Appendix 3-1: HIRA Methodology & Reference Data

A blend of quantitative factors extracted from the National Center for Environmental Information, local damage assessment data, and the 2018 Local Risk Perspective Survey, were used for the new *2018 Baltimore City Hazard Identification and Risk Assessment* (HIRA).

The following five (5) rating parameters were used to develop hazard risk ranking for the (15) identified sixteen hazards.

Probability

Probability means the likelihood of the hazard occurring and are defined in terms of general descriptors, (for example, unlikely, somewhat likely, likely, highly likely), historical frequencies, statistical probabilities, and/or hazard probability maps.

Deaths

Hazard related deaths correlate to the severity of impact to the community from any specific hazards.

Injuries

Hazard related injuries correlate to the severity of impact to the community from any specific hazards.

Damages

Hazard related damages include both property and crop damages and correlate to the severity of impact to the community from any specific hazards.

Local Hazard Risk Perspective

A local hazard risk perspective provides a basis for determining those hazards that are of concern to people who work and/or live in the planning area. Levels of concern are defined in terms of general descriptors, (for example, not concerned, somewhat concerned, concerned, very concerned).

Table 3-1 below provides the specific rating criteria used in this analysis. All rating criteria are equally weighted. HIRA results are presented in Table 3-2.

Table 3-1: Hazard Rating Criteria

Probability Rating		Local Risk Perspective		Damages	
Rating	**Criteria**	**Rating**	**Criteria**	**Rating**	**Criteria**
1	0-0.49 events/year	1	Not Concerned	1	None
2	0.50-1 events/year	2	Somewhat Concerned	2	Minor
3	1.1-2.5 events/year	3	Concerned	3	Significant
4	2.6 or more events/year	4	Highly Concerned	4	Major

Deaths		Injuries	
Rating	**Criteria**	**Rating**	**Criteria**
1	None	1	None
4	1 or more	4	1 or more

Table 3-2: Overall Hazard Risk Ranking

Hazards	Probability	Deaths	Injuries	Damages	Local Risk Perspective	Hazard Risk Ranking
Flooding						
Flood	3	4	4	4	4	19
Dam Failure	1	1	1	1	2	5
Coastal Hazards						
Tropical Storms & Hurricanes	1	1	1	4	4	11
Storm Surge/Coastal Inundation	2	1	1	2	3	9
Sea Level Change	4	1	1	4	4	14
Tsunami	1	1	1	1	1	5
Precipitation Variability						
Thunderstorms (Lightning & Hail)	1	4	4	1	3	13
Winter Storms & Nor'easter	4	4	4	4	3	19
Drought	1	1	1	4	2	9
Wind						
Thunderstorm Winds & Derecho	4	4	4	4	3	19
Tornados	1	1	4	3	2	11
Extreme Heat						
Heat & Air Quality	4	4	4	1	4	17
Land						
Earthquakes	1	1	1	4	1	8
Landslump/Subsidence	1	1	1	1	1	5
Sinkholes	3	1	1	4	3	12

Hazard Risk Ranking Categories		
Low Risk	Medium Risk	High Risk
0-6	7-13	14-20

Note: Hazards that do not include past occurrence data were assessed for future probability. Those hazards that were assessed as having a low probability of occurrence within the planning area, indicated as a "1" on the table above, were then assessed as "1" for all other rating parameters. Those hazards included dam failure and tsunami. Those hazards assessed as probable, indicated as a "2" or higher on the table above were then assessed for all other rating parameters based upon likelihood of occurrence and associated impacts.

Table 3-3: HIRA Raw Data Table

Hazards	Probability	Deaths	Injuries	Damages (Property and/or Crop)	Local Risk Perspective
Flood	3.23	5	2	1.881.03 M	3.6
Tropical Storms & Hurricanes	1.6	0	0	252.6 M	3.5
Storm Surge/Coastal Inundation	0.68	0	0	45K	3.2
Thunderstorms (Lightning & Hail)	0.36	2	1	35K	3.0
Winter Storms & Nor'Easter	7.36	3	20	1.605 M	3.2
Drought	0.45	0	0	1.67 M	2.3
Thunderstorm Winds & Derechos	2.02	1	29	8.267 M	2.7
Tornados	0.27	0	3	200K	2.2
Heat & Air Quality	2.77	68	280	0	3.5
Earthquakes	0.89	0	0	3 M	1.5
Sinkholes	1.3	0	0		2.5

Table 3-4: Local Risk Perspective Survey

Hazards	Local Risk Perspective Survey Results
Flooding	
Flood	Very Concerned
Dam Failure	Somewhat Concerned
Coastal Hazards	
Tropical Storms & Hurricanes	Very Concerned
Storm Surge/Coastal Inundation	Concerned
Sea Level Change	Very Concerned
Tsunami	Not Concerned
Precipitation Variability	
Thunderstorms (Lightning & Hail)	Concerned
Winter Storms & Nor'Easter	Concerned
Drought	Somewhat Concerned
Wind	
Thunderstorm Winds & Derecho	Concerned
Tornados	Somewhat Concerned
Extreme Heat	
Heat & Air Quality	Very Concerned
Land	
Earthquakes	Not Concerned
Land slump/Subsidence	Not Concerned
Sinkholes	Concerned

Table 3-5: High Risk Hazards

Local Hazard Risk Perspective	Hira Results
Flood	**Flood**
Tropical Storm/Hurricane	**Sea Level Change**
Sea Level Change	Winter Storm
Heat & Air Quality	Thunderstorm Winds & Derecho
	Heat & Air Quality
Note: Those hazards shown in bold text denote hazards rating as "high" risk in both the local hazard risk assessment & the HIRA.	

HIRA Data Sources

Table 3-6: HIRA Data Sources

Hazard	National Center for Environmental Information Data	Other Data Sources	Date Range (Best Available Data-Range Varies)
Flood	Flash Floods Flood Heavy Rain	Baltimore Sun	1996-March 2018
Dam Failure	No Data Available	MDE Dam Safety	N/A
Tropical Storms & Hurricanes	Hurricane Tropical Storm	Baltimore Business Journal NOAA National Weather Service	1999-March 2018
Storm Surge/Coastal Inundation	Storm Surge/Tide Coastal Flood	Baltimore Sun The Washington Post Chesapeake Quarterly	1999-March 2018
Sea Level Change	No Data Available	Baltimore Sun Chesapeake Quarterly Sea Grant Maryland Yale Climate Connections	N/A
Tsunami	No Data Available	National Geophysical Data Center Extinction Theory	N/A
Thunderstorms (Lightning & Hail)	Lightning Hail	Baltimore Sun	1957-March 2018
Winter Storms & Nor'Easter	Winter Weather Winter Storm Ice Storm Blizzard Heavy Snow Frost/Freeze Cold/Windchill	Baltimore Sun	1996-March 2018
Drought	Drought	MDE- MD Drought Status	1998-2017
Thunderstorm Winds & Derecho	Thunderstorm Wind High Winds Strong Winds	Baltimore Sun	1957-March 2018
Tornados	Tornado Funnel Clouds	Baltimore Sun Baltimore Patch	1996-March 2018
Heat & Air Quality	Excessive Heat Heat	Baltimore Sun	1996-2017
Earthquakes	No Data Available	Baltimore Sun Earthquaketrack.com WMAR	1962-2017
Land Slump/Subsidence	No Data Available	Maryland Geological Survey	N/A
Sinkholes	No Data Available	Baltimore City DPW Baltimore Sun	2008-2016

National Center for Environmental Information (NCEI) Data

Table 3-7: Blizzard Events (January 7, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
January 7 – January 8, 1996	Southern Baltimore	An historic winter storm, known as the "Blizzard of '96", crippled all of Maryland west of the Chesapeake Bay during the first full weekend of January. In general, snow totals were 20 to 26 inches in central Maryland. To complicate matters, wind gusting in excess of 35 mph produced drifts of 4 to 7 feet, except over 10 feet in the mountains. The storm produced the larges statewide storm totals since the "Megalopolitan Storm" of February 11th, 1983. The storm was induced by a digging upper level trough over the eastern Great Plains. At the surface, an inverted trough extended from the Gulf of Mexico through the Deep South. Surface pressures began falling as the upper trough approached on the afternoon of the 7th. Meanwhile, confluent flow, behind an upper-level arctic vortex over the Canadian Maritimes, maintained strong (1034 mb) surface high pressure over northern New York state. As the upper-level trough approached the southeast U.S. on the 8th, a new surface low developed along the Georgia coast. The low deepened explosively while the arctic high remained in place. Copious Gulf of Mexico and Atlantic moisture was entrained into the system, producing heavy snow; the increasing gradient between the intensifying low and the arctic high caused winds to strengthen to 25 mph with gusts to 35 mph. The system moved slowly from South Carolina to the mouth of the Chesapeake Bay overnight on the 7th. The slow movement prolonged near-blizzard conditions into the 8th. The storm finally moved towards New England later on the 8th, ending the snow but maintaining gusty north winds (and substantial blowing and drifting snow) until evening. The storm effectively closed all major highways on the 7th, but interstates were "open" by the 8th, even though snow removal equipment fought a losing battle with the considerable blowing and drifting snow. All federal, state, and local governments were closed Monday (the 8th) and Tuesday (the 9th). Most school districts remained closed for the week. A federal state of emergency was declared the following Friday (the 12th). Snow removal/damage costs exceeded $70 million (state and county combined), a state record for an individual winter storm. The vast majority was incurred by snow removal operations; another $3.7 million was budgeted for repairs to highways including potholes, guard rails, and side banks.	1	0	N/A
February 5 – February 6, 2010	Southern Baltimore	A potent area of low pressure strengthened over the central portion of the nation on the fifth of February. The storm system slowly moved through the Mid-Atlantic during the night of the 5th before redeveloping off the Mid-Atlantic coast on 6th. The storm system finally moved away from the area on the night of the 6th. Strong high pressure continued to pump in plenty of cold air across the region for the entire event. Due to the slow movement of the storm, there was a prolonged period of precipitation. The storm system ushered in copious amounts of moisture from the Gulf of Mexico and the Atlantic Ocean. The deep moisture combined with the forcing from the storm system to bring a period of heavy precipitation to the area on the night of the 5th through the daytime hours on the 6th. Precipitation finally ended during the evening hours of the 6th as the storm system moved away. Most of the precipitation fell in the form of snow due to the cold air that was already in place. Major snow accumulations were reported throughout the state of Maryland. Wind gusts over 35 mph were reported across portions of southern Baltimore County. The wind combined with visibility below one quarter of a mile due to snow and blowing snow to cause blizzard conditions.	-	-	N/A
February 10, 2010	Southern Baltimore	A potent area of low pressure tracked through the Midwest on the 9th. As the low approached the Mid- Atlantic coast, this system phased with energy in the southern branch of the jet stream to cause strong low pressure to develop just off the Delmarva peninsula. The low continued to rapidly strengthen as it moved off to our northeast on the 10th. The system spread snow across Maryland that began on the 9th and lasted into the 10th. As the low pressure rapidly intensified, strong winds caused blowing and drifting snow that led to blizzard conditions across portions of the state. Visibility was below one quarter mile due to blowing and drifting snow. The low visibility combined with wind gusts over 35 mph to produce blizzard conditions.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-8: Coastal Flood Events (January 27, 2006-March 31, 2018

Date	Area	Narrative	Deaths	Injuries	Property Damage
June 27 & 28, 2006	Southern Baltimore	A weak cold front settled over the forecast area from June 23 until June 27. Waves of low pressure rode northeast along the front. Flow in the atmosphere was parallel to the boundary, producing several rounds of training echoes. As a result, double digit rainfall totals affected parts of the region through the five days. The area of low pressure and stalled frontal boundary contributed to a weather pattern conducive for strong and prolonged onshore winds. These winds caused abnormally high tidal departures in the Chesapeake Bay and Tidal Potomac River. Rapid water rises, and tidal flooding was reported near high tide.	-	-	20K
November 16, 2006	Southern Baltimore	A deep low-pressure system moved from the Tennessee Valley to the eastern great Lakes on November 16, sweeping a strong cold front across the Mid-Atlantic. This system brought widespread moderate to heavy rain to the region after sunrise, then strong thunderstorms during the early afternoon. These thunderstorms produced periods of heavier rainfall as well as gusty and isolated damaging winds. Although rain ended across the region during the midafternoon hours, some locations continued to experience flooding until just after midnight. Flash Flooding was reported the City of Baltimore. Several roads in the City of Baltimore were also closed due to flash flooding. Jones Falls flooded the bridge at Interstate 83 and 41st Street. Other roadways affected by flash flooding include Erdman Avenue on the east side of the city and Caroline and Fleet Streets near downtown. Tidal flooding occurred during the afternoon and early evening around the time of high tide in Baltimore. Strong onshore winds occurred due to a coastal low-pressure system. Flooding of tidal areas and along the shoreline occurred in several communities, including Bowley Bar, Bowley Quarters, Millers Island and near Middle River. Twelve to 18 inches of water was reported to cover roadways in Millers Island and near Bowleys Quarters. Water approached some houses during high tide. There was also some coastal flooding at the Harborplace shopping facilities located at the Baltimore Inner Harbor.	-	-	15K
January 25, 2010	Southern Baltimore	A persistent onshore flow lead to areas of coastal flooding near the shore of the Chesapeake Bay. High water rescues were reported along Bay Drive on Millers Island.	-	-	10K
March 13, 2010	Southern Baltimore	A persistent onshore flow developed around high pressure over New England and low pressure moving up the Mid-Atlantic coast on the 13th. A persistent onshore flow caused coastal flooding in southern Baltimore County near the Chesapeake Bay. A gage indicated that water levels surpassed thresholds for minor coastal flooding near the Chesapeake Bay in southern Baltimore County.	-	-	N/A
September 30, 2010	Southern Baltimore	Low pressure and strong southerly winds allowed water to pool in the Chesapeake Bay and be pushed onshore. Water was also pushed upstream the tidal Potomac River. Coastal flooding was observed along the lower tidal Potomac River and across the Chesapeake Bay. Gage measurements and reports indicated moderate coastal flooding occurred. In Bowley's Quarters, Miller's Island, and Turners, water up to 2 feet deep inundated streets and approached houses. At North Point, North Point Blvd. was closed between Trappe Road and Battle Grove Road. Bayside Drive and Seabright Drive was closed due to tidal inundation as well.	-	-	-
March 10, 2011	Southern Baltimore	A strong pressure gradient between high pressure over the Atlantic Ocean and a cold front moving in from the Ohio Valley resulted in gusty southeast winds over the Tidal Potomac River and Chesapeake Bay. The strong onshore flow caused water levels to be elevated which led to coastal flooding along areas near the western shore of the Chesapeake Bay and near the Tidal Potomac River. Both ends of Bay Drive were flooded. Community property was flooded up to the roadway.	-	-	N/A
April 16 – April 17, 2011	Southern Baltimore	A strong pressure gradient between high pressure over the Atlantic Ocean and a cold front moving in from the Ohio Valley resulted in a strong onshore flow. Elevated water levels due to the onshore flow caused areas of coastal flooding along the western shore of the Chesapeake Bay. High water was reported along Miller Highland Road and also across North Point Road near Shallow Creek. Water was about a foot and a half deep along the intersection of Bay Drive and Chesapeake Road. There was also a report of water that was about one-foot-deep in the park across from the intersection of Bullneck Road and Longpoint Road in Dundalk.	-	-	N/A
October 30, 2012	Southern Baltimore	Hurricane Sandy moved up the Atlantic coast and then turned Northwest and made landfall northeast of MD. Heavy rain and high winds over spread coastal regions and most of Maryland. Heavy rain caused flood and river flooding. As Sandy moved north of the Mid Atlantic, winds switched to southerly and coastal flooding occurred. Water reached the porch of a home on Wilson Point. Shore Rd and Middle river and other nearby streets were flooded. Water piled up the steps of a business facing the harbor. Wolfe Street and Fells Point was flooded Thanes and Aliceanna Streets. The end of Thanes Street was also flooded.	-	-	-
October 30, 2012	Southern Baltimore	Hurricane Sandy moved up the Atlantic coast and then turned Northwest and made landfall northeast of MD. Heavy rain and high winds over spread coastal regions and most of Maryland. Heavy rain caused flood and river flooding. As Sandy moved north of the Mid Atlantic, winds switched to southerly and coastal flooding occurred.	-	-	-

October 24, 2017	Southern Baltimore	A strong onshore flow led to moderate coastal flooding along portions of the western shore of the Chesapeake Bay. Water covered most piers and it proceeded into residence yards in the Bowley Bar Area. Water was about 6 inches deep.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-9: Cold/Wind Chill Events (March 11, 1998-March 31, 2018

Date	Area	Narrative	Deaths	Injuries	Property Damage
March 11 –13, 1998	Southern Baltimore/ Baltimore (C)	A series of cold fronts ushered in only the second arctic air mass of the winter of 1997/98. The unseasonably cold air, arriving on the heels of a mild and wet February, may have caused some damage to peach crops in Maryland orchards, especially on the coastal plain. The combination of mild and moist conditions earlier in the winter not only led to accelerated bud growth but may have decreased the resistance of fruit trees to the hard freeze. In addition to the possible peach damage, early blooming plums and some apricots sustained moderate to heavy damage. The coldest morning, March 13, produced temperatures as low as the low to mid-teens across the northern tier of the state. Minimum temperatures on the 11th and 12th averaged in the upper teens to lower 20s; daytime maxima held in the 30s on the 11th and 12th, with some areas (mainly higher terrain over far northern and western sections) failing to rise above freezing for the first time since January 1.	-	-	N/A
December 7, 2002	Southern Baltimore/ Baltimore (C)	Long standing low temperature records were set on the morning of the 7th as a fresh snow pack, calm winds, and clear skies allowed temperatures to plummet around 20 to 30 degrees below normal overnight. At Baltimore/Washington International Airport a 117-year-old record low temperature was broken. At 5:04 AM the temperature fell to 6 degrees. This exceeded the previous record of 15 degrees set in 1885. At Inner Harbor in downtown Baltimore, the low temperature only fell to 20 degrees due to the urban heat island effect. In Calvert County, an 82-year-old man with Alzheimer's disease who wandered away from his home during the early morning hours of the 7th was found dead from exposure to the cold.	-	-	N/A
January 10, 2004	Southern Baltimore	Very cold Arctic air settled over Western Maryland, North Central Maryland and the Baltimore Metropolitan area. The minimum temperatures ranged from the single digits to the lower teens, and north winds measured 10 to 15 mph. This produced wind chills on the average of 10 degrees below zero. The City of Baltimore issued a "Code Blue and opened the Federal Street shelter because of the bitter cold air. There were dozens of cases of broken water mains and pipes.	-	-	N/A
January 15 –16, 2004	Southern Baltimore	A fast-moving storm system brought light snow to the region on the 14th and 15th. Western Maryland counties received one to two inches of snow, while only a trace of snowfall was reported in North Central Maryland, the Baltimore Metropolitan area, and Lower Southern Maryland. There was some very cold air behind this system. Minimum temperatures across the region were in the single digits and teens. Strong northwest and west winds (20 to 25 mph with gusts to 35 mph) produced wind chills of 5 to 10 below zero on the night of the 15th and the early morning of the 16th. On a different note the winds also downed power lines in Baltimore County. Reports from a local power company show 5 thousand customers in the eastern part of Baltimore County were without heat and electricity for about 3 hours during this cold spell.	-	-	N/A
January 5, 2018	Southern Baltimore	Arctic air and gusty winds caused low wind chills to develop. Wind chill were around -5 to -15 degrees.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-10: Drought Events (October 1, 1998-March 31, 2018

Date	Area	Narrative	Deaths	Injuries	Property Damage
October 1 – 31, 1998	Southern Baltimore	Persistent high pressure over the Southeast U.S. forced most rain producing low pressure centers to steer north of the region during the month. This resulted in unusually dry conditions across Central and Northern Maryland, creating the fourth straight month of drought conditions. Only 1.06 inches of rain fell at the **B**altimore/ Washington International Airport (BWI) in Anne Arundel County during October, 1.92 inches below normal. The Maryland Science Center in Baltimore reported a monthly total of 1.25 inches. To put the severity of the drought in perspective, only one other year on record (1930) had ever come close to the lack of rainfall the Baltimore area saw from July 1st to October 31st. The 4-month rainfall total at BWI was only 4.66 inches. According to records at the airport, this October was the 5th driest since 1871. In addition, the U.S. Geological Survey reported the flow of freshwater into the Chesapeake Bay was 41% of normal during October. Groundwater levels across Central and Northern Maryland were also reported below average during the month. The agricultural community continued to be hard hit by the persistent drought. By October 31st, 82% of topsoil moisture across the state was rated short or very short. Some farmers were feeding livestock at mid- winter levels during the month. Some late fall crops such as wheat, barley, and rye were not planted or planted late due to dry conditions. Six counties in South-Central Maryland were declared federal disaster areas to help compensate for losses in crop yields and damage to pasture land.	-	-	N/A
November 1 – November 30, 19998	Southern Baltimore	This was the fifth month in a row that drought conditions were seen across Central and Northern Maryland. Persistent high pressure over the Southeast U.S. forced most rain producing low pressure systems to steer north of the region. Only 1.13 inches of rain fell at the Baltimore/Washington International Airport (BWI) in Anne Arundel County during the month of November, 2.07 inches below normal. Only one other year on record (1930) had come close to the lack of rainfall the Baltimore area saw from July 1st to November 30th. The 5- month rainfall total at BWI Airport was only 5.79 inches, compared to the normal of over 17 inches. The Maryland Science Center in Baltimore reported a monthly total of 1.11 inches. Water levels and reserves were greatly affected by the persistent drought. The agricultural community continued to be hard hit by the persistent drought. By November 20th, 80% of topsoil moisture across the state was rated short or very short. The persistent drought contributed $40 million in damage to the fall harvest. The lack of precipitation continued to have a negative impact on winter crops such as wheat, barley, and rye. Winter grain crops were only half as tall as they should have been at the end of November. Some farmers opted to not plant winter crops this year due to the lack of moisture. The drought also contributed to a six-fold increase in the amount of brush fires seen across Maryland this November. Officials reported 173 fires, burning a total of 490 acres during the month. From the beginning of August to the end of November, the Forest Service recorded 303 fires statewide. The fire risk in Maryland during the month averaged 700 on a scale of 0 to 800, compared to the normal of 450. The governor declared a statewide ban on outdoor burning on November 26th, hoping to significantly reduce the number of fires being accidentally set by campers and by field and leaf burning.	-	-	N/A ***1.67M in Crop Damage ***
December 1 – December 31, 1998	Southern Baltimore	This was the sixth month in a row that drought conditions were seen across Central and Northern Maryland. Persistent high pressure over the Southeast U.S. forced most precipitation producing low pressure systems to steer north of the region. In addition, record high temperatures baked the region during the first week of the month. Only 1.27 inches of precipitation fell at the Baltimore/Washington International Airport (BWI) in Anne Arundel County during December, 2.14 inches below normal. In the past 127 years, only one other July through December on record (1930) received less precipitation than the last half of 1998. The 6-month total at BWI Airport was only 7.06 inches, 13.66 inches below normal. The Maryland Science Center in Baltimore reported a monthly total of 1.34 inches. Water reserves were greatly affected by the persistent drought. The Maryland Department of Environment declared a drought warning on December 16th, citing South Central Maryland as the driest area in the state. A statewide ban on open burning remained in effect across the entire state through mid-month because of extreme fire danger.	-	-	N/A
May 1 – May 31, 1999	Southern Baltimore	High pressure was the dominant weather feature across Maryland during the month. This weather pattern directed rain producing low pressure systems north of the region and continued the climatological drought that has gripped the area since last summer. The Maryland Department of the Environment issued a drought warning in December and it remained in effect through May. By the last week of the month the Palmer Drought Index, a measure of long term drought conditions, indicated North Central and Northeast Maryland were in a moderate drought, and South-Central Maryland was in a severe drought. May was the 7th month in the past 12 months that precipitation was below normal. From June 1998 through May 1999 precipitation was a staggering 14 inches below average, the 2nd driest 12 months on record. Only 1.72 inches of rain fell at Baltimore/Washington International Airport in Anne Arundel County during the month of May, 2.00 inches below normal. The Maryland Science Center at Inner Harbor Baltimore reported a total of only 1.40 inches, and rain only fell on 6 days during the month. Andrews Air Force Base in Prince Georges County reported a monthly total of only 0.95 inches. Additional rainfall totals included Allegany County at 2.6 inches, Washington County at1.5 inches, Frederick and Northern Prince Georges County at 1.8 inches, Carroll County at 2.2 inches, Northern Baltimore County at 1.7 inches, Howard and Southern Anne Arundel County at 1.3 inches, Montgomery County at 2.0 inches, Charles County at 0.9 inches, and St. Mary's County at 0.7 inches. The lack of rainfall affected water levels along the Potomac River and the Chesapeake Bay. In the Potomac watershed where below normal water levels have been recorded for the past 9 months stream flow averaged around 38% of normal and several record low daily flows were recorded. The flow of water past the Washington D.C. gage was only 23% of the long term monthly average. The total water flow into the Chesapeake Bay which has been below average for the past 10 months was only 46% of average during May, an all-time record low. The deficit of fresh water flowing into the Chesapeake resulted in an increase of salinity levels in the bay and had an impact on animal and plant life. Contents of the Baltimore reservoir system decreased to 85% of average by month's end.	-	-	N/A

June 1 – June 30, 1999	Southern Baltimore	High pressure was the dominant weather feature across Maryland during the month. This weather pattern directed rain producing low pressure systems north of the region and continued the climatological drought that has gripped the area since last summer. The drought warning issued by the Maryland Department of the Environment remained in effect through June. By the last week of the month the Palmer Drought Index, a measure of long term drought conditions, indicated North Central and Northeast Maryland were in a severe drought, and South Central and Western Maryland were in an extreme drought. June was the 8th month in the past 12 months that precipitation was below normal. From July 1998 through June 1999 precipitation was a staggering 15 inches below average, the 2nd driest 12 months on record. Only 2.04 inches of rain fell at Baltimore/Washington International Airport (BWI) during the month of June, 1.63 inches below normal. BWI received 0.86 inches of this total on the 24th. The Maryland Science Center at Inner Harbor Baltimore reported a total of 2.42 inches. The total flow into the Chesapeake Bay has been below average for the past 11 months. Freshwater inflow to the Chesapeake Bay in June was less than 74% of the previously recorded low set in 1964. The deficit of fresh water resulted in an increase of salinity levels in the bay and had an impact on animal and plant life.	-	-	N/A
July 1 – July 31, 1999	Southern Baltimore/ Baltimore (C)	High pressure was the dominant weather feature across Maryland during the month. This forced most rain producing storm systems to steer north of the region and resulted in the continuation of the climatological, meteorological, and hydrological drought that has plagued the area since last summer. The average monthly high temperature at Baltimore/Washington International Airport (BWI) of 91.4 degrees was just shy of the 91.9-degree record. Record highs were set on the 5th and 6th, and temperatures rose above 90 degrees on 22 of the 31 days. By the last week of July, the Palmer Drought Index, a measure of long term drought conditions, indicated Maryland was in an extreme drought. The drought warning issued by the Maryland Department of the Environment in December remained in effect through the month. The governor issued a satellite drought emergency on the 29th. July was the 14th month in the past 16 months that precipitation was below normal. From August 1998 through July 1999 precipitation was a staggering 16 inches below average, the 2nd driest 12- month period on record. Only 2.06 inches of rain fell at BWI during the month of July, 1.63 inches below normal. The Maryland Science Center at Inner Harbor Baltimore reported 4.11 inches for the month, but 3.57 inches of the total fell on the 22nd. The lack of rainfall affected water levels alongthe Potomac River and the Chesapeake Bay.	-	-	N/A
July 8 – July 31, 1999	Southern Baltimore/ Baltimore (C)	High pressure was the dominant weather feature across Maryland through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. Heavy rain fell over all but Western Maryland between the 24th and 26th, helping to fill surface reservoirs. Unfortunately, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into the rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells and springs remained short of water. By the third week of August the Palmer Drought Index, a measure of long term drought conditions, indicated Maryland was in an extreme drought. The drought warning issued by the Maryland Department of the Environment last December remained in effect through the month. The governor issued statewide mandatory water restrictions on the 5th. From September 1998 through August 1999 precipitation was a staggering 12 to 16 inches below average. During August, 6.14 inches of rain fell at Baltimore/Washington International Airport (BWI), 2.22 inches above normal. However, 4.15 inches of this total fell from between the 24th and the 26th. The Maryland Science Center at Inner Harbor Baltimore reported 8.23 inches for the month, but 6.26 inches of this total fell between the 24th and the 26th. Andrews Air Force Base reported 5.71 inches for the month. Additional August rainfall totals included Allegany County at 2.5 inches, Washington County at 2.3 inches, Frederick County at 3.1 inches, Prince Georges County at 5.3 inches, Carroll County at 4.7 inches, Anne Arundel at 6.6 inches, Northern Baltimore County at 5.4 inches, Howard County at 4.3 inches, Montgomery County at 4.6 inches, Charles and Calvert Counties at 5.5 inches, and St. Mary's County at 5.8 inches. The lack of rainfall through the third week of August continued to affect water levels along the Potomac River and the Chesapeake Bay. Some of the lowest freshwater flows into the Chesapeake Bay were recorded during the month. Some of the worst fish kills in recent memory occurred in the bay and on nearby tributaries. Other forms of wildlife had to adapt to the altered bay environment. Crabs were seen several miles farther upstream in freshwater tributaries, the oyster population was weakened, and bottlenose dolphins were spotted as far north as Pooles Island. Most rivers and streams across the state were running at 30% the normal level. The flow of water in the Potomac River past Washington D.C. during the middle of August was only 11% of the long term monthly average. Water was released from the Jennings Randolph Reservoir in the headwaters of the Potomac River on the 11th to boost water levels, leaving the reservoir at 78% of capacity. The Monocacy River was running at half its normal level. Liberty Reservoir, one of the main water sources for 1.8 million people in the Baltimore area, was 24 feet below normal and was holding less than half of its 43-billion-gallon capacity during the first week of August. To increase the amount of water reserves, Baltimore began withdrawing up to 137 million gallons of water from the Susquehanna River, which was already at a historic low level. In Carroll County, the Westminster city reservoir was down to 65% of capacity on the 18th. The worst agricultural drought in Maryland continued to devastate farmers. 55% of pasture land, 45% of corn, 39% of sorghum, 29% of tobacco, and 34% of soybeans across the state were reported in poor or very poor condition by month's end. 42% of topsoil and 84% of subsoil were reported as short or very short of moisture. Statewide, crop losses were expected to exceed $100 million. In addition to agricultural lands, forests and rural vegetation were also dangerously dry. The Maryland DNR responded to 600 fires that burned over 2500 acres from January to July, a 100% increase from the previous year. The Cumulative Severity Index (CSI), a measure of fire danger which ranges from 1 to 800, ranged from 503 in Allegany County to 629 in Prince Georges County on August 12th.	-	-	N/A

