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Natural Resources Conservation Service

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April 2012

USDA Natural Resources Conservation Service Responds to 2011 Montana Floods

Record Rain and Snow Causes Flooding Across Montana

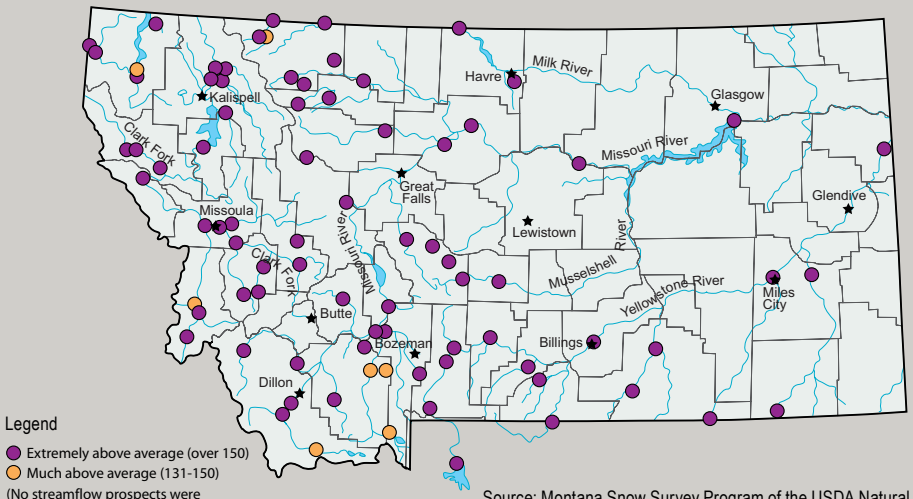
In 2011, Montana experienced floods of a magnitude rarely experienced in a state that more generally suffers from drought than flood. Three storm systems moved across the state dumping an extraordinary amount of precipitation. These systems moved through eastern Montana during May and through southwestern Montana in June. Snow in the eastern plains and saturated soils contributed to the increased runoff that occurred after the storms. Flooding continued into June because of snowmelt, ice jams, and reservoirs being unable to hold any more water.

Record snowfall also contributed to the problem. The USDA Natural Resources Conservation Service (NRCS) issued its final 2011 snowpack report for Montana on June 1, 2011, indicating that river basins across the state had snowpack from 167 to 386 percent of average. NRCS' streamflow forecasts reflected the above average snowpack with forecasts from 149 to 251 percent of average for the state's river basins.

As rain fell and snow melted, many rivers across central Montana swelled beyond their banks. The Musselshell River crested at 14.75 feet on May 26, which surpassed the previous record of 12.9 feet set in 1975, according to the National Climate Data Center (NCDC). The Yellowstone River crested at its third-highest level on record in Billings, Forsyth, and Miles City. Some locations across south central Montana received nearly a foot of rain during the same period. Numerous roads and bridges were closed or washed out, and stretches of Interstate Highway 90 were closed.

On June 17, 2011, a presidential disaster was declared for 31 of Montana's 56 counties and four of its seven reservations. At that time, the governor's office estimated damage to public infrastructure had reached $8.6 million.

Streamflow Prospects for Montana June 1, 2011



Source: Montana Snow Survey Program of the USDA Natural Resources Conservation Service. June 1, 2011.

NRCS Provides Emergency Response

NRCS in Montana offered immediate assistance through its Emergency Watershed Protection (EWP) program, focusing first on irrigation repairs so water would be available for the 2011 irrigation season. NRCS completed its first project on the Huntley Project Irrigation District by July 1.

Huntley Farmers Receive Water One Month after Damaging Flood

Only a month after spring floods ravaged the Huntley Irrigation Canal and shut off irrigation, over 30,000 acres of crops were receiving water. According to Huntley Project Irrigation District Manager Dale Bilyeu, about $17 million of barley, corn and sugar beets crops would have gone dry and failed to produce. Hay ground and cattle pasture would have suffered as well.

June floods washed out both sides of the irrigation canal, causing sediment-laden Pryor Creek and canal water to rush into the Yellowstone River. Flooding also threatened a highway bridge between Huntley and Interstate 90.

