

The Wilmington Wave

National Weather Service, Wilmington, NC

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Hurricane Matthew: Carolina Impacts

-Tim Armstrong

Hurricane Matthew was the most powerful storm of the 2016 Atlantic Hurricane Season, and made its fourth and final landfall near McLeodville, South Carolina as a category 1 hurricane late in the morning of October 8th. Although gusts above hurricane force were reported along the Carolina coast, Matthew will be remembered for its extreme rainfall and deadly flooding. According to the National Hurricane Center, Matthew was directly responsible for 25 deaths in North Carolina and four in South Carolina, all but one due to flooding. Damage in the United States was estimated by the National Center for Environmental Information (NCEI) at \$10.3 billion. The name "Matthew" was officially retired from the list of Atlantic hurricane names due to the immense destruction it caused during its trek across the Caribbean islands and the Southeastern United States.



The 2016 Atlantic Hurricane Season featured 15 named storms, 7 hurricanes, and 4 major hurricanes. The Carolinas were affected by four tropical cyclones in 2016 prior to Matthew: Bonnie, Colin, Hermine, and Julia.

COASTAL IMPACTS ACROSS SOUTH CAROLINA AND NORTH CAROLINA

A combination of wind and storm surge caused extensive damage along the South Carolina coastline. In most locations water levels were three to five feet above the normal astronomical tides. In Beaufort County, SC damage was particularly severe on the sea islands south and east of Beaufort including Hilton Head Island, Fripp Island, Dataw Island, and at Hunting Island State Park. Observed damage to trees and homes implies winds reached at least 100 mph in these communities. Storm surge flooding moved boats inland, including four boats deposited on the runway of the Beaufort County airport. One lane of the Harbor Island Bridge over to Hunting Island was scoured out by the storm surge.

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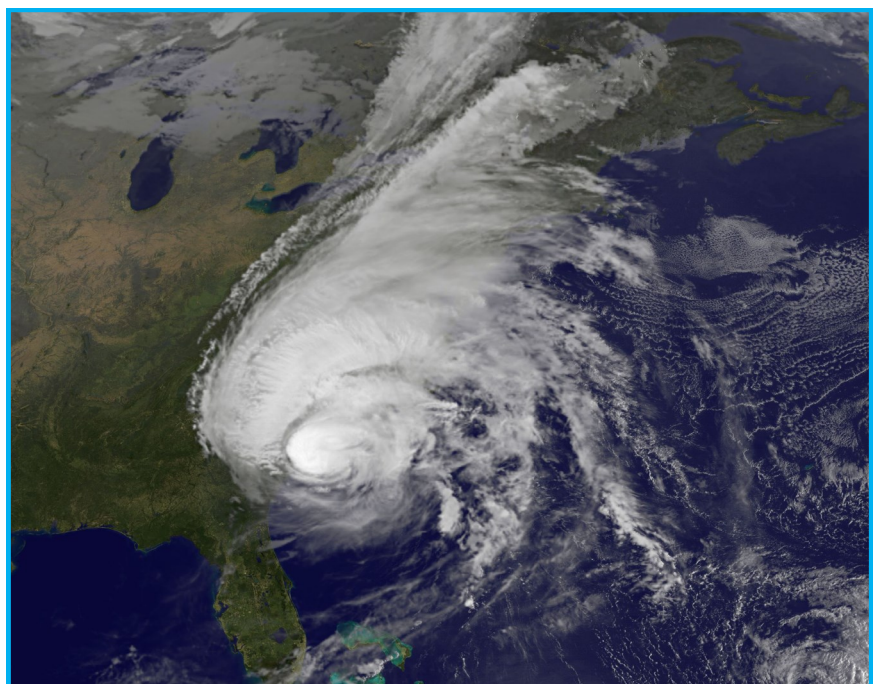
In Charleston, SC storm surge flooding was extensive. The tidal gauge in downtown Charleston recorded its third highest level ever, exceeded only by Hurricane Hugo in 1989 and by an unnamed hurricane in 1940. (Note: Matthew's storm tide was exceeded by 2017's Hurricane Irma in Charleston) Severe beach erosion was reported from Isle of Palms and from Edisto Island where a post-storm survey conducted by NWS Charleston meteorologists indicated at least 70 homes were undermined or damaged, and roads were covered with up to five feet of sand.

