



WORKING TOGETHER TO SAVE LIVES



SKYWARN NEWSLETTER

National Weather Service

STATE COLLEGE, PA

The Summer of 2019 in Review

John La Corte – Lead Meteorologist

Another summer is in the books, and for the most part it passed rather unremarkably.

TEMPERATURES

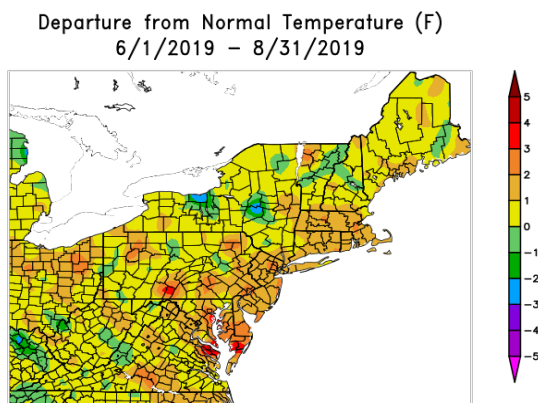
For ease of record keeping, we define meteorological summer as the period from June 1st through the end of August.

As far as temperature, it was a fine summer for enjoying the pool or trips to the lake, averaging

warmer than normal over virtually all of Central Pennsylvania.

With the exception of the third week of July when most places saw several days above 90 degrees along with high humidity, most of the remainder of the summer saw alternating periods of above and below normal temperatures that most would probably judge as pretty typical for the season in Pennsylvania.

Figure 1 shows the summertime temperature departures. Even beyond Central Pennsylvania it was warmer than normal over almost the entire Northeastern US.



Generated 9/10/2019 at HPRCC using provisional data.

NOAA Regional Climate Centers

Figure 1. Temperature departures for June-August

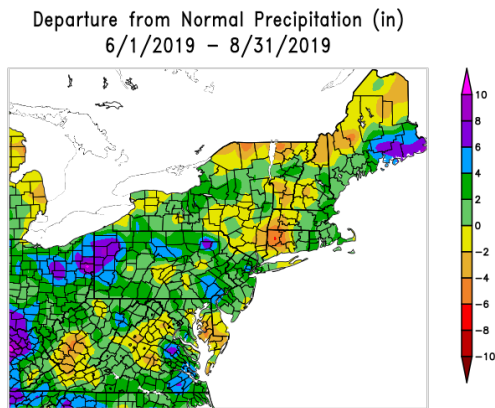
PRECIPITATION

As far as rainfall goes, most areas were wetter than normal, but not excessively so. If you remember, the summer of 2018 was exceedingly wet, record setting in many locations. With the exception of Williamsport which saw a couple of localized big convective events that brought their positive rainfall

departure above four inches, most of the remainder of the area did not vary significantly from normal.

Figure 2 shows the seasonal precipitation departure. While large portions of New York and New England were quite dry, most of Central Pennsylvania was a near normal.

Table 1 shows the actual values for several of



Generated 9/10/2019 at HPRCC using provisional data. NOAA Regional Climate Centers

Figure 2. Precipitation departures for June-August

our climate sites in Central Pennsylvania.

	Average Temp	Departure	Rainfall	Departure
Harrisburg	76.5	+2.7	10.71"	-0.70
Williamsport	72.1	+1.2	16.26"	+4.14
Altoona	70.6	+1.7	9.60"	-0.15
Johnstown	68.5	+1.2	12.66"	+0.95
Bradford	70.6	+1.7	13.78"	+0.57

Table 1. Summer of 2019 temperature and precipitation summary

CPC Winter Outlook

As we like to do at this time of year, it's time to pontificate about the upcoming winter. While the official December – February forecast from NOAA has not yet been released, the Climate Prediction Center (CPC) outlook shows a better than 50% chance for the region to average warmer than normal for the upcoming winter (Figure 3).