NRCS signed a project agreement with the Huntley Project Irrigation District to provide $282,000 in Emergency Watershed Project (EWP) funds for repairs. The Huntley Project Irrigation District provided the remaining $78,000 needed for the project.

"The completion of this project helped avoid catastrophic crop failure and also helped to protect the town of Huntley," said Nick Vira, NRCS district conservationist in Billings. "The project made economic sense when you consider that for every dollar of crop produced, three dollars comes back to the community."

The repairs included reestablishing the canal section, returning Pryor Creek to its channel, establishing erosion control measures and stabilizing the irrigation canal conduit. In short time, much-needed irrigation water was flowing to crops.

"If it hadn't been for NRCS, we'd still be waiting for repairs," Bilyeu said. "It's great how fast the engineers showed up and how quickly the project was completed."

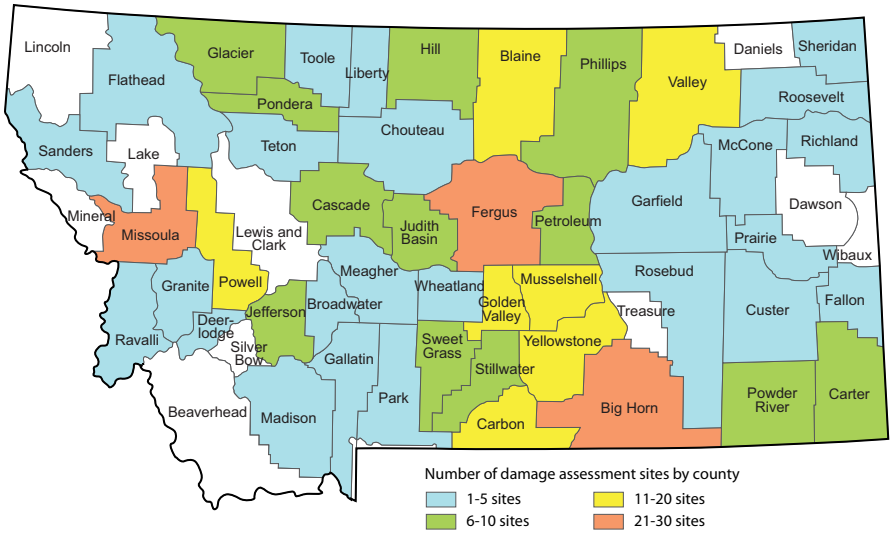
Record high flows in early June washed out irrigation infrastructure and diverted Pryor Creek and Huntley Project Irrigation District canal water into the Yellowstone River.

Dale Bilyeu, left, manager for the Huntley Irrigation Project, and Nick Vira, NRCS district conservationist in Billings, visit while overlooking the repaired Pryor Creek channel.

Emergency Watershed Protection

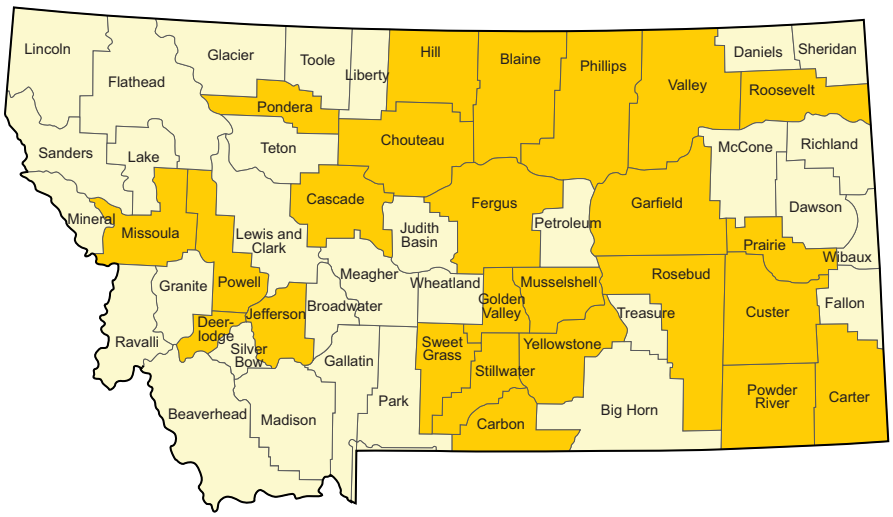
NRCS provided $5.1 million to assist Montana sponsors with flood recovery projects through its Emergency Watershed Protection (EWP) program. NRCS assessed 340 requests for assistance in 46 counties; 62 projects were deemed program-eligible and received funding. Projects include stream bank protection for roads, bridge abutments, and houses; repairs to irrigation diversions and canals; clearing fallen trees and removing sediment to restore the hydraulic capacity in channels and road crossings; and relocation of a house, rural water pipeline, municipal sewage lagoon, and four livestock feedlots.

