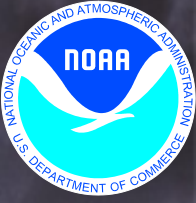




National Weather Service Morristown, Tennessee



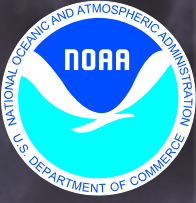
Lightning and Weather - What Every Trail Rider Needs to Know to Protect Themselves

by
David Gaffin
Senior Forecaster



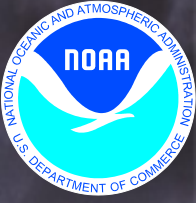


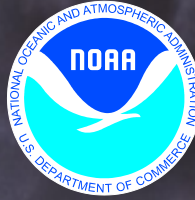
Lightning – Nature's Awesome Power





Lightning Illuminating a Tornado





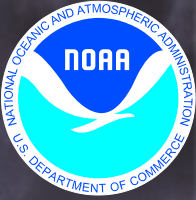
Lightning Quick Facts

- In the United States, there are an average of 100,000 thunderstorms each year.
- An estimated 25 million cloud-to-ground lightning strikes occur in the United States each year.
- One ground lightning stroke can generate between 100 million and 1 billion volts of electricity (enough to keep a 100-watt bulb lit for three months).



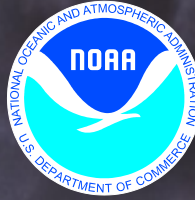
Lightning Quick Facts

- The air around a lightning strike can reach 50,000 degrees Fahrenheit, which is five times hotter than the surface of the sun.
- The rapid heating and cooling of the air near lightning causes a shock wave that produces thunder.
- Every 5 seconds between lightning and thunder equals 1 mile. Divide by 5 to give the distance in miles from you to the lightning.



How Lightning Works

- **Lightning is caused by the attraction between positive and negative charges in the atmosphere, resulting in the buildup and discharge of electrical energy.**
- **During a storm, raindrops acquire extra negatively-charged electrons, which seek out positively-charged electrons from the ground.**
- **When the two charges connect, an electrical current surges through a jagged path of randomly-distributed clumps of charged particles.**

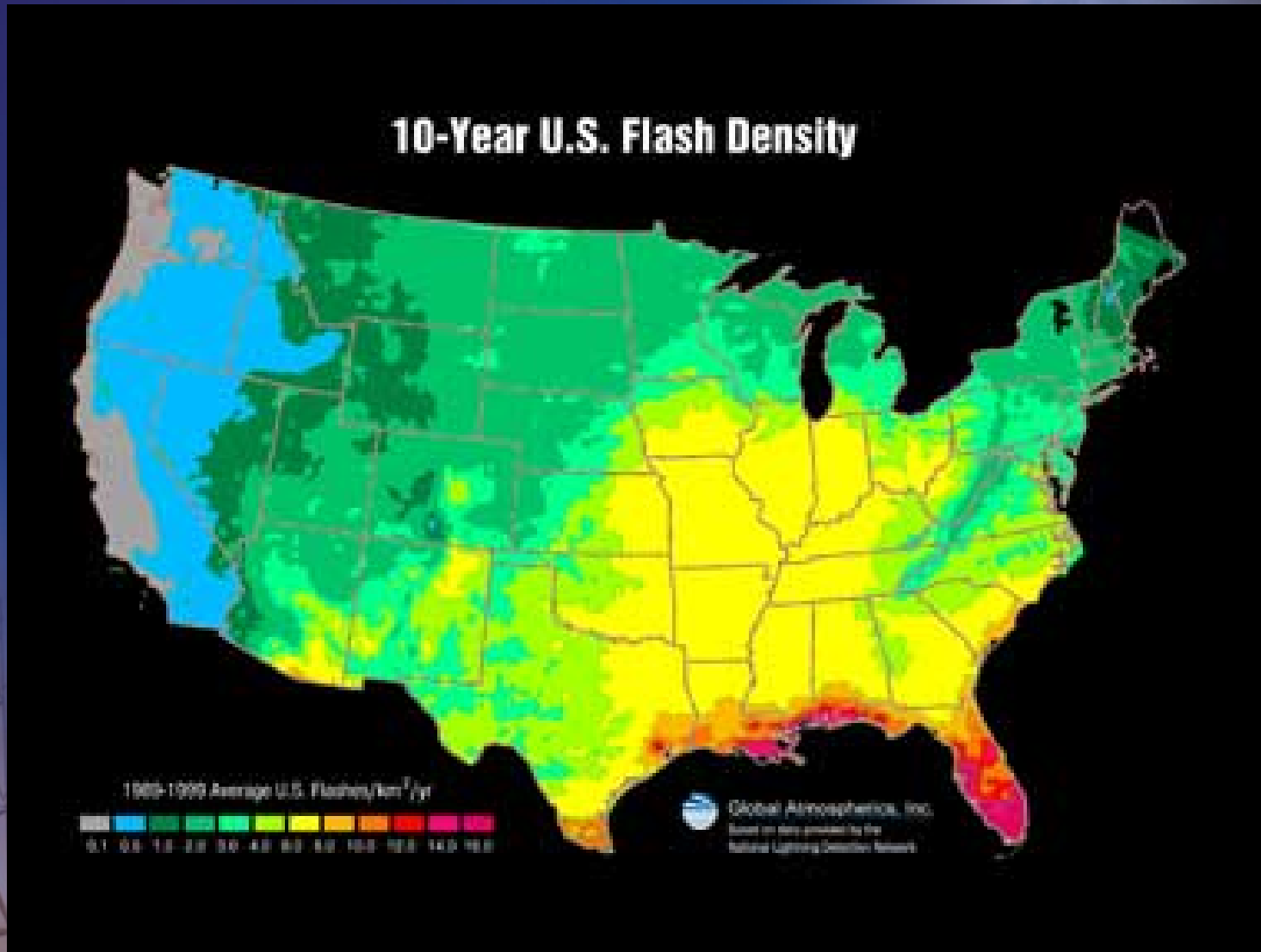
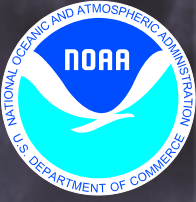


