

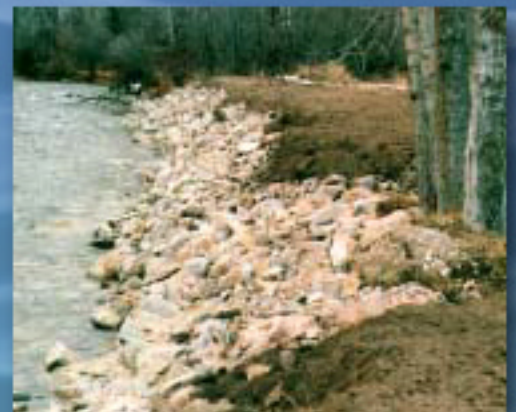


Emergency Watershed Protection in Montana

*Avoiding
the
Disaster*



Before and After
the
Disaster



September 1998

Avoiding the Disaster Before and After the Disaster

Situation

Record-setting snowfall amounts across Montana in 1996 and 1997 contributed to the flood conditions in many parts of the state.

Mountain snowpack data from the USDA Natural Resources Conservation Service (NRCS) automated daily SNOTEL (SNOWpack TELEmetry) network showed that Montana finished the 1997 snow year at 115 to 183 percent of average. SNOTEL data is used to make streamflow forecasts, an important tool for water reservoir managers, irrigators, and other users of Montana lakes, rivers, and streams.

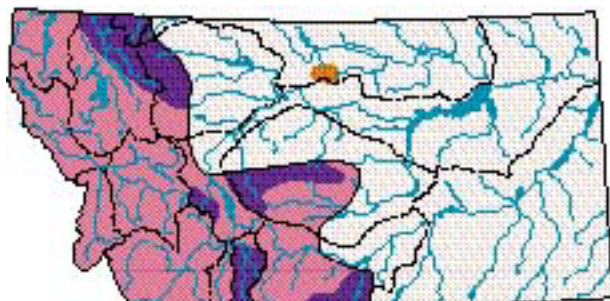


As of May 1, 1997, mountain snow water for Montana was 60 percent above average and 40 percent above 1996 levels



SNOTEL (SNOWpack TELEmetry) sites measure snow water equivalent, precipitation, and temperature. This information allows NRCS hydrologists to forecast stream flows. In 1997, the 16-foot shelter and 16-foot precipitation gage were nearly buried at the Black Bear SNOTEL site in southern Gallatin County.

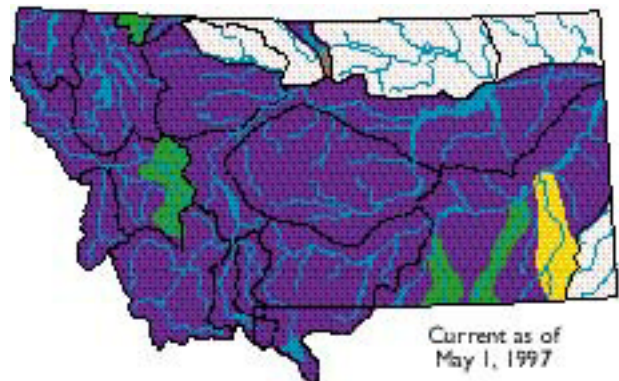
Mountain Snowwater Equivalent for Montana



Current as of May 1, 1997

- extreme (over 150%)
- much above average (over 130%)
- above average (110-130%)
- near average (90-110%)
- below average (70-90%)
- much below average (below 70%)
- no mountain survey

Stream Flow Prospects for Montana



Current as of May 1, 1997

- much above average (over 130%)
- above average (110-130%)
- near average (90-110%)
- below average (70-90%)
- much below average (below 70%)
- not for recast

Response

“Although recovery from this event will continue, the success of the combined efforts is a credit to all of you.”

**Gov. Marc Racicot,
Governor of Montana**

Teams of specialists worked long hours to provide technical expertise in stabilizing streambanks and rivers, removing debris, and repairing damaged property.



