

APPENDIX A

HAZARD IDENTIFICATION & RISK ASSESSMENT

HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)

As part of the plan update process for St. Mary's County, Maryland, a Hazard Identification Risk Assessment (HIRA) has been completed for the County.

A **risk** is the chance, high or low, that any hazard will occur and the severity or impact from that hazard.

Ten (10) natural hazards have been identified and a hazard risk has been assigned to each. Only natural hazards are included in this assessment as they lend themselves better to data collection related to geographic extent than technological and man-made hazards. A separate risk assessment will be conducted for the technological and man-made hazards (i.e., transportation accident, hazardous material incident, dam failure, fire and explosion, mass power outage) identified in the previous plan version.

| Natural Hazard Identification and Risk Assessment Ranking Results | | | |
|---|---------------------|---------------------|----------------------|
| Hazards | 2017 Hazard Ranking | 2022 Hazard Ranking | 2022 Composite Score |
| Coastal Events | High | High | 24 |
| Thunderstorm | Medium-High | Medium-High | 20 |
| Pandemic & Infectious Disease | n/a | Medium-High | 20 |
| Wind | Medium-High | Medium-High | 20 |
| Flood | Medium-High | Medium-High | 15.5 |
| Tornado | Medium-High | Medium-High | 18 |
| Extreme Heat | Medium | Medium-High | 17 |
| Drought | Medium | Medium | 14 |
| Winter Storm | High | Medium | 13.5 |
| Wildfire | Medium-Low | Medium-High | 16.5 |

The methodology and data used to complete this HIRA has been included on the following pages, which will comprise Appendix A of the Plan Update.

METHODOLOGY

To assess the hazard risk for the ten (10) natural hazards identified in this Plan Update, a composite score method was undertaken. The composite score method was based on a blend of quantitative and qualitative factors extracted from the National Centers for Environmental Information (NCEI) database, and other available data sources. These included:

- Historical impacts, in terms of human lives and property;
- Geographic extent;
- Historical occurrence; and,
- Future probability.

The following seven (7) ranking parameters were used to develop the composite risk score, which provide the hazard ranking results for the ten (10) identified natural hazards. Each parameter was rated on a scale of one (1) to four (4).

| Injuries and Death Ranking | | Property and Crop Damage Ranking | | Annualized Events Ranking | | *Probability and Future Ranking | |
|----------------------------|---|----------------------------------|---|---------------------------|---|---------------------------------|---|
| Death | 4 | > 2M | 4 | 2.51 | 4 | Highly Likely | 4 |
| N/A | 3 | 501K | 3 | 1.01 | 3 | Likely | 3 |
| Injury | 2 | 50k | 2 | 0.11 | 2 | Occasional | 2 |
| None | 1 | 0 | 1 | 0 | 1 | Unlikely | 1 |

Source: National Centers for Environmental Information
 * Based upon annualized events

| Max Geographical Extent (Hazard Dependent) Ranking | | | | | | | | | |
|--|---------------------------|------------------------|-----------------------------|---|---|--|-------------------------|---|---|
| Ranking | Coastal Events | Drought | Flood | Thunderstorm | Tornado | Wildfire | Wind | Winter Weather | Pandemic & Infectious Disease |
| 1 | 0.00 | 0 | 0.00 | 0-2 events | 0-10 events | 0 | 0.00 | 10"-19" | Countywide = Ranking of 4 |
| 2 | 25.00 | 0.18 | 10.00 | 3-5 events | 11-17 events | 0.4674 | 60.00 | 20"-29" | |
| 3 | 50.00 | 0.3421 | 20.00 | 6-8 events | 18-22 events | 2.1545 | 74.00 | 30"-39" | |
| 4 | 75.00 | 0.49 | 30.00 | >9 events | >23 event | 3.9041 | 95.00 | >40" | |
| <i>Source:</i> | <i>COASTAL: Risk Area</i> | <i>DROUGHT: CDL MD</i> | <i>FLOOD: DFIRMS</i> | <i>THUNDERSTORM: NCDC</i> | <i>TORNADO: NCDC</i> <i>EARTHQUAKE: Maryland Geological Survey</i> | <i>WILDFIRE: MD DNR Forest Service</i> | <i>WIND: ASCE</i> | <i>WINTER STORM: National Weather Service</i> | <i>Maryland Health Department</i> |
| Calculated Using: | % of Coastal Land Area | % Crop Area | % Area in 100-yr Floodplain | Average number based on: Number of events, 2"> hail and lightning events with Injuries/Deaths | Sum of all tornados weighted by F-scale (F1*1.5, F2*2, F3*3, F4*4); Number of Earthquake Events | Average annual acres burned (%) | ASCE Design Wind Speeds | Average Snowfall | Nature of Hazard: Pandemic Global and Emerging Infectious Disease Large Geographic Area |

