CHAPTER 10 – EXTREME HEAT, DROUGHT & WILDFIRES

Updates to the Wicomico County Chapter 10 – Extreme Heat, Drought and Wildfire included the following:

- Updated Event Tables for Extreme Heat, Drought, and Wildfire Events
- Added Maryland Department of the Environment (MDE) Drought Status
- Added Maryland Department of the Environment (MDE) Drought Restrictions
- Added new Facility and Woodlands Map- Wildfire Vulnerability
- Added potential Mitigation Actions Items for Heat Hazard

CHAPTER 10 – EXTREME HEAT, DROUGHT & WILDFIRES

10.1 INTRODUCTION

The hazard risks from extreme heat, drought and wildfire typically occur during the same months of the year, specifically from April to November. Wildfires and drought can cause both ecological and socioeconomic problems and have the potential to affect a large portion of the population.

10.2 EXTREME HEAT & DROUGHT HAZARD CHARACTERIZATION

The simplest definition of a drought is "an extended period of dry weather"; there are four different types of drought including:

- *Meteorological drought*: A measure of departure from normal precipitation. Due to climatic differences, what is considered a drought in one location may not be in another location.
- *Agricultural drought:* The amount of moisture in the soil no longer meets the needs of a particular crop.
- *Hydrological drought:* Surface and subsurface water supplies are below normal.
- *Socioeconomic drought:* The situation that occurs when physical water shortage begins to affect people.

Droughts may result in damage to crops, livestock and wildlife. During a prolonged drought, land values may decrease, and unemployment may increase. Negative economic impacts on water-dependent businesses may occur as well due to water restrictions implemented during a drought.

Drought & Extreme Heat
Droughts occur when a long period passes without substantial rainfall. A heat wave combined with a drought is a very dangerous situation.

Extreme heat poses a growing and inequitable threat. Cities across the United States must plan now to increase urban heat resilience in the face of climate change and the Urban Heat Island (UHI) effect. Planners are well poised to use existing regulatory tools and plans to mitigate the inequitably distributed risk associated with the UHI effect, reduce greenhouse gas emissions contributing to climate change, and help prepare for extreme heat events. By working with colleagues across agencies and sectors to help coordinate comprehensive approaches to heat mitigation and management, planners can help their communities become more resilient to extreme heat.

- *Extreme Heat Event:* A weather condition with excessive heat and/or humidity that has the potential to cause heat-related illnesses. An Extreme Heat Event is defined as a day or series of days when:
  - The heat index is forecasted to be 105 degrees or higher, or:
  - The National Weather Service has issued a Heat Advisory (Heat Index projected to be 105-109 degrees), or;
  - The National Weather Service has issued an Excessive Heat Warning (Heat Index of 110 degrees or higher for at least 3 hours), or;
  - Weather or environmental conditions are such that a high incidence of heat-related illnesses can reasonably be expected, or;

- The Health Officer has declared an Extreme Heat Event based on weather and/or environmental conditions that may lead to a high incidence of heat-related illnesses.

10.3 EXTREME HEAT & DROUGHT HAZARD RISK & HISTORY

As noted in *Chapter 3: Hazard Identification*, extreme heat and drought are normally not a severe problem in Wicomico County. However, dry conditions do occur, impacting water service to County residents and businesses. The *National Oceanic and Atmospheric Administration (NOAA), National Centers for Environmental Information (NCEI)* reported the following events as extreme heat or drought for Wicomico County.

Table 10.1: Extreme Heat Events

Location	Date	Event Narrative	Property Damage
Unknown	May 18 to May 21, 1996	An early-season four-day heat wave produced record or near record high temperatures across the lower Maryland eastern shore. High temperatures were in the 80s across the region on May 18th. Then on May 19th, 20th and the 21st.	Not Available
Countywide	July 21-23, 2011	An extended period of excessive heat and humidity occurred across most of the Lower Maryland Eastern Shore from July 21st to July 23rd. High temperatures ranged from 96 to 103 degrees during the afternoons, with heat index values ranging from 110 to 119. Overnight lows only fell into the mid-70s to mid-80s.	0
Countywide	July 5- July 8, 2012	High temperatures ranged from the mid-90s to lower 100s and low temperatures ranged from the mid-70s to lower 80s across the county from July 5th through July 8th. High Pressure centered just to the west of the Middle Atlantic Region produced hot and humid weather over the Lower Maryland Eastern Shore from July 5th through July 8th. High temperatures ranged from the mid-90s to lower 100s, and low temperatures ranged from the mid-70s to lower 80s across the area.	0
2021 HMP Update			
No additional Extreme Heat events were reported in the NCEI database since the 2016 HMP Update			