August 1 – August 31, 1999	Southern Baltimore/ Baltimore (C)	High pressure was the dominant weather feature across Maryland through the 24th of August. Most rain producing storm systems steered north of the region through the period. This resulted in the continuation of the climatological, meteorological, and hydrological drought which has plagued the area since last summer. Heavy rain fell over all but Western Maryland between the 24th and 26th, helping to fill surface reservoirs. Unfortunately, because most of the rain fell in the form of thunderstorm downpours, most of the moisture ran off into the rivers before it had the chance to seep into the aquifer supply. Groundwater reserves remained unaffected and wells and springs remained short of water. By the third week of August the Palmer Drought Index, a measure of long term drought conditions, indicated Maryland was in an extreme drought. The drought warning issued by the Maryland Department of the Environment last December remained in effect through the month. The governor issued statewide mandatory water restrictions on the 5th. From September 1998 through August 1999 precipitation was a staggering 12 to 16 inches below average. During August, 6.14 inches of rain fell at Baltimore/Washington International Airport (BWI), 2.22 inches above normal. However, 4.15 inches of this total fell from between the 24th and the 26th. The Maryland Science Center at Inner Harbor Baltimore reported 8.23 inches for the month, but 6.26 inches of this total fell between the 24th and the 26th. Andrews Air Force Base reported 5.71 inches for the month. Additional August rainfall totals included Allegany County at 2.5 inches, Washington County at 2.3 inches, Frederick County at 3.1 inches, Prince Georges County at 5.3 inches, Carroll County at 4.7 inches, Anne Arundel at 6.6 inches, Northern Baltimore County at 5.4 inches, Howard County at 4.3 inches, Montgomery County at 4.6 inches, Charles and Calvert Counties at 5.5 inches, and St. Mary's County at 5.8 inches. The lack of rainfall through the third week of August continued to affect water levels along the Potomac River and the Chesapeake Bay. Some of the lowest freshwater flows into the Chesapeake Bay were recorded during the month. Some of the worst fish kills in recent memory occurred in the bay and on nearby tributaries. Other forms of wildlife had to adapt to the altered bay environment. Crabs were seen several miles farther upstream in freshwater tributaries, the oyster population was weakened, and bottlenose dolphins were spotted as far north as Pooles Island. Most rivers and streams across the state were running at 30% the normal level. The flow of water in the Potomac River past Washington D.C. during the middle of August was only 11% of the long term monthly average. Water was released from the Jennings Randolph Reservoir in the headwaters of the Potomac River on the 11th to boost water levels, leaving the reservoir at 78% of capacity. The Monocacy River was running at half its normal level. Liberty Reservoir, one of the main water sources for 1.8 million people in the Baltimore area, was 24 feet below normal and was holding less than half of its 43-billion-gallon capacity during the first week of August. To increase the amount of water reserves, Baltimore began withdrawing up to 137 million gallons of water from the Susquehanna River, which was already at a historic low level. In Carroll County, the Westminster city reservoir was down to 65% of capacity on the 18th. During the first week of August, the USGS reported ground water levels in Central Maryland were 16 feet below the surface, just under the minimum level. Washington County reported the lowest groundwater levels in history on the 4th. Wells on 24 county farms dried up by the 10th. Nearly 60 communities across the state instituted mandatory or voluntary water restrictions. Nineteen Maryland counties were declared federal drought disaster areas on the 11th. The worst agricultural drought in Maryland continued to devastate farmers. 55% of pasture land, 45% of corn, 39% of sorghum, 29% of tobacco, and 34% of soybeans across the state were reported in poor or very poor condition by month's end. 42% of topsoil and 84% of subsoil were reported as short or very short of moisture. The Maryland DNR responded to 600 fires that burned over 2500 acres from January to July, a 100% increase from the previous year.	-	-	N/A
September 1 – September 17, 1999	Southern Baltimore/ Baltimore (C)	Rainfall from two land falling hurricanes made a tremendous impact on the drought that plagued the region since the summer of 1998. Most of the rain from these systems fell east of Frederick with the highest amounts near the Chesapeake Bay. The water shortage came to an end by mid-month in all but Allegany and Washington Counties. By the 30th, conditions in Western Maryland were upgraded from an extreme to moderate drought and were near normal or slightly wet elsewhere. Baltimore/Washington International Airport (BWI) reported a monthly rainfall total of 11.50 inches, 8.09 inches above normal. It was the 2nd wettest September on record. The Maryland Science Center in downtown Baltimore reported a total of 10.83 inches. Other September rainfall totals included Anne Arundel County at 12.5 inches, Prince Georges County at 11.5 inches, St. Mary's County at 11.2 inches, Montgomery County at 10.9 inches, Carroll County at 10.1 inches, Charles County at 10.0 inches, Howard County at 9.9 inches, Frederick County at 8.7 inches, Washington County at 8.4 inches, and Allegany County at 4.1 inches. The much-needed rainfall affected rivers and water reservoirs dramatically. Carroll County reported a 2.5-foot jump in the groundwater level during September. The governor of Maryland lifted mandatory water restrictions statewide during the first week of the month. The ban on open burning was lifted for all but Western Maryland as well. However, effects of the drought still lingered in the agricultural community. The drought cost Maryland farmers over $75 million. Across the state by the end of the month, 41% of corn, 17% of soybeans, 13% of sorghum, and 14% of pasture land were still in poor or very poor condition. Farmers reported 33% of subsoil moisture and 11% of topsoil was still short or very short of moisture. The average pumpkin in the fall harvest was on average 3 to 5 pounds smaller than normal. Also, the city of Baltimore reported losing 300 street trees to the drought, and Howard County reported the loss of 165 trees.	-	-	N/A
October 1, October 30, 2007	Southern Baltimore	Severe Drought conditions persisted through October. In early October, rainfall deficits totaled nearly 10 inches. However, a series of low pressure systems late in the month brought between 3 and 6 inches of rainfall to slightly reduce those deficits. Many counties and cities posted both voluntary and mandatory water restrictions throughout the month. Just before the needed rainfall towards the end of the month, the National Drought Monitor listed portions of Montgomery and Charles Counties under Extreme Drought conditions. Damage estimates were not available.	-	-	-

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18

Table 3-11: Excessive Heat Events (January 2, 2000-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
January 2 – January 4, 2000	Southern Baltimore/ Baltimore (C)	High pressure off the Southeast U.S. coast turned winds southerly over the Mid-Atlantic region on the 2nd, starting a conveyer belt of warm air that would remain over the region through the 4th. With ample sunshine, high temperatures reached the middle 60s to lower 70s. Normal high temperatures for the first week of January are in the lower 40s. On the 2nd, high temperatures included 68 degrees at Baltimore/Washington International Airport (BWI) and downtown Baltimore, 70 degrees in Waldorf, 66 degrees in Frederick, 67 degrees at Hagerstown, and 69 degrees in Cumberland. On the 3rd, a new record high of 68 degrees was set at BWI Airport. Other high temperatures included downtown Baltimore at 66 degrees, Waldorf at 72 degrees, Frederick at 65 degrees, Hagerstown at 67 degrees, and Cumberland at 62 degrees. On the 4th, the record high of 70 degrees was tied at BWI Airport. Other high temperatures included downtown Baltimore at 70 degrees, Waldorf at 73 degrees, Frederick at 62 degrees, Hagerstown at 67 degrees and Cumberland at 65 degrees. During the evening of the 4th, a strong cold front moved across the region, bringing an end to the unseasonably warm weather.	-	-	N/A
July 21, 2011	Southern Baltimore	Upper-level high pressure provided enough subsidence to cause hot conditions on the 21st. Surface high pressure over the Atlantic caused moist air to move into the region from the south. The combination of the heat and humidity caused heat indices over 110 degrees in some locations. Heat indices up to 117 degrees were reported at the Maryland Science Center.	-	-	N/A
July 22, 2011	Southern Baltimore	Strong upper-level high pressure built over the region during the 22nd. Surface high pressure over the Atlantic Ocean caused moist air to move into the region from the south. Strong subsidence underneath the upper- level high caused extremely hot conditions with air temperatures over 100 degrees. The combination of the heat and high humidity caused heat indices to soar up to as high as 120 degrees. The worst conditions were across eastern Maryland where the humidity was highest. Numerous reports of heat-related illnesses were received by State Health Authorities on the 22nd. Heat indices up to 123 degrees were measured at the Maryland Science Center. A fatality was reported due to the high heat in the city of Baltimore.	1	-	N/A
July 23, 2011	Southern Baltimore	Strong upper-level high pressure combined with humid conditions to produce heat indices around 110 degrees across portions of northeastern Maryland. Heat indices up to 111 degrees were reported at the Maryland Science Center.	-	-	N/A
June 29, 2012	Southern Baltimore	Plenty of moisture from the Gulf of Mexico caused high humidity during the 29th. Upper-level high pressure along with sunshine caused extremely hot conditions. The combination of the heat and humidity caused heat indices to be near or above 105 degrees. Heat indices between 110 and 115 degrees were reported at the Maryland Science Center.	-	-	N/A
July 5, 2012	Southern Baltimore	Upper-level high provided plenty of subsidence while a southerly flow continued over the area due to surface high pressure off the coast. The subsidence and southerly flow caused hot and humid conditions. Heat indices were measured up to 112 degrees at the Maryland Science Center. There were three fatalities reported due to the heat.	3	0	N/A
July 18, 2012	Southern Baltimore	A surface trough combined with moderate instability caused showers and thunderstorms to develop. There was enough instability for thunderstorms to produce damaging wind gusts and large hail. Heat indices were reported to be up to 113 degrees at the Maryland Science Center.	-	-	N/A
July 26, 2012	Southern Baltimore	High pressure off the coast allowed for a hot and humid air mass to remain over the Mid-Atlantic. Heat indices were reported to be up to 112 degrees at the Maryland Science Center.	-	-	N/A
July 19, 2013	Southern Baltimore	High pressure was located over much of the eastern United States for a consecutive day and light southerly flow persisted all week which led to above normal temperatures and dew points in the mid- 70s. Heat indices were around 110 degrees at Martins State Airport and Maryland Science Center.	-	-	-
August 13, 2016	Southern Baltimore	A southerly flow around high pressure ushered in unseasonably hot and humid conditions. Heat indices around 110 degrees were reported at the Maryland Science Center.	-	-	-

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-12: Flash Flood Events (June 17, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
June 17, 1996	Baltimore City (NE-Portion)	Intense thunderstorms, dumping between 3 1/2 and 4 inches of rain within 2 hours, produced widespread flash flooding in the eastern portion of Baltimore City. At last 20 persons were rescued from stranded automobiles. Many of the trapped motorists were on Loch Raven Blvd. and along federal highway 40. No injuries or deaths were reported. Hundreds of low-lying intersections and underpasses were flooded, including one on the Jones Falls Expressway. Numerous basements and ground floors were flooded by a combination of the heavy rainfall and clogged storm drains. The combination of high water, gusty winds, and prodigious lightning knocked out power to nearly 14 thousand city residents.	-	-	100K
June 19, 1996	Baltimore City (Citywide)	N/A	-	-	100K
June 19, 1996	Baltimore City (Citywide)	N/A	-	-	25K
August 26, 1998	Baltimore City	A line of intense thunderstorms moved across much of Maryland during the afternoon, producing damaging winds and frequent lightning. Storm winds weakened, and the speed of the line slowed as it moved south and east of Frederick and Carroll Counties. The resulting line of showers that moved into Prince Georges, Anne Arundel, and Baltimore Counties produced copious amounts of rainfall and led to flash flooding. In Southern Baltimore County, streets and streams flooded in Owings Mills and Randallstown. Several motorists had to be rescued from quickly rising water. The deluge of rain closed the Maryland State Fair at Timonium on its first night of business. In Woodlawn, a storm drain and culvert near Dead Run Creek swelled with water and overflowed into the parking lot of a car dealership on Security Boulevard. In less than 9 minutes, four feet of water poured onto 70 trucks, totaling 30 cars and resulting in $30 million in damages. Dried mud and twigs were found inside the automobiles after the water subsided. Flooding closed sections of Interstate 83 in Baltimore County and in the city of Baltimore. Water poured off Interstate 83 and quickly reached a depth of 6 feet in a health club parking lot off Clipper Mill Road. Forty cars in the parking lot were damaged, and most of the cars were moved several yards by the force of the water. In Arbutus, occupants of 4 cars at the intersection of Leeds Avenue and Maiden Choice Lane had to be rescued after 4 feet of water poured into the street. Eight people were rescued at the intersection of Security Boulevard and Gwynn Oak Avenue around 7:00 PM EDT after cars became stalled in rapidly moving flood waters. Boston and Aliceanna Streets in Canton and Clipper Mill Road in Woodbury were also impassable. Several flights were delayed or cancelled at Baltimore Washington International Airport (BWI). The city of Baltimore reported numerous roads under water and several stalled vehicles and water rescues. So many streets flooded that officials asked drivers to stay put until the water receded. Over 17,000 residents of the city lost power as a direct result of the storm, and hundreds of basements flooded. Hardest hit were areas near Jones Falls along Interstate 83. An apartment complex next to Jones Falls was inundated with water and cars in the parking lot were floating. The Northwest Ice Rink was inundated with water, and motorists near Camden yards waited on the roofs of their cars to be rescued from waist-high water. A building collapsed around 9:00 PM EDT on Wicomico Street, and rushing water blasted a hole in another home. Rain and mud on railroad tracks and water in the Howard Street tunnel two miles south of Baltimore's Penn Station delayed MARC and Amtrack commuter trains between Washington and Baltimore. It rained so hard that medevac helicopters from the Shock Trauma Center at University Hospital had to begrounded.	-	-	100K
September 9, 1999	Baltimore City	Another round of thunderstorms producing damaging winds and very heavy rainfall moved across Central Maryland between 5:30 PM and 11:00 PM EDT. Several locations reported flooding and downed trees and power lines. In Montgomery County, Sligo Creek along Colesville Road, and Rock Creek went out of their banks. East-West Highway and Beach Drive flooded, and a nearby recreational center had to be evacuated. Streets were flooded in Kensington, and a water rescue was reported in Chevy Chase. In Baltimore County, Jones Creek went out of its banks, and roads were flooded in downtown Baltimore. One location in the Baltimore area received 3.6 inches of rain in 1 hour and 20 minutes. Winds gusting between 50 and 60 MPH also downed trees and power lines in Baltimore, resulting in 23,000 electrical outages.	-	-	N/A

September 16, 1999	Baltimore City (Countywide)	Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect Maryland east of Washington County shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 30 to 50 MPH blew across the area between 11:00 AM and midnight on the 16th, with localized wind gusts over 50 MPH near the Chesapeake Bay. Hundreds of trees and power lines were downed and over 500,000 customers lost electricity. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. In Parkton, 5.19 inches at Inner Harbor Baltimore, 5.18 inches in Oraville, 5.16 inches at Lake Roland in Baltimore County. In Baltimore, evacuation orders were issued for businesses near the confluence of Jones Falls and Western Run after both streams overflowed their banks. The water submerged a used car lot and washed out a bridge on Maisel Street near Morrell Park. Winds gusted to 62 MPH on Television Hill. Officials reported 750 downed trees across the city, including 35 which damaged homes. Up to 91,000 customers lost power, and the outage led to the release of 24 million gallons of raw sewage into Jones Falls.	-	-	50K
July 14, 2000	Baltimore City (Countywide)	A cold front moved across the region during the evening of the 14th. Thunderstorms that developed ahead and along this front produced very heavy rainfall, frequent lightning, large hail, and winds in excess of 55 MPH. Across Baltimore County, heavy rain flooded several roads. In Baltimore, flooding was concentrated between Back River and Middle River where some stranded motorists had to be rescued. A total of 3.00 inches of rain fell in Towson and 1.78 inches fell in Perry Hall. Golfball sized hail fell in Rosedale and Baltimore and pea sized hail fell in Overlea. Heavy rain flooded several roads across the county and downed a tree. A total of 3.40 inches of rain fell in Tall Timbers. Several roads were flooded.	-	-	N/A
June 12, 2003	Baltimore City	Thunderstorms with very heavy rainfall, frequent lightning, and damaging winds moved through central Maryland during the afternoon and evening of the 12th. Several locations reported downed trees and power lines in addition to flooding. In Baltimore County, a stream overflowed its banks and a road, and several basements were flooded in Towson. An observer in Towson recorded 2.52 inches of rain and two inches of this total fell in 45 minutes. Five roads were flooded in Parkville. In Baltimore, six roads were flooded. In addition, pea sized hail fell in Towson and Baltimore. An observer in Kingsville recorded 1.8 inches of rain in 2 hours.	-	-	N/A
June 13, 2003	Baltimore City	Thunderstorms with very heavy downpours and gusty winds moved through North Central Maryland for the third straight day on the 13th. In Baltimore County, several trees were downed in Baltimore, Towson, and Parkville. Severe flash flooding was reported in the northeast part of Baltimore. Two streets became rushing rapids, washing several cars hundreds of yards away. Several motorists had to be rescued from their cars or had to swim to safety. The hardest hit areas included Hillen Road, 35th Street, and Aisquith Street near 25th Street. The wall of water reached a height of 10 feet near the intersection of Hillen Road and 35th Street. A pile of vehicles found in this location after the water receded testified to the power of the flood. One woman was injured at this same intersection after flooding weakened the floor in the first level of her home and she fell through when it collapsed. Numerous other homes were damaged by flood waters in this part of town as well. At the intersection of Aisquith Street and 25th Street, the wall of water reached 6 feet in height. Six cars were stuck in water beneath a railroad overpass. Minor street flooding was reported at the intersection of Northern Parkway and Walther Boulevard. Street flooding was also reported in Parkville and Towson. Cars and homes were damaged after several streets were flooded by rapidly rising water. Motorists had to be rescued or swam to safety. A woman was injured when she fell through a floor that was weakened by flooding.	-	1	500K
June 21, 2003	Baltimore City	Showers and thunderstorms with heavy downpours and hail moved through the Baltimore metropolitan area during the late afternoon and early evening hours of the 21st. In Baltimore County, several streams overflowed onto roads in the Towson area. In Baltimore, some streets were flooded on the east side of the city. High water was also reported on Interstate 95 in town. High water covered Interstate 95. Streets were flooded on the east side of town.	-	-	N/A
November 19, 2003	Baltimore City	Creeks and roads were flooded.	4	-	N/A

July 7, 2004	Baltimore City (End:Woodberry)	Scattered showers and thunderstorms developed over the region on the 7th as a warm front lifted north into southern Pennsylvania. The thunderstorms across Northeast Maryland produced strong winds that downed trees and power lines, penny size hail, and flooding. Two to four inches of rain fell in Northeast Maryland with local amounts up to six inches. Dozens of water rescues were performed throughout the county, several motorists were trapped/stranded in stalled cars. A cyclist was rescued from a fence after he emerged his bike in the fast moving, deep waters. In the City of Baltimore, stores and businesses along the Jones Falls closed early to allow clients, shoppers and employees to get out before the waters started to rise. A portion of the historic Meadow Mill building in the Woodberry neighborhood was flooded, and nearly 30 cars in the parking lot were almost submerged. The Mount Washington neighborhood also witnessed some impressive flooding. The Meadow Hill Athletic Club reported a loss of 500,000 dollars in exercise equipment. A newly opened men clothing store reported damages around 400,000 dollars. In Southern Baltimore County, a mechanic in Catonsville barely escaped injury when the roof of his Auto repair shop collapsed due to the weight of the water. Stores and businesses along Jones Fall were damaged due to flooding.	-	-	1M
July 27 – July 28, 2004	Baltimore City (End: North Portion)	A very slow-moving frontal system came through the region on the 27th. Moisture ahead of the front was plentiful. Two to five inches of rain produced wide spread flash flooding in Montgomery and Prince Georges Counties. Streets flooded with water covering roadways.	-	-	N/A
August 1, 2004	Baltimore City (End: West Portion)	Baltimore and Carroll counties were hard hit by flash flooding on August 1st, over two inches of rain fell in a short time causing drainage problems in many areas. Several primary and secondary roads were closed due to high water. Quick rise of water in Gun Powder Falls carried a man away who was tubing. He was later found a few miles downstream with only minor injuries.	-	-	N/A
September 28, 2004	Baltimore City	A few roads closed due to high water.	-	-	N/A
June 1, 2006	Baltimore City (End: NE Baltimore)	A trough of low pressure was draped across the Mid-Atlantic on June 1. This feature combined with high moisture content and instability in the atmosphere to promote scattered strong to severe thunderstorms. The thunderstorms first developed across the higher terrain of the Appalachian Mountains, then moved east across the Washington/Baltimore corridor. A trained spotter reported water flowing across Belair Road near Interstate 695.	-	-	N/A
June 25 – June 26, 2006	Baltimore City	A weak cold front settled over the forecast area from June 23 until June 27. Waves of low pressure rode northeast along the front. Flow in the atmosphere was parallel to the boundary, producing several rounds of training echoes. As a result, double digit rainfall totals affected parts of the region through the five days. Scattered areas of flash flooding began on June 23 and continued into June 24. Then, flooding began to take on a more serious nature since the ground had become saturated in so many spots. A slow-moving line of thunderstorms fired along a tropical moisture plume and dumped between 4 and 7 inches across the Baltimore Metro, causing extensive urban flooding on June 25 and June 26. Major disruption of transportation was experienced June 26 due to the flooding. MARC Commuter rail experienced disruptions, flooding in underground tunnels forced much of the Washington Metro rail to close, and numerous roads were closed due to high water or mudslides. The Water Treatment Plant reported that streams overflowed their banks across the city. Jones Falls topped its banks, flooding parts of Clipper Mill Road and Union Avenue. Thames Street in the Fells Point neighborhood flooded.	-	-	N/A

November 16, 2006	Baltimore City	A deep low-pressure system moved from the Tennessee Valley to the eastern great Lakes on November 16, sweeping a strong cold front across the Mid Atlantic. This system brought widespread moderate to heavy rain to the region after sunrise, then strong thunderstorms during the early afternoon. These thunderstorms produced periods of heavier rainfall as well as gusty and isolated damaging winds. Although rain ended across the region during the midafternoon hours, some locations continued to experience flooding until just after midnight. Heavy rain across Anne Arundel County closed numerous roadways from the early afternoon until after midnight on November 17th. Some of these roads include Governor Bridge Road and Saint George Barber, Routes 10 and 648 (Baltimore-Annapolis Blvd.) and Burns Crossing Road at Severn Run in the town of Severn. Maryland Route 176 (Dorsey Road) and 648 (Baltimore-Annapolis Blvd) continued to be submerged in about two feet of water until after midnight. Flash Flooding was reported in Baltimore County and the City of Baltimore. Gunpowder River rose out of its banks, allowing water to flow over the bridge at Second Mine Road. Flash flooding was also reported at Hydes Road and Long Green Pike as well as near White Hall and Gunpowder Falls State Park. Numerous roads were closed across Baltimore County, including a portion of Pulaski Highway (Route 40). Several roads in the City of Baltimore were also closed due to flash flooding. Jones Falls flooded the bridge at Interstate 83 and 41st Street. Other roadways affected by flash flooding include Erdman Avenue on the east side of the city and Caroline and Fleet Streets near downtown. Tidal flooding occurred during the afternoon and early evening around the time of high tide in Baltimore. Strong onshore winds occurred due to a coastal low-pressure system. Flooding of tidal areas and along the shoreline occurred in several communities, including Bowley Bar, Bowley Quarters, Millers Island and near Middle River. Twelve to 18 inches of water was reported to cover roadways in Millers Island and near Bowleys Quarters. Water approached some houses during high tide. There was also some coastal flooding at the Harborplace shopping facilities located at the Baltimore Inner Harbor. Several roads in the City of Baltimore were closed due to flash flooding. Jones Falls flooded the bridge at Interstate 83 and 41st Street. Other roadways affected by flash flooding include Erdman Avenue on the east side of the city and Caroline and Fleet Streets near downtown.	-	-	-
July 23, 2008	Baltimore City (Began: Mt Royal – End: Golden Ring)	A slow moving cold front moved towards the Mid Atlantic Coast on July 23rd. This front provided the focus for scattered to numerous showers and thunderstorms to develop during the afternoon and evening hours. With high amounts of moisture in place, some storms produced heavy rainfall. Storms also moved repeatedly over the same areas. This allowed flash flooding to occur across the Baltimore metro area, resulting in several road closures and water rescues. Severe thunderstorms also occurred, with gusty winds downing trees and power lines. There were also a few reports of large hail. Local broadcast media reported a water rescue at Exeter Hall Avenue and Aisquith Street. Northbound ramps of the Jones Falls Expressway at President Street and Monument Street were closed.	-	-	-
September 27, 2008	Baltimore City (Roland Park)	The combination of an unstable atmosphere along with plenty of moisture triggered showers and thunderstorms on September 27th. Some thunderstorms produced heavy rain in short periods of time, resulting in flash flooding. Jones Falls was out of its banks near Falls Road and Smith Avenue. Bridges were closed along Smith Avenue. Parking lots were under water.	-	-	1K
March 10, 2011	Baltimore City (Mt Royal)	Low pressure passed through the Great Lakes on the 10th. A strong cold front associated with this system slowly moved through Maryland during the afternoon and evening hours. A southeast wind between this system and high pressure over the Atlantic Ocean pumped in copious amounts of moisture across the region. The deep moisture combined with strong lift from the front and limited instability to trigger showers and thunderstorms. Some thunderstorms produced locally heavy amounts of rain in a short period of time which led to flash flooding. Both the Meadow Mill and Jones Falls parking lots were closed due to flash flooding.	-	-	-
July 7, 2011	Baltimore City (Began: Camden – End: Mt Winans)	A nearly stationary low-pressure trough existing in a moist and unstable atmosphere aided in the development of showers and thunderstorms across northern Maryland. Slow storm movement caused flash flooding across the Baltimore metropolitan area as rainfall rates of over 1 inch per hour occurred. Intersection of Washington Blvd and Monroe Street was closed due to flash flooding.	-	-	-
August 27, 2011	Baltimore City (Hillen)	Hurricane Irene tracked up the Mid-Atlantic Coast during the afternoon and evening hours of the 27th. Heavy rains associated with Irene and her rainbands fell over saturated soils of Maryland. Flash flooding resulted in some areas and flooding continued into the 28th as waters rose. Storm total rainfall from Irene reached 12.00 in spots. McElderry Street near North Patterson Park Avenue was closed due to flooding. A rain gage in downtown Baltimore measured 3.63 inches during the event.	-	-	-
August 27, 2011	Baltimore City (Gardenville)	Hurricane Irene tracked up the Mid-Atlantic Coast during the afternoon and evening hours of the 27th. Heavy rains associated with Irene and her rainbands fell over saturated soils of Maryland. Flash flooding resulted in some areas and flooding continued into the 28th as waters rose. Storm total rainfall from Irene reached 12.00 in spots. Harford Road near Montibello Terrace was closed due to flash flooding. A nearby rain gage tallied 4.59 inches.	-	-	-

August 27, 2011	Baltimore City (Clifford)	Hurricane Irene tracked up the Mid-Atlantic Coast during the afternoon and evening hours of the 27th. Heavy rains associated with Irene and her rainbands fell over saturated soils of Maryland. Flash flooding resulted in some areas and flooding continued into the 28th as waters rose. Storm total rainfall from Irene reached 12.00 in spots. The 600 Block of West Patapsco Avenue was closed due to flooding. A nearby rain gage tallied 3.34 inches.	-	-	-
September 7, 2011	Baltimore City (Westport)	Abnormally moist atmosphere across the mid-Atlantic allowed showers and thunderstorms to produce exceptional rainfall rates across portions of Maryland as the remnants of Tropical Depression Lee interacted with a nearly stationary boundary near the Mason-Dixon line. Major flooding and flash flooding occurred in numerous areas. The highest rainfall and worst flooding happened in a band from Charles County northeastward into Baltimore County. The ramp from Route 295 northbound to Interstate 95 was closed due to flash flooding. A nearby rain gauge measured 4.33 inches.	-	-	-
September 26, 2012	Baltimore City (Hillen)	An area of low pressure was located over the Mid Atlantic which increased tropical southerly flow to the region. Heavy rain was the main threat, but isolated thunderstorms produced damaging winds and lightning. Heavy rain caused evacuations on the 2300 block of East Monument Street due to flash flooding.	-	-	-
September 26, 2012	Baltimore City (Roland Park)	An area of low pressure was located over the Mid Atlantic which increased tropical southerly flow to the region. Heavy rain was the main threat, but isolated thunderstorms produced damaging winds and lightning. There was water flowing over the road.	-	-	-
September 26, 2012	Baltimore City (Crisp)	An area of low pressure was located over the Mid Atlantic which increased tropical southerly flow to the region. Heavy rain was the main threat, but isolated thunderstorms produced damaging winds and lightning. Water was flowing over the road.	-	-	-
September 3, 2012	Baltimore City (Hampden)	A warm front moved north through the region as remnants of Isaac continued to influence the region. Heavy rain was the main impact during the morning, but localized strong winds occurred over the Bay. he intersection of Roland Avenue at Wyndhurst Road was closed.	-	-	-
September 3, 2012	Baltimore City (Roland Park)	A warm front moved north through the region as remnants of Isaac continued to influence the region. Heavy rain was the main impact during the morning, but localized strong winds occurred over the Bay. The intersection of Falls Road and Clark Hill Road was closed.	-	-	-
June 10, 2013	Baltimore City (Camden)	A warm front moved through the region and the Mid Atlantic was located in the warm moist sector. Convergence led to numerous showers and thunderstorms to develop in an atmosphere with high shear. Heavy rain, damaging winds and tornadoes were observed. There was water observed up to the hoods of cars in the 500 block of South Charles Street.	-	-	-
April 30, 2014	Baltimore City (Mt Royal)	The eastern half of the United States was under cyclonic flow and moisture from the Atlantic and Gulf continued to move into the Mid Atlantic. A warm front moved northward, and showers and thunderstorms broke out across the area. Heavy rain produced flash flooding and rapid rises on streams and creeks. Jones Falls was out of its banks. There was flooded reported at the Mount Washington Mill Complex and water moving across Clipper Mill Road. Water covered almost all of the pedestrian bridge paralleling Water Street, and covered Water Street from the MD 4 Westbound exit ramps to Judges Street. There was a landslide near North Charles St and East 26th Street.	-	-	-
June 19, 2014	Baltimore City (Began: Westport – End: Clifford)	An upper level disturbance moved north of the region while instability was still present overnight. A cold front approached the Mason Dixon line and showers and thunderstorms moved across northeast Maryland. Localized heavy rain led to flash flooding in Baltimore. There was flooding blocking one lane of Maryland 295 near Waterview Avenue.	-	-	-
June 19, 2014	Baltimore City (Brooklyn)	An upper level disturbance moved north of the region while instability was still present overnight. A cold front approached the Mason Dixon line and showers and thunderstorms moved across northeast Maryland. Localized heavy rain led to flash flooding in Baltimore. There was a basement and kitchen of a home flooded in Brooklyn.	-	-	-
June 19, 2014	Baltimore City (Clifford)	An upper level disturbance moved north of the region while instability was still present overnight. A cold front approached the Mason Dixon line and showers and thunderstorms moved across northeast Maryland. Localized heavy rain led to flash flooding in Baltimore. There were multiple water rescues near the intersection of Patapsco Avenue and Magnolia Avenue.	-	-	-
August 12, 2014	Baltimore City (Mt Winans)	High pressure resided across the east coast while a warm front was located across the Carolinas. Moist air continued to move into the Mid Atlantic as showers intensified ahead of the warm front. Heavy rain produced flooding in parts of the Washington DC and Baltimore Metro Areas. Gwynns Falls exceeded its flood stage of 13 feet with minor overbank flooding occurring for about an hour near the Gwynns Falls Trail. It went above flood stage at 2:03 PM EDT and peaked at 13.78 feet at 2:20 PM EDT. It went below flood stage at 3:02 PM EDT.	-	-	-

August 12, 2014	Baltimore City (Curtis Bay)	High pressure resided across the east coast while a warm front was located across the Carolinas. Moist air continued to move into the Mid Atlantic as showers intensified ahead of the warm front. Heavy rain produced flooding in parts of the Washington DC and Baltimore Metro Areas. The outer loop of the Baltimore Beltway was flooded and completely closed at Quarantine Road. All traffic was diverted.	-	-	-
August 12, 2014	Baltimore City (Fairfield)	High pressure resided across the east coast while a warm front was located across the Carolinas. Moist air continued to move into the Mid Atlantic as showers intensified ahead of the warm front. Heavy rain produced flooding in parts of the Washington DC and Baltimore Metro Areas. The Baltimore Harbor Tunnel was closed due to flooding.	-	-	-
June 20, 2015	Baltimore City (Brooklyn)	Remnants of Tropical Storm Bill moved into the Mid-Atlantic causing moisture to increase. Showers and thunderstorms led to heavy rain across the Interstate 95 corridor and flash flooding occurred. Some rivers also went to flood into June 21, 2015. There was a car stranded in high water on East Patapsco Avenue between 6th and 7th Streets.	-	-	5K
July 30, 2016	Baltimore City (Westport)	A boundary remained overhead on the 30th of July. Hot and humid conditions led to an unstable atmosphere. The instability along with the boundary caused a few severe thunderstorms to develop. Thunderstorms merged across Montgomery, Howard and Baltimore counties and led very heavy rainfall that led to flash flooding. Catastrophic flash flooding occurred in Ellicott City, MD the night of July 30th. The stream gauge on Gwynn Falls at Washington Boulevard reached their flood stage of 13 feet. It peaked at 17.72 feet at 21:05 EST. Water covered the bike path alongside the stream and approached the end of Berlin Street.	-	-	-
July 29, 2017	Baltimore City (Clifford)	A strong upper level low interacted with a frontal boundary near the Mid-Atlantic region and low pressure formed along the boundary. High moisture content and thunderstorms led to widespread flooding across the Mid-Atlantic region. The 3400 Block of Spelman Road flooded and closed due to torrential rainfall.	-	-	-

