FALL 2023 | SKYWARN NEWSLETTER

THE KEYSTONE CROSSWIND



National Weather Service State College, PA



What's inside?

- SNOW SQUALL **SAFETY**
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WINTER SAFETY CAMPAIGN

Building a Weather-Ready Nation



The Winter safety campaign runs annually from December 1st to March 1st.

See below for outreach resources.

- Social Media Plans: https://www.weather.gov/wrn/wintercampaign-sm-plan
- Infographics: https://www.weather.gov/wrn/infographics_winter
- Videos: https://www.weather.gov/wrn/Videos

SNOW SQUALL SAFETY

by Senior Meteorologist Greg DeVoir and Meteorologist John Banghoff

When you think of winter weather hazards, what comes to mind? Do you think of big snow storms that drop a significant amount of snow? Do you think of ice storms weighing down trees and powerlines, and encasing roadways in a glaze of ice? Or maybe you think of flooding that can occur when a storm drops heavy rain on top of melting snow, overwhelming creeks, streams, and rivers with water.

While Pennsylvania sees many forms of hazardous winter weather, snow squalls are arguably the most dangerous. A snow squall is a brief but intense period of heavy snow (up to 2 inches in 30 minutes), strong winds (30+ mph), and whiteout conditions (visibility less than ¼ mile). Snow squalls often occur on days with otherwise partly cloudy skies. Coming on suddenly, snow squalls can catch drivers off guard and lead to major transportation impacts, including deadly multi-vehicle accidents.



One of the things that makes snow squalls so dangerous is their tendency to produce icy roadways through a flash freeze. Since snow squalls usually occur on days with partly cloudy skies, road surface temperatures can start off well above the freezing point before snow squalls arrive. When the snowflakes start to fall, they initially melt on the warm road surface, making the road wet. However, as the snow becomes heavier and air temperatures fall, the road surface cools and liquid water turns to ice. Ice can also form on road surfaces that start out below freezing, especially when moving traffic drives over fallen snow, packing it down and warming it just enough to melt and then refreeze, forming a dangerous sheet of ice.



In 2018, the National Weather Service began issuing Snow Squall Warnings to alert for the sudden onset of life-threatening conditions encountered by highway travelers during snow squalls. The warnings are "short-fused," only issued for up to about 1 hour, and are designed to be acted upon immediately. To make sure that the public receives them, these warnings activate the Wireless Emergency Alert system and will push audible alert notifications to smartphones.

If you are driving on an interstate when a Snow Squall Warning is issued, the best thing to do is to exit the roadway at the next opportunity. If you're caught driving on a highway during a snow squall, avoid slamming on your brakes, turn on your headlights and hazard lights, stay in your lane, and increase your following distance. In the event that you're involved in a snow squall pileup, do NOT stand outside your vehicle. It's best to get as far away from the road as possible if you can do so safely. If exiting the roadway is not possible, stay in your car with your seatbelt fastened.

Before you get on the road this winter, make sure you are weather-aware. Check the NWS forecasts at weather.gov and on social media. If a Snow Squall Warning is issued by the National Weather Service, delay highway travel until after the snow squall moves through. Use the 511 PA App or visit 511pa.com to check the latest traffic conditions, traffic speeds, and live camera images. Visit www.weather.gov/ctp/snowsquall to learn more.

THERE IS NO SAFE PLACE ON A HIGHWAY DURING A SNOW SQUALL

What is a snow squall?

- A brief but intense period of heavy snow, strong winds, and whiteout conditions.
- Can cause roads to become icy.

What is a snow squall warning?

- Issued for areas that will be impacted by snow squalls.
- Will trigger an alert on your cell phone if significant impacts are expected.

ADDITIONAL LINKS

penndot.gov/winter weather.gov/ctp/snowsquall

If a snow squall warning is issued, what should I do?

Avoid or delay motor travel until the squall passes through your location.



What if I am already traveling?

Safely exit the road at the next opportunity.



What if I cannot exit the road in time?

- · Slow down gradually.
- Turn on your headlights and hazard lights.
- Stay in your lane.
- Increase your following distance.
- Avoid slamming on your brakes.

Use the 511PA App!