Heat Lightning

- **Heat lightning is the term to describe lightning that seems to occur without a thunderstorm or thunder. This phenomenon occurs most often on hot summer days when thunderstorms are more common.**
- **However, it's not possible to have lightning without a thunderstorm or thunder. In the case of apparent "heat lightning", the thunderstorm is too far away to be seen or for the thunder to be heard. But, the storm could be moving your way!**

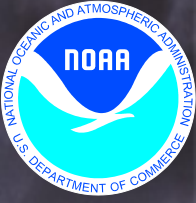


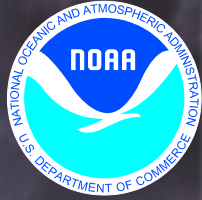
Lightning Climatology





Lightning Strike on the Space Shuttle in Florida



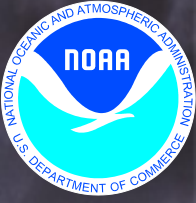


Lightning Kills

- **Lightning is an underrated hazard, killing more people in the United States than any other weather event except flooding.**
- **Because lightning is so common, an average of 400 people per year are struck.**
- **During an average year, 73 people are killed and 300 injured.**
- **Individuals struck by lightning do not carry a charge, and it's safe to touch them and provide medical treatment (such as CPR).**

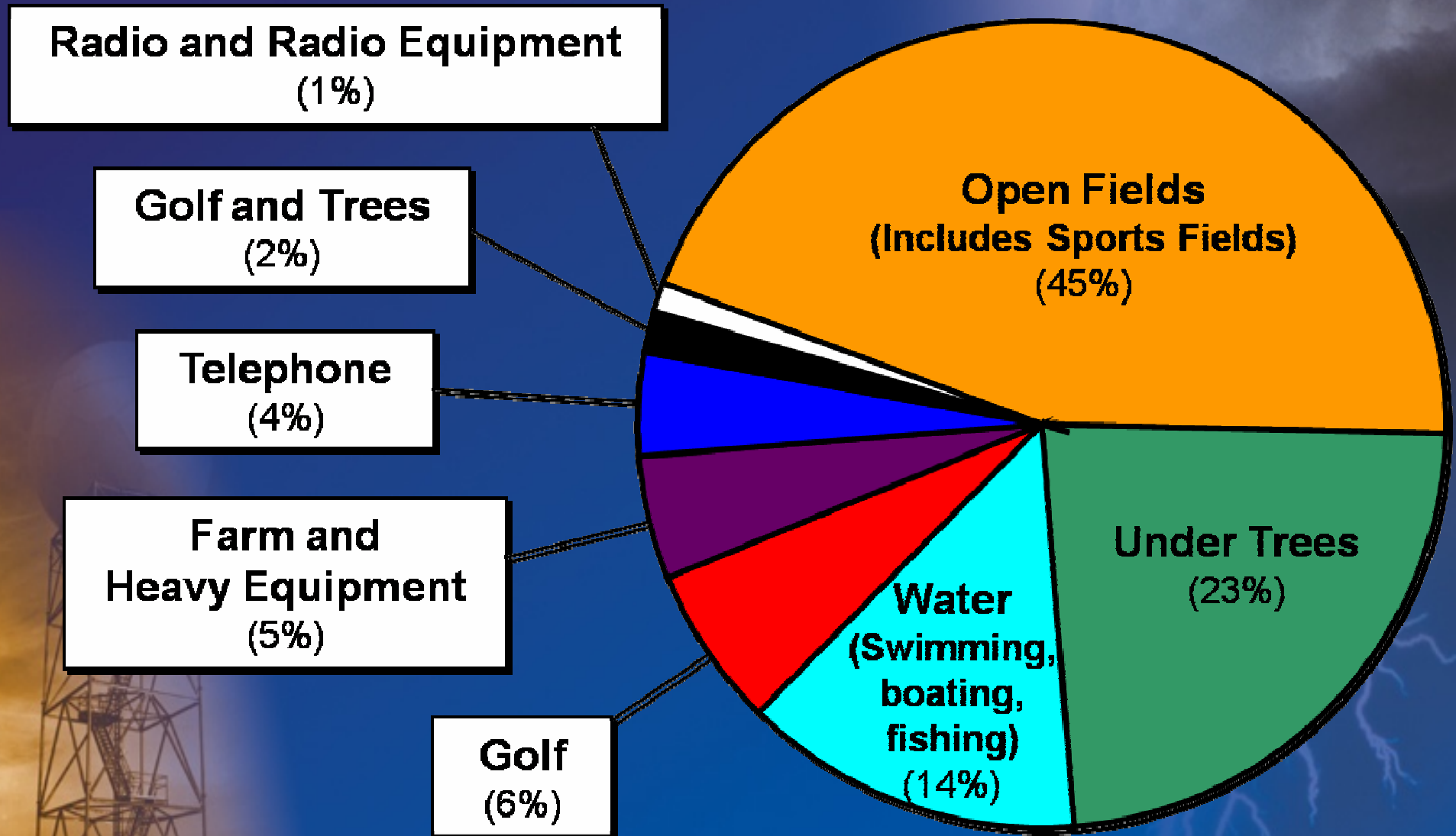
