Mississippi Spring Severe Weather Preparedness Week

MISSISSIPPI SPRING SEVERE WEATHER PREPAREDNESS WEEK

February 29 - March 4, 2016

Overview

Thank you for reading this Spring Severe Weather Preparedness Week brochure for the state of Mississippi. Residents of Mississippi are no strangers to severe weather. Tornadoes, damaging winds, large hail, lightning, and flooding are all common weather phenomena that occur in Mississippi. Based on tornado statistics, Mississippi ranks near or at the top in every category: total number, strong to violent, long-track strong to violent, and fatalities. These statistics show a long history of tornado impacts across the state.

This presents a preparedness challenge to the residents of Mississippi. Unlike the traditional tornado alley of the Great Plains, tornadoes are difficult to spot in Mississippi. Some of the reasons for this are poor visibility in the form of numerous trees in the state, the fact that many tornadoes in Mississippi are rain-wrapped, and that many Mississippi tornadoes occur at night. In addition, many homes and other structures are not constructed as well as buildings in other parts of the country.

All of these factors make it very important for residents of the Magnolia State to have multiple means of receiving severe weather warnings, have a shelter plan in place ahead of time, and take outlooks, watches and warnings seriously. These actions contribute to reducing injuries and fatalities. Situational awareness and proper planning are essential to safety.

Mississippi Spring Severe Weather Preparedness Week Events
February 29 - March 4, 2016

Throughout the week, the National Weather Service will present educational material and conduct a tornado drill to help people prepare and protect themselves from tornadoes, damaging winds, hail, flash floods, and lightning. Each day of the week focuses on a specific type of severe weather, or on the warning and drill system.

- **Monday, February 29** will discuss severe thunderstorms. Large hail and damaging winds from severe thunderstorms are much more frequent than tornadoes in the South.

- **Tuesday, March 1** will draw attention to hazards of flooding and flash floods. Nationwide, flooding is the number one cause of weather-related fatalities on average. Remember…Turn Around Don't Drown!

- **Wednesday, March 2** will emphasize tornado safety. People routinely survive tornadoes by knowing weather safety rules and by taking appropriate and timely action. A statewide tornado drill will be conducted at **9:15am**. Schools, businesses and other agencies are encouraged to participate with the goal of helping everyone learn life saving rules. Thursday will be the alternate drill day if adverse weather is expected on Wednesday.

- **Thursday, March 3** will focus on lightning, often called the underrated killer. All thunderstorms have lightning and this hazard can be deceptively deadly.

- **Friday, March 4** will focus on the methods of receiving severe weather warnings. Having multiple ways to receive weather warnings is very beneficial.

Cover photos courtesy of:
- *April 28, 2014 Louisville, Mississippi Tornado: Scott Peake (Basehunters Chasing)*
- *Flooding on County Road 8 in Carroll Co: March 22, 2015: Tammie Goss*
- *Lightning near West Point, MS: March 27, 2014: Garrett Fornea*

Mississippi SKYWARN®

SKYWARN® is the program developed by the National Weather Service (NWS) to recruit and train storm spotters. SKYWARN® spotters enhance the National Weather Service's storm detection capabilities by identifying and reporting potentially dangerous weather conditions. The SKYWARN® program has become an invaluable link in the NWS warning process.

Despite all of the sophisticated technology used in a modern NWS office, forecasters still rely on storm spotters. Doppler radar can indicate that a storm may be producing large hail, damaging winds or even a tornado, but it cannot tell exactly what's happening on the ground underneath the storm. Storm spotters, trained by NWS meteorologists, act as the eyes and ears of the NWS. The combination of spotter reports, radar data, and other information result in the most timely and accurate warnings possible.

SKYWARN® spotters across Mississippi come from all walks of life – law enforcement, fire or emergency management agencies, and citizens interested in helping their communities. A large number of storm spotters are amateur radio operators who volunteer their time and equipment to help the NWS detect and track severe storms.

Amateur radio operators, or "hams", will frequently operate radio equipment at the local NWS office, gathering reports from spotters in the field and relaying the data directly to NWS forecasters. SKYWARN® spotters are volunteers – they receive no compensation for their hard work. They do, however, have the satisfaction of knowing that their reports result in better warnings, which save lives. If you are not an amateur radio operator and still want to report information directly to the NWS, you can participate in the online spotter program. Go to http://www.srh.noaa.gov/StormReport/SubmitReport.php?site=jan for the Jackson area. Fill the last three letters in as **meg** for Memphis, **lix** for New Orleans, and **mob** for Mobile if your area is served by another office (see page 23 for map of service areas). This online form allows you to report information about the storm in your area, directly to NWS meteorologists.

Who is Eligible?

The NWS encourages anyone with an interest in public service and access to communication, such as HAM radio, to join the SKYWARN® program. Volunteers include police and fire personnel, dispatchers, EMS workers, public utility workers and other concerned private citizens. Individuals affiliated with hospitals, schools, churches, nursing homes or who have a responsibility for protecting others are also encouraged to become a spotter.

How Can I Get Involved?

You can participate in the SKYWARN® program in your area by attending a storm spotter training class to become a trained spotter. Each of the training sessions is free, lasts around two hours and covers the following concepts:

- Basics of thunderstorm development
- Fundamentals of storm structure
- Identifying potential severe weather features
- Information to report
- How to report information
- Basic severe weather safety

Please contact one of the National Weather Service offices listed below if you need more information about an upcoming SKYWARN® class.

Jackson, MS	Dan Byrd	(601) 939-2786
Memphis, TN	Gary Woodall	(901) 544-0411
Mobile, AL	Jason Beaman	(251)-633-6443
New Orleans, LA	Frank Revitte	(985) 649-0357

Here are links to storm spotter training pages for NWS offices that serve Mississippi.

- WFO Jackson, MS: http://www.weather.gov/jan/?n=spotter_train_schd
- WFO Memphis, TN: http://www.weather.gov/meg/?n=skywarn_meetings
- WFO Mobile, AL: http://www.weather.gov/mob/?n=spotter_training
- WFO New Orleans, LA: http://www.weather.gov/lix/?n=skywrnpg2

Severe Thunderstorms

Monday, February 29, 2016

Severe thunderstorm producing baseball & softball-sized hail approaching Brandon, MS - March 18, 2013
Photo by *Alan Campbell*

What is a Severe Thunderstorm?

A severe thunderstorm is a thunderstorm that produces one or more of the following: hail that has a diameter of one inch (quarter-size) or larger, winds greater than or equal to 58 mph, and tornadoes. About 10% of all thunderstorms in the United States meet severe criteria.

Severe thunderstorms can occur at any time of the year, although the most common time of occurrence is during the spring months of March, April, and May. In addition, pulse-type thunderstorms that occur during the summer months can produce high winds, frequent lightning, and torrential downpours.

A secondary season of organized severe weather occurs during the fall in November and December.

What is the Difference between a Watch and a Warning?

A severe thunderstorm/tornado watch means that **conditions are favorable for severe thunderstorms/tornadoes to develop**. These are issued by the Storm Prediction Center in Norman, OK, typically before severe weather develops. When under a watch, pay attention to rapidly changing weather conditions.

A severe thunderstorm/tornado warning means that a **severe thunderstorm/tornado has either been indicated on radar or witnessed by storm spotters**. Your local NWS office issues severe thunderstorm warnings when severe weather is developing or occurring. Warnings tend to be less than an hour and cover a smaller area than a watch (i.e. 1-2 counties or less). During a warning, activate your severe weather safety plan.

Jasper Co. wind damage - April 25, 2015
Photo by *Amy Griffin*

Safety Tips

- **Have a plan.** Prepare ahead of time so you and your family know what actions to take when severe weather occurs.
- **Get indoors!** There is no safe place outdoors during a thunderstorm.
- **Stay informed**! When severe weather threatens, stay tuned to NOAA Weather Radio, local television and radio stations, or the NWS homepage online at www.weather.gov for updated weather information. Click on the office that serves your area.
- **Know what county you are in.** When a warning is issued, the threatened area will be identified by the counties that contain the warned thunderstorm.
- **Have a NOAA Weather Radio.** This is the best way to receive information concerning the latest watches and warnings directly from the National Weather Service, especially at night when TVs and radios are turned off.

Damaging Winds: Not All Wind is a Tornado

A common misconception regarding severe weather is that if there was strong wind that did damage, it must have been a tornado. Not all wind damage occurs from tornadoes. In fact, some of the worst damage is not associated with tornadoes at all. There are several types of damaging wind storms that can occur in Mississippi.

Damaging wind, often also referred to as straight line winds, tends to be more common than tornadoes. Damage from these winds account for half of all severe reports in the continental United States. Wind speeds can reach up to 100 mph and produce a damage path extending for hundreds of miles, in association with both squall lines and supercell thunderstorms. While these winds can occur any time of the year, climatologically the number of damaging wind reports increases during the spring months and peaks during the summer months in Mississippi. In addition, for significant wind reports of 75 mph or greater, the trend is for these to occur more frequently during the spring months of March through May. One notable significant wind event was April 4, 2011. In this event, over 1300 damaging wind reports occurred across the southeastern United States as a squall line raced across the region. Meteorologists can determine if the cause of the damage was from straight line winds or a tornado simply by looking at the direction the damage is laid out in. Straight line wind damage will push debris in the same direction the wind is blowing (hence the term straight line). Tornado damage will scatter the debris in a variety of different directions since the winds of a tornado are rotating violently. To reduce the damage from straight line winds, it is important to secure objects that can be blown by the wind and to keep trees well pruned. Tree branches falling on cars or houses produce a significant amount of damage in high wind events. Make sure you are in a safe place, such as in the interior of a brick home, when straight line winds strike.

Another type of straight line wind event that occurs is called a derecho. Derechos are created by the merging of many thunderstorm cells into a cluster, or solid line, extending for many miles. These tend to be fairly fast moving lines of thunderstorms that may travel 500 to 600 miles. Derechos typically occur in the summer months when thunderstorm complexes form over the Great Plains, and quickly travel towards the Deep South. These complexes are particularly dangerous due to their producing intense, and often damaging, winds over a large area. One such event occurred in June 2012, when a derecho, packing 80 mph winds, plowed through the Mid-South causing widespread wind damage over portions of the Mississippi Delta.

Shelf cloud at Port of Rosedale - May 24, 2015
Photo by *Ray Ruble*

A third type of damaging wind that can occur are microbursts. While straight line winds tend to occur in weather systems that are widespread, microbursts are fairly localized. A microburst is a small, concentrated downburst that produces an outward spread of damaging winds at the surface. Microbursts are generally small (less than two and a half miles wide) and short-lived, lasting only five to ten minutes, with maximum wind speeds up to 100 mph. There are two kinds of microbursts: wet and dry. A wet microburst is accompanied by heavy precipitation at the surface, whereas dry microbursts occur with little or no precipitation reaching the ground. Microbursts tend to be a little more common during the spring and summer months in Mississippi.

