SUMMER 2021 | SKYWARN NEWSLETTER

THE KEYSTONE CROSSWIND

National Weather Service
State College, PA

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SUMMER SAFETY CAMPAIGN

Building a Weather-Ready Nation

The summer safety campaign began on June 1st. Help spread weather safety awareness!

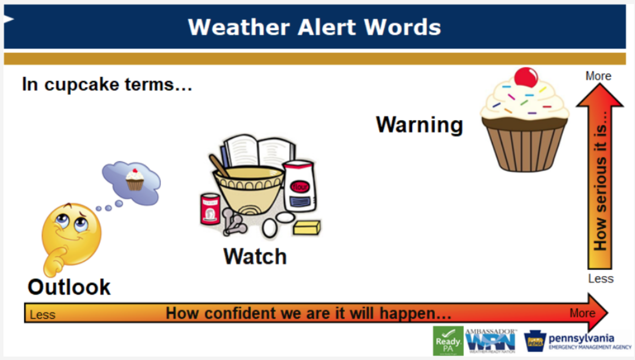
Visit the links below for outreach resources:

- Weather-Ready Nation website: https://www.weather.gov/wrn/
- Social Media Plans: https://www.weather.gov/wrn/summer2020-campaign-sm-plan
- Infographics: https://www.weather.gov/wrn/summer-infographics
- Videos: https://www.weather.gov/wrn/Videos
- Spanish-Language Content: https://www.weather.gov/wrn/summer-espanol-sm

SEVERE STATISTICS

by State Meteorologist Jeff Jumper (PEMA)

Pennsylvania is home to various types of weather, but the most damaging is often tied to thunderstorms. Most typical in the spring and summer months, thunderstorms can occur any time of the year, with hazards ranging from tornadoes to flooding rain. The National Weather Service issues watches and warnings for severe thunderstorms with the potential to produce tornadoes, damaging wind, and large hail. However, the terms WATCH and WARNING are often confused, so let's break it down.



This cupcake reference explains the NWS process for tracking severe weather from days in advance to moments before severe weather impacts an area.

Severe Thunderstorm Watch:
A watch is issued for a large geographical area (multiple counties) over a several hour period when conditions are ripe for severe weather. Think about having all the ingredients for a cupcake, but they haven't been mixed yet, so naturally you don't have a yummy, delicious cupcake. Forecasters must feel confident that all ingredients for severe weather are present to issue a watch, but storms have yet to form or have not reached the watch area.

When a severe thunderstorm watch is issued, you should prepare for the onset of severe weather within a few hours. Consider curtailing outdoor events and plans and have access to weather information, including tv, radio, and phone applications in addition to a NOAA weather radio. Stay close to a safe shelter.

STAT: Since 2006, Pennsylvania averages 32 severe thunderstorm watches per year.

Severe Thunderstorm Warnings:
A warning is issued for a smaller geographic area for a shorter period of time when severe weather is occurring or imminent. The warning typically is issued for only one or a few counties for a half hour to an hour. Using the baking analogy, your cupcakes are baked now and you're ready to eat them (it's no longer a thought, it's happening).

Severe thunderstorms are warned when a storm is capable of producing any one of the following: damaging wind in excess of 58mph, hail of at least one-inch diameter (size of a quarter), or the potential to produce a tornado. Note lightning is not warned as it is a hazard with ***every*** thunderstorm, regardless of severity. All warnings should be taken seriously. Head to a sturdy interior room away from doors and windows to ride out the storm and don't go outdoors until a half hour after the last rumble of thunder.

STAT: Since 1990, Pennsylvania averages roughly 450 severe thunderstorm warnings a year. In 2019, we peaked at 787 severe thunderstorm warnings!

Tornado Watch:
Similar to a severe thunderstorm watch, tornado watches are issued when the primary severe weather hazard is tornadoes. Issued for a large geographic region for several hours, conditions are prime for the formation of tornadoes. Damaging wind and hail are also likely, but the risk of tornadoes takes the forefront due to their violent nature.

Graphic by Meteorologist Rachel Gutierrez

Take the same precautions as a severe thunderstorm watch and be sure to be within reach of a safe place within a few seconds should a warning be issued.

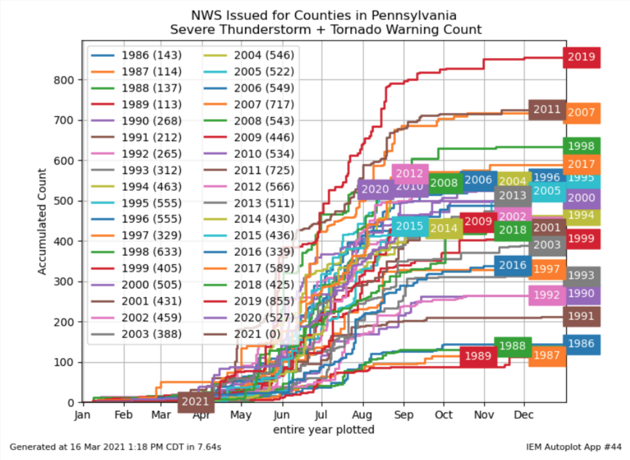
STAT: Since 2006, PA averages five tornado watches per year.

