

SUMMARY OF FLOOD EVENTS

NOTE: Financial damage estimates are the value when the event occurred.

1878 (Black Hills) Flooding caused minor damage in April, May and June. On July 12, a freight train of ten or twelve ox wagons loaded with machinery for the Homestake Mine were covered with water and some washed downstream. Rapid Creek rose ten feet very quickly. One death was reported.

May 1883 (Black Hills) Heavy, wet spring snowstorms caused flooding which washed away most of Deadwood on May 16. Several days of torrential rain over the Black Hills caused flooding on Rapid Creek and the Belle Fourche River on May 17 - 18. Four deaths and \$250,000 damage was reported.

1885 (Black Hills) More than \$25,000 damage occurred when Rapid, Box Elder, and Elk creeks flooded.

June 17, 1890 (Deadwood) Heavy rain caused flooding in Deadwood.

August 15, 1890 (Rapid City) Heavy rain caused flash flooding on Rapid Creek in Rapid City. All the bridges across Rapid Creek in Rapid City were destroyed; water was two feet deep on Main Street and cellars were filled with water causing considerable damage. Water covered the flat between 5th and West Boulevard and from Omaha Street to Denver Street.

June 6, 1892 (Rapid City) Flooding caused damage to railroads and roads.

July 2, 1901 (Rapid City) Street flooding occurred in Rapid City.

July 1905 (Bad River) The Bad River flooded from Philip to Fort Pierre due to a week of heavy rain. Seventeen houses in Fort Pierre were swept into the Missouri River, 40 houses were damaged and 75 families evacuated. A series of small dams washed out, and the river level was an estimated 12 feet above flood stage. This was three feet higher than the highest documented flood of June 1867. \$100,000 damage and seven deaths were reported.

June 12, 1907 (Rapid Creek) An average of five inches of rain caused rapid melting of snow and the worse flood in Rapid City prior to 1972. Every bridge over Rapid Creek between Mystic and Creston was destroyed. Canyon Lake washed out and remained dry until 1932. Peak flow was estimated at 13,000 cfs with \$100,000 damage in Rapid City, plus \$100,000 damage to railroads and four deaths.

May and June 1909 (Northern Black Hills) Thunderstorms flooded streets, railroads and mines in Deadwood, Lead and Spearfish. Spearfish Creek was a half mile wide at the mouth with flooding on Elk and Box Elder creeks. Twenty houses along Bear Butte Creek were evacuated on June 11. In Belle Fourche, \$500,000 damage was reported.

August 1915 (Bad River) Flooding occurred several times in 1915. Heavy snowfall in March was followed by heavy rain in May. Flooding in August destroyed railroad tracks, a few homes and damaged a stockyard. The Bad River was nearly a mile wide in some locations.



*Flooding in Rapid City, June 11, 1909
(photo courtesy of the Rapid City
Journal).*

May 1920 (Black Hills and the Plains) on May 10-12, 4.75 inches of rain fell on saturated ground. The Weather Bureau issued warnings for a rise to six feet above normal on Rapid Creek which was already 3.5 feet above normal. Bridges over Rapid Creek were destroyed. Flooding was reported over a large part of the Cheyenne basin with an estimated 13 foot crest at Edgemont, 18 feet at Wasta and 19 feet at Eagle Butte. Six deaths, \$100,000 in railroad damage and \$200,000 total damage were reported.

April 1924 (Belle Fourche) Warm temperatures and rain caused rapid melting of five feet of snow, causing flooding in Belle Fourche beginning on April 9. Fifty-five houses were destroyed and damage estimates were \$150,000.

May 27, 1926 (Rapid City, Sturgis, and Deadwood) Three inches of rain fell in three hours causing flooding.

May 1927 (Western South Dakota) Flooding occurred over the Cheyenne, Bad, White and Missouri rivers. A wet, snowy spring followed three years of drought. In Rapid City, 51.9 inches of snow fell March 31 to April 15. Heavy rain over the Cheyenne, Bad and White River basins began May 5 with the worst flooding on the Cheyenne and Bad River. The stage on the Bad River at Fort Pierre was estimated at 31 feet. The Bad River flood washed out train tracks and trestles, and the train did not run for a month.

June 17, 1937 (Hot Springs) Estimated \$200,000 damage.

September 4, 1938 (Hot Springs) Discharge of 13,100 cfs was recorded at the Hot Spring river gauge.

1947 (Hot Springs) Flooding along Fall River (prior to Cold Brook Reservoir).

August 15, 1949 (Rapid City) Thunderstorms produced flash flooding and large hail in Rapid City causing \$198,000 in damage. Peak flow on Rapid Creek was 563 cfs.



Hot Springs, prior to construction of Coldbrook Reservoir (photo courtesy of the Rapid City Journal).

May 22, 1952 (Rapid City) Flow on Rapid Creek was 2,500 cfs and damage occurred to the Canyon Lake area. Landslides in Deadwood and Sturgis caused damage to streets and gas lines, and washed out bridges. In 24 hours, 5.55 inches was reported at Pactola with a storm total 6.26 inches.

July 28, 1955 (Pennington County) Minor flooding occurred in Mystic, Rochford and Pactola after five inches of rain fell.

June 24, 1959 (Crook County) A thunderstorm moved down Miller Creek producing flash flooding south of Sundance.

June 20, 1960 (Rapid City/New Underwood) Basement and street flooding occurred due to heavy rain from thunderstorms.

August 1, 1960 (Newcastle) Heavy rain flooded Highway 16 near the refinery.

June 1, 1961 (Newcastle) Runoff from heavy rain flooded Highway 16 near the refinery.

June 1962 (Rapid City) Rapid Creek left its banks on June 15. Nine days later, over three inches of rain fell over the Black Hills. Two motels, 120 mobile homes, and over 400 houses were damaged in Rapid City. Bridges, roads, sewer systems, and recreation areas along Rapid Creek were damaged. Extensive road and bridge damage in Sturgis, Deadwood, and Whitewood. Damage to road equipment estimated at \$200,000. On June 30, 1.5 inches of rain fell in Rapid City damaging north Rapid City and the South Canyon area for the second time.



*Street flooding in Rapid City, June 1962
(photo courtesy of the Rapid City Journal).*

July 1962 (Black Hills) On the evening of July 13, 1962, two to five inches of rain fell in three hours in Cleghorn Canyon, South Canyon, Dark Canyon and Canyon Lake areas just west of Rapid City. Rapid Creek flooded and washed out six bridges. A mobile home company lost 22 new mobile homes and 1200 to 1500 people were forced to temporarily leave their homes. Damage was estimated at \$1.9 million for the summer.

May 15, 1965 (Northern Black Hills) Flash floods, from heavy rain falling on 30 inches of snow, damaged portions of Deadwood, Spearfish and Sturgis. A record crest was reported on Rapid Creek near Silver City. Many houses in the Spearfish-Sturgis area were damaged or destroyed. Two million dollars in damage was reported.

July 22, 1966 (Gillette) Heavy rain caused flash flooding in south and east Gillette.

June 15, 1967 (Bad River) This flood produced the highest stage since 1929 on the Bad River. Thunderstorms moved through the area on several preceding days, saturating the soils and increasing flows along the river. Philip reported 3.13 inches and Pine Ridge 3.80 inches of rain. The gage on the Missouri River at Fort Pierre reported a stage of 29.55 feet (43,000 cfs). Thirty mobile homes had to be moved to higher ground.