Storm surge damage occurred to homes on portions of Pawleys Island, with the first floor walls and doors of many beach houses knocked out by the surge. The Town Hall was flooded, and a long portion of Springs Avenue at the south end of Pawleys Island was covered with sand two to four feet deep. The mayor of Pawleys Island was quoted in news reports saying the frontal dunes on two-thirds of the island were destroyed. A newsletter for the DeBordieu Beach community referenced only minor sand loss and a single area of ocean overwash onto DeBordieu Boulevard.

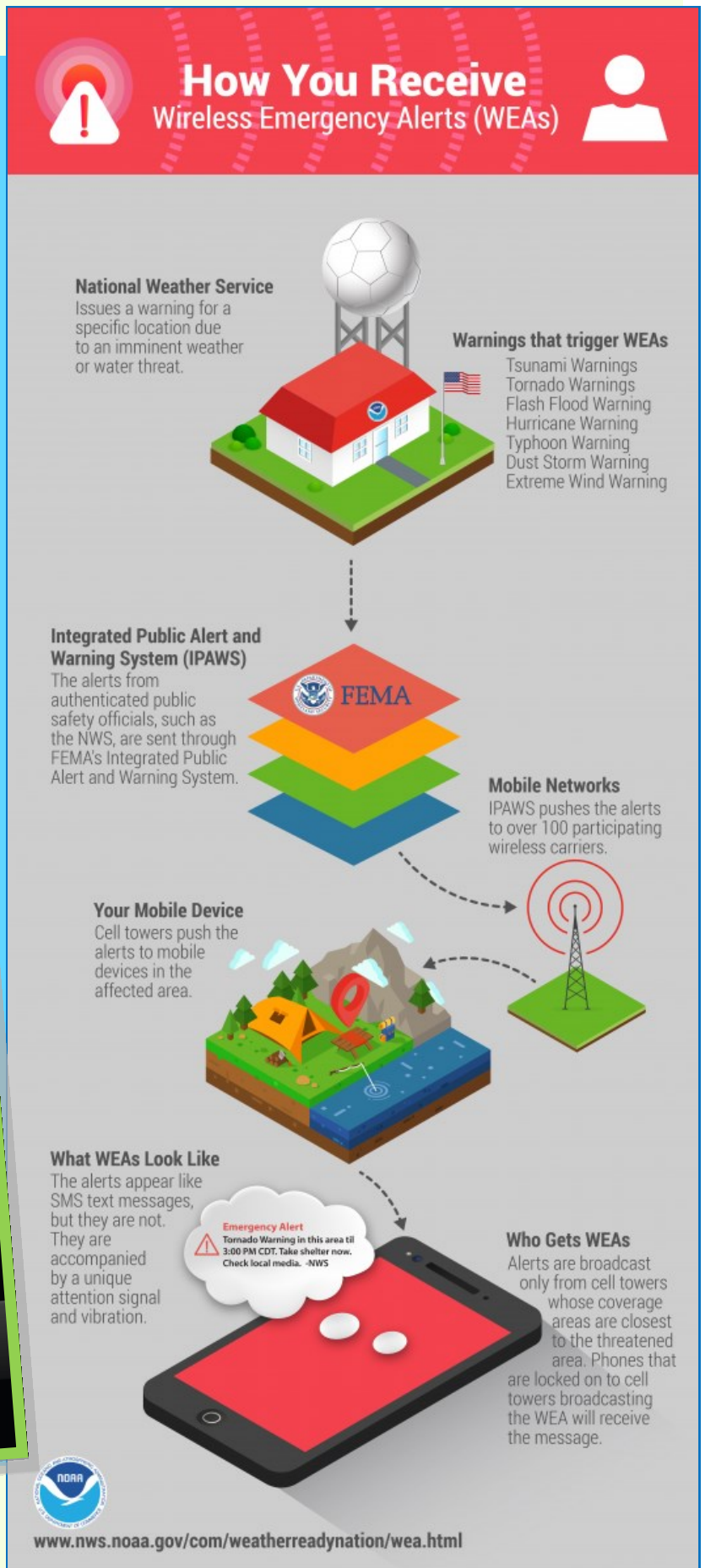
In Myrtle Beach storm surge and large waves destroyed most of Springmaid Pier, including the NOAA weather station which was attached to the end of the pier. Weather and tide data was lost between 12:18 and 12:24 p.m. EDT on October 8th, implying the likely time of the pier's destruction. Just to the south, Garden City Pier suffered damage, and Surfside Pier lost about half of its 689-foot length. Early in the morning of October 8th an EFO tornado touched down in North Myrtle Beach. A storm survey indicated the tornado had winds near 85 mph and was on the ground for around 1.5 miles causing damage to a number of trees and minor structural damage to homes and businesses.