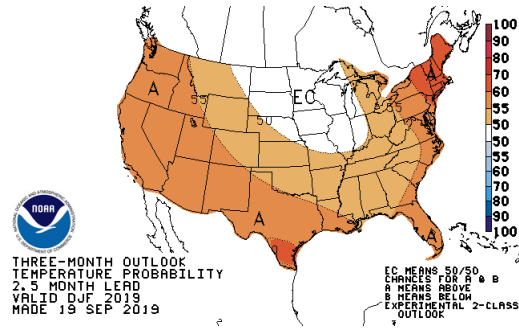


Figure 3. CPC Winter temperature outlook

The precipitation outlook seems less clear. The usual forecast ingredients such as the state of the El Niño and output from the Climate Forecast System point to a small portion of the region seeing a slightly elevated risk for above normal precipitation. The orientation of the area of above normal chances (Figure 4) suggests a possible active lake effect snow season.

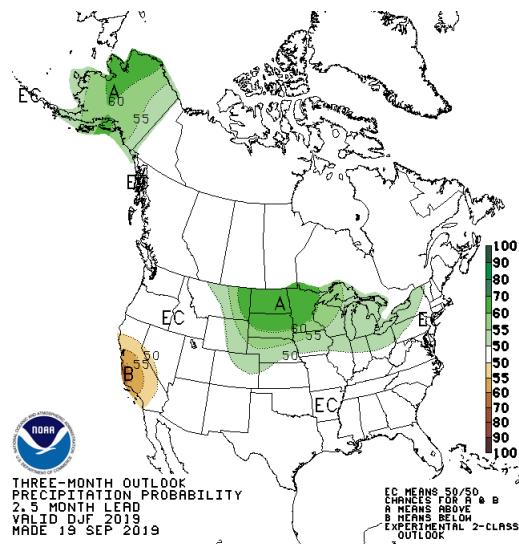


Figure 4. CPC Winter precipitation outlook

When it comes to winter forecasting, we also enjoy looking at what the soothsayers at The Old Farmer's Almanac have to say. Since 1792, they have been providing the agricultural community with seasonal outlooks, as well as a host of home spun tales and lore. This year they are calling for a warmer than normal winter

with snowfall ranging from below normal over the northern portion of our region to above normal in the south. As usual, we here at the National Weather Service State College will maintain daily vigilance for any nor'easters or bone chilling cold on the horizon, and keep you updated. Have a safe and happy winter!

Cat Nights Commence (August 17)

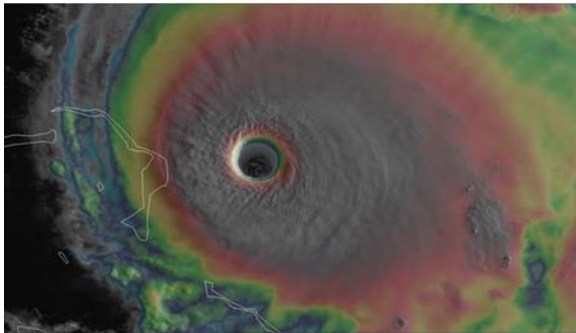
This term harks back to the days when people believed in witches. An Irish legend said that a witch could turn into a cat and regain herself eight times, but on the ninth time (August 17), she couldn't change back and thus began her final life permanently as a cat. Hence the saying "A cat has nine lives."

- **Old Farmer's Almanac**

Hurricane Dorian

John La Corte - Lead Meteorologist

By now, the post Hurricane Dorian recovery efforts in the Bahamas have been going on for weeks. The recovery will likely take years in some areas.

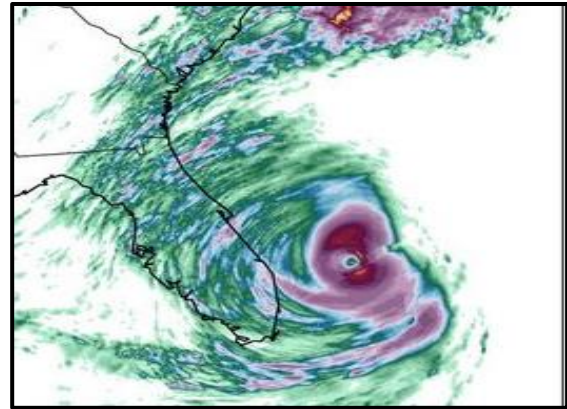


Hurricane Dorian nearing the Bahamas on Sep 1, 2019

The storm formed on the morning of August 24 about 900 miles east of Trinidad and Tobago. Over the next several days it moved steadily westward, passing through the Windward Islands as a Tropical Storm on the 26th and 27th.

