

June 15, 2014



Monsoon, our sensational and savage season!

12 News Weather Team

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Some areas of the country mark seasons with changing leaves or budding flowers. In the Valley, our arguably most exciting season — the monsoon — is heralded with a flurry of Facebook dust storm photos, a flood of thunderstorm tweets and a forecast of spectacular cloud-studded sunsets.

Whether this is your first Valley summer or your 30th, the rules are the same: Be prepared (flashlights), be smart (don't try to cross that flooded wash; just don't), and be ready (you can't get that great shareable photo if your camera isn't charged).

Until the storms start rolling in, we present our Monsoon 101 primer to help you prepare. The 12 News team has put together a quiz to test your monsoon IQ, explanations to help you understand what's happening and tips on staying safe.

If you think it has been dry over the past couple of months, you are not alone. Phoenix Sky Harbor International Airport has not recorded measurable rain since March 2.

Though more than a hundred days have passed without rainfall, this is not unheard of: April, May and June are the driest months for Phoenix, right before we move into the wettest month of the year, July.

And this monsoon's July and August are forecast to have above-normal precipitation, which could substantially help drought conditions across the state.

The good news does not stop there, however, as El Niño is forecast to strengthen, continuing the chance of above-normal precipitation through the winter.

TEST YOUR MONSOON IQ WITH OUR QUIZ

Question: What is the monsoon?

Answer: The monsoon is simply a time of year across the Southwest when the wind shifts, bringing an increase in moisture to the region and resulting in more frequent thunderstorms. For

much of the year, high pressure is to the south of Arizona. The clockwise flow around this high pressure results in a southwesterly-westerly wind, resulting primarily in dry air. In late June and early July, the area of high pressure moves northward near the Four Corners and the wind changes to southeasterly-southerly, bringing moisture.

Question: How do microbursts happen?

Answer: Microbursts are responsible for most of the wind damage associated with monsoon thunderstorms and for nearly all of the dust storms that move through the region. So how do they develop? When a mature thunderstorm has developed a large amount of rain droplets high in the cloud — at times upward of 40,000 feet — that rain falls and evaporates, creating a pool of cold air. Since cold air is denser than the surrounding air, it falls toward the ground and accelerates as it does so. The colder and higher the air begins, the faster the winds will be when it reaches the ground. When this mass of cold air hits the ground, it spreads out in all directions and is termed a microburst. Damage is always laid out in the same direction, radiating from the center of the microburst.

Question: What's a haboob?

Answer: Dust and sandstorms are common in the Middle East, where the Arabic term “haboob” comes from. Here, the word has come to mean a powerful dust storm, the kind with towering walls of dust. Some object to the use of the foreign term, but in any case, “dust storm” is just as accurate. The definition of a dust storm is blowing dust that reduces visibility between $\frac{5}{8}$ and $\frac{5}{16}$ of a mile; a heavy dust storm is one that reduces visibility to less than $\frac{5}{16}$ of a mile. Anything else would simply be called blowing dust.

Question: How does hail form?

Answer: Though we do not typically see large hail in Arizona, it is still a topic of concern. Hail formation occurs in the mature stage of a thunderstorm when an updraft (rising air) and a downdraft (sinking air) are present. As raindrops are pulled high into the cloud, they freeze. These frozen rain drops then fall back below the freezing point in the cloud and pick up an additional layer of water. If the updraft is not strong enough the small piece of hail will fall to the ground. If the updraft is strong it will pull the piece of hail back into the storm and the hail will grow one layer larger. This process will repeat itself until the hail eventually falls to the ground. The more times the piece of hail goes around the thunder storm, the larger it will become. In fact, if large hail falls and is cut open, counting the rings will indicate how many times it circled the inside of the thunderstorm. The largest recorded hail in Maricopa County was 2.75 inches, found in north Cave Creek in 1990.

Question: What is a severe thunderstorm?

Answer: It is simply a storm that is capable of producing hail 1 inch in diameter or one that has winds at or greater than 58 mph.