Emergency Watershed Protection (EWP) Damage Assessments Fiscal Year 2011



Source: Montana NRCS SharePoint EWP spreadsheet. February 16, 2012.

Counties with Emergency Watershed Protection (EWP) Projects Funded Fiscal Year 2011



Source: Montana NRCS SharePoint EWP spreadsheet. February 16, 2012.

The Emergency Watershed Protection program provides assistance to sponsors in areas that have been damaged by natural disasters, such as floods. The program safeguards lives and property by installing conservation measures to reduce storm water runoff and prevent soil erosion. Eligible practices include removal of sediment and debris in channels to restore hydraulic capacity; repair of irrigation canal or drainage ditch embankments; measures that prevent massive soil erosion, landslides, or excessive runoff; removal of structures and obstructions that impede or impair the floodplain; disposal of animal carcasses if they pose a public health hazard or could impede channels; and measures to prevent damage to public and private roads, culverts, and bridges when failure of those facilities would impair the watershed.

Lions Club Campground Inundated with Runoff

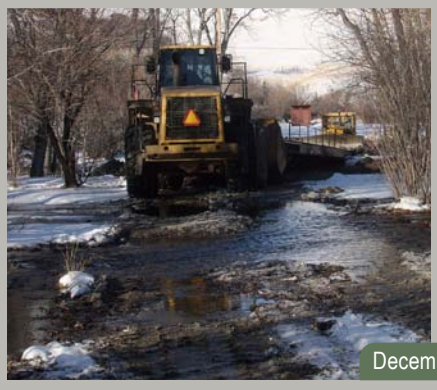
Left: Flooded road and bridge filled with debris block entry to the campground. Above: Floodwaters cut through the Lions Club Campground, uprooting trees.

The Lions Club Campground near Havre was inundated with flood waters in the spring of 2011, depositing sediment within the Beaver Creek channel upstream of the campground bridge. The resulting braided channel threatened the bridge and made the site inaccessible. The original stream location was restored by excavating a bank full channel at the original channel site, and the floodplain was stabilized with transplanted willows, logs, and boulders. Construction was completed in December 2011.

NRCS was able to help with this project through engineering assistance and financial assistance totaling $14,775. This project prevented an estimated $50,000 loss to Hill County and made this popular campground available again. "[It is] not a huge job, but something needed to be done," said Leon LaSalle, NRCS technician, Havre.

An excavator removes gravel deposits from a Beaver Creek stream channel that caused the stream to form a new channel through the Lions Club recreation area.

Cottonwood trunks and boulders were installed to stabilize the banks of Beaver Creek and prevent the stream from accessing the wrong channel.



The bridge, identified as an obstruction that caused a great deal of debris to be deposited, is removed from the creek channel.

A cottonwood trunk used to stabilize a Beaver Creek stream bank is still visible when the project is completed.

NRCS Funds House Move Off Eroded Banks of Yellowstone River

When high rainfall and record amounts of snowmelt started sending water down Montana's Yellowstone River in the summer of 2011, flooding and erosion threatened to wash Greg Piper's house into the river.

"We were measuring erosion everyday; losing as much as 15 feet of land per day," said Greg Piper, homeowner in Stillwater County. "It's hard to get a grasp of what it was. The island in the middle of the river didn't exist. My property ended there, but now it's all river."

While Piper took measures on his own to stabilize the eroding banks, he knew his problem was bigger than one person could fix alone. "Mr. Piper came in the office and was heartsick because his house was in real danger," said Phil Sandoval, district conservationist for the USDA Natural Resources Conservation Service (NRCS). "He was just trying to find anyone who could help him."

