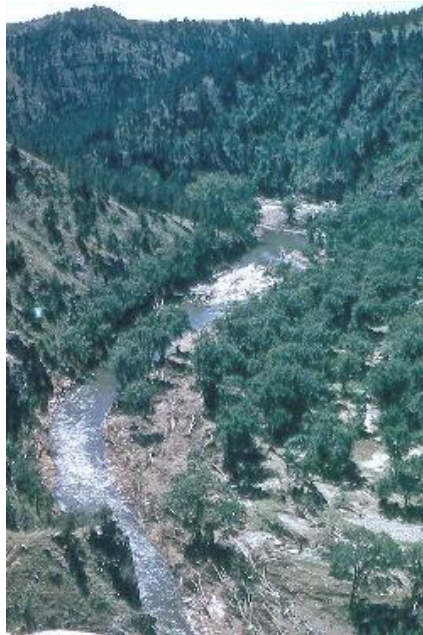


## “When Nature Strikes: Flash Floods”

Almost anywhere you are, heavy rainfall can produce a dangerous [flash flood](#). Even if you are camping high on a mountain, a slow-moving thunderstorm can cause streams to rise quickly and threaten your campsite. Flash floods can occur in areas that are far away from where the rain falls: you could be riding in a car in a desert and water which fell many miles away in the mountains can rush toward you down what is normally a dry stream bed.



June 9, 1972 Black Hills

Rapid City, SD

15 inches of rain in 5 hours

238 fatalities

\$164M in damages

Source: National Weather Service

This episode of “When Nature Strikes” teaches you that flash floods are one of the deadliest weather threats in the U.S. During the past thirty years, more than 125 people each year have been killed by flash flooding. For comparison, on average, 73 people are killed by lightning, 68 by tornadoes, and 16 by hurricanes, although these numbers can vary greatly from year to year.

Flooding can also occur quickly when a hurricane or tropical storm comes ashore. The [storm surge](#) quickly covers low-lying areas. These huge storms may drop vast amounts of water over the region as it slowly moves away. Streams clogged by logs and other debris or ice jams can produce flooding when these obstructions burst. When people build streets and parking lots in areas that once were fields, they can create [urban flooding](#) during heavy storms. Flash floods can happen anywhere.

Forecasting flash floods is a great challenge for meteorologists because it is difficult to know how much rain will fall, where it will fall, and what will happen after it hits the ground. If the area has solid rock or the soil is already saturated from previous rainfall, flooding is more likely to occur. Floods can cause catastrophic mudslides that can block the flood and increase the danger. Floods can move boulders, trees, and cars

To get a better idea of what can happen during a flash flood, you may want to view videos available through the Internet. Here is one example of a [YouTube video of cars swept away by a flash flood](#) in

New Zealand. Photographer David Rankin was able to combine drone footage and computer images to create this amazing video of a [2015 flash flood in Southern UT](#). You may want to conduct a web search to find other videos that enforce the dangers of flash floods.

One of the most important rules to remember if you come to a flooded area is **[“Turn Around, Don’t Drown!”](#)** Nearly half of all flood fatalities are vehicle-related deaths. A cubic foot of water weighs about 63 pounds, so moving water packs a tremendous punch. It takes only about 6 inches of moving water to knock down a person. Just 1 - 2 feet of water is enough to float almost any car or truck. If you are surrounded by water but the car is not being moved, you may be able to get out and rush to higher ground. But if you are in a car that is being moved, do not try to get out—keep the windows rolled up and wait until the car stops.

Russ Schumacher of Colorado State University and other scientists use weather radar, aircraft, satellites, stream measuring systems, and other methods to gather valuable information about flooding. One important goal of their studies is to understand when **[“Mesoscale Convection Systems”](#)** will occur. These are a series of slowly-moving thunderstorms that result from cool downdrafts spreading out along the ground, bumping into warm and moist air, and forcing it upward to begin a new thunderstorm. They affect regions more than 60 mi (100 km) wide. They can stay over the same area for many hours, dropping very heavy rainfall amounts, as well as strong winds and severe hail.

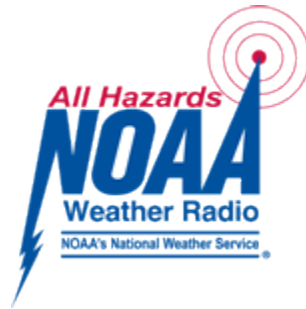
Engineers and municipal planners try to reduce the loss of life and property through [levees](#) (walls along streams); diversion spillways (channels in levees that water can flow into to reduce the flood); wetlands restoration projects (flooding low areas with no people in them), and other [flood management methods](#). But even these measures sometimes fail. As paved, populated areas expand and rural areas are reduced in size, the potential for greater storm damage and loss of life increases.



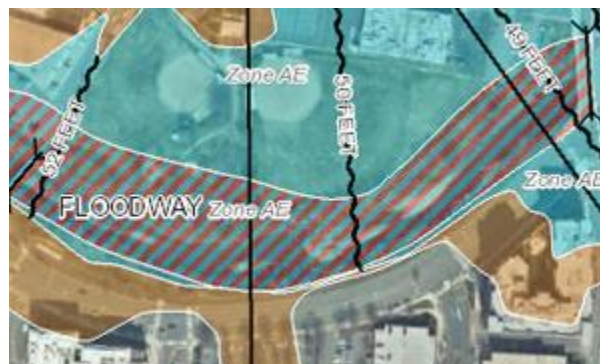
Break in levee during Mississippi River flooding near Miller City, IL, Jan 2016

The National Weather Service has responsibility for issuing [official notices about flooding and other hazardous weather](#). The NWS will send out a “Flash Flood Watch” to tell people they should stay alert and keep listening for updates. If the NWS issues a “Flash Flood Warning,” you should immediately

take action. You, your family, and your community should make “emergency response plans” in advance. You should have ready a [“disaster emergency kit”](#) with such items as water, food, battery-operated radio and flashlight, first aid kit, whistle, and other necessary items.



The best way to know about possible storm dangers is to listen to [NOAA Weather Radio](#). This provides 24/7 broadcasts about weather conditions, watches, and warnings throughout the US. If you don't have access to a weather radio and are driving, hiking, camping, or playing in an area that could be flooded, remember to “Listen for distant thunder and watch for rising water.” Get to higher ground as soon as possible. If possible, bring your emergency supply kit.



Before a disaster happens, participate in plans to prepare your home, school, or community. You can check whether your area is likely to experience a flood through the [NWS Interactive Flood Information Map](#) and the [FEMA Flood Map Service](#). In case of an event, it is a good plan to make images and lists of all your property and consider buying protection through [the National Flood Insurance Program](#).

Activity:

After you read the discussion, play the accompanying [“When Nature Strikes: Flash Floods”](#) Jeopardy Game to strengthen your understanding. You can play by yourself or in up to four teams.