511

iPhone

Android

Download this FREE app to get:

- · Traffic conditions
- Traffic speeds
- Live traffic camera images
- Highway construction updates
- Weather
 conditions and alerts

#SnowSquallSafetyPA



NO PRESSURE: LOW Pressure extremes Across central pa

by Senior Meteorologist Mike Dangelo

Recently, Dave Roth at the NWS Weather Prediction Center in DC compiled a map of the extreme Sea Level Pressure readings (and the date of occurrence) for many long-term reporting sites across the entire United States. Dave's results were fascinating. The lowest pressure readings were of particular interest.

Many people remember the "worst" storms they ever encountered. Those events are usually associated with areas of very low (deep) pressure. Low pressure areas pull in moisture from hundreds of miles away, which further decreases the central/lowest pressure in the storm. Why? Water vapor weighs less than most of the other components of the air in which we live and breathe. Thus, the weight of the air overhead - the atmospheric pressure - becomes lower. Conversely, colder, drier (less moisture) air is associated with areas of high pressure, and relatively fair weather.

The lowest pressures recorded at all sites in Central PA over the last 60 to 110 years (depending on each site's period of record) fell on one of two dates.



January 26-27, 1978: The Blizzard of 1978
Oct 29-30: Hurricane Sandy
March 13, 1993: The Superstorm

The Blizzard of January 1978 holds the lowest pressure record for most of Pennsylvania. The remnants of Hurricane Sandy, Oct 29, 2012, made the lowest pressure for the Lower Susquehanna Valley and the rest of the southeastern piedmont. The atmospheric pressure is reported in a unit called "millibars (mb)" or in "inches" of mercury (in Imperial units). See the chart below for the details. For reference, typical sea level pressure readings are normally +/- 20 of 1000 mb.

Location	Lowest Pressure (mb)	Date
Williamsport	967.8	28 Jan 1978
Harrisburg	966.1	29 Oct 2012
York	963.1	29 Oct 2012
DuBois	965.7	28 Jan 1978

WINTER WEATHER REPORTING

by Warning Coordination Meteorologist Jonathan Guseman

Winter or cold season SKYWARN reporting criteria is a bit different than that of the warmer seasons when we experience thunderstorms. The National Weather Service greatly appreciates any and all reports of snow and ice accumulations. The below graphic gives some general guidelines for measuring snow.



How to accurately measure and report snow

If ice accumulates on a radial surface, such as a tree branch, we ask that you please measure the ice on each side of the branch, average the two measurements, then send that average measurement into us.

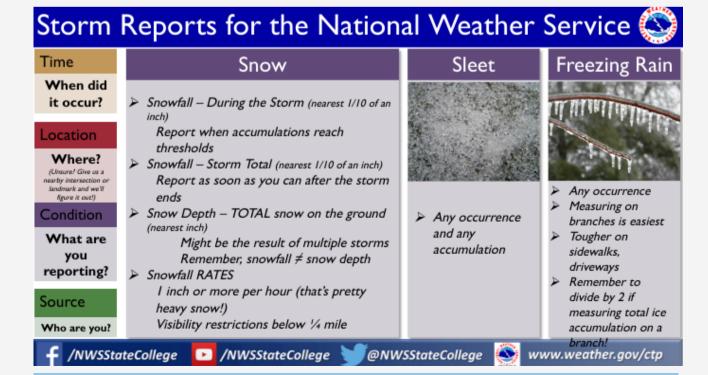


How to accurately measure and calculate ice accumulation

If we are in a weather setup where we may be experiencing multiple precipitation types (rain, snow, sleet, freezing rain), we ask that you please let us know what precipitation type you are experiencing! This is very helpful in keeping our forecast and warning information as up-to-date and accurate as possible.

Of course, we always want to know about any flooding concerns, which in the winter may include flooding due to snow melt or ice jams. Wind damage is still solicited as well, even though it would likely be from non-thunderstorm winds in the winter months.

For additional information on the NWS State College Spotter Program and to learn how to become a weather spotter for the National Weather Service, please visit https://www.weather.gov/ctp/SkyWarn.