June 9-10, 1972 (Eastern Black Hills) Record flows were reported on Rapid, Battle, Bear Butte, and Boxelder creeks. On June 9 a stationary front, with moderate southeast surface flow, moved through high pressure aloft. A strong flow of warm, moist air near the surface fed the storms and anchored them against the Hills for six to eight hours. An average of six inches of rain fell with up to 15 inches reported. Rainfall intensities of two to six inches/hour were common. Canyon Lake breached, adding to the wall of water that poured through Rapid City. Flow on Rapid Creek in Rapid City was estimated at 50,000 cfs. After the flood, 750 acres near Rapid Creek were designated as a floodway. 238 deaths and \$164 million in damages were reported.



*Flood damage on East Blvd at
Omaha St in Rapid City, June 10, 1972
(photo courtesy of the Rapid City Journal).*

July 21, 1973 (Northeastern Wyoming) Torrential rains accompanied by hail caused flash flooding in southern Weston County. Several earthen dams breached, causing damage to bridges and roads. Crop and property damage was substantial. In Gillette, heavy rain amounting to 1.5 inches in one hour resulted in flooded streets and basements and damage to new construction.

August 21, 1973 (Beulah) Heavy rain caused flash flooding on Sand Creek washing out roads and damaging houses. A pickup truck and a trailer were washed into a bridge abutment.

June 8, 1975 (Rapid City) 2.5 inches of rain in 30 minutes which damaged houses, cars and parks.

June 25, 1975 (Upton) Street flooding in Upton from heavy rain.

June 13-14, 1976 (Northern Black Hills) A strong low pressure system moved toward central South Dakota, and the cold core low aloft stalled out over western South Dakota. Moist unstable air wrapped around the low and pushed up the northern slopes of the Hills on June 13. By 3:00 p.m. on June 14, 4.08 inches had fallen at Sturgis, with nine inches by midnight. Storm totals included ten inches at Galena and eight inches at Whitewood. Most property damage occurred in Spearfish along Spearfish Creek, Deadwood along Whitewood Creek and Sturgis along Bear Butte and Vanocker creeks. Major damage occurred along Redwater Creek near the Wyoming state line and in Keystone near Grizzly and Battle creeks. Damage estimates were three million dollars in Sturgis with two million dollars elsewhere. One death was reported.

March 1978 (Western South Dakota) Temperatures in January and February were 10-12 degrees below average, but were followed by a warm up in March. Ice melted then broke up and piled against bridges and other constrictions. The White River near Oacoma crested at 23.59 feet on March 14th flooding a total of 3,000 acres and four ranches. Two mobile homes near the Bad River were moved and six houses were evacuated.

May 1978 (Northeastern Wyoming) A strong low pressure system developed over Colorado at the southern end of the cold front and the features became stationary. Southerly mid-level flow forced the precipitation northward over the stationary boundary and focused the precipitation over northeastern Wyoming for about 60 hours. Precipitation ended early on May 19 as the low and cold front moved over the central Dakotas. Total rainfall was three to six inches over northeast Wyoming including: Echeta 2NW reported 4.65 inches, Gillette 5.06 inches, and Dillinger 3.67 inches. Flooding was reported on May 22 along the Belle Fourche, Cheyenne (Wyoming portion) and Powder rivers and their tributaries due to the heavy rain. Keyhole Reservoir spilled for the first time in its 26-year history. Extensive damage to roads, bridges and buildings occurred. Campbell, Crook and Weston counties declared major disaster areas.

July 23, 1981 (Rapid City) In fifteen minutes, 0.71 inches of rain fell causing widespread street flooding. A youth was swept into a culvert and suffered minor injuries.

March 1982 (Cheyenne River) The second highest stage of record at Wasta which was 16.25 ft.

June 13, 1982 (Crook County) A thunderstorm dumped up to seven inches of rain throughout the southeastern part of Crook County along with hail drifts from two to five feet in some places. Damage resulting from flooding was reported in the Moskee and Oshoto areas.

July 24, 1982 (Moorcroft) A thunderstorm dumped 2.3 inches of rain in a short period of time causing localized flooding.

July 25, 1982 (Gillette) An inch of rain fell in less than 20 minutes on already saturated ground causing flooding. Damage estimates from the flooding approached one million dollars.

March 1987 (Lower Bad, Cheyenne, Moreau and Grand Rivers) Rapid warming in the first week of March melted 20 to 30 inches of snow and brought many streams to near bank full. Numerous ice jams formed on the Grand and Moreau rivers in early March. Heavy snow cover from the Bad Basin to the lower Grand basin slowly melted until late March when storms produced two to three inches of rain over this area. On the evening of March 20, the lower Bad, Cheyenne, Moreau and Grand Rivers rose rapidly. The Bad River crested at 24.38 feet, three feet above flood stage, on March 21. No damage was reported.

May 16, 1987 (Wright) A severe thunderstorm dropped over 2.5 inches of rain over the town of Wright in 45 minutes. About 14 homes sustained minor damage and three homes had major damage. The 3 homes with major damage had approximately 3 to 14 inches of water in their basements.

July 30, 1987 (Campbell County) A line of strong thunderstorm produced heavy rain across Campbell County. Savageton received 1.5 inches of rain in 35 minutes. In Gillette, 1.5 inches of rain fell in less than an hour along with 1.5 inch diameter hail. Many streets and a few apartments were flooded due to the torrential rain in Savageton and Gillette.

August 11, 1987 (Crook County) Thunderstorms with heavy rain swept through northern Crook County during the afternoon. Highway 24 south of Hulett was closed due to flooding and fences were washed out north of Aladdin.

May 10-12, 1991 (Southwestern South Dakota) A strong upper level low over the western United States with southerly flow over South Dakota brought copious amounts of moisture into the southern Black Hills. A surface stationary front remained over western South Dakota through the period. Very heavy rainfall over the southern Black Hills and southwestern South Dakota caused extensive flooding. Total rainfall was four to ten inches. In Oral, flood waters carried houses a few hundred feet off foundations, while many highways, roads, culverts and bridges were completely washed out by the heavy rains. Towns along the Cheyenne and White Rivers were evacuated. One million dollars in damage was reported.

June 13, 1991 (Sundance) A thunderstorm produced 2.72 inches of rain in 45 minutes flooding streets and basements.

August 19, 1993 (Rozet) A person working on an oil rig died when he was caught in a flash flood in what usually is a dry creek bed north of Rozet.

May and June 1993 (Battle Creek) Two inches of rain fell in twenty minutes on May 5. Five thousand dollars in road and culvert damage occurred near Hill City. On June 7 three inches of rain in ten hours caused localized flooding. Numerous roads were closed due to water, mudslides or debris and a campground near Keystone was evacuated.

August 6, 1993 (Rapid City) Brief, heavy rain caused three to four feet of water over a road.

May 1995 (Western South Dakota) A strong upper-level low over the central and southern Rockies on the evening of May 7 slowly pushed northeast across the central Plains, producing heavy rain in western South Dakota. Early on May 8 the surface low over the central Plains pulled moist air into western South Dakota. Strong upslope flow developed as surface winds backed to the north. With northeast flow aloft, the heaviest precipitation fell north-northeast of the Black Hills. Rainfall amounts ranged from over two inches in southeastern Rapid City to 8.6 inches in Deadwood. The Belle Fourche, Bad and Cheyenne Rivers approached or reached flood stage with over 100 roads closed in Lawrence, southwest Meade and southern Butte counties. Damage was estimated at \$20 million.

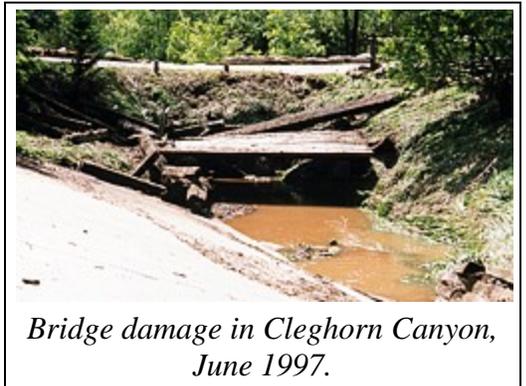
May 30, 1996 (Pennington and Custer Counties) Three to six inches of rain fell on saturated ground. Two to three feet of water was reported on the Highway 79 Bridge at Spring Creek near Hermosa. French Creek left its banks and the Hart Ranch Campground and homes near Rapid Creek were evacuated.