A storm surge three to four feet above normal tide levels brought ocean overwash and beach erosion to Southeastern North Carolina. Erosion was particularly severe on Oak Island and the eastern end of Ocean Isle Beach, NC where water was flowing beneath homes at the ends of East 2nd and 3rd streets. Damage to the dunes on Oak Island was extensive and nearly complete in some areas. Local news video showed a 150 foot portion of the Oak Island pier collapsing during the height of the storm surge event. Damage to dunes was less extensive at Caswell Beach. On Bald Head Island the worst beach erosion occurred to the south- and west-facing beaches, with much less damage on the east-facing beach. Beach erosion was generally minor on the east-facing beaches of New Hanover County, although on Topsail Island the Surf City town manager was quoted in local newspapers saying escarpments up to ten feet high were cut into the beach. Although wind gusts of 60 to 75 mph were reported from a number of locations across Southeastern North Carolina, damage was primarily limited to trees and power lines with only minor damage to homes.

For the rest of Coastal Impacts across the Carolinas along with other information regarding Hurricane Matthew, www.weather.gov/ilm/Matthew



Wireless Emergency Alerts



Fall Hazards: Weather-Ready Nation

From NOAA's Weather-Ready Nation



Know your Risk, Take Action, Be a Force of Nature!

<https://www.weather.gov/wrn/fall-safety>

As the days get shorter and temperatures fall, a new round of weather hazards are on the rise. This transitional season often features weather hazards seen during both warm and cold months, including hurricanes, wildfires, intense winds, flooding, droughts, early season snow and more.

Get ready for fall weather with preparedness tips from the National Weather Service. Stay safe this fall!



Driving in Dense Fog

When driving in dense fog, you have little time to see hazards or other vehicles in the road. At freeway speeds, you only have a few seconds to react to objects that become visible in the road.

Reaction Time at 60 MPH

- 1/4 mile visibility - 15.0 seconds
- 1/8 mile visibility - 7.5 seconds
- 100 yard visibility - 3.4 seconds
- 100 ft visibility - 1.1 seconds



[weather.gov/fog](https://www.weather.gov/fog)

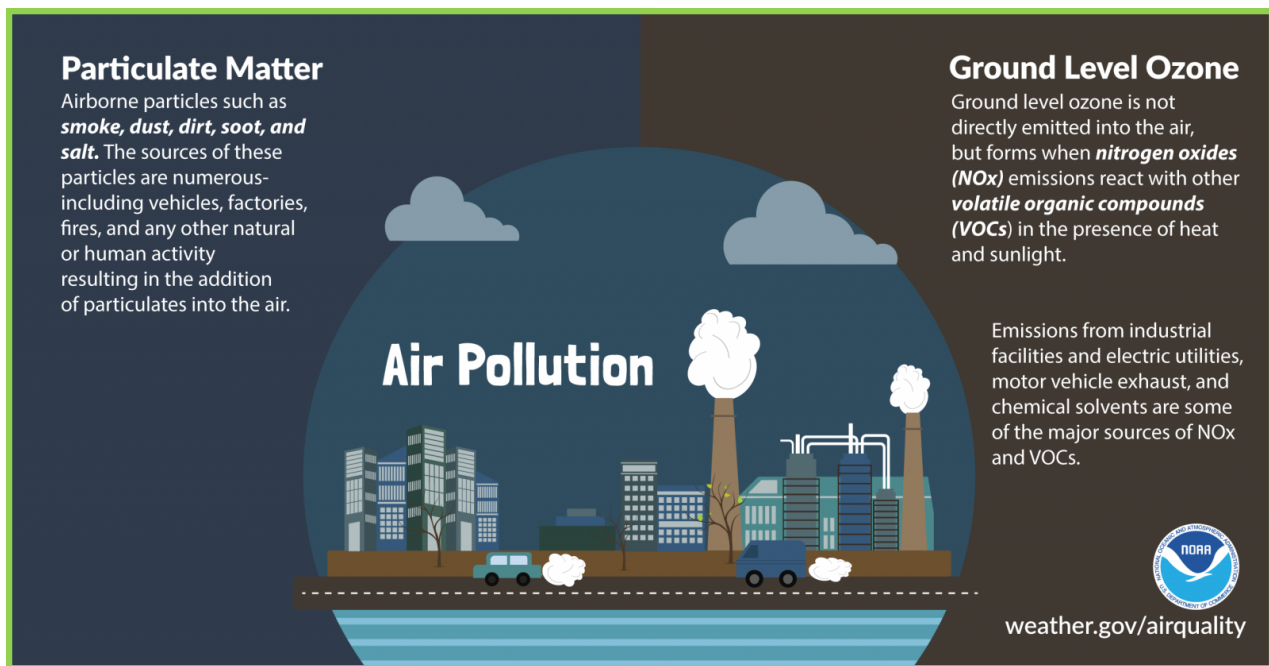
Clearing the Air on Weather and Air Quality

From NWS Weather Ready Nation—Safety Campaign

Air quality affects the air we breathe. There are many factors that can lead to poor air quality, but the two most common are related to elevated concentrations of ground-level ozone or particulate matter.