EL NIÑO TO DRIVE WINTER OUTLOOK 2023-2024

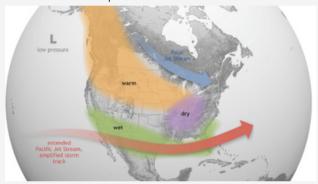
by Senior Meteorologist Matt Steinbugl

For the first time in four years, El Niño conditions or above average sea-surface temperatures are in place across the central and eastern equatorial Pacific Ocean. Other tropical atmospheric anomalies, such as low and upper-level wind speed and direction, along with thunderstorm activity from Indonesia to around the International Date Line are consistent with and strongly reflect the El Niño signal.

This year's warm episode is forecast (with high confidence | 75-85% chance) to be a strong event with a 3 in 10 chance of reaching the "historically strong" category. (Strong events are classified by an aggregate oceanic nino index or ONI >= 1.5°C). There have only been 2 "historically strong" El Niño events that have occurred during the meteorological winter months (December-February) since 1950: 1997-1998 and 2015-2016. El Niño is anticipated to continue through the Spring, with an 80% chance during March-May 2024.*

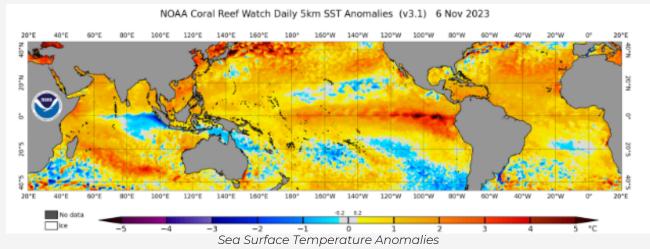
With an El Niño winter a forgone conclusion at this point, you might be asking yourself why it should matter that the tropical Pacific Ocean is much warmer than average and how can that [being thousands of miles away from the continental United States] impact the weather in Pennsylvania? Well, it turns out that El Niño often results in changes in the patterns of temperature and precipitation across many parts of the globe, including North America.

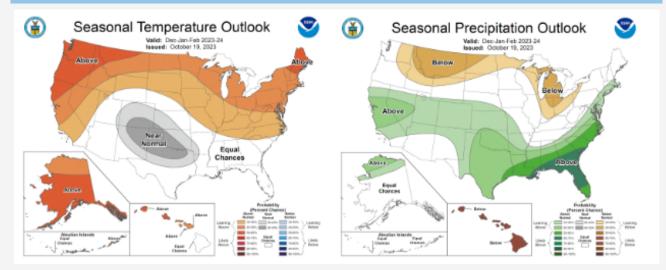
By examining seasonal climate conditions from previous El Niño years, atmospheric scientists have identified a similar set to typical impacts associated with these events. Now we must caveat that "associated with" does not mean that these impacts happen during every El Niño episode; rather they happen more often than you'd expect by chance so there is some predictive skill embedded in the seasonal or 3-month probabilistic forecasts. The weather impacts, which can be significant, are largely due to shifts in the jet stream. The warmer waters over the Pacific Ocean effectively cause the jet stream to move south of its neutral position and extend farther east across the southern tier of the United State with an amplified storm track. This southward shift most often leads to wetter conditions than usual conditions in the southern U.S. and warmer and drier conditions across parts of the northern U.S.



A typical El Nino Pattern

The official 2023-2024 NOAA U.S. Winter Outlook released from the Climate Prediction Center - a division of the National Weather Service - calls for warmer-than-average temperatures for the northern tier of the continental U.S. The greatest odds for warmer-than-average conditions are in Alaska, the Pacific Northwest and northern New England. For Pennsylvania, the outlook indicates a lean in the odds (40-50% chance) toward above average temperatures.

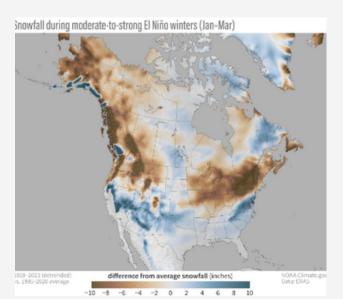




While odds favor a mean temperature during the December-February period in the warmest third of the historical 30-year period, it is not the only possible outcome. There is at least a 33% chance of being near-normal, with the lowest probability outcome being below or colder than average.

