



The USGS StreamStats Web Application for California

Presented to the California Water Quality
Monitoring Collaboration Network,
April 12, 2012

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What is StreamStats?

- A map-based Web application that provides information that can be used by engineers, hydrologists, managers, planners, and others to make informed decisions on water-related activities
- Primary products are basin delineations, basin characteristics, and estimates of streamflow statistics
- Provides information for gaged and user-selected ungaged sites on streams

Development Team

- John Guthrie, RMMC, programmer
- Al Rea, ID WSC, GIS specialist
- Kernell Ries, OSW, hydrologist, coordinator
- Pete Steeves, MA WSC, GIS specialist
- Dave Stewart, OSW, GIS specialist

- Consultants
 - ESRI – StreamStats application programming
 - Aqua Terra – StreamStatsDB and NSS

Agenda

- Description of web pages and base functionality
- GIS data preparation for StreamStats
- Statistical underpinnings
- Stream network navigation in StreamStats
- Batch process and web services
- Future plans for StreamStats
- Summary of related activities being done by the CA WSC
 - Tony Gotvald Nancy Barth

StreamStats Home Page

<http://streamstats.usgs.gov>

Welcome to StreamStats - Microsoft Internet Explorer provided by MD-DC-DE WSC

http://water.usgs.gov/osw/streamstats/

File Edit View Favorites Tools Help

Welcome to StreamStats

USGS
science for a changing world

USGS Home
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Welcome to StreamStats Best viewed in Internet Explorer 5 or above
Screen resolution of 1024x768

[Home](#)
[News](#)
[StreamStats Description](#)
[Unaged Sites](#)
[Data-Collection Stations](#)
[StreamStats Limitations](#)
[State Applications](#)
[USGS Station Statistics](#)
[User Instructions](#)
[Definitions](#)
[Basin Characteristics](#)
[Streamflow Statistics](#)
[StreamStats Fact Sheet](#)
[Frequently Asked Questions](#)
[Talks and Other Info](#)
[Internal Links](#)

StreamStats is a Web-based tool that allows users to obtain streamflow statistics, drainage-basin characteristics, and other information for user-selected sites on streams. StreamStats users can choose locations of interest from an interactive map and obtain information for these locations. If a user selects the location of a U.S. Geological Survey (USGS) data-collection station, the user will get previously published information for the station from a database. If a user selects a location where no data are available (an unaged site), a Geographic Information System (GIS) program will estimate information for the site. The GIS program determines the boundary of the drainage basin above the site, measures the physical characteristics of the drainage basin, and solves the appropriate regression equations to estimate streamflow statistics for the site. The results are presented in a table and a map showing the basin outline. The estimates assume natural flow conditions at the site. In the past, it could take an experienced person more than a day to estimate this information for an unaged site. StreamStats reduces the effort to only a few minutes.

Separate applications have been established for each state that has implemented StreamStats. The state applications provide access to all of the functionality that is available for the state. The State Applications link at the left provides access to the individual applications. In addition to the state applications, a separate application has been established for serving information for USGS data-collection stations throughout the Nation. The USGS Station Statistics link to the left provides access to this application.

Some StreamStats options will not work in Netscape. The application continues to be improved and expanded. Please continue to come back to this page to see future enhancements. [Contact us](#) if you have any questions.

Users should familiarize themselves with StreamStats Description, Instructions, and Limitations (using the links on the left) before utilizing the application.

The StreamStats Web application provides access to automated procedures and very large, complex data sets. These data sets are known to contain occasional errors. Users are hereby advised to carefully check all results for accuracy and to exercise their own professional judgment in evaluating the appropriateness of the results for their application. Basin delineations in particular frequently have been found to be erroneous. The Web site provides tools and base maps useful for verifying the accuracy of the basin delineations.

Done Internet 100%

National Station Statistics Site

StreamStats National Data-Collection Station Information - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS
StreamStats National Data-Collection Station Information

Zoom In to at least 1:5,000,000 to see gages. Click on a gage to get additional information.