Tornado Warning

A warning typically covers a small region within a county or a few counties for about 30-45 minutes where the tornado is expected. These warnings are issued when a tornado is spotted by radar or people, and an immediate threat to life and property exist. All Pennsylvania counties have recorded tornadoes, and while most are "weak", they all cause damage and a threat to life. We have record of strong tornadoes up to EF-5 in PA counties, so don't be fooled by old tales of the mountains protecting us.

Tornado warnings should be taken with the utmost seriousness. Move to the lowest floor of your home or office, putting as many walls between you and the outside as possible. Wear helmets to protect your head. If stuck outdoors, there is no safe option. Lying flat in a low ditch or culvert is safer than a car which may be launched.

STAT: Since 1990, Pennsylvania averages 32 tornado warnings per year, peaking in 1998 at 109 warnings with 2019 taking second place with 68 warnings.



Combined severe thunderstorm and tornado warning counts issued by year for Pennsylvania since 1986. Notice most are issued between April and September shown by the rapid climb of the lines on the map. Also, 2019 was the peak year with 855 warnings issued, close to double the annual average! (Source IEM Autoplot)

NWS STORM SURVEYS

by WCM Jonathan Guseman and Meteorologist Michael Colbert

Ever wonder who determines whether or not thunderstorm damage is caused by a tornado? Or how tornadoes are classified into rankings based on the Enhanced Fujita scale?

When widespread or high-impact damage occurs from thunderstorm winds, National Weather Service meteorologists are assigned the task of completing a thorough damage survey as soon as possible. A survey team's mission is to gather data and ultimately determine the magnitude of the wind that caused the damage, along with classifying whether the wind was produced by a tornado or straight-line thunderstorm winds.

Before a survey team is deployed, the NWS will often coordinate with local Emergency Management to gain better insight as to where the damage occurred. If storm damage occurs on private property, Emergency Management may accompany NWS personnel and introduce them to the owners of the property being surveyed.

A variety of tools are used to complete a damage survey. All data points are collected using the Damage Assessment Toolkit, accessed through the Survey123 app on a mobile device. NWS meteorologists also pack a storm survey kit with other tools including a GPS unit, compass, tape measure, digital camera, an atlas or gazetteer, hard hat, flashlight, and a notebook.

After a survey team is assigned and the survey kit is prepared, the team then drives to the reported tornado damage location(s). Most commonly, a survey team will conduct a full ground survey in order to assess damage, but occasionally, a team may also conduct an aerial survey if the spatial extent of the damage is large enough and an aircraft is available. Additionally, footage from non-NWS drones may be utilized if available and offered to NWS staff for damage survey purposes.

The starting and ending points of the damage will be determined along with the path width. An attempt is made to confirm the timing of the damage through eyewitness accounts, but is often supplemented with radar data. To determine the magnitude of the wind that produced the damage, the survey team will attempt to find the worst damage.

To determine whether the damage was caused by a tornado or straight-line winds, the survey team analyzes the *pattern* of the damage. Straight-line wind damage, typically associated with thunderstorm outflow or downbursts, appears to be laid out in one general direction. Larger uprooted trees point in the same direction, or even in a fan-shaped divergent pattern, as downburst winds spread out when they come in contact with the ground. On the other hand, tornado damage often has a chaotic appearance, with larger uprooted trees often crossing each other in a convergent/twisted pattern. This is due to the upward motion of a tornado, which sucks debris towards the centerline of the tornado path. We often look at large, uprooted trees to get a true idea of where the wind was blowing from. Smaller branches/snapped trees are not as helpful, as they may fall based on the tree itself and not where the wind was coming from. Tornadoes and straight-line outflow winds are both capable of causing significant damage. In fact, straight-line wind events from strong thunderstorm downbursts are capable of producing worse damage than some weak tornadoes.

If it is determined that a tornado occurred, then the worst damage will be used to assign a rating to the tornado. The survey team will assign a damage indicator to the structure or object sustaining this damage. There are 28 damage indicators, including one or two-family residences, manufactured homes, motels, warehouses, schools, small retail buildings (e.g. fast food restaurants), and even trees. Once the structure or object has been assigned a damage indicator, the team will begin a thorough analysis of the building structure and construction. The survey team will then assign a most likely wind speed based on the degree of damage to the structure or object.