Source: NOAA NCEI

Table 10.2: Drought Events

Date	Event Narrative	Crop Damage
September 1, 1995 to September 30, 1995	Dry conditions, which began in July, continued into early September before welcome rains began falling. Some water use and outdoor burning restrictions were still in effect. Crops such as soybeans were severely impacted by the drought.	Not Available
November 1 to November 30, 1998	A very dry period from July through November resulted in drought-like conditions across much of the Lower Maryland Eastern Shore. This caused significant crop damage and other drought-related problems throughout much of the area.	$6 Million
2021 HMP Update		
No additional Extreme Heat events were reported in the NCEI database since the 2016 HMP Update		

Source: NOAA NCEI

The worst drought in Maryland occurred from December 1929 to February 1931, with 1930 being the driest year since 1869 (*U.S. Weather Bureau 1930*). During the 15-month agricultural drought, rainfall was 21.5 inches below normal. Crop losses in 1930 dollars were estimated at $40 million.

The State of Maryland generally experiences average to higher-than-average stream flow. However, it is normal for Maryland to experience drought cycles as well. In 2002, 72 average monthly low stream flow records were set across Maryland. In 2000, more wells broke monthly record lows than any other recorded period. In 1966, the worst year of the 1958-1971 droughts, 32 monthly low stream flow records were set. Between the years of 1951 - 1999, stream flow into the Chesapeake Bay in 1999 had the fourth lowest annual flow. Lower flows were experienced only in 1963, 1965, and 1966.

10.4 DROUGHT VULNERABILITY

According to the Maryland Department of the Environment (MDE), the drought status for the Eastern Region, which includes Wicomico County, has been at normal as of July 31, 2021. This information is maintained and updated by MDE and may be obtained on their website.

The *Water Resources Element* of the *2017 Wicomico County Comprehensive Plan* includes important data pertaining to the County water supply. For instance, there are no impoundments used for water supply in Wicomico County; residents rely exclusively on groundwater for water supply. This can be problematic, as was the case from May 2007 to August 2007, when approximately 120 wells in Somerset and Wicomico Counties had to be replaced due to prolonged drought conditions that occurred in previous years.

During periods of drought, Maryland implements mandatory water use restrictions including the following prohibited uses:

- Watering of lawns;
- Water of gardens and irrigation, except for agriculture and certain commercial uses;
- Restrictions on irrigation and watering of golf courses;
- Washing of paved surfaces such as streets, roads, sidewalks, driveways, garages, parking areas, tennis courts and patios;
- Use of water for washing or cleaning of mobile equipment including automobiles, trucks, trailers, and boats;
- Use of water to fill and top off swimming pools; and,
- Homeowner power-washing of buildings, fences, decks, or other structures.

Note: There are additional exceptions to the Maryland Water Use Restrictions listed above.

The USGS Water Science for Maryland, Delaware, and the District of Columbia monitors conditions and host a MD-DE-DC Drought Watch at: http://md.water.usgs.gov/drought/index.html. Real time Maryland streamflow data is available, as well as drought status and resources.

10.5 WILDFIRE HAZARD CHARACTERIZATION

Wildfires are fueled by natural cover, including trees, brush, grasses, and crops. Available fuel, topography, and weather provide the conditions that encourage wildfires to spread. Wildfires pose serious threats to human safety and property in rural and suburban areas. They can destroy crops, timber resources, recreation areas, and habitat for wildlife. Wildfires are a growing problem in the wildland/urban interface of the eastern United States, including Maryland.

Climatic and meteorological conditions that influence wildfires include solar insulation, atmospheric humidity, and precipitation, all of which determine the moisture content of wood and leaf litter. Dry spells, heat, low humidity, and wind increase the susceptibility of vegetation to fire. Natural and human agents can be responsible for igniting wildfires. Natural agents include lightning, sparks generated by rocks rolling down a slope, friction produced by branches rubbing together in the wind, and spontaneous combustion. Most wildfires in Maryland are caused from humans, such as arson and accidents from equipment operations.