Question: What's the most rain we've ever gotten during a monsoon?

Answer: The wettest monsoon in Phoenix was in 1984, when 9.56 inches of rain fell at Phoenix Sky Harbor International Airport. The driest was 1924, when only 0.35 of an inch was recorded.

Question: Surely, I can drive across that, right?

Answer: One of the main hazards associated with the monsoon is flooding, in particular flash flooding. Rainfall during the monsoon is typically heavy and does not soak into the ground, resulting in copious runoff into washes. So, just how much rain is falling? Every inch of rain that falls over an acre equals more than 27,000 gallons of water. With this much water falling in a short period, it is no surprise that our normally dry desert washes quickly fill. And it takes only 6 inches of water to sweep someone off his feet, and 24 inches of flowing water can wash a car off the road. And thanks to Arizona's Stupid Motorist Law, a wrong choice could get pricey: If a motorist becomes stranded while trying to cross a flooded roadway that has a sign similar to "Do not enter when flooded" or is barricaded, the driver is responsible for the cost of the rescue as well as a fine.

SAFETY: WHAT YOU NEED TO KNOW

Flash flooding: Flash flooding is the No. 1 cause of death related to thunderstorms. Never drive through flooded roadways or let your children play in washes during periods of heavy rainfall. It takes only about 2 feet of flowing water to float a car and just 6 inches of swiftly flowing water to sweep you away.

Lightning: The second-highest number of casualties related to thunderstorms is from lightning. It is important to remember that lightning can strike several miles away from the storm itself. If a storm is approaching, move inside as soon as possible and stay inside until at least 30 minutes since hearing the last rumble of thunder. If you cannot find shelter, be sure to stay away from tall objects.

Dust: Dust storms are a common occurrence during the monsoon that affect a large number of motorists. If you are caught in a dust storm while driving, pull as far off the roadway as you can, put your car in park, turn off all your lights and take your foot off the brake. After a large dust storm you should also replace your air-conditioning filters and, if driving your car, the air filter.

To report a power outage: Arizona Public Service: 855-688-2437. Salt River Project: 602-236-8811 Statewide road conditions 888-411-ROAD.

WHEN THE LIGHTS GO OUT

- » Make sure you haven't blown a main fuse or circuit breaker.
- » Turn off appliances, including TVs, computers, air-conditioners, washers, dryers, dishwashers, ranges and heavy-duty motors, such as pool pumps and water heaters. In some cases, you might want to unplug appliances to avoid a power surge.
- » Wait at least a minute after the power is restored before turning equipment on.
- » Don't turn off the freezer or refrigerator. Keep doors closed. Food will remain frozen for 12 hours in a half-full freezer, 24 hours in a full one.

BE PREPARED

Have these things on hand in case it takes crews longer to restore power than expected:

- » Batteries.
- » Cordless pocket fan.
- » Battery-operated lanterns or flashlights that are easy to find in the dark.
- » Wall-mounted closet lights. They usually take D batteries and are helpful in a child's room or garage.
- » Battery-powered radio or TV.
- » Instructions to open or close an electric garage door manually.
- » A manual can opener.
- » Canned goods and dried foods that don't need to be refrigerated. Don't forget pet food.
- » Backup medical plan for life-support equipment.

PROTECT YOUR PETS

Lightning, thunder and down pours can be frightening to family pets. During a storm, try these tips from the Arizona Humane Society:

- » Keep pets indoors. If dogs are crate-trained and want to go into the crate, let them. If they don't want to go in, don't force them.
- » Make sure pets have current identification in case they escape.
- » Distract pets with toys or play during loud storms.
- » Don't overprotect. If you fuss because your pet is scared, you will reinforce their fears.
- » If your pet just can't cope, consider prescription medications, but only under the supervision of a veterinarian.

Website Editor

NOTE: I strongly recommend that you make a copy of this article and share it with your neighbors for use during the Monsoon Season.