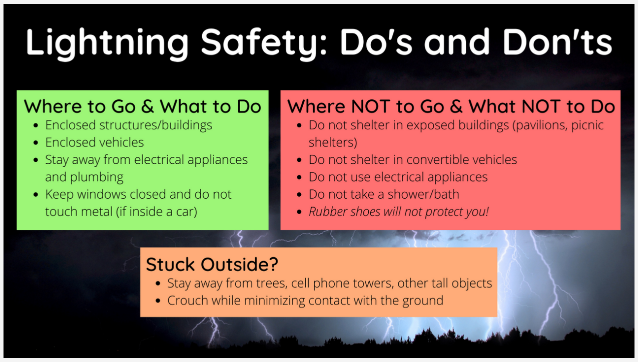
If you are interested in learning more about the damage indicators used to classify tornadoes, please see *A Recommendation for an Enhanced Fujita Scale (Texas Tech University Wind Science and Engineering Center, 2004).*

The scale used to rate tornadoes is called the Enhanced Fujita (EF) Scale. In February 2007, the new Enhanced Fujita Scale became operational and is still the scale used to rate the magnitude of tornadoes (see below).

EF Rating	Wind Speeds	Expected Damage
EF-0	65-85 mph	'Minor' damage: shingles blown off or parts of a roof peeled off, damage to gutters/siding, branches broken off trees, shallow rooted trees toppled.
EF-1	86-110 mph	'Moderate' damage: more significant roof damage, windows broken, exterior doors damaged or lost, mobile homes overturned or badly damaged.
EF-2	111-135 mph	'Considerable' damage: roofs torn off well constructed homes, homes shifted off their foundation, mobile homes completely destroyed, large trees snapped or uprooted, cars can be tossed.
EF-3	136-165 mph	'Severe' damage: entire stories of well constructed homes destroyed, significant damage done to large buildings, homes with weak foundations can be blown away, trees begin to lose their bark.
EF-4	166-200 mph	'Extreme' damage: Well constructed homes are leveled, cars are thrown significant distances, top story exterior walls of masonry buildings would likely collapse.
EF-5	> 200 mph	'Massive/incredible' damage: Well constructed homes are swept away, steel-reinforced concrete structures are critically damaged, high-rise buildings sustain severe structural damage, trees are usually completely debarked, stripped of branches and snapped.

Enhanced Fujita Scale (EF Scale)

The data we collect can be accessed by you at: https://apps.dat.noaa.gov/StormDamage/DamageViewer/ (data points collected on surveys) and https://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=42%2CPENNSYLVANIA (available a few months later after published in Storm Data)



Graphic by Meteorologist Rachel Gutierrez

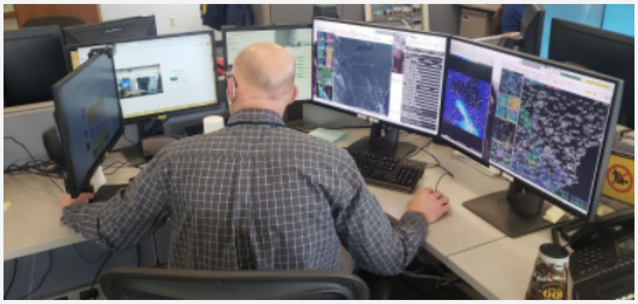
NWS STATE COLLEGE STUDENT VOLUNTEER PROGRAM

by Meteorologist John Banghoff

Over the years, NWS State College has had an excellent relationship with Penn State University and Millersville University through our immersive student volunteer program. Each semester, 1 or 2 undergraduate students have joined us for a few hours a week to learn about the NWS, work on a project or two, and gain invaluable experience for their future careers. During the spring of 2020, the pandemic threatened the student volunteer program, which had always been 100% in person.

Through the summer of 2020, the CTP Student Volunteer Team worked diligently to transition the program to a fully virtual format while ensuring that the core aspects of the in-person experience were preserved. NWS CTP hosted 2 students in the fall and 3 students in the spring. Each student was assigned a primary mentor, with whom they met weekly or bi-weekly to discuss progress, ask questions, and learn from the expertise of area program leads (fire weather, aviation, winter, etc.).

A staple of the volunteer program has always been opportunities for students to shadow forecasters as they look at computer models, monitor observations/radar, make the forecast, and create text products such as the Area Forecast Discussion (AFD). Having their names at the end of an AFD is a highlight for any student volunteer! Thanks to the wonder of webcams and some creativity by our staff (see Lead Forecaster Mike Dangelo below), students were able to watch the entire forecast process as if they were in the office!



The caliber of students coming through our volunteer program continues to be impressive. From our office's perspective, the work the students complete as a part of their projects is incredibly valuable. Each semester, student volunteers are able to select from a variety of projects we've outlined or they can choose their own. A few of the projects our students have been involved with in the past year (completely virtual) include: identification of populations vulnerable to severe weather in Central PA (mobile homes, state parks, Amish communities, fairgrounds, etc.), spatial extent and frequency of severe weather in PA, improved service to Amish populations in Central PA, Weather-Ready Nation Lecture Series content design, Awareness Week social media content, past weather event webpage design, detection of snow squalls using radar, and a freezing rain climatology. Our students cover a wide scope and have done an incredible job during the limitations of the pandemic!