The seasonal precipitation outlook is a lower confidence forecast, with equal chances or evenly split probabilities for below, near, or above average precipitation. This is often the case in our region given the lack of a strong and consistent climate signal.

Snowfall patterns are even more flakey. Snowfall during El Niño winters (January-March) compared to the 1991-2020 average show a fairly consistent signal toward below average snowfall across much of the Commonwealth. The signal is even more amplified when examining strong El Nino winters which is what we expect for this upcoming season.



If we examine snowfall observed at the State College COOP site during strong El Nino winters, the variability in snowfall is clearly evident. Out of the 4 strong El Nino winters since 1950, it was a split decision; the winter of 1991-1992 and 2015-2016 saw snowfall totals below the 30-year climate average (26.1" and 16.5" or -10.8" and -20.4" respectively) while the winter of 1997-1998 and 2009-2010 observed snowfall above average (48.2" and 49.1" or +11.3 and +12.2").

Lastly, a long shot forecast: Since 1950, there have only been 4 occasions where ENSO conditions have transitioned from La Niña to Neutral to El Niño within the same year: 1976, 2006, 2018, and now most recently ... 2023. 2023 not only follows an ENSO transition from La Niña to Neutral to El Niño, but also comes on the heels of a triple dip La Niña. This has only occurred 1 other time since 1950 and that year is 1976. Using 1976 as a possible analog (sample size = 1) and examine the weather pattern during the following winters of 1976-1977 and 1977-1978.

It turns out the winter of 1976-77 was brutally cold in the Midwest, Ohio Valley, and Northeast U.S. It was the coldest winter on record in Indianapolis, Columbus, Cleveland, Pittsburgh and Philadelphia. Specifically in central Pennsylvania, the winter of 1976-77 was very cold, ranking 7th coldest at Harrisburg, 4th coldest at State College and Williamsport, 2nd coldest at Altoona and the coldest winter on record at Bradford. The winter of 1977-78 was also very cold with many sites in central Pennsylvania recording a top-10 coldest winter. While the winter of 1976-1977 was not abnormally snowy, the following winter season 1977-78 certainly was with 2 of the top 15 ranked storms (#10 and #15) on NESIS.

NATIONAL WEATHER ASSOCIATION ANNUAL MEETING RECAP

by John Banghoff, Jonathan Guseman and Michael Jurewicz

The National Weather Association (NWA) is a professional association that has supported and promoted excellence in operational meteorology and related activities since 1975. Each year in late August or early September, members of the NWA gather for the Annual Meeting to network, present research findings, and collaborate on areas of common interest. The 2023 Annual Meeting was held in Kansas City, MO September 9th through 13th and this year's theme was Continual Growth and Development. Three of us attended the Annual Meeting: Science Operations Officer Michael Jurewicz, Sr., Warning Coordination Meteorologist Jonathan Guseman, and Meteorologist John Banghoff.



The Annual Meeting kicked off on Saturday with the Student and Early-Career Session. John was part of the planning committee that put together the lineup of speakers and activities. John oversaw an interview workshop where students got to practice mock interviews. Jonathan led a brief discussion on applying for jobs in the NWS and he and Michael both participated in speed mentoring - a speed dating-style activity that allowed students to rotate through 11 stations and interact with professionals from a variety of sectors in the weather community: broadcast, NWS, emergency management, private sector, military, academia, etc.

On Sunday, we participated in the Broadcaster's Workshop alongside television meteorologists from across the country. A highlight of the day was participating in a breakout session with the Storm Prediction Center (SPC) and social scientists. During this session, meteorologists from SPC talked about some of the ways they are seeking to improve their products such as the Severe Weather Outlooks. Social scientists provided an update on their findings related to how the public interacts with SPC products. One big finding was that the words associated with outlook levels (marginal, slight, enhanced, moderate, high) are confusing to the public and using numbers (1 - 5) is a better way to communicate. NWS State College will work to incorporate that finding in our severe weather outlook and excessive rainfall outlook graphics for



Road Weather Information System (RWIS) data for winter weather monitoring

On Tuesday, Michael Jurewicz presented about NWS State College's partnership with PennDOT District 2 during the last couple of winters. District 2 covers McKean, Potter, Elk, Cameron, Clinton, Clearfield, Centre. Mifflin. and Juniata Counties and is responsible for a long stretch of Interstate 80 that is often impacted by winter weather. This relationship has led to PennDOT sharing Road Weather Information System data with us so that NWS meteorologists can view road cameras and surface conditions in real time. Reciprocally, NWS State College provides phone calls and webinar briefings to PennDOT ahead of impactful weather events including snow squalls and synoptic storms. This partnership has been very fruitful and we look forward to continuing to improve our relationship in the future.

