

Rocky Mountain Geographic Science Center

## Flood Hazards Mapping



### Background

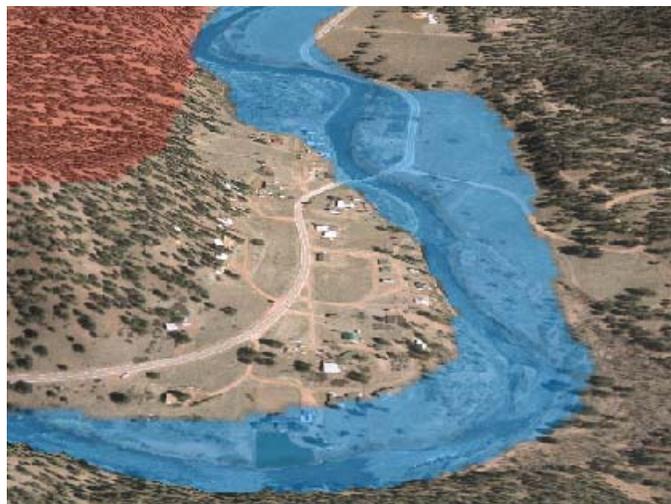
The Flood Hazards Mapping project focused on mapping 100-year and 500-year flood plain data due to increased vulnerability to flooding as a result of wildfire. Wildfires cause changes in the hydrologic, hydraulic, and geomorphologic characteristics of the landscape. The impact often creates soil and vegetation conditions that can result in catastrophic flooding that threatens

property and life. As a result, the USGS has performed detailed investigations on watersheds that were determined to be areas of high risk. Various geospatial data sources, including high-resolution imagery and elevation data, were integrated to provide information regarding potential flood inundation.

### Flood Plain Mapping

The 100-year and 500-year flood plain data was modeled to reflect post wildfire conditions of various short-term and long-term wildfire recovery phases. Historic flood records and post-burn runoff parameters were used for the evaluation and mapping of the flood plains. A variety of data types and resolutions were used for different areas.

The Hayman Fire occurred in June, 2002, southwest of Denver, Colorado. As the largest recorded fire in Colorado's history, it had a significant impact on the natural characteristics of the area. In order to map the flood plain accurately, reflecting post-fire conditions, several data sources were required. 5-meter digital elevation models, created from IFSAR, were used to generate contours for a portion of the South Platte River area. Other data included high-resolution aerial photography. Cross sections of the Platte River were collected in the field, using GPS. Profiles of the cross sections were created using the elevation data and flood-modeling software was used to generate an updated 100-year flood plain.



3D Model of the projected Platte River 100-year flood plain.

The Mitchell Creek area, near Glenwood Springs, Colorado, was affected by the Coal Seam Fire. Elevation data and imagery existed for this area, but the city of Glenwood Springs had grown considerably since the data was collected. Changes in the hydrography, channelization, and built-up area made some of the existing data obsolete. As a result, new high-

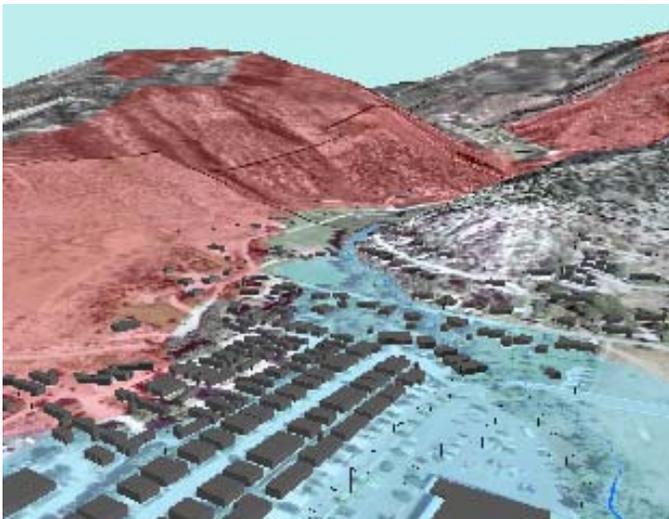


resolution, stereo aerial photography was collected over the areas with the most change. Using this photography and field-sampled control points, the USGS created a 2-meter digital elevation model which was used in conjunction with the existing 5-meter DEM for the area. This elevation model was used to generate contours and create profiles of the stream cross sections. The HEC-RAS modeling software utilized these data and flood prediction models to generate current 100-year and 500-year flood plains for the area.

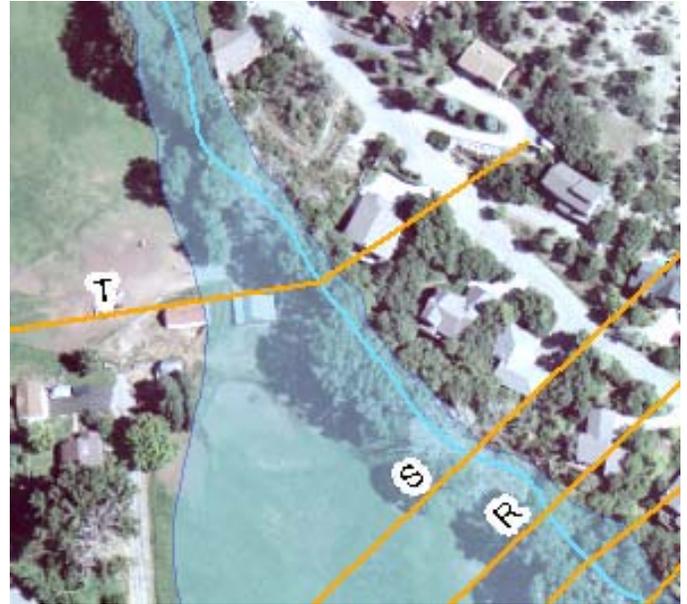


3D Model of the projected Mitchell Creek 500-year flood plain, Glenwood Springs, Colorado

The Million Fire, west of Alamosa, Colorado impacted the Willow Creek watershed. Since no current high-resolution imagery or elevation data existed for this area, the first challenge was to acquire data for the flood modeling. Like the Mitchell Creek area, this was accomplished by collecting high-resolution, stereo photography and using it to create a digital elevation model. After contours and cross sections were generated the modeling software was used to determine the new flood plain boundaries.



3D Model of the projected Mitchell Creek 500-year flood plain, Glenwood Springs, Colorado



Planimetric view of Structures affected by the Mitchell Creek flood plain with cross sections.

The processed flood data will be used to supplement Digital Flood Insurance Rate Maps (DFIRMS) for flood insurance purposes which are managed by the Federal Emergency Management Agency (FEMA).

#### For more information

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