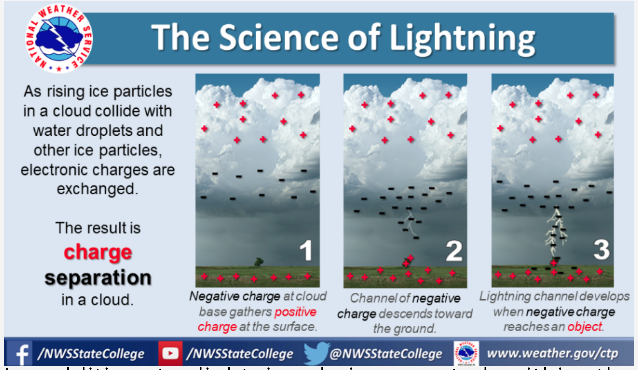
By all accounts, the virtual experience has been a success. One student said, "I thoroughly enjoyed having conversations with each of the meteorologists around the office ... I learned that there are a large variety of passions that place people on the NWS career path other than forecasting" As for the impact the student volunteer experience had on their career trajectory, another student remarked, in regards to learning about DSS and the social science aspect of the NWS, "[The student volunteer program] certainly allowed me to see that there is space for everyone within the weather service and I would be excited to work for the weather service after grad school." For another student, who is interested in becoming a teacher, the volunteer program "furthered my goal of teaching and working with others as a career." As a researcher who is working at Colorado State University this summer, another student remarked, "I was not aware of the research opportunities presented by the NWS ... I now will certainly consider working with the NWS in the future!" And, last but not least, one of our students will be joining us in State College this fall as she starts graduate school at Penn State. As a result of the volunteer program, she said she wants to "work for an NWS WFO, RFC, or National Center" and "found that the program areas that resonated with [her] most were outreach, severe weather, and hydrology."

SOME ENLIGHTENMENT ON LIGHTNING

by Meteorologist Steve Travis

Lightning is a fascinating phenomenon that occurs every year all across Pennsylvania. Have you ever wondered how lightning forms? Or perhaps how to stay safe if you are outside and hear that low rumble from an approaching thunderstorm? Keep reading to find out!

Thunderstorms are composed of countless water droplets, ice crystals and graupel. Graupel is a small, soft ice pellet that forms when water droplets freeze onto a snow crystal in a process called riming. Rising and sinking air within the storm causes the graupel to crash into water droplets and ice particles. This collision leads to a separation of electrical charge; the graupel takes on a negative electrical charge and the other particles take on a positive charge. Since graupel (negative charge) is heavier than the water and ice crystals, it sinks to the lower part of the storm cloud while the lighter particles (positive charge) collect higher up in the cloud. Eventually the separation of charge becomes so large that a channel forms between the positive and negative regions. The resulting electrical transfer within that channel is what we see as lightning!



In addition to lightning being created within the thunderstorm cloud, lighting can be created in a channel between the cloud and ground. Known as cloud-to-ground lightning, the channel forms outside of the cloud due to the charge difference between the base of the cloud and the ground.

The majority of lightning, about 75-80 percent, occurs with the storm cloud, with the remaining 20-25 percent occurring between the cloud and the ground.

Lightning is extremely hot, in fact it can reach temperatures as high as 54,000˚F. Lightning rapidly heats the air around it in less than a second, which causes a shock wave of expanding and contracting air that moves at the speed of sound away from the lightning channel. This shock wave is what we hear as thunder!

We see lightning before we hear thunder due to how fast light and sound waves travel. The flash of light that we see as lightning travels at the speed of light to our eyes (about 186,000 miles per second), while thunder travels at the speed of sound (about 0.21 miles per second). It takes sound waves about five seconds to travel one mile, so if you count the number of seconds between the flash of lightning and the sound of thunder, then divide that number by five, you'll get how many miles you are away from the lightning! Remember, if you're close enough to hear thunder then you're close enough to be struck by lightning which is why we always say "When thunder roars, go indoors!"

So now that we understand how lightning works, what can we do to stay safe from it? One of the best ways to stay safe in a lightning storm is to plan ahead. Check the forecast and know when there is a risk for thunderstorms. If you plan to be outdoors, make sure you have a safe place to take shelter if needed. The best shelter locations are either in a building or in a car. If you're out camping, a tent is not a safe place to be; instead, make sure you can go to a sturdy structure or your vehicle as soon as possible. You should never take cover under a tree or other object that could act as a conductor to lightning. Remember, lightning can strike as far as ten miles away from a thunderstorm, so even if you can only hear thunder or see a distant lightning strike, you could still be in danger and should take cover until the storm has passed.

For more information on lightning and how it works, be sure to check out www.weather.gov/jetstream/lightning. The website www.ready.pa.gov also has some great information on lightning awareness and safety. Remember that lightning awareness week runs from June 20th to the 26th this year, so keep an eye out for all sorts of interesting information from the NWS State College and our partners!