June 14, 1996 (Meade County) Nearly stationary thunderstorms dumped up to 14 inches of rain, washing out the road from Sturgis to Hereford. Numerous damage to cars, houses, ranches and livestock caused an estimated loss of \$260,000.

May 24, 1997 (Rapid Creek) Stationary thunderstorms produced four to five inches of rain, causing minor flooding.

June 2, 1997 (Pennington County) Two to three inches of rain fell in less than an hour from Deerfield to Rapid City. Up to 4.5 inches of rain fell in thirty minutes in Chapel Valley. Six to eight feet of water in Cleghorn Canyon washed out driveways and bridges. Eight to ten feet of water in Red Rock Canyon washed out driveways and bridges. Minor flooding reported at a golf course near Chapel Valley. In Rapid City, six to twelve inches of water was reported over roads with the highest flows on Rapid Creek since 1972.

July 24, 1997 (Lawrence and Pennington Counties) Stationary thunderstorms produced over five inches of rain in the Lead and Deadwood area. Rock and mud slides partially blocked Highway 14A west of Lead. Flooding occurred near the intersection of Highway 85 and Highway 385. Several secondary roads were washed out around Lead. Whitewood Creek and Yellow Creek were over their banks. In Pennington County, four to five inches of rain caused the south fork of Rapid Creek to rise over its banks five miles west of Rochford. Minor flooding also occurred along the north fork and along the tributaries of Rapid Creek.



June 22, 1998 (Weston) General flooding was reported near Weston with stock ponds overflowing and roads being threatened.

July 1 1998 (Campbell County) Heavy rains of six inches in an hour caused a stock dam to breach on the Iberland Ranch. Highway 387 about 26 miles southwest of Wright was flooded.

July 2, 1998 (Campbell & Weston Counties) Flood waters covered highway 50 between mile markers 16 and 20 about 18 miles southwest of Gillette. Oil Creek Road near Four Corners was washed out in several places.

June 18, 1999 (Keystone) In less than 90 minutes, three to four inches of rain fell around the Keystone area. Sections of Old Hill City Rd washed away. The 1880 Historic Train had several hundred feet of railroad track wash away at a cost of \$300,000. The flood stage at Camp Judson on Battle Creek is 6.5 feet and the river reached 8.48 feet around 1648 MST and dropped back below flood stage at 1830 MST.

June 29, 1999 (Hermosa) Water along French and Grace Coolidge Creeks rose rapidly after three to four inches of rain in less than an hour. Some vehicles in the Hermosa area had water up to the doors because local drainage systems could not keep up.

August 7, 1999 (Custer County) Nearly stationary thunderstorms produced three to seven inches of rainfall in the French Creek basin. This water inundated French Creek which flows through Custer and considerable damage occurred to county roads and portions of the city of Custer. Over one dozen evacuations were ordered. One major result of the flooding was the contamination of the waste treatment plant which took in 2.9 million gallons of water in 48 hours, and it can normally handle just 500,000 gallons of water a day. Damage to streets, bridges, highways and public buildings was approximately \$115,000 with no estimate for private property. Numerous homes had three to four inches of water in their basements.

May 28, 2001 (Gillette) A surface trough across central Wyoming with weak southeasterly flow caused training storms in the Donkey Creek basin. Dew points were in the mid 40's with temperatures in the 70's as the mid-level ridge was anchored over the plains. Model sounding for Gillette indicated low CAPE, near average precipitable water and weak upper level winds. These storms produced water in basements and submerged county roads under four feet of water. Damage included \$50,000 at a golf course and business losses totaled \$400,000. Storm total precipitation ranged from 0.18 inches at the Gillette Airport to 7.5 inches 4SW Gillette.

June 13, 2001 (Northern Crook County) Locally heavy rain from thunderstorms overnight produced a flash flood on the Little Missouri River at Government Canyon. A road was washed out and eight feet of water was covering the roadway.

July 15, 2001 (Rapid City) Very heavy rain overwhelmed street drainages in downtown Rapid City. Vehicles were reported to have moved "several feet" in flooded downtown streets. Water covered Nemo Road in northwestern Rapid City where the river gage at Echo Canyon went over flood stage.

July 21, 2001 (Keystone) One to three inches of rain put Highway 16A under water. Damage at several businesses and houses was estimated at \$50,000.

August 12, 2001 (West of Custer) Flash flooding occurred through Buck Springs and Gillette Canyons. Normally dry creek beds had water flowing from 18 inches to 4 feet deep and from 6 feet to 20 feet wide. Excessive runoff from scorched earth of the Jasper Fire of 2000 contributed more to the flooding than the heavy rainfall.

June 2, 2002 (Rozet) In one hour, 1.25 inches of rain fell which clogged storm drains causing water to flow over Bishop Road near Rozet.

July 5, 2002 (Pringle) Heavy rain left three to four inches of standing water in the town of Pringle, and water covered roads adjacent to Bear Creek around Pringle. An inch of rain was recorded in ten minutes in Pringle and radar estimates were around 2.5 inches per hour over the area. A total of three inches of rain was reported which produced standing water on County Road 341.

August 8, 2002 (Deadwood) The Grizzly Gulch automatic rain gage received 0.39 inches in 15 minutes. Other stations around Deadwood reported around 0.75 inches in the same period of time. The heavy rainfall caused a mudslide near the Grizzly Gulch burn area. One house was destroyed and 20 others were damaged. The hospital retaining wall was destroyed and hospital offices were damaged. Several vehicles were also damaged.

August 24, 2002 (Deadwood) A severe thunderstorm moved over Deadwood, producing locally heavy rain. This rainfall was in addition to rains received the past few days. Steep terrain, which was severely burned in a recent forest fire and had flash flooding and mudslides a few weeks earlier, experienced very rapid runoff again. Flash Flooding and mudslides sent up to three feet of water, mud, and debris through downtown Deadwood. No injuries were reported and only cosmetic damage was reported by businesses.

June 13, 2003 (Fall River County) Three to four inches of rain with training thunderstorms caused Black Banks Creek to flow out of its banks.

June 17, 2003 (Shannon County) Up to five inches of rain over White Clay Creek basin briefly closed Highway 18.

July 5, 2003 (Pennington County) Thunderstorms produced rapid runoff east of Keystone in the Battle Creek Fire burn area. Seventy-five people were stranded at Rushmore Cave as water and debris up to three feet deep flowed over the road.

August 17, 2003 (Pennington County) Radar estimated 2.5 - 4.5 inches of rain near the Battle Creek burn area, and two to three feet of water was reported over roads in Hell Canyon.

June 8, 2004 (South Central South Dakota) Eight inches of rain fell in Witten (Tripp County) flooding basements and washing out roads in Todd County.

June 20, 2004 (Keystone) Along Battle Creek, 1.5 to 2.0 inches of rain fell in an hour. The river gage at Camp Judson (JUDS2) was within a foot of flood stage. No damage reported.

July 1, 2004 (Central Lawrence County) Flash flooding occurred in Lead as two to three inches of rain fell in about an hour. Road flooding was reported in Lead with debris flowing down the streets and into storm sewers, causing damage. Some basements were flooded in low lying areas of town.

July 3, 2004 (Rapid City) One to two inches of rain fell in Rapid City in less than an hour which caused minor street flooding. Rapid Creek went out of its banks near Creek Drive in Rapid City and Meade Street flooded. No injuries or damage were reported.