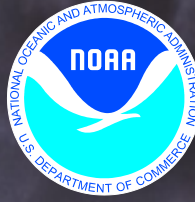


Lingering Effects from a Lightning Strike



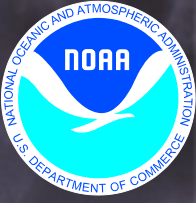
- **Long-term lightning symptoms are primarily neurological and are difficult to diagnose. Though very variable, some of the more frequent symptoms include memory deficit, sleep disturbance, chronic pain, dizziness, and chronic pain.**
- **Lightning survivors sometimes have trouble processing information, are easily distracted, and have personality changes. Symptoms may not appear until months after the lightning strike.**

Locations and Causes of Lightning Deaths

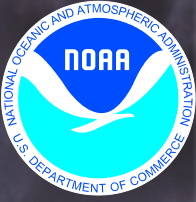




Lightning Spreads Out From Its Striking Point



Keep Away From Trees!

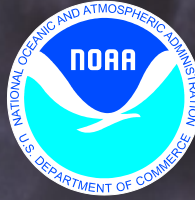


Lightning Warning Signs

- While many lightning casualties happen at the beginning of an approaching storm, more than 50 percent of lightning deaths occur after the thunderstorm has passed.
- When thunderstorms are in the area, but not overhead, the lightning threat can exist when skies are clear.
- Lightning may occur as far away as 10 miles from any rainfall.