Graphic by Meteorologist Rachel Gutierrez

CLOUDS

by Meteorologist Michael Colbert

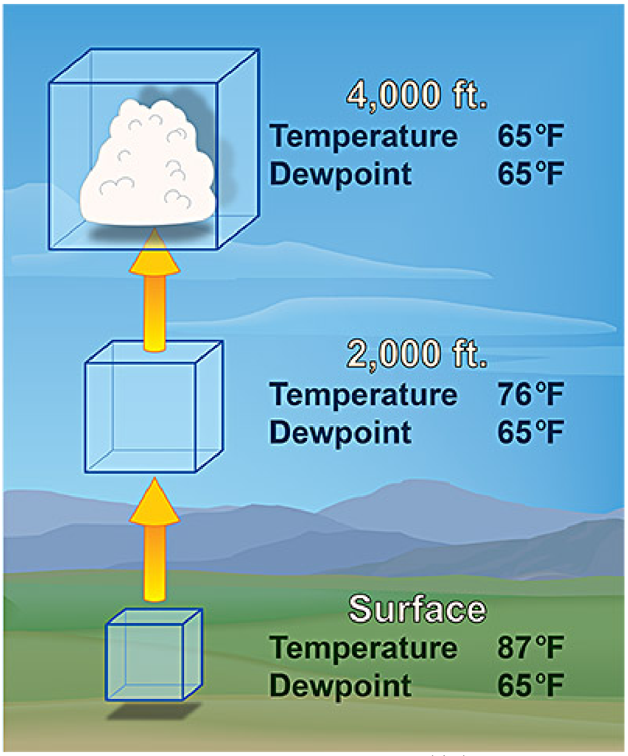
What do you think when you look up at the clouds? Do you imagine fantastical beasts within them, or think about how the unique shape of a cloud looks a lot like a particular animal? Do you use the clouds as a gauge for how close the rain is, or whether thunder is likely on a summer day? Do you ever think about what must be going on in the atmosphere to get clouds of a particular shape or color?

The official NWS glossary defines a cloud as “a visible aggregate of minute water droplets or ice particles in the atmosphere above the Earth's surface.” A simple definition for a fascinating phenomena. What makes clouds so fascinating is their wide breadth of shapes, heights, depths, colors, and behaviors - all of which can tell you something about the state of the atmosphere above you.

How Do Clouds Form?

Clouds form when air containing a sufficient amount of water vapor rises up in the atmosphere and cools enough for the water vapor to condense into liquid water droplets. If the cloud is cold enough, some of the liquid droplets will freeze as they come into contact with ice nuclei, which can be in the form of aerosols like pollen or dust, or even tiny fungal spores or bacteria. Other liquid drops will stay liquid even with temperatures below freezing, in a state known as “supercooled liquid.” In very cold cases (colder than -35˚F), water vapor can undergo deposition to form ice crystals, skipping the supercooled liquid phase.

There are many mechanisms in the environment that can provide the lift necessary for cloud formation. In the middle and upper atmosphere, clouds such as cirrus and altostratus can form as air circulates around the jet stream or glides over frontal boundaries. At lower altitudes, clouds can form when moist air blows across a mountain or a ridge and is forced to ascend. Even in the absence of terrain, fair weather cumulus clouds can form within thermals of warm, moist air rising up from Earth’s surface.



Graphic by NWS JetStream

What determines the cloud level?

The height of the cloud level depends on how moisture and vertical motion vary with altitude. Clouds are typically lower to the ground when the relative humidity is higher. The most extreme example is fog, which is a cloud of residing just above the ground. Fog forms when air has a relative humidity exceeding 100% (supersaturated) and the atmosphere is stable enough to prevent the fog from mixing with drier air above. This air does not need to be lifted and cooled, because condensation is already occurring. However, if the relative humidity of the air is less than 100%, the air must be lifted and cooled for a cloud to form. ted with its formation. Next time you are on an airplane, take note of how many decks of clouds you fly through!

If the source of air forming the clouds is near the Earth's surface (e.g. fair weather cumulus forming within thermals) then the cloud level can be predicted by computing the "lifted condensation level (LCL)." The theory behind the LCL is that the temperature of rising air parcels containing water vapor will fall at a constant rate of 9.8˚C per kilometer (5.4˚F/1000ft), while the amount of water vapor in the air parcel remains constant. The level at which the temperature of the air parcel becomes equal to the dew point of the parcel is the LCL. This height is typically the base of clouds.

Of course, not all clouds form from air originating near the ground. Clouds in the middle and upper atmosphere typically tap into layers of moisture aloft that were carried by upper level winds. Sometimes, there can be multiple "decks" of clouds, each having its own cloud level. Each deck has its own moisture source and some lifting mechanism associated with its formation. Next time you are on an airplane, take note of how many decks of clouds you fly through!

What determines cloud shape?

Clouds can take on all sorts of shapes. One important characteristic of clouds is their degree of smoothness or roughness. A cloud that takes the form of a smooth sheet or layers is a type of "stratus" cloud. It forms in stable air with minimal vertical acceleration. On the contrary, a cloud characterized by more roughness contains air that accelerates as it rises upward. These clouds have the prefix "cumulo", which is Latin for "heaping or piling up" (e.g., cumulus, cumulus congestus, cumulonimbus).

Clouds that are smooth, forming in stable air with minimal vertical acceleration, can act as tracers as air gently glides over terrain features. When wind blows across a mountain range or ridge line, if the air is stable and sufficiently moist, mountain waves can develop, forming flying-saucer-shaped lenticular clouds, or undulating asperatus clouds.