“It is difficult to estimate how much the NRCS technical data and assistance helped prevent damages, but it would be safe to say the value was well over \$100 million in 1997 alone.”

**Jim Suit, state engineer,
USDA Natural Resources
Conservation Service**

Before flood waters had receded, NRCS employees began their work of locating and assessing the type and extent of damages. NRCS employees assessed more than 100 sites for damage in 1997. Employees informed individuals as well as community leaders of the work needed to relieve the areas of imminent danger to life and property. Teams of engineers, resource conservationists, contracting specialists, and technicians worked long hours to provide technical expertise in stabilizing streambanks and rivers, removing debris, and repairing damaged property.

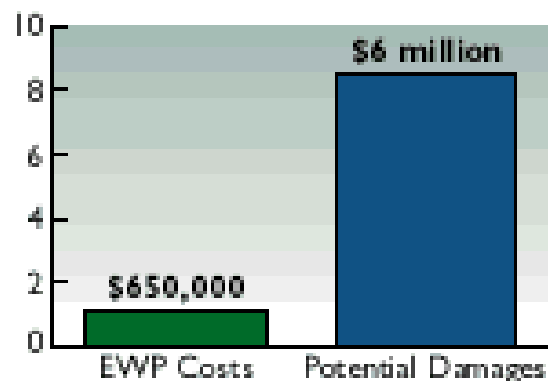
NRCS provided technical and financial assistance through the Emergency Watershed Protection (EWP) program to communities for restoring watersheds ravaged by high runoff and flooding. EWP allows damages to be repaired during or after a watershed emergency, which is when a natural occurrence creates a watershed impairment that threatens life or property.

Individuals in need of emergency assistance contacted local city, county, state, and/or watershed authorities for sponsorship. Sponsors assumed responsibility for obtaining permits and easements, for operation and maintenance of the sites, and shared 25 percent of the total construction cost.

NRCS provided 75 percent of the construction cost and 100 percent of the technical assistance.

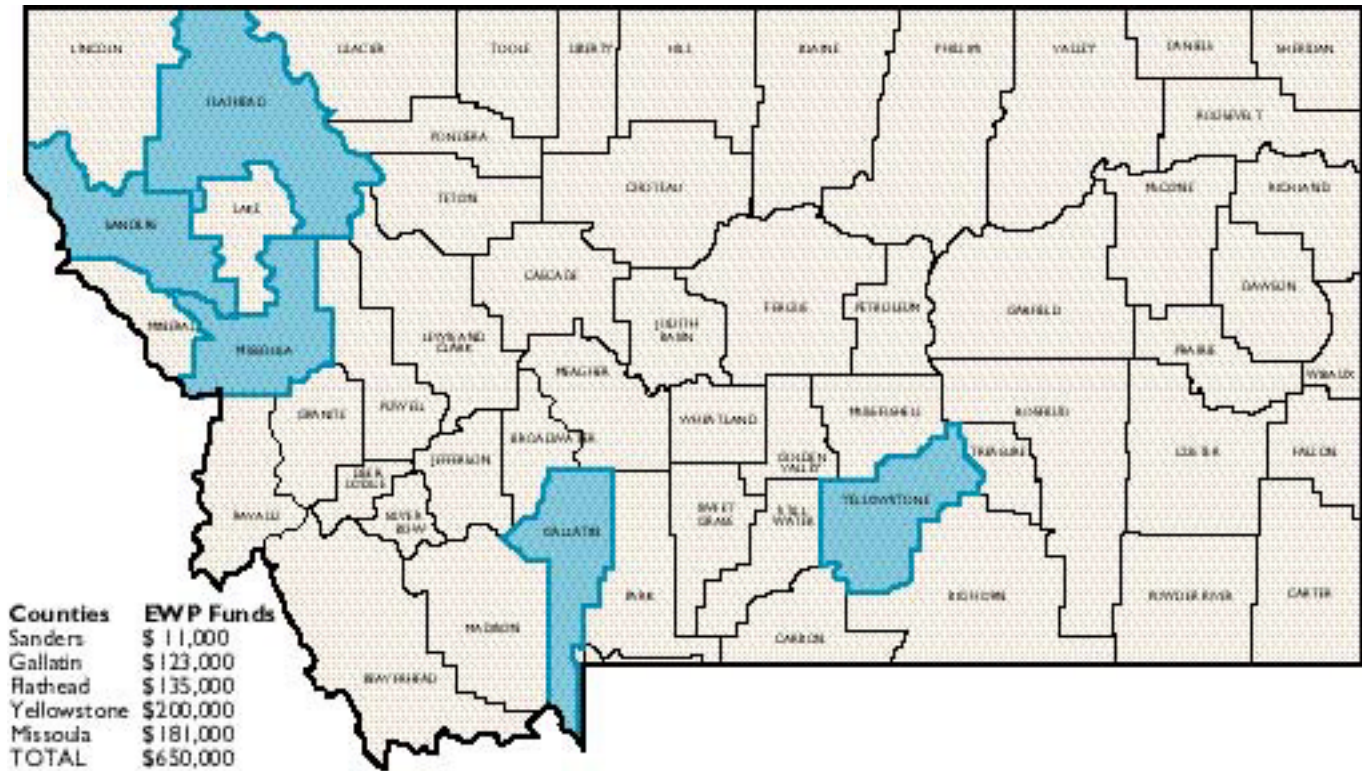
Following the high water and flooding events of 1997, approximately \$650,000 of EWP funds were used to prevent more than \$6 million in estimated potential damages

