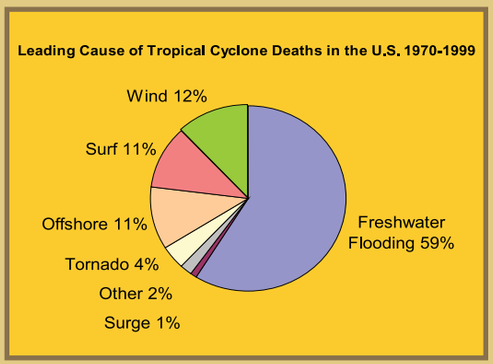
FLOOD WATERS RISING

Summer is the season for floods in South Carolina. Rapidly moving, decaying hurricanes and tropical storms are the most likely cause of flooding in the State. These dying tropical cyclones drop tremendous amounts of rainfall during a short period. This tropical rainfall can overwhelm creeks and rivers, quickly sending them above flood stage. In 1999, a glancing blow by Hurricane Floyd caused the Waccamaw River to remain above flood stage for 55 days. The rising waters flood low-lying coastal areas, roadways, and urban areas such as downtown Charleston. Tropical Storm Gaston lumbered ashore in August 2004 and dumped 6-12 inches of rainfall across Berkeley County. Radar estimates of 15 inches of rain fell near St. Stephens flooding county roads and destroying 20 buildings.

Another summer-time cause of flooding is powerful cold fronts which contain strong thunderstorms that can release several inches of rainfall in a matter of only an hour or two. A common heavy rainfall and potential flooding event is caused by what meteorologists call training. Training occurs when a long series of severe thunderstorms develop and line up, like boxcars on a train, and pass over one specific location, dumping massive amounts of rain. Generally, these thunderstorms occur during the height of summer when there is plenty of hot, humid air. Training can be triggered by urban heat islands. These localized hot spots are due to the concentration of concrete and asphalt in cities and the lack of heat moderating vegetation. Urban areas heat up faster at the surface than the surrounding countryside causing the air above to become unstable, triggering thunderstorm formation.

A decaying tropical cyclone and a summer cold front can act together to create torrential rainfall. Hurricane Floyd collided with a cold front as it tracked off the South Carolina coast September 14-16, 1999. Georgetown and Conway, South Carolina, recorded over 12 inches of rain causing flooding three feet deep near Murrells Inlet. The decaying cyclone provides abundant amounts of moisture and the upper level winds associated with the cold front provide large areas of upper level lift, creating clouds and heavy rainfall. This dynamic coupling of tropical and mid-latitude weather systems is always guaranteed to produce copious amounts of widespread heavy rain and flooding.



Topography can magnify the severity of heavy rainfall. Moist air forced upslope cools, condenses, and enhances the rainfall over the hills. Mountainous terrain with narrow valleys collects and channels heavy rain causing rapidly rising creeks and rivers. Low-lying coastal areas have the afternoon sea-breeze to trigger thunderstorms and heavy rains in addition to the astronomical tide range which acts to force water into the mouths of rivers and shallow bays, causing coastal floods.

Flooding and floodwaters from any cause are extremely hazardous in many different ways. Water is heavy and does not like to be confined. At eight pounds per gallon, or 64 pounds per cubic foot, water can do serious damage when in motion. Floodwaters are capable of destroying bridges and buildings in the flood's path. Debris in the floodwaters further increases a flood's destructiveness.

FEMA

Floodwaters disrupt underground utilities such as gas and electric lines. Heavy rainfall and floodwaters can overwhelm storm drains and wastewater treatment plants, contaminating wells and drinking water supply pipes. Roads and sidewalks can also be undermined or washed away. After the floodwaters recede, a soggy contaminated mess is left behind that becomes a breeding ground for mold and mildew. Houses become uninhabitable without extensive decontamination.

From 1993 through 2005, floods in South Carolina killed eight people, and caused over 87 million dollars of property damage. The rising waters also caused crop damage over 15 million dollars. On July 29, 2004, a large thunderstorm dumped four to nine inches of rainfall over the Reedy River causing major flooding in Greenville. Thirty homes were damaged and condemned. Property damage in and around Greenville totaled three and a half million dollars.

Floodwaters endanger lives in many ways. Floods are the second-most deadly natural hazard eclipsed only by heat-related fatalities. The National Hurricane Center has shown that 59 percent of all hurricane deaths are from fresh water drowning while just 12 percent of all hurricane deaths result from the hurricane's strong winds. Swift, cold floodwaters in overflowing creeks and rivers can over-power even the strongest swimmer. Just six inches of rushing water can knock over a full grown adult. Swift water rescues in these conditions are complicated and treacherous for both the trapped and the rescuers. Rising waters can also lift cars and carry them downstream. For this reason, motorists should never try to drive through a flooded roadway. It only requires 18 inches of water to float a car.

Phillip Jones

After the flood, many homeowners have tragically discovered that their homeowner's insurance policy does not cover damage or losses due to flooding. Homeowners may purchase building and contents coverage from the National Flood Insurance Program through their local insurance agent. The lack of flood insurance coverage is a very expensive lesson that is taught every year to many unfortunate homeowners. All home and property owners and renters should be intimately familiar with the flood-prone areas near or on their property. Homeowners and renters should carefully review and update their insurance policies before the first raindrop hits their roof.

With an increasing population and development, floods and flood damage are inevitable. As seen during Hurricane Katrina, a single storm can cause flooding that is both deadly and costly beyond our wildest imagination. Flooding is not confined to hurricane prone areas but is also a frequent occurrence in mountain regions as well. The raw power of floodwaters is difficult at best to control with modern engineering practices and in most cases floodwaters can catastrophically overwhelm even the seemingly most impregnable flood control measures we devise. Mitigation of flood risk is best accomplished with: acknowledgement of the risk, logical site development, sound construction practices, and personal preparation near flood-prone areas before the storm occurs.