Pileus Cloud

What determines cloud depth?

The depth of a cloud, or height from the cloud base to the cloud top, can tell you a lot about the atmosphere. For stratus clouds, deeper stratus signifies that the layer of increased atmospheric moisture is deep and that air is slowly rising within that layer of moisture. As the stratus becomes thicker and deeper, liquid droplets and ice crystals within the cloud may grow big enough to produce precipitation. If that is the case, the precipitating stratus cloud is called "nimbostratus."

Cumulus clouds grow taller in the presence of thermal instability, which is a state of the atmosphere where temperature decreases rapidly with altitude. When the temperature near ground level is much greater than air temperature aloft, warm air rising from the surface tends to accelerate rapidly through the colder air aloft, due to warmer air being less dense. Cumulus congestus, also known as towering cumulus, signify developing updrafts with air accelerating as it rises upward. If the atmosphere is sufficiently unstable the towering cumulus can grow into a cumulonimbus cloud, the name given to clouds that produce lightning and thunder. In the presence of extreme instability, these clouds can reach 50,000 to 60,000 feet into the atmosphere. They contain large amounts of liquid droplets, ice crystals, and even hail, all of which collide and produce electrical charge separations that lead to lightning.

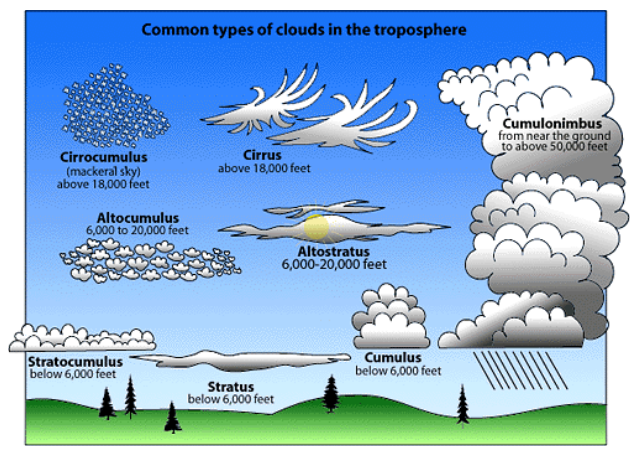
Kelvin-Helmholtz Waves

What determines cloud color?

The color of a cloud can tell you quite a bit about the weather. Cloud color is determined by the interaction between light and the liquid water and ice contained within the cloud. Darkness of a cloud depends on the "optical thickness" of the cloud, or how much liquid and ice matter exists between the sun and the part of the cloud that you are viewing. The bottoms of clouds become darker as clouds grow taller and contain greater concentrations of ice crystals and water droplets. In addition to shades of white and gray, clouds can contain red or green tints when they contain hail or large raindrops, which preferentially scatter and absorb various parts of the light spectrum, depending on the time of day and the angle of the sun in the sky.

How are clouds named?

Clouds are named based on three main factors - the cloud shape, cloud level, and whether the cloud is producing precipitation. As we mentioned earlier, clouds that are puffy or heaped are called "cumulus" or have "cumulo" in their name, while clouds that form in smooth blankets are called "stratus" or have "strato" in their name. Clouds that form in midlevels of the atmosphere receive the prefix "alto", while clouds forming at upper levels have the prefix "cirro." For example, puffy clouds that form in the midlevels of the atmosphere are called "altocumulus." Stratus clouds that form in the upper levels of the atmosphere are called "cirrostratus." Clouds that produce precipitation have the term "nimbo" in their name, like nimbostratus and cumulonimbus.There are also hybrids - like stratocumulus clouds, which are still puffy but beginning to come together to form a blanket of clouds, more like stratus - and special types of clouds like lenticular clouds, which are lens shaped. You can learn about all these clouds and more at https://www.weather.gov/jetstream/cloudchart



Graphic by UCAR

Send us your cloud photos!

Hopefully you just learned something new about clouds! One more thing to tell you - we love when people send us cloud photos on social media! If you ever snap a photo of an interesting cloud near you, please consider sharing it with us on Facebook, Twitter, or Instagram @NWSStateCollege.

Happy cloud watching!