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-13: Flood Events (July 30, 1998-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
July 30, 1998	Baltimore City (SW Highlandtown)	An isolated rotating thunderstorm moved out of the eastern West Virginia panhandle and into north central Maryland, producing some wind damage during the evening. Other storms developed later in the evening, including another very small supercell which dropped a brief tornado along the western shore of the Chesapeake Bay. The storms formed at the juxtaposition of a weak surface low pressure area along a stationary front parked over north central Maryland. Heavy rains of 1 to 2 inches, combined with poor drainage, caused sidewalk flooding in the Fells Point section of Baltimore City. At least two poorly draining intersections reported water "up to car windows" in the south portion of town. Baltimore Gas and Electric reported 15,000 customers lost power during the storm.	-	-	8K
February 22 – February 23, 2003	Southern Baltimore	A combination of 1.5 to 3 inches of rain that fell between the evening of the 21st and the morning of the 23rd and snow melt from the massive snowstorm of 14-18 February led to widespread flooding. In Frederick County, Gas House Pike, Glissans Mill Road, and Bretheren Church Road were closed by flood waters. Two people had to be rescued when their pickup became stranded in high water on Gas House Pike. A 35-year- old man was killed after his car hydroplaned and crashed into another car near Green Valley. Linganore Creek and Catoctin Creek overflowed their banks. In Carroll County, small streams and creeks overflowed their banks. Keysville Road and Bucher John Road in addition to 10 other roads were closed by flooding. In Baltimore County, about 500 basements were flooded. The Baltimore-Washington Parkway was closed by high water on the afternoon of the 23rd north of the Baltimore Beltway. In Baltimore City, 90 roads and 290 basements were flooded. In Harford County, Route 7 was closed by flooding in several locations. One car became stalled in flood waters on the highway. Flooded basements and backed up sewer drains were reported in Aberdeen, Havre de Grace, and Perryville. Broad Street in Perryville was closed by flooding.	-	-	N/A
May 16, 2003	Southern Baltimore/ Baltimore (C)	A large area of showers and thunderstorms containing heavy downpours moved through the region between the afternoon of the 15th and the morning of the 16th. The system dropped between 2 and 4 inches of rain across western and central Maryland which caused several low-lying areas to flood. Isolated 5- inch rainfall totals were reported in northern Frederick County. In some areas it took over 10 hours for the water to recede after the rain came to an end. In Allegany County, twenty sewage pumping stations overflowed after being inundated by water. Residents in 3 communities had to boil their water for a few days following the flood. In Washington County, twenty-five roads were closed by flooding and many small streams overflowed their banks. Schools were forced to close early, and some parents had to pick up their children at school because the buses had trouble navigating the flooded roads. Two motorists became stranded in flood waters including one woman who had to be rescued from Antietam Creek near Leitersburg. Conococheague Creek at Fairview rose above its bankful stage of 8 feet at noon on the 16th. It crested at 9.4 feet at 8 PM and fell below bankful stage at 2:30 PM on the 17th. Water overflowed onto Wishard Road and other low-lying areas along the creek. In Baltimore County, Jones Falls overflowed its banks near Owings Mills.	-	-	N/A
December 11, 2003	Southern Baltimore	An area of low pressure moved across the region and produced some heavy rainfall late the 10th and early on the 11th. This rain fell on top of snow covered grounds and led to melting. The combination of the heavy rainfall and the melting snow produced widespread road flooding of over portions of Maryland during the morning and afternoon hours. Rainfall amounts averaged 2 to 3 inches. Three water rescues were necessary in Frederick County. 40 to 50 cars had to be moved from a parking lot in a low-lying area to prevent damage to the vehicles in Laurel. Several rivers and creeks also flooded. Baltimore County authorities closed a number of roads along the Patapsco River due to flooding. The River flooding persisted through the 13th.	-	-	N/A
February 6 – February 7, 2004	Southern Baltimore	Heavy rainfall and melting snow produced some flooding across North Central Maryland and the Baltimore Metropolitan area. Radar estimates and rain gauge data indicated that two to three inches of rain fell over the region. Some roads were blocked after small streams came out of their banks.	-	-	N/A
April 2, 2005	Southern Baltimore	A strong cold front crossed the Mid Atlantic Saturday, April 2nd. This front brought severe thunderstorms that downed trees and power lines as well as heavy downpours that flooded rivers, streams, and roadways. After the front passed, strong winds downed trees and power lines mainly in the higher terrain of western Maryland. General flooding of side streets	-	-	N/A
October 8, 2005	Southern Baltimore	The remnants of Tropical Storm Tammy caused widespread heavy rainfall between 3 to 7 inches across the region. Numerous reports of flooded roads were received due to the prolonged rains. Localized areas received close to 12 inches of storm total rainfall, such as the automated gauge at Montebello in Nelson County Virginia, which measured 11.36 inches. Washington National Airport measured 7.34 inches of rain from this event. Sterling NWS measured 7.14 inches. Baltimore/Washington Airport measures 6.72 inches. Water rises, and subsequent areal flooding occurred in many parts of the area. Water flooded many basements of houses near the flood plain of the Northeast Branch of the Anacostia River. The mayor of Anacostia reported the flooding could have stemmed from the failure of a county-operated pumping station. Roads were closed due to flooding on Jones Falls. 30 people had to be evacuated from their homes and taken out of flooded cars. As much as 6 feet of water swamped roads in the Darlington area, reported by newspaper. Flooded and closed roads were reported in the Perry Hall area of suburban Baltimore. Some power outages were also noted due to the heavy rainfall. Roads were closed due to flooding on Jones Falls.	-	-	N/A

October 8, 2005	Southern Baltimore	The remnants of Tropical Storm Tammy caused widespread heavy rainfall between 3 to 7 inches across the region. Numerous reports of flooded roads were received due to the prolonged rains. Localized areas received close to 12 inches of storm total rainfall, such as the automated gauge at Montebello in Nelson County Virginia, which measured 11.36 inches. Washington National Airport measured 7.34 inches of rain from this event. Sterling NWS measured 7.14 inches. Baltimore/Washington Airport measures 6.72 inches. Water rises, and subsequent areal flooding occurred in many parts of the area. Water flooded many basements of houses near the flood plain of the Northeast Branch of the Anacostia River. The mayor of Anacostia reported the flooding could have stemmed from the failure of a county-operated pumping station. Roads were closed due to flooding on Jones Falls. 30 people had to be evacuated from their homes and taken out of flooded cars. As much as 6 feet of water swamped roads in the Darlington area, reportedby newspaper. Flooded and closed roads were reported in the Perry Hall area of suburban Baltimore. Some power outages were also noted due to the heavy rainfall. Roads were closed due to flooding on Jones Falls.	-	-	N/A
April 15, 2007	Baltimore City (C)/Hampde n	A Nor'easter impacted the Mid-Atlantic region on April 15th and 16th. Low pressure off the southeastern coast moved north along the Delmarva. Heavy rain spread north across the region early April 15th, causing flooding by the afternoon and evening. As the low-pressure area pushed north and intensified, colder air advanced from the northwest. This allowed rain to change to snow along the upslope region of the Allegheny Front. Winds also increased in the wake of the low, downing trees and power lines across central and lower southern Maryland. A Trained Spotter reported flooding in the Hampden area of Baltimore.	-	-	-
April 30, 2014	Baltimore City (C) (Mt Winans)	The eastern half of the United States was under cyclonic flow and moisture from the Atlantic and Gulf continued to move into the Mid Atlantic. A warm front moved northward, and showers and thunderstorms broke out across the area. Heavy rain produced flash flooding and rapid rises on streams and creeks. The stream gauge at Gwynns Falls in Baltimore reached flood stage. This event peaked at 15.68 feet. At 13 feet, water covers the bike path alongside the stream and approaches the end of Berlin Street.	-	-	-
June 21, 2016	Baltimore City (C) (Clifford)	A cold front moved into the Mid-Atlantic region and showers and thunderstorms formed on the warm, unstable side of the boundary. Some thunderstorms produced heavy rainfall that led to flooding. There was a water rescue of people in a stranded car on Patapsco Ave.	-	-	5K

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-14: Frost/Freeze Events (November 3, 2006-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
November 3, 2006	Southern Baltimore	A freeze occurred in the early morning of the 3rd. This ended to growing season for the area.	-	-	-
April 9, 2007	Southern Baltimore	Unseasonably colder air moved over western Maryland on April 4th and spread east through April 10th. Clear skies and light winds overnight allowed temperatures to fall into the upper 20s to lower 30s. Due to warmer temperatures at the end of March, many crops and gardens began to bloom early, before the established growing season.	-	-	-
April 10, 2007	Southern Baltimore	Unseasonably colder air moved over western Maryland on April 4th and spread east through April 10th. Clear skies and light winds overnight allowed temperatures to fall into the upper 20s to lower 30s. Due to warmer temperatures at the end of March, many crops and gardens began to bloom early, before the established growing season.	-	-	-
October 30, 2011	Southern Baltimore	Canadian high pressure provided chilly conditions during the morning hours of the 30th. Minimum temperatures during the early morning hours range from the mid-20s to lower 30s. Temperatures were reported between 31 and 32 degrees.	-	-	N/A
March 27, 2012	Southern Baltimore	A northwest flow around Canadian High Pressure caused temperatures to drop below freezing across most locations. Low temperatures were between 30 and 32 degrees.	-	-	N/A
November 6, 2012	Southern Baltimore	High pressure over the Mid Atlantic led to temperatures to drop below freezing overnight. Temperatures ranged from 29 to 32 degrees and were reported at a mesonet and a Coop observer.	-	-	-
October 26, 2013	Southern Baltimore	High pressure was located across the Mid-Atlantic and clear and calm conditions led to temperatures to fall below freezing. This ended the growing season in many locations. Temperatures of 32 degrees or less were reported at surrounding mesonets.	-	-	-
April 17, 2014	Southern Baltimore	High pressure was centered over Maine and extended down to the Mid Atlantic. Calm and clear conditions led to the second night in a row with temperatures below freezing. Temperatures of 32 degrees or below were measured at surrounding locations.	-	-	-
October 19, 2015	Southern Baltimore	High pressure built up over the region, resulting in light winds and clearing skies. Strong radiational cooling led to widespread temperatures dropping below freezing. Multiple stations reported temperatures below 32 degrees Fahrenheit.	-	-	N/A
April 5, 2016	Southern Baltimore	A reinforcing strong Arctic cold front moved through the region, with temperatures dropping well below freezing, resulting in widespread freeze.	-	-	N/A
April 5 – April 6, 2016	Southern Baltimore	Arctic high pressure built into the region behind a departing cold front, with temperatures dropping well below freezing, resulting in widespread freeze.	-	-	N/A
April 10, 2016	Southern Baltimore	A deepening upper level trough swung through the region during the day. As the trough axis set up east of the region, strong cold air advection on northwest flow resulted in temperatures across the area dropping well below freezing.	-	-	N/A
November 13, 2016	Southern Baltimore	High pressure overhead caused mainly clear skies and light winds. Radiational cooling led to a freeze. Temperatures below freezing were reported nearby.	-	-	N/A
November 10 – November 11, 2017	Southern Baltimore	Canadian high pressure shifted overhead, causing temperatures to drop well below freezing. Temperatures dropped well below freezing.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18

Table 3-15: Funnel Cloud Events (August 12, 1957-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
May 10, 2000	Baltimore City (Pikesville)	A cold front passed across Maryland during the early evening hours of the 10th. Numerous thunderstorms erupted along and ahead of the front and many locations saw several rounds of strong to severe weather. The first round of storms developed over Central Maryland around 11:00 AM EDT Thunderstorms redeveloped during the afternoon and continued through sunset, producing damaging winds, large hail, frequent lightning, and very heavy downpours. In Baltimore County, a funnel cloud was spotted in Pikesville.	-	-	N/A
June 6, 2005	Baltimore City (Roland Park)	An upper level disturbance, in conjunction with a very warm, moist, and unstable airmass, caused a large outbreak of severe weather. Associated with this event was a large squall line of strong to severe thunderstorms. Damage was reported in portions of the Washington and Baltimore Metropolitan areas. Strong winds also occurred on the maritime waters of the Potomac River and Chesapeake Bay. A funnel cloud partially descended for less than 10 seconds.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-16: Hail Events (August 12, 1957-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
August 12, 1957	Baltimore City	N/A	-	-	-
August 1, 1963	Baltimore City	N/A	-	-	-
June 18, 1970	Baltimore City	N/A	-	-	-
May 25, 1979	Baltimore City	N/A	-	-	-
April 24, 1991	Baltimore City	N/A	-	-	-
November 8, 1996	Baltimore City	Three quarter inch diameter hail fell at the intersection of Moravia and Bel Air Road in Baltimore City.	-	-	N/A
June 2, 1998	Baltimore City	The combination of an upper-level disturbance, increasing atmospheric shear, and ample instability set the stage for a major severe weather episode across the north half of Maryland during the late afternoon and evening. The episode was highlighted by supercell thunderstorms which produced three tornadoes, numerous instances of large hail, and several downbursts. Tornadoes were just a portion of the severe weather to affect northern Maryland. The other major player was hail, with dozens of occurrences associated with each mini- supercell. The strongest cells produced hailstones ranging from 1.75" to 2.50" in diameter; the strong updrafts in each storm combined with steep atmospheric lapse rates to produce not only large hail but long-duration hail as well. Some areas experienced up to 20 minutes of hail, and many residents noted hail which covered the ground. Reported damage included some stripped siding, varying sized dings and dents, as well as shattered glass, in numerous vehicles; stripped paint from homes and vehicles, small limb and leaf debris, and likely crop damage or destruction. The main hail- producing storm affected portions of northern Montgomery, Howard, southern Carroll, southern Baltimore, and northern Prince George's and Anne Arundel Cos - all between 1800 and 1945EST. The episode concluded in Maryland with a few wind damage reports on the western shore of the Chesapeake Bay just before midnight.	-	-	5K
July 30, 1999	Baltimore City	A thunderstorm producing wind gusts in excess of 55 MPH, heavy downpours, and dangerous lightning developed over Howard County around 6:00 PM EDT. The storm moved to the south and crossed into Prince Georges County by 6:30 PM EDT. As the storm moved through the Clarkesville and West Friendship area of Howard County, trees and power lines were downed. The storm also downed a tree in Laurel as it moved through Prince Georges County. A second severe thunderstorm developed just north of the Mason-Dixon line around 8:00 PM EDT and moved south across Baltimore County and the city of Baltimore through 9:00 PM EDT. As the storm moved through the town of Hereford in Northern Baltimore County, grapefruit sized hail was reported. The storm also produced a weak, short-lived tornado that touched down one mile south of Beckleysville around 8:30 PM EDT. The tornado moved southeast and stayed on the ground for 3 miles until it reached the Mt. Carmel area. Several trees were damaged or downed in the path of the tornado, and weak structures such as lawn furniture and a tent were also blown over. As the storm moved into the southern half of the county it produced golf ball sized hail at Cockeysville and in the city of Baltimore.	-	-	N/A

May 13, 2000	Baltimore City	Temperatures in the mid-80s to lower 90s in combination with humid conditions resulted in several rounds of thunderstorms across Maryland west of the Chesapeake Bay from midday through late evening on the 13th. Several storms produced winds in excess of 55 MPH, large hail, frequent lightning, and very heavy downpours. Two tornadoes were also reported. In Baltimore County, quarter sized hail fell in the city of Baltimore and pea sized hail fell in Reisterstown. Trees were downed onto a home and onto roads in Perry Hall. A tree fell through the roof of a building on Old Harford Road. Fences were blown down in Middle River. Quarter sized hail fell in Cockeysville. An F1 tornado crossed 5 miles of southeast Baltimore County between 8:00 PM and 8:10 PM EDT. The tornado was 75 yards wide and began just off Kenwood Avenue near the Interstate 95 and 695 interchanges east of the city of Baltimore. It moved east uprooting and snapping trees and branches and causing damage to the trim and exterior of over a dozen homes. A large boat and trailer was rotated around. The tornado crossed Interstate 695 and damaged the roof of four townhouses off Fontana Lane. It crossed Rossville Boulevard and Philadelphia Road and damaged several buildings in an industrial park along Yellow Brick Road. The tornado finally dissipated near Pulaski Highway. Nearly 55,000 customers in the area lost power. Quarter sized hail fell.	-	-	N/A
July 14, 2000	Baltimore City	A cold front moved across the region during the evening of the 14th. Thunderstorms that developed ahead and along this front produced very heavy rainfall, frequent lightning, large hail, and winds in excess of 55 MPH. Across Baltimore County, heavy rain flooded several roads. In Baltimore, flooding was concentrated between Back River and Middle River where some stranded motorists had to be rescued. A total of 3.00 inches of rain fell in Towson and 1.78 inches fell in Perry Hall. Golf ball sized hail fell in Rosedale and Baltimore and pea sized hail fell in Overlea. Golf ball sized hail fell.	-	-	N/A
May 2, 2002	Baltimore City	Thunderstorms with large hail, heavy downpours, and gusty winds developed across central Maryland during the early afternoon. In Baltimore County, quarter sized hail was reported in the northern and western sections of Baltimore. Quarter sized hail fell.	-	-	N/A
May 13, 2002	Baltimore City	Scattered showers and thunderstorms moved through the region during the afternoon and early evening hours of the 13th. These storms produced damaging winds, large hail, and heavy downpours. The storms came to an end during the late evening hours after a strong cold front pushed through. The winds behind the front gusted to 50 MPH and some locations reported downed trees from these winds. In Baltimore County, nickel to quarter sized hail was reported in Baltimore. The hail came down so long that it accumulated to a depth of 3 inches. In White Marsh, golf ball sized hail fell. Thunderstorm winds downed trees and power lines in Catonsville, Essex, and Baltimore. Widespread power outages were reported in Baltimore. Officials recorded 30 reports of downed power lines scattered from Annapolis north to the Baltimore County border. Nickel to quarter sized hail was reported in the northern portion of the city.	-	-	N/A
April 3, 2006	Baltimore City	A cold front combined with strong instability to cause numerous severe thunderstorms to occur on April 3 across the Mid Atlantic. The majority of the severe weather reports were from large hail and damaging wind gusts.	-	-	N/A
July 10, 2007	Baltimore City (Began: Druid – End: Hamilton)	High pressure across the western Atlantic brought hot and humid conditions to the Mid Atlantic on July 10th. Showers and thunderstorms developed along and east of the Interstate 95 corridor, including the Washington DC and Baltimore metro areas, in the very hot and unstable air mass ahead of a cold front approaching the region from the Ohio Valley. Some of these storms became severe, producing damaging winds and large hail across the eastern Baltimore metro and south across lower southern Maryland. A Trained Spotter reported quarter size hail in Druid, MD. Mail measuring one half inch in diameter was reported in the northern portion of Baltimore City.	-	-	-
August 14, 2012	Baltimore City (Woodberry)	A cold front moved through the Mid Atlantic in the afternoon and evening. Scattered thunderstorms occurred with damaging winds and hail as the main threat.	-	-	-
May 8, 2013	Baltimore City (Arbutus)	Low pressure tracked northeast of the Mid-Atlantic. While most of the forcing was north of the region, easterly flow transported moisture into the region and surface convergence led to storms that produced heavy rainfall, large hail and damaging winds.	-	-	-
June 18, 2014	Baltimore City (Mt Royal)	A weak cold front moved across the Mid-Atlantic region while hot and humid conditions led to an unstable environment. Showers and thunderstorms formed in vicinity of the front in the afternoon and some thunderstorms led to damaging winds.	-	-	-

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-17: Heat Events (May 18, 1957-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
May 18 – May 21, 1996	Southern Baltimore	An early-season four-day heat wave, following a period of cool and generally cloudy weather, took it's toll on outdoor enthusiasts who were unprepared for the dramatic temperature swing. Two persons suffered heat stroke in Washington Co (MDZ003), requiring hospitalization. Temperatures for the period averaged in the mid to upper 90s, yet less than a week earlier, fruit crops in western Maryland were threatened by subfreezing temperatures. In fact, daily maxima one and two days prior to the heat wave were in the 60s. Several record high temperatures were shattered, including two at Patuxent River NAS (MDZ017) on the 19th and 20th. In fact, Patuxent River NAS was the sole official site to reach the century mark (on the 20th). Potomac Electric Power Co (PEPCO) induced a small-scale "brownout" in the Washington Metropolitan area to reduce energy consumption.	-	-	N/A
June 25 – June 26, 1997	Southern Baltimore/ Baltimore (C)	The first bona-fide summer heat wave in nearly two years arrived in the city after a three-month period of below normal temperatures. The maximum temperature on the 25th at Baltimore/Washington International Airport (BWI) reached 99 degrees, shattering the previous record by 1 degree. At Baltimore's Custom House, the reading soared to 104. Readings rose to 96 at BWI on the 26th before a line of strong thunderstorms cooled the atmosphere. Heat indices in town surpassed 105 for a brief period on the 25th; however, the values likely remained at or above 90 degrees for much of the overnight hours in the more densely populated sections of the city, including the downtown sector. The heat wave was potentially more dangerous than most since it occurred early in the season and was preceded by a three-month period of below normal temperatures and several cloudy periods. No serious injuries or fatalities occurred due to the heat. However, several persons were admitted to area hospitals for brief stays due to minor heat exhaustion.	-	-	N/A
July 13 – July 19, 1997	Southern Baltimore/ Baltimore (C)	The combination of antecedent dry weather, a prolonged upper-level high pressure area, and the time of year produced a bona-fide heat wave across much of Maryland during the middle of the month. Unlike events of previous years, the apparent temperature was not quite as oppressive. Nonetheless, daytime high temperatures averaged in the upper 90s for the 7 days, with the hottest days occurring on the 17th and 18th. Surface ozone levels became hazardous as the heat wave persisted; the Metropolitan Council of Governments declared code orange (approaching unhealthful) or red (unhealthful) conditions each day. The heat wave resulted in increased power output; Baltimore Gas and Electric reported a record 6,000 megawatt on the 15th. Water usage bans were enforced in portions of southern Washington Co (MDZ003) from the 13th through the 17th. Three persons perished in Maryland (west of the Bay) from the heat in July. One death was indirect; on July 20th, a woman died in an automobile because the vehicle's windows were shut tight (Montgomery Co, F89VE). The other deaths were directly attributable to the heat. A woman was found dead in her Baltimore City apartment on the morning of the 18th; the unit had no air conditioning or fans and the interior temperature was measured at 90 degrees at 0600 EST. Late in the month (July 27th) a man collapsed while riding a motorcycle; he was wearing several layers of heavy clothing. Local hospitals across the state reported dozens of persons were treated for heat-related disorders. Most were from heat exhaustion; some were from the more dangerous heat stroke. Many were in the Baltimore-Annapolis metropolitan region, including 3 Navy midshipmen.	0	50	N/A
August 16 – August 17, 1997	Southern Baltimore	West winds circulating around a "Bermuda" high pressure system allowed temperatures to soar during the weekend of the 16th and 17th. Maximum temperatures were near or just above the century mark across most of northern and central Maryland east of the Allegheny Highlands both days. Heat index values ranged from105 to 110 each day, but aside from several heat exhaustion cases, it appeared that at-risk residents remained in air-conditioned locations. No heat-related deaths were reported by the state Office of the Chief Medical Examiner. However, one person perished from heat-induced cardiac arrest while attending a baseball game in downtown Baltimore during the middle of the afternoon on the 17th. A record maximum was achieved at Baltimore/Washington International Airport (BWI) on the 16th (101 degrees), and the maximum temperature of 100 degrees on the 17th equaled an existing record. The heat wave was shattered by a strong cold front which was accompanied by strong to severe thunderstorms during the late afternoon and evening of the 17th.	1	0	N/A
January 6 – January 9, 1998	Southern Baltimore	A sprawling area of high atmospheric pressure became anchored over the western Atlantic for several days. Circulation around the high brought an unencumbered flow of tropical air from the Caribbean region into all of Maryland for a 2 1/2-day period beginning around dawn on the 6th and continuing until around noon on the 9th. A new record high temperature was set at Hagerstown (MDZ003) on the 8th; the record was tied on the 6th. More interestingly, temperatures remained above 55 degrees for over 48 hours, spanning two mornings when the normal low temperatures were some 35 degrees colder! After nine days, the mean temperatures across central and western Maryland were between 15 and 20 degrees above normal - more like April than early January.	-	-	N/A

March 27 – March 31, 1998	Southern Baltimore/ Baltimore (C)	After a winter of cloudy, wet conditions, spring struck back with a vengeance in the form of strong atmospheric high pressure. Underneath the high, very warm and dry weather developed - more like early June than late March. One record high temperature was set at Baltimore Washington International (BWI) airport with 86 degrees. The previous record had been 83, set in 1979. Four long-standing records were shattered in Hagerstown. Notably, the all-time March high temperature (formerly 88 degrees) was broken on March 30th when the mercury topped out at 89. The record had stood since 1907. The dry and breezy conditions aided several small brush fires, including three in eastern Anne Arundel Co (MDZ014) on the 28th through the 30th. One fire consumed 4 acres; the others burned less than 2 acres each.	-	-	N/A
July 20 – July 23, 1998	Southern Baltimore	After an unusually pleasant start to the month, a singular heat wave affected much of Maryland west of the Chesapeake Bay during the climatological peak of highest annual temperatures. The heat wave, caused by the combination of hot and humid air associated with "Bermuda" high pressure and increasingly dry ground, caused temperatures to soar into the mid and upper 90s. The heat index, however, equaled or exceeded 100 each afternoon. Highest temperatures were recorded in the Baltimore metropolitan region, with 99 degrees on the 22nd at Baltimore/Washington International Airport. This heat wave was less tolerable than those in recent years since much of the summer had been cooler and less humid than normal. Two deaths were reported by the Office of the Chief Medical Examiner - both in Baltimore City. One of the fatalities, a 47-year-old male, resulted from exposure (likely heat stroke) while working at the Bethlehem Steel plant near the shipyards. A 51-year-old male was found dead in his un-air-conditioned home on South Parish Street. During the three-day episode, another 30 to 44 persons were treated for heat exhaustion in the county, and there were perhaps a dozen incidents of heart attacks which may have been heat-related. The heat wave and attendant power usage allowed daily wattage to surpass previous records in the Baltimore Gas and Electric service area; an all-time record of 6,016 megawatts was used on the 22nd.	-	-	N/A
June 7 – June 9, 1999	Southern Baltimore	High pressure centered over the Southeast U.S. caused air to downslope over the Appalachian Mountains, sending afternoon temperatures into the upper 90s to lower 100s. The heat, in combination with very humid air, resulted in afternoon heat indices between 100 and 110 degrees. Record high temperatures were set at Baltimore/Washington International Airport (BWI) on the 7th, 8th, and 9th. High temperatures on the 7th included 96 degrees at BWI, 98 degrees at the Maryland Science Center in downtown Baltimore, 95 degrees at Sharpsburg in Washington County, 97 degrees at Oxon Hill in Prince Georges County, and 100 degrees at Williamsport in Washington County. Highs on the 8th included 97 degrees at BWI, 98 degrees in downtown Baltimore, 97 degrees at Oxon Hill, and 95 degrees at Sharpsburg and Williamsport. Highs on the 9th included96 degrees at BWI, 95 degrees in downtown Baltimore, 96 degrees at Cumberland, 98 degrees at Oxon Hill, 97 degrees at Bryans Road, 96 degrees as Sharpsburg, and 104 degrees at Williamsport. Nighttime lows dipped into the 70s, except the lower 80s in downtown Baltimore, making the overnight hours very uncomfortable for those without air conditioning. As a result of the heat, a pollution alert was issued for the Washington D.C. metropolitan area on the 7th. Air conditions reach "Code Red" levels two days in a row. Schools without air conditioning in the City of Baltimore, Prince Georges County, and Anne Arundel County cancelled classes. Area hospitals reported treating a handful of people for heat related illnesses, including a hospital in Anne Arundel County that admitted a patient for heat related dehydration. Several locations reported near record water and energy consumption during the period.	-	-	N/A

July 4 – July 7, 1999	Southern Baltimore	High pressure sat off the Mid-Atlantic coast from the 4th through the 7th, acting like a heat pump drawing in extremely warm and humid air. Temperatures on the 4th through early on the 7th were oppressively hot, and extremely humid conditions added to the misery. These conditions continued until a cold front swept through the area during the afternoon of the 7th, ushering cooler and much less humid air. The mercury soared into the upper 90s to lower 100s during the period. Dew points were in the lower to middle 70s, creating heat indices between 100 and 115 degrees. Nighttime lows only dipped into the 70s and heat index values remained in the upper 70s to middle 80s. Heat index values only dropped to between 85 to 90 degrees in downtown Baltimore. Record high temperatures were recorded at Baltimore/Washington International Airport (BWI) on the 5th and 6th. At BWI the mercury soared to 98 degrees on the 4th, 102 degrees on the 5th and 101 degrees on the 6th. Afternoon highs at the Maryland Science Center at Inner Harbor Baltimore rose to 99 degrees on the 4th, 101 degrees on the 5th, and 102 degrees on the 6th. The heat index only dropped to 90 degrees at Inner Harbor on the morning of the 6th. Other high temperatures from the 4th included 101 degrees at Bryans Road, 100 degrees at Ridge, 99 degrees at Williamsport, Smithsburg, and Oxon Hill; and 98 degrees at Cumberland, Hagerstown, and Olney. On the 5th, temperatures soared to 102 degrees at Oxon Hill and Ridge, 101 degrees at Smithsburg, 100 degrees at Cumberland, South Bowie, and Millersville, 99 degrees at Laurel, Hollywood, and Glenmont; and 98 degrees at Gaithersburg, Rockville, Sharpsburg, and Hagerstown. Highs on the 6th included 103 degrees at Ridge, 102 degrees at Lothian, 101 degrees at Olney, Rockville, and Glenmont, 100 degrees at Forest Glen and Hagerstown, and 99 degrees at Millersville, Laurel, Gaithersburg, and California. Because of the 4th of July holiday weekend, many people were inconvenienced by the oppressive conditions. Many holiday events had low attendance, with the exception of the late evening fireworks displays which occurred after the temperatures fell below 90 degrees. Those who spent considerable time outdoors or in non- air- conditioned buildings were subject to heat related illnesses. The heat wave tragically killed 15 people in the city of Baltimore. The number of people treated for heat related illnesses included 21 in Anne Arundel County, 200 or more in the city of Baltimore, 6 in Montgomery County, 5 in Prince Georges County and Calvert County, 2 in Washington County, and 1 in Allegany and Frederick Counties. Road surfaces and cars also fell victim to the heat. A huge buckle on Columbia Pike in Howard County between Johns Hopkins Road and Route 216 forced the road to be closed. Interstate 70 in Western Maryland was littered with tractor-trailer tire caps as the heat caused the rubber to fly off the tire casings. State police reported 20 vehicles were disabled by the heat, and AAA responded to 600 heat related service calls across the state. Power companies reported record high energy consumption during the late afternoon of the 5th and 6th. High demand for electrical power blew transformers, leading to power outages for 17,000 customers. The city of Baltimore cancelled summer school classes on the 6th because many schools had no air conditioning. Washington County closed summer day camps on the 6th after several campers reported problems dealing with the heat. Baltimore County reported thousands of yellow perch were killed in the Middle River watershed by the extreme rise in water temperature that occurred during the heat wave.	15	100	N/A
March 8, 2000	Southern Baltimore/ Baltimore (C)	High pressure over the Eastern Seaboard and warm southerly winds on the 8th resulted in sunny skies and temperatures nearly 30 degrees above normal. Baltimore/Washington International Airport reached a high temperature of 83 degrees, shattering the previous daily record by 8 degrees. Other high temperatures across Maryland included Hagerstown at 86 degrees, Mechanicsville at 85 degrees, Cumberland and Aberdeen at 84 degrees, Bethesda at 83 degrees, Owings Mills at 81 degrees, Smithsburg and Baltimore at 79 degrees, and Frostburg at 73 degrees.	-	-	N/A
May 6 – May 9, 2000	Southern Baltimore	Mostly sunny skies and southerly winds brought to the region by an area of high pressure pushed temperatures well above normal from the 6th through the 9th. On the 6th, heat indices climbed into the upper 80s to mid- 90s. Washington Reagan National Airport recorded a high temperature of 88 degrees, compared to the normal high of 74 degrees. Baltimore/Washington International Airport (BWI) recorded a high temperature of 88 degrees and the Inner Harbor of Baltimore reached 91 degrees. On the 7th, National Airport recorded a high temperature of 90 degrees. BWI Airport reached 92 degrees and Baltimore reached 94 degrees. Heat indices elsewhere ranged from 89 to 97 degrees. On the 8th, National Airport reached 90 degrees, and both BWI Airport and Baltimore rose to 92 degrees. On the 9th, National Airport reached a high of 88 degrees. BWI Airport recorded a high temperature of 90 degrees and downtown Baltimore reached 93 degrees. Heat indices elsewhere ranged from 87 to 95 degrees. Across the Washington D.C. metropolitan area, 40 people were treated for heat related illnesses during the period.	-	-	N/A
June 10 – June 11, 2000	Southern Baltimore/ Baltimore (C)	High pressure in combination with sunny skies caused afternoon temperatures to reach into the upper 80s to middle 90s on the 10th and 11th. Dew points reached into the lower 70s creating heat indices in the middle 90s to lower 100s. Service stations across the state reported a total of 1300 cars that had to be towed and serviced for overheated engines on the 10th. The air quality over the Washington D.C. metropolitan area dropped into the Code Red category during the period. Normal high temperatures across the area for the 2nd week of June are in the middle 80s. A cold front moved through the region on the 12th, bringing an end to the hot weather.	-	-	N/A

May 6 – May 9, 2000	Southern Baltimore	Mostly sunny skies and southerly winds brought to the region by an area of high pressure pushed temperatures well above normal from the 6th through the 9th. On the 6th, heat indices climbed into the upper 80s to mid- 90s. Washington Reagan National Airport recorded a high temperature of 88 degrees, compared to the normal high of 74 degrees. Baltimore/Washington International Airport (BWI) recorded a high temperature of 88 degrees and the Inner Harbor of Baltimore reached 91 degrees. On the 7th, National Airport recorded a high temperature of 90 degrees. BWI Airport reached 92 degrees and Baltimore reached 94 degrees. Heat indices elsewhere ranged from 89 to 97 degrees. On the 8th, National Airport reached 90 degrees, and both BWI Airport and Baltimore rose to 92 degrees. On the 9th, National Airport reached a high of 88 degrees. BWI Airport recorded a high temperature of 90 degrees and downtown Baltimore reached 93 degrees. Heat indices elsewhere ranged from 87 to 95 degrees. Across the Washington D.C. metropolitan area, 40 people were treated for heat related illnesses during the period.	-	-	N/A
June 10 – June 11, 2000	Southern Baltimore/ Baltimore (C)	High pressure in combination with sunny skies caused afternoon temperatures to reach into the upper 80s to middle 90s on the 10th and 11th. Dew points reached into the lower 70s creating heat indices in the middle 90s to lower 100s. Service stations across the state reported a total of 1300 cars that had to be towed and serviced for overheated engines on the 10th. The air quality over the Washington D.C. metropolitan area dropped into the Code Red category during the period. Normal high temperatures across the area for the 2nd week of June are in the middle 80s. A cold front moved through the region on the 12th, bringing an end to the hot weather.	-	-	N/A
June 25, 2000	Southern Baltimore/ Baltimore (C)	High pressure in combination with sunny skies caused afternoon temperatures to reach into the upper 80s to middle 90s on the 25th. Dew points reached into the lower 70s creating heat indices in the middle 90s to lower 100s. Normal high temperatures across the area for the last week of June are in the middle to upper 80s. The combination of heat and humidity also led to the development of several thunderstorms, some of which produced damaging wind, very heavy rainfall, frequent lighting, and large hail.	-	-	N/A
June 12 – June 13, 2001	Southern Baltimore/ Baltimore (C)	High pressure in combination with southerly winds brought hot, hazy, and humid conditions to the Mid- Atlantic region between June 12th and 13th. High temperatures soared to around 90 degrees and heat indices reached near 100 degrees through the period.	-	-	N/A
June 27 – June 30, 2001	Southern Baltimore/ Baltimore (C)	High pressure in combination with southerly winds brought hot, hazy, and humid conditions to the Mid- Atlantic region between June 27th and 30th. High temperatures soared into the lower 90s and heat indices reached into the lower 100s through the period. Two deaths in Baltimore were related to the heat wave. On the 30th, a 34-year-old man died from a combination of heart problems, cocaine use, and exposure to the heat. On July 1st, when temperatures still reached near 90 degrees, a 51-year-old man died from heat exhaustion and heart problems.	1	-	N/A
August 6 – August 10, 2001	Southern Baltimore/ Baltimore (C)	High pressure brought ample sunshine and warm southerly winds to the region between the 6th and 10th. Afternoon temperatures soared into the 90s and dew points in the 60s pushed heat indices to between 98 and 112 degrees. At Baltimore/Washington International Airport a high temperature of 98 degrees was reported on the 9th and 10th. A high temperature of 96 degrees was recorded on the 7th and 97 degrees was recorded on the 8th. At the Inner Harbor of Baltimore, a high temperature of 101 degrees was recorded on the 9th and a high of 99 degrees was recorded on the 7th, 8th, and 10th. Overnight lows in the heat island of downtown Baltimore only dropped into the lower 80s on the 9th and 10th. A "code red" alert was issued by environment officials in the Washington D.C. and Baltimore metropolitan area on August 8th and 9th due to bad air quality. Medical professionals reported treating several people for heat related illnesses during the period. Three people died from heat exhaustion in their un-air-conditioned Baltimore City homes on the 9th. The victims were two males ages 50 and 75 and one female age 75.	3	-	N/A
June 25 – June 26, 2002	Southern Baltimore	Very warm and moist air was ushered into the region by south winds during the last week of June. On the 25th and 26th, temperatures in the mid-90s combined with dew points near 70 to create heat index values between100 and 110 degrees. A handful of people who were in non-air-conditioned environments, especially in downtown Baltimore, died from complications of prolonged exposure to the heat. Temperatures remained in the lower 90s through the end of the month which also led to additional heat- related deaths and illnesses. In the city of Baltimore, a 52-year-old man and an 82-year-old man were found dead in their homes on the 27th. On the 30th, a 67-year-old woman was found dead in her home.	3	-	N/A