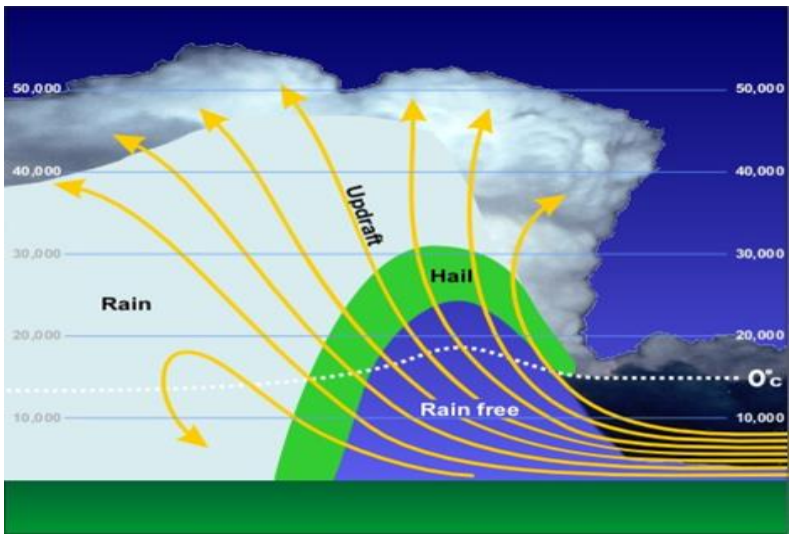
Wet Microburst - 1991
Photo by *William Bunting*

Severe Thunderstorms—Hail

Monday, February 29, 2016

How Does Hail Form?

Hail is formed when water droplets are drawn into an area of strong upward moving air, known as an updraft, of a storm. Once the water droplets are transported above the freezing level, they combine with tiny airborne particles, such as dirt, salt, volcanic ash, etc., and freeze on contact, forming tiny ice particles. These ice particles are light enough that they remain suspended in the cloud, where they undergo processes that allow them to combine with other supercooled water droplets and grow into hail stones. Once the hail stones are heavy enough to overcome the upward force of the updraft, they fall out of the cloud and can inflict significant damage to automobiles, buildings, crops, and even people.



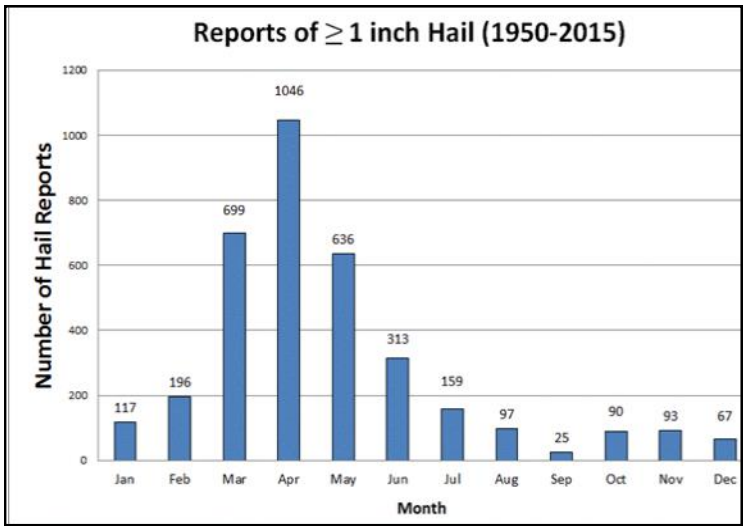
Measuring Hail

It's often difficult to get an accurate measurement of hail diameter, especially when it's falling. The table below helps observers estimate the size of hail based on average diameters of common items. When in doubt, play it safe and wait until the thunderstorm has moved away before going outside to measure the size of hail.

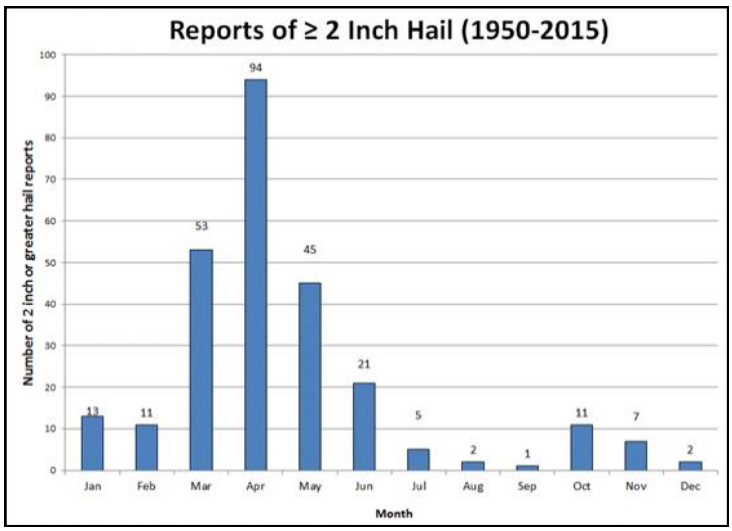
Softball-size hail in Clinton, MS
March 18, 2013
Photo by *Stephanie Mumbower*

Hail Size Estimates

Pea	1/4 inch
Penny	3/4 inch
Nickel	7/8 inch
Quarter	1 inch
Half Dollar	1 1/4 inches
Golf Ball	1 3/4 inches
Tennis Ball	2 1/2 inches
Baseball	2 3/4 inches
Grapefruit	4 inches
Softball	4 1/2 inches



One inch or greater hail reports in MS since 1950



Two inches or greater hail reports in MS since 1950

Flooding and Flash Flooding Are Top Weather Related Killers!

Tuesday, March 1, 2016

FLASH FLOODING: Flash floods can occur within a few minutes or up to six hours after excessive rainfall, with a dam or levee failure, or with a sudden release of water held by an ice jam or mud slide. Flash floods can wash out roads, and destroy buildings and bridges. Because flash floods happen in a short period of time (less than six hours after the causative event), they are more life-threatening than other types of flooding. Areas most susceptible to flash flooding are mountainous streams and rivers, urban areas, low-lying areas, storm drains, and culverts.

A **FLASH FLOOD WARNING** is issued when flash flooding has been reported or is imminent. It focuses on specific communities, creeks or streams, or other geographic areas where flooding is imminent or occurring.

Pelahatchie Creek flooding April 6, 2014
Photo by *NWS Jackson, MS*

A **FLASH FLOOD EMERGENCY** is issued when there is confirmation of an immediate threat to life and property, many times in the form of water rescues or evacuations, due to rapidly rising water levels from either extremely heavy rainfall over an area or a dam failure.

RIVER FLOODING: This type of flooding is caused by an increased water level in established watercourses, such as a rivers, creeks, or streams. River flooding is slower to develop than flash flooding (more than six hours after the causative event); however, some smaller creeks and streams have a short lag time between the runoff from heavy rain and the onset of flooding. On the other hand, it may take several days for a flood crest to pass downstream points on major rivers such as the Pearl and Mississippi rivers. The NWS issues river flood warnings when rivers are expected to rise above flood stage. Persons in the warned area are advised to take necessary precautions immediately. River stages and crest forecasts are given for selected forecast points along with known flood stages for each forecast point. While there is usually more advanced warning time with river floods than with flash floods, people should be familiar with the flood prone areas they live and work in, and must know what action to take and where to go if a flood occurs. Advanced planning and preparation is essential.

Washed out road. Taylor, MS. April 25, 2015
Photo by *Laura Toles Wadlington*

FLOOD WATCHES: The NWS issues a Flood Watch when conditions are anticipated that could result in either flooding or flash flooding within a designated area. People in the watch area are advised to check flood action plans, keep informed, and be ready to take action if a warning is issued or flooding is observed.

FLOOD SAFETY RULES: Follow these tips to stay safe during flood conditions. When a warning is issued get out of areas subject to flooding. These may include dips, low spots, stream beds, drainage ditches and culverts. If caught in low areas during flooding, go to high ground immediately.

Avoid already flooded and high velocity flow areas. A rapidly flowing stream or ditch can sweep you off your feet or even carry your car or truck downstream. Never drive through a flooded area as the road bed may be washed away. Play it safe! If you encounter a flooded road - **TURN AROUND, DON'T DROWN!**

Be especially cautious at night when it is harder to recognize flood conditions, and never drive around a barricaded road.

Most flood deaths occur at night and when people become trapped in automobiles that stall in areas that are flooded. If your vehicle stalls, abandon it immediately and seek higher ground. The rising water may engulf the vehicle and the occupants inside. Do not camp or park your vehicle along streams or creeks during threatening conditions.

When a FLOOD WARNING is issued for your area, act quickly to save yourself. You may only have seconds!

Tornadoes

Wednesday, March 2, 2016

EF3 tornado in Tupelo, MS on April 28, 2014.
Photo by *Skip Talbot*

What is a Tornado?

A tornado is a violently rotating column of air that extends from the base of a storm cloud to the ground. Some conditions that are conducive for tornado formation include warm, moist, unstable air, strong atmospheric winds that increase in speed and change direction with height, and a forcing mechanism to lift the air. When a combination of these factors comes together just right, tornadoes form. The most common time of year for tornado formation in Mississippi is during the spring months of March, April, and May, with a secondary tornado season in November and December. Additionally, the afternoon and evening hours are the times of day which most tornadoes occur, as they are the times at which the maximum heating takes place. However, tornadoes can occur at any time of day and at any point during the year given the right environment. Many tornadoes occur at night in Mississippi, especially during the fall and winter months.

Tornadoes and Car Safety

Being prepared for severe weather and tornadoes is important no matter your location, but this is especially critical if you are in a car when a tornado approaches. The winds from a tornado are strong enough to lift a car and toss it a far distance. Tornadoes can and do cross major highways and interstates, as occurred during the April 24, 2010 tornado. This tornado crossed two interstates as well as at least two heavily traveled highways.

Every year, several people die from being in a car during a tornado. In 2015, one person died in northern Mississippi during the December 23 tornadoes and nine died in cars as a result of a tornado that struck Dallas, Texas on December 26th. In 2011, 18 people were killed in cars during tornadoes, including one in northern Mississippi during the April 27th outbreak.

If traveling, make sure to adhere to the following safety tips regarding being on the road during severe weather:

- Always plan ahead. Check the weather forecast and if severe weather is expected in your path of travel, consider delaying your trip or altering your times of travel.
- Listen to live, local radio as a way to get warning information. Many radio stations will broadcast warnings within their listening area. Otherwise, consider bringing a portable weather radio and ensure that the WEA alerts are activated on your phone.
- Be aware of your surroundings and make note of any potential shelters along your route.
- Never take shelter under highway overpasses and bridges!!

Car tossed into a baseball field in Oak Grove, MS during the February 10, 2013 tornado.
Photo by *NWS Jackson, MS*

Enhanced Fujita Scale (EF Scale)

EF Rating	Wind Speeds	Potential Damage Threats
EF 0 (weak)	65-85 mph	Light damage, shallow rooted trees pushed over, some damage to gutters or siding.
EF 1 (weak)	86-110 mph	Moderate damage, mobile homes overturned, roof surfaces peeled off.
EF 2 (strong)	111-135 mph	Considerable damage, large trees uprooted or snapped, mobile homes destroyed.
EF 3 (strong)	136-165 mph	Severe damage, trains overturned, well built homes lose roofs and walls.
EF 4 (violent)	166-200 mph	Devastating damage, well built homes leveled, cars thrown.
EF 5 (extreme)	Over 200 mph	Incredible damage, well built homes disintegrated, automobile-sized objects thrown >300ft.