Graphic by Meteorologist Rachel Gutierrez

A DRY 2021 SO FAR

by Meteorologist Dave Martin

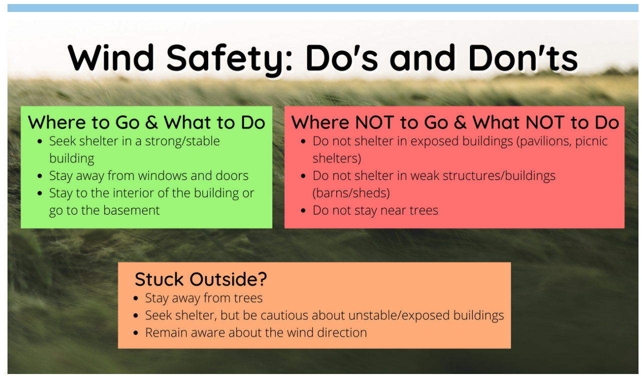
Much of 2018 saw widespread heavy to extreme rainfall events. Even into 2019 and the first part of 2020 central Pennsylvania had several widespread heavy rainfall events. The last large-scale extreme rainfall event that helped ease off the dry conditions across central Pennsylvania and much of the northeast occurred the day before Christmas. This was especially the case for portions of New England, which were having a severe drought across much of the region. Upwards of 2 to 4 inches of rain fell across the southern tier of New York and central Pennsylvania on the 24th of December 2020. This rainfall combined with runoff from a deep snowpack across north central Pennsylvania and the southern tier of New York resulted in river flooding across our area.

While we have seen dry periods so far this year, the distribution of the rainfall has allowed folks to get field work done much easier than in recent years. Much of the western half of the country has been and remains in widespread extreme drought conditions. Portions of the eastern states have been in D0 (abnormally dry) to D1 (moderate drought) drought conditions at times. This was especially the case a few weeks ago across portions of western New York, southward into northwestern Pennsylvania. April was a warm and dry month across central Pennsylvania. Temperatures the first part of May took a turn to below normal, with temperatures averaging 2 to 8 degrees cooler than normal. Also we saw more in the way of cloudy and wet conditions, especially on Sunday, May 9th.

The combination of these conditions has helped soil moisture conditions and stream flows return to more typical levels for this time of year. Upwards of 1 to 4 inches of rain has fallen in recent weeks. Only a few areas across the eastern states are abnormally dry now. The exception is a small area across the central Great Lakes region which is still in moderate drought conditions. In our area only a small area of northwest Pennsylvania is still in the D0 (abnormally dry) outlook as of May 13th.

As of the middle part of May, Harrisburg has received 1.68 inches of rain for the month. The total for the year so far is 12.98 inches, just under 2 inches short of normal value for the year. Last year we had received 15.95 inches of rain up to this time in Harrisburg. As of the middle of part of May, Williamsport has received 2.04 inches of rain for the month. The total for the year so far is 11.67 inches, just over 2 inches above the normal value for the year. Last year we had received 15.14 inches up to this time in Williamsport.

Overall the period January to April this year is the 18th driest on record for this 4 month period since 1895 for the northeast states. Average departure from normal was 2.31 inches. The 12 month period ending in April was the 5th warmest for the northeast states. The average temperature departure from normal for this period was 3.0 degrees above normal.



Graphics by Meteorologist Rachel Gutierrez

NEWS IN NATURE

by Meteorologist Dave Martin

INSECTS – NEW INFORMATION

A new item of interest this Spring is the year of the Cicadas. Upon growing up in western New York as a kid, we would hear them in the evening. A few days later we would find their empty shells.

This year billions of Cicadas will be popping out of the ground across the eastern United States. The main area is from New York State, southward to Tennessee. This area includes central Pennsylvania. These cicadas are part of a group called Brood X, known at the Great Eastern Brood. The cicadas have been underground for 17 years. They have been tunneling and feeding beneath the soil. The cicadas will look for a mate upon getting about the ground. They make a loud noise for their size. The males will spend their time making this mating song to find a mate. The loud noise is made by flexing an organ called a Tymbal.

We are lucky to live in an area where we have a 17 year cycle of Cicadas. Periodical Cicadas only occur in the eastern United States. Aside from being a nuisance in large numbers, they are largely harmless. They will play dead when threatened. They can be as long as 2 inches. There are thousands of different Cicada species.

Once the soil gets to be warmed up to 64 degrees, they will start to emerge. Recent cold snaps have delayed the Cicadas emergence, especially across northern areas. Cicadas normally come out in large numbers at the same time to protect each other.

A big problem for Cicadas is the Zombie Fungus. This fungus is present in the soil but is dormant for 13 to 17 years. The fungus will emerge when the Cicadas do. Other threats to the Cicadas are bats, birds, squirrels, wasps, robber flies, mantis, ants, and nymphs.

The diet of a Cicadas consist of the sap from various species of trees like oak, willow, ash, and maple. They control their body temperature by consuming large amounts of sap.

Cicadas have been used in folk medicine, as money, and even to forecast the weather. Cicadas were eaten in Ancient Greece, and are consumed in China and many other counties today.

Once the Cicadas have emerged they will mate, lay eggs, and live about 5 to 6 weeks before they shed their shells and die. Get ready to enjoy the show this warm season.

