

Implementing a Web-based Streamflow Statistics Tool for New Mexico (StreamStats)

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The Question and What We Did

How can we calculate streamflow at ungaged stream locations?

The USGS has developed an online application, StreamStats, that can be used to calculate streamflow statistics at ungaged stream locations, but StreamStats is being implemented on a state-by-state basis utilizing USGS and cooperator funding. During 2016 the USGS implemented StreamStats for New Mexico; calculation of low and peak streamflow statistics for ungaged stream locations is now possible across the state.

How We Did It

StreamStats was implemented for New Mexico by defining a set of data layers for the state, including precipitation, topography, basin areas, and stream networks. Regression equations that relate low and peak streamflow to basin characteristics (elevation, slope, and area) that were defined in a previous study were incorporated into New Mexico StreamStats. The equations, based on streamflow at existing gaging stations, are used in StreamStats to calculate low and peak streamflow statistics at interactively-selected stream locations.

What We Found Out

StreamStats is an online application (http://streamstatsags.cr.usgs.gov/v3_beta/viewer.htm?stabbr=NM) that can be used to obtain estimates of streamflow at ungaged stream locations. After opening the application in a web page (MS Explorer works best), the user may zoom into a map location of their choice. As you zoom in past a scale of 1:2,000,000 the user will see the map populated with gaging station symbols. The user can click on the gage house tool near the top of the map and then click on a gaging station to get information about that gage. When the user zooms in past a scale of 1:24,000 the map will update with a digital representation of the streams. The user can then delineate the basin of their choice by clicking on the basin delineation tool (the button with a round dot and a plus sign) near the top of the map and following the instructions in the popup window. Once the basin has been defined, the user can retrieve basin characteristic data or streamflow statistics for the defined basin. In addition, the basin area can be downloaded to the user's computer.

Currently the New Mexico StreamStats application can provide low and peak streamflow statistics at ungaged stream locations, but cannot provide **mean annual** streamflow because the regional equations for mean annual streamflow have not been derived. The USGS has submitted a proposal to develop mean annual streamflow regression equations that can be incorporated into StreamStats.

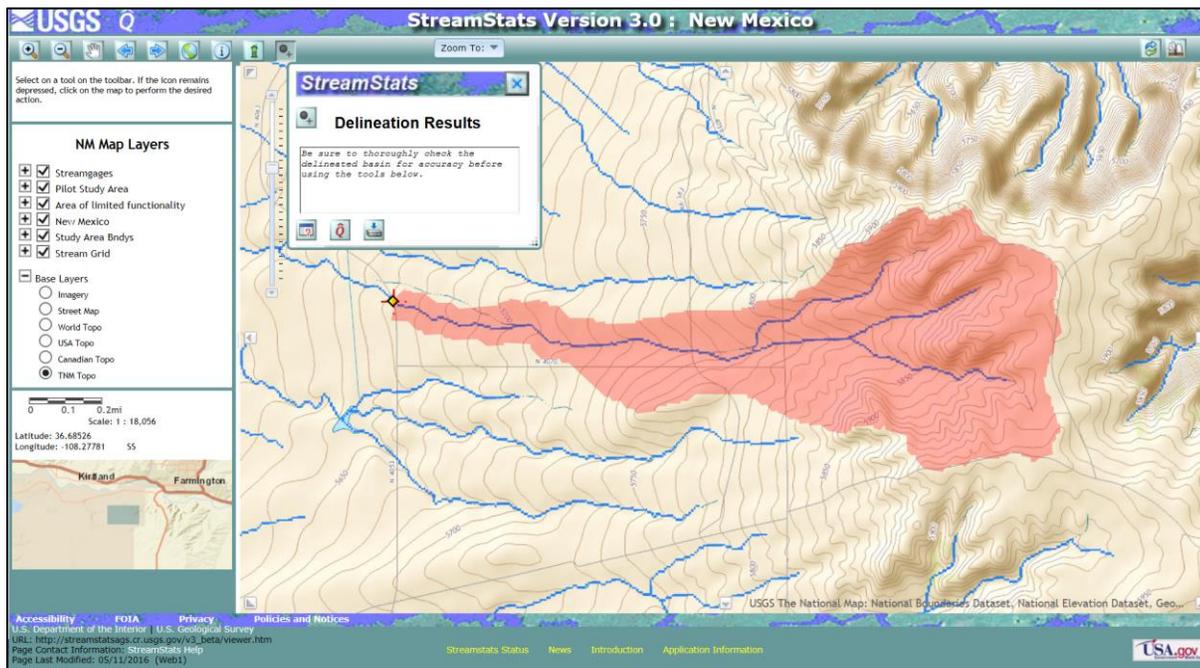


Figure 1: A basin upstream of a Navajo road 4063 in northwestern New Mexico delineated using the New Mexico StreamStats application. Basin characteristics and streamflow statistics for this basin are shown below in table 1.

Date: Thurs June 30, 2016 4:41:40 PM GMT-6
 Study Area: New Mexico
 NAD 1983 Latitude: 36.6917 (36 41 30)
 NAD 1983 Longitude: -108.3062 (-108 18 23)
 Drainage Area: 0.63 mi²

Peak Flows Region Grid Basin Characteristics			
100% Peak 2008 5119 NW Plateau Flood Region 2 (0.63 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.63	0.059	12700
Mean Basin Slope from 30m DEM (percent)	0.0554	0.0231	0.4447
Mean Basin Elevation (feet)	5840	4320	7520

Peak Flows Region Grid Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	79.2	ft ³ /s	130			
PK5	187	ft ³ /s	89			
PK10	310	ft ³ /s	72			
PK25	541	ft ³ /s	63			
PK50	765	ft ³ /s	60			
PK100	1060	ft ³ /s	59			
PK500	2000	ft ³ /s	66			

Table 1: Basin Characteristics and peak flow statistics for the delineated basin shown in figure 1. The table indicates that the peak streamflow that has a 1 percent change of occurring in any given year (PK100) would be 1,060 cubic feet per second with an uncertainty of 59 percent. Road engineers could use this information to select the correct culvert size for this road crossing.