Tornado Safety Tips

When a tornado warning is issued:

- Get inside a sturdy, well built structure.
- Get into a storm shelter or into an interior room on the lowest floor of the structure with no windows, such as a hallway, a bathroom, or a closet.
- Protect your head with items such as a helmet, blankets, mattresses, pillows, cushions. Use something that will provide more protection than just your hands.
- If you are in a car do not try to outrun a tornado. Take shelter in a sturdy building nearby. If none is available, get out of the car and get into the lowest part of the ground such as a ditch.
- Never take shelter under highway overpasses. Many are not constructed properly to provide adequate shelter, especially as the wind speeds increase as the tornado passes over.
- Mobile homes are not safe shelters. Plan to take shelter in a sturdier building nearby, or if no other shelter is available, get low to the ground in a ditch.
- For those in schools, nursing homes, hospitals, airports and shopping centers: take shelter in the designated shelter area. Stay away from large windows or glassed areas. Stay away from large rooms like dining halls, gymnasiums, or warehouses because they have weakly supported roofs.

Develop a tornado preparedness plan in advance! Do not wait until the tornado is on your doorstep to decide where to go, or what to do. Tornadoes form very quickly and may do so with little or no advanced warning. You may only have a few seconds to find shelter. Thus, it is important to act quickly and know where you need to go.

Outside walls of a home collapsed after being struck by a tornado. Interior walls remain standing (above). A 2x6 piece of wood through a refrigerator (left). Both of these photos show why being in the interior portion of a home/building is important, and why wearing a helmet is a good idea!

DRILL DAY
Wednesday, March 2, 2016
9:15 am Local Time

MISSISSIPPI'S PrepareAthon!℠ for Tornado Safety

A STATEWIDE TORNADO DRILL will be conducted **Wednesday morning, March 2, 2016, at 9:15 AM Local Time**, weather permitting, as part of MISSISSIPPI'S PREPAREATHON FOR TORNADO SAFETY. *If Wednesday's weather is inclement, the test will be conducted on Thursday, March 3, 2016* at 9:15 AM.

The message will be sent under the Routine Weekly Test Product (RWT) disseminated by NOAA Weather Radio only. This will be broadcast on all NOAA weather radio transmitters across Mississippi. Many weather radios will alert for this test but some models will just flash a light. If your weather radio does not give an audible alert at 9:15 am, proceed with your drill anyway.

A drill such as this gives schools, churches, business offices and plant safety managers across the state a chance to check the readiness of their severe weather safety plans. If your office has a plan already in place, test it to make sure your employees know how to respond properly. If your employees know how the safety procedures work, they can carry them out effectively when the time comes.

IF YOUR WORK PLACE, SCHOOL OR CHURCH DOES NOT HAVE A SAFETY PLAN, NOW IS THE TIME TO START ONE!! Developing a safety plan is not difficult. If a plan is easy to operate, it is more likely to be successful when needed. Countless lives are saved each year by planning, preparedness and proper education. The United States population has grown in recent years, yet the number of tornado deaths has diminished. This is due to agencies and individuals developing weather safety plans and to people reacting in a prudent manner when severe weather threatens their areas.

YOUR SAFETY AND THAT OF YOUR FAMILY, FRIENDS AND CO-WORKERS DEPENDS ON YOU!!

50th Anniversary of the Candlestick Park Tornado

On March 3, 1966, one of the most devastating tornadoes in Mississippi history occurred. This tornado would come to be known as the “Candlestick Park” tornado, named after the shopping center in south Jackson that was totally obliterated by the tornado.

Entire track of the Candlestick Park tornado.

This tornado initially developed near the old Adams community southwest of Raymond in central Hinds County, at about 4 pm on March 3rd. It moved east northeast across the rural areas near Springridge Road, damaging homes and farms. The tornado then moved into the Jackson city limits, destroying the Candlestick Park shopping center and leveling a number of homes and businesses in this area. Eyewitnesses reported cars thrown more than a half of a mile and pavement scoured off of the ground. All of this is indicative of a violent (F4 or F5) tornado. Nineteen people were killed in Hinds County, most at Candlestick Park or nearby.

Once in Rankin County, the tornado mainly passed through what was then a very rural area. The tornado did cause very heavy damage to an industrial area near Flowood. The tornado continued through central portions of Rankin County with a heading towards eastern Rankin County. Much of the most intense damage in Rankin County, as well as casualties, occurred in the areas west and southwest of the Leesburg community. Six people were killed in these areas.

The tornado then moved into Scott County, where the tornado’s worst devastation appears to have taken place. The destruction was particularly catastrophic in the area north of Branch and near Forkville in northwest Scott County. Pictures and video from this area show houses destroyed to the foundation and large swaths of trees totally annihilated. Eyewitnesses again reported road pavement scoured out by the force of the tornado. The tornado continued east-northeast, with additional heavy damage near the Midway community in north-central Scott County. Before moving out of Scott County, the tornado would kill 26 people in this county alone.

After causing destruction in Scott County, the tornado moved into Leake County, crossing the county line along Highway 35 south of Walnut Grove. As the tornado moved through southeast Leake County, six people were killed in the area between the Madden and Salem communities as more than 40 homes and buildings were destroyed. Significant tornado damage continued into southwest Neshoba County, where nearly a dozen homes were heavily damaged or destroyed, and the historic Carolina church, which was more than 100 years old, was completely leveled to the ground. One person was killed near the Dowdville community.

BY THE NUMBERS

-Tracked for 202.5 miles, making it the longest track in Mississippi history.

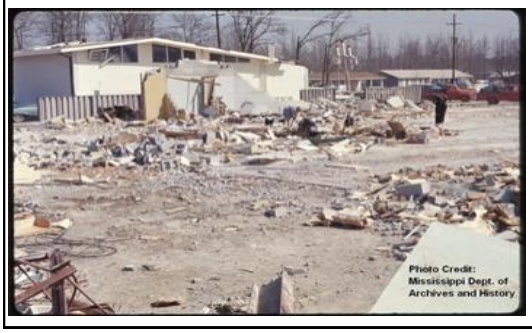
-900 yards wide

-Wind speeds were around 200mph per recent research

-Resulted in 58 deaths and 518 injuries, making it the second deadliest tornado in Mississippi history (behind the Delta outbreak)

-Caused $18 million in damages, which converts to nearly $134 million 2016 USD.

-One of only 7 recorded F5/EF5 tornadoes to hit Mississippi.

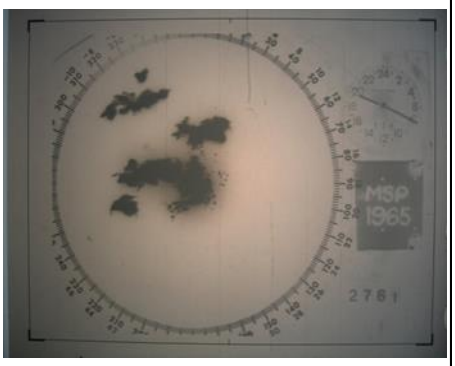


Reports indicate that the tornado weakened with records referencing more sporadic damage through the remainder of Neshoba County, and into Kemper and Noxubee counties. Officially the tornado continued into Alabama where Pickens and Tuscaloosa counties were impacted with one fatality in Pickens County. The official record for the tornado shows a continuous 202.5 mile track from Hinds County, Mississippi to Tuscaloosa County, Alabama. The tornado dissipated around 7:45 pm near Tuscaloosa.

Pictures above are of the destruction at Candlestick Park shopping center area. Courtesy: *Mississippi Department of Archives and History*

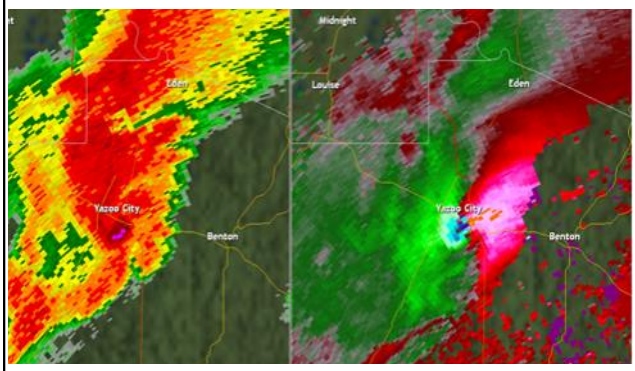
Fifty Years Since Candlestick Park

Like anything in our culture and society, the science and technology of meteorology has changed dramatically in the 50 years since the Candlestick Park tornado. The tornado occurred at a time when research on severe thunderstorms and tornadoes was really beginning to accelerate. Just two years before in 1964, the National Severe Storms Laboratory (NSSL) was created and located in Norman, OK. In the years following this historic occurrence, NSSL would be responsible for dramatic progress in the understanding of severe thunderstorms and how tornadoes are produced. Unfortunately, in 1966 these new discoveries were still in the future. The process of issuing tornado watches and warnings to the public was still in development in 1966. The NWS (called the Weather Bureau back then) office in Jackson was equipped with a World War II era weather radar which was incredibly primitive in comparison to the WSR-88D Doppler radar used by the NWS today. The somewhat more modern WSR-57 weather radar was installed at the Jackson International Airport in 1969.



Example of the WSR 57 radar screen. This image is of a supercell near Minneapolis, MN in 1965.

In order to try to detect tornadoes using radar in 1966, weather radar observers would look into a viewing tube, like those used on military aircraft radar during the war, and attempt to discern "hook echoes" as indicators of possible tornadoes. It had been understood since the 1950s that "hook echoes" were correlated with the occurrence of tornadoes, but the reason why was not particularly well understood. In fact, renowned research meteorologist Theodore Fujita, the inventor of the Fujita tornado damage scale, had just published a paper in 1965 theorizing the existence of the "supercell" thunderstorm. It would later be shown definitively that the supercell was a special type of rotating thunderstorm, associated with the hook shaped echo on radar, which produced the overwhelming majority of tornadoes. This discovery paved the way for the development of Doppler radar (WSR 88D), the biggest technological advancement since 1966, and what really set the stage for meteorologists to forecast and track tornadoes.



Example of the WSR 88D radar screen. This image is of the supercell that hit Yazoo City, MS in 2010.

This allowed meteorologists to not only see the storms in better detail, but provided velocity information about the storm. Forecasters were now able to see rotation in the storms and determine if they had the potential to produce a tornado like never before. This radar was deployed across the US in the early 90s and arrived in Jackson in March 1993. Since then, the 88D has been the single most important tool in the forecast and warning aspect of tornadoes.

A major upgrade occurred to the 88D radar during 2012-2013. This upgrade was to dual polarization technology and the Jackson radar was upgraded on January 23, 2013. This upgrade allows radar operators to see the different shapes and sizes of the particles that are being sample by the radar. From this, it is possible to see tornadic debris that is being lofted by the tornado and forecasters are able to "confirm" that a tornado is on the ground and track it with much higher certainty than ever before. From seeing this debris signature, it is also possible to gauge the potential intensity of the tornado by how high the debris is lofted. This has a direct impact on how warnings are worded. Meteorologists can now say with high confidence that a tornado is on the ground, a tornado is potentially strong, and issue "tornado emergencies" when there are expectations that a violent tornado is occurring. This information is communicated to emergency managers and broadcast meteorologists so that they can pass along this critical information to everyone.

Communications have also advanced tremendously over the last five decades. In 1966, the Weather Bureau relied on teletype and phone to get warnings and statements out to the public. The teletype circuits utilized at this time operated at only about 75 words per minute, and it would often take several minutes for a warning to actually be prepared and transmitted on the teletype. This is in stark comparison to the rapid communication of today, in which a warning message can be prepared by a NWS meteorologist in a matter of seconds and, once issued, is disseminated automatically and almost instantaneously via NOAA All-Hazards Weather Radio (not deployed until 1975), the Internet, television, cell phones, and other forms of media. Additionally, other forms of warning the public such as outdoor sirens are much more common today than in the 1960s.

