that lead to catastrophic fires
- the impacts of fire suppression, lack of fire, and altered fire regimes on original habitats

The Alafia Watershed Management plan documents the use of cattle management on rangelands by local landowners to reduce vegetative load. This reduces the necessity for mow-

ing and the potential for wildfires. This is sometimes preferable to prescribed burns, which are expensive, labor intensive, and/or complicated to permit.

Other individual watershed management plans note that lack of fire results in less biodiversity and unwanted promotion of hardwood succession in Florida swamp communities. One invasive species of vine is especially harmful, because it allows fire to access to the crown of a tree, thus resulting in catastrophic fire “where under natural circumstances, a low, less damaging ground fire may have occurred.”

Comprehensive Plans

Temple Terrace and Plant City each have one policy related to wildfire mitigation in their comprehensive plans.

Community Wildfire Protection Plan

The Community Wildfire Protection Plan (2016) recognizes, measures, and addresses wildfire risks in Hillsborough County. The CWPP is consistent with the goals and objectives of the Local Mitigation Strategy.

The plan presents four goals for the county: increasing coordination and collaboration, improving the defensibility of properties, using cost-effective mitigation and prevention, and addressing deficiencies in resources. The action plan includes fuel management actions, community outreach activities, Firewise building strategies, and policy recommendations.

It also rates all communities in the county to determine which are low, medium, or high risk using the definition from the Healthy Forests Restoration Act of 2003. The majority of Communities at Risk (CAR) are in unincorporated Hillsborough County. This includes Boyette and Wimauma, both in the southeastern part of the county, are the only two communities that have a “high” risk rating. This means the countywide CWPP recommends these communities to complete a separate community wildfire protection plans to be eligible for federal funding needed to undertake hazardous fuel reduction projects at a smaller scale.

One noteworthy finding is that the leading causes of wildfire in Hillsborough County have been incendiary and debris burning. Public awareness and education programs, like Firewise USA™, can mitigate these causes.

Hazard Mitigation Plan

The Local Mitigation Strategy (2015) identifies potential mitigation initiatives. The most relevant for the WUI is the “Controlled and/or Prescribed Burns” program. The plan states that controlled burns and urban preventative fire programs will assist in managing wildfires within the county. It identifies local fire departments and state forestry departments as potential partners. It establishes that “citizen

awareness programs will only serve to augment current programs implemented through city and county initiative”. The LMS Working Group updates the original list of hazard mitigation projects and initiatives in the plan annually; this includes updating prioritization, implementation, and administration information (e.g., timeline, funding sources, responsible agencies).

The LMS also includes a hazards analysis, which provides a history of fire events, a risk assessment, and a list of potential impacts.

Post-Disaster Redevelopment Plan

The Post-Disaster Redevelopment Plan (2010) generally references wildfire in both the Land Use and Environmental Restoration sections. The plan recognizes that most post-disaster planning occurs after a major hurricane, but there is a need for post-disaster planning to address other types of disasters, such as wildfires and sea level rise.

The Land Use section of this plan presents the amount of existing land that is susceptible to wildfire in Hillsborough County. One main issue identified in the plan is prioritizing areas to focus rebuilding, reconstruction, and redevelopment. The recommended strategy in this plan is spatially prioritizing holistic development through priority development areas (PRAs). The plan outlines how to define, categorize, and pilot PRAs in Hillsborough County. It further recommends that effective pilot PRAs should include a hazard assessment of specific locations to ensure the PRA is not a high-risk location, such as in a high-risk wildfire interface zone. In doing so, it references and aligns itself with the LMS.

Neighborhood and Site Plans

Plan Hillsborough has a community-based planning program that focuses on creating subarea plans for communities in unincorporated Hillsborough County. The Livable Communities element of the comprehensive plan for unincorporated Hillsborough county summarizes these subarea plans. However, none of them address wildfire risk or WUI development.