July 2 – July 4, 2002	Southern Baltimore	High pressure remained stationary off the Delmarva coastline during the 1st week of July. This resulted in a prolonged period of hot and humid weather across the Mid-Atlantic region. Between July 2nd and 4th, high temperatures rose into the lower to middle 90s and dew points reached into the lower 70s. This resulted in heat index values reaching 100 to 110 degrees during the afternoon. In addition, heat index values only dropped into the middle 80s overnight in downtown Baltimore on the 4th and 5th, resulting in little relief for people without air conditioning. These conditions led to several heat related deaths and illnesses, especially in people already suffering from pre-existing medical conditions. In Baltimore City, 12 people died in their non-air-conditioned homes between July 3rd and 9th. On the 3rd, an 85-year-old man died from heat stroke. On the 4th, two men, age 65 and 72, and one woman who was 90 years old succumbed to the heat. On the 5th, three men, age 52, 56, and 86, and two women, age 53 and 67, died. On the 6th, an 80-year-old man and an 82-year-old woman died. On the 7th, a man of unknown age was found dead in his residence. On the 8th, an 88-year-old man was found dead in his home. On the 9th, an 83- year-old woman and a 53-year-old man died from exposure to the heat. Several other people were treated for heat illnesses in city hospitals during the period. In Baltimore County, a 78-year-old man died in his home on the 4th of July and a 48-year-old man was found dead at a construction site on the 10th. Also, on the 4th, ten people were treated for heat exhaustion at a parade in Dundalk.	17	0	N/A
July 22 – July 23, 2002	Southern Baltimore/ Baltimore (C)	Another round of hot and humid weather occurred across Central and Southern Maryland on July 22nd and 23rd. Heat indexes rose to between 98 and 105 degrees both days. Three people died from heat related illnesses during this time. In the city of Baltimore, a 60-year-old man was found dead in a junkyard on the 20th. Each victim had underlying health conditions which contributed to their death.	2	-	N/A
July 28 – July 29, 2002	Southern Baltimore/ Baltimore (C)	A large area of high pressure sat off the Mid-Atlantic coast during the last week of July. This caused a warm and moist south wind to blow into the region for several days, resulting in another heat wave. The hottest days were the 28th and 29th of July when temperatures rose into the 90s and heat index values reached 100 to 110 degrees. Power companies reported record electricity use on the 29th. Excessive heat was believed to have played a part in buckling train tracks that caused a passenger train derailment in the Montgomery County community of Kensington on the afternoon of the 29th. The derailment injured 97 people, including 6 who were critically injured. In Baltimore City, a 73-year-old man was found dead in his home on the 30th and an 81-year-old woman was found dead in her home on the 31st. Underlying health conditions contributed to these deaths. A 71-year-old man was also believed to have succumbed to the heat in his Baltimore home where a temperature of 96.5 degrees was measured on the 28th. Several other jurisdictions reported an increase of emergency room visits due to the heat. In Baltimore County, at least 3 people were treated for heat cramps or heat exhaustion.	2	-	N/A
August 1 – August 5, 2002	Southern Baltimore	High pressure off the Atlantic Coast pumped hot and humid air into the Mid-Atlantic region. This caused high temperatures to reach between 92 and 100 degrees August 1st through the 5th. Dew points in the upper 60s to mid-70s forced heat indexes to soar to between 98 and 110 degrees. Seven residents of Baltimore County and Prince George's County succumbed to the excessive heat. In Baltimore City, a 56- year-old man and a 74-year- old man were found dead in their home on the 5th. On the 6th, an 88-year- old man was found dead in his home. On the 7th, a 36-year-old man being held in jail was found dead in his cell from heat related causes. In Baltimore County, a 30-year-old woman was found dead in her home. The heat was also blamed for buckling pavement on Interstate 70 near the Route 355 exit. Several regional power companies noted record energy consumption during this heat wave, the hottest in 5 years.	5	-	N/A

August 12 – August 19, 2002	Southern Baltimore/ Baltimore (C)	High pressure sitting off the Atlantic coastline pumped hot and humid air into the region between August 12th and 19th. Temperatures soared well into the 90s during the afternoon each day and heat index values approached 100 degrees. At Baltimore-Washington International Airport, a record high temperature of 99 degrees was set on the 13th. On the 18th, the mercury soared to a record high of 96. Four Marylanders died during the eight-day heat wave. In Baltimore, two men, ages 51 and 62, were found dead in their homes on the 17th. On the 20th, a 38-year old man died in the city	3	-	N/A
August 22, 2002	Southern Baltimore/ Baltimore (C)	High temperatures rose into the mid-90s on the 22nd. With dew points in the lower to mid-70s, heat index values soared to near 105 degrees during the afternoon. Three people died as a result of the excessive heatIn the city of Baltimore, a 72-year old man died in his home on the 22nd and a 74-year old man was found dead in his home on the 26th.	2	-	N/A
June 9, 2004	Southern Baltimore/ Baltimore (C)	Heat indices ranged from 95 to 100 degrees.	-	-	N/A
July 17, 2006	Southern Baltimore	A hot and very humid airmass seeped into the Mid Atlantic on July 17 and July 18. The heat index value climbed to around 105 degrees both afternoons. Emergency response officials reported sporadic incidents of heat- related illness, such as shortness of breath and heat exhaustion, around the Washington/Baltimore Metropolitan region. Three deaths were attributed directly to this heat wave. The deaths occurred in the Maryland suburbs of Washington DC in the counties of Prince Georges, Calvert, and Carroll. Two additional deaths, also in the Maryland suburbs, were indirectly attributed to this heat wave, since they were related to pre-existing health conditions.	-	-	N/A
July 18, 2006	Southern Baltimore	A hot and very humid airmass seeped into the Mid Atlantic on July 17 and July 18. The heat index value climbed to around 105 degrees both afternoons. Emergency response officials reported sporadic incidents of heat- related illness, such as shortness of breath and heat exhaustion, around the Washington/Baltimore Metropolitan region. Three deaths were attributed directly to this heat wave.	-	-	N/A
August 1 – August 3, 2006	Southern Baltimore	Excessive heat conditions occurred on Tuesday, Wednesday, and Thursday, August 1-3, across much of Maryland. Afternoon heat index values ranged between 105 to as high as 115 degrees. Six people lost their lives in Central Maryland due to the excessive heat conditions during this heat wave. Five people, including one baseball player, were rushed to the hospital during a baseball game, due to heat-related illnesses.	4	-	N/A
August 25, 2007	Southern Baltimore	A hot and humid air mass developed over the Mid Atlantic ahead of a strong cold front on August 25th. Temperatures climbed into the mid-90s by noon. These temperatures combined with high humidity created heat index values around 105. Showers and thunderstorms developed during the late afternoon as the cold front approached the region. Some of these storms became severe, producing large hail and damaging winds that downed trees and power lines. Automated Surface Observations reported high temperatures and relative humidity that produced heat index values of 105 and above.	-	-	-
June 24, 2010	Southern Baltimore	A strong ridge of high pressure along with plenty of sunshine resulted in hot conditions. Temperatures hovered in the upper 90s to around 100 degrees during the afternoon and early evening hours of the 24th. A local newspaper reported two fatalities due to hyperthermia.	2	-	N/A
July 4 – July 8, 2010	Southern Baltimore	A ridge of high pressure aloft along with a southwest flow around surface high pressure resulted in hot and humid conditions during the Fourth of July through the 8th. Max temperatures were in the 90s and 100s across most locations. The hottest days were on the 6th and 7th of July where most locations soared past 100 degrees. A fatality was discovered due to the heat.	1	-	N/A
June 1, 2011	Southern Baltimore	A clockwise flow around high pressure off the Mid-Atlantic Coast produced hot and humid conditions on the first. Heat indices up to 105 degrees were reported across portions eastern Maryland during the afternoon hours. Heat indices in excess of 100 degrees were measured at the Maryland Science Center.	-	-	N/A
June 8, 2011	Southern Baltimore	Upper-level high pressure remained over the region while surface high pressure was located off the East Coast. Subsidence associated with the upper-level high caused hot conditions during the 8th while a southerly flow around the surface high caused high humidity. The combination of hot and humid conditions caused heat indices to approach 105 degrees during the afternoon hours. Heat indices up to 106 degrees were recorded at the Maryland Science Center.	-	-	N/A

June 9, 2011	Southern Baltimore	A southerly flow around high pressure over the western Atlantic produced hot and humid conditions during the late morning and afternoon hours of the 9th. Heat indices around 105 degrees were reported across portions of eastern Maryland during this time. Heat indices up to 108 degrees were recorded at the Maryland Science Center.	-	-	N/A
July 11, 2011	Southern Baltimore	A southerly flow around high pressure over the Atlantic caused humid conditions on the 11th. Strong subsidence associated with upper-level high pressure nearby caused hot conditions. Heat indices in excess of 105 degrees were recorded across portions of eastern Maryland. Heat indices up to 107 degrees were measured at the Maryland Science Center.	-	-	N/A
July 24, 2011	Southern Baltimore	Strong upper-level high pressure combined with humid conditions to produce heat indices in excess of 105 degrees across portions of eastern Maryland. Heat indices up to 106 degrees were measured at the Maryland Science Center.	-	-	N/A
July 29, 2011	Southern Baltimore	Upper-level high pressure provided enough subsidence for hot conditions on the 29th. A southerly flow around surface high pressure over the Atlantic caused humid conditions. Hot and humid conditions caused heat indices over 105 degrees across many locations. Heat indices up to 109 degrees were measured at the Maryland Science Center.	-	-	N/A
May 28, 2012	Southern Baltimore	A southerly flow around high pressure over the Atlantic Ocean provided hot and humid conditions. Heat indices were around 100 degrees during the afternoon and early evening hours. Heat indices were around 100 degrees in Baltimore.	-	-	N/A
June 20, 2012	Southern Baltimore	Strong subsidence associated with upper-level high pressure caused hot conditions on the 20th. A southerly flow around high pressure off the coast ushered in high humidity during this time. The combination of the heat and humidity caused heat indices to reach 105 degrees in some locations. Heat indices up to 105 degrees were reported at the Maryland Science Center.	-	-	N/A
June 21, 2012	Southern Baltimore	Strong subsidence associated with upper-level high pressure caused hot conditions on the 21st. A southerly flow around high pressure off the coast ushered in high humidity during this time. The combination of the heat and humidity caused heat indices to reach 105 degrees in some locations Heat indices of 105 degrees were reported at the Maryland Science Center.	-	-	N/A
July 4, 2012	Southern Baltimore	Upper-level high pressure built overhead while surface high pressure moved off the coast. A southerly flow combined with sunshine and subsidence for hot and humid conditions. Heat indices were around 102 to 103 degrees at the Maryland Science Center.	-	-	N/A
July 5, 2012	Southern Baltimore	Upper-level high provided plenty of subsidence while a southerly flow continued over the area due to surface high pressure off the coast. The subsidence and southerly flow caused hot and humid conditions. Heat indices were between 105 and 109 degrees at the Maryland Science Center.	-	-	N/A
July 8, 2012	Southern Baltimore	Upper-level high pressure built overhead while surface high pressure moved off the coast. A southerly flow combined with sunshine and subsidence for hot and humid conditions. Heat indices were estimated to be between 105 and 109 degrees based on observations nearby. A fatality was reported due to the heat.	1	-	N/A
July 18, 2012	Southern Baltimore	High pressure off the coast allowed for a hot and humid air mass to remain over the Mid-Atlantic. Heat indices were between 105 and 109 degrees at the Maryland Science Center.	-	-	N/A
July 26, 2012	Southern Baltimore	High pressure off the coast allowed for a hot and humid air mass to remain over the Mid-Atlantic. Heat indices were reported to be around 105 degrees at the Maryland Science Center.	-	-	N/A
July 18, 2013	Southern Baltimore	High pressure was located over much of the eastern United States and light southerly flow persisted all week which led to above normal temperatures and dew points in the mid-70s. Heat indices were around 105 to 109 degrees at MD Science Center.	-	-	-
July 21, 2015	Southern Baltimore	Warm air and moisture advection ahead of an approaching cold front combined with produce heat indices in the 90s. Temperatures reached the lower 90s and combined with dew points in the upper 60s to produce heat indices in the mid to upper 90s. The Department of Health and Mental Hygiene, Office of Preparedness and Response reported one death from exposure to the heat. A toddler was left inside a car for 16 hours from the afternoon on the 21st until the 22nd. The windows were left rolled up, and the toddler died, suffering from second degree burns.	1	1	-

July 23, 2016	Southern Baltimore	A southwesterly flow around high pressure over the Atlantic pumped in plenty of moisture while hot conditions persisted due to an upper-level ridge of high pressure. The heat and humidity caused heat indices to top off around 105 degrees. Heat indices around 105 degrees were reported nearby.	-	-	N/A
July 25, 2016	Southern Baltimore	A southwesterly flow around high pressure over the Atlantic pumped in plenty of moisture while hot conditions persisted due to an upper-level ridge of high pressure. The heat and humidity caused dangerous heat indices. Heat indices were around 105 degrees at the Maryland Science Center.	-	-	N/A
August 12, 2016	Southern Baltimore	A southerly flow around high pressure to the east cause hot and humid conditions over the area. Heat indices around 105 degrees were reported at the Maryland Science Center.	-	-	N/A
July 20, 2017	Southern Baltimore	High pressure both at the surface and aloft caused hot conditions. A southerly flow caused high humidity, which led to high heat indices. Heat indices around 105 degrees were reported.	-	-	N/A
August 18, 2017	Southern Baltimore	A southwesterly flow around high pressure over the Atlantic pumped in plenty of moisture while hot conditions persisted due to an upper-level ridge of high pressure. The heat and humidity caused dangerous heat indices. Heat indices were around 105 degrees based on observations nearby.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-18: Heavy Rain Events (August 20, 1997-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
August 20, 1997	Southern Baltimore	A soaking rain put a dent into the summer drought. The precipitation was caused by a low-pressure area moving up the eastern seaboard. Rainfall across central and eastern Maryland ranged from 1 1/2 to 2 1/2 inches. A daily precipitation record was set a BWI; 2.75 inches of rain fell. Washington/National Airport (DCA) recorded over 2 inches as well. The rain and accompanying gusty winds caused scattered power outages, including 6,000 in the Potomac Electric Power Co. service area.	-	-	N/A
January 28, 1998	Southern Baltimore	An intense and slow-moving nor'easter produced a large area of moderate to heavy rains across central and lower southern Maryland beginning late on the 27th and continuing through late afternoon on the 28th. The heaviest rain fell while the storm was tracking along the South and North Carolina coastline. Storm totals ranged from 1 1/2 to 2 1/2 inches over the area, except between 3 and 4 inches across lower southern Maryland. Widespread minor to moderate flooding of small streams, creeks, and low-lying areas occurred over much of lower southern Maryland. Other localized flooding was observed in Frederick Co. The Maryland State Highway Administration and local emergency management officials reported numerous road closures in these areas. Gale-force winds extended inland a bit, affecting most of the counties along the western shore of the Bay. Gusts in excess of 30 mph were observed in the piedmont, and over 40 mph along the coastal plain. The combination of gusty winds and saturated soil caused several instances of trees, limbs, and power lines to come down. Baltimore Gas and Electric, and Potomac Electric Power Co reported 3800 and 538 customers without power, respectively, during the peak of the storm (0945EST on the 28th).	-	-	N/A
January 28, 1998	Northern Baltimore	An intense and slow-moving nor'easter produced a large area of moderate to heavy rains across central and lower southern Maryland beginning late on the 27th and continuing through late afternoon on the 28th. The heaviest rain fell while the storm was tracking along the South and North Carolina coastline. Storm totals ranged from 1 1/2 to 2 1/2 inches over the area, except between 3 and 4 inches across lower southern Maryland. The Maryland State Highway Administration and local emergency management officials reported numerous road closures in these areas. Gale-force winds extended inland a bit, affecting most of the counties along the western shore of the Bay. Gusts in excess of 30 mph were observed in the piedmont, and over 40 mph along the coastal plain. The combination of gusty winds and saturated soil caused several instances of trees, limbs, and power lines to come down. Baltimore Gas and Electric, and Potomac Electric Power Co reported 3800 and 538 customers without power, respectively, during the peak of the storm (0945EST on the 28th).	-	N/A	

September 5 – September 6, 1999	Baltimore City	The remnants of Hurricane Dennis moved across Maryland from late on the 4th through midday on the 6th. Its legacy included heavy rain, especially across Central Maryland, power outages from fallen tree limbs, and tidal flooding along the western shoreline of the Chesapeake Bay. Tides were 2 to 3 feet above normal along the shoreline of Calvert and Anne Arundel Counties. Several locations next to the water were flooded at high tide, including a parking lot on Dock Street in Annapolis and Halloween Point, North Beach, and Cove Point in Calvert County. Chesapeake Beach in Calvert County also reported 2 feet of water over 9th Street and minor damage to 2 businesses. In Baltimore, the persistent east to southeast wind pushed water over the seawall at Inner Harbor and onto the Harbor Place promenade. Heavy rain also caused several problems in the region. Two days of rain made Jones Falls Creek in Baltimore swell, and a 13-year-old boy floating down the creek in a makeshift raft was washed downstream. It took an hour for a team of 30 fire fighters to rescue him from a pile of debris snagged by a pillar of a bridge supporting the Jones Falls Expressway. The child was treated for hypothermia. Several other communities including Bowley's Quarters near Middle River and Oella near the Patapsco River reported street flooding. Rainfall totals from Dennis across Central Maryland included at Baltimore/Washington International Airport (BWI), 2.33 inches at Inner Harbor in Baltimore. Winds gusting to 35 MPH downed tree limbs onto power lines on the afternoon of the 5th, causing scattered power outages. Nearly 2000 customers in Central Maryland lost power. 13-year-old boy rescued from swollen Jones Falls.	-	1	N/A
July 26, 2000	Baltimore City	Showers and thunderstorms the produced very heavy rainfall moved across central Maryland during the afternoon of the 16th. Heavy rain flooded streets in Prince George's and Baltimore Counties. Rainfall totals in Baltimore County included 2.60 inches at Ft. McHenry, 2.37 inches at the Maryland Science Center, 2.12 inches at Lake Roland, 1.92 inches at Carroll Park, and 1.72 inches in Perry Hall.	-	-	N/A
July 28, 2000	Baltimore City	During the afternoon and evening of the 28th, thunderstorms that produced winds in excess of 55 MPH, heavy rainfall, and frequent lightning moved across Maryland A total of 2.62 inches fell in Baltimore.	-	-	N/A
July 30, 2000	Baltimore City	Scattered thunderstorms produced heavy rainfall across the northern third of Maryland during the afternoon of the 30th. A total of 2.04 inches fell at Carroll Park in Baltimore.	-	-	N/A
September 19, 2000	Baltimore City (Countywide)	The remnants of Tropical Storm Gordon moved across central Maryland on the 19th and dropped up to 3 inches of rainfall. In downtown Baltimore, 2.45 inches was recorded.	-	-	N/A
September 24 – September 25, 2000	Baltimore City (Countywide)	Showers and thunderstorms developed over Maryland as a moist tropical airmass covered the region. Between midday on the 24th through the evening on the 25th, between 1 and 3 inches of rain fell. In Baltimore County, rainfall totals included 2.80 inches at Ft. McHenry in Baltimore, 2.56 inches in Pikesville, 2.52 inches in Fullerton, 2.40 inches in Owings Mills, and 1.96 inches in Freeland.	-	-	N/A
December 16 – December 17, 2000	Baltimore City (Countywide)	A strong cold front moved across the region around midday on the 17th. Ahead of the front, heavy rain fell from showers and thunderstorms In Baltimore County, 2.32 inches fell at Parkton, 2.20 inches fell at Baptist Home, 2.15 inches fell in Owings Mills, and 1.60 inches fell in Freeland. Spotters reported that both Gwynns Falls and Jones Falls overflowed their banks temporarily. Sections of Route 140 (Reisterstown Road) and Owings Mills Boulevard were closed by high water. Behind the front, northwest winds increased to 30 to 45 MPH. Measured wind gusts included 51 MPH at Andrews AFB and 48 MPH at Martin State Airport just east of Baltimore.	-	-	N/A
March 21, 2001	Baltimore City (Countywide)	A Nor'easter moved from the North Carolina coast to New England from the 20th to the 22nd. As it passed by the Mid-Atlantic region, it dropped heavy precipitation between midnight and midafternoon on the 21st. From Washington County eastward, the precipitation fell in the form of rain and totaled between 1 and 2.5 inches. After the precipitation ended on the 21st, northwest winds gusted between 35 and 50 MPH. Recorded gusts included 52 MPH at Parkton in Baltimore County. In Baltimore County, tree limb and power line damage were reported.	-	-	N/A
March 29 – March 30, 2001	Baltimore City (Countywide)	Low pressure brought a period of heavy rainfall to the Mid-Atlantic region between the morning of the 29th and the morning of the 30th. Between 1.5 and 2.5 inches of rain was recorded.	-	-	N/A
May 22, 2001	Baltimore City	Thunderstorms that produced wind gusts in excess of 55 MPH, large hail, heavy downpours, frequent lightning, and isolated tornadoes crossed the area during the afternoon and early evening hours of the 22nd. In the city of Baltimore, rainfall totals included 1.83 inches at Fort McHenry, 1.80 inches at Inner Harbor, and 1.55 inches at Carroll Park.	-	-	N/A
March 20, 2003	Baltimore City (Countywide)	Between 1.5 and 2.5 inches of rain fell region wide on the 20th. The heavy precipitation caused flooding of low lying areas and waterways in isolated areas.	-	-	N/A
May 15 – May 16, 2003	Baltimore City (Countywide)	A large area of showers and thunderstorms containing heavy downpours moved through the region between the afternoon of the 15th and the morning of the 16th. The system dropped between 2 and 4 inches of rain	-	-	N/A

		across western and central Maryland which caused several low-lying areas to flood. Isolated 5-inch rainfall totals were reported in northern Frederick County. In some areas it took over 10 hours for the water to recede after the rain came to an end In Baltimore County, Jones Falls overflowed its banks near Owings Mills. In Prince George's County, high water forced sewage to pour out of a manhole onto Indian Head Highway.			
June 20, 2003	Baltimore City	Another round of showers and thunderstorms with heavy rainfall moved through Central Maryland during the afternoon of the 20th. For the 2nd straight day, flooding was reported. In Baltimore County, minor street flooding was reported in Baltimore. A total of 2.28 inches of rain was recorded in Parkton.	-	-	N/A
September 23, 2003	Baltimore City (Countywide)	During the morning of the 23rd heavy rain fell on top of already saturated ground from Hurricane Isabel which struck a few days before. This lead to widespread flooding of roads, waterways, and other low-lying areas. In Washington County, rainfall totals included 2.65 inches in Knoxville and 2.19 inches in Sharpsburg. In Baltimore County, 2.52 inches of rain fell in the city of Baltimore. The entrance ramps to Interstate 83 and the Jones Falls Expressway were closed temporarily due to high water.	-	-	N/A
June 28, 2005	Baltimore City	With a tropical airmass in place, strong to severe thunderstorms occurred. These thunderstorms produced damaging wind gusts and heavy rainfall across a large portion of the Mid-Appalachian and Mid-Atlantic regions. Four children were playing in a stream. Heavy rainfall caused the stream to become swollen within its banks. One of the boys was swept away and drowned.	1	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-19: Heavy Snow Events (January 9, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
January 9, 1996	Southern Baltimore	Low- and mid-level lift ahead of an "Alberta Clipper" added insult to injury only a day after the "Blizzard of '96," dumping 4 to 6 inches of snow in a 5-hour period from lower southern Maryland through the northern suburbs of Baltimore. The additional snowfall produced total snow depths similar to those over the Maryland and Virginia piedmont.	-	-	N/A
January 12, 1996	Southern Baltimore	Less than one week after the crippling "Blizzard of '96," a new winter storm dumped substantial snow across Maryland west of the Chesapeake Bay. The snow changed to freezing rain and sleet from the Chesapeake Bay through the eastern and southern suburbs of the Baltimore/Washington area before tapering off. The changeover suppressed accumulations to 4 to 6 inches in this region. The storm developed as an area of low pressure in the Midwest, which became an elongated trough extending from the Tennessee Valley through southeastern North Carolina. As the upper-level trough approached, the North Carolina low became dominant, intensifying slowly as it moved through the mouth of the Chesapeake Bay, then off the Delaware coast by late afternoon. Unlike the "Blizzard of '96," a lack of cold air behind the surface low, combined with the fact that the upper-level trough was significantly weaker and more progressive, kept the surface low from rapidly intensifying. Nonetheless, west-central Maryland received some of the highest snow totals in the Eastern U.S. Travel was slowed yet again, but by evening main arteries were cleared. Excessive speed contributed to numerous accidents, the most impressive on the Capital Beltway in Montgomery Co (MDZ009) which involved four tractor-trailers. Most local, state, and federal offices were closed. School districts remained closed, giving children an extra week of winter vacation. Unfortunately, the week of storms also wiped out their allotment of snow days. The additional snow load caused several structures to partially fail.	-	-	N/A
February 3, 1996	Southern Baltimore	The continuation of a strong upper-level jet streak, combined with additional mid-level dynamics, generated surface low pressure over central Georgia by evening on the 2nd. As the low moved to near Cape Hatteras overnight, a broad area of heavy snow overspread all of Maryland west of the Chesapeake Bay. Areas that were hit with 4 to 13 inches of snow during an early-morning event received an additional 4 to 6 inches, leaving most of lower southern Maryland with a grand total of 12 to 18 inches. Farther north, from the Potomac Highlands through the western suburbs of Baltimore and Washington, between 6 and 9 inches fell. Circulation around the surface system allowed arctic air to pour into the area during the heaviest snowfall. Much of the snow fell at temperatures below 20 degrees, making it powdery. The 6 to 9 inches were cleared by the next afternoon, but problems remained in lower southern Maryland, where snow removal (rather than plowing) was required. Very thin bands of heavy snow continued into early Sunday morning (the 4th) along the immediate western shore of the Chesapeake Bay, producing as much as 9 additional inches in southeastern Calvert (MDZ018) and northeastern St Mary's (MDZ017) Cos. Storm totals in these areas were as high as 2 feet. The storm's exit ushered the coldest air in two years into the region. Daytime temperatures on the 4th remained below 20 degrees, with wind chills ranging from 10 to 20 degrees below zero. Light winds and clear skies, combined with deep snow cover, allowed temperatures to fall well below zero by dawn on the 5th at most locations. Low temperature records were set on two consecutive calendar days at Baltimore/Washington International Airport (MDZ014), with 8 degrees late on the 4th and 1 degree below zero early on the 5th.	-	-	N/A

February 16, 1996	Southern Baltimore	A strong "Alberta Clipper", diving southeast from the upper Midwest into the deep south, linked up with subtropical moisture lurking along the southeast U.S. coast to develop a classic nor'easter, which moved from northeast South Carolina to off the Virginia Capes during the day on the 16th. As the area of low pressure intensified, it wrapped Atlantic moisture well to the west, where modified arctic air was pouring in from southern Canada. The result was an area of heavy snow across all of eastern Maryland during the morning and early afternoon. The heaviest snowfall was noted along the western shore of the Chesapeake Bay, where between 10 and 13 inches fell. Over the immediate suburbs of Washington and Baltimore, 7 to 11 inches fell, with lesser amounts (4 to 6 inches) over areas of north central Maryland. The snowfall added to the already remarkable seasonal totals. At Baltimore/Washington International Airport (MDZ014), the additional 9.8 inches brought the 1995/96 total to 55.1 inches, breaking the all-time record of 51.8 inches, set over 30 years prior, by 3.3 inches. The record was shattered with still an entire calendar month of winter remaining. Farther south, in Hollywood (MDZ017), the all-time record, dating back nearly a century, was nearly tied as the snow total reached 53.2 inches. The standing record of 54.7 inches was set during the legendary winter of 1898/99, known for its infamous February blizzard.	-	-	N/A
March 8, 1996	Southern Baltimore	Low-level lift of residual moisture, induced by favorable circulation underneath an upper-level jet streak, squeezed out a narrow band of heavy snow immediately behind an arctic front. Four to five inches fell in an 8- hour period across central and northern Maryland as temperatures fell through the 20s and northwest winds gusted over 25 mph. The snow was followed by the coldest air this late in winter since March 14th through 15th, 1993. At Baltimore/Washington International Airport (MDZ014), the snow continued piling on to records set earlier in the winter. The seasonal total reached 62.5 inches - a full 18.1 inches higher than the previous record set in 1966/67. Seasonal snow amounts in the region as of the 8th roughly ranged from 54 to 64 inches, rivalling values achieved during the noteworthy winter of 1898/99.	-	-	N/A
February 8, 1997	Southern Baltimore	A winter storm dumped 4 to 8 inches of heavy, wet snow across all of central and northern Maryland on the 8th. Highest totals were observed in the northern and western suburbs of Washington and Baltimore, as well as in Allegany Co above 2000 feet. Antecedent warm weather, combined with air temperatures at or just above freezing during the event, allowed roads to remain generally wet. However, icy spots developed late that afternoon and evening as temperatures fell well below freezing. The snow, which clung to everything, was aesthetically pleasing. However, the weight of the snow snapped numerous tree limbs and knocked others onto utility lines. At the peak of the storm, over 2000 Maryland and District PEPCO customers in the Washington metropolitan region were without electricity. Otherwise, public impact was minimal since the storm occurred on a Saturday. The storm resulted from the interaction of the subtropical jet stream, which provided a strong energy impulse to aid in lifting relatively warm humid air, with the polar jet stream, which provided enough low-level cold air to maintain wet snow rather than rain.	-	-	N/A
February 11 – February 12, 2006	Southern Baltimore	A historic snowstorm occurred between February 11-12 across the Mid-Atlantic. Storm total snowfall across much of Maryland ranged generally between 8-14 inches. A period of thundersnow occurred overnight and early in the morning of the 12th across portions of the northern Washington DC suburbs and the Baltimore suburbs of Maryland, where localized snowfall ranged between 14 to 22 inches. Local utility companies reported total power outages of around 300,000 customers in the Washington/Baltimore region. Amtrak reported major delays and cancellations all along the northeast rail corridor, which passes through both Baltimore and Washington, DC. There were also major delays at all 3 major hub airports in the region, Washington Dulles International, Washington Ronald Reagan National, and Baltimore/Washington Thurgood Marshall International.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-20: High Wind Events (February 24, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
February 24, 1996	Southern Baltimore	Gradient winds of 25 to 35 mph, with gusts to 60 mph, which occurred between an intense storm over the Canadian Maritimes and a strong high-pressure ridge over the southeast U.S., produced minor damage and power outages in the Baltimore metropolitan region. Baltimore Gas and Electric reported over 22,000 customers without power during the peak winds. Most of the outages were the result of large limbs or trees which bent onto power lines. The wind gusts also knocked down small trees and tore aluminum siding off a few homes over the northern and western suburbs.	-	-	N/A
March 3, 1996	Southern Baltimore	Northwest winds gusted to 60 mph behind a strong cold front in the immediate Baltimore metropolitan area. The winds caused minor roof shingle damage in northern Anne Arundel Co (MDZ014).	-	-	10K
March 19, 1996	Southern Baltimore	Deep low pressure moving up the Ohio Valley produced gusty east winds which blew down trees and limbs, some onto power lines. Undoubtedly, moist ground contributed to the damage. Most of the damage occurred in Baltimore City (MDZ011), where larger buildings likely induced localized severe (greater than 58 mph) gusts. One of these gusts blew down a plywood walkway in downtown Baltimore, injuring 6 persons. Baltimore Gas and Electric (BG&E) reported over 22,000 customers were without power at the height of the storm.	-	6	50K
April 23, 1996	Southern Baltimore	Gusty gradient winds associated with a vigorous cold front caused numerous power outages across north central Maryland during the evening of the 23rd. Baltimore Gas and Electric reported over 30,500 customers without power - a combination of minor damage from early (daytime) gusty winds ahead of the cold front and more substantial damage associated with the front. The largest outages were clustered in Annapolis (MDZ014, 8100 customers); Baltimore City/Glen Burnie (MDZ011/14; 11,500 customers) and Howard Co (MDZ010; 4256 customers).	-	-	25K
September 6, 1996	Southern Baltimore	The remnants of Hurricane Fran continued to spawn high winds, ranging from 25 to 35 mph with gusts to 50 mph, across much of Maryland west of the Chesapeake Bay. The combination of strong winds and saturated soil knocked down numerous trees across the area, most concentrated at the highest elevations. Power was knocked out to thousands of customers in the state, including many in the Baltimore/Washington metropolitan area.	-	-	N/A
January 14, 2006	Southern Baltimore	Very strong winds developed on the 14th due to a strengthening low-pressure system off the Mid Atlantic Coast and a fast-moving cold front that passed through the region early in the day. Widespread damages and power outages occurred during this event, with newspaper reports indicating tens of thousands without power for an extended period of time. Numerous trees and powerlines down.	-	-	200K
April 16, 2007	Southern Baltimore	A Nor'easter impacted the Mid-Atlantic region on April 15th and 16th. Low pressure off the southeastern coast moved north along the Delmarva. Heavy rain spread north across the region early April 15th, causing flooding by the afternoon and evening. As the low-pressure area pushed north and intensified, colder air advanced from the northwest. This allowed rain to change to snow along the upslope region of the Allegheny Front. Winds also increased in the wake of the low, downing trees and power lines across central and lower southern Maryland. Thousands were left without power when high winds downed trees and power lines. Power outages forced several schools to close early.	-	-	10K
February 10, 2008	Southern Baltimore	Gusty winds developed in the wake of a strong cold front that crossed the region February 10th. Wind gusts in excess of 60 mph were measured in some locations, with several hours of wind gusts in excess of 40 mph. This downed trees and power lines across the region. Property damage was also reported due to the winds. A trained spotter measured a wind gust of 50 knots.		-	-