By early on September 1st, Dorian had intensified to a Category 5 hurricane with top winds of 160 mph just east of Hope Town in the Bahamas. The storm first passed over Lubbers Quarters Cay around noon on the 1st, moving west over Great Abaco Island toward a devastating hit on Grand Bahama.

From there the storm slowed considerably, at one time moving slower than an average person walks!



Hurricane Dorian radar precipitation estimates

The storm moved so slowly that the 24 hour radar precipitation estimate that ended at 5 AM on September 3rd actually showed the eye!

Dorian crawled slowly north, taking three more days to ultimately make landfall on the Outer Banks of North Carolina early on September 6th. By then, the storm was finally chugging along and continued quickly northeast, eventually slamming into Nova Scotia east of Halifax on the 7th. Significant damage was reported in the Maritimes, with even a report of

a 100 foot wave just south of Nova Scotia near Sable Island as the storm approached.

In the Bahamas the death toll continues to rise, and in places the damage resembled that of a “nuclear detonation” according to officials. Entire towns were said to be wiped out.

The storm set or approached several records on its rampage through the southwest Atlantic. It became the strongest storm to occur east of Florida north of the tropics (>23.5 north latitude). It matched the Labor Day Hurricane of 1935 for the strongest winds of any Atlantic land-falling hurricane. Dorian’s winds of 185 mph were second only to Hurricane Allen in 1980 (190 mph). Dorian also set a record for rapid intensification with winds increasing from 150 mph to 185 mph in just a space of 9 hours on Sunday the 1st, something never observed in a storm that strong.

Dorian set yet another record. For the 4th straight year a Category 5 storm formed in the

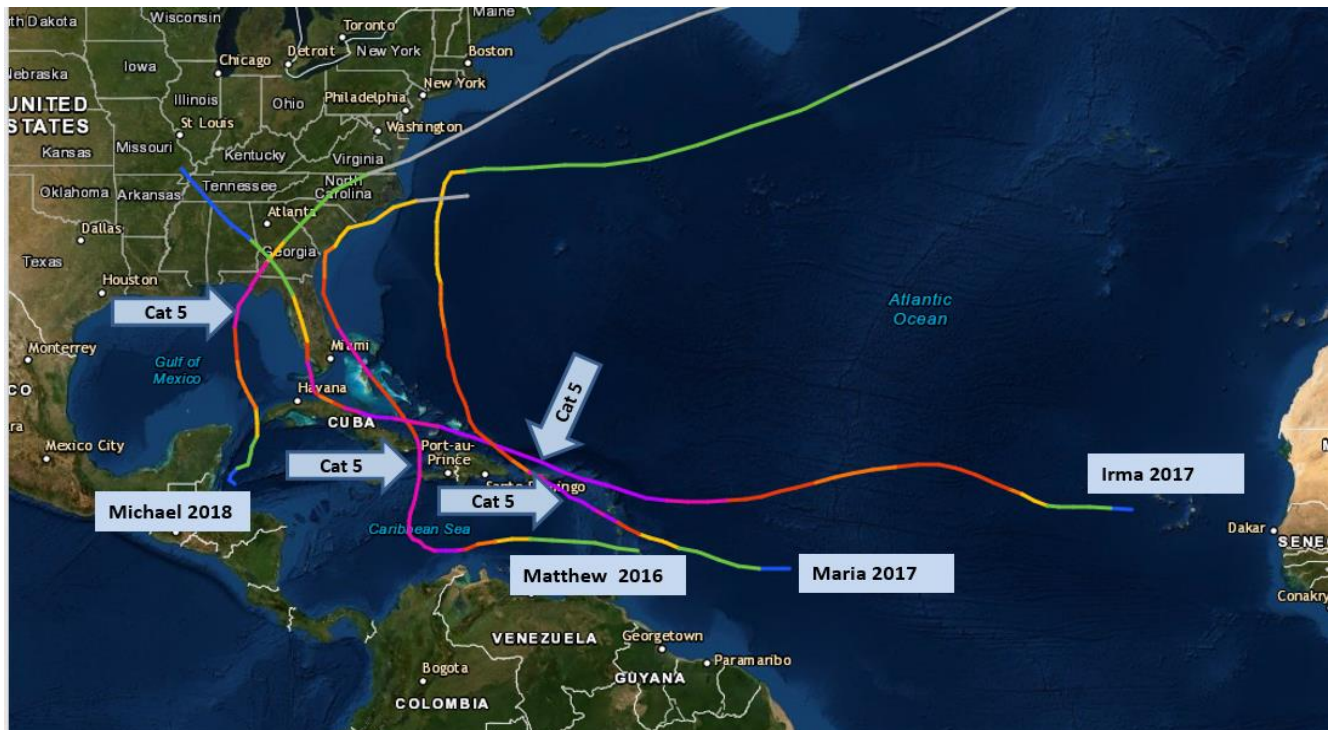
Atlantic, the longest streak since records began in 1842.