July 13, 2004 (Campbell County) Severe thunderstorms developed and moved across southern parts of Campbell County. Heavy rain flooded roads in southern Campbell County including Highway 50. Hail to the size of golf balls were reported around Wright. A weak tornado briefly touched down just west of Highway 59 at Reno Junction with no injuries or damage reported.

May 6, 2005 (Southwestern SD) Up to five inches of rain fell in a 90 minute period over Beaver Creek just west of Buffalo Gap. The creek flooded Custer County Road 101 in several places and eroded the road near a large culvert making it impassable to traffic. Water height was estimated at eight feet from evidence on large cottonwood trees. The water continued downstream flooding other county roads.

May 10-14, 2005 (White River) Rain changed over to freezing rain and snow. High flows were noted on the Bad and White Rivers. The White River was out of its bank at Highway 83 south of Murdo on May 14. Minor flooding of agricultural land occurred along the White River from south of Belvidere to Oacoma.

June 12-13, 2005 (Southwestern SD) Along Hat Creek, 3.5 inches of rain caused flooding from Route 71 to the Cheyenne River. The 75-100 feet wide channel was swift and carried debris. Horsehead Creek was out of its banks and over County Highways 4 and 20, four miles southwest of Oelrichs. Water was reported running over County Highway 5A, southwest of Edgemont, and County Road 8S was washed out when Cottonwood Creek left its banks. No reports were received of injuries or fatalities.

June 24, 2005 (Rozet) Heavy rains north of Rozet resulted in the flooding of Cow Creek Road about ten miles north of Rozet for a short period of time.

July 5, 2005 (Southern Black Hills) Water from heavy rain accumulated two inches deep in the Rushmore Cave gift shop. A supercell thunderstorm moved slowly southeast across central Pennington county, central Custer County, and eastern Fall River County producing large hail and locally heavy rain.

July 23-24, 2005 (Hot Springs) One to two inches of rain fell in about an hour and flooded roads in the Hot Springs area. Many streets in downtown Hot Springs were covered with a foot of water. The Fall River overflowed the low water crossings at Sixth Street and at Joplin.

August 12, 2005 (Hot Springs) Heavy rain in a short period of time around Hot Springs caused flash flooding in Hot Springs. Many roads in downtown Hot Springs were covered with up to a foot of water and the Fall River at Hot Springs rose near bankfull for a brief time with debris in the stream bed clogging the river.

April 22-25, 2007 (Camp Crook) On April 17, severe thunderstorms produced large hail and up to two inches of rain southwest of Camp Crook. On April 17 -19, heavy snowfall resulted in two to three inches of liquid water equivalent in northeast Wyoming and extreme southeast Montana in the upper reaches of the Little Missouri River Basin. Two days after the heavy snowfall, temperatures quickly warmed into the 70s, rapidly melting the snow. On April 21, the Little Missouri River at Camp Crook, CACS2, rose quickly. Within 12 hours, the river rose eight feet. The river crested at 14.8 ft at Camp Crook on the April 22, and fell below flood stage on April 25.

May 5, 2007 (Interior) Interior, SD received 3.95 inches of rain in less than three hours causing the White River to rise five feet. Highway 44 south of Interior was covered with water due to a plugged culvert, and a county road was washed out. Damage was estimated at \$67,750.

May 5, 2007 (Campbell and Crook Counties) Two to four inches of rain fell over Campbell and Crook counties in northeastern Wyoming. Minor street flooding occurred in Gillette, and water flowed over several county roads north and east of Gillette washing out culverts. The Little Powder and Big Powder rivers both overflowed their banks. Damage was estimated at \$58,025.

June 1-2, 2007 (Sturgis and Spearfish) Several roads in Spearfish and Sturgis were closed due to flooding along Spearfish Creek, Whitewood Creek and Bear Butte Creek.

June 2, 2007 (Butte County) The Redwater River, Belle Fourche River and Hay Creek around Belle Fourche produced minor flooding. Wood Road near the Butte/Lawrence county line was closed due to water flowing over the bridge.

June 8, 2007 (Campbell County) Donkey Creek flooded the Moran Ranch Road one mile east of Gillette.

June 12, 2007 (Todd County) Flooding along Cut Meat Creek closed Highway 18 and secondary roads south and west of Parmelee near He Dog Lake. One basement was flooded in Norris.

August 17, 2007 (Hermosa) Intense thunderstorms produced up to 10.5 inches of rain west of Hermosa. An automated rain gage in Hermosa reported 0.86 inches in 15 minutes between 7:30 pm and 7:45 pm. Three rain gages reported 10 inches or more. A rain gage in Ghost Canyon reported 5.33 inches and a gage in Hermosa reported 5.5 inches of rainfall. Over 50 homes were flooded, Highway 40 and Highway 36 were damaged by flood waters and numerous roads and vehicles sustained damage.



*Damaged railroad track in Hermosa.
August 2007.*

August 17, 2007 (Piedmont) Thunderstorms brought large hail and heavy rain to the Piedmont area. The heavy rain falling on the burn scars from the Ricco, Little Elk Creek and Eastridge fires caused flash flood debris flows along Chimney Canyon, Stagebarn Canyon, and Little Elk Creek roads. At least 20 homes were flooded, portions of the railroad tracks in Piedmont were washed out and several vehicles were damaged from the flash flooding. Due to the severe hail, almost all of Piedmont's 150 residents reported some type of property damage.

May 6-11, 2008 (Northwestern South Dakota) Heavy rain falling on snow remaining from the previous week's blizzard caused flooding over northwestern South Dakota, the northern Black Hills, and northern foothills. Rainfall amounts on the plains were 0.75 to 1.0 inches with 1.0 to 2.5 inches of rain falling over the northern Black Hills. The water content of the snow was two to five inches. The Little Missouri River at Camp Crook crested at 14.11 feet (FS is 12 feet). Minor flooding occurred along the Grand, Moreau, Belle Fourche, Willow Creek, Frog Creek, Indian Creek, Sand Creek, Elk Creek, Bear Butte Creek, Spearfish Creek, False Bottom Creek, Whitewood Creek and their tributaries. Low water crossings and some side streets were flooding along Bear Butte Creek. Several secondary roads in Sturgis were closed. Streets on the east side of Spearfish were flooded; flooding was also reported at Brownsville and the Tomahawk Golf Course south of Deadwood.

May 23-24, 2008 (Northeast Wyoming) As much as four inches of rain in two days caused widespread flooding over northeastern Wyoming. The flooding washed out culverts and forced the closing of secondary roads. A few homes and basements were also flooded. Flooding was observed in Gillette, Wright, Rozet, Weston, Moorcroft, Newcastle, Clareton and Rochelle. Minor flooding was observed along Skull Creek, the Belle Fourche River, and the Little Powder River from Weston to the Montana State Line.

May 23-26, 2008 (Black Hills) Three to five inches of rain fell over the central Black Hills and eastern foothills. The water covered secondary roads and side streets, washed out several roads and culverts and flooded yards. Heavy rain caused flooding in Nisland, Vale, Belle Fourche, Spearfish, Whitewood, Tilford, Keystone, Rapid City, Rapid Valley, Hermosa, Custer and Custer State Park. Minor flooding was observed along the Belle Fourche River, Willow Creek and Dry Creek near Newell, Stinking Water Creek, Maloney Creek, Redwater River, False Bottom Creek, Whitewood Creek, Elk Creek from Tilford to the confluence of the Cheyenne River, Rapid Creek from the fairgrounds to east of Rapid Valley, Grace Coolidge Creek and Battle Creek. Elk Creek east of Piedmont crested at 11.5 ft; 2.5 ft over flood stage. Six yards and a basement along 220th St north of Box Elder were flooded as well as several basements and yards in the Golden Valley Subdivision east of Piedmont. Battle Creek at Hermosa crested at 10 ft which is two feet over flood stage.