Emergency Watershed Protection Costs vs. Cost of Potential Damages 1997



Projects

Emergency Watershed Protection Funds Allocated 1997



Flathead County

High water in the Stillwater River near Kalispell caused severe erosion along the streambank. EWP funds were used to install approximately 500 feet of rock riprap to control erosion, which protected two homes and county property on the Brander/Broder project. EWP costs: \$90,000. Potential damages if EWP measures had not been taken: \$191,000.

The flooding Stillwater River threatened the Buffalo Hills community golf course in Kalispell. EWP funds were used to control erosion by stabilizing the river with rock riprap and soil. EWP costs: \$45,000. Potential damages if EWP measures had not been taken: \$869,000.



Approximately 500 feet of rock riprap was used to control erosion on the Stillwater River near Kalispell.



Rock riprap and soil were used to stabilize the Stillwater River near Kalispell.

Emergency Watershed Protection (EWP) in Montana



Rock riprap was used on the Bitterroot River to protect a business near Florence from erosion.



Rock riprap on Lolo Creek protects property, a bridge, and a highway from flood damages.



EWP funds were used on the Lower Middle Canal on the Gallatin River to protect and rebuild the irrigation inlet area damaged by flood waters.

Missoula County

High streamflows in Lolo Creek were causing damage to a bridge, highway, and property near Lolo. Rock riprap was used to protect the property and prevent further damage. EWP costs: \$50,000. Potential damages if EWP measures had not been taken: \$64,000.

A swollen Clark Fork River posed a threat to one home and agricultural land near Missoula. A series of



A series of bending wiers and bank protection were used to stabilize the banks of the Clark Fork River and allow it to move back toward its original channel.

bandway wiers and bank protection were used to stabilize the river banks and allow the river to move back toward its original channel. Work protected the Fred Stout home and adjacent agricultural land. EWP costs: \$78,000. Potential damages if EWP measures had not been taken: \$601,000.

Rock riprap was used to protect the Bitterroot Sporting Clays business near Florence from erosion along the Bitterroot River. EWP costs: \$53,000. Potential damages if EWP measures had not been taken: \$192,000.

Gallatin County

The Highline irrigation canal along the Gallatin River near Gallatin Gateway suffered severe erosion from flooding. EWP funds were used to repair the inlet area and canal, and Emergency Conservation



The Highline irrigation canal on the Gallatin River suffered severe erosion from flooding. EWP funds were used to repair the inlet area and canal and Emergency Conservation Program funds from the Farm Service Agency were used to repair the inlet structure.