On Wednesday, Jonathan and John were part of an hour-long session focused on providing weather support to the Amish and Plain Communities. Pennsylvania has the largest Amish population of any state with nearly 90,000 people.

During this presentation, we discussed how the Amish generally do not have access to computers or cell phones and therefore are unable to receive weather information through most of the ways that the National Weather Service provides it.



Because of their inability to access weather information, they are a vulnerable community. The National Weather Service offices in State College, PA, Jackson, KY, and Paducah, KY have teamed up as part of the Weather Awareness For a Rural Nation (WARN) Task Force to improve Amish communities' preparedness for, understanding of, and response to hazardous weather. Some of the efforts that are being made include (1) enhancement of phone recordings to include more detailed information that is pertinent to Amish farmers, (2) development of a NOAA Weather Radio that is acceptable to the Amish community (no radio or plug in feature), (3) helping Amish get signed up for AlertPA so that they can receive a voicemail on their landlines if a Severe Thunderstorm, Tornado, or Flash Flood Warning is issued for their location, and (4) distributing flyers about tornadoes, flooding, and lightning to help educate the Amish about a variety of weather conditions and how to stay safe. NWS State College is proud to partner with the Lancaster County Amish Safety Committee and Lancaster County Emergency Management to help keep the Amish in PA safe from all types of hazardous weather!



Alert PA: Push Technology for the Amish/Plain Communities

The National Weather Association Annual Meeting was an exciting conference this year and we came back with a lot of new ideas and energy for the upcoming year. Our office is committed to continuing provide better forecasts. timely communication/warnings, and excellent service to the citizens of Central Pennsylvania. Attending conferences like this helps us learn from what others are doing, showcase the work we've been involved in locally, and collaborate with meteorologists from across the country in the future. For more information about the National Weather Association, visit www.nwas.org.

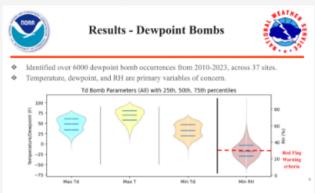
2023 HOLLINGS Scholarship Program

by John Banghoff, Michael Colbert and Michael Jurewicz

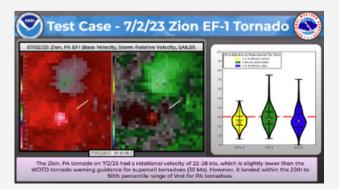
During the summer of 2023, NWS State College hosted 3 students as part of the Hollings Scholarship Program. As far as we know, no office has ever hosted more than 2 students in a given summer. This Program provides undergraduate applicants with academic assistance and a paid internship at a National Oceanic and Atmospheric Association (NOAA) facility during the summer. Our office has hosted Hollings students multiple times over the years and it is a great opportunity to mentor the next generation of students while working toward solving a research problem in Central Pennsylvania.

This year's students were an exceptional group. Max Katsouros has spent most of his life in State College and is pursuing his Undergraduate and Graduate degrees in Atmospheric Sciences from Penn State University. Max spent his summer continuing the work he had participated in as a student volunteer in 2022 investigating days when the relative humidity ends up dropping well below forecasted levels and creates issues for fire weather. These "Dewpoint Bomb" days are not well forecast by computer models and our office has been working hard to improve our understanding of these phenomena. Max made use of his Python coding skills to develop a climatology of dewpoint bombs across Pennsylvania from 2013-2023.

He also ran some model verification statistics and determined some significant biases in the Global Forecast System (GFS) for dewpoint bomb days. These statistics have been shared with the Environmental Modeling Center in order to improve the GFS in the future. Max's efforts laid a great foundation for our future efforts in this area and we hope to publish his work within the next year.