The 2019 hurricane season is not over, but hopefully any storms that form do not come anywhere close to the severity and devastation meted out by record Hurricane Dorian.

Dog Days (July 3 - August 11)

These 40 days are traditionally the year’s hottest and unhealthiest. They once coincided with the year’s heliacal (at sunrise) rising of the Dog Star, Sirius. Ancient folks thought that the “combined heat” of Sirius and the Sun caused summer’s swelter.

- **Old Farmer’s Almanac**



Category 5 hurricanes since 2016 (excluding Dorian)

Review of Recent Severe Weather Events

David Martin – General Meteorologist

While the summer of 2018 was noted for record rainfall and extensive flooding; the spring and summer of 2019 not only featured heavy rain, but a large amount of severe weather. This included a very active year for tornado events.

October 2nd 2018 was an active day for severe weather, including a large number of tornado touchdowns. This trend continued into this season.

The first major event occurred on Sunday, April 14th into the early morning hours of April 15th. There was 4 tornadoes reported in central Pennsylvania. Two of these were rated EF-2.

Only a few days later, another tornado event occurred on April 19th. Four more tornadoes occurred. Again two of these were rated EF-2.

The spring and early summer were especially wet across the Susquehanna Valley. The later part of August into September has trended drier.

Overall it was an active year for storms. This April had the most tornadoes of any April since records started back in 1950. Here in central Pennsylvania there have been 20 tornado and 20 flash flood warnings. There have been 274 severe thunderstorm warnings issued as well. Compared to just a few years ago when we barely reached 100 severe thunderstorm warnings issued, this year was especially busy.

The storm prediction center (SPC) keeps track of the number of watches. Portions of central Pennsylvania found themselves under 4

tornado watches. This number is about as high as the average for any location across the eastern United States.

While rainfall for the season across the Susquehanna Valley is well below what we had at this time last year, it has been a wet year over parts of the region. Rainfall averaged 4 to 7 inches above normal across the Middle and Upper Susquehanna Valley.

UPDATE ON OUTSIDE HAZARDS

Spotted Lanternfly Update

David Martin – General Meteorologist

In recent years, a relatively new pest has emerged over southeastern Pennsylvania, the Spotted Lanternfly.

The Spotted Lanternfly is an invasive sap-feeding plant hopper and was first spotted in 2014. The Lanternfly has spread as far west as Dauphin County as of early this past spring. You should check with the Pennsylvania Department of Agriculture for up to date information.

The following are some steps you can take to limit the spread of this pest.

1. Be aware of what counties are included in the quarantine order.
2. Learn what the Spotted Lanternfly looks like in its various stages.
3. Avoid parking or storing things under trees in infested areas.
4. Inspect items that you need to move from one area of the state to another.
5. If you buy or sell or produce mulch, be careful to make sure the Spotted Lanternfly is not present in the mulch.



In the process of damaging crops and trees, the Lanternfly leaves behind a large amount of “honeydew” (excrement). This material is messy and slippery and could even attract Yellow Jacket hornets. This feeding routine also weakens the plants and trees they feed on. Aside from hardwood trees, they also feed on grape vines and tree fruit. Eggs are laid on any solid surface in the fall. They hatch in the spring season.

Monarch Butterfly - Update

Early this year the number of butterflies around the area was considered to be large. These were the butterflies that were born in the spring. They die off after they lay eggs for the second set of butterflies that are born in the late summer.

Unlike last year, the later part of summer and early fall has featured mainly dry, sunny, and warm days. Normally by now we would expect to see a large number of Monarch Butterflies from the late summer hatching. To date, the numbers seem to be off so far. These butterflies are the ones that will make the annual trip to Mexico for the winter. Normally the number of butterflies heading south numbers in the many millions.

To help this beautiful insect, you can help by planting and preserving native milk weed. Monarch Butterflies need this plant to survive and breed.