Turns out, he went to the right place. Sandoval told him about an NRCS program that might be able to help him. The Emergency Watershed Protection (EWP) program is designed to help a project sponsor prevent immediate threats to life and property created by a natural disaster.

That's when the Stillwater Conservation District stepped in to become a project sponsor. In lieu of placing rock riprap along the river, the conservation district chose to move the house farther from the river banks to reduce the threat to its stability. While EWP does not traditionally allow the movement of structures as part of disaster recovery, NRCS received a program policy waiver, as moving the house was the most economically and environmentally beneficial approach.

"We agreed to serve as a sponsor if we could find a viable solution" said Kenneth Kem, Stillwater Conservation District urban supervisor. "We knew a river armor solution was not going to work. Riprap was going to cost about $400,000, and we didn't want to sponsor a riprap project. Long-term management of this is a much better solution."

With that thinking, the Stillwater Conservation District placed a deed restriction on the property so that the same land would not be developed again. "The deed restriction will prevent anyone from building on it again and be in danger of river flooding," said Barbara Berry, Stillwater Conservation District administrator.

While Piper cannot get his land that washed into the Yellowstone River back, his house is safe from the next flood. NRCS provided $106,000 through EWP to move the house approximately 1,000 feet from its original location, moving it out of the river migration area.

"What the public got for its money was a deed that another structure would not go back on the bank of the Yellowstone River," said Steve Becker, NRCS state engineer for Montana. "This will prevent further development in this part of the flood migration area and was the best option to protect his house in the future."

With his house situated in a new spot, Piper can still see the river that very nearly took his house. "People ask me how it felt; I can't even describe the anguish at watching my property wash away," he said. "But I am extremely grateful for all of the help. I know it's been a lot of work for everyone, and I truly appreciate it."

Greg Piper's barn located on the banks of the Yellowstone River was undercut by erosion caused by flood water and could not be saved. His driveway (forefront) was also completely washed away by flood water.

The Piper house was lifted from its foundation and placed on a trailer (above) to be moved to its new location and situated on its new foundation away from the Yellowstone River (below).

NRCS Assistance Used to Protect Wolf Point Lagoon

Missouri River floodwaters significantly eroded the banks endangering a sewage lagoon and a concrete storm drain spout.

The new dike is set back 400 feet from the Missouri River to protect it from future flood water. The portion of the lagoon in the foreground is no longer part of the sewage treatment system.

Heavy equipment was used to excavate a trench and install the core of the new dike.

NRCS began working with Wolf Point town officials in July 2011 to protect the town's sewage lagoon from Missouri river flood waters. Protecting the lagoon involved moving it 400 feet away from the Missouri River and reinstalling a storm drain that emptied into the river. For the project, NRCS provided engineering assistance in developing new plans for the lagoon and performing on-the-job inspections, as well as $169,840 in financial assistance.

Through these efforts, Wolf Point's sewage lagoon was saved from flood waters approaching the levee, preventing a potential $260,000 loss. Repairs included installing a new dike and filling the lagoon portions outside of the dike.

This Roosevelt County project was completed in December 2011. Wolf Point town officials are thankful for the assistance, as the lagoon serves approximately 3,500 people. If flood waters and erosion had caused the finishing pond to fail, town officials would have had to take the costly measure of shutting down the sewage treatment facility. "[It was] great for NRCS to give a helping hand in this project," said Rick Isle, the town's public works director.

The old storm drain is getting new rock skirting to protect it from future flood events.

The finishing touches are put on the new dike as an excavator pulls dirt back over the dike's protective rock skirting.

Yellowstone Floodwaters Endanger Huntley Infrastructure

Flood waters surging down the Yellowstone River eroded banks and began to endanger Nahmis Avenue, the Yellowstone Valley Electric Cooperative shop and substation, and a restaurant near Huntley in 2011. NRCS assisted Yellowstone County in its efforts to protect the structures by providing designs, construction inspection, and financial assistance for a project with a total cost of $633,000. NRCS engineers designed 1,620 feet of bank shaping and rock riprap to protect river banks from additional erosion.

