

# TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE

UTAH

NATURAL RESOURCES CONSERVATION SERVICE

March 3, 2011

ENG – 210 - TECHNICAL NOTE UT210-11-02  
190-VI

**SUBJECT:** ANNOUNCING THE USAGE AND LIMITATIONS OF THE USGS  
STREAMSTATS

Purpose. To transmit information on the usage and limitations of USGS StreamStats.

Effective Date. Upon receipt.

Contents of Technical Note.

**Background:** The USGS StreamStats is available for Utah. StreamStats is an internet-based web-based application and will:

- Automatically measure basin and climatic characteristics for ungaged sites using GIS;
- Provide published streamflow statistics, basin and climatic characteristics, and other information for data-collection stations contained in published streamflow statistics reports.
- Provide estimates of flood-frequency statistics, basin and climatic characteristics, and other information for user-selected points on ungaged streams; and
- Link to USGS NWIS on line data.

The internet-based web-based application can be used for planning purposes and used for calibration efforts of hydrology, stream gage analysis, and watershed delineation. StreamStats is particularly important for project planning and projects that include peak flow designs, calibration of hydrologic models, validation with USGS Stream Gages for ungaged watersheds, or other beneficial use and for which accurate estimates of available water supply or peaks are essential to the project's performance and justification. If a statistically viable sample is needed for hydrologic analysis, a minimum of 15 years of data is required.

**Limitations:** StreamStats has errors ranging from 35 to 132 percent for the 25-year return intervals and 39 to 166 percent error for the 100-year return intervals. Alternatively, equivalent years of data range from 2.5 years to 8.91 years of record for the 25-year return interval and 3.13 years to 12.97 years of record for the 100-year return interval. Since the equivalent years of record is less than 15 years, StreamStats will be used for estimates and planning purposes only. An excerpt from StreamStats documentation (Kenny and Wright, 2007) explains precautions,

*“Equations developed from more than 35 gaging stations had standard errors of prediction that ranged from 35 to 108 percent, and errors for equations developed from less than 35 gaging stations ranged from 50 to 357 percent. On the basis of the standard error of prediction, the equations for region 4 have the least uncertainty, and the equations for regions 3 and 7 have the greatest. The limitations presented in this report should be considered for any application of the developed regression equations.”*

An excerpt from StreamStats (Kenny and Wright, 2007) states the usage of StreamStats relative to regions,

*“The range of predictor variable values for the gaging stations used to develop the regression equations is contained in table 8. The equations, and associated errors, are valid for these ranges of predictor-variable values”.*

Table 8 from StreamStats (Kenny and Wright, 2007) is presented below.

**Table 8.** Range of predictor variables computed for streamflow-gaging stations used in the development of the regression equations.

[—, variable not used in equations]

Region	Drainage area, in square miles	Elevation, in feet	Precipitation, in inches	Average area slope, percent	Area covered by herbaceous upland, percent
1	3.62-390	6,420-10,500	—	—	—
2	2.14-84.1	—	16.5-53.7	—	—
3	5.72-66.5	—	—	—	—
4	2.95-667	8,130-10,900	—	9.67-40.3	—
5	.91-629	—	—	—	2.14-15.6
6	.87-532	4,300-9,380	—	—	—
7	5.43-1,670	—	—	—	—

**Other applications:** Other statistical methods to derive return intervals include the following CCE certified programs such as PEAKFQ and RiverMorph software and a downloadable Microsoft Excel file FreqCurves\_ver301.xlsm file. For more information about acceptable statistical methods refer to NRCS National Engineering Handbook Part 630 (Hydrology) Chapter 18 - Selected Statistical Methods.

**Distribution:** For access to StreamStats go to <http://water.usgs.gov/osw/streamstats/utah.html> and click on “Interactive Map” or type Utah USGS in internet browser and search for StreamStats.

**References:**

Kenney, T.A., Wilkowske, C.D., and Wright, S.J., 2007, Methods for estimating magnitude and frequency of peak flows for natural streams in Utah: U.S. Geological Survey Scientific Investigations Report 2007-5158, 28 p. <http://pubs.usgs.gov/sir/2007/5158/>

ENG – 210 - TECHNICAL NOTE UT210-11-02

190-VI

Page 3

**Contacts:** For more information about StreamStats or stream gage statistical methods contact:  
Nathaniel Todea, Hydraulic Engineer, at (801) 524-4573 or [Nathaniel.Todea@ut.usda.gov](mailto:Nathaniel.Todea@ut.usda.gov).



SYLVIA A. GILLEN  
State Conservationist