Chronic Wasting Disease (CWD)

CWD has been a concern for hunters over the last several years. As a result, the number of hunters is down, given the concern over the consumption of deer meat.

Aside from guidelines on consumption of deer meat and proper handling of the deer, there are guidelines on the Proper Disposal of Deer

remains. If you hunt, precautions should be taken to assure proper guidelines are followed.

Aside from less hunting, there are more road kills. Safe disposal of the deer still should be a priority.

Whether hunted or road killed the deer hides can still be used. These are still used in the leather industry. The rest of the carcass (bones, fat, etc.) should be properly disposed of. The Pennsylvania Game Commission has said it is illegal to just dump the animal remains. Proper disposal not only prevents an unsightly eye sore, but also a potential health hazard.

The Department of Environmental Protection considers the remains municipal waste that can be placed with your regular garbage. You should use a suitable container for curbside pick-up or you can take it to the Authority’s Transfer Station.

Enjoy the upcoming fall season and stay safe.

A Farewell Message

Peter Jung - Warning Coordination Meteorologist

Greetings fellow Skywarn Spotters! Well, after a long (34 year) career, I will be retiring at the end of September 2019 (retired as of the publishing of this newsletter). I’ve been here at the National Weather Service Office here in State College since 1993, and Warning Coordination Meteorologist since 2010.

Over that time, we’ve seen our share of Floods, Tornadoes, Snowstorms and Severe Thunderstorms. I want to take this moment to thank all the thousands of Skywarn Spotters in our area for their dedication and service.

I’ve conducted hundreds of training classes over the years, and gotten to meet quite a number of

you. I appreciate your dedication in helping out the National Weather Service – as I always say, your Skywarn reports are invaluable to us. You help give us a real sense of what’s happening on the ground – either verifying or contradicting what we’re seeing on our radar. Your reports are sometimes critical in making warning decisions. While the Skywarn program is purely voluntary in nature, it’s been really impressive to receive wind, snow and damage reports at all hours of the day and night from you. Your dedication demonstrates that Skywarn spotters go above and beyond what’s expected!

I’ll miss the training classes, and the opportunity to get out to the counties and municipalities we serve and meet you. I hope the training you’ve received from the classes I’ve conducted were both fun and informative. Again, I will miss seeing and meeting all of you, and the many chats I’ve had after class with you about storms and unusual weather phenomena you’ve experienced over the years.

While no replacement for me has yet been named, I’m sure whoever that is will continue the tradition of providing training and outreach to the citizens of central Pennsylvania.

Warmest wishes to you all!

Pete



NOAA and Partners Respond to Ongoing Outbreak of Coral Disease in Florida

Florida's coral reefs are experiencing a multi-year outbreak of stony coral tissue loss disease. Here is a description of the problem, what NOAA and partners are doing in response to the problem, and how you can help.

The Problem

The ongoing outbreak of stony coral tissue loss disease in the Florida Reef Tract began in 2014 and continues to spread. It is highly active off Key West, Florida and appears to be expanding to the Caribbean region. The Lower Florida Keys are in

the epidemic zone with the highest concentration of active disease.

While disease outbreaks are not uncommon, this event is unique due to its large geographic range, extended duration, rapid progression, high rates of mortality, and the number of species affected. Stony coral tissue loss disease affects at least 22 species of reef-building corals. Once infected, coral colonies typically die within weeks to months.

The disease is thought to be caused by bacteria and can be transmitted to other corals through direct contact and water circulation.

Researchers are working to identify potential

pathogens and relationships with environmental factors, developing strategies to treat diseased colonies, and identifying genotypes of corals that are resistant to the disease.

How NOAA is Responding

The majority of the Florida Reef Tract lies within the 3,800 square miles of Florida Keys National Marine Sanctuary. The sanctuary is a leader in the collaborative response to stony coral tissue loss disease. The sanctuary permits disease interventions, coral rescues, and restoration, working alongside NOAA Fisheries, Florida Fish and Wildlife Commission, and other agencies in planning, implementation, and evaluation.

first-ever rescue effort of this magnitude and is necessitated by the urgency and devastating impact of the current outbreak. Coral species are prioritized based on their susceptibility to the disease, the speed of disease progression across the colony, prevalence of whole colony mortality, contribution to reef-building, long-term declines in spatial distribution, reproductive strategy, conservation status, and current abundance. To ensure sufficient genetic diversity is preserved and available for future propagation activities, approximately 4,500 corals are planned for rescue. Genetic markers will be developed and the genetic identity of each rescued coral will be determined. When conditions are suitable, this project will be



A researcher surveys the progression of stony coral tissue loss disease in Florida Keys National Marine Sanctuary.