Savannah Southward is attending the University of Oklahoma and Matthew Teare is attending Millersville University. Savannah and Matthew worked on the same project this summer - investigating radar signatures associated with tornadic storms in Central Pennsylvania. Savannah looked at storms far (>50 nautical miles) from the radar and Matthew looked at storms closer to the radar (<50 NM). Savannah and Matthew looked through hundreds of radar images and recorded information about a myriad of storm features including velocity couplets, tornado debris signatures, and environmental characteristics. Their research is invaluable because it localizes the thresholds for tornadoes and severe weather that have been developed largely in the Great Plains and Southeast US. Many of the storms that produce tornadoes in Pennsylvania have less obvious radar signatures, due in part to smaller and weaker areas of storm-scale rotation when compared to storms in the Great Plains and Southeast US. Matthew and Savannah's work made significant progress in helping us calibrate thresholds for our warning operations.



Max, Savannah, and Matthew brought great energy, brilliant intellects, and fresh ideas to their research projects and we enjoyed having them. In addition to their work with research, they got some operational experience this summer. Max and Savannah went on a tornado damage survey in York County and got a first-hand look at how the damage survey process happens. Both students indicated it was one of their favorite parts of the summer. We wish Max, Savannah, and Matthew all the best in their future endeavors! NWS State College hopes to host another Hollings Student in the summer of 2024.

A REVIEW OF 2023 Weather

by Meteorologist Dave Martin

Many days in January had the feel of early Spring. While a lot of cloud cover was noted, the average temperature for the month was still between 8 and 10 degrees above normal. Very little winter weather was noted during the month. The mean temperature for January at Harrisburg was 39.7 degrees. Only 1950 and 1932 were warmer. The mean temperature for 1950 was 39.8 degrees, while the mean for 1932 was 42.5 degrees. The mean temperature for January at Williamsport was 37.5 degrees. This was warmer than the mean temperature of 36.3 degrees in 1950. Only 1932 was warmer, with a mean temperature of 40.2 degrees.

February ended up being similar to January, with temperatures averaging 6 to 9 degrees warmer than normal. Like January, little winter weather was noted. Much of the winter weather for both January and February occurred during the last few days of each month. The fire weather season got off to an early start. This February was in the top 10 driest for Harrisburg. Williamsport only had 1.33 inches of precipitation for the month.

March featured a bit more winter weather than we saw since December. Several abnormally cold days occurred. Average temperatures still ended being about a degree above normal. Johnstown average temperature for March was lower than the average temperature in February by .6 degrees.

While it was wetter than normal across portions of western and northern Pennsylvania northward into western, New York; drier than normal conditions were across the southeastern part of the Keystone state in April. Most of the rain during the month fell during the last few days. Last year at the same time, much of western New York was about 3 inches behind on precipitation. This year has been the opposite with that area being up on precipitation by about that amount. I was a warm month, with Williamsport having the 5th warmest April, and Harrisburg tied for the 2nd warmest.

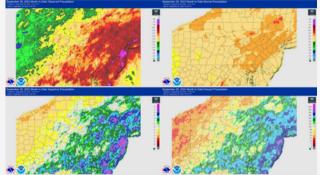
As has been the case in recent years, May was colder than normal. Temperatures averaged 1 to 2 degrees colder than normal. This was the first time the State College office issued a winter weather advisory in the month of May. It was a very dry month, with only .19 inches of rain at the airport in Harrisburg (MDT). Nights were especially on the cool side. No severe weather occurred during the month.

After the first few days of June, there was not a lot of hot days or dry days. Stormy and wet weather was common by the middle of the month, with the Middle Susquehanna Valley being the wet area. Often storms would form near Lewisburg and track northeast across Sullivan County. This was often the case into August. June 3rd saw severe storms with large hail across the Susquehanna Valley.

July did manage to end up being a bit warmer than normal. As noted above, the wet and stormy conditions that started in June persisted. A severe storm in northwestern Pennsylvania on July 20th resulted in large hail, some as large as 2 to 3 inches in diameter. It was second wettest July on record at Williamsport.