Ground level ozone forms when nitrogen oxides from sources like vehicle exhaust and industrial emissions react with organic compounds in the presence of heat and sunlight. Per EPA, ozone can cause a number of health problems, including coughing, breathing difficulty, and lung damage. Exposure to ozone can make the lungs more susceptible to infection, aggravate lung diseases, increase the frequency of asthma attacks, and increase the risk of early death from heart or lung disease (see <https://airnow.gov/index.cfm?action=pubs.aqguideozone>).

Particulate matter in the air consists of solid and liquid particles including smoke, dust and other aerosols, some of which are directly emitted and others are resulting from chemical transformations. The sources of these particles are numerous- including vehicles, factories, power plants, fires, other natural phenomena and human activities. Particle pollution is linked to a number of health problems, including coughing, wheezing, reduced lung function, asthma attacks, heart attacks, strokes and even early death (see <https://airnow.gov/index.cfm?action=pubs.aqguidepart>).



The weather can have a significant impact on air quality since different aspects of the weather affect the amounts of ozone and particulates that are present in a specific area. Sunshine, rain, higher temperatures, wind speed, air turbulence, and mixing depths all affect pollutant concentrations.

- Sunshine can cause some pollutants to undergo chemical reactions, resulting in the development of smog
- Higher air temperatures can speed up chemical reactions in the air
- Rain typically results in less pollution since it washes away particulate matter and can also wash out pollutants that are dissolvable
- Wind speed, air turbulence, and mixing depth all affect how pollutants disperse, or spread out from an area

National Weather Service provides model forecast guidance for ozone, dust and fine particulate matter twice daily and smoke predictions once daily for next 48 hours. State and local agencies use NWS model guidance to issue air quality forecasts that weather forecast offices (WFOs) help disseminate. Air quality forecasts of unhealthy (code orange) or worse air quality that are shared with WFOs get displayed on NWS warning maps as air quality alerts. When Air Quality Alerts are in effect, there are many actions you can take to stay safe and protect your health.

- Stay informed about air quality conditions in your area. Information is provided by EPA, NWS and the media
- Choose a less-strenuous activity
- Shorten and take more breaks during outdoor activity
- Reschedule activities to the morning or to another day
- Move your activity inside where ozone levels are usually lower
- Spend less time near busy roads




AIR QUALITY ALERTS

Stay informed by following the EPA, NWS or the media.

Try to limit the amount of time you are outside.

Minimize your use of gas powered equipment and vehicles.

Do not burn debris or other items.



weather.gov/airquality

If you would like to help reduce air pollution, you can take the following measures:

- Eliminate tobacco smoke
- Reduce your use of wood stoves and fireplaces
- Don't burn candles, leaves, garbage, plastic or rubber
- Use HEPA air filters and air cleaners designed to reduce particles
- Drive less: carpool, use public transportation, bike or walk
- Keep car, boat and other engines tuned
- Inflate tires to the recommended pressure
- When refueling: stop when the pump shuts off, avoid spilling fuel, and tighten your gas cap
- Use low-VOC paint and cleaning products, and seal and store them so they can't evaporate
- Choose energy saving appliances
- Set thermostats higher in summer and lower in winter
- Turn off lights you are not using

For more information:

<https://airnow.gov/index.cfm?action=pubs.aqguideozone>

<https://airnow.gov/index.cfm?action=pubs.aqguidepart>

EPA compiles the official air quality forecasts at <https://www.airnow.gov/> and NWS provides hour-by-hour predictions of air quality at <https://airquality.weather.gov/>

Want to Become a Weather-Ready Nation Ambassador?

- Steve Pfaff

It's no surprise for many that live in southeast NC and northeast SC that we are susceptible to a wide variety of weather impacts. In fact, our part of the country is like no other when it comes to the different hazards we have to prepare for including wind driven wildfires, hurricanes, ice storms, flooding, tornado outbreaks, severe thunderstorms, drought, etc. Although many of these events do not occur routinely, if we fail to plan for them then many will become caught off guard by their impacts. The National Weather Service (NWS) is responsible for doing storm survey assessments of areas hit hard by severe weather, and a common theme we hear from those who were hit hardest is – "I can't believe this happened to me". While most people agree that we have an exposure to hazardous weather, only a small segment of the population is ideally prepared to deal with extreme weather events.