May 23-26, 2008 (Southwest South Dakota) Heavy rain flooded several highways and secondary roads. Highway 44 south of Kadoka was flooded. Flooding was also observed along the White River, Bear-in-the-Lodge Creek, and their tributaries.

May 23-26, 2008 (Cheyenne River) Several days of heavy rain and rain runoff caused moderate flooding along the Cheyenne River from the confluence of the Belle Fourche River to Lake Oahe.

June 1-2, 2008 (Fall River and Custer Counties) Between 2.5 and 3 inches of rain fell over Sheps and Alabaugh Canyons southwest of Hot Springs. A section of Sheps Canyon Road was washed out, several culverts were damaged, and trees fell across roads near Angostura Reservoir. Significant flooding was reported near Cascade Springs. Over two inches of rain fell over central and eastern Custer County. Driveways and yards were flooded east of Hermosa along Highway 40 to the Cheyenne River.

June 4, 2008 (North Rapid City) One to two inches of rain and four inches of hail fell in less than 30 minutes, causing flash flooding on the north side of Rapid City and Country Road along the Pennington/Meade County line. Homes, highways and streets were damaged from this flash flood.

June 4-7, 2008 (Pennington and Meade Counties) Two to three inches of rain in 18 hours on saturated soils caused flooding in central and eastern Pennington County and southern Meade County on June 4. An additional one to two inches of rain on June 5 exacerbated the flooding. Houses, highways and streets were damaged by the high water and several stock dams failed. Flooding was reported in north Rapid City, Box Elder, New Underwood, Quinn, Wall, Creighton, along Elk Creek, Alkali Creek, Antelope Creek and the Belle Fourche River from east of Piedmont to Viewfield and Elm Springs.

June 5-8, 2008 (Western South Dakota) Flooding from 2.5 to 3.5 inches of rain on saturated soils damaged homes and destroyed culverts and roads. Levels along the Belle Fourche River were among the highest levels ever recorded. Flooding was observed along Redwater Creek, Redwater River, Willow Creek, Hay Creek, Indian Creek, Moreau River, Whitewood Creek, False Bottom Creek, Bear Butte Creek, Spearfish Creek and their tributaries. Several stock dams failed and the embankment next to the spillway at Newell Lake nearly eroded. Water covered Highway 85 south of Interstate 90.

June 5-12, 2008 (Northwestern and Central South Dakota) Runoff from three to seven inches of heavy rain caused flooding across northwestern and central South Dakota. Homes and roads were flooded and culverts were damaged. Record flooding was reported along the Moreau River northwest of Faith. Highway 20 west of Bison and Bixby, Cedar Canyon and Zeona Roads in southern Perkins County were covered by water. The Little Missouri River at Camp Crook crested 2 ft over flood stage. Minor flooding was reported around Camp Crook and Redig. Highway 79 was closed from Reva south to the Butte County line. A portion of Cherry Creek was inundated by flood waters. Major flooding was reported along Cherry Creek.

June 5-7, 2008 (Central and Southwestern South Dakota) Runoff from three to six inches of heavy rain flooded homes, basements, and yards. The flood waters inundated county roads and washed out culverts. The White River overflowed its banks from south of Interior to south of Belvidere and covered Highway 44. Flooding occurred in Philip and along Cottonwood Creek, the Bad River and their tributaries.

June 5-7, 2008 (South Central South Dakota) Runoff from three to five inches of heavy rain washed out culverts and county roads and flooded basements, driveways and yards. The White River in northern Tripp County crested four feet over flood stage. Minor flooding occurred around Parmelee.

June 5-9, 2008 (Cheyenne River) Record high flows along Elk Creek, Elm Springs and the Belle Fourche River combined with runoff from heavy rain to cause major flooding along the Cheyenne River from southeast of Elm Springs to Lake Oahe. The USGS river gauge on the Cheyenne River southeast of Plainview recorded a peak flow of 72,700 cfs around 2:00 am MDT June 7.

June 5-7, 2008 (Northeast Wyoming) Rainfall of 1.5 to 3.0 inches caused minor flooding along the Belle Fourche River, Oak Creek, Hay Creek and other small streams and flooded roads north of Aladdin.

July 6-7, 2008 (Rochford) Three to six inches of rain fell in two hours from O'Neil Pass to Roubaix Lake along north Rapid Creek upstream of Pactola Reservoir. Several culverts were washed out, several sections of roads were damaged and a home was flooded. The river gage on rapid Creek at Silver City above Pactola Reservoir reached the second highest flow of 1640 cfs.



Damage in Rochford, July 2008.

July 18, 2008 (Hot Springs and Fall River County) Rainfall rates of 1 to 2 inches in a half hour flooded roads and yards from Hot Springs to Cascade Falls early in the morning. Later that day, runoff from heavy rain in eastern Wyoming caused minor flooding along the Cheyenne River upstream from Angostura reservoir.

July 22, 2008 (Fall River County) Runoff from heavy rain caused flash flooding along Fiddle Creek and Cottonwood Creek six miles southwest of Edgemont.

July 22, 2008 (Northern Campbell County Wyoming) Three to six inches of rain fell from near Weston to the Wyoming/Montana border. The flash flood washed out at least one secondary road causing one fatality and three injuries.

August 10, 2008 (Custer County) Runoff from heavy rain washed out a county road between Red Canyon and Pleasant Valley Creek in Custer County.

February 10-15, 2009 (White River) Several ice jams along the White River caused flooding from one mile west of Highway 83 to the Missouri River.

March 6-7, 2009 (Belle Fourche River) Minor flooding occurred due to ice jams along Indian Creek, South Fork of the Moreau River, and on the Belle Fourche River near the diversion canal. Water was flowing over Arpan Road from Indian Creek, several yards in Belle Fourche were flooded, and pasture land along the Moreau River flooded affecting ranchers and calving operations.

March 8-20, 2009 (Northwestern South Dakota) Ice jams and snowmelt caused minor flooding in northwestern South Dakota. Several roads and culverts were damaged. Minor flooding occurred along the Little Missouri River. The river gage at Camp Crook crested at 14.84 feet or 2.84 feet above flood stage. Minor flooding occurred along the Moreau River. The river gage northwest of Faith crested at 16.37 feet or 0.37 feet above flood stage.

April 10, 2009 (White River) Melting snow combined with a half inch to an inch of rain and caused minor flooding along the White River

April 14, 2009 (Hotchkiss Dam Breach) Hotchkiss Dam on Thybo Pond in eastern Harding County caused flash flooding along Rabbit Creek downstream to Sorum Dam.

April 12-22, 2009 (Western South Dakota Flooding) Heavy snow accumulations produced by several spring blizzards across western South Dakota began to melt in early April. Extensive areas of western South Dakota experienced flooding. Homes, basements, roads and culverts were damaged in Harding, Perkins, Butte, Meade, Ziebach, Haakon, and Pennington counties from the flooding. The Little Missouri River at Camp Crook flooded at least two homes and reported record flooding. Highway 212 northwest of Belle Fourche was covered with water six inches deep.

May 24, 2009 (Rapid City) Heavy rain of two to three inches caused flash flooding along Rapid Creek from the fairgrounds east to Rapid Valley.

June 13, 2009 (Hot Springs) Runoff from two inches of rain in an hour caused flash flooding in Hot Springs. Several roads and low water crossings were flooded.

June 14, 2009 (Southern Custer County) Runoff from heavy rain washed out Dewey Road between Red Canyon Creek and Pleasant Valley Creek.

June 14-15, 2009 (Pennington and Meade Counties) Two to four inches of rain in less than two hours combined with large hail to produce flash flooding in New Underwood and in south central Meade County. Most roads were impassable for a couple of hours during the evening on June 14. Flooding continued along Elk Creek from north of Box Elder to just south of Elm Springs.