Another important tool is our NWSChat service. This is a direct connection from the NWS to core partners, where they can essentially get the thoughts of the warning operators. This provides a heads up on new warnings and overall storm/system evolution and expectations. Sharing critical information to each other about what storms may do and what storms have done in the form of damage reports is critical during the warning process and getting the most accurate and timely information to the public. If another tornado like that of the Candlestick Park tornado occurred in the same locations today, destruction would be tremendous, but the chances of saving lives would be greater thanks to the increased technology and communication that has evolved over the last fifty years. Who knows what will occur in the next fifty.

Graphical Tornado Database

Have you ever wanted to look at historical data to see when and where tornadoes occurred and what their impacts were? The National Weather Service has developed easy to use, interactive tornado databases that can display tornado data going all the way back to 1880! **Figure 1** shows an example of the April 24, 2010 tornado that tracked nearly 150 miles across central Mississippi, and the impacts it had on our state. Check it out today!

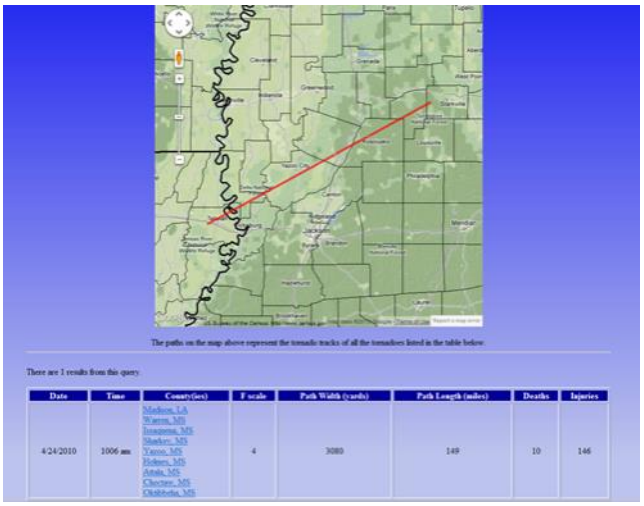
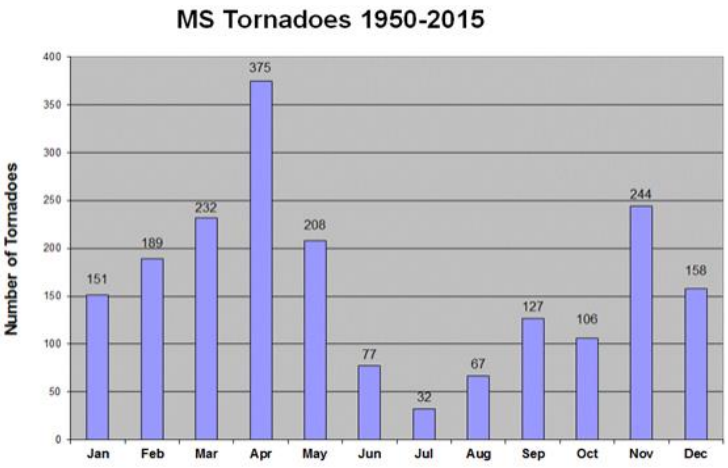
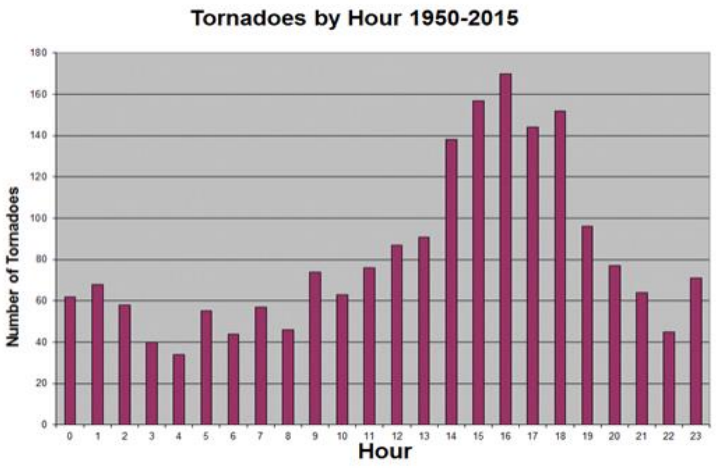
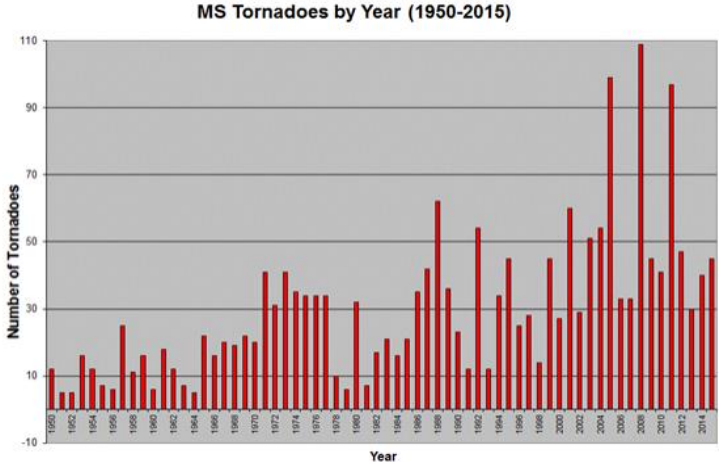


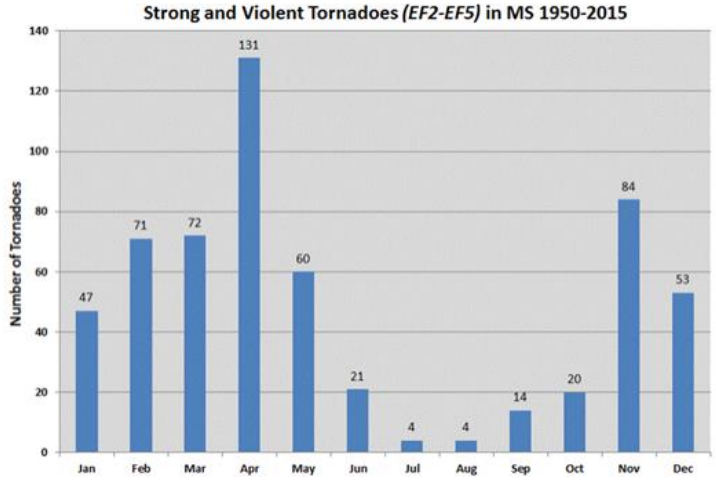
Figure 1. Example output from the Graphical Tornado Database.

Memphis (Northern MS) – http://midsouthtornadoes.msstate.edu/index.php?cw=meg
Jackson (Central and Southeast MS) - http://midsouthtornadoes.msstate.edu/index.php?cw=jan
Slidell, LA (Southwest & Coastal MS) - http://midsouthtornadoes.msstate.edu/index.php?cw=lix
Mobile, AL (Southeast MS) - http://midsouthtornadoes.msstate.edu/index.php?cw=mob









History of Violent, Long-Track Tornadoes in Mississippi

Historically, the southeastern United States, and namely Mississippi, has been prone to violent (EF4 or EF5), long-track (100+ miles) tornadoes. Since 1950, when the official tornado database began, a total of **26** violent, long-track tornadoes have occurred across the United States (Figure 1). The Southeast (highlighted in green) accounts for **16 (~62%)** of the total violent, long-track tornadoes. Even more frightening, the state of Mississippi (highlighted in red) has experienced **8 (31%)** of the nation's total violent, long-track tornadoes (Figure 2). These eight violent, long-track tornadoes shown impacting Mississippi in Figure 2 resulted in 224 fatalities and an estimated 2,375 injuries. These figures average out to 28 fatalities and nearly 297 injuries per violent, long-track tornado in Mississippi. However, with heightened awareness, better technology, and increased warning lead times, the last two violent, long-track tornadoes (2010, 2011) combined for a total of 17 fatalities and 268 injuries. Mississippi is the only state to have back to back years in which a violent, long-track tornado occurred. The largest official fatality count of the eight is 58, which occurred twice, nearly five years apart, in 1966 and 1971. Unfortunately, Mississippi has three of the top ten deadliest tornadoes to strike the entire United States before the official tornado database began. These include tornadoes that affected Natchez (1840), Tupelo (1936), and Purvis (1908), ranking second, fourth, and seventh respectively.

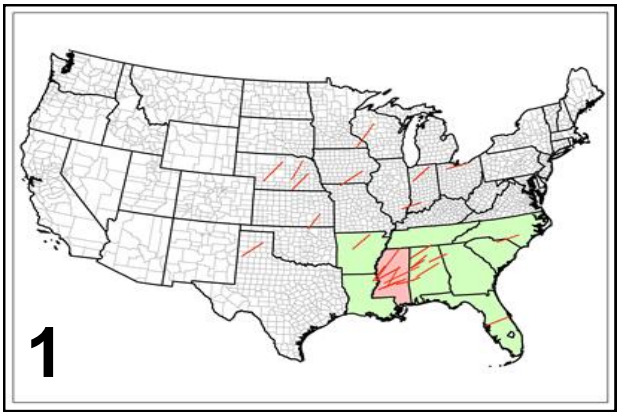


Figure 1: Violent, long-track tornado paths from 1950-2015.

Traditionally, violent and long-track tornadoes have occurred over a range of months from November through April (Figure 3). Interestingly, the tornado that struck Purvis in 1908 and the violent, long-track tornado that struck Yazoo City in 2010 occurred on the same day, April 24th. Research analyzing all historical tornado paths since 1950 has shown Mississippi, and especially Smith County, to have the greatest probability of experiencing ***any*** tornado within a given year (Figure 4, Dixon et al. 2011). In terms of tornadic activity impacts, a large area of central Mississippi is equal to, if not greater than, areas out in "Tornado Alley." On average, south central Mississippi will be impacted by at least one tornado in a given year with a greater likelihood of experiencing a violent and long-track tornado. It's important to note that any area of Mississippi may be impacted by a tornado, not just those highlighted areas.

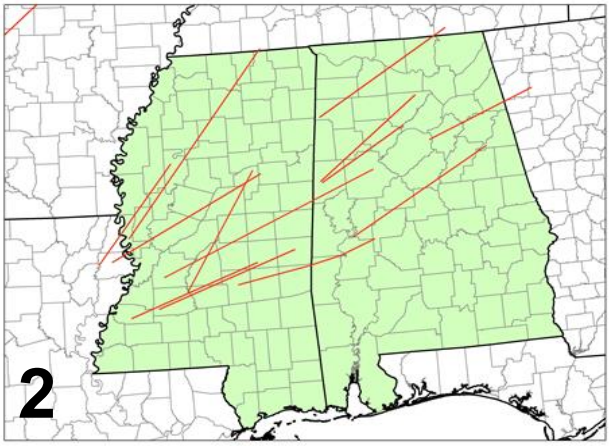


Figure 2: Violent, long-track tornadoes across Mississippi and Alabama from 1950-2015.