Coral Rescue:

NOAA is co-leading the Coral Rescue Team, which is collecting healthy corals and placing them in land-based aquaria to prevent them from becoming diseased, to preserve genetic diversity, and to serve as propagation source stock for future restoration activities. This is the

completed with the eventual propagation of corals for introduction to the wild.

Additionally, another NOAA coral rescue effort was underway. As the outbreak progressed, divers attempted to rescue the remaining genotypes of the pillar coral *Dendrogyra cylindrus* from the Florida Reef Tract. Live, but critically ill, coral fragments were collected

(May 2016-April 2019) and relocated to the coral critical care and culture facility at NOAA's National Centers for Coastal Ocean Science (NCCOS) in South Carolina. The NCCOS team pioneered the direct application of antibiotics and other therapeutics to the coral fragments. By mixing the antibiotics into a modified dental paste and applying it to the diseased tissue, the topical medicine was released slowly, enabling lower dosing than if the antibiotics were mixed into the water. With this novel approach, the team saved a number of *Dendrogyra* fragments and the small population is growing. The coral critical care and culture facility now houses 90 stabilized pillar coral fragments. Twenty-three genotype fragments are housed in the NCCOS Charleston facility and represent the only

remaining tissue that exists in the world for these genotypes.

Interventions:

Scientists and resource managers are coordinating interventions and treatments with the goal to slow or stop the spread of stony coral tissue loss disease. The most urgent needs are at the disease front in the Lower Keys. Strategies include colony-specific interventions to prevent mortality of the most important corals, efforts to reduce the pathogen load, and salvage selected colonies to prevent the loss of the diversity and genetic structure of the corals.



Divers along the Florida Reef Tract are encouraged to photograph and report the condition of tagged corals that have been treated with antibiotics.

The coral rescue missions during summer 2019 are focused west of Key West to stay ahead of the disease front. Intervention trials, primarily using antibiotics, are concentrated in the Middle and Lower Keys. Restoration trials of susceptible species are taking place in the Lower Keys where the disease remains rampant.

Restoration:

Florida Keys National Marine Sanctuary is working with partners to devise a bold, aggressive, long-term plan that strategically uses a holistic approach involving habitat recovery and coral restoration. Restoration is a key component in the sanctuary's zoning and regulatory review process.

Response. The team provides support and information for the prevention, detection, and response of the disease outbreak throughout the Caribbean. Outside of Florida, similar disease outbreaks have been confirmed in Mexico, Jamaica, the Dominican Republic, the U.S. Virgin Islands, St. Maarten, Turks and Caicos, and Belize. The team shares best practices for diver gear decontamination, the consideration of ballast water as a possible vector, identification cards for disease detection, monitoring methodology, reporting resources, and a disease intervention action plan. The team also holds trainings on the disease and response techniques.

How You Can Help



Healthy coral colonies rescued in the Florida Keys ahead of the disease front by NOAA and partners are banked for breeding and restoration.

Caribbean Efforts:

NOAA is leading the Caribbean Cooperation Team as part of the Florida Coral Disease

NOAA is working diligently to respond to the disease and invites others to support the effort. Florida Keys National Marine Sanctuary established a website to provide information

about the disease, the response, and how individuals can become involved in preventing and monitoring the spread of the disease.

This story provides a highlight of activities led by NOAA offices to respond to the outbreak. NOAA is part of multi-partner response with the Florida Department of Environmental Protection, Florida Fish and Wildlife Conservation Commission, and National Park Service. A full list of contributing partners and updates on ongoing projects are available from the Florida Keys National Marine Sanctuary.

For more information, go to:

<https://oceanservice.noaa.gov/news/july19/coral-disease.html>

Why do Leaves Change Color?

Joe Ceru – General Meteorologist

Every fall the trees make their preparation for winter and it leaves us to wonder-Why do the leaves color change? There are three factors when it comes to leaf color.

