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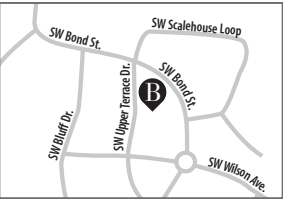
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LOCAL, STATE & REGION

How to stay safe when lightning strikes

BY MATTHEW CAPPUCCI

The Washington Post

Thunderstorms are a staple of the summertime across the Lower 48, and they all produce lightning — a wild phenomenon that also can be dangerous. In Washington, D.C., on Thursday, two people from Wisconsin died after being hospitalized with injuries sustained in an apparent lightning strike near the White House.

These bolts of raw electricity ricochet through thin air, arcing from stormy skies and blasting whatever they hit with a deafening roar. Lightning can be mesmerizing, dangerous, beautiful and terrifying, but how much do you know about what happens when there's a strike?

What is lightning?

Lightning is an electrical discharge and nature's balancing mechanism for distributing charge throughout the atmosphere.

Thunderstorms become electrified when electrons, which are negatively charged particles, are shaved off one water particle — like a raindrop, snowflake or hailstone — and end up on another, leaving the former with a net positive charge and the latter a bit extra negative. Generally speaking, ice crystals acquire a positive charge, while raindrops take on a negative charge.

That makes the top of a cloud, where temperature are well below freezing, positively charged. Below that is a more expansive "central negative" within the storm. A shallow, broad positive charge sits at the storm's base like the bottom of a hamburger bun.

Most lightning we see is either intracloud (within the cloud) or takes the form of cloud-to-ground bolts, most commonly originating from the middle negative charge. The greater the electrical field within a cloud, the more "sparky" the storm will be.

How does lightning work?

Getting an electric spark to jump through thin air is tricky. The ambient electric field has to be great enough to overwhelm the "dielectric breakdown strength" of air.

Think of a dam. It prevents water from flowing beyond it, unless the volume of water behind it reaches a threshold sufficient to burst the dam. Then the stored-up water can break through unimpeded.

For air, that magic number is 3 megavolts (or 3 million volts) per meter for dry air (it will change some in a storm). Charge accumulating on the surface will begin to bleed



Ryan Brennecke/The Bulletin file

A bolt of lightning fills the sky as an afternoon thunderstorm passes over Bend on Wednesday, Aug 5, 2020. The lightning sparked a one-eighth of an acre fire off of Bull Springs Road west of Shevlin Park. Crews patrolled the forest looking for any smoldering fires caused by the lightning in the days after the strike.

into thin air in a fine stream of electrons known as a "corona" discharge. That heats the adjacent air, lowering the resistance and making it possible for that spark to begin spreading in jagged increments.

It's unclear what processes unfold within a cloud, but eventually what's called a "stepped leader" of electricity races toward the ground, leaping in a branched, fractal pattern.

"Upward streamers," or narrow tendrils of electricity, reach skyward from the surface, akin to a group of students raising their hands. Eventually, the downward-stepped leader connects with one of the upward streamers to create an unbroken channel of electricity between the cloud and the ground. Current pulses surge through the channel, each causing a burst of light. That's why lightning appears to flicker.

Surprising facts about lightning

- Lightning isn't that thick. In fact, it's only an inch or two across. It just looks wider because of luminosity.
- Lightning is five times hotter than the surface of the sun. Within that narrow lightning channel, the electricity heats the air to nearly 55,000 degrees. That causes a rapid expansion of the air, which produces the atmospheric shock wave we hear as thunder.
- Lightning can be triggered. Researchers at Los Al-



Lightning flashes over Central Oregon in 2011.
Bulletin file

amos National Laboratory in New Mexico use rockets to trigger lightning, and then employ high-speed cameras and instruments to collect data. It's also well-established that airplanes, helicopters, tall man-made structures and even wind turbines can spark their own strikes.

- "Upward lightning" is a thing. It's exactly what it sounds like — lightning that leaps from the ground to the cloud, fanning outward along the cloud's expansive lower positive charge. In fact, self-initiated upward leaders are common from man-made transmission/broadcast towers and are an area of emerging research.
- Some lightning is more likely to spark wildfires. Although lightning is extremely hot, it is also brief. That limits its window of opportunity to ignite a wildfire. But instead of current flowing between the sky and ground in a brief series of staccato bursts, some lightning takes the form of a "continuing current" discharge. That means the current flows over longer-duration pulses. Because the

current is heating the ground for longer, the odds of a wildfire climb markedly.

- Men are struck roughly four times as often as women. In the United States, men account for 84% of lightning fatalities, and women make up the remaining 16%.
- Lightning fatalities are trending downward. Because of improved forecasts, education and awareness, lightning fatalities have declined significantly in recent decades. An average of 43 people died of lightning strikes annually in the United States between 1989 and 2018, but the average dropped to 23 between 2012 and 2022. A record low 11 deaths occurred in 2021.