Source: 2021 State of Maryland Hazard Mitigation Plan

The following weighted risk factors were used in the equation below to determine the composite risk score for each identified hazard.

| Weighted Risk Factors | | |
|--------------------------------------|----|-----|
| Injuries | IN | 1 |
| Deaths | DT | 1 |
| Property Damage | PD | 1 |
| Crop Damage | CD | 1 |
| Geographic Extent (Hazard Dependent) | GE | 1.5 |
| Events (Annualized) | EV | 1 |
| Future Probability | FP | 1 |

Equation: Composite Score = IN + DT + PD + CD + (GE*1.5) + EV + FP

Hazard Ranking Results

Using the data tables above to populate the parameters, the composite score was determined for each identified hazard. Hazard Rankings were assigned accordingly using the adjacent Composite Score chart.

| Composite Score | |
|-----------------|----------------|
| Score (>=) | Hazard Ranking |
| 0 - 9 | Low |
| 10 - 15 | Medium |
| 15 - 20 | Medium-High |
| 21 - 28 | High |

The following table provides the hazard risk ranking update results. Coastal Events was ranked as a “High” risk hazard. Thunderstorm, Flood, Tornado, Wildfire, Wind, Extreme Heat, and Pandemic & Infectious Disease were ranked as “Medium-High” risk hazards, while Drought and Winter Weather were ranked as “Medium” risk hazards.

| Hazard | Injuries & Deaths | | Property & Crop Damage | | Geographic Extent | Total Events Annualized | Future Probability | Composite Score | HAZARD RANKING |
|--|-------------------|----------|------------------------|-------------|-------------------|--|--------------------|-----------------|--------------------|
| | IN | DT | PD | CD | GE | EV | FP | CS | |
| Flood (Flash Flood, Heavy Rain) | 0 = 1 | 0 = 1 | \$785K = 3 | 0 = 1 | 8% = 1 | 4.15 = 4 | Highly Likely = 4 | 15.5 | Medium-High |
| Drought | 0 = 1 | 0 = 1 | 0 = 1 | \$1.67M = 3 | 18% = 2 | 1.2 = 3 | Occasional = 2 | 14 | Medium |
| Tornado | 4 = 2 | 0 = 1 | \$4.21M = 4 | \$21K = 1 | 25 = 4 | 0.46 = 2 | Occasional = 2 | 18 | Medium-High |
| Thunderstorm (Thunderstorm Wind, Lightning, Hail) | 0 = 1 | 0 = 1 | \$2.131M = 3 | \$22.6K = 1 | 215 = 4 | 3.58 = 4 | Highly Likely = 4 | 20 | Medium-High |
| Wind | 0 = 1 | 0 = 1 | \$4.937M = 4 | \$75K = 2 | 115 = 4 | 1.16 = 3 | Likely = 3 | 20 | Medium-High |
| Wildfire | 1 = 2 | 1 = 4 | 0 = 1 | 0 = 1 | 0.012% = 1 | 29.13 = 4 | Likely = 3 | 16.5 | Medium |
| Extreme Heat | 0 = 1 | 2 = 4 | 0 = 1 | 0 = 1 | 18% = 2 | 2.73 = 4 | Likely = 3 | 17 | Medium-High |
| Winter Weather (Winter Storm, Blizzard, Ice Storm) | 0 = 1 | 0 = 1 | \$15K = 1 | \$2.5K = 1 | 14.2" = 1 | 4.62 = 4 | Highly Likely = 3 | 13.5 | Medium |
| Coastal Events (Tropical Storm, Hurricane, Coastal Flooding) | 154 = 2 | 1 = 4 | \$91.175M = 4 | \$50k = 2 | 81% = 4 | 2.32 = 3 | Likely = 3 | 24 | High |
| Pandemic & Emerging Infection Diseases | *17,732 = 2 | *198 = 4 | 0 = 1 | 0 = 1 | **100% = 4 | *** 1,078.6 avg. cases annually = 4 | Occasional = 2 | 20 | Medium-High |

Data Tables

The following data tables were developed and used to populate five (5) of the eight (8) parameters: Injuries, Death, Property Damage, Crop Damage, and Annualized Events.