The first is leaf pigment. Pigment is a chemical in the leaves that are a signal for what kind of food the leaves make. There are four types of pigments (right).

In spring and summer leaves are green because they are making lots of chlorophyll. Chlorophyll is the chemical



Chlorophyll (greens)



Xanthophylls (yellows)



Carotenoids (oranges)



Anthocyanins (reds)

that helps plants make energy from sunlight in a process known as photosynthesis. This continues through the summer into autumn. As the amount of daylight changes the creation of chlorophyll stops and that allows the yellows, oranges and reds to be visible.

That brings us to the second factor which is length of night. As the days get shorter with less sunlight and the temperatures get colder, the trees take that signal to prepare for winter. This is when the trees stop making chlorophyll and the green color fades. That allows the other colors made from the other pigments to come through. This brings out the vibrant yellows, oranges and reds we see on beautiful fall days.

The third factor that then determines how vivid the colors are is weather, specifically temperature and moisture. The weather that helps to determine the color of the leaves is the climate of the whole growing season. If there is a drought, then the leaves can drop before they change color. If there are heavy winds or rain, that will strip the trees of their leaves as well. Lots of sunlight and cold nighttime temps can cause the chlorophyll to be destroyed more quickly and bring out the colors more quickly.

Cooler air at night can also promote the better formation of more red pigments. An early frost kills the leaves and will thus weaken the brilliance of the colors. Rainy and overcast days have a tendency to increase the intensity of all colors.

The best colors come from a growing season where the soil has been moist through the year and where there isn't a warm period during the fall, since that can trigger early leaf drop before the colors have completely developed.

Temperatures are crucial to when leaves begin to change their color and eventually fall off as the tree prepares itself for the change in season. A tree that is in a low lying region can collect cooler air compared to upland trees and thus change color sooner.

Tree health is also a factor. If a tree is weak or diseased then the colors will change faster.

So weather patterns and the overall change in temperature and moisture play a significant role on how early or late that leaves change color, how vivid the colors and how long they will stay on the trees before falling off.

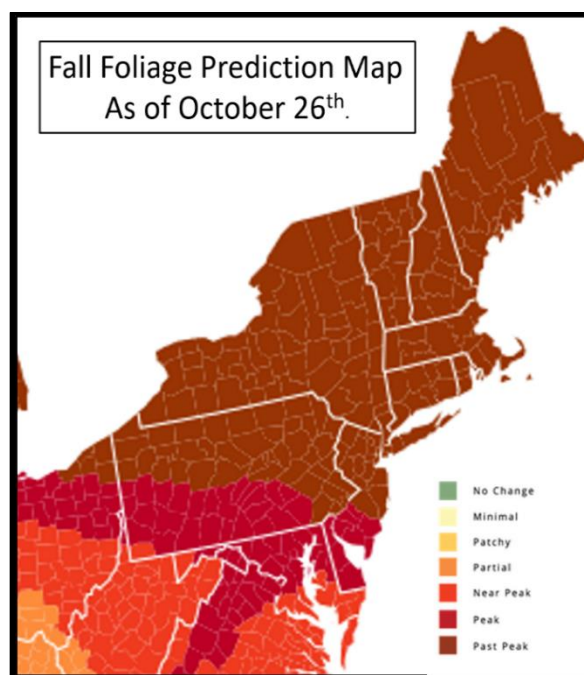
Below is the latest map for central PA on when colors are in their peak this year. For a full 7 day forecast please go to weather.gov/ctp. You will then know when to enjoy the fall colors and all that autumn has to offer.

Resources:

SciJinks: <https://scijinks.gov/leaves-color/>

Smoky Mountains:

<https://smokymountains.com/fall-foliage-map/>



Finally

Like the already departed Pete Jung, by the time most of you read this Newsletter, I will have called it a career after more than 42 years of trying to outguess Mother Nature. As my first Air Force commander once said; "it could be worse, you could have to work for a living." And he was 100% correct! I have loved the weather since I first saw snow as a youngster, and making it a career has been enjoyable, challenging and very rewarding.

I will be honest, I won't miss working nights, and getting in synch with the rest of the world when it comes to weekends and holidays and viewing the weather as a spectator will all take some getting used to, but I'm ready.

As the editor of this Newsletter for nearly 20 years, I want to thank you for all the support over the years. Happy Holidays to one and all.

John La Corte