Flooding

General

Flooding is the leading cause of death among all types of natural disasters throughout the United States, with its ability to roll boulders the size of cars, tear out trees, and destroy buildings and bridges. Typically the result of heavy precipitation, snowmelts, and ice jams, major flood events can last several days or even weeks. Unfortunately, many homeowners fail to realize that the average insurance policy does not cover flooding. For this reason, floods are a costly hazard.

A property's vulnerability to a flood depends on its location in the floodplain. The properties that lie along the banks of a waterway are the most vulnerable. The property within the floodplain is broken into sections depending on its distance from the waterway. The 10-year flood zone is the area that has a 10 percent chance of being flooded every year. However, this label does not mean that this area cannot flood **more than** once every 10 years. It simply designates the probability of a flood of this magnitude every year. Further away from this area is the 50-year floodplain. This area includes the 10-year floodplain, plus additional property. The probability of a flood of this magnitude occurring during a one-year period is two percent. A summary of flood probability is shown above.

Flood Probability Summary

Flood Recurrence Intervals	Chance of Occurrence
10-year	10.00%
50-year	2.00%
100-year	1.00%
500-year	0.20%

Source: FEMA

In the past, heavy rains caused most of Juniata County's flood problems. Heavy rains cause small creeks and streams to overflow their banks, leading to road closures and other damage.

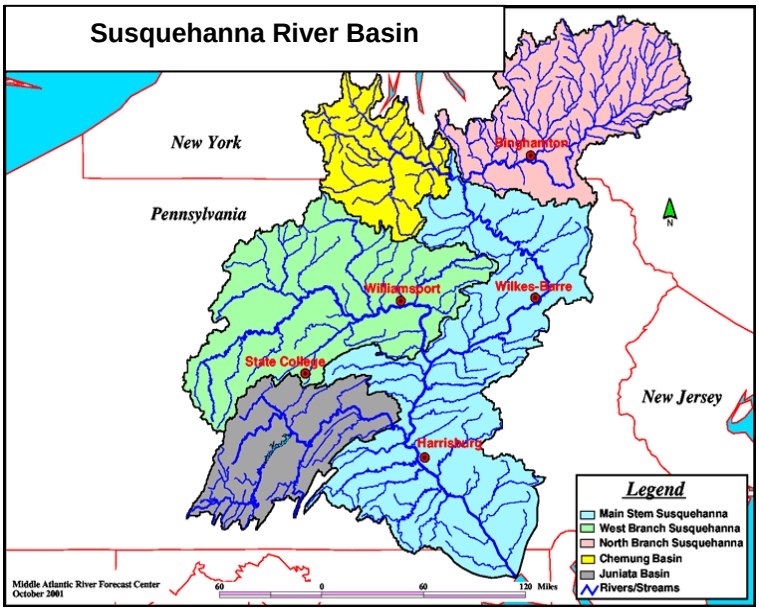
Flooding poses the biggest threat to those who reside or conduct business in the floodplain. The most significant hazard exists for businesses in the floodplain that process, use, and/or store hazardous materials. A flood could potentially allow for hazardous materials to leak out of these areas. As the water recedes, it would spread the hazardous materials throughout the area. Also threatened are the agricultural areas in the floodplain. Most flood damage to property and structures located in the floodplain is caused by water exposure to the interior, high-velocity water, and debris flow.

Juniata County is prone to two types of floods:

- Riverine Flood – Occurs in the floodplain of a river or stream when the amount of water and the rate at which it is moving increases.

- Flash Flood – A type of riverine flood that occurs after a heavy storm, when the ground cannot absorb the high amount of precipitation. This can occur when heavy precipitation falls on frozen or already-saturated soil.

Flooding – Susquehanna River Basin



The Susquehanna River Basin encompasses much of Pennsylvania and portions of New York to the north and Maryland to the south. It is composed of the Main Stem Susquehanna, North Branch Susquehanna, West Branch Susquehanna, Chemung Sub-basin and Juniata Sub-basin. The Susquehanna River Basin is one of the most flood-prone watersheds in the entire nation. The main stem of the Susquehanna and its many tributaries drain 27,510 square miles of New York, Pennsylvania, and Maryland. Since the early 1800s, the main stem of the Susquehanna has flooded every 20 years, on average. The Susquehanna Basin also is vulnerable to frequent, localized flash floods every year. Since flood records were first kept in 1810, the Susquehanna River Basin's most devastating floods occurred in: 1936 (St. Patrick's Day Flood); 1955 (Hurricanes Connie and Diane); 1972 (Hurricane Agnes); 1975 (Hurricane Eloise); 1996 (January flooding); and 2004 (Tropical Storm Ivan). In 1972, Hurricane Agnes caused the worst recorded flooding in the basin. The flooding caused 72 deaths and $2.8 billion in damage; flood levels exceeded the record levels of 1936 by as much as six feet in some places.