July 2-3, 2009 (Southern Fall River County) Runoff from one to three inches of rain caused minor flooding along Indian Creek and Hat Creek in southern Fall River County. Water was reported over low water crossings and some culverts were blocked. Minor flooding of agricultural land and low lying fields were also observed.



Flash Flooding in Southern Meade County, June 14, 2009.

March 4-14, 2010 (White River Flooding) Ice break-up and several ice jams caused flooding along the White River from south of Interior to the Missouri River. Flood waters south of Interior reached the shoulder of Highway 44. Between Murdo and White River along Highway 83, the river was reported to be a half mile wide. South of Reliance at OACS2, the gage height reached 23.4 feet (flood stage is 15 feet) which was one of the highest crests of record.

May 18, 2010 (Crook County) At least four inches of rain in less than three hours caused flash flooding along Oak Creek, Hay Creek and Beaver Creek in northeastern Crook County. Oak Creek Road and Mona Road were severely damaged. At one crossing, during the worst part of the flooding, the water was at least three feet above the road and was over 40 feet deep. There was a lot of debris and the water cut away at the road base at all of the culverts in the area.

May 24, 2010 (Pennington, Meade, Custer, and Fall River) A strong upper level wave combined with ample moisture to produce strong thunderstorms along the eastern and southern slopes of the Black Hills. Strong thunderstorms moved over the same areas for about three hours. Torrential rain of two to four inches fell in a brief period of time. This heavy rain caused flooding from Piedmont, SD southward to the Nebraska border.

June 16, 2010 (Dupree) During the evening, four to seven inches of rain fell around Dupree, SD. Flash flooding occurred in Dupree and along Bear Creek, Ash Creek, and along the Moreau River. Several homes flooded from the heavy rain and several sections of Highway 212 were covered with water at least a foot deep.

June 19-20, 2010 (Custer and Fall River Counties) Heavy rain over the southern Black Hills caused flooding in Wind Cave National Park and along Lame Johnny and Beaver Creeks. Water was reported over Custer County 101 between Highway 385 and Highway 79 and over Beaver Creek Road south of Buffalo Gap.

June 22-23, 2010 (Perkins County) Rainfall of two to four inches washed gravel off county roads, caused road damage near culverts, washed out a crossing, and damaged the shoulder on Bixby Road near Deep Creek.

August 3, 2010 (Lead and Deadwood) A strong upper level disturbance combined with excessive moisture causing flash flooding. Four to five inches of rain fell in two hours causing widespread street flooding in Lead and Deadwood. Water was swiftly flowing down Main Street and Sherman Street in Deadwood at a depth of six to twelve inches. In Deadwood a city parking garage was flooded, as well as several cars, basements and businesses. The Iron Horse Inn Pub was flooded with hail and water about three and a half feet deep.

February 13-17, 2011 (Shannon and Bennett Counties)

Snowmelt and ice jams caused flooding along White Clay Creek, Wounded Knee Creek, and Porcupine Creek in Shannon County. Several unnamed BIA roads were flooded and six inches of water was reported over a section of Highway 18 about five miles east of Oglala at White Clay Creek. In Bennett County, Spring Creek, Bear Creek, and Bear in the Lodge Creek caused flooding across a few county roads due to overwhelmed culverts.



*Calico Creek east of Oglala,
February 14, 2011*

(photo courtesy of Emergency Management).

February 15-March 4, 2011 (White River)

An ice jam formed about two miles upstream from the Highway 44 Bridge near Interior. The ice was six to eight inches thick and caused flooding of pasture land near the river. Downstream the ice jam caused minor to moderate flooding at the White River near the Highway 83 Bridge south of Murdo and at the Highway 47 Bridge south of Reliance. Ice jam flooding continued along the White River near Oacoma into early March. Minor flooding occurred, but cold air moved back into the area, allowing the flooding to subside by March 4.

March 12-March 17, 2011 (Belle Fourche River)

Two ice jams were reported on the Belle Fourche River. The first ice jam was located at the Highway 34 Bridge about 20 miles east of Sturgis. This ice jam caused minor flooding along the river from about five miles upstream to about ten miles downstream as the water backed up behind the jam, released and reformed downstream. The second ice jam was located in eastern Meade County near the confluence of the Belle Fourche and Cheyenne Rivers. Several feet of water backed up behind this jam and caused minor flooding.

March 11-March 17, 2011 (Cheyenne River)

Several ice jams were located along the Cheyenne River. A ranch in Meade County was surrounded by water due to an ice jam along the Meade/Pennington County line. Another ice jam was reported downstream near the Highway 34/73 Bridge. This ice jam, and possibly others, caused moderate flooding from the Highway 34/73 Bridge upstream on the Cheyenne River to the confluence of the Belle Fourche River.



*Cheyenne River Flooding,
March 12, 2011*

(photo courtesy of Todd Trask).

March 13-March 18, 2011 (White River)

Flooding was reported near Interior to the confluence with the Missouri River. Several ice jams formed, released and redeveloped. At least three homes were reported to be surrounded by water. One home was located south of the Badlands, another was south of Belvidere and another was near the Highway 47 Bridge. Several other homes and ranches may have been impacted, but the NWS did not receive any other damage reports.

March 16-March 23, 2011 (Little Missouri River)

On the Little Missouri River, flooding of agricultural land was reported extending from the Montana Border to Camp Crook. Also an ice jam south of the North Dakota/South Dakota Border caused flooding of a County Road west of Ladner along the Little Missouri River as well.

March 16-March 22, 2011 (Perkins, Ziebach and northeastern Butte Counties) Flooding was reported on Rabbit Creek, the Moreau River, Thunder Butte Creek and the Grand River. Eight to ten roads were closed in Perkins and Ziebach Counties due to the flooding. Releases from Shadehill Reservoir peaked at 3,500 cfs around March 21st. On March 22, flooding on most of the creeks and streams subsided. However, a few crossings downstream from Shadehill remained flooded due to releases from Shadehill Reservoir.

May 9, 2011 (Newcastle) Three to four inches of rain and hail fell in a little over an hour. This rain and hail caused flooding that overwhelmed the drainage system and caused significant damage. Damage from the flooding was mainly water in basement and washed out driveways, however some infrastructure damage (foot bridges) in a local park also occurred.

May 20-May 31, 2011 (Northwestern South Dakota and Northeastern Wyoming) During the middle of May several, slow-moving, upper level disturbances moved through the area. These disturbances produced very heavy rainfall that caused flooding and flash flooding. Flooding was reported along the Belle Fourche River, Cheyenne River, Grand River, Elk Creek, Horse Creek, Rapid Creek, Horse Creek and Battle Creek. Counties with flooding included Crook and Weston Counties in northeastern Wyoming and Harding, Butte, Lawrence, Meade, Pennington, Custer, Fall River, Perkins, Haakon, Ziebach, and Jackson Counties in western South Dakota.



*Flooding in Hulett, May 21, 2011
(photo courtesy of Emergency Management).*

Several counties in western South Dakota experienced significant flooding, especially Butte County, which had a no unnecessary travel advisory in affect for several days. The Little Missouri River at Camp Crook crested at a new record gage height of 19.27 ft and 19,400 cfs on May 24. The previous record was 17.67 ft and 12,400 cfs in 2009. According to residents, water was in homes that were built before 1900 that have never had water in them before. Also the water threatened Highway 20 between Camp Crook and Buffalo.

May 24, 2011 (Upton) Heavy rain caused flash flooding in Upton. Water was reported flowing down Main Street and Highway 16 due to runoff from the heavy rain. The official rainfall amount in Upton was 1.79 inches, but most of this rain fell in about an hour.