During a typical year the United States has 100,000 severe thunderstorms, 5,000 floods and flash floods, 1,000 tornadoes, and 2 land-falling hurricanes. It's no wonder why our Nation needs to be Weather-Ready. While there have been advancements in weather related technology and research that have led to the increased accuracy and warning lead time over the last decade, people are still being killed in great numbers. For instance, during 2011 there were 549 fatalities from tornadoes – almost 300 people during the Alabama outbreak on a single day! As a result, the NWS has started a new program called Weather-Ready Nation to enhance community resilience in the face of extreme weather events across the Nation.

The Weather-Ready Nation Ambassador program is the initiative that recognizes a wide variety of partners in their efforts to advocate weather safety and planning. The Ambassadors help to unify weather safety efforts, are action-oriented, inclusive, and help lead to new partnership opportunities with the NWS. The Ambassador program is open to any club, organization, company, civic group, or government agency (Local/State/Federal) and is free to join. There are no formal guidelines or requirements to become an Ambassador other than to sign-up and become integrated into the pipeline of weather safety information through the Weather-Ready Nation program. Consider the following - does weather potentially impact your family, friends, club members, staff or co-workers? If you answered yes then consider joining to become a Weather-Ready Nation Ambassador. Help the NWS to better serve our local communities by signing up!

For more information visit: <http://www.weather.gov/ilm/wrn>



Be Prepared for Winter Weather

- Sandy LaCorte

Exposure to extreme cold, fires and poisoning due to the improper use of heaters, and vehicle accidents are just a few reasons as to why dozens of fatalities are reported each year due to winter weather, an overlooked significant threat. Now you may be thinking that the winter season across the Coastal Carolinas is nothing compared to, for example, the New England region. Well, we have our share of winter weather across the Carolinas, thus you should always be prepared.

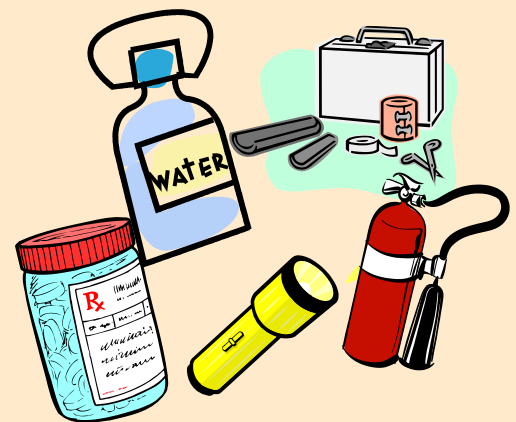
In preparation for a winter weather event, keep in mind that the primary concern will be the loss of heat, power outages, and shortage of supplies if storm or proceeding conditions persist for more than one day.

Before winter weather strikes, be sure to take necessary precautions such as maintaining, cleaning, and annually inspecting chimneys and other heating equipment, and making sure your vehicle is prepared by having a full gas tank and inspecting the antifreeze levels, brakes, battery, and more!

For additional information, visit www.ready.gov

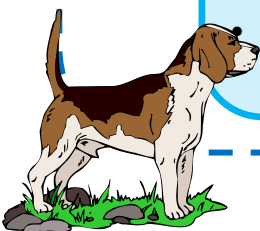
Disaster Kit: Home/Work

- Flashlight and extra batteries
- Battery-powered NOAA Weather Radio
- Extra food and water (one gallon of water per person, per day)
- Prescription medicines
- Special items for infant, elderly or disabled family members
- Emergency tools
- Cash and a credit card, emergency phone numbers
- Important documents
- Blankets and change of clothing per person
- First aid supplies
- Fire extinguisher/smoke alarm/carbon monoxide detector
- Heating fuel
- Emergency heat source (fireplace, space heater, etc)



Safety Tips: Animals/Pets

- Move animals to sheltered locations
 - Have extra feed on hand or near feeding areas
 - Have water available (animals may die from dehydration)
- Make sure pets have plenty of food, water and shelter