Program (ECP) funds from the Farm Service Agency were used to repair the inlet structure. EWP costs: \$24,000. Potential damages if EWP and ECP measures had not been taken: \$2.2 million.

EWP funds were used on the Lower Middle Canal on the Gallatin River to protect and rebuild an irrigation inlet area that was damaged by flood waters. Irrigation canals were cleared of debris and a dike was built to protect agricultural land from raging waters. EWP costs: \$99,000. Potential damages if EWP measures had not been taken: \$597,000.

Yellowstone County

When the Yellowstone River threatened to reroute its course through the Canyon Creek irrigation canal, flooding a portion of Billings, NRCS employees assessed damage and designed a system to protect the irrigation canal and ensure the Yellowstone stays in its banks. Estimated EWP costs: \$25,000-\$100,000. Poten

Emergency Watershed Protection (EWP) in Montana



When the Yellowstone River threatened to reroute its course through the Canyon Creek irrigation canal, flooding part of Billings, NRCS employees designed a system to protect the canal and ensure the Yellowstone remains in its banks.



Bendway wiers along the Yellowstone River will protect property from future flooding.



EWP funds were used to repair an eroded drainage area into the Thompson Falls' drinking water collection site that was allowing high sediment loads to enter the water supply.

tial damages if EWP measures are not taken: \$764,000.

The Huntley dike along the Yellowstone River was damaged by high water. EWP funds will be used to build bendway wiers to move the river back to its original channel to protect property from flooding. Estimated EWP costs: \$25,000-\$100,000. Potential damages if EWP measures are not taken: \$575,000.

Sanders County

Erosion occurred on an outside bend of the East Fork of Elk Creek in western Sanders County, threatening a county road. Approximately 105 feet of rock riprap was placed on the outside curve of the creek. EWP costs: \$8,000. Potential damages if EWP measures had not been taken: \$55,000.

When record levels of snow began to melt near Thompson Falls, the community's drinking water collection site along Ashley Creek sustained severe damage. The eroded drainage area was allowing water to easily pick up sediment and debris and carry it into the water supply. For a short period of time, the site could not provide water to the city of 1,400 people because of the high sediment load. EWP funds were used to protect the area and prevent further erosion. Tree revetments were used to reduce the force of water draining into the water collection site; grass was seeded to replace nature's filter. EWP costs: \$3,000. Potential damages if EWP measures had not been taken: \$31,000.

New for 1997

NRCS developed the first emergency watershed floodplain easement in Montana under EWP in 1998. Floodplain easements, new in 1997 to EWP, allow landowners to place floodplain areas in permanent easements, which ensures the floodplain area can again act in a natural

floodplain situation. This first easement is 670 acres along the Missouri River in Cascade County. The land will be managed for floodplain purposes and some areas will be planted with wildlife-friendly shrubs and grasses.

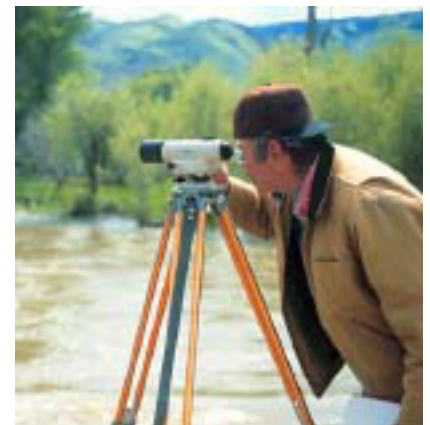
Other Projects

1995

When the small community of Alder, which sits along the Ruby River in Madison County, was threatened by waters flooding the Putnam irrigation canal, NRCS took immediate action. Between 8 p.m. and midnight, NRCS employees had assessed damages and developed a contract for the work needed.