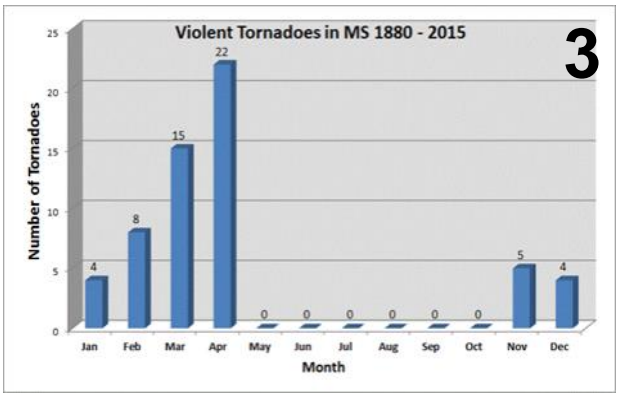


Figure 3: Number of violent, long-track tornadoes per month in Mississippi from 1950-2015.

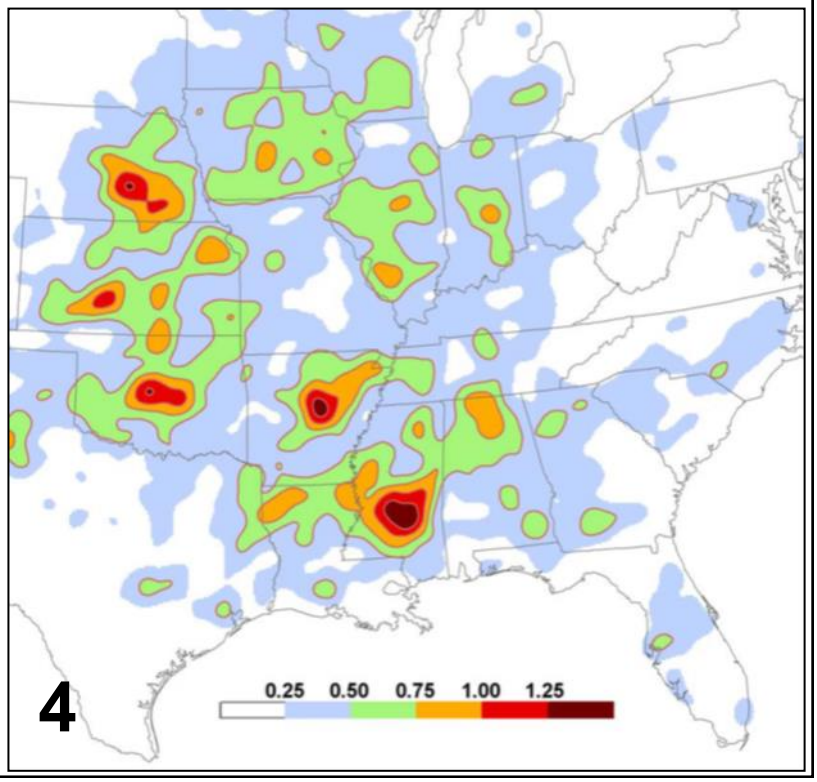


Figure 4 (right): Average annual tornadoes within 25 miles of a point 1950-2007. Courtesy: Dixon et al. 2011.

Dual Polarization Radar and the Benefits to Meteorologists

Since 2012, all National Weather Service WSR-88D radars have been upgraded to dual polarization (dual pol) technology. The upgrade has been profound in its short life, specifically in its ability to detect tornadic debris. Multiple tornadoes have been detected since the upgrade, but several significant weather events have proven the worth of this new system and the upgraded technology.

One might be asking, what are we talking about when we say dual pol? In general terms, the 88-D radar now transmits two different pulses of energy. The first radio wave pulse, the traditional pulse, has a horizontal orientation. The second radio wave pulse, the new pulse, has a vertical orientation. What makes these different oriented waves so unique/special is that they now can provide information back to the radar about what size and shape the particles are in the atmosphere. This additional information can be used in turn to improve rainfall estimates, help determine precipitation type, and better detect certain types of hazardous weather like tornadic debris.

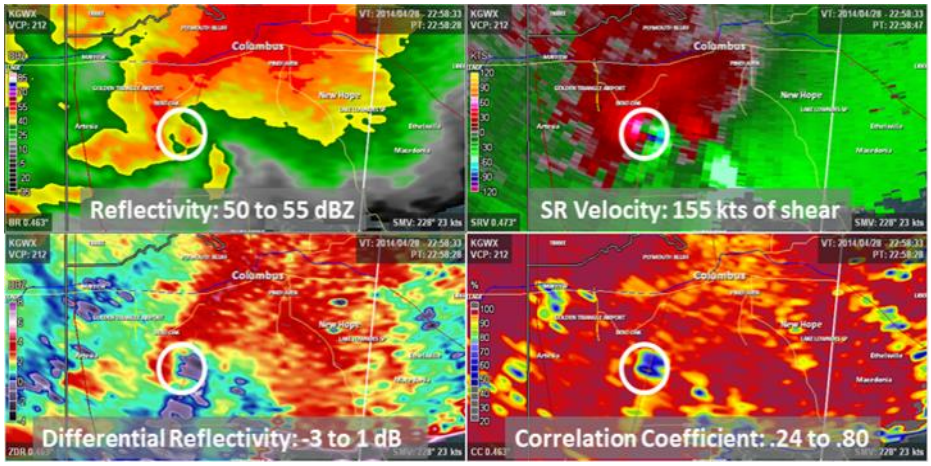


Figure 1. Radar images from an EF2 tornado in Lowndes County from April 28, 2014. The bottom two images are a result of the dual pol upgrade. The bottom right image shows tornadic debris. You can see this debris signature, circled, southwest of Columbus. This signature is co-located with rotation, top right panel, which builds confidence in a tornado being on the ground.

While the dual pol upgrade has benefited radar meteorologists in several ways, the greatest benefit has come from detecting tornadic debris. Initially, the radar operator has to detect three key radar signatures (see Figure 1). From that, the radar shows it is detecting various shapes in the atmosphere such as tree limbs, insulation, boards, etc. This indication has proved valuable in many tornado events in the past three years, including the EF-4 that struck Hattiesburg in 2013, the EF-4 that struck Louisville in 2014, along with many others. During the April 28, 2014 tornado outbreak, there were many storms showing signs of rotation as indicated on radar and a tornado warning would be issued. Seeing the tornado debris on radar gave warning operators confidence that a tornado was occurring and were able to use enhanced wording in the warning in order to bring a heightened sense of awareness of the situation. In many cases, such as the Louisville tornado, there were also storm spotter reports to help confirm what was shown on radar; however this was not the case for all rotating storms that day. In addition, having debris signatures also are very useful in storm surveys. Following a debris signatures can give surveyors a clearer picture of where they need to go to seek out damage.

Another event where dual pol radar data was very helpful was on April 11, 2013 in Kemper and Noxubee counties. On this day, no big tornadoes were expected as conditions for tornadic development appeared to be on the low side. However, conditions became more favorable towards midday. A tornado warning was issued for an intensifying storm and a few minutes later a tornado touched down, which was confirmed by a debris signature. Radar operators modified the wording in the warning to “confirmed tornado” based solely on the radar data. Roughly 15 minutes later, radar signatures indicated the tornado was likely “strong” and still on the ground. Based off a local study that shows there is a strong correlation between the height of tornadic debris and tornado intensity, confidence increased on the strength of the tornado that was occurring. After combining all of the available information about the ongoing tornado, the warning was upgraded to a Tornado Emergency. This EF-3 tornado was on the ground for 68 miles. Unfortunately, one fatality occurred along with nine injuries.

As you can see, information from dual pol radar can be quite powerful. NWS warning meteorologists have access to information they have not had in the past. When used properly, the ability exists to tell people that a tornado is on the ground without having supporting information from storm spotters. Also, enhanced wording in warnings can be used to pass along more accurate information so people can take the necessary actions to save their lives.

Tornado Emergency

What does it mean? Here is the criteria for a Tornado Emergency:

**Report of significant damage or a reliable report (from a trained spotter) of a large tornado on the ground
**Radar showing strong indications of a strong/violent tornado (visible either by debris ball or tornadic debris signature)

Impact Based Warnings

Impact Based Warnings (IBW) were developed to improve communication of the most critical information the National Weather Service (NWS) provides in our text based warning products. In the past, critical information could have been missed as it was hard to find in the traditional warnings that contained plenty of text. With IBW, this information is more easily found and the overall warning is composed in a more concise manner. We still issue tornado/severe thunderstorm warnings as we did before, but now we have a way of expressing what we expect to occur and in a manner that can be quickly seen and understood. The goal of IBW is again to better communicate the most critical information. It also is trying to generate a better public response to the threat and better meet societal needs by clearly defining the hazard or threat and then indicating some typical impacts that often occur from such an event.

IBW was developed after the devastating tornadoes of 2011, mainly the Joplin, MO EF5. Initially this warning concept was tested in 2012 in five offices from the Plains and Midwest. It was later expanded to all NWS offices across the Plains and Midwest (38 offices) in 2013. In 2014, eight additional offices were added, one of which was NWS Jackson. As of 2015, all offices that serve Mississippi use impact based warnings, as well as many in the central and southern parts of the country.

With the NWS radar fleet fully upgraded to dual polarization, IBW fits ideally with the enhancements the radar provides to warning forecasters. The most notable benefit to IBW, from the dual pol upgrade, is the detection of tornadic debris. This is truly a powerful tool which helps build confidence on when to use enhance wording, especially in tornado warnings and statements. The detection of the tornadic debris signature (TDS) provides high confidence that a tornado is occurring and doing damage, even when not observed by trained spotters. When a TDS exists, the warning forecaster can use wording such as “confirmed tornado”. Additionally, recent research has found a strong correlation to the height of the TDS to the intensity of a tornado. Utilizing this and other tools, warning forecasters can use wording such as “considerable” when they feel a strong (EF2 +) tornado is more likely or even “catastrophic” (Tornado Emergency) when the possibility of a violent tornado (EF4 or EF5) exists. NWS Jackson has applied these findings to notable tornadic events such as the February 2013 Hattiesburg tornado, the East Mississippi tornado of April 2013, the April 28, 2014 outbreak and the December 23, 2014 Columbia tornado.

Here is a list of warning enhancements of critical information from IBW being used by NWS offices:

- Using “confirmed tornado” from radar and/or spotters
- Anticipating the intensity of the tornado and the use of damage threat wording such as “considerable” or “catastrophic”
- Use of hazard tags at the bottom of the warning that will state potential hail size, thunderstorm wind speeds, and tornado damage threats.

The following are examples of IBW and how it was implemented in three tornadic events in 2014.