February 12, 2009	Southern Baltimore	A strong area of low pressure intensified off the New England coast on the 12th. A strong pressure gradient between this low and high pressure over the Ohio Valley resulted in high winds across Maryland on the 12th. Wind gusts were estimated around 50 knots across southern Baltimore County.	-	-	N/A
February 19, 2011	Southern Baltimore	A cold front passed through the area during the evening of the 18th. A strong pressure gradient between high pressure to the south and low pressure to the north resulted in high winds during the 19th. A tree was down at the intersection of Hilton and Idlewild Avenues.	-	-	1K
February 25, 2011	Southern Baltimore	A strong cold front passed through the region during the morning hours. Strong low pressure associated with the front moved through New England during the afternoon hours while high pressure moved toward the Midwest. The strong pressure gradient between these two systems caused high winds. Wind gusts of 66 mph were measured near Hamilton.	-	-	N/A
October 29, 2012	Southern Baltimore	Hurricane Sandy moved up the Atlantic coast and then turned Northwest and made landfall northeast of MD. Heavy rain and high winds over spread coastal regions and most of Maryland, eastern panhandle of West Virginia and Northern Virginia. Heavy rain caused flooding and river flooding. Wind gusts of 59-68 mph were measured by a mesonet and spotters. There was numerous tree damage as well as trees into homes and some trees blocking roads. Many people were without power.	-	2	7.12M
March 12, 2014	Southern Baltimore	A cold front moved through the Mid Atlantic while sharp pressure rises occurred behind the frontal passage. Gusty Northwest winds occurred across the region with widespread gusts up to 55 mph with localized higher amounts. Estimated gusts of 50 knots blew down trees in Towson and Pimlico.	-	-	2K (Crop Damage)
February 14, 2015	Southern Baltimore	Strong gradient winds formed as a resulting of a tight pressure gradient between low pressure near New England and high pressure building in from the Midwest. A gust of 58 mph was reported at Martin State Airport. Siding was reported torn off from a house in Arlington around midnight.	-	-	N/A
April 2, 2016	Southern Baltimore	A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. Highest gust reported near Glyndon. Gusts between 46 and 58 reported across the county.	-	-	N/A
April 2, 2016	Southern Baltimore	A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. Several branches were reported down around Towson, resulting in a blown transformer.	-	-	N/A
April 2, 2016	Southern Baltimore	A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. A large tree was reported down on South Lane in Sparrows Point, resulting the road being closed.	-	-	N/A
April 3, 2016	Southern Baltimore	A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. Structural damage was reported on North Fulton Ave in Baltimore.	-	-	N/A
February 12, 2017	Southern Baltimore	Low pressure rapidly intensified as it moved up the New England coast. A strong pressure gradient between the low and high pressure over the Midwest caused high winds. There were several reports of trees down in the Towson area.	-	-	N/A
March 2 –3, 2018	Southern Baltimore	A low-pressure system moving eastward from the central United States on Thursday March 1st, intensified rapidly as it moved offshore Thursday night and early Friday, deepening to 974 mb by the evening of Friday March 2nd. Strong winds were present in the low levels of the atmosphere due to the strengthening pressure gradient and were able to mix down to the surface in strong wind gusts under northwest flow cold air advection. Numerous trees were down due to high winds. A large tree branch fell onto a pedestrian in the 11000 block of Cedar Lane resulting in a fatality.	1	0	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-21: Hurricane Events (June 7, 2013-March 31, 2018)

Date	Storm Event Name	Narrative
June 7, 2013	Tropical Storm Andrea	Caused minor flooding in the Baltimore-Washington Area. Total rainfall just over 2 inches resulting from post tropical storm system.
Oct. 9-12, 2013	Tropical Storm Karen	Heavy rainfall across the State of Maryland.
June 20, 2015	Tropical Storm Bill	Heavy rainfall, thunderstorms, and gusty winds to the State of Maryland.
Sept. 19-22, 2016	Tropical Storm Julia	Cold front and rain across the State of Maryland.
Oct. 8-9, 2016	Hurricane Matthew	Hurricane Matthew did not make landfall, however the large size of the storm brought heavy rainfall and gusty winds to the State of Maryland.
June 23-24, 2017	Remnants of Tropical Storm Cindy	The storm brought heavy rainfall to the entire State of Maryland.
Sept. 2, 2017	Hurricane Harvey	The storm brought heavy rain, thunderstorms, and gusty winds across the State of Maryland.
Oct. 21, 2017	Tropical Storm Phillipe	The storm brought heavy rain and winds to the State of Maryland.

Source: National Weather Service (NWS)

Table 3-22: Ice Storm Events (January 14, 1999-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
January 14 – January 15, 1999	Southern Baltimore	A strong arctic cold front moved slowly southeast across the Mid-Atlantic region from late on the 13th to midday on the 15th. This front brought a thick layer of sub-freezing air to the lowest levels of the atmosphere, but just off the surface warmer air moved in. A low-pressure system developed on the 13th over the Tennessee Valley. The low moved into the Mid-Atlantic region over the next few days, spreading precipitation region wide from early on the 13th through midday on the 15th. The precipitation started as snow but melted into rain as it fell through the warm layer of air. Unfortunately, west of the cold front the ground was below freezing during the period, so the rain froze on every surface it came in contact with. This created ice accumulations of one quarter to one half inch north and west of a line from Montgomery County to Harford County through early afternoon on the 14th. By 9 AM on the 15th, ice accumulations from one quarter to nearly one inch occurred across all of Western and Central Maryland, except Charles, Calvert, and St. Mary's county where a trace to one quarter inch accumulated. The ice this storm left behind had a large impact on theregion. Hundreds of car accidents, slip and fall injuries, downed trees, and power outages were reported. Winds gusted over 40 MPH after the precipitation ended and trees weighed down by the heavy ice accumulations fell on homes, across roads, and onto power lines across the area. 2000 power lines were reported down in PEPCO's Maryland power service area leading to a loss of power for 230,000 of the utility companies 680,000 customers. This was the worst ice storm in PEPCO's service history. The Governor declared a state of emergency in Howard, Prince Georges, Carroll, Baltimore, Harford, and Montgomery Counties. Also, 119,000 in Baltimore County. Power outages also caused a disruption in the public transportation system in the suburbs of Washington D.C., leading to a commuter nightmare. The Red Line of the Metro subway system had to be shut down from the Van Ness to Shady Grove Station in Montgomery County at 3:30 PM on the 15th after rail de-icing equipment failed and a tree fell across the tracks. The MARC train system had to cancel departures from Washington D.C. westward between 5 and 6 PM due to ice and related power outages.	-	-	100K
December 11, 2002	Southern Baltimore	An area of low pressure that tracked across the region on the 11th produced between 1 and 2 inches of rainfall. Unfortunately, while rain was falling during the morning hours, ground temperatures were below freezing across Western and North Central Maryland. This caused the rain to freeze on contact with the ground and several locations reported ice accumulations between 1/4 to ½ inch. Roads and sidewalks became treacherous and numerous trees and power lines were downed by the heavy ice accumulations. Across Central and Western Maryland, 38,000 customers lost power as a direct result of the storm. In Frederick County, two men died from carbon monoxide poisoning in their Libertytown home. A gas-powered electric generator that was turned on in response to a 3-day power outage was blamed for the deaths. In Howard County, 22 people were treated in emergency rooms for slip and fall injures related to the ice. In Anne Arundel County, 8 slip and fall injuries were reported. In Prince George's and Anne Arundel counties, ice accumulations were held to less than one quarter of an inch because temperatures rose above freezing by mid-morning. A few icy patches were reported on roads and sidewalks during the morning hours. In Baltimore and Harford counties, a combination of heavy rainfall and melting snow caused minor flooding on roads during the afternoon and evening of the 11th.	-	-	N/A

February 12 – February 13, 2008	Southern Baltimore	Light precipitation spread east across the Mid Atlantic ahead of a low-pressure system. Temperatures at the onset of precipitation were cold enough to produce snow. As precipitation spread east of the Blue Ridge, temperatures aloft increased to above freezing while temperatures at the surface remained below freezing. This caused eastern portions of the state to see a change over from snow to freezing rain. Road conditions began to rapidly deteriorate during the afternoon rush when rain began to freeze onto the roadways. Numerous traffic accidents were reported across the Baltimore Metro and across the northern Washington DC suburbs. Several inches of snow were reported in the western part of the state in Allegany and Washington counties, with a mix of snow, sleet and freezing rain in central Maryland. Mostly ice was reported further east into the Baltimore Metro and northern Washington DC suburbs. Trained spotters and cooperative observers measured 3 tenths of an inch of ice. Local media reported numerous traffic accidents.	-	-	-
March 1, 2015	Southern Baltimore	Widespread precipitation was produced ahead of an approaching cold front. Southerly flow overrunning near freezing surface temperatures led to the main precipitation type being freezing rain. Multiple reports of storm total ice between 0.15 and 0.25 inch.			

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-23: Lightning Events (June 19, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
June 19, 1996	Baltimore City (Downtown)	Lightning struck and killed a construction worker on a roof in downtown Baltimore. The worker died from cardiac arrest.	1	0	N/A
July 8, 1996	Baltimore City	Several trees were struck by lightning, and a home on Allendale Road which was also struck had its ceiling collapse. Numerous traffic lights were temporarily knocked out as a result of the storm. Baltimore Gas and Electric reported 23,000 customers without power in the metropolitan area.	0	0	30K
June 26, 198	Baltimore City (West Baltimore)	A weak upper-level disturbance, combined with a surface trough, triggered a hot, humid, unstable air mass lying across much of Maryland. Strong to severe thunderstorms developed rapidly in northern Maryland and tracked east-southeast into east-central and lower southern Maryland during the early evening. The main culprits for damage were gusty winds and lightning, through a few occurrences of large hail were noted. Initial thunderstorms produced large hail in central Baltimore and northern Carroll Cos during the mid- afternoon. The real action began during the early evening commuting hours, when a severe thunderstorm knocked down numerous trees and large limbs on an east-southeast trek from Reisterstown to Essex. The same cell produced wind-driven hail which broke windows of several automobiles in Reisterstown. The flying glass shards injured one occupant of a vehicle; the shards had to be removed from his scalp.	1	1	N/A
July 27, 2005	Baltimore City	A cold front moved through the region during the late afternoon and evening. This cold front, combined with moist and unstable conditions, triggered widespread showers and storms across the region. The strongest of these storms downed trees and powerlines, as well as producing very large hail. Intense lightning caused fires and several personal injuries. Torrential rainfall flooded a few areas and was also responsible for sweeping away a young boy. Damage estimates by print media were in the hundreds of thousands, possibly more. Lightning ignited a few fires in the city and damaged the chimney of a local civic organization.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-24: Storm Surge/Tide Events (June 19, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
September 5 – September 6, 1999	Baltimore City	The remnants of Hurricane Dennis moved across Maryland from late on the 4th through midday on the 6th. Its legacy included heavy rain, especially across Central Maryland, power outages from fallen tree limbs, and tidal flooding along the western shoreline of the Chesapeake Bay. In Baltimore, the persistent east to southeast wind pushed water over the seawall at Inner Harbor and onto the Harbor Place promenade. Heavy rain also caused several problems in the region. Two days of rain made Jones Falls Creek in Baltimore swell, and a 13-year-old boy floating down the creek in a makeshift raft was washed downstream. It took an hour for a team of 30 fire fighters to rescue him from a pile of debris snagged by a pillar of a bridge supporting the Jones Falls Expressway. The child was treated for hypothermia. Several other communities including Bowley's Quarters near Middle River and Oella near the Patapsco River reported street flooding. In Howard County, Route 1 at Elkridge was closed for a time on the 5th by 2 feet of water. Rainfall totals from Dennis across Central Maryland included 5.59 inches at Clarksburg, 4.50 inches at Glenmont, 4.41 inches at Gaithersburg, 4.05 inches at Rivera Beach, 3.96 inches at Damascus, 3.84 inches at Rockville, 3.77 inches at Laurel, 3.5 inches at Silver Spring, 3.47 inches at Oxon Hill, 3.30 inches at Thurmont, 3.04 inches at Dawsonville, 2.90 inches at Cooksville, 2.70 inches at Hipsley Mill, 2.52 inches at Baltimore/Washington International Airport (BWI), 2.33 inches at Inner Harbor in Baltimore, and 1.68 inches at Waldorf. Winds gusting to 35 MPH downed tree limbs onto power lines on the afternoon of the 5th, causing scattered power outages. Nearly 2000 customers in Central Maryland lost powerWater rose over seawall onto the Harbor Place promenade at Inner Harbor.			
September 16, 1999	Baltimore City	Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect Maryland east of Washington County shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 30 to 50 MPH blew across the area between 11:00 AM and midnight on the 16th, with localized wind gusts over 50 MPH near the Chesapeake Bay. Hundreds of trees and power lines were downed and over 500,000 customers lost electricity. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. The highest rainfall reports included 11.60 inches in Annapolis, 11.11 inches in Ridge, 11.10 inches at Cape St. Claire in Anne Arundel County, 9.76 inches in California, 9.67 inches in Hollywood, 9.52 inches at Brown Landfill in Prince George's County, 8.64 inches in Bel Air, 8.62 inches at Fort McHenry, 8.30 inches in Pasadena, 8.27 inches in La Plata, 8.07 inches at Jug Bay Wetlands in Anne Arundel County, 7.82 inches in Tall Timbers, 7.78 inches in South Bowie, 7.25 inches in Millersville, 7.00 inches in Camp Springs, 6.96 inches in Marlboro, 6.83 inches in Morganza, 6.75 inches in Bowie, 6.13 inches in Brooklyn Park, 5.92 inches at Perry Hall, 5.78 inches at Baltimore/Washington International Airport, 5.33 inches in College Park, 5.26 inches in Bryans Road, 5.25 inches in Parkton, 5.19 inches at Inner Harbor Baltimore, 5.18 inches in Oraville, 5.16 inches at Lake Roland in Baltimore County, 5.12 inches in Elkridge, 5.10 inches in Millers, and 5.04 inches in Ellicott City. In Baltimore, evacuation orders were issued for businesses near the confluence of Jones Falls and Western Run after both streams overflowed their banks. The water submerged a used car lot and washed out a bridge on Maisel Street near Morrell Park. Winds gusted to 62 MPH on Television Hill. Officials reported 750 downed trees across the city, including 35 which damaged homes. Up to 91,000 customers lost power, and the outage led to the release of 24 million gallons of raw sewage into Jones Falls. Across Baltimore County, 57,000 customers lost power. Winds gusted to 69 MPH at Martin State Airport at 3:05 PM EDT, 56 MPH in Bowie, and 52 MPH in Towson and Parkton. Hundreds of trees fell in Gunpowder State Park. Countywide, fallen trees damaged homes, sheds, fences, and cars, and closed 125 roads. Officials reported 6 rapid water rescues and 350 flooded basements. A 10-year-old boy was swept into a storm drain and carried 300 feet in a buried pipe before fire fighters opened a manhole cover and rescued him uninjured. Tide 2 feet above normal.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-25: Thunderstorm Wind Events (August 12, 1957-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
August 12, 1957	Baltimore City	N/A	-	-	-
June 11, 1958	Baltimore City	N/A	-	-	-
August 3, 1960	Baltimore City	N/A	-	-	-
July 23, 1962	Baltimore City	N/A	-	-	-
August 19, 1963	Baltimore City	N/A	-	-	-
June 27, 1966	Baltimore City	N/A	-	-	-
April 2, 1970	Baltimore City	N/A	-	-	-
June 12, 1970	Baltimore City	N/A	-	-	-
July 10, 1975	Baltimore City	N/A	-	-	-
August 30, 1977	Baltimore City	N/A	-	-	-
October 5, 1979	Baltimore City	N/A	-	-	-
June 29, 1980	Baltimore City	N/A	-	-	-
June 21, 1981	Baltimore City	N/A	-	-	-
June 25, 1981	Baltimore City	N/A	-	-	-
July 20, 1981	Baltimore City	N/A	-	-	-
May 15, 1983	Baltimore City	N/A	-	-	-
July 6, 1983	Baltimore City	N/A	-	-	-
July 21, 1983	Baltimore City	N/A	-	-	-
May 8, 1984	Baltimore City	Statewide severe thunderstorms erupted ahead of a strong cold front, with activity characterized by an apparent series of intense downburst winds.	-	18	-
May 28, 1985	Baltimore City	N/A	-	-	-
July 10, 1985	Baltimore City	N/A	-	-	-
July 25, 1985	Baltimore City	N/A	-	-	-
July 20, 1986	Baltimore City	N/A	-	-	-
August 2, 1986	Baltimore City	N/A	-	-	-
May 5, 1989	Baltimore City	N/A	-	-	-
November 16, 1989	Baltimore City	High winds associated with a strong, fast-moving cold front began at approx. 2000 EST in western Maryland, 2130 EST in Baltimore and District of Columbia. There were numerous reports of gusts reaching between 60 and 70moh and a few reports of even higher gusts. Damages were widespread. An 80-year-old woman was killed in the Little Italy section of east Baltimore City when the wall of a warehouse that was in the process of being renovated collapsed, fell across an alley, and smashed through the roof of her home. She was buried under the rubble. Her husband escaped with a leg injury.	1	1	-
May 17, 1990	Baltimore City	N/A	-	3	-
July 9, 1990	Baltimore City	N/A	-	-	-
July 10, 1990	Baltimore City	N/A	-	-	-
July 12, 1990	Baltimore City	N/A	-	-	-
October 18, 1990	Baltimore City	N/A	-	-	-
July 7, 1991	Baltimore City	N/A	-	-	-
April 24, 1992	Baltimore City	N/A	-	-	-

July 15, 1992	Baltimore City	N/A	-	-	-
June 1, 1998	Baltimore City (End: Mt Washington)	A derecho whipped across northern Maryland just after midnight on June 1, knocking down hundreds of trees and producing scattered property damage. Baltimore Gas and Electric (BGE) reported 61,000 customers without power during the overnight hours, mostly in Carroll, Howard, and Baltimore Cos, as well as Baltimore City. Some of the hardest hit areas did not receive power until the following evening. BGE also noted that more than double the normal number of cleanup crews were out removing trees and limbs. Tree and property damage began in western Carroll Co and continued sporadically through northern Howard, Baltimore (Co. and City), and Harford Co. In Westminster, city crews commented that tree damage was the most they had seen "in 20 years". Many trees and large limbs fell onto roadways; one smashed a vehicle. Ten thousand customers were without power in Carroll Co alone. The line of storms scraped northern Howard Co, knocking down more trees, limbs, and power lines. Widespread, scattered tree and power line damage was reported in Baltimore Co. A wind gust of 66 mph was recorded in Upperco, near the Carroll Co line. The same storm produced a 59-mph gust in Towson approximately 10 minutes later. Numerous trees were reported down between Cockeysville and Towson. Volunteer fire companies answered at least 40 calls for fallen trees. One tree caused damage to a house. Five other trees/large limbs covered the northern suburban light rail line, mainly north of Ruxton, causing commuter delays later that morning. A few crossing gates were blown down as well. Less than a half hour later, numerous trees and limbs were knocked down in the city of Baltimore, most likely in the northwestern section. The storms weakened a bit as they moved into Harford Co. Still, several trees/limbs were blown down, as were power lines. Several utility poles caught fire; over 6000 customers were without power at the peak of the storm. An isolated cell produced damage in extreme eastern Baltimore Co before the derecho arrived. On Sparrows Point, near Edgemere, several large trees were either uprooted or snapped off at their bases. Cement slabs were also moved by the high winds.	-	-	10K
January 18, 1999	Baltimore City (End: Baltimore)	A vigorous cold front swept across Maryland during mid-afternoon on the 18th, accompanied by thunderstorms that produced damaging wind. The Baltimore/Washington International Airport in Anne Arundel County recorded a wind gust of 53 MPH at 3:25 PM. Around 3:30 PM, a spotter near the Carroll/Northern Baltimore County line reported a wind gust of 72 MPH. Other recorded gusts included 44 MPH at Mount Airy Middle School (Carroll County) at 2:55 PM, 48 MPH in Brooklyn Park (Anne Arundel County) at 3:22 PM, 45 MPH at Rivera Beach (Anne Arundel County) at 3:40 PM, and 50 MPH in Annapolis at 3:35 PM. In Carroll County, the storm left behind damage to a barn, downed trees, and the destruction of a house under construction. The wind blew part of the metal roof off a barn that housed a champion horse on Sams Creek Road, one-mile north of Taylorsville. The wind left an extension cord stuck 30 feet high in a tree and bent the metal frame of a glass table around a tree. A large tree toppled by the storm blocked Raincliffe Road at Slacks Road in Sykesville. A home under construction in Mount Airy was destroyed by the severe wind. The structure had a roof and outside walls and was scheduled to have the windows installed on the day it was destroyed. In Baltimore County, the storm left behind downed trees and a damaged porch. Several trees and limbs blew down onto cars around the city of Baltimore. In Towson, a two foot plus diameter tree fell across Greenspring Avenue, taking other trees and a power line down with it. A porch awning was ripped from its mooring at a home on Wareham Road in Dundalk. Power outages occurred for 11,750 customers in Baltimore City, 800 in Baltimore County, 6,700 in Anne Arundel County, 4,800 in Carroll County, 6,500 in Harford County, 2,400 in Howard County, and 1,650 in Montgomery County. Several trees fell onto cars.	-	-	5K
May 24, 1999	Baltimore City (End: Countywide)	A line of thunderstorms moved across North Central Maryland during the early afternoon. These storms produced winds in excess of 55 MPH which felled hundreds of trees and knocked out power to 47,000 customers. The hardest hit counties were Montgomery, Howard, Harford and Southern Baltimore. One tree at the intersection of Holder and Echodale Avenue near Baltimore fell onto a minivan and totaled the vehicle. A second tree that fell onto Route 1 near Sandy Hook Road in Harford County nearly missed hitting a moving car. A third tree on Philadelphia Road in Aberdeen fell onto a truck and car. Heavy downpours that accompanied these storms led to minor flooding and lowered visibility, a contributing factor in two serious automobile accidents. One car on Interstate 495 near Greenbelt in Prince Georges County hydroplaned and overturned, killing the 19-year-old driver. Another vehicle, an empty tractor trailer, lost traction on Interstate 95 near Halethorpe in Baltimore County and slid into a jersey barrier. The impact of the crash ruptured the gas tank and the vehicle caught on fire, seriously injuring the 50-year-old driver. Several trees and power lines downed.	-	-	20K

August 14, 1999	Baltimore City (End: Baltimore)	An area of thunderstorms moved across much of Maryland from 1:15 PM to 5:45 PM EDT, producing damaging wind, frequent lightning, and brief heavy downpours. As the storms moved through Washington County trees were downed in Rohersville, a community 5 mile south of Boonesboro. The thunderstorm complex intensified rapidly as it moved into Frederick County around 1:45 PM EDT, and the northwest side of the city of Frederick took the brunt of the storm. As the storm reached the Abbington Farms area a tornado developed. The tornado was F1 strength with winds between 75 and 112 MPH and ranged from 50 to 200 yards wide as it travelled east for 3 miles. The twister did extensive damage to trees as it moved through the communities of Eastview, Walnut Springs, Shookstown, and Fort Detrick. Some trees fell onto cars and houses, and a few homes under construction were damaged. One home under construction in Walnut Ridge was torn to pieces by the tornado and the debris turned into airborne missiles which heavily damaged two finished homes nearby. Two homes in the Eastview subdivision were condemned after trees fell onto the structures. A chimney was blown off a Willowdale Drive home. Yellow Springs Road had to be closed for several hours until power and telephone poles blocking the road could be cleared. A metal storage building on Rosemont Avenue was crumbled. Part of the roof of the Food Lion grocery store on Rosemont Avenue was torn off and thrown toward the gates of Fort Detrick. The store suffered water damage and the loss of frozen foods and perishables from the resulting power outage. Next, the storm moved across Fort Detrick, causing $260,000 in damage. The twister moved across Area B, then onto the main post where it uprooted trees, downed power lines, and blew off parts of buildings. The headquarters building and post chapel lost part of its roof. Nearly 30 cars along Rocky Springs Road and near post housing were damaged by downed trees and debris. In addition, the central portion of Frederick was hit by destructive straight-line winds estimated between 60 and 70 MPH. Thirty Bradford pear trees were downed on Heather Ridge Drive. Sixteen city streets were closed by fallen trees. A one mile stretch of Route 40 west of the Golden Mile had to be closed for an hour to clear fallen trees. A glider valued at $11,000 was ripped from its mooring at the airport and totaled. The storm downed a total of 300 trees across Frederick and resulted in outages for 8,000 power customers. High winds also downed trees in Brunswick, leaving 100 customers without power. High winds also crossed Baltimore County. Trees were downed from Cockeysville to Lutherville, and across the city of Baltimore. About 18,000 Baltimore city and 11,500 Baltimore County customers lost power as a direct result of the storm. Over 1.5 inches of rain fell in Baltimore and 2.0 inches fell in Cockeysville in less than one hour. Lightning knocked out phone service at the Cockeysville police precinct. A lightning strike in Harford County caused $5000 damage to a home. Another strike in Havre de Grace started a house fire which resulted in $80,000 in damage. Heavy downpours of rain between 4:30 PM and 6:00 PM EDT temporarily flooded the intersection of Route 24 and Jarrettsville Road in Forest Hill. Lightning was also blamed for 1000 power outages. Trees downed throughout city.	-	-	15K
September 9, 1999	Baltimore City (End: Baltimore)	Another round of thunderstorms producing damaging winds and very heavy rainfall moved across Central Maryland between 5:30 PM and 11:00 PM EDT. Several locations reported flooding and downed trees and power lines. In Baltimore County, Jones Creek went out of its banks, and roads were flooded in downtown Baltimore. One location in the Baltimore area received 3.6 inches of rain in 1 hour and 20 minutes. Winds gusting between 50 and 60 MPH also downed trees and power lines in Baltimore, resulting in 23,000 electrical outages. Trees and power lines downed.	-	-	5K
September 30, 1999	Baltimore City (End: Baltimore)	An area of intense showers moved across much of Maryland from 10:00 PM EDT on the 29th through 2:00 AM EDT on the 30th, producing winds in excess of 55 MPH and very heavy downpours. Minor flooding was reported in a few locations, and high winds knocked numerous trees and power lines downOver 60 trees and many power lines were downed in the city of Baltimore. 14,000 city customers lost power. 60 trees downed	-	-	15K
May 13, 2000	Baltimore City (End: Countywide)	Temperatures in the mid-80s to lower 90s in combination with humid conditions resulted in several rounds of thunderstorms across Maryland west of the Chesapeake Bay from midday through late evening on the 13th. Several storms produced winds in excess of 55 MPH, large hail, frequent lightning, and very heavy downpours. Two tornadoes were also reported. In Baltimore County, quarter sized hail fell in the city of Baltimore and pea sized hail fell in Reisterstown. Trees were downed onto a home and onto roads in Perry Hall. A tree fell through the roof of a building on Old Harford Road. Fences were blown down in Middle River. Quarter sized hail fell in Cockeysville. An F1 tornado crossed 5 miles of southeast Baltimore County between 8:00 PM and 8:10 PM EDT. The tornado was 75 yards wide and began just off Kenwood Avenue near the Interstate 95 and 695 interchanges east of the city of Baltimore. It moved east uprooting and snapping trees and branches and causing damage to the trim and exterior of over a dozen homes. A large boat and trailer was rotated around. The tornado crossed Interstate 695 and damaged the roof of four townhouses off Fontana Lane. It crossed Rossville Boulevard and Philadelphia Road and damaged several buildings in an industrial park along Yellow Brick Road. The tornado finally dissipated near Pulaski Highway. Nearly 55,000 customers in the area lost power. Fences were blown down in Middle River and a tree fell through a roof on Old Harford Road.	-	-	15K

March 13, 2001	Baltimore City (End: Baltimore)	A line of showers and a few thunderstorms moved across North Central and South-Central Maryland between 9 and 11 PM on the 13th. These storms produced winds in excess of 55 MPH and pea sized hail. In Baltimore County, winds gusted to 58 MPH in Parkton and 40 MPH in Owings Mills. Trees and power lines were downed across the city of Baltimore. Across Harford County, a few branches were downed. Across Howard County, thirteen trees were downed. Winds gusted to 55 MPH in Laurel and 50 MPH in Ellicott City. Winds gusted to 43 MPH at Baltimore/Washington International Airport and 50 MPH at Rivera Beach. Trees and power lines were downed.	-	-	5K
June 20, 2001	Baltimore City (End: Baltimore)	Scattered thunderstorms that produced damaging winds, heavy rainfall, hail, and frequent lightning moved through the area between 8 and 11 PM EDT on the 20th. In Baltimore County, high winds downed power lines and 100 trees across the city of Baltimore. Over 15,000 city customers lost power during the storm. Power lines and 100 trees were downed.	-	-	10K
July 1, 2001	Baltimore City (End: Baltimore)	Thunderstorms with damaging winds and frequent lightning moved through central Maryland between 3:30 and 7:30 PM EDT on the 1st. Numerous trees were downed across the northern part of Baltimore. Lightning struck an apartment building in Hillendale and started a roof fire which made 12 units uninhabitable. Numerous trees were downed in the north portion of the city.	-	-	8K
July 5, 2001	Baltimore City (End: Baltimore)	Thunderstorms with damaging winds, large hail, and heavy rainfall moved through central Maryland between 3:45 and 7:30 PM EDT on the 5th. In the city of Baltimore, around 200 trees were also downed, including a large tree that was felled onto a garage and power poles. An extensive area of trees had fallen in the Pimlico Race Track area. Funnel clouds were sighted in the Woodlawn area. A wind gust of 43 MPH was recorded downtown. Trees were downed across the city.	-	-	15K
July 10, 2001	Baltimore City (End: West Baltimore)	Thunderstorms with high wind, large hail, and dangerous lightning moved across Maryland between 4 PM EDT on the 10th through 2 AM EDT on the 11th. In Baltimore County, a wind gust of 48 MPH was recorded at the University of Maryland campus in Baltimore. Four trees were downed across the western part of Baltimore. Large trees were downed in Reisterstown and Randallstown and tree limbs were downed in Owings Mills. A total of 13,000 customers across the county lost power because of the storms. Four trees were downed.	-	-	2K
August 31, 2001	Baltimore City (End: Baltimore)	A thunderstorm with winds in excess of 55 MPH moved across Central Maryland between 9:30 and 11:00 PM EDT on the 31st. In Baltimore County, thirteen trees were downed in the city of Baltimore. Thirteen trees were downed.	-	-	5K
May 12, 2002	Baltimore City (End: Baltimore)	Scattered thunderstorms moved through Northern Virginia during the evening of the 12th. The storms contained damaging winds and hail In Baltimore County, 20,000 customers lost power after trees downed power lines. In Arbutus, a large tree fell onto a home and seriously damaged the structure. Other trees were downed onto roads and cars. Twenty trees were downed across the southern part of Baltimore. Heavy downpours flooded roads after drains became clogged with debris. Small trees and large limbs were downed by 51 MPH in Dundalk. A 53 MPH wind gust was recorded in Catonsville.	-	-	10K
May 13, 2002	Baltimore City (End: Baltimore)	Scattered showers and thunderstorms moved through the region during the afternoon and early evening hours of the 13th. These storms produced damaging winds, large hail, and heavy downpours. The storms came to an end during the late evening hours after a strong cold front pushed through. The winds behind the front gusted to 50 MPH and some locations reported downed trees from these winds. In Baltimore County, nickel to quarter sized hail was reported in Baltimore. The hail came down so long that it accumulated to a depth of 3 inches. In White Marsh, golf ball sized hail fell. Thunderstorm winds downed trees and power lines in Catonsville, Essex, and Baltimore. Widespread power outages were reported in Baltimore Another large branch was downed onto a mobile home in Severn. Officials recorded 30 reports of downed power lines scattered from Annapolis north to the Baltimore County border. Trees were downed, especially on the northwest side of the city.	-	-	5K
May 14, 2002	Baltimore City (End: Baltimore)	Showers that produced damaging winds moved south through Maryland east of the Chesapeake Bay between 3:00 and 7:30 PM EDT. In Baltimore County, trees and power lines were downed in Cockeysville and Baltimore. On Berkshire Road in Dundalk, the roof of a row house under construction was blown off. A wind gust of 50 MPH was recorded in Catonsville and a gust to 48 MPH was recorded in Perry Hall. Trees were downed.	-	-	10K
May 14, 2002	Baltimore City (End: Baltimore)	Showers that produced damaging winds moved south through Maryland east of the Chesapeake Bay between 3:00 and 7:30 PM EDT. In Allegany County, winds between 50 and 65 MPH were reported by a spotter in Frostburg. Across the county, numerous trees and power lines were downed. In Baltimore County, trees and power lines were downed in Cockeysville and Baltimore. On Berkshire Road in Dundalk, the roof of a row house under construction was blown off. A wind gust of 50 MPH was recorded in Catonsville and a gust to 48 MPH was recorded in Perry Hall. Trees were downed.	-	-	2K