Explanation

Gaging Stations

- Continuous Streamgage
- Lowflow Streamgage
- Peakflow Streamgage
- Peak, Low and Partial Record
- Miscellaneous Record
- Unknown

HUC 8
HUC 12

Scale: 1 : 36,978,595

Zoom To:
Lat/Long
Gage Station
Place Name
Street Address
State
HUC8
HUC12

Accessibility FOIA Privacy Policies and Notices
U.S. Department of the Interior | U.S. Geological Survey
URL: <http://streamstatsags.cr.usgs.gov/gages/viewer14.htm>
Page Contact Information: StreamStats Help
Page Last Modified: 02/11/2011 11:30:13

USA.gov
TAKE PRIDE IN AMERICA

Done Local intranet 100%

Base Layers

StreamStats National Data-Collection Station Information - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS
StreamStats National Data-Collection Station Information

Zoom In to at least 1:5,000,000 to see gages. Click on a gage to get additional information.

Explanation

Gaging Stations

- Continuous Streamgage
- Lowflow Streamgage
- Peakflow Streamgage
- Peak, Low and Partial Record
- Miscellaneous Record
- Unknown

HUC 8
HUC 12

0 1.5 3mi
Scale: 1 : 288,895

IDAHO
Boise
84

Imagery Street Map World Topo USA Topo

Eagle
Garden City
Boise
Meridian
Boise County

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U.S. Department of the Interior | U.S. Geological Survey
URL: <http://streamstatsags.cr.usgs.gov/gages/viewer14.htm>
Page Contact Information: StreamStats Help
Page Last Modified: 02/11/2011 11:30:13

Streamstats Status News

USA.gov
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Streamgauge Reports

StreamStats Data-Collection Station Report - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/gagepages/html/11532500.htm

File Edit View Favorites Tools Help

StreamStats Data-Collection Station Report

General Flow Statistics

Average_daily_streamflow	3752.285	cubic feet per second	41
Maximum_daily_flow	180000	cubic feet per second	41
Minimum_daily_flow	160	cubic feet per second	41
Std_Dev_of_daily_flows	6847.619	cubic feet per second	41

Base Flow Statistics

Average_BFI_value	0.444	dimensionless	42
Number_of_years_to_compute_BFI	72	years	42
Std_dev_of_annual_BFI_values	0.086	dimensionless	42

Precipitation Statistics

24_Hour_2_Year_Precipitation	6.0000	inches	31
Mean_Annual_Precipitation	111.062	inches	219
Mean_January_Precipitation	17.3	inches	44
Mean_July_Precipitation	0.588	inches	44

Climate Characteristics

Mean_Annual_Lake_Evaporation	30.000	inches	31
Mean_Annual_Snowfall	77.2	inches	44

Temperature Statistics

Mean_Max_July_Temperature	79.9	degrees F	44
Mean_Maximum_January_Temperature	51.9	degrees F	44
Mean_Min_January_Temperature	38.000	degrees F	31
Mean_Minimum_July_Temperature	47.4	degrees F	44

Citations

Citation Number	Citation Name and URL
219	Parrett, C., Veilleux, A., Stedinger, J.R., Barth, N.A., Knifong, D.L., and Ferris, J.C., 2011. Regional skew for California, and flood frequency for selected sites in the Sacramento–San Joaquin River Basin, based on data through water year 2006. U.S. Geological Survey Scientific Investigations Report 2010–5260, 94 p.
30	Imported from NWIS file
31	Imported from Basin Characteristics file
41	Wolock, D.M., 2003. Flow characteristics at U.S. Geological Survey streamgages in the conterminous United States: U.S. Geological Survey Open-File Report 03-146, digital data set
42	Wolock, D.M., 2003. Base-flow index grid for the conterminous United States: U.S. Geological Survey Open-File Report 03-263, digital data set
44	Cooper, R.M., 2005. Estimation of Peak Discharges for Rural, Unregulated Streams in Western Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5116, 76 p.