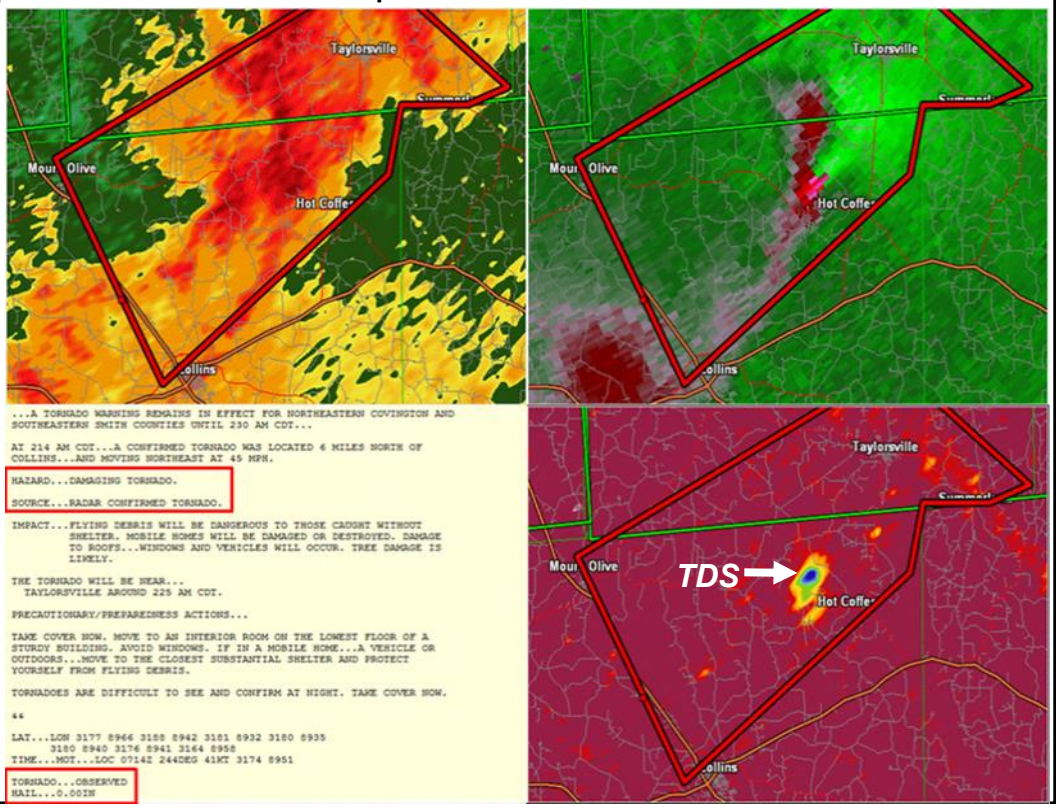


Figure 1. Radar Confirmed example. Red text box shows IBW enhanced wording, TDS detected. *This tornado occurred during the early morning hours of April 7, 2014 and tracked across northern Covington County for 16 miles. Warning forecasters had the ability to “confirm” a tornado without trained spotters at 2am.*

Impact Based Warnings

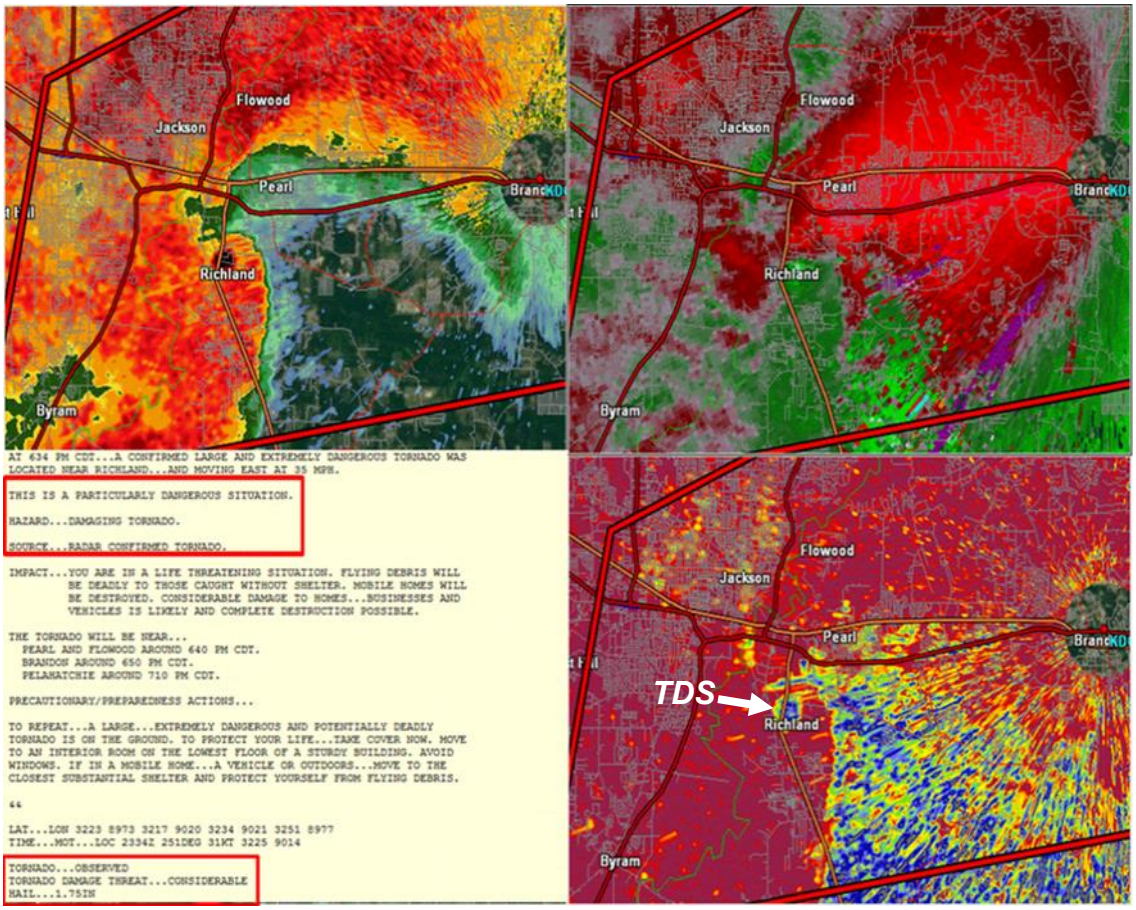


Figure 2. Example of a strong tornado. Red text box shows "considerable" tag and enhanced wording, TDS detected. *This tornado tracked across central Rankin County and impacted the cities of Richland and Brandon before it lifted in western Scott County. This tornado was on the ground for 30 miles and was rated EF3.*

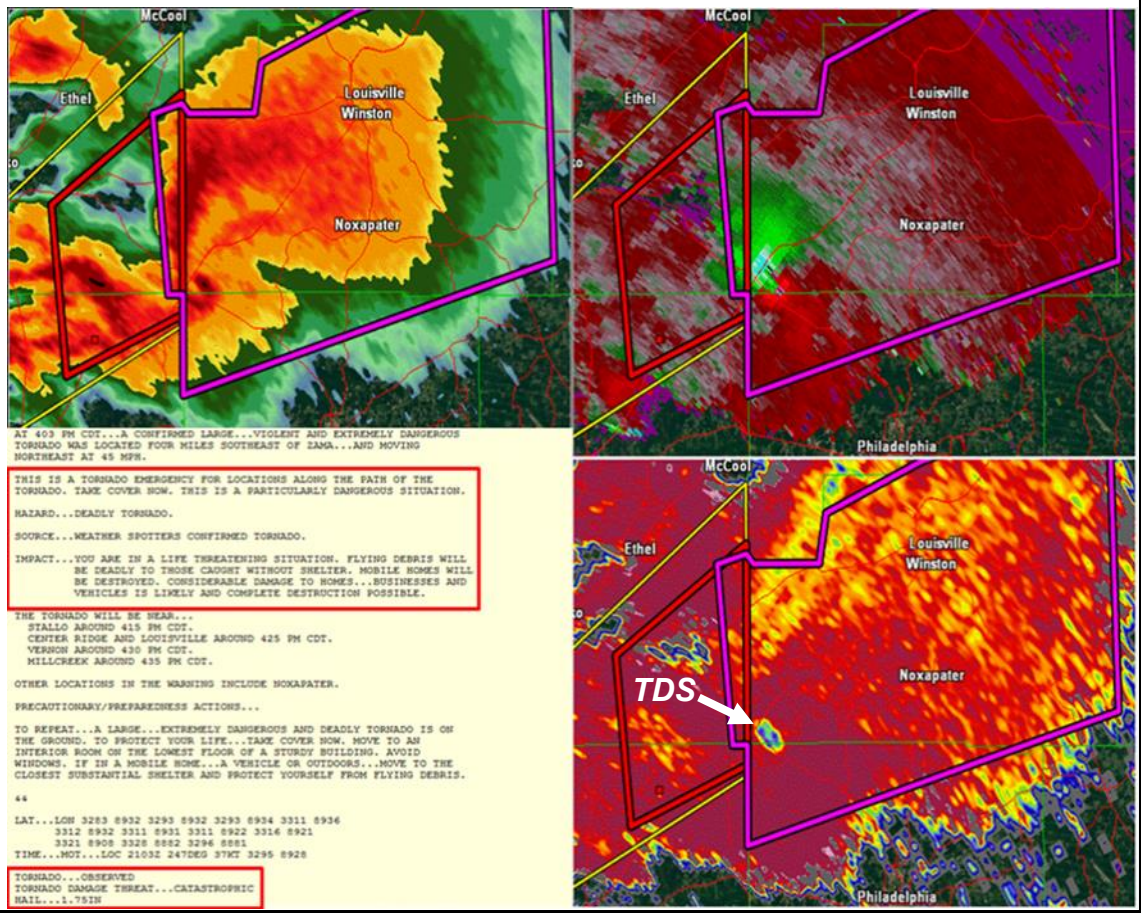


Figure 3. Example of a violent tornado. Red text box shows "catastrophic" tag and "Tornado Emergency" wording, TDS detected. *This violent tornado started in Leake County and moved across the corners of Neshoba and Attala counties, with Winston County being the hardest hit. A "Tornado Emergency" was issued based on the height of the TDS and spotter reports. This tornado was on the ground for 34 miles and rated EF4.*

Lightning

The Underrated Killer

Thursday, March 3, 2016

Lightning near Flora, MS.
Photo by *Brandon Morgan*
March 31, 2014

EVERY THUNDERSTORM CONTAINS LIGHTNING.

Lightning is an incredibly powerful electrical discharge, containing up to 100 million volts of electrical charge and capable of reaching 50,000 degrees Fahrenheit. Cloud to ground lightning is the result of incredible differences in electrical charge which forms within thunderstorms as well as between thunderstorms and the earth's surface. Recent science suggests that ice in thunderstorms is key to creating the massive charge differences which lead to lightning. Thunderstorm updrafts and downdrafts work to separate smaller ice particles from larger hail stones within the storm. As this happens many of the ice pieces collide, resulting in a separation of electrical charge. The higher part of the storm contains primarily positively charged small ice crystals, with negatively charged larger chunks of ice down low. As the storm moves across the earth, a pool of positively charged particles gathers near the ground. Eventually a brief electrical circuit is created as a negatively charged "step leader" descends from the storm toward the ground and connects to the positive charge on the ground. The extreme heating of the air from lightning causes a rapid expansion of the air around it, leading to thunder. The sound of thunder will travel away from lightning at a speed around one mile every five seconds. Being in the vicinity of lighting is obviously dangerous. However, if you can hear thunder in the distance but can't visually observe lightning, you are still in danger. Lightning can strike up to ten miles from a thunderstorm. **When thunder roars, go indoors!**

An oil tank exploded & flew over 100 yards after being struck by lightning. Photo by *Jeff Galloway*

Lightning Safety Rules - Outdoors

- Seek shelter inside a house, large building or an all metal vehicle with the windows rolled up (avoid convertibles or open top cars). It is the metal frame that protects from lightning, not the tires.
- If your hair stands on end and your skin tingles... lightning is about to strike. Take cover immediately!
- When boating, or in the water, head for shore and get into a shelter, or vehicle.
- Once you hear thunder, stop your outside activity immediately and head for safe shelter!