July 9, 2002	Baltimore City (End: Baltimore	Thunderstorms with heavy downpours and damaging winds moved through Central Maryland between 6 PM and 9:30 PM EDT on the 9th. In Baltimore County, hundreds of trees and some power lines were downed between Reisterstown and Dundalk. Officials in Baltimore City received 50 calls regarding downed trees. A wind gust of 48 MPH was recorded on the University of Maryland's Baltimore Campus. A wind gust of 62 MPH forced a 20-minute closure of the Key Bridge (Interstate 695) as the storms moved through. In the Baltimore metro area, around 70,000 customers lost power as a direct result of the storm. Fifty calls for downed trees were received by county officials.	-	-	20K
August 3, 2002	Baltimore City (End: Baltimore)	Thunderstorms with high winds moved through Baltimore County between Midnight and 2 AM EDT on the 3rd. Just northeast of West Liberty, trees and power lines were downed onto Old York and West Liberty Roads. In Baltimore, numerous trees were snapped or uprooted in Patterson Park and the surrounding neighborhood. Some branches downed electrical wires and at least one tree fell onto a car. A 70-foot flag pole was also downed. Several homes around the park sustained shingle and gutter damage. Numerous lightning strikes were also reported with this storm. Several trees were downed in Patterson Park. Power lines and cars were damaged in the surrounding community.	-	-	100K
June 13, 2003	Baltimore City (End: Baltimore)	Thunderstorms with very heavy downpours and gusty winds moved through North Central Maryland for the third straight day on the 13th. In Baltimore County, several trees were downed in Baltimore, Towson, and Parkville. Severe flash flooding was reported in the northeast part of Baltimore. Two streets became rushing rapids, washing several cars hundreds of yards away. Several motorists had to be rescued from their cars or had to swim to safety. The hardest hit areas included Hillen Road, 35th Street, and Aisquith Street near 25th Street. The wall of water reached a height of 10 feet near the intersection of Hillen Road and 35th Street. A pile of vehicles found in this location after the water receded testified to the power of the flood. Numerous other homes were damaged by flood waters in this part of town as well. At the intersection of Aisquith Street and 25th Street, the wall of water reached 6 feet in height. Six cars were stuck in water beneath a railroad overpass. Minor street flooding was reported at the intersection of Northern Parkway and Walther Boulevard. Street flooding was also reported in Parkville and Towson. Several trees were downed.	-	-	1K
July 6, 2003	Baltimore City (End: Baltimore)	Thunderstorms with heavy downpours and wind gusts over 60 MPH moved through Central Maryland during the evening of the 6th. In Baltimore County, widespread trees and power lines were downed in Baltimore. The hardest hit area was in the north side of town. Trees were also downed in Cockeysville and Hunt Valley. A wind gust of 43 MPH was recorded in Parkton. Numerous trees and power lines were downed.	-	-	5K
August 22, 2003	Baltimore City (End: Baltimore)	Thunderstorms with high winds, frequent lightning, and large hail moved through Central Maryland during the evening of the 22nd. In Baltimore County, golfball sized hail was reported in Towson. Trees were downed in Cockeysville, Dundalk, Hunt Valley, and Baltimore. Trees were downed.	-	-	2K
August 26, 2003	Baltimore City (End: Baltimore	A line of thunderstorms with winds up to 78 MPH, hail, and frequent lightning moved from northwest to southeast across Maryland during the afternoon and evening of the 26th. Widespread damage was reported from downed trees and power lines in addition to lightning strikes. Over 150,000 customers lost power as a direct result of the storms. In Baltimore County, numerous downed trees and power lines caused power outages, including in the community of Garrison. Twenty trees were downed in the city of Baltimore. In Howard County, numerous downed trees and power lines were reported. Twenty trees were downed.	-	-	8K
November 5, 2003	Baltimore City (End: Baltimore)	A line of strong to severe thunderstorms developed ahead of an approaching cold front on the 5th and caused widespread wind damage and some flash flooding from Northern Virginia to Eastern Maryland. Flash flooding was reported on Beech Drive in Bethesda. Over 2 inches of rain fell in some locations. Large tree downed.	-	-	$250
May 2, 2004	Baltimore City (End: Baltimore)	Trees down.	-	-	5K
May 17, 2004	Baltimore City (End: Baltimore)	Scattered afternoon thunderstorms produced damage across portions of Northeast Maryland. Reports included downed trees, downed power lines, and penny to nickel size hail. Trees down around the city.	-	-	3K
May 25, 2004	Baltimore City (End: Baltimore)	Thunderstorms spawned tornadoes in Washington and Frederick Counties. Other strong thunderstorms also produced wind and hail damage across North Central Maryland and the Metropolitan areas of Baltimore and Washington DC. Downed trees and power lines caused power outages for over 100,000 customers. Penny to golfball size hail damaged cars and gardens. Lightning strikes started a number of house fires according to Fire and Rescue Personnel. Maryland State Police responded to several accidents blamed on the pelting hail and ponding of water on roadways. Trees down.	-	-	2K

July 7, 2004	Baltimore City (End: Baltimore)	Scattered showers and thunderstorms developed over the region on the 7th as a warm front lifted north into southern Pennsylvania. The thunderstorms across Northeast Maryland produced strong winds that downed trees and power lines, penny size hail, and flooding. Two to four inches of rain fell in Northeast Maryland with local amounts up to six inches. Dozens of water rescues were performed throughout the county, several motorists were trapped/stranded in stalled cars. A cyclist was rescued from a fence after he emerged his bike in the fast moving, deep waters. In the City of Baltimore, stores and businesses along the Jones Falls closed early to allow clients, shoppers and employees to get out before the waters started to rise. A portion of the historic Meadow Mill building in the Woodberry neighborhood was flooded, and nearly 30 cars in the parking lot were almost submerged. The Mount Washington neighborhood also witnessed some impressive flooding. The Meadow Hill Athletic Club reported a loss of 500,000 dollars in exercise equipment. A newly opened men clothing store reported damages around 400,000 dollars. In Southern Baltimore County, a mechanic in Catonsville barely escaped injury when the roof of his Auto repair shop collapsed due to the weight of the water. Trees down.	-	-	5K
August 4, 2004	Baltimore City (End: Baltimore)	Strong thunderstorms moved through the region on August 4th. The storms toppled trees and downed power lines. At the height of the storm Baltimore Gas and Electric Company reported about 14,000 customers without power in portions of Prince Georges, Baltimore and Anne Arundel Counties. The storms even caused a 57- minute delay to the Baltimore Orioles and Seattle Mariners baseball game at Camden Yards Stadium, in downtown Baltimore. Trees downed.	-	-	2K
June 6, 2005	Baltimore City (End: Baltimore)	An upper level disturbance, in conjunction with a very warm, moist, and unstable airmass, caused a large outbreak of severe weather. Associated with this event was a large squall line of strong to severe thunderstorms. Damage was reported in portions of the Washington and Baltimore Metropolitan areas. Strong winds also occurred on the maritime waters of the Potomac River and Chesapeake Bay. Trees down on Loch Raven Road.	-	-	N/A
June 6, 2005	Baltimore City (End: Roland Park)	An upper level disturbance, in conjunction with a very warm, moist, and unstable airmass, caused a large outbreak of severe weather. Associated with this event was a large squall line of strong to severe thunderstorms. Damage was reported in portions of the Washington and Baltimore Metropolitan areas. Strong winds also occurred on the maritime waters of the Potomac River and Chesapeake Bay. Powerlines downed near Johns Hopkins University.	-	-	N/A
June 28, 2005	Baltimore City (End: Baltimore)	With a tropical airmass in place, strong to severe thunderstorms occurred. These thunderstorms produced damaging wind gusts and heavy rainfall across a large portion of the Mid-Appalachian and Mid-Atlantic regions. Trees were reported down in the northwestern portion of Baltimore City.	-	-	N/A
July 27, 2005	Baltimore City (Baltimore)	A cold front moved through the region during the late afternoon and evening. This cold front, combined with moist and unstable conditions, triggered widespread showers and storms across the region. The strongest of these storms downed trees and powerlines, as well as producing very large hail. Intense lightning caused fires and several personal injuries. Torrential rainfall flooded a few areas and was also responsible for sweeping away a young boy. Damage estimates by print media were in the hundreds of thousands, possibly more. Trees were downed on Falls Road at Bellmore in the northern part of the city.	-	-	N/A
June 1, 2006	Baltimore City (End: Baltimore)	A trough of low pressure was draped across the Mid Atlantic on June 1. This feature combined with high moisture content and instability in the atmosphere to promote scattered strong to severe thunderstorms. The thunderstorms first developed across the higher terrain of the Appalachian Mountains, then moved east across the Washington/Baltimore corridor. Trees downed on the east side of the city.	-	-	20K
June 21, 2007	Baltimore City (Baltimore)	A secondary cold front crossed the region late June 21st. A warm and humid airmass ahead of the front combined with the approaching front allowed thunderstorms to develop across the Ohio Valley and move southeast towards northern and central Maryland. Some of these storms became severe, producing damaging winds. The Baltimore City Fire Department reported trees down.	-	-	-
July 4, 2007	Baltimore City (Baltimore)	Showers and thunderstorms developed during the afternoon and evening of July 4th and moved east across northern Virginia and western Maryland. Some became severe, producing large hail and damaging winds. The Baltimore City Department of Public Works reported trees down on Frederick Ave.	-	-	1K
July 10, 2007	Baltimore City (Hamilton)	High pressure across the western Atlantic brought hot and humid conditions to the Mid Atlantic on July 10th. Showers and thunderstorms developed along and east of the Interstate 95 corridor, including the Washington DC and Baltimore metro areas, in the very hot and unstable air mass ahead of a cold front approaching the region from the Ohio Valley. Some of these storms became severe, producing damaging winds and large hail across the eastern Baltimore metro and south across lower southern Maryland. A Trained Spotter reported trees down in northern Baltimore City.	-	-	1K

August 25, 2007	Baltimore City (Baltimore)	A hot and humid air mass developed over the Mid Atlantic ahead of a strong cold front on August 25th. Temperatures climbed into the mid-90s by noon. These temperatures combined with high humidity created heat index values around 105. Showers and thunderstorms developed during the late afternoon as the cold front approached the region. Some of these storms became severe, producing large hail and damaging winds that downed trees and power lines. Baltimore Emergency Management reported trees down in the City of Baltimore.	-	-	1K
March 5, 2008	Baltimore City (Baltimore)	An area of low pressure moving over West Virginia pushed a strong cold front through the region during the early morning hours of March 5th. This front triggered several strong to severe thunderstorms with gusty winds as well as heavy rain. Several lines of thunderstorms crossed the region from the evening of March 4th through the early morning of March 5th. Heavy rain lead to several road closures due to flooding and several flooded basements. Wind gusts in excess of 50 mph were measured at several locations, with a maximum wind gust of 73 mph measured in White Plains, MD. There were numerous reports of trees and power lines down across northern and central Maryland. Baltimore City Fire reported 2 trees down within the city.	-	-	2K
June 4, 2008	Baltimore City (Mt Royal)	A stalled front resided across the Mid Atlantic during the afternoon and evening of June 4th, allowing moisture and instability to pool along the boundary. This combined with several strong upper level disturbances resulted in numerous thunderstorms during the afternoon and evening. Many of these thunderstorms became severe. While penny sized was reported in spots, damaging winds from the thunderstorms was widespread. A local newspaper reported a tree down on St. Paul Street.	-	-	1K
June 4, 2008	Baltimore City (Baltimore)	A stalled front resided across the Mid Atlantic during the afternoon and evening of June 4th, allowing moisture and instability to pool along the boundary. This combined with several strong upper level disturbances resulted in numerous thunderstorms during the afternoon and evening. Many of these thunderstorms became severe. While penny sized was reported in spots, damaging winds from the thunderstorms was widespread. A trained spotter estimated a wind gust of 65 MPH in northern Baltimore City.	-	-	-
July 23, 2008	Baltimore City (Gardenville)	A slow moving cold front moved towards the Mid Atlantic Coast on July 23rd. This front provided the focus for scattered to numerous showers and thunderstorms to develop during the afternoon and evening hours. With high amounts of moisture in place, some storms produced heavy rainfall. Storms also moved repeatedly over the same areas. This allowed flash flooding to occur across the Baltimore metro area, resulting in several road closures and water rescues. Severe thunderstorms also occurred, with gusty winds downing trees and power lines. There were also a few reports of large hail. A local newspaper reported downed trees along Hillen Road near Argonne Drive.	-	-	4K
July 31, 2009	Baltimore City (Began: Leahigh – End: Raspeburg)	A cold front and its associated trough of low pressure triggered showers and thunderstorms across Maryland. A southwest flow ahead of the front ushered in plenty of moisture from the Gulf of Mexico, resulting in an unstable atmosphere. The moderate amounts of instability combined with the forcing from the front and strong winds aloft for some thunderstorms to become severe. Numerous trees were down across the northern portion of Baltimore.	-	-	N/A
July 12, 2010	Baltimore City (Walbrook)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was knocked down onto the highway near Gwynnoak.	-	-	1K
July 12, 2010	Baltimore City (Walbrook)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was down over the 2400 Block of Chelsea Terrace.	-	-	1K
July 12, 2010	Baltimore City (Walbrook)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree fell onto Alto Road.	-	-	1K

July 12, 2010	Baltimore City (Catonsville)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was down on the 3800 Block of Crescent Street.	-	-	1K
July 12, 2010	Baltimore City (Mt Royal)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was over the roadway on West 30th Street.	-	-	1K
July 12, 2010	Baltimore City (Roland Park)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was down on the 2100 Block of Carterdale Road.	-	-	1K
July 12, 2010	Baltimore City (Hampden)	A pressure trough remained over Maryland on the 12th while an upper-level disturbance passed through in a zonal flow aloft. The forcing from these two systems were responsible for the development of showers and thunderstorms. Due to moderate amounts of instability, some thunderstorms became severe with damaging winds. A tree was down on the 1200 Block of West Cold Spring Lane.	-	-	1K
July 29, 2010	Baltimore City (Baltimore)	A cold front passed through Maryland on the 29th triggering showers and thunderstorms. Warm and humid conditions ahead of the front led to moderate amounts of instability. Some thunderstorms became severe due to the instability along with strong winds aloft. Five to ten trees were down in Baltimore.	-	-	7K
July 29, 2010	Baltimore City (Arlington)	A cold front passed through Maryland on the 29th triggering showers and thunderstorms. Warm and humid conditions ahead of the front led to moderate amounts of instability. Some thunderstorms became severe due to the instability along with strong winds aloft. Two trees were down in Gwynn Oak.	-	-	1.5K
November 17, 2010	Baltimore City (Began: Gardenville – End: Raspeburg)	A strong cold front passed through the region late during the early morning morning hours of the 17th. A strong southerly flow ahead of the cold front transported plenty of moisture into the area allowing for limited instability to develop. Strong forcing associated with the frontal passage combined with limited instability to trigger showers and thunderstorms. Thunderstorms were able to mix down very strong winds aloft causing damaging winds across some locations. Numerous trees were down near Morgan State University. The path of tree damage continued to the northeast into southern Baltimore County.	-	-	0K
December 1, 2010	Baltimore City (Loudon Park)	A strong cold front passed through the region early on the first of December. Southerly winds ahead of the front were able to pump in plenty of warm and moist air for this time of year. Strong forcing from the front combined with limited instability to trigger showers and thunderstorms. Strong winds aloft were able to mix down to the surface in some of the stronger thunderstorms. Trees were down near Dorchester Road and Wilkens Avenue.	-	-	3K
June 9, 2011	Baltimore City (Govans)	Plenty of moisture continued to rotate around high pressure over the southeastern Conus. Hot conditions combined with the moisture to cause moderate amounts of instability to develop. The instability combined with forcing from a surface trough to trigger showers and thunderstorms during the afternoon and evening hours. The moderate instability caused some thunderstorms to produce damaging wind gusts and large hail. Large tree limbs were down along Walker Avenue.	-	-	1K
June 9, 2011	Baltimore City (Hampden)	Plenty of moisture continued to rotate around high pressure over the southeastern Conus. Hot conditions combined with the moisture to cause moderate amounts of instability to develop. The instability combined with forcing from a surface trough to trigger showers and thunderstorms during the afternoon and evening hours. The moderate instability caused some thunderstorms to produce damaging wind gusts and large hail.	-	-	2K
June 9, 2011	Baltimore City (Hampden)	Plenty of moisture continued to rotate around high pressure over the southeastern Conus. Hot conditions combined with the moisture to cause moderate amounts of instability to develop. The instability combined with forcing from a surface trough to trigger showers and thunderstorms during the afternoon and evening hours. The moderate instability caused some thunderstorms to produce damaging wind gusts and large hail. Three limbs and a tree were blown over near Park Heights.	-	-	2K

June 12, 2011	Baltimore City (Woodberry)	A cold front combined with moderate instability to trigger showers and thunderstorms on the twelfth. Stronger winds aloft due to an upper-level low over New England caused thunderstorms to become well organized. Thunderstorms were able to produce damaging wind gusts along with large hail. Multiple trees were down in northern parts of Baltimore.	-	-	5K
June 12, 2011	Baltimore City (Canton)	A cold front combined with moderate instability to trigger showers and thunderstorms on the twelfth. Stronger winds aloft due to an upper-level low over New England caused thunderstorms to become well organized. Thunderstorms were able to produce damaging wind gusts along with large hail. Trees were down in the eastern parts of Baltimore.	-	-	5K
July 25, 2011	Baltimore City (Woodberry)	A cold front stalled over the area on the 25th. Showers and thunderstorms developed along and ahead of the front. Moderate instability due to a warm and humid air mass caused some thunderstorms to produce damaging wind gusts. A tree was knocked down on Green Spring road.	-	-	1K
July 25, 2011	Baltimore City (Roland Park)	A cold front stalled over the area on the 25th. Showers and thunderstorms developed along and ahead of the front. Moderate instability due to a warm and humid air mass caused some thunderstorms to produce damaging wind gusts. A tree was knocked down at Bellemore Road.	-	-	1K
June 1, 2012	Baltimore City (E Walbrook)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down along Burleith Ave.	-	-	1K
June 1, 2012	Baltimore City (S Walbrook)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	-
June 1, 2012	Baltimore City (ENE Walbrook)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were knocked down by strong thunderstorm winds along Druid Park Dr.	-	-	1K
June 1, 2012	Baltimore City (SE Hampden)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	1K
June 1, 2012	Baltimore City (SSE Hampden)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Large tree limbs were blown down along Cloverhill Rd.	-	-	0.50K

June 1, 2012	Baltimore City (SW Govans)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down along Halwyn Ave.	-	-	1K
June 1, 2012	Baltimore City (S Roland Park)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	1K
June 1, 2012	Baltimore City (ENE Hampden)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Large tree limbs were blown down along Putney Way.	-	-	.05K
June 1, 2012	Baltimore City (N Hampden)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Large tree limbs were knocked down from strong thunderstorm winds.	-	-	.50K
June 1, 2012	Baltimore City (NW Hampden)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down along Deepdene Rd.	-	-	1K
June 1, 2012	Baltimore City (SW Govans)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were knocked down along Dartmouth Rd.	-	-	1K
June 1, 2012	Baltimore City (N Frederick Road)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	1K
June 1, 2012	Baltimore City (WNW Baltimore)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	1K

June 1, 2012	Baltimore City (SSE Govans)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down along Chinquapin Parkway.	-	-	1K
June 1, 2012	Baltimore City (NNW Mt Royal)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Large tree limbs were knocked down along Clipper Mill Rd.	-	-	.50K
June 1, 2012	Baltimore City (ESE Raspeburg)	Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes. Trees were blown down by strong thunderstorm winds.	-	-	1K
June 29, 2012	Baltimore City (ENE Port Covengton)	A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust around 50 knots was measured near the Baltimore Harbor.	-	-	N/A
August 5, 2012	Baltimore City (W Gardenville)	A cold front moved eastward through the Mid Atlantic in the evening. Ample amounts of instability and moisture combined to cause severe thunderstorms with damaging winds and hail. There were trees down at Loch Raven Blvd and Pentwood Rd from damaging winds.	-	-	.05K
August 5, 2012	Baltimore City (N Holabird)	A cold front moved eastward through the Mid Atlantic in the evening. Ample amounts of instability and moisture combined to cause severe thunderstorms with damaging winds and hail. Tree branches 5-6 inches in diameter were blown down.	-	-	.05K
June 26, 2013	Baltimore City (N Camden)	A subtropical ridge was present over the Mid-Atlantic and hot and humid conditions persisted. This led to an unstable atmosphere. A shortwave trough moved into the Mid-Atlantic and showers and thunderstorms formed that were capable of strong winds. There was a tree down on West Lombard Street.	-	-	.05K

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-20: Tornado Events (July 19, 1957-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
July 19, 1996	Baltimore City (End: NE Portion)	The parent thunderstorm that dropped tornadoes northwest of the Baltimore metropolitan region put down brief twisters in the north and east portions of the city of Baltimore. People watched as a funnel snaked to the ground for no more than 10 seconds over the north central portion of town. A few minutes later, a second funnel touched down over the eastern portion of town. Some debris was seen being sucked up into the funnel, which also lasted 10 seconds, before it retreated into the wall cloud. Both funnels were captured on film.	-	-	N/A
November 17, 2010	Baltimore City (Raspeburg)	A strong cold front passed through the region late during the early morning hours of the 17th. A strong southerly flow ahead of the cold front transported plenty of moisture into the area allowing for limited instability to develop. Strong forcing associated with the frontal passage combined with limited instability to trigger showers and thunderstorms. Thunderstorms were able to mix down very strong winds aloft causing damaging winds across some locations. Three of the units in the Dutch Village Apartment complex had their roofs blown off. There was also extensive tree damage across the area and several cars were shifted by the force of the wind. Three minor injuries were reported in Baltimore. One of those was a child. The path of the tornado continued into Baltimore County.	0	3	200K

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18

Table 3-26: Tropical Storm Events (September 16, 1999-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
September 16, 1999	Southern Baltimore/Baltimore (C)	Hurricane Floyd made landfall just east of Cape Fear, North Carolina in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland by evening on the 16th. Rainbands on the outer edge of the hurricane began to affect Maryland east of Washington County shortly after 8:00 AM EDT on the 15th and continued to cross the area through afternoon on the 16th. The eye of Hurricane Floyd passed east of the Chesapeake Bay between 9:00 AM and midnight on the 16th. Gusty winds of 30 to 50 MPH blew across the area between 11:00 AM and midnight on the 16th, with localized wind gusts over 50 MPH near the Chesapeake Bay. Hundreds of trees and power lines were downed and over 500,000 customers lost electricity. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. Tropical downpours also led to flooding. The rainfall reports included 5.19 inches at Inner Harbor Baltimore and 5.16 inches at Lake Roland in Baltimore County. Across Baltimore County, 57,000 customers lost power. Winds gusted to 69 MPH at Martin State Airport at 3:05 PM EDT, 56 MPH in Bowie, and 52 MPH in Towson and Parkton. Hundreds of trees fell in Gunpowder State Park. Countywide, fallen trees damaged homes, sheds, fences, and cars, and closed 125 roads. Officials reported 6 rapid water rescues and 350 flooded basements. A 10-year-old boy was swept into a storm drain and carried 300 feet in a buried pipe before fire fighters opened a manhole cover and rescued him uninjured.	-	-	400K
September 18 – September 19, 2003	Southern Baltimore	On September 18, 2003, Hurricane Isabel made landfall on the North Carolina Coast. Its huge wind field was already piling water up into the southern Chesapeake Bay. By the time Isabel moved into central Virginia, it had weakened and was downgraded to a tropical storm. Isabel's eye tracked well west of the bay, but the storm's 40 to 50 mph sustained winds pushed a bulge of water northward up the bay and its tributaries producing a record storm surge. The Maryland western shore counties of the Chesapeake Bay and along the tidal tributaries of the Potomac, Patuxent, Patapsco and other smaller rivers experience a storm surge reached 5 to 9 feet above normal tides. In many locations, Isabel's surge was higher than the previous record storm known as the Chesapeake-Potomac Hurricane of 1933. For coastal properties below 10 feet MSL exposed to wave action, much damage was wrought. Over 2000 people were evacuated from their homes. Maryland saw 472 homes and buildings destroyed, 3260 with major damage and over 3600 more affected. Extensive damage occurred to Maryland's shoreline which rarely sees storms of this intensity. The Chesapeake Bay Foundation estimates that 43,000 tons of silt and millions of pounds of nitrogen and phosphorus and millions of gallons of raw sewage washed into the bay during Isabel. In Dundalk (Baltimore County), a 27- year-old man was found drown floating in the flood waters. In Baltimore County alone, $3 million in damage is estimated to have occurred from erosion of the shoreline. Residential areas of Millers Island, Edgemere, North Point, Bowley Quarters and Turners Station were hard hit with more than 400 people being rescued from their homes and over 300 buildings destroyed. Marinas were also destroyed orseverely damaged. Water flooded Baltimore's Inner Harbor and Fells Point area causing millions of dollars damage to waterfront property. The Baltimore Museum of Industry alone received $1.5 million in damage. The two hardest areas hit in Harford County were up the Bush River and the waterfront at Havre de Grace. About 55 people were evacuated from Abingdon, Edgewood and Perryman along the Bush River and about a dozen people were evacuated in Havre de Grace. Hurricane Isabel's wind field extended for hundreds of miles from the storm's center. Winds were highest along the Chesapeake Bay and Tidal Potomac where the warm waters and smooth surface helped mix down the strong winds from above and below onto the coastline. Inland, the air at the surface was relatively cool. Temperatures had been in the 60s during the day and the strongest winds came at night. The high winds came with bands of showers that would mix down to the surface causing streaks of damage that sometimes appeared as though a tornado had moved through instead of a strong narrow ribbon of wind. Wind damage to structures was limited with the greatest damage reported in St. Mary's County where on one property winds blew the roof off a structure. and knocked down 70 trees. Unofficial wind gust readings of up to 110 mph have been reported, but not confirmed. Patuxent Naval Air Base recorded wind gusts to 69 mph at midnight and Quantico Marine Base recorded a wind gust of 78 mph near the same time. Andrews Air Force Base also recorded a wind gust of 69 mph around 1 am EDT. Wind damage to trees in the area was extensive and widespread to the region. Soil moisture was high from previous rains making it easier for trees to uproot. Also, the trees were still in full canopy which acted like a sail to catch the wind. Trees feel on electrical and utility wires taking out power and phone. Trees fell on roads, cars, and homes. In Baltimore, 220,000 out of a possible 273 customers lost power. Baltimore County was estimating 3189 tons of debris to be hauled from the storm. 118 trees fell on school grounds. In Baltimore City, 70,000 customers were without power.	-	-	252M
August 27 – August 28, 2011	Southern Baltimore	Hurricane Irene tracked up the Mid-Atlantic Coast during the evening hours of the 27th through the early morning hours of the 28th. Irene passed by just to the east of Ocean City, Maryland during the early morning hours of the 28th. The minimum central pressure was 958 millibars and maximum sustained winds were 80 mph, making Irene a category one hurricane. Irene produced tropical storm conditions across portions Maryland near and east of the Interstate 95 Corridor. Total damage from Irene was over 10 million dollars. Numerous trees were down throughout southern Baltimore County. A tree fell onto a house in the city of Baltimore. Roads were blocked due to downed trees in Bowleys Quarters and Catonsville. Hundreds of thousands were without power.	-	-	200K

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-27: Winter Storm Events (January 2, 1999-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
January 2 – January 3, 1999	Southern Baltimore	An area of low pressure moved from the Ohio Valley to the Eastern Great Lakes on the 2nd, spreading precipitation across the Mid-Atlantic region from midday on the 2nd to early morning on the 3rd. High pressure centered over New England brought a shallow layer of sub-freezing air to locations east of the Appalachian Mountains. A trace of snow and sleet fell in Northern Baltimore, Howard, and Montgomery County, in addition to an ice accumulation up to 1/4 inch. The aftermath of this storm included icy roads and dense fog.	-	-	N/A
March 14 – March 15, 1999	Southern Baltimore	An area of low pressure over the Southeast U.S. produced snow across Western and Central Maryland on the 14th. Snowfall amounts were heaviest near the Pennsylvania border. Rain mixed with snow southeast of a line from Baltimore to Washington, D.C. The low-pressure system redeveloped off the coast of North Carolina and moved up the Eastern Seaboard on the morning of the 15th, resulting in another period of snowfall. Total accumulations included 10 to 12 inches in Allegany County, 6 to 15 inches in Washington County, 6 to 12 inches in Frederick County, 5 to 10 inches in Carroll County, 4 inches in Howard County, and 2 to 3 inches in Southern Baltimore County, Northern Anne Arundel County, Prince Georges, and Northern Charles County. The snow was very wet and heavy, and accumulations resulted in over 30,000 power outages across North Central Maryland; 15,000 in Baltimore County, 6,300 in Harford County, and 1,600 in Anne Arundel County.	-	-	N/A
January 20, 2000	Southern Baltimore	Low pressure moved from west to east across the Mid-Atlantic region on the 20th, dropping 3 to 8 inches of snow between midnight and mid-afternoon. Gusty winds of 35 to 45 MPH developed during the afternoon causing the snow to drift across roadways and reduce visibilities in open areas. The first snowstorm of the season led to flight delays at Baltimore Washington International Airport (BWI) and resulted in several minor traffic accidents. Snowfall totals included 4.7 inches in Westminster, 7.0 inches in Bel Air, 5.0 inches in Baltimore, 7.5 inches in Annapolis, 5.7 inches at BWI, 4.8 inches at Andrews Air Force Base, 3.0 inches at Patuxent River Naval Air Station, 4.0 inches in La Plata, 6.2 inches in Damascus, 8.0 inches in Emmitsburg, 4.1 inches in Hagerstown, 6.5 inches in Cumberland, and 7.7 inches in Frostburg.	-	-	N/A
January 25, 2000	Southern Baltimore/ Baltimore (C)	Low pressure off Cape Hatteras rapidly intensified late on the 24th and developed into a nor'easter which tracked northward along the Eastern Seaboard on the 25th. Very heavy snow and near-blizzard conditions were seen throughout the day east of the Blue Ridge Mountains, resulting in extremely hazardous travel conditions. Wind gusts of up to 45 MPH were recorded and several roads were drifted shut by blowing snow. Snow drifts of 4 to 5 feet were common. Numerous traffic accidents were reported, and most airports and transit systems were shut down. A 74-year-old man found sitting next to a building in Annapolis died from hypothermia. Another man in Prince George's County died of a heart attack after shoveling snow. A pedestrian was killed in Baltimore County after slipping under a tow truck. The governor of Maryland declared a state of emergency as the storm battered the area. Snowfall totals ranged from about 1 inch in Central Washington County to 20 inches near the Chesapeake Bay. A new daily snowfall total of 10.3 inches was set at Baltimore/Washington International Airport (BWI) on the 25th. Storm total snowfall included 14.9 inches at BWI, 17.0 inches in Annapolis, 16.5 inches in Hollywood, 14.0 inches in Westminster, 13.5 inches in Oxon Hill, 11.5 inches in Gaithersburg, 12.0 inches in Waldorf, 17.0 inches in Baltimore, 11.5 inches in Columbia, 14.0 inches in Bel Air, 9.0 inches in Frederick, 13.5 inches in Hagerstown, and less than 1 inch in Frostburg and Cumberland.	-	-	N/A
January 30, 2000	Southern Baltimore	Cold air was in place east of the Blue Ridge Mountains on the 29th and 30th, keeping surface temperatures below freezing. Low pressure moved from the Lower Mississippi Valley northeastward to the Mid-Atlantic region early on the 30th, creating the perfect conditions for freezing rain across South Central Maryland, a mix of sleet and snow in North Central Maryland, and moderate snowfall from Carroll County westward. Ice accumulations between 1/4 and 1-inch coated roads, trees, and power lines in St. Mary's, Charles, and Calvert	-	-	N/A