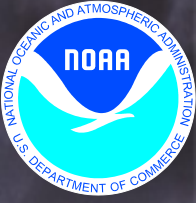
Lightning Safety Rules



- If you can hear thunder, you are close enough to the storm to be struck by lightning.
- Listen to the weather forecast on NOAA weather radio or your local media. Watch for increasing wind, darkening skies, rainfall, and static on an AM radio.
- Avoid being the tallest object or being near the tallest object. As a result, avoid open fields.
- Don't stand under or near an isolated tree or small group of trees.

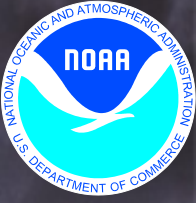


Avoid Isolated Tall Trees!





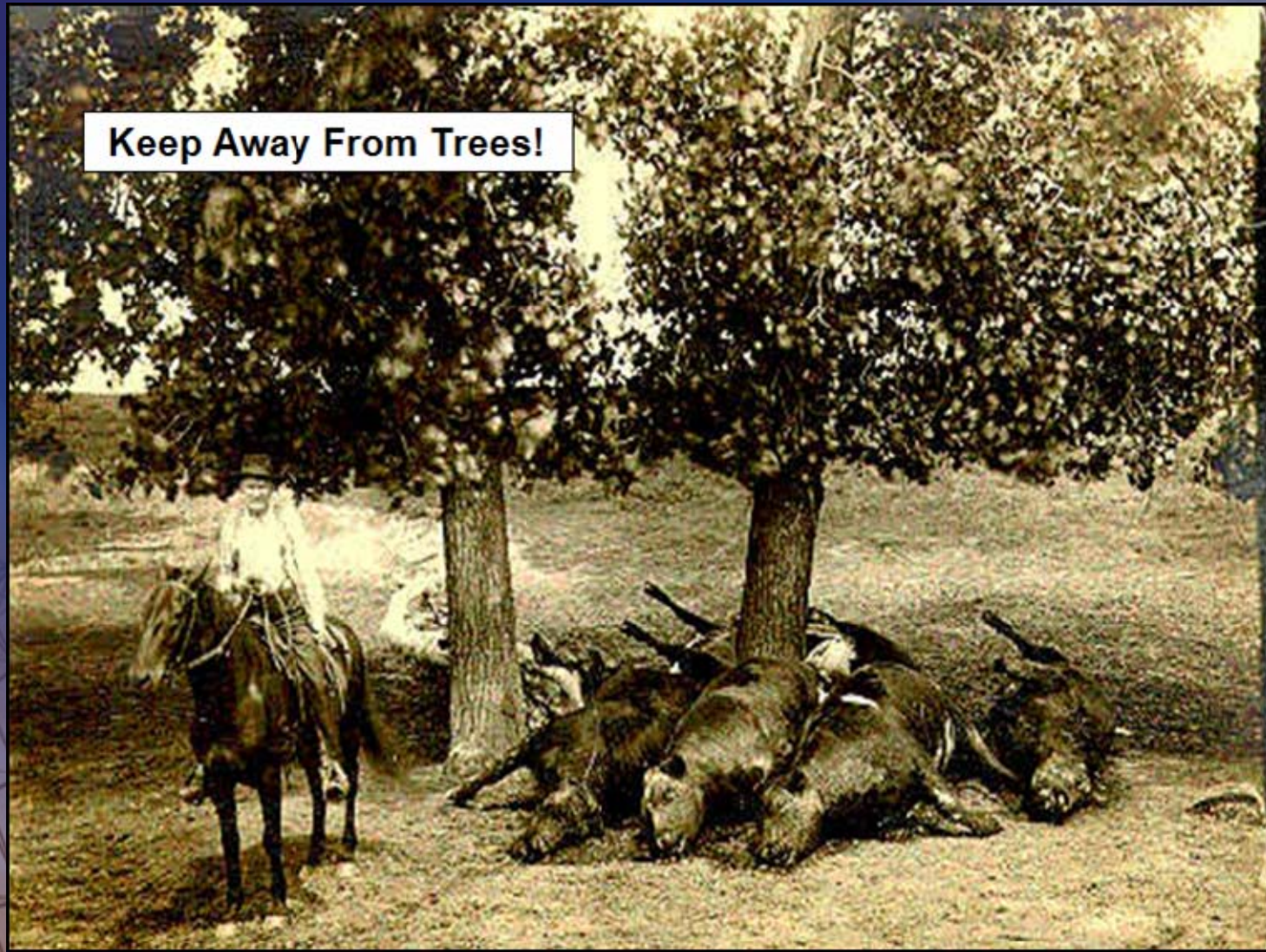
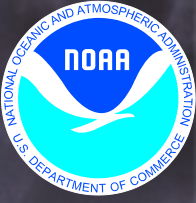
Tree Splintered by a Lightning Strike



Keep Away From Trees!