Despite frequent flooding, seven upstream dams contribute to the reduction of flood hazards on the Susquehanna River: Stillwater Reservoir, located approximately nine miles north of Carbondale, Pennsylvania, on the Lackawanna River; East Sidney Lake, located approximately eight miles east of Sidney, New York, on Ouleout Creek; Whitney Point Dam, located approximately one mile north of Whitney Point, New York, on the Otselic river; Almond Dam, located approximately two miles northwest of Hornell, New York, on Canacadea Creek; Arkport Dam, located approximately five miles northeast of Hornell, New York, on the Canisteo River; Tioga-Hammond Dam, located approximately 20 miles southwest of Elmira, New York, on the Tioga River and Crooked Creek; and Cowanesque Lake, located on the Cowanesque River approximately two miles above the confluence with the Tioga River at Lawrenceville, Pennsylvania.

Flooding – Municipal Hazard Analysis

History

The National Climatic Data Center maintains a historical record of flooding since 1993 in its Storm Event Database. This database measures all weather events from 1993 – 2005. According to the Storm Event Database, Juniata County has experienced 12 flood events since 1993. Of these, 11 events were categorized as flash floods, and one as combination flood/flash flood. Floods are caused by a variety of factors. The most significant occurrence of flooding is due to heavy rains. A summary of the flood history of Juniata County since November 1993 can be seen on the following pages.

The major cause of flooding in Juniata County is slow moving rain storms, originating from the south or southwest, with an abundance of moisture that has been transported from the Gulf of Mexico and re-supplied with Atlantic Ocean moisture by strong, stationary, Bermuda highs. A blocking high pressure area to the northeast of Pennsylvania contributes to these conditions. Intense local flash floods are most likely to occur in squall lines just to the east of a slow moving north-south oriented cold front. These are usually warm weather phenomena, where afternoon heating adds to the instability of the already unstable, moist air mass. Storms of tropical origin affect the Susquehanna River valley an average of once in three years. Their usual path is from the south to the northeast, but a few have traveled from the southeast to the northwest. The tropical storm season runs from June to November.

The Pennsylvania Emergency Management Agency (PEMA) maintains historical records of declared disasters since 1954. According to PEMA, four flooding events since 1954 that resulted in a declared disaster, affected Juniata County. The flooding in 2006 resulted in a Governor's and Presidential Major Disaster Declaration, individual and public assistance, and Hazard Mitigation.

Juniata County Flooding Event History, 1950-2006

Date	Type
10/21/1995	Flood/Flash Flood
1/19/1996	Flood
1/19/1996	Flash Flood
9/6/1996	Flash Flood
9/13/1996	Flash Flood
12/13/1996	Flash Flood
9/11/1997	Flash Flood
1/8/1998	Flash Flood
4/19/1998	Flash Flood
1/23/1999	Flash Flood
8/20/1999	Flash Flood
6/20/2001	Flash Flood
9/17/2004	Flood
3/28/2005	Flood
6/27/2006	Flash Flood