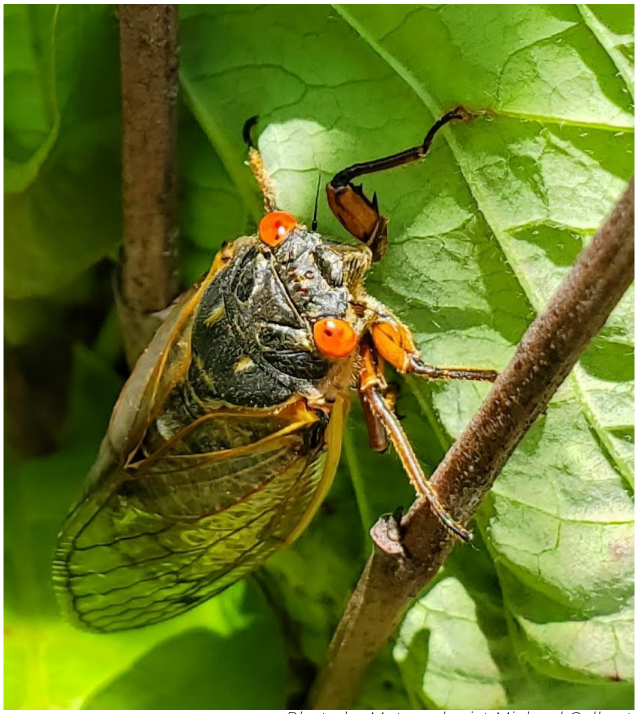


Photo by Meteorologist Michael Colbert

MONARCH BUTTERFLY - UPDATE

The number of Monarch Butterflies this winter in Mexico was up to the highest numbers in 12 years. Good news for a change. The butterflies occupied just over 6 hectares. This is the largest area since 2006-2007. The least on record was just under .7 hectares in 2013-2014. For reference and comparison a hectare is 2.47 acres. Thus one is working with a rather small parcel of land to start with.

The University of Guelph in Ontario, Canada said this is an improvement, but more conservation is needed along the butterflies route. It is estimated that 6 hectares are needed for the butterfly to survive. The current increase was due to weather conditions not being too hot or cold.

Folks should remember to preserve and plant native milk weed. Monarch Butterflies need this plant to survive and breed.

NEWS CLIMATE NORMALS

by the National Centers for Environmental Information

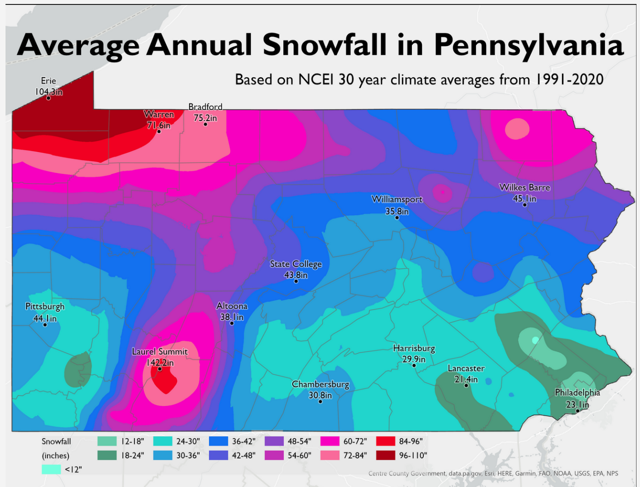
Decadal update from NCEI gives forecasters and public latest averages for 1991–2020

NOAA's new [U.S. Climate Normals] give the public, weather forecasters, and businesses a standard way to compare today's conditions to 30-year averages. Temperature and precipitation averages and statistics are calculated every decade so we can put today's weather into proper context and make better climate-related decisions. Normals may be familiar to most Americans by their inclusion in local daily weather information from television, radio, print, and digital media. Not only do Normals indicate how conditions measure up for the nation as a whole, but also for specific locations—from Bangor, Maine, to San Diego, California. And, from Nome, Alaska, to San Juan, Puerto Rico. U.S. Climate Normals are designed—and best-suited for—better understanding what is happening today. Rather than assess long-term climate trends, Normals reflect the impacts of the changing climate on our day-to-day weather experience. Normals are not merely averages of raw data. Thirty years of U.S. weather station observations are compiled, checked for quality, compared to surrounding stations, filled in for missing periods, and used to calculate not only averages, but many other measures. These then provide a basis for comparisons of temperature, precipitation, and other variables to today's observations. Supplemental Normals for the 15-year period 2006–20 are being released simultaneously with conventional 30-year Normals for users who require information for periods closer to the present.

Why Update U.S. Climate Normals?

Member states of the World Meteorological Organization (WMO) are required to calculate their country's normals at ten-year intervals. Countries follow recommendations by the WMO, which provides a framework for international cooperation among meteorologists, climatologists, and hydrologists.

The decadal update is the equivalent of the Census for those who use the data. It replaces the previous set of U.S. Normals, which cover all 50 states and U.S. territories such as Puerto Rico and Guam. NCEI and its predecessors have been the official source for U.S. Climate Normals since the 1950s. New data come from approximately 8,700 National Weather Service stations operated by NOAA, which include Automated System Observing Stations (ASOS) and Cooperative Observer Program (COOP) stations. Normals provide information about national and localized average temperature and precipitation as well as other parameters, such as snowfall, heating and cooling degree days, frost and freeze dates, and growing degree days. For more information, please visit https://www.ncei.noaa.gov/news/noaa-delivers-new-us-climate-normals.



Graphic by Meteorologist Amanda Wagner