FLOOD

| Total Flood Hazard Risk Assessment Data Table | | | | | |
|---|--------|-----------------|-------------|----------------------------------|----------------------------------|
| <i>Hazards included within this table from NCEI Data: Flood, Flash Flood, and Heavy Rain</i> | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2021) |
| 0 | 0 | \$785K | \$0 | % in 100-yr SFHA Flood Zone = 8% | Total = 108 Annual Avg = 4.15 |
| <small>Source: National Centers for Environmental Information, as of February 2022 & 2021 State of Maryland Hazard Mitigation Plan *Note: Data collected for 1950-present, no data available for these event types prior to 1996.</small> | | | | | |

| Flood Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|----------------------------------|---------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (2005-2021) |
| 0 | 0 | \$30K | \$0 | % in 100-yr SFHA Flood Zone = 8% | Total = 41 Annual Avg = 2.41 |
| <small>Note: Data collected for 1950-present, no data available for this event type prior to 2005. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Flood (C). Any high flow, overflow, or inundation by water which causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water level in an established watercourse, or ponding of water, that poses a threat to life or property. If the event is considered significant, it should be entered into Storm Data, even if it only affected a small area. Refer to the Flash Flood event (Section 14) for guidelines for differentiating between Flood and Flash Flood events.</small> | | | | | |

| Flash Flood Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|----------------------------------|---------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2021) |
| 0 | 0 | \$755K | \$0 | % in 100-yr SFHA Flood Zone = 8% | Total = 33 Annual Avg = 1.27 |
| <small>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Flash Flood (C). A life-threatening, rapid rise of water into a normally dry area beginning within minutes to multiple hours of the causative event (e.g., intense rainfall, dam failure, ice jam). Ongoing flooding can intensify to the shorter-term flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters. Flash flooding, such as dangerous small stream or urban flooding and dam or levee failures, requires immediate action to protect life and property. Conversely, flash flooding can transition into flooding as rapidly rising waters abate. The Storm Data preparer uses professional judgment in determining when the event is no longer characteristic of a Flash Flood and becomes a Flood.</small> | | | | | |

| Heavy Rain Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|----------------------------------|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1997-2006) |
| 0 | 0 | \$0 | \$0 | % in 100-yr SFHA Flood Zone = 8% | Total = 34 Annual Avg = 3.4 |
| <small>Note: Data collected for 1950-present, no data available for this event type prior to 1997. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Heavy Rain (C). Unusually large amount of rain which does not cause a Flash Flood or Flood event, but causes damage, e.g., roof collapse or other human/economic impact. Heavy Rain will no longer be acceptable as a means to record low-impact or isolated flood events.</small> | | | | | |

DROUGHT

| Total Drought Hazard Risk Assessment Data Table | | | | | |
|--|--------|-----------------|-------------|--|--------------------------------|
| <i>Hazards included within this table from NCEI Data: Drought</i> | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1998-2007) |
| 0 | 0 | \$0 | \$1.67M | % Crop land cover from 2017 USDA Cropland Data = 18% | Total = 12 Annual Avg = 1.2 |
| <small>Source: National Centers for Environmental Information, as of February 2022, 2021 State of Maryland Hazard Mitigation Plan & USDA 2017 Cropland Data. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Drought (Z). Drought is a deficiency of moisture that results in adverse impacts on people, animals, or vegetation over a sizeable area. Conceptually, drought is a protracted period of deficient precipitation resulting in extensive damage to crops, resulting in loss of yield. There are different kinds of drought: meteorological, agricultural, hydrological, and social-economic. Each kind of drought starts and ends at different times.</small> | | | | | |

WILDFIRE

| Wildfire Hazard Data Table | | | | | |
|----------------------------|--------|-----------------|-------------|----------------------------------|---------------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Events (2000-2020) |
| 1 | 1 | \$0 | \$0 | Avg Annual Acres Burned = 0.012% | Total = 418 Annual Avg = 29.13/yr. |

Note: Data obtained from MD-DNR Forest Service for 2000-2020.