AVOID

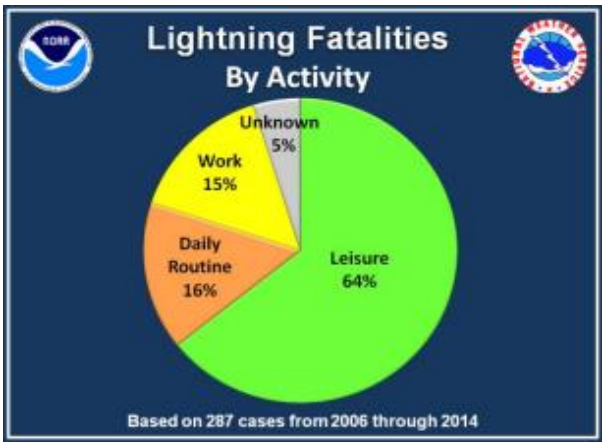
- Large trees, hilltops and other high places. Don't be the tallest object! Never seek shelter under a tree.
- Chain link fences and any other metal fences like those around ball parks and play grounds.
- Sports dugouts and open park pavilions.
- Motorcycles, scooters, golf carts, small metal sheds, bicycles, tractors and farm equipment that does not have an enclosed metal cab.

Lightning Safety Rules - Indoors

- Stay away from windows.
- Avoid telephones and electrical appliances (wires connecting to these devices run outside of the home and act as lightning rods). Don't wash dishes or take a shower. The pipes will conduct electricity.
- Unplug computers and other sensitive electrical devices (time permitting) since surge suppressors may not protect these items if lightning hits close to the home.
- There is no truth to the old myth that "lightning never strikes the same place twice."
- If a person is struck by lightning, there is no residual charge left on the body. The quick application of CPR may maintain vital body functions until medical help can be obtained.

WHEN THUNDER ROARS, GO INDOORS!

Lightning Fatalities

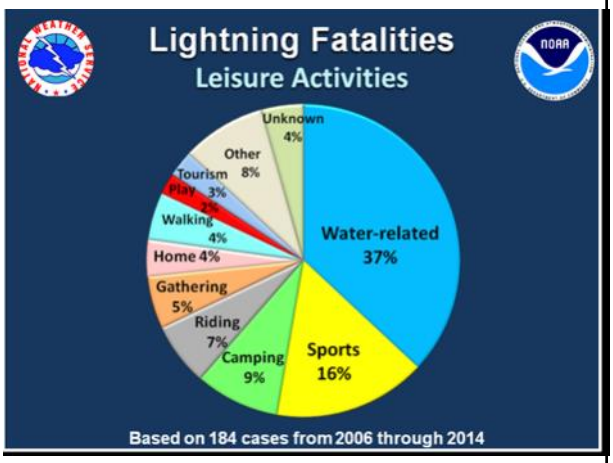


Percent of lightning fatalities by activity 2006 - 2014.

Despite the decreased amount of deaths in recent years, individuals are still getting caught by the unpredictable nature of lightning. Statistics continue to show that the activities performed at the time of death are those that do not provide sufficient protection from lightning. From the period 2006-2014, almost two-thirds of the deaths occurred from people enjoying outside leisure activities. These activities include outdoor sports, fishing, boating, being on the beach, camping, and outdoor recreation of many other types.

In addition, men remain by far the most likely gender to get killed from lightning strikes. This is especially the case when the activity is sports or work related. If the activity is considered a day to day activity (i.e. walking to/from the car, yard work, taking out the garbage, etc.), women are slightly more vulnerable than other activities. Overall, water-related activities (fishing, swimming, boating, etc.) remain the number one activity being performed when a lightning death occurs.

What are the factors that contribute to lightning fatalities? A study conducted by NWS Lightning Safety Specialist John S. Jensenius looked at some proposed reasons for lightning fatalities. These include:



Percent of leisure activities that contributed to most lightning deaths 2006 - 2014.

Willingness to cancel or postpone activities
In the busy schedules of today's society, very few people like to alter their plans. Although many outdoor activities are cancelled in advance due to threat of a steady rain, few are cancelled in advance due to the threat of a potentially deadly thunderstorm. For outdoor activities, there is a balance between safety and convenience. People who don't alter outdoor plans when thunderstorms are forecast (or occurring) are unnecessarily putting themselves at risk of being struck by lightning. For any activity where a safe shelter is not readily available, there is no safe alternative but to cancel or postpone the activity in advance if thunderstorms are forecast.

Being aware of approaching or developing storms
Certain activities limit a person's ability to monitor conditions. Background noise may limit a person's ability to hear distant thunder from an approaching or nearby storm. Mountains, trees, or buildings may impair a person's view of the horizon and limit the ability to watch for signs of developing storms. Recent advances in cell phone technology and the availability of lightning notification services may help provide advance warning in these situations.

Vulnerability of the activity
Being outdoors any time a thunderstorm is in the area is dangerous. However, some activities cause people to be more vulnerable to a lightning strike, and in particular, a direct lightning strike. Direct strikes are a greater threat to people in open areas, such as sports fields or on the water.

Ability and willingness to get to a safe place quickly
The inability and unwillingness to get to a safe place in a timely manner both contribute to many lightning fatalities. Many people wait far too long to start heading to safety, and that puts them in a dangerous and potentially deadly situation. In fact, a number of lightning victims in this study were seeking safety when they were struck – the problem is that they just didn't start soon enough. In some cases, people decide to wait to see if the conditions improve rather than heading toward safety immediately. It's important to note that some activities require a considerable amount of time to get to a safe place. In those instances, it is imperative that people in charge or involved in the activities monitor conditions and head to safety immediately at the first signs of a developing storm.

Lightning is an awesome display of the power of nature and just one strike can change a life. Remember, when you can hear thunder, you need to seek shelter immediately! Situational awareness and proper planning are essential to safety from all kinds of weather phenomena.

NOAA Weather Radio / Emergency Alert System / Wireless Emergency Alerts
Friday, March 4, 2016

The National Weather Service (NWS) utilizes NOAA Weather Radio to broadcast continuous weather information 24 hours a day, every day of the year. This is your direct link in receiving watches and warnings from the NWS. When properly programmed, with options for single or multiple counties, the NOAA weather radio will alert you of a warning for your area, day or night. With battery back-up, the radio will still be able to deliver life-saving information even if the power goes out due to the storms. Mississippi is served by 16 NOAA Weather Radio (NWR) transmitters with several more surrounding transmitters in neighboring states covering additional counties. Approximately 95 percent of the people in Mississippi are within range of a NWR transmitter (see list of NWR transmitter locations and frequencies in table below).

While routine programming offers the latest forecasts, hazardous weather outlooks, current weather conditions, and official climate data, the broadcast cycle is automatically updated and at times interrupted whenever a specific weather watch, warning, or advisory is issued by an NWS Forecast Office. Watches, warnings, advisories and special weather statements are given the highest priority on NWR and are frequently updated with critical weather information.

In an emergency, each station will transmit a warning alarm tone in addition to the SAME (Specific Area Message Encoding) tone. Information on the emergency situation then follows. These alert tones, especially the SAME, are capable of activating specially-designed receivers by producing a visual and/or audible alarm. For the deaf and hard of hearing, special equipment is available to purchase for NOAA Weather Radio, such as strobe lights and bed shakers. Not all weather band receivers have this capability, but all radios that receive the NWR transmission can receive the emergency broadcasts. The warning alarms and SAME tones are **tested each Wednesday, typically between 11AM and noon, weather permitting**.

Commercial radio and television stations, as well as cable television companies, are encouraged to use NOAA Weather Radio in order to rebroadcast pertinent weather information to the general public. NWR is also a major part of the Emergency Alert System (EAS), which efficiently disseminates critical weather warning information through commercial broadcast outlets in order to save your life.

Wireless Emergency Alerts (WEA) are another avenue for government agencies to send urgent messages directly to cell phones in an area of interest. Applications or additional software are not needed, and the messages will look similar to text messages when they arrive on your phone. We **strongly** encourage residents not to disable these vital alerts as they have helped save lives. Additional information on WEA can be found at http://www.nws.noaa.gov/com/weatherreadynation/wea.html#faq1 .

Locations and Frequencies of NOAA Weather Radio Stations Serving Mississippi

Leakesville, MS	162.425	Magee, MS	162.525
Gulfport, MS	162.400	Baton Rouge, LA	162.400
Oxford, MS	162.550	Memphis, TN	162.475
Inverness, MS	162.425	Fountain Hill, AR	162.475
Ackerman, MS	162.475	Marvell, AR	162.525
Booneville, MS	162.400	Bogalusa, LA	162.525
Rose Hill, MS	162.550	Alexandria, LA	162.475
Jackson, MS	162.400	Florence, AL	162.475
Bassfield, MS	162.475	Winfield, AL	162.525
Bude, MS	162.550	Mobile, AL	162.550
Carthage, MS	162.500	Demopolis, AL	162.475
Aberdeen, MS	162.450	New Orleans, LA	162.550

A New NOAA Weather Radio Transmitter in Central and Southeast Mississippi

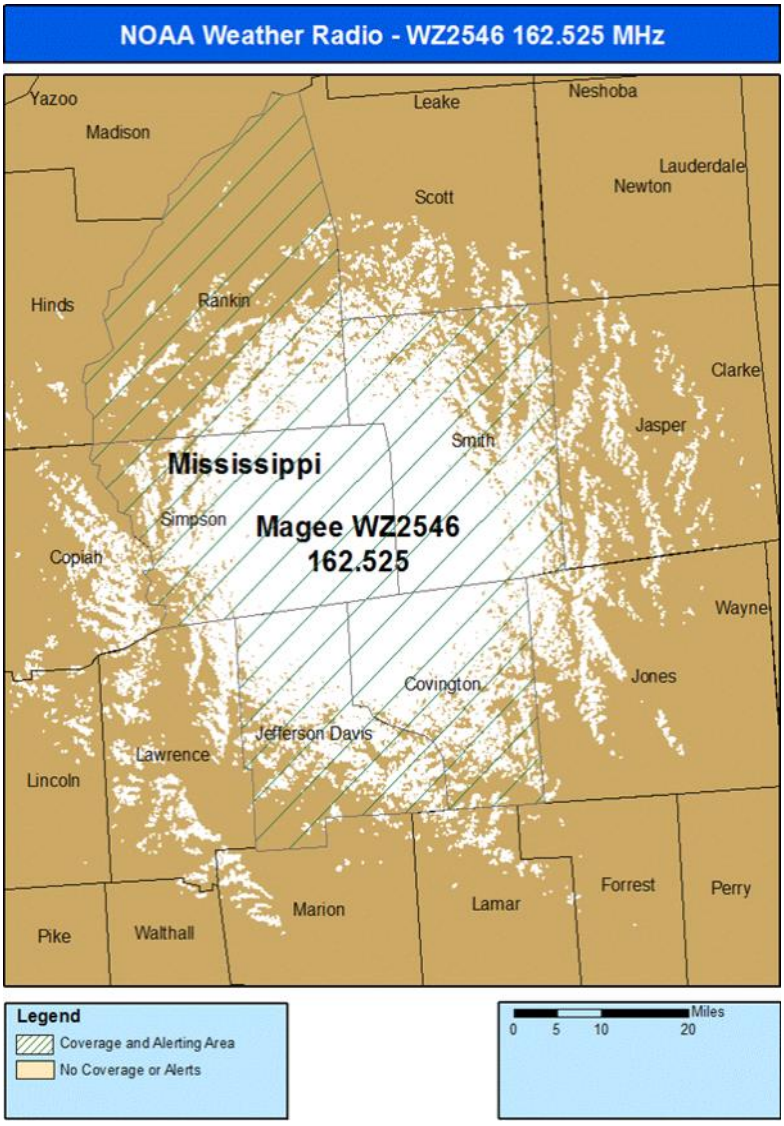
One addition to the 2016 spring severe weather season is the deployment of a new NOAA Weather Radio (NWR) transmitter, which will service portions of central and southeast Mississippi. The National Weather Service, in partnership with the city of Magee, MS, is pleased to announce the installation of a new National Weather Service Weather Radio transmitter.