Crews arrived in the early morning to stave off the river, which was ready to capture the canal and reroute the Ruby River through Alder. EWP costs: \$15,000. Potential damages if EWP measures had not been taken: \$88,000.

Flower Creek, north of Libby, suffered severe damage when warm temperatures and rainfall melted snow rapidly, creating unusually high runoff levels. The eroded streambed and banks of Flower Creek



Mike Barron, NRCS district conservationist in Sheridan, surveys the Ruby River near Alder to design a system that will protect the community from flood waters.

Emergency Watershed Protection (EWP) in Montana

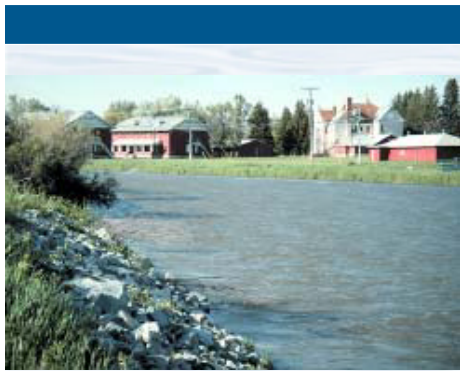
were creating a great sediment load in the creek, and the potential for flooding in central Libby was high. Through EWP, NRCS was able to help sponsors within the community rebuild the streambed. This protected eight homes along the creek and prevented flooding within the city itself. EWP costs: \$117,000. Potential damages if EWP measures had not been taken: \$900,000.

1996

Near the community of Twin Bridges, the dikes along the Beaverhead River were near collapse under the pressure of unusually high streamflows. NRCS used EWP funds to assist local sponsors in protecting the banks and stabilizing the dikes along the river. These measures prevented the flooding of 36 homes, 3 trailer homes, 4 churches, and 4 businesses in Twin Bridges. EWP costs: \$13,000. Potential damages if EWP measures had not been taken: \$201,000.

Other projects completed in 1996 include:

- **East Fork Elk Creek Road in Sanders County**
To ensure vehicle access, a country road was protected from flooding and destruction.
EWP costs: \$15,000 Potential damages: \$43,000
- **Wilderness Lodge in Sanders County**
Protection was given to a road bridge, fishery, and business.
EWP costs: \$20,000 Potential damages: \$67,000



Dikes along the Beaverhead River near Twin Bridges were near collapse under the pressure of unusually high stream flows. EWP funds were used to protect the banks and stabilize dikes along the river.

“Without EWP work, the high water would have eaten the dike away, flooding most of the town.”

Sam Novich, maintenance supervisor, Twin Bridges



- **Hot Springs in Sanders County**
Property in the small community of Hot Springs was protected from creeping flood waters.
EWP costs: \$8,000 Potential damages: \$40,000
- **Big Creek Bridge in Mineral County**
A bridge over Big Creek was threatened, making it impassable. EWP was used to protect the bridge ensuring access to property.
EWP costs: \$27,000 Potential damages: \$28,000
- **Kountz Bridge in Madison County**
When the Jefferson River was cutting a new channel, threatening a bridge and a major farm-to-market road, EWP funds were used to ensure the river stayed in its original channel.
EWP costs: \$107,000 Potential damages: \$215,000
- **Byers in Lincoln County**
This involved removing silt and debris from a stream to prevent flooding behind debris.
EWP costs: \$7,000 Potential damages: \$8,000

Working Together

In addition to the EWP work in 1996 and 1997, NRCS staff assisted the Federal Emergency Management Agency (FEMA) and the Montana Disaster and Emergency Services (DES) staff in assessing damages to public and private property. In 1997 alone, FEMA and NRCS worked on approximately 35 point projects. Most were on Montana’s larger rivers. Many involved irrigation diversions, headworks, and canal systems. Some damages were estimated at more than \$1 million. The agencies worked together to determine solutions and find funding sources.

“Having teams of NRCS people and DES in the field working together gives potential applicants continuity of government service. This is government action that is positive; that helps the victims of a disaster.”

Jim Anderson, Montana Disaster and Emergency Services