10.6 WILDFIRE HAZARD RISK & HISTORY

In Maryland, wildfires and brushfires have forced school closings, disrupted telephone services by burning fiber optic cables, damaged railroads, other infrastructure, and adversely affected tourism, outdoor recreation, and hunting. The peak months for wildfire activity in Maryland by rank order are April, March, and November (spring and fall). In the spring months, increasing daytime temperatures, low relative humidity, and wind combine to dry surface litter, which promotes the ignition and spread of wildfires. After forest canopies are established, the forest floors become shaded, moisture levels increase, and fire hazard decreases. In the fall typically there are depleted soil moisture conditions, low streamflow conditions, and increased insulation of the forest floor due to reduced leaf canopies.

The Maryland Department of Natural Resources Forest Service handles statistics on wildfires. Table 10.3 lists the number of wildfires and the amount of acreage burned in Wicomico County from 1988 to 2020.

Table 10.3: Wildfire Events

Year	Number of Fires	Acres Burned
1988	125	1,461.5
1989	46	481.9
1990	41	609.8
1991	26	1,090.8
1992	28	199.9
1993	30	370.3
1994	35	33.7
1995	65	28.1
1996	22	29.3
1997	65	43.2
1998	70	89.8
1999	52	36.9
2000	34	74.1
2001	57	39.0
2002	46	33.3
2003	17	6.4
2004	26	45.1
2005	32	31.9

Year	Number of Fires	Acres Burned
2006	40	46.4
2007	29	121.7
2008	39	50.5
2009	14	3.1
2010	14	43.2
2011	13	19.2
2012	12	42.3
2013	9	4.1
2014	4	0.8
2015	5	4.1
2016	6	1.9
2017	2	2.0
2018	9	14.8
2019	8	27.9
2020	2	2.3
Annual Average	**31 fires**	**29.2 acres**

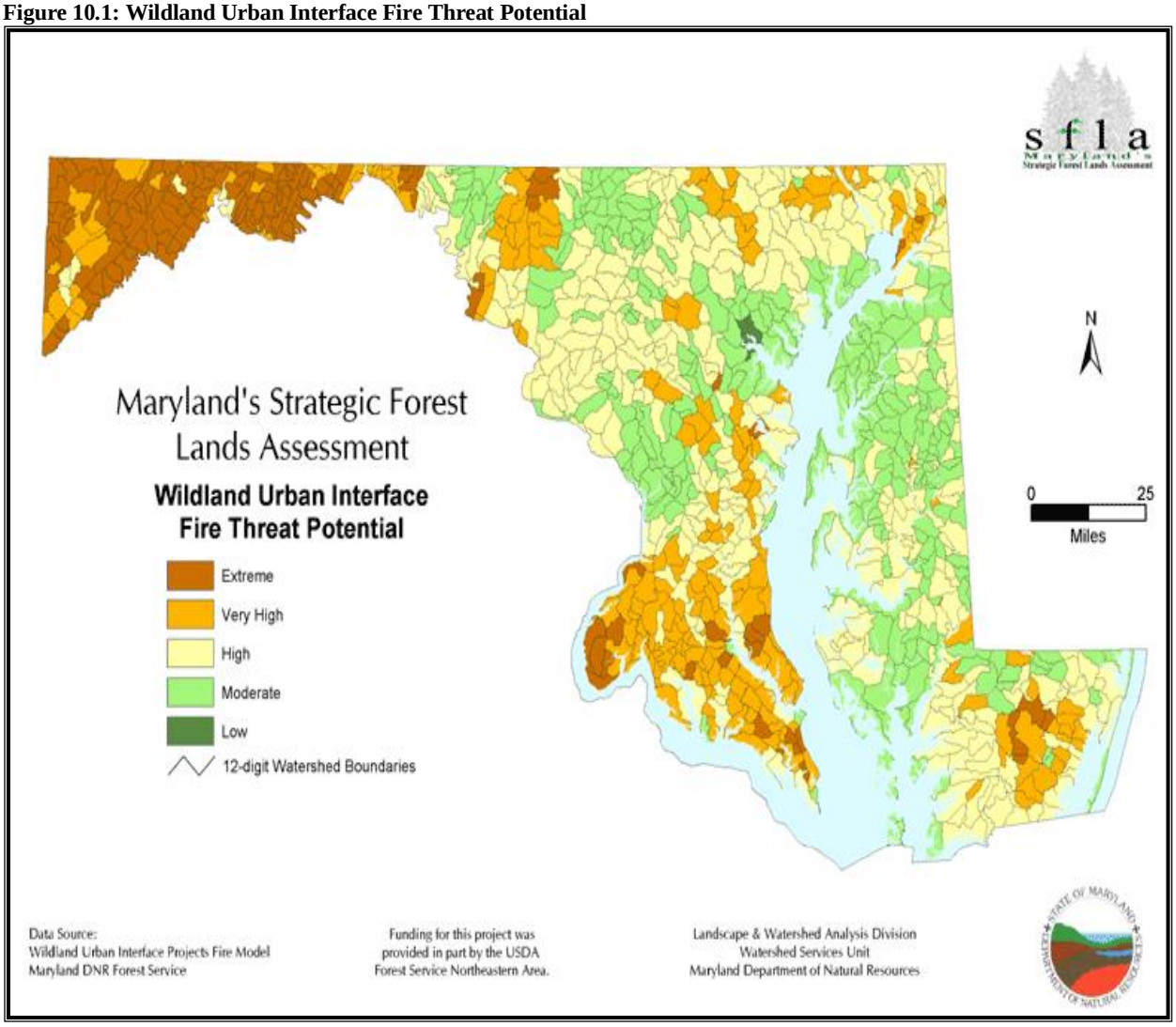
Source: Maryland DNR Forest Service
NOTE: Wildfire responses by the Maryland Forest Service do not represent all wildfire statistics in the County.