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Disaster Kit: Vehicle

- Mobile phone, charger, batteries
- windshield scraper and small broom
- flashlight with extra batteries
- battery powered radio
- compass and road maps
- water and snack food
- matches
- extra hats, socks, mittens, and clothing
- first aid kit with pocket knife
- necessary medications
- blanket(s)/sleeping bags
- tow chain and/or rope
- road salt and sand, booster cables
- emergency flares/fluorescent distress flag

Safety Tips: Vehicle

- Drive only if it is absolutely necessary. If you must drive: travel during the day; don't travel alone; keep others informed of your schedule; stay on main roads and avoid back road shortcuts.
- If driving on snow or ice-covered roadways, reduce your speed. Driving at the regular speed limit will reduce your ability to control the car if you begin to slide. Leave plenty of room between you and other vehicles.
- If conditions worsen and you can no longer drive safely, pull off the highway. Stay calm and remain in your vehicle. Do not set out on foot unless you can see a building close by where you know you can take shelter.
- Let someone know your destination, your route, and when you expect to arrive. If your car gets stuck along the way, help can be sent along your predetermined route.

Carbon Monoxide: The Invisible Killer

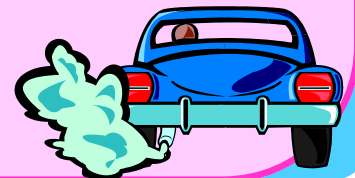
Carbon monoxide (CO) is a deadly odorless, colorless, and poisonous gas that is the cause of fatalities each year, especially during the winter weather season. It is a result of the incomplete burning of various fuels (ie coal, wood, kerosene, propane) from equipment such as generators and cars.

Symptoms

- Dizziness, nausea, fatigue, headache, shortness of breath
- High level of CO poisoning: vomiting, mental confusion, loss of consciousness

Prevent CO poisoning:

- Never operate equipment in enclosed spaces, such as a garage or locations within a home.
- Never leave car running in an attached garage (even with garage door open)
- Never burn charcoal inside home, vehicle, garage
- Never use gas appliances to heat your home (ovens, clothes dryers, etc)
- Never operate equipment where people are sleeping
- Install carbon monoxide alarms in central locations on every level of your home
- If carbon monoxide alarm sounds, move quickly to fresh air



Weather.gov on Your Mobile Phone

From: Weather-Ready Nation

Take the weather with you on your mobile phone! Wherever you are, you can get the local weather forecast from the National Weather Service with one click on your home screen. Bookmark **mobile.weather.gov** to make sure that you have the latest weather news and information on the go.

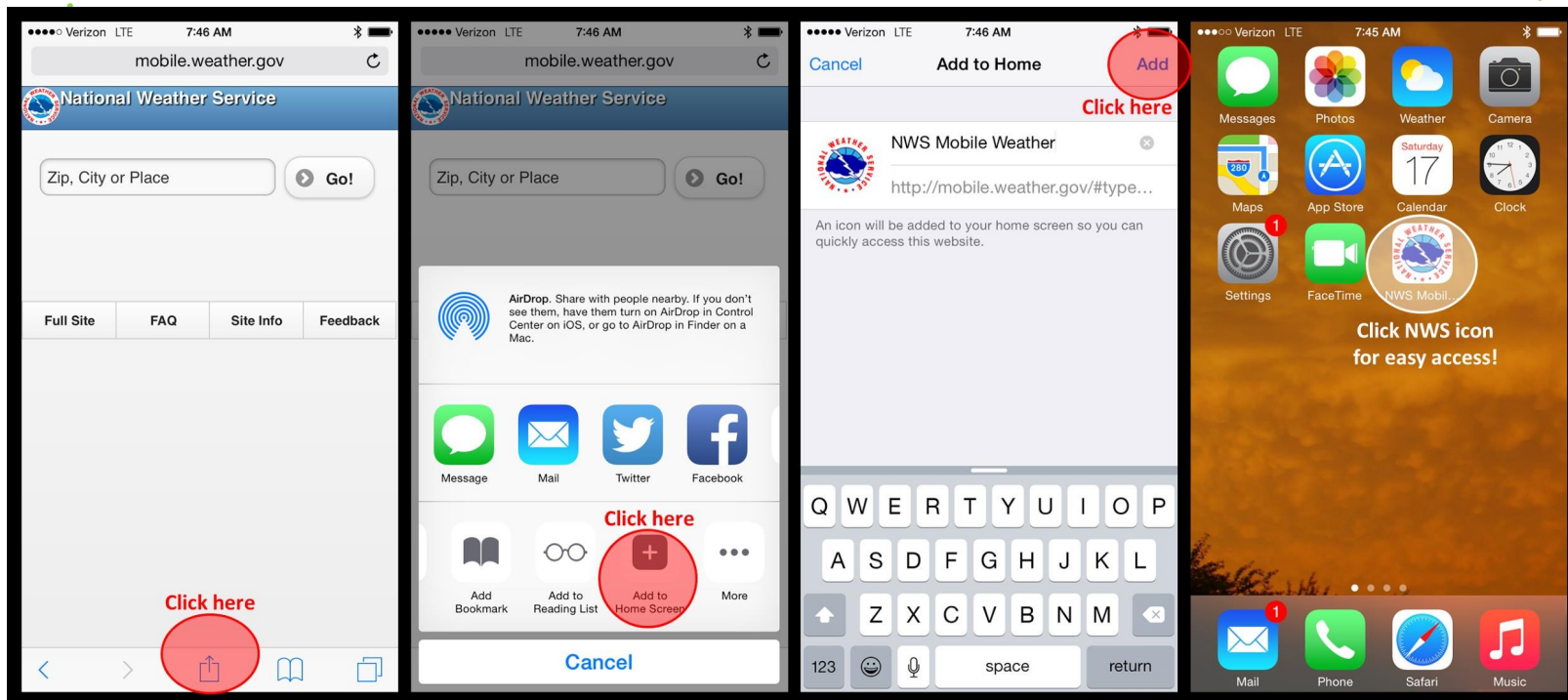
How can you add mobile.weather.gov to your mobile phone's Home Screen? It's easy! Learn how to add the mobile version of weather.gov to your iPhone or Android phone.