June 16, 2011 (St. Francis) A slow moving thunderstorm during the evening produced 2.4 inches of rain southeast of St. Francis. Runoff from this heavy rain damaged roads and left fence posts hanging in the air.

June 20-21, 2011 (South Central South Dakota) Precipitation amounts up to five inches were reported that flooded some basements in homes. Many secondary roads in in Todd, Tripp, Mellette, Bennett and Jackson Counties had washouts due to flooding as well as water flowing over the roads.

June 24-26, 2011 (Western South Dakota) Significant flooding occurred due to runoff from heavy rain. One complex of storms washed out roads and flooded ranches in the Midland area of central South Dakota. This storm also caused flooding on Ash Creek and Brave Bull Creek and caused a stock dam to fail and flood Highway 63 for up to 300 ft. The excessive rainfall and runoff also caused flash flooding in south central Meade County where a few County Roads were flooded and gravel was washed off roads in spots. In Hot Springs, the dip bridge at South 6th Street quickly flooded for fifteen minutes. In Rapid City, several streets had water running across them as the hail and rain overwhelmed the storm drains.

July 1, 2011 (Belle Fourche) Street flooding occurred due to runoff from heavy rainfall.

July 7, 2011 (Perkins County) During the morning hours, one to three inches of rain fell in less than an hour over southern Perkins County. Runoff from heavy rainfall caused gravel and debris to be washed over Moreau River Road about five miles west northwest of Bixby. Brushy Creek and other small creeks and streams also had minor flooding.

July 18, 2011 (Buffalo) Afternoon thunderstorms with heavy rain caused street flooding in Buffalo.

July 22, 2011 (Western South Dakota) An area of low pressure pushed through western South Dakota. Ahead of this system, abundant moisture was in place. A few of the stronger afternoon and evening thunderstorms produced flooding. Street flooding was reported in Rosebud, Faith, and Buffalo when one to two inches of rain fell in 30 minutes. In Harding County, runoff from heavy rain caused rural roads along Highway 85 north of Buffalo to become quickly inundated with water. Several roads, culverts and driveways were damaged by the flooding.

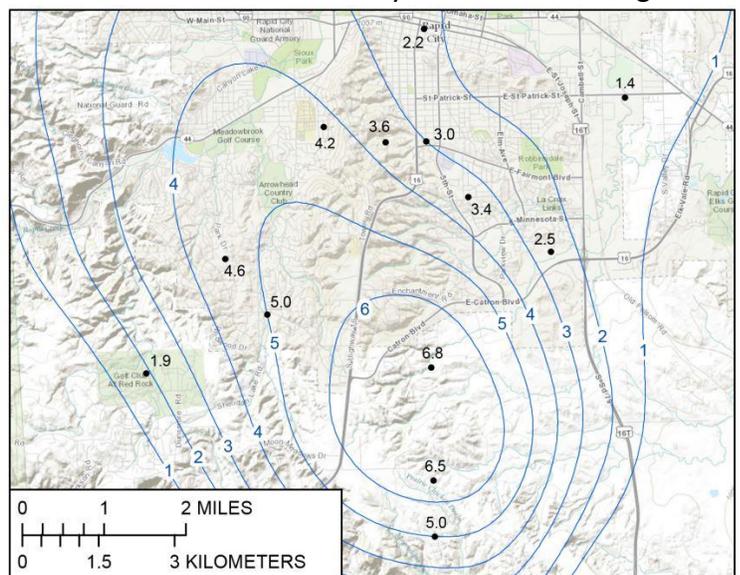
July 5, 2012 (Fall River County) Slow moving thunderstorms with heavy rain and strong winds moved across the White Draw Fire Burn area northeast of Edgemont. Water containing silt and debris was reported flowing over a few gravel road and fire lines, with minor surface erosion caused by the runoff. Dry drainage areas quickly filled with flowing water 1 to 2 feet deep.

July 17, 2012 (Weston County) Flash flooding occurred in Black Canyon located within the Oil Creek Fire Burn Area northwest of Newcastle, WY. Runoff from $\frac{3}{4}$ " of rain in 20 minutes caused debris to be carried several miles down the canyon. Debris covered Seeley Road in numerous locations, corrals at the Seeley Ranch were destroyed, and three stock ponds were completely silted in due to the flash flood debris flows.

May 18, 2013 (Ziebach and Haakon County) Slow moving thunderstorms with heavy rain caused water to flow over roads and flood pastures in central South Dakota. Three to five inches of rain fell in less than two hours causing several small streams and creeks to quickly overflow their banks. Dry drainage areas quickly filled with flowing water one to two feet deep.

May 26, 2013 (Campbell County) Thunderstorms with heavy rainfall of two to four inches caused flash flooding northwest of Gillette. Runoff from the heavy rain created ponding of water along the Burlington Northern Santa Fe Railway Lines about ten miles north northwest of Gillette. County roads were damaged when one-foot ruts were cut in the gravel roads.

May 29-30, 2013 (Flash Flooding along the eastern Black Hills) Thunderstorms developed along the east side of the Black Hills from Nisland to Sturgis to Rapid City. As these storms moved toward the northwest, they quickly redeveloped and became anchored over the eastern foothills. Rainfall amounts over six inches fell within a few hours. Flash flooding was reported in Rapid City, Sturgis, and rural areas of Butte, Meade and Pennington counties. Runoff from the rainfall quickly inundated city streets, overflowed small creeks, and caused a few private stock dams to breach. Flooded rivers included Horse Creek,



Base from U.S. Geological Survey 1:250,000 map sheet

Isohyetal map of storm event of May 29, 2013 in southwest Rapid City. All data in inches reported for the 24-hour period ending on May 30th. The greatest rainfall intensity occurred in the early evening of May 29th. Precipitation data provided by the National Weather Service and the U.S. Geological Survey.

Indian Creek, Rapid Creek, Willow Creek, Whitewood Creek and the Belle Fourche River. The Bismark Bridge over the Belle Fourche River east of Vale had two feet of water over it. Around Rapid City, flooding was reported along Sheridan Lake Road in the Spring Brook Acres area; Fifth Street was flooded south of Minnesota St and south of Catron Blvd; Arrowhead and Meadowbrook Golf Courses were flooded with a cart bridge destroyed; water was up to three feet deep against Meadowbrook School; and a few structures along Rapid Creek were flooded near South Valley Drive.

May 31 – June 3, 2013 (Bear Lodge and northern Black Hills) A large upper level low pressure system brought very heavy rainfall to the Bear Lodge Mountains and northern Black Hills. Embedded thunderstorms with rainfall amounts around four to five inches fell within 24 hours. Runoff from this heavy rain caused flooding along the Belle Fourche River, Crow Creek, False Bottom Creek, Redwater River, Spearfish Creek, and other smaller creeks and streams. Culverts were damaged and several county roads were washed out including Red Hill Road near exit 2 at Crow Creek, Sanford Road into Beulah, and Homestake Road at Bear Creek Bridge. The Belle Fourche River near Alva reached a stage of 7.5 ft, which is 3 ft over flood stage and minor flooding was reported in Spearfish Park.

June 21, 2013 (Flash Flood in Oil Creek Fire Scar, Weston County) Flash flooding and debris flows occurred after a half inch to an inch of rain fell in less than an hour over the Plum Creek drainage in the Oil Creek Fire Scar area. West Plum Creek, which is normally dry, suddenly was flowing eight feet deep and 30 feet wide. Plum Creek Road, Big Plum Road, and Oil Creek Road were damaged when water and debris flowed over the roads.