The stretch of the Yellowstone River immediately upstream of this project was armored twice in the past with emergency funds from NRCS; the first armament occurred in 1978, and the second in the late 1990s. Construction of the current project began on Dec. 5, 2011, and was finished on Dec. 23. "[NRCS is] a very efficient government entity," said Tim Miller, Yellowstone County's Public works director. "They saved us a lot of time and money." This was the first time Miller worked with NRCS.

The Yellowstone River is actively eroding the north river bank near Huntley enough to tear down cottonwoods and endanger local infrastructure.

Left: Engineering staff checks over the bank shaping and rock riprap work done on the banks of the Yellowstone River near Huntley. After the banks have been reshaped, a gravel "filter" layer is installed before the large rocks are put on top to prevent bank sediments from moving through gaps in the larger rocks. Right: Additional rock riprap was installed around the southern end of the repair project to ensure that future flood events won't erode behind the rock riprap and destroy the 2011 repairs.

Environmental Quality Incentives Program

Cover Crops Rebuild Soils After Floods

As soon as floodwaters began to recede, NRCS offered landowners an incentive through the Environmental Quality Incentives Program to plant a cover crop where wet conditions prevented planting of spring crops. Instead of leaving fields bare, producers could enroll acres in the Soil Health, Erosion, and Weed Prevention Special Initiative to plant cover crops to reduce erosion, increase soil health, provide cover and food for many wildlife species, and provide forage for livestock.

Kate Norvell, left, NRCS agronomist, and Ty Checketts, right, landowner near Melstone, worked together to decide on a diverse cover crop mix of legumes and grasses for Checketts to plant on fields eroded by spring floods. The cover crops will reduce erosion, increase soil health, and provide food and cover for wildlife.

Ty Checketts was one of 49 landowners who took advantage of the incentive. NRCS obligated $162,000 to cover 9,900 acres.

Spring flooding of Montana's Musselshell River wiped out irrigation canals, fences and acreage on Checketts' farm near Melstone and scoured some of his hay fields of topsoil and organic matter. He was able to irrigate, and he'll fix the fences over time, but immediately, he needed to stabilize soils. Checketts planted a diverse cover crop mix of legumes and grasses on 110 acres. The mix stabilized the soil and added organic matter. "I really like the idea of using crops to put nutrients back in the soil," Checketts says. "I've been hearing about the benefits of these cocktail mixes that need less tillage, pesticides, fertilizers and water."

Cottonwood Regeneration Will Protect Montana's River and Stream Corridors

An intriguing natural repair appeared on river and stream bottoms everywhere there was high water in 2011. Cottonwood tree seedlings emerged from new sediment deposits and bared-off hay and crop fields to carpet large acreages along the Missouri, Musselshell, Yellowstone and other river floodplains.

Joyce Swartzendruber, NRCS state conservationist for Montana, wrote an editorial that appeared in newspapers across the state, encouraging landowners to consider the trees' potential to buffer damage from future large floods and give the watershed resilience.

To help landowners "bank" a good share of last year's flood-induced cottonwood crop, NRCS offered an incentive through the Environmental Quality Incentives Program for cottonwood regrowth and riparian area management. Eighteen producers requested $300,000 to regenerate cottonwood trees on 3,450 acres. Another four landowners applied to place land substantially altered by flooding into Wetlands Reserve Program easements, requesting $655,000. These new forested riparian areas will become the defense against riverbank erosion the next time these areas flood.

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Source of Program Data:
USDA, NRCS, Montana
Protracts Database (4/23/12)

Recovery Continues into 2012

NRCS set aside $5 million in its Environmental Quality Incentives Program for agricultural producers in Montana who had land or other qualifying agricultural structures damaged in 2011 by a natural disaster. NRCS received 113 applications for natural disaster assistance.

"While NRCS provided immediate response following last year's flooding, many projects didn't qualify for funding under our emergency criteria," said Joyce Swartzendruber, NRCS state conservationist in Montana. "This additional funding will let us help landowners get their operations functional again."

Practices considered for funding include irrigation sprinklers, diversions, and pipelines; land leveling; cover crops; animal feeding operation relocations; critical area treatment; and obstruction removal.

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