Tips and facts to know for staying safe when there's lightning

- Never shelter under a tree. If lightning strikes a tree, the charge can flow through the trunk and laterally strike individuals beneath it, or also spread through the ground. Many lightning tragedies have stemmed from individuals seeking shelter beneath trees.
- Leisure activities — es-

pecially fishing and boating — are the greatest sources of lightning fatalities. "[F]ishermen and boaters are likely to be out in the open and more vulnerable to a direct lightning strike," a report from the National Lightning Safety Council from 2020 stated.

- Lightning can strike even in blizzards. Thundersnow is real and it can be dangerous. On Jan. 25, 1990, lightning hit a light pole during a thundersnow storm in Crystal Lake, Ill. The charge traveled through the frozen ground and injured 11 people nearby shoveling snow or pushing stranded motorists.
- Lightning can travel 10 or more miles away from a parent thunderstorm and even strike in clear air far from any rain. These "bolts from the blue" are often more powerful and potent, since they originate from the positively charged top of a thunderstorm. These are among the most dangerous, since they can strike in otherwise tranquil conditions. That's why experts recommend sheltering at the first sign of thunder, as that's a sign that you're close enough to be struck by lightning.
- Ninety percent of lightning-strike victims survive. There are an average of 30 lightning fatalities in the United States every year. The lightning strike that occurred in Washington, D.C., near the White House on Thursday brought this year's fatality count to 11.

LOCAL BRIEFING

Head-on crash results in injuries

A Redmond man was arrested following a head-on crash in Tumalo Friday that seriously injured another driver.

Jose Alvarez Ibarra, 46, was lodged in the Deschutes County jail on suspicion of second-degree assault, reckless driving, driving under the influence of alcohol and driving while suspended.

According to the Deschutes County Sheriff's Office, the crash occurred around 9 p.m. on Tumalo Road near Cline Falls Highway when Ibarra, driving east on Tumalo Road in a 2007 Ford Expedition, crossed into the west-bound lane of travel and truck a 2015 Dodge Dart driven by a 17-year-old Montague, California girl. Sheriff's deputies and bystanders assisted the girl until Bend Fire & Rescue arrived and took her to St. Charles Bend with serious injuries, according to a release from the sheriff's office.

Ibarra was taken to St. Charles Bend with minor injuries. After his release from this hospital he was arrested and jailed.

Tumalo Road was closed for about four hours.

Man arrested after stabbing

A Bend man was arrested Saturday after allegedly stabbing another man in



Submitted photo/Crook County Sheriff's Office

Prineville police arrested a man suspected of drunk driving Saturday after a head-on collision with another vehicle caused the driver and five other people to be taken to the hospital.

the abdomen during a confrontation.

Kevin Patterson, 51, was arrested on suspicion of aggravated second-degree assault, unlawful use of a weapon and a probation violation.

According to Bend Police, Patterson and the alleged victim, Manuel Garcia Martinez, 35, were both staying at the Bend emergency shelter at 275 NE Second St., where they had previous confrontations in the past couple months.

At 9:58 p.m. Saturday, Bend Police responded to a report of subject bleeding from his abdomen near the

intersection of NE Third Street and NE Franklin Avenue. Police arrived and provided medical care to the man, Garcia Martinez.

On investigation, police learned that Patterson and Garcia Martinez had earlier been involved in another confrontation near NE second Street and NE Emerson Avenue, which led to Patterson allegedly stabbing Garcia Martinez in the abdomen, according to a release from Bend Police Department.

Garcia Martinez was taken to St. Charles Bend with non-life-threaten-

ing injuries.

Patterson was arrested at the Bend emergency shelter and taken to the Deschutes County jail.

Crash sends 6 to hospital

Prineville police arrested a man suspected of drunk driving Saturday after a head-on collision with another vehicle caused the driver and five other people to be taken to the hospital.

At 1:23 p.m. Saturday, Prineville Police and deputies from the Crook County Sheriff's Office responded to a report of a car crash at North Main Street and NW Terrace Lane. Rodrigo Ortiz Gonzalez, 45, of Prineville was driving north on North Main Street in a 2014 GMC truck when he crossed the center line and hit small Dodge SUV traveling south, according to a release from the Crook County Sheriff's Office. After being evaluated at St. Charles Prineville, Gonzales was arrested on suspicion of driving under the influence of intoxicants, third-degree assault, reckless driving and several counts of recklessly endangering another person. He was lodged in the Crook County Jail.

Five other individuals were transported by Crook County Fire and Rescue to St. Charles in Prineville to be evaluated and treated.

— Bulletin staff reports