

Thunderstorms and lightning... the underrated killers!



MANSCEN SAFETY OFFICE

Fort Leonard Wood, MO

Agenda

- **Thunderstorms...and their offspring**
- **Flash Floods/Floods**
- **Lightning**
- **Straight-line Winds**
- **Large Hail**
- **Tornadoes**
- **Environmental clues**
- **Thunderstorms and lightning safety**

References

- Federal Emergency Management Agency
- National Oceanic and Atmospheric Administration's
- FLW Reg 500-4, Tornado Protection Plan

Thunderstorms...and their offspring

- Flash Floods/Floods
- Lightning
- Straight-line Winds
- Large Hail
- Tornadoes



Flash Floods/Floods

- The number ONE thunderstorm killer...nearly 140 fatalities each year.
- Most flash flood deaths occur at night and when people become trapped in automobiles.

Lightning

- Occurs with ALL thunderstorms.
- Averages 93 deaths and 300 injuries each year.
- Causes several hundred million dollars in damage to property and forests annually.

Straight-line Winds

- Responsible for most thunderstorm wind damage.
- Winds can exceed 100 mph!
- One type of straight-line wind, the downburst, can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation.
- During the summer in the western states, thunderstorms often produce little rain but very strong wind gusts and dust storms.

Large Hail

- Causes nearly \$1 billion in damage to property and crops annually.
- Costliest United States hailstorm: Denver, Colorado, July 11, 1990. Total damage was \$625 million.

•Flash Flooding:

- The #1 thunderstorm killer, nearly 140 deaths each year
- Most deaths occur at night and when people become trapped in their automobiles

•Straight-Line Winds:

- Winds can exceed 100mph
- One specific type is the “Downburst” it can cause damage equivalent to a strong tornado and can be extremely dangerous to aviation

•Large Hail:

- Falls at speeds faster than 100mph
- Causes nearly \$1 Billion in crop and property damage annually
- Costliest damage was in Denver, CO on July 11, 1990
\$625 Million in damage

Tornadoes

- Nature's most violent storms.
- Winds can exceed 200 mph.
- Result in an average of 80 deaths and 1,500 injuries each year.
- Most fatalities occur when people do not leave mobile homes and automobiles.



Tornado - Environmental Clues

Look out for:

- Dark, often greenish sky
- Wall cloud
- Large hail
- Loud roar; similar to a freight train



Tornado Safety

What *YOU* Can Do

- **Before the Storm:**

- Develop a plan for you and your family for home, work, , school and when outdoors.
- Have frequent drills.
- Know the county/parish in which you live, and keep a highway map nearby to follow storm movement from weather bulletins.
- Have a NOAA Weather Radio with a warning alarm tone and battery back-up to receive warnings.
- Listen to radio and television for information.
- If planning a trip outdoors, listen to the latest forecasts and take necessary action if threatening weather is possible.

If a Warning is issued or if threatening weather approaches:

- In a home or building, move to a pre-designated shelter, such as a basement.
- If an underground shelter is not available, move to an interior room or hallway on the lowest floor and get under a sturdy piece of furniture.
- Stay away from windows. Get out of automobiles.
- Do not try to outrun a tornado in your car; instead, leave it immediately.

MOBILE HOME SAFETY

- Mobile homes should **always** be tied down. If not tied down, mobile homes can be "rolled" by a sudden gust of wind from a thunderstorm.
- A mobile home, **even if tied down**, can not withstand the violence of a tornado and should be abandoned whenever a tornado is approaching.
- If you remain in your mobile home and a **tornado warning** is issued, you should immediately go to the mobile home park's community shelter...or be prepared to make a dash for the nearest ditch or ravine.

Who's Most At Risk From Thunderstorms?

- **From Lightning:**
 - People who are: outdoors, especially under or near tall trees; in or on water; or on or near hilltops.
- **From Flooding:**
 - People who are in automobiles when flash flooding occurs near them.
- **From Tornadoes:**
 - People who are in mobile homes and automobiles.

Lightning... nature's fireworks

What is Lightning?

- The action of rising and descending air within a thunderstorm separates positive and negative charges. Water and ice particles also affect the distribution of electrical charge.
- Lightning results from the buildup and discharge of electrical energy between positively and negatively charged areas.
- The average flash could light a 100-watt light bulb for more than 3 months.

What is Lightning....?

- Most lightning occurs within the cloud or between the cloud and ground.
- Your chances of being struck by lightning are estimated to be 1 in 600,000 but could be reduced by following safety rules.
- Most lightning deaths and injuries occur when people are caught outdoors. Most lightning casualties occur in the summer months and during the afternoon and early evening.