The site plan regulations covered in the county’s Land Development Code do not mention wildfire-related requirements but do generally require that “developments have adequate fire protection” (§5.02.01).

Land-Use and Development Regulations

The Land Development Code includes multiple overlay zones (known as special districts) but does not currently use any type of overlay zone to address wildfire risk. However, the LDC does have two natural hazard related zoning overlays: Coastal High Hazard Area (§3.04.01) and Flood Damage Control Regulations (§3.06.01).

The Land Development Code allows transfer of development rights (§5.07.01). This section states that it is the policy of the county to provide landowners with regulatory incentives to permanently restrict environmentally sensitive lands from urbanization. Therefore, it recognizes the function of environmentally sensitive lands as playing a role in mitigation hazards; however, the section does not explicitly protect areas that are of hazard risk.

The county's subdivision regulations include Conservation Subdivisions (§5.09.01). This allows for clustered development that preserves open space and reduces risk related to placing residential development in close proximity to environmental resources and open spaces. The section states that development is guided to and clustered on the most suitable portions of the tract.

While the Strategic Regional Policy Plan for the Tampa Bay Region recommends defensible space as a strategy for reducing wildfire risk, there are currently no local regulations in place to create buffers between structures and wildlands. The LDC includes a section on Landscaping, Irrigation and Buffering requirements (§6.06.01), but these do not explicitly mention wildfire. However, these requirements include buffering between incompatible land uses (§6.06.06).

Public Investments

Land acquisitions are the main public investment the county uses to influence and manage WUI areas. No communities in the county have been designated as Firewise USA™ Communities, which is a voluntary program through the National Fire Protection Association that helps residents take action to increase ignition resistance of their homes and communities. The nearest Firewise Communities are in neighboring Pasco and Polk Counties (CWPP 2016).

The Hillsborough County Housing Rehabilitation Program provides financial assistance to income eligible homeowners for making needed repairs on owner-occupied homes, but it does not incentivize homeowners to install rain barrels, green stormwater infrastructure, or maintain defensible space. Similar initiatives, such as the Tree Grant Program and the Stormwater Program, are in place but the county does not explicitly address hazard mitigation in explanations of the program on their web site.

The Office of Emergency Management has public outreach and education programs with wildfire-related information. The annual Disaster Planning Guide briefly informs residents on how to prepare for wildfires, including removing dry leaves and plants within 5 feet of homes. Virtual outreach videos describe general preparedness, but mainly focus on hurricane and flooding events. The county web site does not currently contain public outreach or education programs focused exclusively on wildfire risk in the WUI, but the Local

Mitigation Strategy includes specific homeowner mitigation activities related to wildfire.

CONCLUSION

The Hillsborough County Community Wildfire Protection Plan characterizes Hillsborough County as very active in hazard mitigation and emergency management. The CWPP bases their characterization on the county's maintenance of fire suppression resources, proactive management of wildland fuels, and limiting of further WUI development. However, a review of future land use patterns in the county indicates that agricultural and mining pressures, coupled with regional population growth, might soon begin to encroach on the WUI.

This case study of Hillsborough County found that the community's network of plans includes various functional plans that measure wildfire risk, plan for future hazard events, and promote a multi-hazard approach. Comprehensive plans in the county do not go beyond meeting the state requirements to plan for natural hazards. This case study also found that land-use and development regulations that address individual site standards in the WUI are not currently in the county's planning framework. Public investments in the community provide robust land management and acquisition programs, but further investigation is needed to evaluate community, neighborhood, and site-level public investments related to wildfire.

The Community Wildfire Protection Plan is the one of the most recently completed major plans for the county. Incorporating the findings from this plan and implementing the recommendations will likely lead to updates in the land development code and long-range comprehensive plans. With the creation of the CWPP, Hillsborough County is on the right track towards expanding and improving its multi-hazard planning framework. Given the community's experience dealing with natural hazards, it will be drawing from a strong foundation of hazard mitigation, emergency planning, and post-disaster recovery.

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