Cows Killed by Lightning Strike on a Grove of Trees



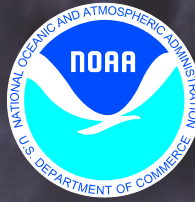


Avoid Mountain Tops

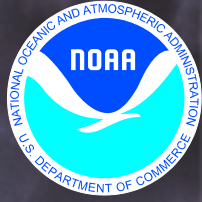




Lightning Safety Rules



- **Get inside a sturdy structure before the storm approaches.**
- **Don't stand by open windows, doors, or patios during a thunderstorm.**
- **Don't use the telephone during the storm unless it's an emergency.**
- **Do not take a bath or shower during a thunderstorm.**
- **Avoid metallic objects such as fences, flag poles, towers, bleachers, or picnic shelters.**



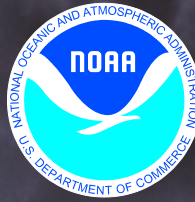
Avoid Metallic Objects



- **Dead cows lined up along a metallic fence. Lightning struck the fence, and the current traveled along the fence killing the cows.**



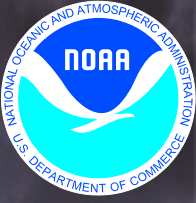
Lightning Safety Rules



- If a sturdy shelter is not available, get inside a hard-topped automobile and keep the windows up.
- Get out of boats and away from water.
- If you feel your skin tingle or your hair stands on end, squat low to the ground on the balls of your feet. Place your hands on your knees with your head between them. Make yourself the smallest target possible and minimize your contact with the ground – do not lay flat on the ground.



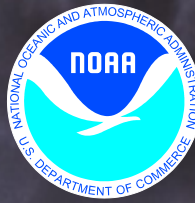
Bad Sign of an Imminent Lightning Strike



- This picture was taken in Sequoia National Park, California. A family was out for a day hike on a mountain, and then three seconds after this picture was taken, lightning struck.



Lightning Guidelines

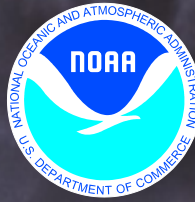


- **30/30 Rule**

- **If you see lightning, count how many seconds before you hear thunder. If it's less than 30 seconds, take cover.**
- **Once indoors, wait 30 minutes after the last clap of thunder before venturing back out.**
- **Remember, more than 50 percent of lightning deaths occur after the thunderstorm has passed (people had perceived the threat to have ended).**



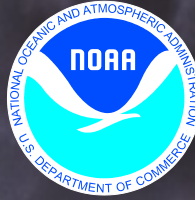
How to be Safe on the Trail



- **Your first and only truly safe choice is to get to an enclosed building or vehicle. Avoid partially-open or small structures such as picnic shelters, dugouts, covered patios, and sheds.**
- **If you are caught out in the open, STOP riding, get off of your horse, find a ditch or other low spot, and sit down.**
- **Stay at least 15 feet apart from other members of your group, so the lightning won't travel among you if you're hit.**
- **Stay away from tall, isolated objects. Lightning typically strikes the tallest object. That may be you in an open field or clearing.**



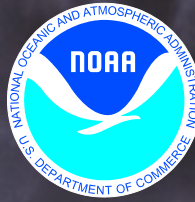
How to be Safe on the Trail



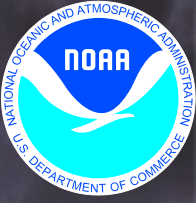
- **Know the weather patterns of the area. For example, in mountainous areas, thunderstorms typically develop in the early afternoon, so plan to ride early in the day and be done by noon.**
- **Know the weather forecast. If there is a high chance of thunderstorms, curtail your outdoor activities.**
- **Wet ropes can make excellent conductors. Stay away from metal objects, such as fences, poles and backpacks.**



NOAA Weather Radio



- **Provides forecasts and severe weather watches and warnings from your local National Weather Service office.**
- **Specific Area Message Encoder (SAME) technology radios available:**
 - ***Provides alerting for a single county or up to 15 separate counties.***
 - ***Has lights to indicate a watch, warning, or statement.***
 - ***Light stays on for duration of the event.***