In terms of number of occurrences, the Maryland Forest Service listed a total of 1,023 wildfire events affecting Wicomico County during the years 1988 through 2020. Based on this data, Wicomico County experiences approximately 31 wildfire events per year. A trend in the data provided in Table 10.3 shows that the number of fires and the acres burned per year has generally decreased over the years in Wicomico County. There are several explanations for the decrease in wildfires, including wildfire awareness in the County, loss of forest land due to urban sprawl, and increased response times by fire departments.

10.7 WILDFIRE VULNERABILITY

Maryland's Strategic Forest Lands Assessment is conducted by the Maryland Department of Natural Resources with financial assistance from the United States Department of Agriculture Forest Service and is composed of many types of vulnerability studies applying to the forests of Maryland. Figure 10.1 depicted below shows one of the studies conducted on wildland urban interface fire threat potential.

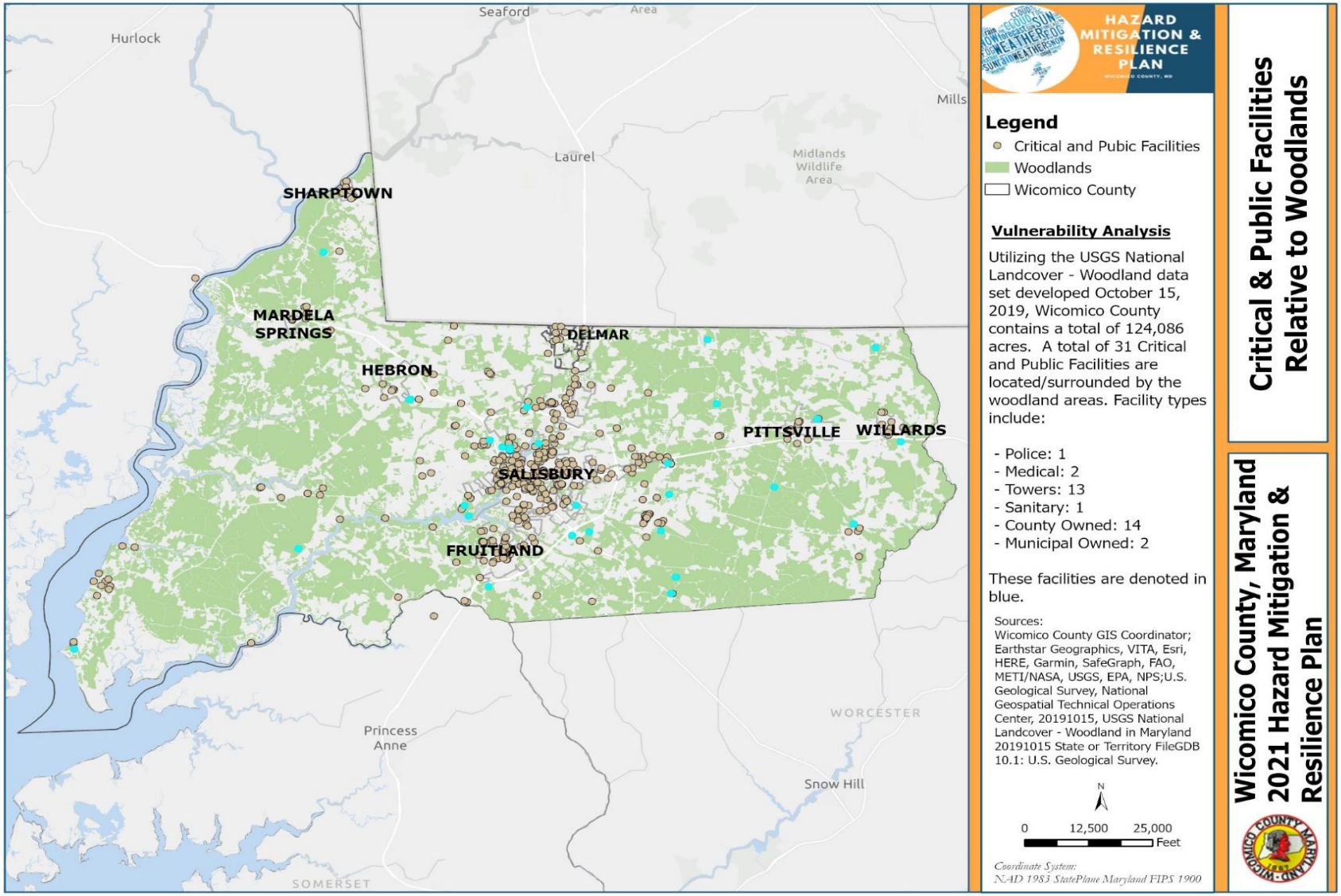
Figure 10.1: Wildland Urban Interface Fire Threat Potential



Source: Maryland DNR Forest Service

According to the figure, when compared to other counties in the state of Maryland, Wicomico County appears to have a moderate-to-high fire threat potential. In terms of forest cover, the woodlands of Wicomico County along with the location of critical and public facilities within the County, combine to determine their wildfire vulnerability.

Map 10.1: Facility Locations Compared to Woodlands



Analyzing Map 10.1 depicted above, Wicomico County has a considerable amount of woodlands. A wildfire could affect some facilities located outside of municipalities where the ratio of woodland to urban interface is considerably higher than in municipalities, where the high amount of impervious surfaces creates a barrier for wildfires. However, from analyzing the Critical and Public Facilities Relative to Woodlands Map above, the majority of facilities at high risk for wildfire consist of utility towers and storage tanks.