Follow these three steps for one-click access to your local forecast.

If you have an iPhone...

Visit **mobile.weather.gov** using Safari on your iPhone.

1. Click the Send button at the bottom of the screen.
2. Choose "Add to Home Screen" and tap "Add."



Weather.gov on Your Mobile Phone

From: Weather-Ready Nation

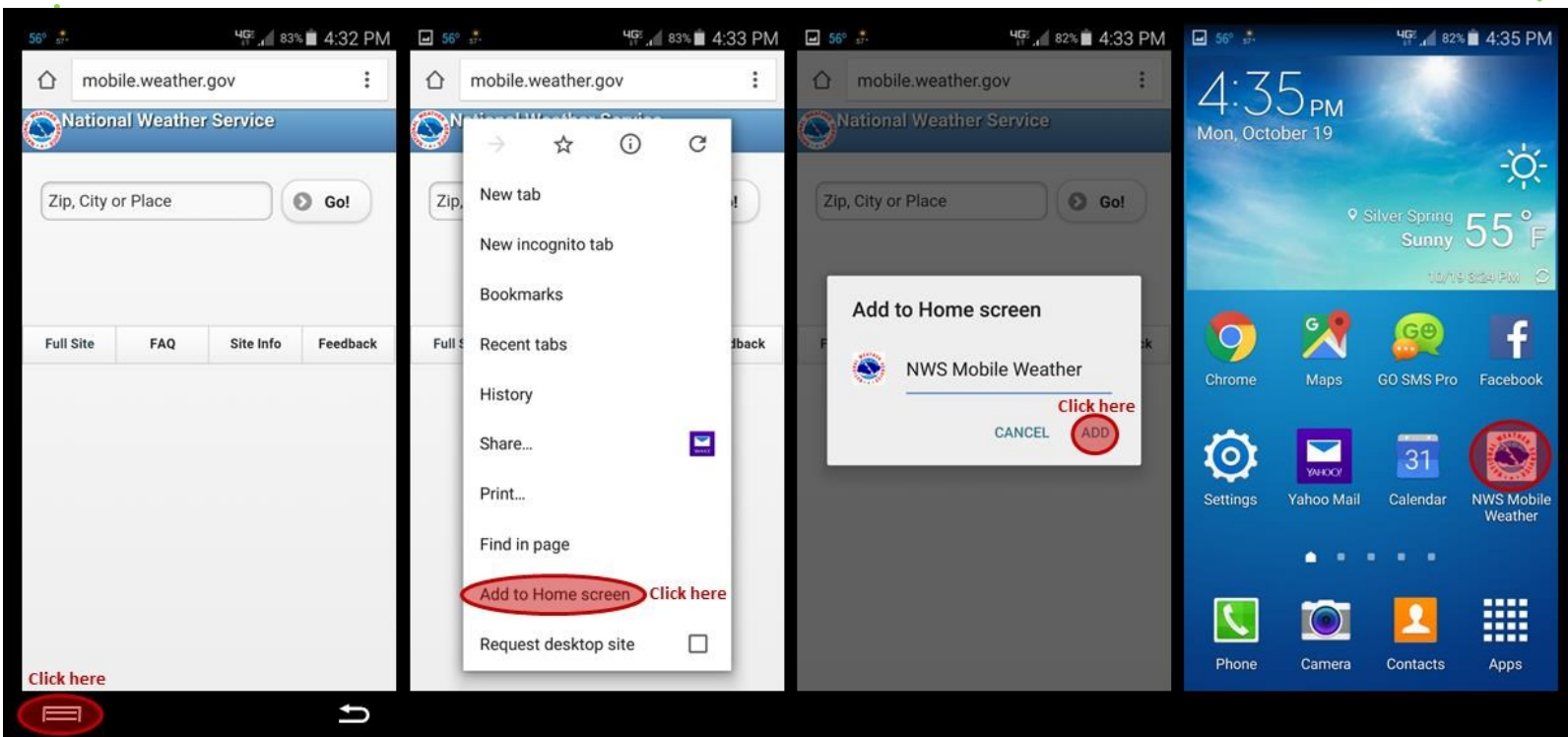
If you have an Android mobile device...