		Counties. Electrical outages were reported as trees and branches weighed down by ice fell onto power lines. Disruptions affected 1700 customers in Prince George's and Charles Counties, 4000 customers in Anne Arundel County, 600 customers in Baltimore, 2200 customers in Calvert County, and 4100 customers in St. Mary's County. Snow and sleet accumulations in this area ranged from 1 to 3 inches. Elsewhere 3 to 10 inches of snow and sleet fell. Storm total snow/sleet accumulations included 4.0 inches in Baltimore and Bel Air, 2 to 3 inches at Baltimore/Washington International Airport (BWI), 1 to 2 inches in Annapolis, 7.0 inches in Gaithersburg, 1.0 inch in Oxon Hill, 9.3 inches in Westminster, 10.0 inches in Frederick, 7.9 inches in Hagerstown, 5.0 inches in Cumberland, and 5.1 inches in Frostburg. Several traffic accidents were reported across the area, including one wreck which claimed the life of a 45-year-old woman on the Baltimore- Washington Parkway. One hospital in Anne Arundel County treated 25 people for car accident related injuries, 12 patients for slip and fall injuries, and 20 patients reporting heart-related problems, most likely due to shoveling snow. Passengers at both BWI and on commuter trains reported travel delays.			
January 20 – January 21, 2001	Southern Baltimore/ Baltimore (C)	A complex low-pressure system moved across the Mid-Atlantic region on the 20th and 21st and brought a mixed bag of precipitation. Across southern Maryland, the precipitation fell mainly as rain but mixed with freezing rain, sleet, and light now early on the 21st. Little if any accumulation was reported. Elsewhere across Maryland west of the Chesapeake Bay, rain fell through the afternoon of the 20th but changed over to sleet and snow from west to east during the evening hours.	-	-	N/A
February 22, 2001	Southern Baltimore/ Baltimore (C)	Low pressure moved from the mid-Mississippi Valley into the southern portion of the Mid-Atlantic region on the 22nd. This system produced mainly light to moderate snowfall across the region between 9 AM and 10 PM. However, some areas received a brief period of heavy snow at the beginning of the event. Snowfall amounts ranged from 3 to 7 inches. The highest amounts were recorded across Harford and Northern Baltimore Counties. The largest impact on the region from this storm system was on travel. Numerous accidents were reported as roads became slippery and some areas experienced brief whiteout conditions. On the southbound side of Interstate 95 north of Baltimore, a 40-vehicle pileup was reported at 12:20 PM. In Harford County, Interstate 95 was closed around 2:30 PM north of the White Marsh exit due to several accidents along the highway. Portions of Route 1 were also closed by accidents. Six county school buses were also involved in minor accidents.		-	N/A
January 19, 2002	Southern Baltimore	Low pressure that moved across Northern Carolina on the 19th brought mixed precipitation to the region between 6 AM and 11 PM. In most locations, the precipitation started off in the form of snow, then changed to a mix of sleet and rain around midday. In Baltimore County, 3 to 5 inches fell. In Carroll, Howard, and Montgomery Counties, 3 to 4 inches was recorded. Carroll County officials reported four serious traffic accidents related to the weather.	-	-	N/A
December 5, 2002	Southern Baltimore/ Baltimore (C)	Low pressure moved from North Carolina to the Delmarva Peninsula between midnight and 3 pm on the 5th. This storm produced accumulating snowfall across the entire region as it moved by. Across Southern Maryland, freezing rain and sleet was mixed in with the snow. The snow and sleet accumulations ranged from 3 to 5 inches in this area. In Central Maryland, including the Washington D.C. and Baltimore suburbs, snowfall totals ranged from 6 to 8 inches. Across North Central and Western Maryland, snowfall accumulations of 7 to 9 inches were recorded. One person died in a car accident in Cumberland that was attributed to the slippery conditions resulting from the snow.	-	-	N/A
February 6 – February 7, 2003	Southern Baltimore/ Baltimore (C)	Low pressure tracked from the Gulf Coast to the Carolinas on the 6th then off the Atlantic coast on the 7th. This storm dropped light to moderate snow between the evening of the 6th and Noon on the 7th. Accumulations ranged from 2 to 4 inches across Western Maryland and 5 to 8 inches in Central and Southern Maryland.	-	-	N/A
February 14 – February 18, 2003	Southern Baltimore	A complex storm system produced copious amounts of wintery precipitation across Maryland west of the Chesapeake Bay between the evening of the 14th and midday on the 18th. The first batch of precipitation fell between the evening of the 14th and the evening of the 15th in the form of light to moderate snow or rain. The second batch of precipitation fell between midnight on the 16th through midday on the 17th in the form of heavy snow or sleet. The third batch of precipitation on the back side of the storm fell between the evening of the 17th and midday on the 18th in the form of scattered snow showers. After the precipitation came to an end, record breaking snow and sleet accumulations were reported. Across western and north central Maryland, and the Baltimore metropolitan area, accumulations of mainly snow ranged from 20 to 32 inches. The highest amounts occurred across the north and west suburbs of Baltimore where a period of thunder snow produced snowfall rates up to 4 inches per hour on the 16th. Across the east and southeast Maryland suburbs of Washington D.C., accumulations of snow and sleet ranged from 12 to 20 inches. Across extreme Southern Maryland, accumulations of mainly sleet ranged from 7 to 12 inches. As a general rule, 1 inch of sleet accumulation is equivalent to 3 inches of snow. Therefore, areas that received mainly sleet during this massive winter storm received accumulations around two thirds less than areas that had all snow, even though they were impacted by the same storm system. As an example, Hollywood (St. Mary's County) recorded 7.5 inches of accumulation (almost all sleet) whereas downtown Baltimore recorded 24 inches of	-	1	1.5M

		accumulation (all snow). Nicknamed the President's Weekend Snowstorm of 2003, this storm will go down in history as the heaviest snowstorm in the Baltimore region since records began in 1870. A total of 28.2 inches of snow was recorded at Baltimore-Washington International Airport. This massive storm took a heavy toll on residents, structures, transportation systems, emergency responders, businesses, livestock, and travelers. A state of emergency was declared by the governor of Maryland and people across the state were ordered to stay off the roads during the height of the storm between the morning of the 16th and the morning of the 17th. Roads were covered by deep snow and sleet and were nearly impassible. Almost every airport in the region was shut down on the 16th, stranding hundreds of travelers. Emergency personnel and those needing emergency transport had to be taken to their destinations in 4-wheel drives or military vehicles during the storm. Main highways were partially cleared by the 18th but it took up to 5 days to reach some secondary and residential roads. Area schools were closed up to a week after the storm ended. Heavy accumulations weighed down on buildings in the region and several structural collapses occurred. In addition, several injuries and a handful of deaths were attributed to the storm. In Baltimore City, bus and commuter train operations were suspended during the storm. The historic B&O Railroad Museum roof collapsed, damaging priceless exhibits. Twenty-four homes were condemned, and two homes were demolished after suffering structural collapses. A 5-story building downtown had to be evacuated after support beams buckled. Five people (males ages 11, 12, 16, 20, and 55) died in the city from carbon monoxide poisoning in snowbound cars. Another 11-year-old boy was overcome by carbon monoxide but was resuscitated. A 64-year-old man died from a heart attack after shoveling snow. A 65- year-old woman was injured when an awning on her home collapsed.			
December 4 – December 5, 2003	Southern Baltimore	The first in a pair of low pressure systems moved across the region late on the 4th through midday on the 5th. This system produced 5 to 9 inches of snow across North and Central Maryland. As a result, the roads were treacherous in many places. Several automobile accidents were reported. Several non-life- threatening injuries were also reported across Maryland.	-	-	N/A
December 5 – December 6, 2003	Southern Baltimore	A second storm developed quickly on the heels of the first winter storm. This storm affected the region from the evening of the 5th through the morning of the 6th. The second storm produced another 5 to 6 inches of snow across North and Central Maryland.	-	-	N/A
January 25 – January 26, 2004	Southern Baltimore	An area of low pressure developed off the coast of North Carolina and moved north. This storm produced widespread snow, sleet and freezing drizzle over the region. Six to eight inches of snow fell across Maryland from Allegany to Anne Arundel County. The snow mixed with sleet and finally changed over to freezing drizzle before tapering off. Several other accidents with minor injuries were reported to Emergency Operations Centers. Many school districts closed due to the inclement weather.	-	-	N/A
January 22, 2005	Southern Baltimore	A winter storm system moved out of the northern plains brought snow to the Mid-Atlantic region on 22 January. The storm produced several inches of snow over central, northern and western Maryland before coming to an end during the late evening hours of the 22nd. The storm produced a large area of 4-8-inch snowfall totals with some of the highest totals from the storm in the Baltimore metropolitan area and northeast Maryland where some totals reached as high as 9 inches.	-	-	N/A
February 24, 2005	Southern Baltimore/ Baltimore (C)	Low pressure formed over the gulf coast states and moved northeast off the Carolinas. This storm produced heavy snowfall across the region. Snow totals for this event ranged from 4-8 inches.	-	-	N/A
February 28, 2005	Southern Baltimore	A strong coastal low pressure moved from offshore Carolinas to near the mid-Atlantic coast on late Sunday into Monday, February 27-28, 2005. Snow heavy at times developed across central Virginia into West Virginia and Maryland during the late-night Sunday and continued at times Monday and Monday night. During the day Monday a lot of the snow melted on contact in the lower elevation metro areas such as DC and Baltimore. However, after sunset the snow...mixed with sleet at times...began accumulating and caused serious road hazards even in the urban areas. Total snow accumulations ranged from nearly a foot in the high country to 5 inches or less at locations closer to the Chesapeake Bay.	-	-	N/A

February 12 – February 14, 2007	Southern Baltimore	A low-pressure system moved out of the Southern Plains and strengthened off the southeast coast February 12th through 14th, bringing accumulating wintry precipitation to much of Maryland beginning during the afternoon and evening hours of February 12th and continued through the early morning hours of February 14th. The heaviest precipitation occurred February 13th as the low-pressure system intensified off the coast. Snow and sleet accumulations ranged from 1 to 9 inches and ice accumulations ranged from a tenth to three quarters of an inch. This mix of sleet, snow and freezing rain created a very hard and thick layer of ice. Many snow plows were not equipped to handle such heavy precipitation, leading to longer wait times for roadways and sidewalks to be cleared. Across lower southern Maryland, freezing rain was more of a problem. Ice coated trees and power lines, causing over 100,000 power outages. Several roadways were closed due to downed trees. Those open roadways were snarled with traffic and dozens of minor car accidents. Schools were closed for much of the week. Restaurants and florists reported reduced Valentine's Day sales due to the hazardous road conditions. A quarter inch of ice was reported in the City of Baltimore by a Spotter.	-	-	-
January 27 – January 28, 2009	Southern Baltimore	An area of low pressure tracked through the Tennessee Valley into the Ohio Valley on the 27th spreading precipitation across Maryland. Precipitation began as snow, but a changeover to sleet, and eventually freezing rain occurred from south to north during the afternoon and evening of the 27th. Freezing rain finally changed to rain from south to north during the morning and afternoon hours of the 28th. Rain ended during the early evening hours of the 28th. Ice accumulation of one quarter inch was reported in Towson. Snow and sleet accumulation of 2 to 3 inches was also reported across southern Baltimore County.	-	-	N/A
March 1 – March 2, 2009	Southern Baltimore	A potent area of low pressure developed off the Southeast Coast on Sunday, March 1st. This system slowly moved up the Mid-Atlantic coast Sunday night tapping into plenty of moisture from the Gulf of Mexico as well as the Atlantic Ocean. With cold air in place, precipitation fell in the form of snow Sunday night into Monday, March 2nd. The heaviest snow fell close to the Chesapeake Bay. Snow tapered off early Monday afternoon as the storm system headed up towards New England. Snowfall reports throughout southern Baltimore County averaged 5 to 7 inches.	-	-	N/A
December 18 – December 19, 2009	Southern Baltimore	A disturbance in the northern branch of the jet stream was able to phase with low pressure in the southern branch of the jet stream over the Southeast Coast on the night of the 18th. These two systems combined to develop a strong area of low pressure that slowly track up the Mid-Atlantic Coast during the 19th. The low was able to tap into moisture from the Gulf of Mexico and the Atlantic Ocean causing copious amounts of precipitation to develop. High pressure to the north kept plenty of cold air in place causing the precipitation to fall in the form of snow. Snowfall amounts between 15 and 21 inches were reported across most of southern Baltimore County.	-	-	N/A
January 30 – January 31, 2010	Southern Baltimore	An upper-level low passed through the Mid-Atlantic triggering snow on the 30th. The heaviest snow fell during the late morning and afternoon hours. Snow amounts around five to eight inches were received throughout southern Baltimore County.	-	-	N/A
February 2 – February 3, 2010	Southern Baltimore	Low pressure tracked through the Ohio Valley on the 2nd before emerging off the Mid-Atlantic Coast during the early morning hours of the 3rd. The forcing from the low combined with cold air already in place to produce snow across Maryland during late afternoon hours on the 2nd into the early morning hours of the 3rd. Snowfall averaged around five to six inches across the southern portion of Baltimore County.	-	-	N/A
February 5 – February 6, 2010	Southern Baltimore	A potent area of low pressure strengthened over the central portion of the nation on the fifth of February. The storm system slowly moved through the Mid-Atlantic during the night of the 5th before redeveloping off the Mid-Atlantic coast on 6th. The storm system finally moved away from the area on the night of the 6th. Strong high pressure continued to pump in plenty of cold air across the region for the entire event. Due to the slow movement of the storm, there was a prolonged period of precipitation. The storm system ushered in copious amounts of moisture from the Gulf of Mexico and the Atlantic Ocean. The deep moisture combined with the forcing from the storm system to bring a period of heavy precipitation to the area on the night of the 5th through the daytime hours on the 6th. Precipitation finally ended during the evening hours of the 6th as the storm system moved away. Most of the precipitation fell in the form of snow due to the cold air that was already in place. Major snow accumulations were reported throughout the state of Maryland. Snowfall reports between 20 and 30 inches were received across southern Baltimore County. Power outages were reported throughout southern Baltimore county due to the weight of the snow on trees and power lines.	-	-	5K

February 9 – February 10, 2010	Southern Baltimore	A potent area of low pressure tracked through the Midwest on the 9th. As the low approached the Mid- Atlantic coast, this system phased with energy in the southern branch of the jet stream to cause strong low pressure to develop just off the Delmarva peninsula. The low continued to rapidly strengthen as it moved off to our northeast on the 10th. The system spread snow across Maryland that began on the 9th and lasted into the 10th. Major snow accumulations were reported with this storm, especially across the northeastern portion of Maryland. As the low pressure rapidly intensified, strong winds caused blowing and drifting snow that led to blizzard conditions across portions of the state. Snowfall totaled up to 22.3 inches in Essex. Snowfall averaged between one and two feet across the rest of southern Baltimore county.	-	-	N/a
January 17 – January 18, 2011	Southern Baltimore	Low pressure tracked up the Mid-Atlantic Coast on the 17th before moving toward New England on the 18th. Precipitation overspread the area on the night of the 17th ahead of the low. Warmer air was drawn into the system, but cold high pressure over New England kept enough low-level cold air in place for a prolonged period of frozen precipitation into the early morning hours of the 18th. A quarter inch of ice was reported due to freezing rain at Dundalk.	-	-	N/A
January 26, 2011	Southern Baltimore	A potent area of low pressure was located over the Tennessee Valley on the morning of Wednesday, January 26th. The warm front associated with the low triggered a period of mixed precipitation early Wednesday morning. There was enough warm air behind the warm front for precipitation to fall in the form of light rain and drizzle later in the morning into the afternoon. The low passed through the area late in the afternoon into the evening. A burst of heavier precipitation was associated with the low and at the same time colder air was drawn into the system. This caused a period of heavy snow to bring significant snow accumulation to the area in a short period of time. The heavy snow which fell around the evening rush hour caused numerous traffic accidents and there were also numerous power outages due to the heavy snow weighing on trees and power lines. Stranded vehicles were also reported around the Baltimore metropolitan area due to the snow. Snowfall averaged between eight and ten inches across southern Baltimore County. Many motorists were stranded in the city of Baltimore due a burst of heavy snow in a short period of time.	-	-	N/A
February 21 – February 22, 2011	Southern Baltimore	A cold front passed through the region on the evening of the 21st. High pressure to the north allowed for plenty of cold air to move into the region during the nighttime hours of the 21st. A wave of low pressure was moving along the front during this time causing precipitation over the area. Precipitation initially started out as rain before changing over to ice and snow as colder air worked its way in. Snowfall totaled up to 5.0 inches at Randallstown and Towson.	-	-	N/A
December 8 – December 9, 2013	Southern Baltimore	High pressure was wedged down the east coast and surface temperatures fell below freezing. Low pressure developed across the gulf coast states and moved across the Ohio Valley. Snow began but changed over to sleet and freezing rain as warmer temperatures aloft overran the cold air at the surface. Ice accumulations of around a quarter inch occurred at Oella.	-	-	-
January 2 – January 3, 2014	Southern Baltimore	Low pressure tracked across the Mid-Atlantic and led to accumulating snow with the highest amounts from Northern Virginia to East-Central Maryland. Low pressure quickly moved off the coast. Snow accumulations of six hours were measured at surrounding locations.	-	-	-
January 21, 2014	Southern Baltimore	A shortwave trough moved into the region while low pressure developed south of the Mid Atlantic. Upper level dynamics led to moderate to heavy snow to move into the region. Snow accumulations of five inches or more were measured at Towson.	-	-	-
February 12 – February 14, 2014	Southern Baltimore	Low pressure moved up the east coast and approached the Mid Atlantic. High pressure was located across New England and fed cold air into the region. Heavy snow fell across most parts of the Mid Atlantic with the highest amounts near the Mason Dixon line where mid-level forcing led to a heavy band. Snow accumulations of 15 inches were measured in Towson.	-	-	-
March 3, 2014	Southern Baltimore	A cold front crossed the region as low pressure passed across the south of the Mid Atlantic and heavy snow moved across the region. Temperatures dropped from north to south and precipitation changed from rain to sleet/freezing rain to snow. Snowfall accumulations of five or more inches were measured at surrounding locations.	-	-	-

March 16 – March 17, 2014	Southern Baltimore	Two areas of low pressure formed south of the Mid Atlantic. Dry and cold air at the surface led to precipitation to quickly change to snow. Heavy snow fell across the region with a confined area of greater than 10 inches across the Central Foothills. Snow accumulations of five or more inches were measured at Pimlico.	-	-	-
February 16 – February 17, 2015	Southern Baltimore	A surface low formed over Texas, then quickly moved east during the day and overnight, pushing off the Carolina coast by the morning of the 17th. A very cold airmass in place from retreating Arctic high pressure resulted in higher than average snow ratios, between 12:1 and 15:1. Eastern Maryland received the highest amounts, with lower amounts to the west. Spotter near Dundalk reported a snow total of 5.0 inches. Between 3.0 and 5.5 inches was reported by multiple sources across the southern portions of the county.	-	-	N/A
February 21 – February 22, 2015	Southern Baltimore	Low pressure lifting from the Ohio River Valley into the eastern Great Lakes dragged a cold front through the region. Southerly flow ahead of the front resulted in high moisture advection and with temperatures hovering in the 20s, moderate to heavy snow was reported across the region. Spotter in Essex reported a snow total of 10.0 inches. Between 5.0 and 10.0 inches of snow was reported across the southern portion of the county. Between a trace and 0.10 inches of ice was reported.	-	-	N/A
March 5, 2015	Southern Baltimore	A cold front brought widespread heavy snow to the area with a strong convergence zone aligning across northern Virginia into eastern Maryland resulting in mesoscale banding and higher snow totals. Storm total snow between 7.0 and 9.0 inches was reported around the county.	-	-	N/A
January 22 – January 24, 2016	Southern Baltimore	Coastal low pressure rapidly intensified as it tracked up the Mid-Atlantic coast. At the same time, high pressure to the north was funneling cold air into the region. The strong low-pressure system was able to tap into moisture from the Gulf of Mexico and the Atlantic Ocean resulting in heavy amounts of precipitation. The cold air caused that precipitation to fall in the form of snow. Gusty winds also accompanied this storm. The combination of gusty winds and low visibility along with snow and blowing snow caused blizzard conditions across central and southern Maryland. Snowfall totaled up to 27.0 inches in Pamlico. A report of 24 inches was received from near Hamilton. Snowfall averaged between 21 and 27 inches across southern Baltimore County.	-	-	N/A
March 20 – March 21, 2018	Southern Baltimore	A wave of low pressure passed by to the south on the 20th. At the same time, high pressure was building to the north and this caused cold air to filter in from New England. Rain changed to a wintry mix on the 20th. There was enough cold air for a period of heavier snow across northern Maryland with snow, sleet and freezing rain elsewhere. A light wintry mix continued for all areas on the night of the 20th. Coastal low pressure developed along the Mid-Atlantic Coast on the morning of the 21st. This caused a round of heavier precipitation to fall mainly in the form of snow. The snow tapered off later in the day as the low moved off to the north and east. A wintry mix occurred on the 20th before a round of heavier snow developed on the 21st. Snowfall totaled up to 6.4 inches near Pikesville and 6.0 inches near Pamlico.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Table 3-28: Winter Weather Events (December 19, 1996-March 31, 2018)

Date	Area	Narrative	Deaths	Injuries	Property Damage
December 19, 1996	Southern Baltimore	A band of light snow, which accompanied the first arctic front of the season, laid down a thin coating of slush which flash-froze into dangerous ice. Numerous accidents occurred during the evening commute, including several which bottled up major arteries and interstates. The Capital Beltway was closed near Kensington (MDZ009) when several automobiles careened into concrete barriers and other vehicles. Federal highway 29 was closed north of Burtonsville (MDZ009/010) due to a 15-car pile-up; several accidents were also reported in the Baltimore metropolitan region. No deaths or serious injuries were reported.	-	-	N/A

January 9, 1997	Southern Baltimore	The first area-wide winter weather event of the 1996/97 season spread a mix of snow, sleet, and freezing rain across all northern and western Maryland during the daylight hours of the 9th. Over the eastern Piedmont and coastal plain, 2 to 4 inches of snow and sleet fell before the changeover to freezing rain and rain. The event was the result of subtropical moisture rapidly overrunning a dome of cold air, causing a period of moderate snow and sleet. A secondary wave of low pressure developed along the North Carolina coast, locking cold air in place over inland areas. The changeover to mixed precipitation, combined with widespread road treatments, allowed for a more benign evening commute. Residential roads remained treacherous until the following day, when afternoon temperatures rose well above freezing. Late on the 10th through early on the 11th, a band of moderate snow developed along an arctic front, producing 1 to 3 inches across much of the Piedmont through the western shore of the Chesapeake Bay. There was negligible human impact with this event, since it occurred around midnight on a Saturday.	-	-	N/A
February 13 - February 14, 1997	Southern Baltimore	A fast-moving upper level disturbance dropped a quick 1 to 2 inches of snow, with spots over extreme western Allegany Co (MDZ002) receiving 3 inches. The snow was followed by a brief period of freezing rain and drizzle, causing numerous slippery roads during the early morning commute on the 14th. The ice accretion was 1/8- inch or less; no damage to trees or lines was reported. Traffic accidents were reduced since many school districts were closed and other residents took the day (a Valentine's Day Friday) off.	-	-	N/A
January 1, 1998	Southern Baltimore/Baltimore (C)	Residual moisture from rainfall of the previous evening combined with clear calm conditions to produce abundant black ice in the Maryland suburbs of Washington, DC and Baltimore during the morning commute. Dozens of accidents occurred as motorists travelled at unsuitable rates of speed considering the untreated roads. Sixty accidents were reported in northern Anne Arundel Co alone, and one bridge in the Annapolis area was briefly closed. No serious injuries were reported.	-	-	N/A
December 23 – December 24, 1998	Southern Baltimore	A cold front with northwest winds gusting to 40 MPH swept across Maryland on the 22nd of December. These winds were blamed for temporary power outages for 4,200 customers across Central Maryland, including the Prince Georges Hospital Center. This front also ushered in sub-freezing air that set the stage for a mixed bag of precipitation the following day. On the 23rd, a weak upper level disturbance from the Gulf States moved quickly across the Mid-Atlantic region, dropping between 1 and 3 inches of snow, in addition to a thin layer of ice and sleet. Baltimore/Washington International Airport (BWI) in Anne Arundel County received 3.0 inches. The combination of mixed precipitation, holiday travelers, and the first snowstorm of the season for drivers led to many traffic accidents. Interstate 95 through Central Maryland and especially near Baltimore was referred to as a "sheet of ice" during the evening rush hour of the 23rd. Law enforcement officials reported 90 accidents causing 4 injuries and 70 disabled vehicles in Baltimore County. Flight delays were also reported at BWI Airport. The Washington D.C. metropolitan area saw 70 accidents during evening rush hour on the 23rd. Interstate 97 south of Baltimore was shut down for 40 minutes early on the 24th because of a jackknifed tractor trailer. The wintry mix remained on the ground through December 25th, giving the region a rare "white Christmas".	-	-	N/A
January 8 – January 9, 1999	Southern Baltimore	An area of low pressure over Ohio brought a variety of precipitation to Central and Western Maryland. Precipitation started off as snow during the early morning hours of the 8th. By early afternoon warm air moved into the middle levels of the atmosphere, turning the precipitation to freezing rain. The freezing rain continued through early morning on the 9th, when temperatures finally rose above freezing at the surface. Snowfall amounts included 5 to 6 inches in Frederick, Washington and Allegany County, and 4 to 5 inches in Montgomery, Carroll, Howard, Harford, and Baltimore County. Two to 4 inches of snow fell in Anne Arundel, Prince Georges, and Charles County. Ice accumulations on top of the snowfall ranged from a trace to 1/3 of an inch. The aftermath of the snow and ice included school closings and many car accidents. Washington County officials reported a dozen accidents on Interstates 81 and 70 during the storm. Anne Arundel County reported over 50 accidents, including one with a serious injury on the 8th. State Police closed Route 50 between Rowe Boulevard and Route 450 for 90 minutes to clear accidents and attend to 8 injured people. Runways at the Baltimore/Washington International Airport (BWI) in Anne Arundel County had to be closed for plowing from 9:45 AM to 11:15 AM, causing flight delays. The northbound side of Interstate 97 was closed at 10:15 PM to clear several fender benders and the Severn River Bridge was closed due to ice. Maryland Route 140 had to be closed from Finksville east to the Anne Arundel/Baltimore County line because several drivers coming down a hill had lost control on ice around 9:30 AM on the 8th. On Interstate 295 near Baltimore, a bus slipped off the road and six cars hit utility poles. Accidents were also reported on the Vienna, Cambridge E. Tydings Memorial, and Kent Narrows Bridges. Around the Maryland suburbs of Washington D.C., over 100 accidents occurred leading to more than a dozen injuries.	-	-	N/A
March 9, 1999	Southern Baltimore	An area of low pressure moved from the Ohio Valley to North Carolina from late on the 8th through the evening of the 9th. Heavy snow fell across Western and Central Maryland as the storm system moved through. Snowfall rates were in excess of 1 1/2 inches per hour in some locations during the storm. By the evening of the 9th, 6 to 10 inches had fallen in Prince Georges, Montgomery, and Allegany County; 4 to 8 inches had fallen across Washington, Southern Frederick, Howard, Anne Arundel, Charles and Calvert County; 2 to 5 inches had fallen across St. Mary's, Northern Frederick, Carroll, and Southern Baltimore County, including Baltimore City; and 2 inches or less had fallen across Northern Baltimore County. Travel was treacherous across the region on the 9th.	-	-	N/A

February 18, 2000	Southern Baltimore/ Baltimore (C)	Low pressure tracked from the Mid-Mississippi Valley to Pennsylvania on the 18th, spreading a mixed bag of precipitation across Western and North Central Maryland. Light snow spread into the area before dawn then changed to freezing rain by mid-morning. The precipitation changed to rain across the area by early afternoon. Several traffic accidents occurred on slippery roads, and minor delays were reported at Baltimore/Washington International Airport. Ice accumulations included three quarters of an inch in Allegany County, one half inch in Washington County, between one quarter and one-half inch in Carroll, Montgomery, and Northern Baltimore Counties; and less than one quarter inch in Frederick, Howard, Southern Baltimore, and Harford Counties. Snowfall amounts ranged from 1 to 3 inches.	-	-	N/A
December 19, 2000	Southern Baltimore	Low pressure moved across the region on the 19th and produced periods of light to moderate snow between 4 AM and 8 PM. Snowfall totals ranged from 1 to 7 inches with the highest amounts falling across Frederick and Washington Counties and the smallest accumulations right along the Chesapeake Bay. Several traffic accidents were reported during the evening commute after roads became snow covered. After the snow ended, northwest winds gusted up to 30 MPH which caused some of the snow to drift back onto plowed roads overnight.	-	-	N/A
January 5, 2001	Southern Baltimore/ Baltimore (C)	Two bands of light snow moved across the region during the morning and early afternoon of the 5th. By 4 PM, 1 to 3 inches of snow had accumulated across western and central Maryland. Frederick County had locally higher snowfall accumulations between 4 and 6 inches. Several minor traffic accidents were reported after snow stuck to roads.	-	-	N/A
March 5, 2001	Southern Baltimore/ Baltimore (C)	A Nor'easter formed off the coast of North Carolina and moved northward along the Atlantic seaboard on the 4th and 5th. This storm brought moisture onshore and resulted in two days of precipitation across the Mid Atlantic area. As the storm passed by the Delmarva Peninsula a strong easterly wind pushed tides along the western shore of the Chesapeake Bay about 2 feet above normal which resulted in minor flooding at high tide from late evening on the 4th through the early morning hours of the 5th. Because temperatures were above freezing for most of the storm, a majority of the precipitation fell as rain, especially south and east of Washington D.C. and Baltimore. North and east of Baltimore and Washington D.C. to Hagerstown and average of 1.5 to 3 inches of snow was recorded and a brief period of sleet was also noted. In the high terrain of northwest Frederick County, 5.8 inches of snow fell. From Hagerstown to Frostburg, a total of 3 to 5 inches of snow accumulated. From Frostburg to the Garrett/Allegany border, a period of lake effect snow following the main storm on the 6th left an additional 5 inches along the ridges. Frostburg ended up with a grand total of 9.5 inches. After the precipitation from the Nor'easter ended, northwest winds gusted up to 40 MPH during the afternoon and evening of the 5th.	-	-	N/A
January 6, 2002	Southern Baltimore/ Baltimore (C)	Low pressure moved from the Gulf Coast through the Eastern Seaboard on the 6th and brought a mixed bag of precipitation to the region. From Washington County west, the precipitation fell mainly in the form of snow with a period of sleet and freezing rain at the onset. Elsewhere, a mix of rain, freezing rain, and sleet changed over to snow and sleet late in the day. In Baltimore County, a trace to 2 inches was reported. Some locations also reported a thin layer of ice accumulation.	-	-	N/A
January 9, 2002	Southern Baltimore	Light drizzle measuring three hundredths of an inch or less fell from low clouds between 6 and 7 AM on the 9th. Temperatures on roads were below freezing so the drizzle froze on impact. This created slippery driving conditions during the morning commute and several accidents were reported. In Baltimore County, more than 270 accidents occurred in the western portion of the area, mainly along Interstates 83, 695, and 795. Portions of these roads were closed until salt trucks could arrive.	-	-	N/A
December 24 – December 25, 2002	Southern Baltimore/ Baltimore (C)	Low pressure passed directly over the region between the evening of the 24th and midday on the 25th. This system brought mainly snow to Western and North Central Maryland. A mixed bag of precipitation including snow, sleet, and freezing drizzle was reported in the Washington D.C. and Baltimore suburbs. The largest snowfall totals occurred near the Pennsylvania border where between 6 and 8 inches was reported. Two to 4 inches of snow fell in Southern Frederick, Southern Carroll, Central Baltimore, Harford, Howard, and Northern Montgomery Counties. In Northern Prince George's and Northern Anne Arundel counties, in addition to Baltimore City, 1 to 2 inches of snow was recorded. The amount of snow that fell from this storm was enough to give the region an official "White Christmas". According to historical records for Baltimore, measurable snowfall has only occurred 6% of the time on December 25th. In addition, Baltimore only has a 13% chance of having snow on the ground on the 25th. Winds increased to 20 to 30 mph with gusts to 45 MPH after the low passed by on the afternoon of the 25th. Isolated power outages and downed trees were reported.	-	-	N/A
January 5, 2003	Southern Baltimore	A weak area of low pressure moved through the region on the 5th. It dropped 2 to 5 inches of snow across Central and Western Maryland between 6 AM and 7 PM. The snow caused roads to become very slippery and hundreds of traffic accidents were reported. In Baltimore County, a 19-car pileup and a 35-car pileup were reported on Interstate 695.	-	-	N/A
February 26 – February 28, 2003	Southern Baltimore	A series of low pressure systems that tracked from the Gulf Coast to Cape Hatteras dropped light snow off and on between the morning of the 26th and midday on the 28th. A total of 5 to 8 inches of snow accumulated across Central and Southern Maryland and 2 to 4 inches was reported in Western Maryland. Minor traffic accidents were reported after the fallen snow made roads slippery.	-	-	N/A