10.8 CONCLUSION

In reviewing Map 10.1: Facility Locations Compared to Woodlands, the potential Wildland-urban interface area(s) and concentrated areas of critical facilities in Wicomico County are moderate. Upon further analysis, critical and public facilities depicted in the Map 10.1, specifically when viewed up close, do not appear to be at significant risk to wildfire given the built-up environment within the county where the facilities are predominantly located.

In order to address Extreme Heat, Wicomico County could consider the following mitigation actions:

- Increase building energy efficiency through weatherization and the use of "cool" surfaces can reduce waste heat generated by indoor cooling and mechanical systems. Decreasing vehicle use through the planning of transit and active transportation modes is another waste heat reduction strategy. These strategies also have the co-benefit of reducing greenhouse gas emissions and local contributions to climate change.

- As heat risks increase, it is important to educate and inform the public about the dangers of heat and how to avoid them. Continue efforts to conduct public information and awareness campaigns throughout the summer months.

- A cooling center is a location, typically an air-conditioned or cooled building that has been designated as a site to provide respite and safety during extreme heat. This may be a government-owned building such as a library or school, an existing community center, religious center, recreation center, or a private business such as a coffee shop, shopping mall, or movie theatre. Some counties have set up cooling sites outdoors in spray parks, community pools, and public parks. Sometimes temporary cool spaces are constructed for events such as a marathon or outdoor concert.