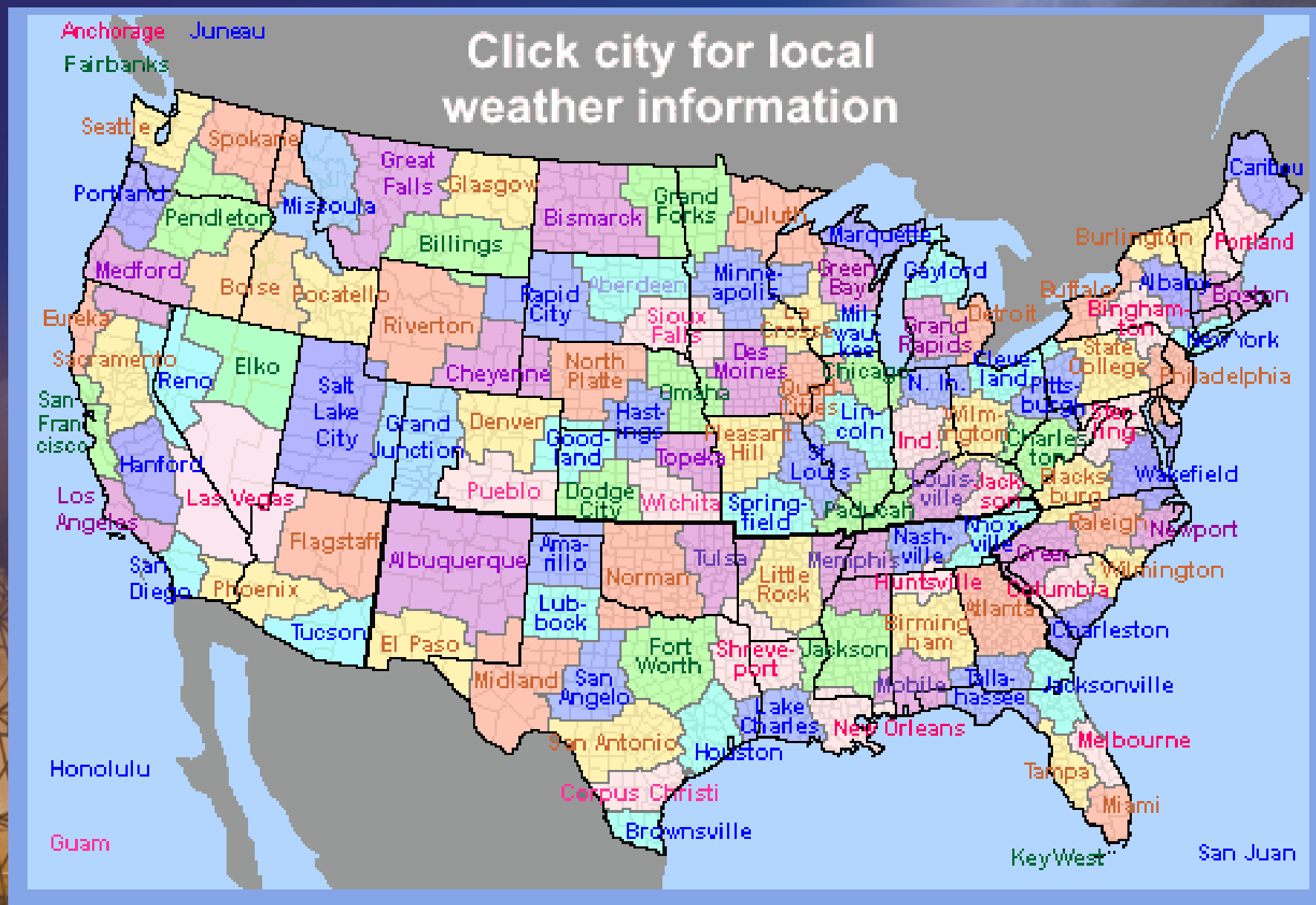
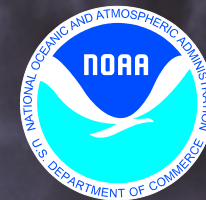
Stay in Touch on the Internet

www.weather.gov

www.srh.noaa.gov/mrx



National Weather Service County Warning Areas





National Weather Service Forecast Office

Morristown, TN

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