Source: National Climatic Data Center

Vulnerability

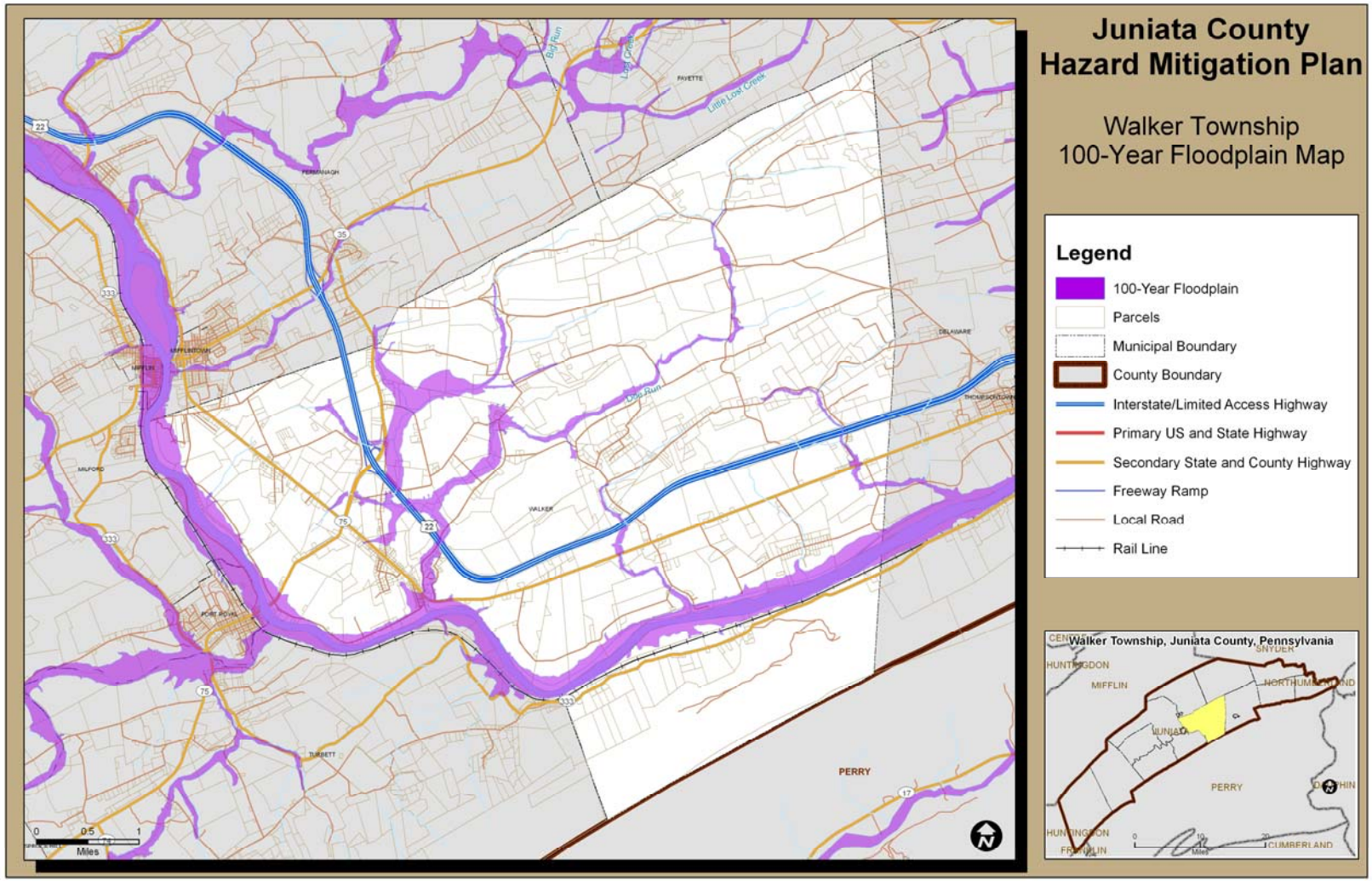
The following municipal summaries detail flood threats within Juniata County. This analysis was taken from the Federal Emergency Management Agency (FEMA) Flood Insurance Study.

Walker Township

Walker Township is located in the south-central portion of Juniata County. It is bordered by Fermanagh Township, Mifflintown Borough, and Fayette Township to the north; Delaware Township to the east; Tuscarora Township in Perry County to the south; and Turbett Township, Port Royal Borough, and Milford Township to the west. The Juniata River forms a large portion of the western and southern boundaries of the Township.

Other major streams in the Township are Doe Run, Locust Run, and Cedar Spring Run. However, the principal source of flooding in Walker Township is the Juniata River. The worst flooding event occurred in 1889 when the River reached more than 35 feet just downstream in Newport, Perry County. The flooding history of other streams in the Township was not recorded in the FEMA Flood Insurance Study.

The map on the following page presents the 100-year floodplain risk for Walker Township.


Juniata County
Hazard Mitigation Plan
Walker Township
100-Year Floodplain Map
Legend
100-Year Floodplain
Parcels
Municipal Boundary
County Boundary
Interstate/Limited Access Highway
Primary US and State Highway
Secondary State and County Highway
Freeway Ramp
Local Road
Rail Line
Walker Township, Juniata County, Pennsylvania
PERRY
Miles