July 8, 2013 (Southwest South Dakota) Flash flooding and debris flows occurred after two to five inches of rain fell in about two hours across southern Custer County during the early morning hours. Runoff from heavy rainfall caused flooding of Cold Brook Creek above Cold Brook Reservoir and Cottonwood Springs Creek above Cottonwood Reservoir. Debris flowing down Cold Brook Creek piled up in the channel along Argyle Road causing water to flow over Argyle Road. The debris filled five dump trucks when it was removed. Along Cottonwood Springs Creek, water created a 12-foot wide channel into Cottonwood Reservoir and washed gravel off rural roads.

July 14-15, 2013 (Tripp County) Runoff from three to six inches of rain in a few hours caused flooding in western Tripp County. Highway 44 was flooded in six locations and numerous county roads were damaged.

July 28, 2013 (Weston County) Runoff from three to six inches of rain caused localized flash flooding in southern Weston County along Lion Creek. This flash flood washed away two pole barns and their contents, the contents of a nearby shop, and collapsed the foundation of a ranch house. Lynch Road was overtopped at Lion Creek, damaging the culvert and downstream side of the road.



Flooding on Pahapesto Rd in Tripp County, July 15, 2013 (photo courtesy of Tripp County).

July 30-31, 2013 (Rosebud Reservation) The failure of Omaha Boy Dam, debris flows from the 2012 Longhorn Fire Complex, and runoff from heavy rain caused flash flooding on the Rosebud Reservation. Debris clogged the outlet works at Ghost Hawk Dam and Rosebud Dam causing the dams to overflow with water. In addition, a breach at Omaha Boy Dam, located about a mile southwest of Rosebud Dam, caused increased inflows into the lake and additional flooding. Several culverts and roads were damaged by the flooding, including Ghost Hawk Road and Grass Mountain Road. The Little White River near Rosebud went from less than 100 cfs to over 1000 cfs in less than four hours, with a peak flow of 1300 cfs.

August 1, 2013 (Wright) Golf ball sized hail and runoff from heavy rain caused flooding of low lying areas in and around Wright, Wyoming. Drainage systems plugged with hail caused flooding of roadways, yards, and basements. The dam on Panther Pond was overtopped; the Wright Golf Course was flooded; and some road, including Wright Blvd and rural roads on the south side of Wright, were covered with two feet of water.

August 3, 2013 (Campbell County) Heavy rainfall of three to five inches fell in a few hours caused minor flooding along rural roads in northern Campbell County. Hail drifts and water covered portions of Sam Adam Road and Broyles Road when drainage culverts were quickly overwhelmed from the excessive runoff. Nearly dry stock ponds quickly filled from the runoff.

August 5-6, 2013 (Rapid City) Two to three inches of rain fell in less than an hour near the Rushmore Mall in Rapid City just before midnight on August 5. Runoff from the heavy rainfall caused minor flooding at maple and Disk Drives and washed a car into a ditch. At the intersection of Crestwood and Racine, rapidly rising water flooded adjacent backyards and basements. In Rapid City near the fairgrounds, Rapid Creek was a foot from exceeding its banks. The water quickly receded, within twenty minutes at most locations.

August 7, 2013 (Fall River and Weston Counties) Runoff from heavy rain, two to three inches in less than an hour, caused flash flooding in eastern Weston County and northern Fall River County. In Fall River County, flooding was reported in Hot Springs, around Cold Brook Reservoir, and in the Minnekahta Valley area. Six inches of water was flowing down Highway 18 and water was over the curbs on a couple of streets in Hot Springs. Minor flooding occurred in Hot Brook Canyon along Hot Brook Creek. Cold Brook Reservoir reached its second highest pool level to date at 3585.42 ft. In Weston County, flooding was reported along Skull Creek Road, Oil Creek Road, Green Mountain Road, and Purvis Road. On the north side of Highway 16 west of Newcastle, ponding water was close to overflowing the highway. North of Four Corners, 1.5 inches of rain fell in 20 minutes.

August 9-10, 2013 (Campbell County) Porcupine Creek, Spring Creek, and their tributaries flooded Highway 59 in spots for nine miles as runoff from heavy rainfall overwhelmed culverts and caused flooding in southern Campbell County. Highway 59 had to be closed from seven miles south of Wright to the Converse County line due to flooding.

August 13, 2013 (Southern South Dakota Heavy Rain) A large area of heavy rainfall fell across portions of southern South Dakota. Rainfall estimates of two to three inches fell in two hours, with some locations receiving an inch in a half hour. Runoff from this rainfall caused ponding of water, minor flooding of low-lying areas, and small creeks to overflow their banks. Runoff from 2.15 inches of rain south southeast of Kadoka caused minor flooding along Pass Creek in Jackson County. In Fall River County, three miles north northwest of Hot Springs, 0.93 inches of rain fell in 30 minutes, with $\frac{3}{4}$ inch in 15 minutes. The heavy rain caused water to briefly run over the two low water crossings in Hot Springs. Cold Brook Creek backed up behind Argyle Road and covered the Campground Road with a few inches of water at Cold Brook Reservoir.

August 27-28, 2013 (Perkins/Ziebach County) Flash flooding and flooding occurred during the evening of August 27 and continued through the morning of August 28 after three to six inches of rain fell over central Perkins and northern Ziebach Counties. Flash flooding was reported along Thunder Butte Creek, Hart Creek, Twin Butte Creek, Worthless Creek, Beaver Trap Creek, and their tributaries. Rural roads were flooded when culverts were quickly overwhelmed from the excessive runoff.

August 30, 2013 (Rapid City) Runoff from over an inch of rain in less than an hour from slow moving thunderstorms caused street flooding in Rapid City. Rapid Creek quickly rose into the greenway through town. Most roads from West Blvd. to Mt. View were flooded from curb to curb and several other roads and intersections were flooded including Soo San Drive and the intersection of West Blvd. at St. Joseph Street.

September 7-8, 2013 (Northwestern South Dakota) Slow moving thunderstorms over northwestern South Dakota produced significant rainfall amounts of two to six inches within a few hours. Runoff from this heavy rain caused flash flooding along the Grand River and its smaller tributaries. Several roads were inundated when culverts were overwhelmed or damaged from the significant runoff. Water inundated most roads, driveways, and fields in northeastern Harding and northern Perkins Counties. Localized street flooding was reported in Lemon. Five to six inches of rain was reported west of Lodgepole, five inches northeast of Ralph, 3.7 inches in Ludlow, three to five inches around Bison and Shadehill Reservoir, and two to three inches around Lemmon. Shadehill Reservoir rose over 2.5 feet from September 8-14 from the excessive runoff.

October 11-17, 2013 (Western South Dakota) Heavy rain fell on melting snow remaining from the October 4-5 blizzard causing flooding over portions of western South Dakota. Liquid equivalent precipitation amounts over four inches were common over the northern and central Black Hills and eastern slopes from the blizzard, with additional rainfall of two to three inches on October 10-11. In Keystone, law enforcement reported water over the road at several locations along Winter Street and Highway 16A. Battle Creek in Keystone mainly remained within its banks; however, Grizzly Bear Creek overflowed its banks in several locations. Flows in Grizzly Bear Creek were estimated around 500 cfs with around 1300 cfs estimated in Battle Creek. Normal flows for Battle Creek and Grizzly Bear Creek during October is less than 5 cfs.



Flooding of several rural roads and agricultural land occurred due to runoff from heavy rain combined with melting snow. (Harding, Perkins, Butte, Meade, Ziebach, Lawrence, Pennington, Haakon, Jackson, Custer, Fall River, Shannon, Bennett counties). Small streams and creeks quickly overflowed their banks. Normally dry creeks quickly inundated culverts and caused flooding. (Harding, Perkins, Butte, Meade, Ziebach, Lawrence, Pennington, Haakon, Jackson, Custer, Fall River, Shannon, Bennett counties). The duration of the flooding was exasperated by an additional storm system on Sunday October 13th through Tuesday October 15th which brought an additional one to two inches of precipitation.