TORNADO

| Total Tornado Hazard Risk Assessment Data Table | | | | | |
|--|--------|-----------------|-------------|--|---------------------------------|
| <i>Hazards included within this table from NCEI Data: Tornado, Funnel Cloud, and Waterspout. No Funnel Cloud or Waterspout events are recorded in the NCEI Database for this county.</i> | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1967-2020) |
| 4 | 0 | \$4.12M | \$21K | SVRGIS (intensity & frequency) = 25 events | Total = 25 Annual Avg = 0.46 |

Source: National Centers for Environmental Information, as of February 2022 & 2021 State of Maryland Hazard Mitigation
Note: Data collected for 1950-present, no data available for this event type prior to 1967.

| Tornado Hazard Data Table | | | | | |
|---------------------------|--------|-----------------|-------------|--|---------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1967-2020) |
| 4 | 0 | \$4.12M | \$21K | SVRGIS (intensity & frequency) = 25 events | Total = 25 Annual Avg = 0.46 |

Note: Data collected for 1950-present, no data available for this event type prior to 1967.
Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.
Based on NCEI definitions/criteria: Tornado (C). A violently rotating column of air, extending to or from a cumuliform cloud or underneath a cumuliform cloud, to the ground, and often (but not always) visible as a condensation funnel. For a vortex to be classified as a tornado, it must be in contact with the ground and extend to/from the cloud base, and there should be some semblance of ground-based visual effects such as dust/dirt rotational markings/swirls, or structural or vegetative damage or disturbance.

WIND

| Total Wind Hazard Risk Assessment Data Table | | | | | |
|---|--------|-----------------|-------------|------------------------------|---------------------------------|
| <i>Hazards included within this table from NCEI Data: High Wind and Strong Wind</i> | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2020) |
| 0 | 0 | \$4.9376M | \$75K | ASCE Wind Design Speed = 115 | Total = 29 Annual Avg = 1.16 |

Source: National Centers for Environmental Information, as of February 2022 & 2019 Building Code Administration
Note: Data collected for 1950-present, no data available for these event types prior to 1996.

| High Wind Hazard Data Table | | | | | |
|-----------------------------|--------|-----------------|-------------|------------------------------|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2020) |
| 0 | 0 | \$4.855M | \$0 | ASCE Wind Design Speed = 115 | Total = 15 Annual Avg = 0.6 |

Note: Data collected for 1950-present, no data available for this event type prior to 1996.
Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.
Based on NCEI definitions/criteria: High Wind (Z). Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer, or gusts of 50 knots (58 mph) or greater for any duration (or otherwise locally/regionally defined). In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

| Strong Wind Hazard Data Table | | | | | |
|-------------------------------|--------|-----------------|-------------|------------------------------|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1997-2003) |
| 0 | 0 | \$82.6K | \$75K | ASCE Wind Design Speed = 115 | Total = 14 Annual Avg = 2.0 |

Note: Data collected for 1950-present, no data available for this event type prior to 1997.
Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.
Based on NCEI definitions/criteria: Strong Wind (Z). Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph), resulting in a fatality, injury, or damage. Consistent with regional guidelines, mountain states may have higher criteria. A peak wind gust (estimated or measured) or maximum sustained wind will be entered.

WINTER WEATHER**Total Winter Weather Hazard Risk Assessment Data Table**

Hazards included within this table from NCEI Data: Winter Storm, Winter Weather, Blizzard, Ice Storm, Frost/Freeze, Heavy Snow, Extreme Cold, and Cold/Wind Chill.

| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2021) |
|----------|--------|-----------------|-------------|---|----------------------------------|
| 0 | 0 | \$15K | \$2.5K | Average snowfall total: 14.2" (NOAA/NWS) | Total = 120 Annual Avg = 4.62 |

Source: National Centers for Environmental Information, as of February 2022, 2021 State of Maryland Hazard Mitigation Plan, & NOAA/NWS

Winter Storm Hazard Data Table

| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1999-2021) |
|----------|--------|-----------------|-------------|---|---------------------------------|
| 0 | 0 | \$5K | \$ | Average snowfall total: 14.2" (NOAA/NWS) | Total = 28 Annual Avg = 1.22 |

Note: Data collected for 1950-present, no data available for this event type prior to 1999.

Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.

Based on NCEI definitions/criteria: Winter Storm (Z). A winter weather event that has more than one significant hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice) and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. Normally, a Winter Storm would pose a threat to life or property.

Winter Weather Hazard Data Table

| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1997-2021) |
|----------|--------|-----------------|-------------|---|--------------------------------|
| 0 | 0 | \$0 | \$0 | Average snowfall total: 14.2" (NOAA/NWS) | Total = 50 Annual Avg = 2.0 |

Note: Data collected for 1950-present, no data available for this event type prior to 1997.

Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.

Based on NCEI definitions/criteria: Winter Weather (Z). A winter precipitation event that causes a death, injury, or a significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifted snow, or freezing rain/drizzle). The Winter Weather event can also be used to document out-of-season and other unusual or rare occurrences of snow, or blowing/drifted snow, or freezing rain/drizzle. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

Ice Storm Hazard Data Table

| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (2000-2021) |
|----------|--------|-----------------|-------------|---|--------------------------------|
| 0 | 0 | \$0 | \$0 | Average snowfall total: 14.2" (NOAA/NWS) | Total = 3 Annual Avg = 0.14 |

Note: Data collected for 1950-present, no data available for this event type prior to 2000.

Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.

Based on NCEI definitions/criteria: Ice Storm (Z). Ice accretion meeting or exceeding locally/regionally defined warning criteria (typical value is 1/4 or 1/2 inch or more). If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. The Storm Data preparer should include the times that ice accretion began, met criteria, and accretion ended. If the freezing rain was mixed with other precipitation types, then a Winter Storm event should be used.

Blizzard Hazard Data Table

| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2016) |
|----------|--------|-----------------|-------------|---|--------------------------------|
| 0 | 0 | \$10K | \$0 | Average snowfall total: 14.2" (NOAA/NWS) | Total = 4 Annual Avg = 0.19 |

Note: Data collected for 1950-present, no data available for this event type prior to 1996.

Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone.

Based on NCEI definitions/criteria: Blizzard (Z). A winter storm which produces the following conditions for 3 consecutive hours or longer: (1) sustained winds or frequent gusts 30 knots (35 mph) or greater, and (2) falling and/or blowing snow reducing visibility frequently to less than 1/4 mile. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.

| Heavy Snow Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2006) |
| 0 | 0 | \$0 | \$0 | Average snowfall total: 14.2” (NOAA/NWS) | Total = 8 Annual Avg = 0.73 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone. Based on NCEI definitions/criteria: Heavy Snow (Z). Snow accumulation meeting or exceeding locally/regionally defined 12 and/or 24 hour warning criteria. This could mean values such as 4, 6, or 8 inches or more in 12 hours or less; or 6, 8, or 10 inches in 24 hours or less. If the event that occurred is considered significant, even if it affected a small area, it should be entered into Storm Data. I</i></p> | | | | | |

| Extreme Cold Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|---|-------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (2000-2001) |
| 0 | 0 | \$0 | \$0 | Average snowfall total: 14.2” (NOAA/NWS) | Total = 5 Annual Avg = 2.5 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 2000. Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone. Based on NCEI definitions/criteria: Extreme Cold (Z). A period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35° F or colder). If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data .</i></p> | | | | | |

| Cold/Wind Chill Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1998-2019) |
| 0 | 0 | \$0 | \$2.5K | Average snowfall total: 14.2” (NOAA/NWS) | Total = 4 Annual Avg = 0.18 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 1998. Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone. Based on NCEI definitions/criteria: Cold/Wind Chill (Z). Period of low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined advisory (typical value is -18° F or colder) conditions. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data .</i></p> | | | | | |

| Frost/Freeze Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (2005-2019) |
| 0 | 0 | \$0 | \$0 | Average snowfall total: 14.2” (NOAA/NWS) | Total = 18 Annual Avg = 1.2 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 2005. Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone. Based on NCEI definitions/criteria: Frost/Freeze (Z). A surface air temperature of 32 degrees Fahrenheit (°F) or lower, or the formation of ice crystals on the ground or other surfaces, for a period of time long enough to cause human or economic impact, during the locally defined growing season. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data. .</i></p> | | | | | |