This August was an active month for severe weather and tornado activity across the Keystone state. A significant swath of wind and tornado damage occurred in August across the southern tier of Pennsylvania, especially in York County. Temperatures ended up being a shade cooler than normal. This August was the third wettest on record for Williamsport.

After a cool August we had a warm start to September. Rainfall ranged from about 3 inches below normal across the northwest, to the around 3 inches above normal in the southeast. See map of rainfall for the month.



Left top: observed rainfall for Sept, Right top: normal rainfall for same period. Lower left: departure from normal. Lower right: departure from normal in percentage.

Like much of the summer, a small heavy rain event occurred on 10/6 to 10/7 across the middle and upper Susquehanna Valley. A small strip from near Lewisburg northeast to Sullivan County received 2 inches of rain. Overall October ended being warmer and drier than normal.

So far the first half of November have featured very dry conditions. Also many days have been sunny. Normally November and December are rather cloudy months.

With a strong El-Nino in place, the west coast has seen rather stormy conditions lately. This has largely ended the drought on the west coast that started several years ago. The El-Nino pattern is likely to persist at least for the first part of the winter. As long as the west is stormy and wet, this would favor the eastern states to have normal if not warmer than normal temperatures.



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registered to be a spotter!

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WHAT'S BUGGIN' DAVE? AN UPDATE ON TICKS, MONARCH BUTTERFLIES AND THE SPOTTED LANTERNFLY

by Meteorologist Dave Martin

In recent years, there has been a tendency for more extreme weather events. This may have an influence on insects, animals, and disease. In the last several newsletters I have written several articles on various subjects such as the decline of Monarch Butterflies and Lyme disease. I have also discussed chronic wasting disease (CWD).

UPDATE ON TICKS

Spring 2023 and this fall so far have been dry in spots across central Pennsylvania. May was especially dry across the region, while the start of the fall was dry over the west and north. November so far has trended dry across the entire area. While the summer was quite wet across portions of the Middle and Upper Susquehanna Valley, the far southern part of the Keystone state has been quite dry. No real cold snaps have occurred so far this fall. Overall the mild and dry weather is favorable for ticks.

Ticks have been a big problem in the Keystone state in recent years; and given the trend with mild conditions in recent years, one should expect an active tick season again. Some Key points and Safety tips for folks spending time outside.

Folks spending time outside should check for ticks upon coming inside. Putting clothes in the drier for 15 minutes should kill most of the ticks. Allow another 5 minutes for electric dryers. Also allow extra time for damp clothing. After drying the clothes, then one could wash them. The heat kills the ticks, more so than the water.

MONARCH BUTTERFLY UPDATE

I did not have a lot to add to this tragic story. I did not see many butterflies this past summer or early this fall. Monarch butterflies were placed on the endangered species list back in the summer of 2022.

Folks can help out by not destroying native milkweed. Monarch Butterflies need this plant to survive and breed. Spraying along hedge rows, roads, and trails often destroys the native milkweed plants. Planting flowers in general help butterflies, bees, and other helpful insects. Also cut back on mowing hedge rows, along trails, roads etc. as much as much as possible. Wait until late fall to mow if possible.

SPOTTED LANTERNFLY

The Spotted Lanternfly has been a problem in some parts of the Keystone state for about 10 years now. It is a good practice to check your car and other outside equipment for these pest, before leaving one spot and traveling to another. These Lanternflies do significant damage to grapevines, black walnut saplings etc.

Also of significance is moving camp fire wood from one location to another. Other harmful insects can spread this way. Significant damage to ash trees has occurred in recent years. See dontmovefirewood.org for more information on tree-killing bugs.

As of this fall, a few Lanternflies have been seen in Centre County. Blair County has seen more of them. Nearby Pittsburgh has had a lot of these Lanternflies.

OTHER CONSIDERATIONS

Methane gas makes it harder for the atmosphere cool off at night. Folks should take advantage of programs that recycle items, especially yard waste and food waste. Food waste tossed in landfills is a major source of methane. Plant trees when possible. As noted above, planting flowers etc. to help out butterflies, bees, and other useful insects. Limit burning of wood, trash etc. to when other options are not available. Consider donating unwanted household items to organizations and community groups, to help cut down pollution and amount of material going into a landfill.