There are a number of browsers that will allow you to add mobile.weather.gov to your home screen. For example, on Chrome for Android:

Visit **mobile.weather.gov** using Chrome on your Android phone

1. Click the menu button

Choose "Add to Home Screen."



That's it! That's all it takes to get local weather information from the National Weather Service on your iPhone or other device.

For other mobile platforms, if you do not know how to bookmark a page on your phone, open your browser and search "how to bookmark a page on _____" with the blank being filled in with your model of phone.

Interested in other sources for weather alerts? Go **www.weather.gov/subscribe** for alternative options for weather alerting services or visit your mobile phone's app store for commercial app options.

NWS Wilmington Office History

They say everyone has a story, and for the National Weather Service office in Wilmington, NC, that story begins with December of 1870. It was then that the U.S. Signal Corps began taking sporadic snowfall measurements. Jump ahead a few years to 1874, when in April, the first complete and continuous set of weather observations began in a building located in downtown Wilmington, which no longer exists. From historic weather events to multiple moves for the office location, a lot has happened since 1870.



U.S. Post Office building slowly demolished beginning in 1936.

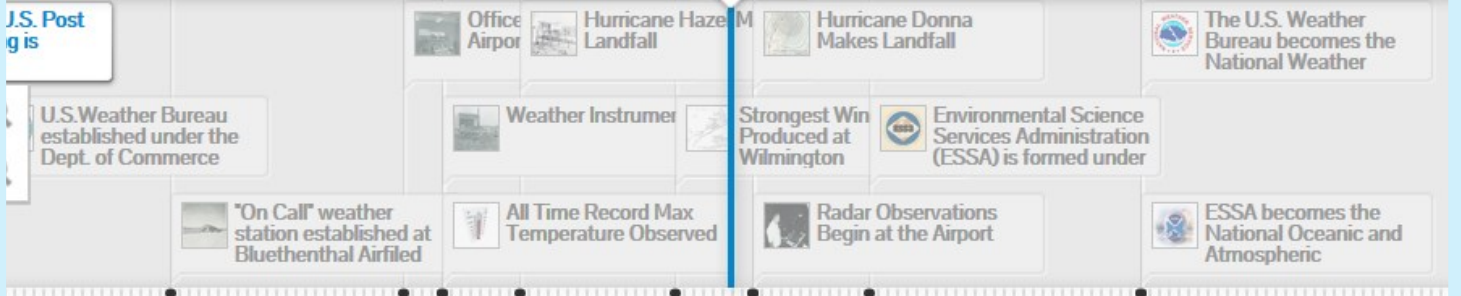
1936

Old office in U.S. Post Office building is demolished.

After being located in the U.S. Post office building for 41 years (1890-1931) the old building was demolished in 1936.

1940

U.S. Weather Bureau established under the Dept. of Commerce

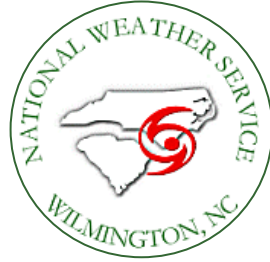


Take a ride down memory lane through our office history timeline:

<http://www.weather.gov/ilm/TimelineNWSILM>

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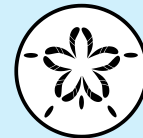
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and flooding are very important to us.

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Email: ilm.wxreports@noaa.gov

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*Where we share adverse weather information and historical weather events,
and you share storm reports and any weather questions you might have!*