COASTAL EVENTS

| Total Coastal Events Hazard Risk Assessment Data Table | | | | | |
|---|--------|-----------------|-------------|---|---------------------------------|
| <i>Hazards included within this table from NCEI Data: Tropical Storm, Hurricanes, Storm Surge, and Coastal Flooding. No Hurricanes or Tropical Depressions are recorded in the NCEI Database for this county.</i> | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2020) |
| 154 | 1 | \$91.175M | \$50K | % of County in Coastal Land Area = 81% | Total = 58 Annual Avg = 2.32 |
| <p><i>Source: National Centers for Environmental Information, as of February 2022 & 2021 State of Maryland Hazard Mitigation Plan Note: Data collected for 1950-present, no data available for these event types prior to 1996.</i></p> | | | | | |

| Tropical Storm Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1999-2020) |
| 154 | 1 | \$90.775M | \$50K | % of County in Coastal Land Area = 81% | Total = 5 Annual Avg = 0.23 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 1999. Legend: There are three designators: C - County/Parish; Z - Zone; and M – Marine Zone. Based on NCEI definitions/criteria: Tropical Storm (Z). A tropical cyclone in which the 1-minute sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). A Tropical Storm should be included as an entry when these conditions are experienced in the WFO’s (Weather Forecast Office) CWA (County Warning Area).</i></p> | | | | | |

| Coastal Flooding Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2020) |
| 0 | 0 | \$300K | \$0 | % of County in Coastal Land Area = 81% | Total = 50 Annual Avg = 2.0 |
| <p>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Coastal Flood (Z). Flooding of coastal areas due to the vertical rise above normal water level caused by strong, persistent onshore wind, high astronomical tide, and/or low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Coastal areas are defined as those portions of coastal land zones (coastal county/parish) adjacent to the waters, bays, and estuaries of the oceans. Farther inland, the Storm Data preparer determines the boundary between coastal and inland areas, where flood events will be encoded as Flash Flood or Flood rather than Coastal Flood. Terrain (elevation) features will determine how far inland the coastal flooding extends.</p> | | | | | |

| Storm Surge Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2006) |
| 0 | 0 | \$100K | \$0 | % of County in Coastal Land Area = 81% | Total = 3 Annual Avg = 0.27 |
| <p>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Storm Surge (Z). For coastal areas, the vertical rise above normal water level associated with a storm of tropical origin (e.g., hurricane, typhoon, tropical storm, or subtropical storm), caused by any combination of strong, persistent onshore wind, high astronomical tide and low atmospheric pressure, resulting in damage, erosion, flooding, fatalities, or injuries. Note: Coastal flooding not associated with a typhoon, hurricane, tropical storm or subtropical storm should be reported under the Coastal Flood event.</p> | | | | | |

THUNDERSTORM

| Total Thunderstorm Hazard Risk Assessment Data Table | | | | | |
|--|--------|-----------------|-------------|--|----------------------------------|
| Hazards included within this table from NCEI Data: Thunderstorm Wind, Lightning, and Hail. | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1962-2021) |
| 0 | 0 | \$2.131M | \$22.6K | ASCE Wind Design Speed = 115 2" > hail and lightning events with Injuries/Deaths = 1 | Total = 215 Annual Avg = 3.58 |
| <p>Source: National Centers for Environmental Information, as of February 2022, & 2019 Building Code Administration & 2021 State of Maryland Hazard Mitigation Plan. Note: Data collected for 1950-present, no data available for this event type prior to 1962.</p> | | | | | |