In recent years, people have been killed by lightning while:

- Boating
- Loading a truck.
- Standing under a tree.
- Playing soccer.
- Swimming.
- Riding on a lawnmower.



- Fishing in a boat
- Golfing
- Talking on the telephone
- mountain climbing
- bike riding
- golfing

Environmental clues

When skies darken or thunderstorms are forecast, look AND listen for

- Increasing wind.
- Flashes of lightning.
- Sound of thunder.
- Static on your AM radio.

To estimate the distance in miles between you and the lightning flash, count the seconds between the lightning and the thunder and divide by five.

Thunderstorms and lightning safety

What *YOU* Can Do!

- **Before the Storm...**
 - Know the county or parish in which you live and the names of nearby major cities. Severe weather warnings are issued on a county or parish basis.
 - Check the weather forecast before leaving for extended periods outdoors.
 - Watch for signs of approaching storms.

What *YOU* Can Do!

Before the Storm...

- If a storm is approaching, keep a NOAA Weather Radio or AM/FM radio with you.
- Postpone outdoor activities if thunderstorms are imminent. This is your best way to avoid being caught in a dangerous situation.
- Check on those who have trouble taking shelter if severe weather threatens.

When Thunderstorms Approach...

- Remember: if you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately!
- Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles.
- If lightning is occurring and a sturdy shelter is not available, get inside a hard top automobile and keep windows up.

When Thunderstorms Approach...cont.

- Get out of boats and away from water.
- Telephone lines and metal pipes can conduct electricity. Unplug appliances not necessary for obtaining weather information. Avoid using the telephone or any electrical appliances. Use phones **ONLY** in an emergency.
- Do not take a bath or shower.
- Turn off air conditioners. Power surges from lightning can overload the compressors.

When Thunderstorms Approach...cont.

- Get to higher ground if flash flooding or flooding is possible. Once flooding begins, abandon cars and climb to higher ground. Do not attempt to drive to safety.
- Note: Most flash flood deaths occur in automobiles.

If Caught Outdoors and No Shelter Is Nearby...

- Find a low spot away from trees, fences, and poles. Make sure the place you pick is not subject to flooding.
- If you are in the woods, take shelter under the shorter trees.
- If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Place your hands on your knees with your head between them.

STAY INFORMED ABOUT THE STORM

- By listening to NOAA Weather Radio, commercial radio, and television for the latest severe thunderstorm **WATCHES** and **WARNINGS**.
 - When conditions are favorable for severe weather to develop, a severe thunderstorm **WATCH** is issued.
 - Weather Service personnel use information from weather radar, satellite, lightning detection, spotters, and other sources to issue severe thunderstorm **WARNINGS** for areas where severe weather is imminent.

What to Listen For...

- **SEVERE THUNDERSTORM WATCH:** tells you when and where severe thunderstorms are more likely to occur. Watch the sky and stay tuned to know when warnings are issued.
- **SEVERE THUNDERSTORM WARNING:** issued when severe weather has been reported by spotters or indicated by radar. Warnings indicate imminent danger to life and property to those in the path of the storm.

FAMILY DISASTER PLAN

Follow these basic steps to develop a family disaster plan...

- **Gather information about hazards**
 - Learn your community's warning signals and evacuation plans.
- **Meet with your family to create a plan.**

Discuss what you would do if advised to evacuate.

Implement your plan...

- (1) Post emergency telephone numbers.
- (2) Install safety features in your house, such as smoke detectors and fire extinguishers;
- (3) Inspect your home for potential hazards (such as items that can move, fall, break, or catch fire) and correct them;
- (4) Have your family learn basic safety measures, such as CPR and first aid; how to use a fire extinguisher; and how and when to turn off water, gas, and electricity in your home;

Implement your plan...cont.

- (5) Teach children how and when to call 911 or your local Emergency Medical Services number.
- (6) Keep enough supplies in your home to meet your needs for at least three days.
- (7) Assemble a disaster supplies kit with items you may need in case of an evacuation. Store these supplies in sturdy, easy-to-carry containers, such as backpacks or duffel bags. Keep important family documents in a waterproof container. Keep a smaller disaster supplies kit in the trunk of your car.

A Disaster Supplies Kit Should Include:

- A 3-day supply of water (one gallon per person per day) and food that won't spoil.
- One change of clothing and footwear per person.
- One blanket or sleeping bag per person a first aid kit, including prescription medicines emergency tools, including a battery-powered NOAA Weather Radio and a portable radio, flashlight, and plenty of extra batteries.
- An extra set of car keys and a credit card or cash..

**Remember to take shelter during
thunderstorms
and use good sense if you
see one rolling in
to your area.**