NOAA Weather Radio station WZ 2546 is now on the air and broadcasts on a frequency of 162.525 MHz. This 300 watt transmitter is located atop a tower in Magee, and will serve the residents of Magee and much of Simpson County. It will also broadcast to portions of Covington, Jefferson Davis, Rankin, and Smith counties, one of the most active tornado areas in the country.

WZ 2546 will provide weather forecast information 24 hours a day, with regional observations updated hourly. The Mississippi River stage and five day forecast for selected locations along the river, in addition to a recreational forecast for some selected area lakes, can be heard daily. Information concerning hazardous weather conditions, such as watches, warnings, and advisories, will always replace routine programming, and will be broadcast as conditions warrant. A test of the NOAA Weather Radio Warning Alarm Device, will be conducted each Wednesday between 11 AM and noon, unless there is a risk of hazardous weather.

The National Weather Service would like to commend the city of Magee for their dedicated pursuit in both improving and expanding the coverage of NOAA Weather Radio across central and southeast Mississippi.

NWR transmitter atop a tower in Magee, MS.
Photo by NWS Jackson, MS



Broadcast coverage area (in white) for NOAA Weather Radio Station WZ 2546.

The Use of Social Media by the National Weather Service

One of the newest and most direct ways for distributing weather information by the National Weather Service is through social media. Over the past few years, we have established a presence on Facebook, Twitter, and most recently, YouTube. These platforms have allowed us to reach beyond our traditional text products and provide graphical weather information to a new audience. Not only does social media allow us to share critical forecast information with our followers; it also provides a way for us to directly interact with them, allowing us to answer questions and our followers to share their own weather reports.

We took our first step into the world of social media when we joined Facebook in April 2011. In less than three years, we have gained a significant number of followers. We routinely post forecast updates, interesting climate factoids, outreach events, storm survey information and interesting weather facts on our Facebook page. Along with our routine postings, our most significant usage is during severe weather events when we diligently post radar updates and storm reports. Perhaps some of the most important items we post on Facebook are our forecast graphics. Graphical posts allow us to provide early notice of upcoming severe weather outbreaks and other hazardous weather events, which can be easily shared by our followers. For instance, here is a graphic that was posted to the NWS Memphis Facebook page in advance of severe weather in May 2014 (Figure 1).

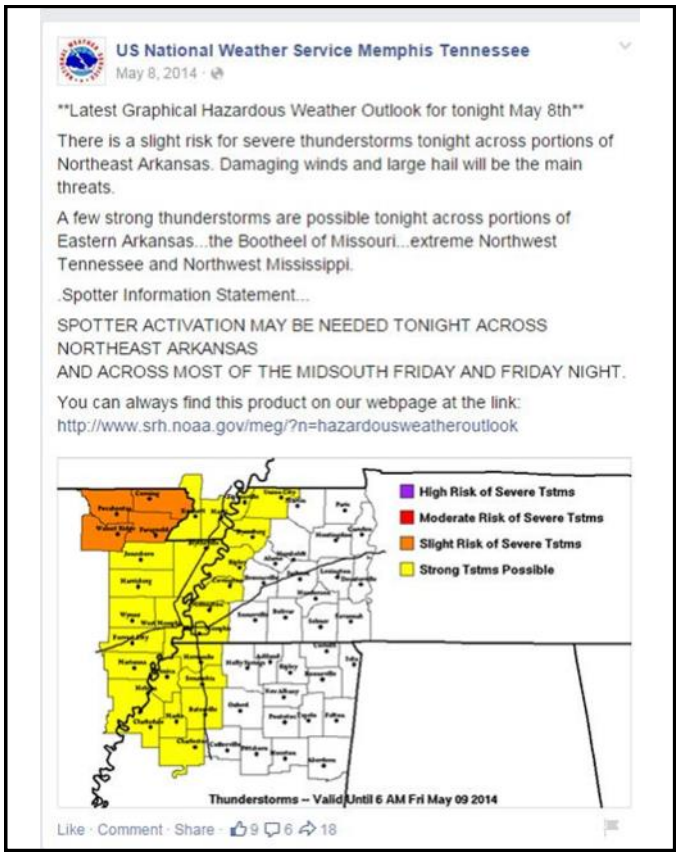


Figure 1. Facebook post advertising severe weather on May 8, 2014 issued by NWS Memphis.

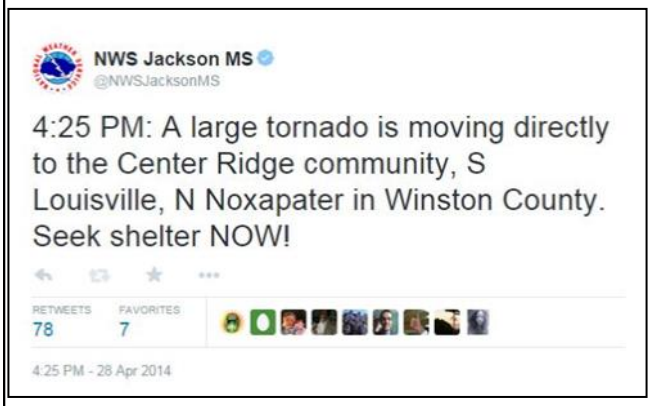


Figure 2. Tweet issued by NWS Jackson alerting followers of a large tornado headed to Louisville from April 28, 2014.

Just over a year after joining Facebook, we expanded our social media presence by joining Twitter in June 2012. Whereas Facebook is better suited for longer, more detailed forecast updates; Twitter is more geared towards shorter, but more frequent updates. This comes in handy during severe weather situations, when it is necessary for us to send out more frequent updates, including radar information and severe weather reports. An example of the usage of Twitter during a tornado outbreak is shown in Figure 2 from NWS Jackson.

Our newest social media outlet debuted in May 2013 when we joined YouTube. Unlike Facebook and Twitter, where we primarily share text and image updates, our YouTube account consists exclusively of video information. Updates run the gamut from weather briefings to time-lapse videos to educational videos. Weather briefings are updated when hazardous weather is anticipated or sometimes produced weekly (Figure 3).

For a complete list of the Facebook, Twitter and YouTube accounts for each NWS office that serves Mississippi, see page 23.

Figure 3. Video briefing posted to YouTube by NWS New Orleans for a winter weather event in January 2014.

Tips from *MEMA* to Help Weather the Weather

To make sure you are prepared before, during and after severe weather, be sure to have an emergency disaster kit like this one recommended by the Mississippi Emergency Management Agency (MEMA):

- Flashlights with extra batteries. Use flashlights instead of candles when the power goes out.
- Portable radio with extra batteries.
- NOAA Weather Radio.
- Non-perishable food for at least 3 days.
- Bottled water (1 gallon per person per day).
- First Aid Kit with prescription medications.
- Bedding and clothing for each family member.
- Blankets and towels.
- Plastic dishes/eating utensils.
- Baby supplies (food, diapers, medication).
- Pet supplies (food, leash & carrier, vaccination records).
- Toothbrush, toothpaste, soap, shampoo, towelettes, other toiletries.
- Copies of important documents such as driver's license, SS card, insurance policies, birth and marriage certificates.
- Cash, enough to fill up your vehicle with gas and travelers checks.
- Helmet (bicycle, football, etc.) to protect your head during a tornado.

For Your Information

This booklet contains material useful during the Mississippi Spring Severe Weather Preparedness Week campaign. You are invited to contact the National Weather Service, state and county emergency management agencies for interviews and for answers to your questions. National Weather Service personnel and local emergency management are available for weather awareness programs to civic and industrial organizations, schools, hospitals, and others interested in weather safety. Each county in Mississippi is served by a designated National Weather Service office as identified below:

Please contact one of the offices listed below if you need more information.

Jackson	Joanne Culin	(601) 939-2786
Jackson	Chad Entremont	(601) 939-2786
Memphis, TN	Gary Woodall.	(901) 544-0411
Memphis, TN	Jim Belles	(901) 544-0411
Mobile, AL	Jason Beaman	(251) 633-6443
Mobile, AL	Jeff Medlin	(251) 633-6443
New Orleans, LA	Frank Revitte	(985) 649-0357
New Orleans, LA	Ken Graham	(985) 649-0357
Mississippi Emergency Management Agency		(866) 519-6362

Information Resources on the World Wide Web

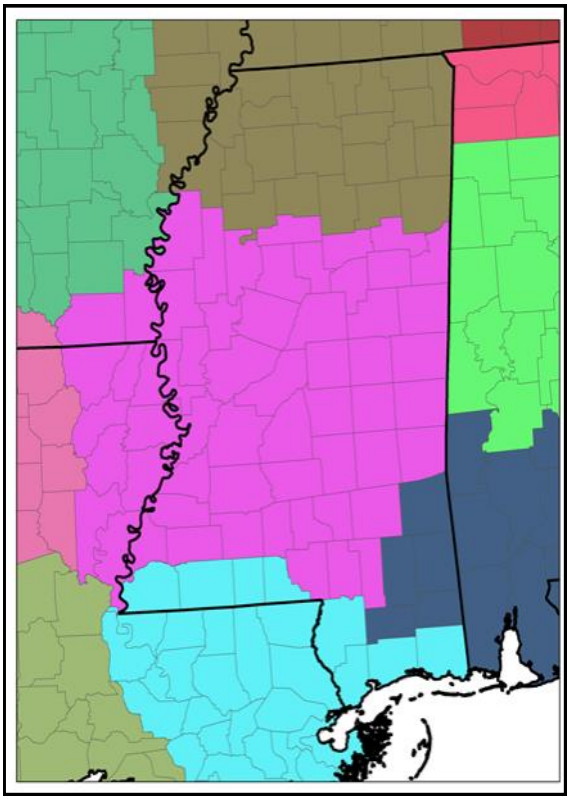
For additional resources, the following web sites are available:

NWS Jackson: www.weather.gov/jan
NWS Memphis: www.weather.gov/meg
NWS Mobile: www.weather.gov/mob
NWS New Orleans: www.weather.gov/lix

Follow us on Facebook:
US National Weather Service Jackson Mississippi
US National Weather Service Memphis Tennessee
US National Weather Service Mobile Alabama
US National Weather Service New Orleans Louisiana

Follow us on Twitter: @NWSJacksonMS
@NWSMemphis
@NWSMobile
@NWSNewOrleans

Follow us on Youtube: NWSJacksonMiss
NWSMemphis
NWSMobile
NWSNewOrleans



Legend: Jackson | Memphis, TN| New Orleans, LA| Mobile, AL

All NWS Offices:
http://www.weather.gov