| Thunderstorm Wind Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|------------------------------|----------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1963-2021) |
| 9 | 0 | \$1.457M | \$22.6K | ASCE Wind Design Speed = 115 | Total = 158 Annual Avg = 2.68 |
| <p>Note: Data collected for 1950-present, no data available for this event type prior to 1963. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Thunderstorm Wind (C). Winds, arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage. Maximum sustained winds or wind gusts (measured or estimated) equal to or greater than 50 knots (58 mph) will always be entered. Events with maximum sustained winds or wind gusts less than 50 knots (58 mph) should be entered as a Storm Data event only if the result in fatalities, injuries, or serious property damage. Storm Data software permits only one event name for encoding severe and non-severe thunderstorm winds. The Storm Data software program requires the preparer to indicate whether the sustained wind or wind gust value was measured or estimated.</p> | | | | | |

| Lightning Hazard Data Table | | | | | |
|---|--------|-----------------|-------------|-------------------|---------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2008) |
| 0 | 0 | \$662K | \$0 | Countywide | Total = 10 Annual Avg = 0.77 |
| <p>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Lightning (C). A sudden electrical discharge from a thunderstorm, resulting in a fatality, injury, and/or damage.</p> | | | | | |

| Hail Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|--|---------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1962-2021) |
| 0 | 0 | \$12K | \$0 | 2"> hail and lightning events with Injuries/Deaths = 1 | Total = 47 Annual Avg = 0.78 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 1962. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Hail (C). Frozen precipitation in the form of balls or irregular lumps of ice. Hail 3/4" or larger in diameter will be entered. Hail accumulations of smaller size, which cause property and/or crop damage or casualties, should be entered. Maximum hail size will be encoded for all hail reports entered.</i></p> | | | | | |

EXTREME HEAT

| Total Extreme Heat Hazard Risk Assessment Data Table | | | | | |
|--|--------|-----------------|-------------|---|---------------------------------|
| Hazards included within this table from NCEI Data: Excessive Heat and Heat | | | | | |
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2021) |
| 0 | 2 | \$0 | \$0 | % Crop from 2017 Agriculture Census = 18% | Total = 71 Annual Avg = 2.73 |
| <p><i>Source: National Centers for Environmental Information, as of February 2022 & 2021 State of Maryland Hazard Mitigation Plan. Note: Data collected for 1950-present, no data available for this event type prior to 1996.</i></p> | | | | | |

| Excessive Heat Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (2000-2020) |
| 0 | 0 | \$0 | \$0 | % Crop from 2017 Agriculture Census = 18% | Total = 6 Annual Avg = 0.29 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 2000. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Excessive Heat (Z). Excessive Heat results from a combination of high temperatures (well above normal) and high humidity. An Excessive Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established excessive heat warning thresholds. Fatalities (directly related) or major impacts to human health that occur during excessive heat warning conditions are reported using this event category. If the event that occurred is considered significant, even though it affected a small area, it should be entered into Storm Data.</i></p> | | | | | |

| Heat Hazard Data Table | | | | | |
|--|--------|-----------------|-------------|---|--------------------------------|
| Injuries | Deaths | Property Damage | Crop Damage | Geographic Extent | Days with Events (1996-2021) |
| 0 | 2 | \$0 | \$0 | % Crop from 2017 Agriculture Census = 18% | Total = 65 Annual Avg = 2.5 |
| <p><i>Note: Data collected for 1950-present, no data available for this event type prior to 1996. Legend: There are three designators: C - County/Parish; Z - Zone; and M - Marine Zone. Based on NCEI definitions/criteria: Heat (Z). A period of heat resulting from the combination of high temperatures (above normal) and relative humidity. A Heat event occurs and is reported in Storm Data whenever heat index values meet or exceed locally/regionally established advisory thresholds. Fatalities or major impacts on human health occurring when ambient weather conditions meet heat advisory criteria are reported using the Heat event. If the ambient weather conditions are below heat advisory criteria, a Heat event entry is permissible only if a directly related fatality occurred due to unseasonably warm weather, and not man-made environments.</i></p> | | | | | |