March 30, 2003	Southern Baltimore/ Baltimore (C)	Low pressure over North Carolina moved northeast along the Atlantic Seaboard on the 31st. This system brought a period of light to moderate snow to western and central Maryland. Snowfall accumulations with this late season storm were elevation dependent because ground temperatures were above freezing below 1500 feet. This prevented most of the snowfall from accumulating in valleys and in lower elevations east of Hagerstown. Lower elevations reported accumulations between 1 and 3 inches. Above 1500 feet where the snow was able to accumulate, snow depth reached 4 to 8 inches. Minor power outages were reported in isolated locations where the snow weighed down on trees and power lines.	-	-	N/A
December 14, 2003	Southern Baltimore	An area of low pressure developed over the Gulf Coast region and tracked northeast into the Mid-Atlantic region. The storm produced a mixture of snow, sleet and freezing rain. Snowfall totals across Central and Lower Southern Maryland averaged 1 to 3 inches. Some light ice accumulations were also reported.	-	-	N/A
January 17 – January 18, 2004	Southern Baltimore	Two areas of low pressure merged over the region and produced a wintry mix of snow and freezing rain. Snow amounts from one quarter to two inches were recorded across Maryland from Allegany down to St. Mary's County. There were also reports of ice accumulations up to two tenths inch. Law Enforcement officers and Emergency personnel responded to several automobile accidents.	-	-	N/A
January 26, January 27, 2004	Southern Baltimore	An area of low pressure moved across the region on the 26th and 27th. This system produced a second round of freezing rain and snow. One to two additional inches of snow fell across the Baltimore Metropolitan area as well as one tenth inch of ice. Ice covered sidewalks and roadsides were blamed for the death of a pedestrian near Baltimore City. The man was struck and killed by a vehicle as he walked in the street because the sidewalks were slick and dangerous. Scattered power outages and other minor injuries were also blamed on the ice. Federal agencies in the Washington DC Metropolitan area closed three hours early on the 27th due to the inclement weather. Schools were closed again on the 27th.	1	-	N/A
February 5 – February 6, 2004	Southern Baltimore	An area of low pressure moved through on the 5th and 6th and brought freezing rain and sleet to north central and northeast Maryland. One to two tenths ice accumulated and formed a glaze on roadways and downed power lines. This led to school closures, some automobile accidents, and scattered power outages.	-	-	N/A
December 5 – December 6, 2005	Southern Baltimore	A significant winter storm occurred across portions of the Mid-Atlantic on the 5th and 6th of December. The wintry weather was caused by a low-pressure system that was located over the southeast states, which then moved off the North Carolina coast on the 6th. A swath of light to moderate snowfall occurred across portions of MD and Northern VA. Storm total snowfall was between only a trace to up to 4 inches in some spots.	-	-	N/A
December 9, 2005	Southern Baltimore	A major winter storm impacted the Mid-Atlantic Region on the 8th and 9th. A coastal low-pressure storm developed off the southeast coast, meanwhile a strong upper-level storm moved from the Ohio Valley to the Eastern Great Lakes. All this combined to generate a swath of generally light accumulations of snow and ice across the noted winter weather area. Still, even these relatively light accumulations had a significant impact on commerce and travel across the region, especially since severe winter storm conditions occurred nearby. Generally, storm total snowfall ranged between 1 to 4 inches, while ice accumulations were two-tenths of an inch or less. 3 fatalities occurred (indirect) as a result of this storm system in traffic related accidents, all occurring in Maryland.	-	-	N/A
December 15, 2005	Southern Baltimore	A major winter storm occurred on December 15-16 across portions of the region. A low-pressure storm tracked from the Gulf Coast to the Delmarva Peninsula by Friday morning, December 16. With warm air being drawn north into the cold air already in place, significant accumulations of freezing rain occurred across much of the area. Significant power outages occurred, especially in the Central Shenandoah Valley. Heavy snowfall also occurred across the higher elevations mainly along the Allegany Front, with nearly a foot of storm total snowfall. Ice accumulations in the Shenandoah Valley were up to 1 inch. 5 fatalities occurred as a result of this major winter storm (indirect). All of these fatalities were traffic related. Dominion Power reported more than 40,000 customers without power in portions of the area. Relatively Light accumulations of snow and ice occurred across the western suburbs of Washington, DC, and Baltimore, due to the intrusion of more warm air, which turned the precipitation over to all rain for a period of time.	-	-	N/A

February 24 – February 25, 2007	Southern Baltimore	A low-pressure system developed over the high plains of eastern Colorado on February 23rd and pushed east to the Ohio Valley by February 25th. Abundant warm and moist air just above the surface originating from the Gulf of Mexico was pulled north over the Mid Atlantic ahead of the system. Snow began to fall over the region beginning late on February 24th and continued through the early evening hours on February 25th. Snowfall amounts ranged from 3 to 6 inches across Maryland. Nearly 2000 people lost power in Montgomery County with the snowfall. Numerous traffic accidents were reported across the Baltimore metro area due to the icy road conditions. Schools were delayed Monday, February 26th, in Montgomery and Prince Georges Counties. Broadcast Media and a Trained Spotter in the City of Baltimore reported between 3 and 4 inches of snow. Snow mixed with sleet and freezing rain at times during the afternoon.	-	-	-
March 7, 2007	Southern Baltimore	A strong clipper system developed over the Great Lakes March 6th and dove south across the Mid Atlantic on March 7th. Snow began along the western edge of the Allegheny Front shortly after midnight on March 7th and spread east overnight. The highest snowfall reports came from Allegany County. Trained spotters in Frostburg, MD., reported 10 inches of snow. Snowfall amounts diminished further east, with an average of 1 to 3 inches reported across the Baltimore metro. A Broadcast Meteorologist reported between 1 and 2 inches of snow across the City of Baltimore.	-	-	-
March 16, 2007	Southern Baltimore	A strong cold front crossed the region on the afternoon of March 15th, ushering in drastically colder temperatures. A low-pressure system approached the region that night and moved north along the Atlantic coast on March 16th. As the low approached the region early on the 16th, precipitation became widespread and continued through much day. Warm air briefly surged ahead of the low-pressure system, allowing precipitation to begin in the form of rain. Several roads were closed due to flooding across Anne Arundel, St. Mary's and Northern Baltimore Counties. Colder air was brought into the region by the low. This forced rain to change to snow and sleet before changing to all snow. Snowfall amounts ranged from 2 to 10 inches. Hazardous driving conditions led to numerous minor car accidents. A vehicle in President Bush's motorcade traveling from Washington DC to the Camp David presidential retreat collided with another car along Interstate 270 in Urbana, MD., in Frederick County. No injuries were reported. Trained Spotters reported between 1 and 3 inches of snow across southern Baltimore County. Newspapers reported early school closings due to the weather.	-	-	-
December 5, 2007	Southern Baltimore	An Alberta Clipper system moved quickly across the Mid Atlantic on December 5th. This was the first snow of the season for much of the region. This storm caused significant traffic impacts during the morning commute across the Washington DC and Baltimore metro areas. The highest snowfall accumulations were measured across northern Maryland from Allegany County east to Carroll County. Snow amounts ranged from 1 to 3 inches across lower southern Maryland north into the Washington and southern Baltimore suburbs, and up to 7 inches in far western Allegany County. Trained spotters measured between 3 and 5 inches of snow.	-	-	-
January 17 – January 18, 2008	Southern Baltimore	An area of low pressure moved northeast from the central Gulf of Mexico off the North Carolina on January 17th. Precipitation began as snow before warmer air moved in aloft. This changed snow to a mix of sleet and freezing rain and ended as freezing drizzle. Significant accumulations of snow and sleet were reported with only a trace of ice. The highest snowfall accumulations, up to 6 inches, were reported from western Montgomery County through Howard County north across eastern Carroll County in central Maryland. According to newspaper reports, snow caused numerous traffic accidents in northern Maryland east towards the Baltimore Metro. Accidents were also reported further west in Allegany County. Cooperative observers and trained spotters measured 2 to 4 inches of snow in southern Baltimore County and the City of Baltimore.	-	-	-
February 20, 2008	Southern Baltimore	An Alberta Clipper system brought snow to the Mid Atlantic on February 20th. Snow amounts ranged from 3 to 5 inches along and west of the Allegheny Front to 1 to 2 inches further east across the Baltimore Metro and south across lower southern Maryland. Trained spotters and cooperative observers measured 1 to 2 inches across southern Baltimore County.	-	-	-
December 21, 2008	Southern Baltimore	An area of low pressure tracked through the Mid-Atlantic on the morning of the 21st allowing for precipitation to develop over Maryland. Despite warmer air just a few thousand feet above the surface, temperatures at the surface remained below freezing allowing for freezing rain to occur. Ice accumulation of thirteen hundredths of an inch was reported in Baltimore.	-	-	N/A
December 23 – December 24, 2008	Southern Baltimore	A warm front tracked through the Mid-Atlantic spreading precipitation over Maryland during the evening of the 23rd into the morning of the 24th. Low-level cold air ahead of the cold front triggered some freezing rain. Black ice was reported on roadways across the Baltimore area due to freezing rain.	-	-	N/A

January 6 – January 7, 2009	Southern Baltimore	An area of low pressure passed through the Ohio Valley spreading precipitation across Maryland on the 6th and 7th. Warmer air was drawn into the storm system aloft, but surface temperatures remained below freezing resulting in freezing rain. Light glaze of ice on trees was reported in Owings Mills and the City of Baltimore.	-	-	N/A
January 10 – January 11, 2009	Southern Baltimore	An area of low pressure passed through the Mid-Atlantic on the 10th into the early morning hours of the 11th. The track of the low was far enough north for warmer air to be drawn into the storm system above the surface. However, colder air remained trapped at the surface causing freezing rain to develop. A light glaze of ice was reported on cars and bushes due to freezing rain in Owings Mills.	-	-	N/A
January 19, 2009	Southern Baltimore	An area of low pressure passed through the Mid-Atlantic spreading a period of snow across Maryland. The snow fell during the morning and afternoon hours of the 19th. Snowfall reports of one to two inches were received across southern Baltimore County.	-	-	N/A
February 3 – February 4, 2009	Southern Baltimore	An area of low pressure off the New England coastline allowed a band of snow to push southward into Maryland during the overnight hours. A snowfall report of one inch was received from Baltimore.	-	-	N/A
December 5, 2009	Southern Baltimore	Low pressure tracked through the Tennessee Valley and emerged off the Mid-Atlantic coast on the 5th. This system spread precipitation across Maryland. There was enough cold air drawn in from the north for precipitation to fall in the form of snow across most areas. Most of the snow fell during the morning and afternoon hours. Snowfall totaled to 2.5 inches in Pamlico.	-	-	N/A
December 13, 2009	Southern Baltimore	Low pressure developed off the Mid-Atlantic coast causing precipitation to develop over Maryland. There was enough cold air in place for precipitation to start off as a wintry mix of sleet and freezing rain across locations to the north and west of Baltimore. Precipitation changed to all rain by late in the morning as warmer air was drawn into the system. Ice accumulation around two hundredths of an inch was reported in Catonsville.	-	-	N/A
December 31, 2009	Southern Baltimore	Low pressure passed through the Mid-Atlantic spreading precipitation over Maryland on the morning of the 31st. There was enough cold air for a period of snow and ice before drier air worked in during the afternoon. Snowfall amounts averaged around 2 across southern Baltimore County and there was also a trace of ice from freezing rain.	-	-	N/A
January 7 – January 8, 2010	Southern Baltimore	A clipper system tracked through the Mid-Atlantic bringing a period of snow to most locations beginning on the evening of the 7th and lasting into the morning of the 8th. Snow persisted through the afternoon hours on the 8th across locations along and west of the Allegheny front. Snowfall amounts around one to two inches were reported throughout southern Baltimore County.	-	-	N/A
December 16, 2010	Southern Baltimore	Low pressure passed through the region in a zonal flow causing precipitation to develop on the 16th. There was plenty of cold air in place ahead of this system causing precipitation to fall in the form of snow. Snowfall totaled up to 2.0 inches in Essex. Snowfall amounts between one and two inches were reported across southern Baltimore County.	-	-	N/A
January 11, 2011	Southern Baltimore	Low pressure tracked through the Ohio Valley on the 11th before transferring its energy to another area of low pressure off the Mid-Atlantic Coast during the evening hours. A period of snow associated with these systems affected the area during the late afternoon and evening hours of the 11th. Upslope snow continued into the early morning hours of the 12 for locations along and west of the Allegheny front. Snowfall averaged between two and three inches across southern Baltimore County.	-	-	N/A
January 26, 2011	Southern Baltimore	A potent area of low pressure was located over the Tennessee Valley on the morning of Wednesday, January 26th. The warm front associated with the low triggered a period of mixed precipitation early Wednesday morning. There was enough warm air behind the warm front for precipitation to fall in the form of light rain and drizzle later in the morning into the afternoon. The low passed through the area late in the afternoon into the evening. A burst of heavier precipitation was associated with the low and at the same time colder air was drawn into the system. This caused a period of heavy snow to bring significant snow accumulation to the area in a short period of time. The heavy snow which fell around the evening rush hour caused numerous traffic accidents and there were also numerous power outages due to the heavy snow weighing on trees and power lines. Stranded vehicles were also reported around the Baltimore metropolitan area due to the snow. Snowfall averaged between two and four inches across the southern portion of the county.	-	-	N/A

February 1, 2011	Southern Baltimore	Low pressure over the Ohio Valley caused periods of precipitation during the first into the morning hours of the second. There was enough low-level cold air for a period of wintry precipitation before enough warm air eventually worked its way into the storm causing precipitation to change to rain. A glaze of ice was reported at Kingsville, Catonsville, Towson, and Baltimore City. A couple hundredths of an inch of ice was reported near Oella.	-	-	N/A
February 5, 2011	Southern Baltimore	Low pressure tracked through the Ohio Valley on the fifth of February causing precipitation over the area. High pressure just off the New England coast supplied enough low-level cold air for a period of freezing rain. Precipitation changed to rain later in the morning as warmer air was drawn into the system. A trace of ice was reported near Stevenson.	-	-	N/A
January 20 – January 21, 2012	Southern Baltimore	Low pressure passed through the area during the evening of the 20th into the morning hours of the 21st. There was enough cold air for precipitation to start off as snow, but warmer air eventually wrapped into the system, causing precipitation to change to a wintry mix. Snow and sleet totaled up to between one and two inches across most of southern Baltimore County. Ice accumulation from freezing rain averaged between one and two tenths of an inch.	-	-	N/A
January 22 – January 23, 2012	Southern Baltimore	Low pressure was located over the central portion of the nation while high pressure remained just off the New England Coast. Surface cold air remained in place during the evening hours of the 22nd into the morning hours of the 23rd. A southerly flow around the low allowed for warm and moist air to overrun the surface cold air, resulting in periods of freezing drizzle. Temperatures rose above freezing later during the morning hours of the 23rd. A light glaze of ice was estimated due to freezing drizzle.	-	-	N/A
December 26, 2012	Southern Baltimore	Parent low pressure moved up the Tennessee Valley towards the Mid Atlantic. As precipitation moved over the area, surface temperatures were below freezing, and a wintery mix of sleet and freezing rain occurred. Low pressure continued to intensify across the Mid-Atlantic and onward to New England. Wrap around moisture produced heavy snow showers in the higher elevations. Snowfall accumulations averaged 1 inch in the county at rush hour.	-	-	-
January 24, 2013	Southern Baltimore	A positively tilted trough of low pressure moved through the Mid Atlantic while a weak clipper system moved through Central Virginia. Cold temperatures and banding produced advisory level snowfall accumulations. Snowfall amounts of around one inch were reported at Pimlico during the morning rush hour.	-	-	-
January 28, 2013	Southern Baltimore	High pressure was slow to move off the Atlantic Coast and sub-freezing air was trapped on the leeward side of the Appalachian Mountains. Southwest flow a few thousand feet above the surface brought above freezing temperatures and led to freezing rain and accumulating ice in the Mid Atlantic. Ice accumulation of around a trace was reported at surrounding locations.	-	-	-
February 1, 2013	Southern Baltimore	A clipper system moved through the Mid Atlantic in the early morning hours and produced advisory level snowfall in the Baltimore and Washington DC metro areas. Snowfall amounts of around an inch were reported at Perry Hall during the morning rush hour.	-	-	-
February 8, 2013	Southern Baltimore	The Mid Atlantic was located between low pressure to the west and east. This led to northerly flow overnight. Low pressure to the east intensified as it moved northward. Surface temperatures were marginal, and the rain-snow line was close to the I-95 corridor. Ice amounts of a trace were reported at surrounding locations.	-	-	-
February 22 – February 23, 2013	Southern Baltimore	A stacked low-pressure system was over the Northern Plains. High pressure to the north caused below freezing temperatures to advect southward into the Mid Atlantic. Southerly flow aloft and ahead of low pressure led to above freezing temperatures above the below freezing surface. Freezing rain occurred in most areas in the Mid Atlantic. Ice reports of around a trace were reported at surrounding locations.	-	-	-
March 6, 2013	Southern Baltimore	Strong low pressure impacted the Mid Atlantic bringing rain and snow to the region. A rain-snow line was present across the I-95 corridor where snowfall accumulations dropped off significantly from west to east. Snowfall amounts of around 2 inches were reported at Pimlico.	-	-	-

March 25, 2013	Southern Baltimore	Coastal low pressure impacted the Mid-Atlantic region with snow and rain showers. Surface temperatures were marginal during the event and a sharp gradient of snowfall accumulation existed near Washington DC. Snowfall totaled up to 4.1 inches near Dundalk and 4.0 inches near Reisterstown.	-	-	N/A
December 10, 2013	Southern Baltimore	A fast-moving upper level disturbance and jet max moved across the region and mid-level convergence led to snow banding across Northern Maryland. Banding led to 1-2 inches an hour in some locations. Snow accumulation of 2 inches was measured at Perry Hall.	-	-	-
January 5, 2014	Southern Baltimore	Low pressure tracked up the Appalachian Mountains and southerly flow ahead of the system led to warm air overrunning cold air at the surface. This led to freezing rain and ice accumulation across the Mid Atlantic. Ice accumulation of a trace or more was measured at surrounding locations.	-	-	-
January 10, 2014	Southern Baltimore	A weak disturbance crossed the Mid Atlantic while a wedge of high pressure was at the surface. Precipitation that fell melted aloft and froze on contact. Ice accumulations of a trace or more were measured at surrounding locations.	-	-	-
February 4 – February 5, 2014	Southern Baltimore	A wedge of high pressure extended southwest along the Appalachian Mountains. Low pressure approached the Mid Atlantic from the Tennessee Valley and warm air overran colder air at the surface resulting in freezing rain. Ice accumulation of a tenth inch was reported at White Marsh.	-	-	-
February 26, 2014	Southern Baltimore	An upper level disturbance moved across the Mid Atlantic in the morning. A jet axis coincided with the disturbance and snow showers moved across the region. The most accumulation occurred east of the Blue Ridge. Snow accumulations of an inch or more was measured at surrounding locations during rush hour.	-	-	-
March 25, 2014	Southern Baltimore	Low pressure moved past the Mid Atlantic from the Carolinas. High pressure to the north fed freezing temperatures to the region resulting in snow to accumulate across the region. Snowfall occurred during the morning rush for the Baltimore/Washington DC and Interstate 95 corridor. Snow accumulation of 2 inches or more was measured at Reistersburg.	-	-	-
January 6, 2015	Southern Baltimore	A quick moving clipper system brought widespread snow showers to the region. Trained spotters reported storm snow totals between 1.0 and 3.5 inches.	-	-	N/A
January 11 – January 12, 2015	Southern Baltimore	Low pressure passed just to the south of the region, with overspreading precipitation pushing to the north. High pressure to the north resulting in cold air wedging led to the precipitation falling as freezing drizzle and rain. Trained spotters reported between a trace and 0.05 inch of ice.	-	-	N/A
January 18, 2015	Southern Baltimore	Areas of freezing rain, resulting in hazardous road conditions, occurred the morning of the 18th. High pressure over the northeast slowly retreated ahead of an approaching low-pressure system, keeping northeast flow over the Mid-Atlantic for a good portion of the night on the 17th and allowing for surface temperatures to drop into the 20s. As the high moved offshore, warm air advection with an increasing low- level jet overrode the colder air at the surface, producing light rain along the I-95 corridor, with pockets of freezing rain especially along bridges and overpasses. An accident involving a Maryland Transit Administration bus was reported on Rocklyn Ave near Milford Mills. Reported by the Baltimore Sun. Six people were sent to the hospital as a result. All lanes of I-83 were reported closed during the morning hours near the Northern Parkway. Around a trace of ice was reported.	-	6	N/A
January 21, 2015	Southern Baltimore	Low pressure tracking to the north with a deepening upper level low produced scattered snow showers. Spotters reported storm total snow between 1.0 and 3.0 inches.	-	-	N/A
January 26 – January 27, 2015	Southern Baltimore	A surface low tracked across the Mid Atlantic. As the low pushed offshore and deepened while the upper level trough became negatively tilted, precipitation became more widespread. Spotters reported storm snow totals between 1.0 and 2.0 inches.	-	-	N/A
February 1 – February 2, 2015	Southern Baltimore	Low pressure moving through the Mid-Atlantic brought periods of snow, sleet and freezing rain. Retreating high pressure initially provided a cold air mass, but a strengthening low-level jet injected in warmer air overnight, resulting in a transition to sleet and freezing rain. Around an inch of snow and a trace of ice was reported.	-	-	N/A
February 9 – February 10, 2015	Southern Baltimore	Low pressure tracked just south of the region during the overnight hours, bringing over running precipitation to areas east of the Blue Ridge. Northeast flow resulting in cold air damming kept temperatures hovering right below freezing, which resulted in light ice formation. Between a trace and a tenth of an inch of ice were reported by multiple sources.	-	-	N/A

February 14, 2015	Southern Baltimore	A strong cold front moving through brought a quick moderate snow. Between 1.0 and 3.0 inches of snow were reported by multiple spotters.	-	-	N/A
March 3, 2015	Southern Baltimore	A warm front lifting north through the area resulted in light freezing rain and sleet. Storm total ice between a trace and a tenth of an inch was reported around the county and in surrounding areas.	-	-	N/A
March 20, 2015	Southern Baltimore	Widespread precipitation formed as energy transferred from low pressure moving through the Ohio River Valley to a developing coastal low off the Carolinas. Snow was brief as a strengthening low-level jet aided in transitioning the precipitation to rain by midday, limiting snow totals. Storm total snow between 1.0 and 2.0 inches was reported around the county.	-	-	N/A
January 26, 2016	Southern Baltimore	Retreating high pressure resulted in colder air being wedged in the valleys along and east of the Appalachians. As a warm front lifted north during the overnight hours, light rain formed, which when combined with the below freezing surface temperatures, resulted in patches of freezing rain. Trace amounts of ice were reported around the county.	-	-	N/A
February 9, 2016	Southern Baltimore	Two low pressure systems impacted the Mid-Atlantic while an upper level trough deepened across the region. As one low pushed to the south and then east, energy from the second low over the Great Lakes region was transferred to the coastal flow, resulting in snow banding across portions of central Maryland. Between 1 and 3 inches of snow were reported over the 12-hour period.	-	-	N/A
February 15 – February 16, 2016	Southern Baltimore	Prolonged event impacted the Mid-Atlantic. Southwest flow aloft overriding northeast flow at the surface from departing high pressure led to snow spreading over the region initially. Low pressure formed and organized over the Gulf of Mexico, eventually pushing off to the northeast and impacting the region on the 15th. As the cold air wedge was eroded away from this low, warming at all levels led to the snow transitioning to sleet and ice for most of the area. Trained spotters reported up to a tenth of an inch of ice and between 1 and 4 inches of snow, resulting in numerous trees down.	-	-	N/A
March 3 – March 4, 2016	Southern Baltimore	Low pressure tracked through the Southeast US before pushing northeast, just off the Carolina coast. The low deepened quickly just offshore as the northern and southern stream energy pieces phased, but far enough east where only fringes of southern Maryland received warning level snow, with less snow amounts to the north and west. Trained spotters reported between 1-2 inches of snow across the county, impacting rush hour.	-	-	N/A
December 17, 2016	Southern Baltimore	Warm and moist air overran an arctic air mass that was in place. This resulted in a period of freezing rain that caused hazardous conditions. Icy roads on Interstate 95 resulted in a 55-car accident that lead to 12 injuries and 2 fatalities.	2	12	N/A
January 5, 2017	Southern Baltimore	Low pressure developed and tracked off Mid-Atlantic coast at the same time colder air was funneling in from the north. This resulted in a period of snow. Snowfall was estimated to be around one inch based on observations nearby.	-	-	N/A
January 14 – January 15, 2017	Southern Baltimore	Low pressure passed through the area. There was enough cold air trapped near the surface for a period of freezing rain. Ice totaled up to four-hundredths of an inch in Pimlico.	-	-	N/A
March 13 – March 14, 2017	Southern Baltimore	The northern and southern branches of the jet phased together, which resulted in coastal low pressure on the 13th. The coastal low tracked up the Mid-Atlantic Coast during the morning hours of the 14th before moving out to sea later in the day. High pressure over New England caused enough cold air for precipitation to start out as snow. However, warmer air did work its way in aloft causing precipitation to change to a period of sleet and rain across eastern areas. This cut down on some of the snow totals across these areas, but also caused ice accumulations. Snowfall totaled up to 3.8 inches near upper Falls and 2.5 inches near Catonsville. Snowfall averaged between 2 and 4 inches across southern Baltimore County.	-	-	N/A
December 9, 2017	Southern Baltimore	Low pressure passed by to the south and this caused a period of snow across southern Maryland on the 9th. For other locations, a potent upper-level trough and disturbance associated with the trough passed through the area on the 9th. The forcing from the disturbance caused a period of snow to develop. Snowfall totaled up to 4.3 inches near Towson. Snowfall averaged between 2 and 4 inches across southern Baltimore County.	-	-	N/A

December 15, 2017	Southern Baltimore	A period of snow developed as weak low pressure tracked through the area. Snowfall totaled up to 1.0 inches near Pimlico.	-	-	N/A
January 3 – January 4, 2018	Southern Baltimore	Low pressure rapidly intensified offshore. A period of snow developed due to the lows rapid intensification. Although snow amounts were light, it impacted the morning rush thanks to cold temperatures that allowed the light snow to stick. Snowfall totaled up to 1.0 inch in Towson.	-	-	N/A
January 8, 2018	Southern Baltimore	Low pressure passed by to the west. Warm and moist air overran the arctic air in place causing a period of freezing rain. A glaze of ice was reported near Lochearn.	-	-	N/A
January 17, 2018	Southern Baltimore	A couple waves of low pressure brought some precipitation to the area, and there was enough cold air ahead of this system for the precipitation type to be snow. Snowfall amounts of 1 to 2 inches were received across southern Baltimore County.	-	-	N/A
February 4, 2018	Southern Baltimore	Weak low pressure tracked up the Mid-Atlantic Coast. A cold air mass in place caused precipitation with this low to fall in the form of snow and ice. Ice totaled up to a tenth of an inch at near Catonsville.	-	-	N/A
February 7, 2018	Southern Baltimore	Low pressure tracked up the Appalachians. Warm and moist air overran the colder air in place, resulting in precipitation. There was a cold layer near the surface that caused freezing rain. Ice accumulations from a trace to around one-tenth of an inch were reported across southern Baltimore county.	-	-	N/A
February 17, 2018	Southern Baltimore	Low pressure to our west transferred its energy to a weak coastal low off the Mid-Atlantic Coast. High pressure to the north supplied the cold air and moisture from the low caused snow to develop. Snowfall averaged between 2 and 3 inches across southern Baltimore County.	-	-	N/A
March 6 –7, 2018	Southern Baltimore	Coastal low pressure developed of the Mid-Atlantic Coast. A period of snow developed over eastern and northeastern Maryland before the low intensified and moved off to the north and east. Snowfall totaled up to 2.8 inches near Pikesville.	-	-	N/A

Source: National Centers for Environmental Information (NCEI), best available data as of 3/31/18.

Other Data Sources

Flood

The Baltimore Sun

'Water up to your neck': Flooding displaces six people in Southwest Baltimore; cleanup, aid efforts ongoing

http://www.baltimoresun.com/news/weather/bs-md-ci-city-flooding-20180529-story.html

Flooded section of Frederick Avenue in Southwest Baltimore reopening Friday

http://www.baltimoresun.com/news/maryland/baltimore-city/bs-md-frederick-ave-reopens-20180615-story.html

Baltimore expected to hit nuisance flooding 'tipping point' by 2020

http://www.baltimoresun.com/news/weather/weather-blog/bal-wx-baltimore-expected-to-hit-nuisance-flooding-tipping-point-by-2020-20141218-story.html

May rainfall topped 8 inches for just the third time on record in Baltimore

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-may-rainfall-record-20180601-story.html

Tropical Storms & Hurricanes

National Weather Service

https://www.weather.gov/lwx/hurricane_history

NOAA – Historic Hurricane Tracks

https://coast.noaa.gov/hurricanes/

Baltimore Business Journal

Hurricane Sandy Cripples Greater Baltimore; 200,000 without power

https://www.bizjournals.com/baltimore/news/2012/10/30/hurricane-sandy-cripples-greater.html

Storm Surge/Coastal Inundation

The Baltimore Sun

Potential storm surge flooding map

http://www.baltimoresun.com/80701649-157.html

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Baltimore's Storm Surge Is the Worst in Decades

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Chesapeake Quarterly

The Perfect Surge: Blowing Baltimore Away

http://www.chesapeakequarterly.net/sealevel/main4/

Sea Level Change

The Baltimore Sun

Rising sea levels threaten $19 billion in real estate across Maryland, study says

http://www.baltimoresun.com/news/maryland/investigations/bs-md-suninvestigates-sea-level-20171026-story.html

Chesapeake Quarterly

The Perfect Surge: Blowing Baltimore Away

http://www.chesapeakequarterly.net/sealevel/main4/

Sea Grant Maryland

Rising Sea Level

http://www.mdsg.umd.edu/topics/coastal-flooding/rising-sea-level

Yale Climate Connections

How Baltimore is preparing for sea-level rise

https://www.yaleclimateconnections.org/2018/02/how-baltimore-is-preparing-for-sea-level-rise/

Dam Failure

Maryland Department of Environment - MDE Dam Safety

http://mde.maryland.gov/programs/Water/DamSafety/Pages/index.aspx

Tsunami

National Geophysical Data Center

Tsunamis and Tsunami-Like Waves of the Eastern United States

ftp://ftp.ngdc.noaa.gov/hazards/publications/ref0541_lockridge.pdf

Extinction Theory

Small Tsunami Hits US East Coast

http://www.extinctiontheory.com/small-tsunami-hits-us-east-coast/

Thunderstorm (Lightning & Hail)

The Baltimore Sun

Storms bring outages, road closures, large hail to Maryland

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-storm-damage-outages-20150624-story.html

No tornadoes confirmed yet, but reports of hail, flooding pour in

http://www.baltimoresun.com/news/weather/weather-blog/bal-wx-no-tornadoes-confirmed- yet-20120815-story.html

Winter Storm & Nor'Easter

The Baltimore Sun

City inspectors directing, monitoring street plowing

http://www.baltimoresun.com/news/maryland/baltimore-city/bs-md-inspectors-0126-20160125-story.html

Three killed as winter storm wreaks havoc across region; I-95 tanker crash part of 67-vehicle pileup in city

http://www.baltimoresun.com/news/weather/bs-md-icy-conditions-20161217-story.html

Baltimore declares Code Blue cold weather alert through Wednesday morning as temperatures dip into 20s

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-ci-code-blue-20180130-story.html

Drought

Maryland Department of Environment

Maryland's Drought Status: Current Conditions

http://mde.maryland.gov/programs/water/droughtinformation/Currentconditions/Pages/index .aspx

Thunderstorm Winds & Derecho

The Baltimore Sun

PSC to hear from utilities on derecho storm response

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-derecho-psc-hearing-20120913-story.html

Maryland weather: Light showers predicted for Baltimore on Tuesday afternoon as thousands remain without power

http://www.baltimoresun.com/news/weather/bs-md-weather-heat-air-quality-20180618-story.html

Tornadoes

The Baltimore Sun

Tornado watch issued for Baltimore area overnight Saturday

http://www.baltimoresun.com/news/weather/bs-md-ci-tornado-warning-20180512-story.html

Baltimore Patch

Tornado Watch Issued In Maryland; Severe Weather Expected

https://patch.com/maryland/baltimore/tornado-watch-issued-maryland-severe-weather-expected

Heat & Air Quality

The Baltimore Sun

Heat advisory continues in Baltimore area, as temperatures surge and cooling centers stay packed

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-weekend-heat-20180629-story.html

Health officials declare 'code red' heat advisory for Thursday

http://www.baltimoresun.com/news/weather/weather-blog/bal-wx-health-officials-declare-code-red-heat-advisory-for-thursday-20160713-story.html

Baltimore issues first Code Red heat alert of the year

http://www.baltimoresun.com/news/weather/weather-blog/bs-md-code-red-0708-20130707-story.html

Earthquakes

The Baltimore Sun

Basilica needs millions in repairs after quake damage found

http://www.baltimoresun.com/news/breaking/bs-md-ci-basilica-cracks-20120322-story.html

WMAR

Baltimore Basilica closed since August for repairs from 2011 earthquake damage

https://www.wmar2news.com/news/region/baltimore-city/baltimore-basilica-closed-since-august-for-repairs-from-2011-earthquake-damage

Land Slump/Subsidence

Maryland Geological Survey

http://www.mgs.md.gov/index.html

Sinkholes

The Baltimore Sun

Sinkhole could close Mulberry Street for weeks; city inspector injured in fall down crater

http://www.baltimoresun.com/news/maryland/baltimore-city/bs-md-ci-sinkhole-update-20160705-story.html

Small sinkhole develops in Federal Hill

http://www.baltimoresun.com/news/maryland/baltimore-city/bs-md-sink-hole-20140606-story.html

Sinkhole repairs to Eutaw Street through Thursday evening

http://www.baltimoresun.com/news/maryland/commuting/bs-md-traffic-20150402-story.html