PANDEMIC AND EMERGING INFECTIOUS DISEASES

| Cases of Selected Notifiable Conditions Reported St. Mary's County, Maryland | | | | | |
|---|------|------|------|------|------|
| Condition | 2015 | 2016 | 2017 | 2018 | 2019 |
| Amebiasis | 0 | 0 | 1 | 0 | 0 |
| Anaplasmosis | 0 | 1 | 0 | 0 | 0 |
| Animal Bites | 253 | 479 | 381 | 365 | 318 |
| Babesiosis | 0 | 1 | 0 | 0 | 0 |
| Campylobacteriosis | 6 | 11 | 7 | 9 | 13 |
| Chlamydia | 351 | 308 | 404 | 504 | 511 |
| Creutzfeldt-Jakob Disease | 1 | 0 | 0 | 0 | 0 |
| Cryptosporidiosis | 1 | 0 | 0 | 0 | 1 |
| Cyclosporiasis | 0 | 0 | 0 | 0 | 3 |
| Dengue Fever | 0 | 2 | 0 | 0 | 0 |
| Ehrlichiosis | 1 | 2 | 8 | 5 | 11 |
| Giardiasis | 2 | 0 | 1 | 1 | 3 |

| Cases of Selected Notifiable Conditions Reported St. Mary's County, Maryland | | | | | |
|--|----------------|--------------|--------------|--------------|--------------|
| Condition | 2015 | 2016 | 2017 | 2018 | 2019 |
| Gonorrhea | 38 | 127 | 95 | 165 | 314 |
| H. influenzae – invasive disease | 4 | 4 | 3 | 2 | 1 |
| Hepatitis A (acute symptomatic) | 4 | 2 | 0 | 0 | 1 |
| Hepatitis B (acute symptomatic) | 0 | 1 | 1 | 0 | 0 |
| Hepatitis C (acute symptomatic) | 4 | 1 | 0 | 2 | 1 |
| Influenza Novel A Virus Infection | 0 | 0 | 1 | 0 | 0 |
| Kawasaki Syndrome | 0 | 0 | 0 | 0 | 1 |
| Legionellosis | 1 | 1 | 1 | 1 | 0 |
| Lyme Disease | 53 | 53 | 67 | 30 | 37 |
| Malaria | 0 | 0 | 1 | 1 | 1 |
| Meningitis, aseptic | 9 | 2 | 3 | 3 | 3 |
| Meningitis, fungal | 0 | 0 | 0 | 2 | 2 |
| Mycobacteriosis, Other than TB & Leprosy | 11 | 13 | 20 | 12 | 3 |
| Pertussis | 4 | 2 | 0 | 9 | 6 |
| Pneumonia – Hospitalized Healthcare Worker | 2 | 1 | 1 | 1 | 0 |
| Rabies - Animal | 5 | 14 | 0 | 5 | 3 |
| Salmonellosis – other than typhoid fever | 21 | 20 | 15 | 16 | 10 |
| Shiga toxin producing E. coli (STEC) | 0 | 1 | 0 | 5 | 1 |
| Shigellosis | 0 | 0 | 1 | 2 | 2 |
| Spotted Fever Rickettsiosis | 2 | 0 | 4 | 15 | 13 |
| Strep Group A – Invasive Disease | 6 | 3 | 5 | 3 | 5 |
| Strep Group B – Invasive Disease | 15 | 11 | 11 | 7 | 7 |
| Strep pneumoniae - Invasive Disease | 9 | 8 | 9 | 6 | 8 |
| Syphilis – primary and secondary | 3 | 1 | 3 | 5 | 3 |
| Tuberculosis | 2 | 0 | 2 | 0 | 0 |
| Vibriosis (non-cholera) | 1 | 2 | 1 | 2 | 2 |
| Yersiniosis | 0 | 0 | 0 | 3 | 2 |
| Zika virus disease, non-congenital | ** | 1 | 0 | 0 | 0 |
| Zika virus infection, congenital | ** | 0 | 0 | 0 | 0 |
| Zika virus infection, non-congenital | ** | 0 | 0 | 0 | 0 |
| TOTALS: | 809 | 1,072 | 1,045 | 1,181 | 1,286 |
| Average Numbers of New Cases 2015-2019 | 1,078.6 | | | | |
| * Data sources: Maryland's NEDSS and PRISM databases. Data is current as of 1/15/2021. These are active databases and counts may vary slightly over time, as well as differ slightly from counts published by the Centers for Disease Control and Prevention (CDC). HIV/AIDS data are not included here but available at http://phpa.dhmh.maryland.gov/OIDEOR/CHSE/SitePages/statistics.aspx . | | | | | |
| ** Zika virus infections not reported for the years 2014 and 2015 in the database. | | | | | |