StreamStats National Data

USGS StreamStats

Zoom In to at least 1:5,000,000 to see gauges. Click on a gage to get additional information.

Explanation

- ▲ Gaging Station, Continuous
- ▲ Low Flow, Partial Record
- ▲ Peak Flow, Partial Record
- ▲ Peak and Low Flow, Partial Record
- ▲ Stage Only
- ▲ Low Flow, Partial Record, Miscellaneous Record
- ▲ Unknown
- ▲ HUC 8
- ▲ HUC 12

Scale: 1 : 288,890

Latitude: 41.79012
Longitude: -124.07568

Accessibility
U.S. Department of the Interior
URL: http://streamstats.gov
Page Contact Information
Page Last Modified: 09/20/2010

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StreamStats Home Page

<http://streamstats.usgs.gov>

Welcome to StreamStats - Microsoft Internet Explorer provided by MD-DC-DE WSC

http://water.usgs.gov/osw/streamstats/

File Edit View Favorites Tools Help

Welcome to StreamStats

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Welcome to StreamStats

Best viewed in Internet Explorer 5 or above
Screen resolution of 1024x768

[Home](#)

[News](#)

[StreamStats Description](#)

[Ungaged Sites](#)

[Data-Collection Stations](#)

[StreamStats Limitations](#)

[State Applications](#)

[USGS Station Statistics](#)

[User Instructions](#)

[Definitions](#)

[Basin Characteristics](#)

[Streamflow Statistics](#)

[StreamStats Fact Sheet](#)

[Frequently Asked Questions](#)

[Talks and Other Info](#)

[Internal Links](#)

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Done

Internet 100%

State Applications

State Info - Windows Internet Explorer provided by MD-DE-DC WSC

http://water.usgs.gov/osw/streamstats/ssonline.html

File Edit View Favorites Tools Help

USGS Water Science for Mar... State Info

USGS Home
Contact USGS
Search USGS

Welcome to StreamStats

Best viewed in Internet Explorer 5 or above
Screen resolution of 1152x864 or greater, with pop-up blocker disabled

State Applications

[StreamStats Application Status](#)

Choose a State

Efforts are underway to make StreamStats operational for many states, with a long-term goal of national coverage. Work needed to implement StreamStats is generally done by the USGS in cooperation with various state and local agencies. The map below indicates states where StreamStats has been implemented, and where work on implementation is currently underway. Green states have fully implemented StreamStats applications, orange states have been completed and are in testing internally, and blue states are undergoing implementation. Users may access the implemented state applications by selecting the state of interest on the map below, or by selecting the name of the state from the list above.

- Fully implemented (Clickable)
- Delineation and basin characteristics implemented (Clickable)
- Implemented and testing internally
- Undergoing implementation

Local intranet | Protected Mode: Off 100%

California Introductory Page

StreamStats in California - Windows Internet Explorer provided by MD-DE-DC WSC

http://water.usgs.gov/osw/streamstats/california.html

File Edit View Favorites Tools Help

USGS Water Science for Mar... StreamStats in California

Current Streamflow Conditions

Users are cautioned that peak-flow estimates provided by StreamStats may be unreliable because the equations in Waananen and Crippen (1977) are based on analytical methods and data only through 1974, while the equations in Thomas and others are based on analytical methods and data only through 1986. The California Water Science Center currently is working on a study to update flood-frequency data and estimation methods throughout California.

Users are also cautioned that basin-characteristics data used in StreamStats to solve the regression equations were determined from national and regional Geographic Information Systems (GIS) data bases and may not exactly match basin characteristics measured manually from maps and other data sources in use at the time the equations were developed. In particular, estimation equations developed by Waananen and Crippen (1977) for several regions in California use a basin characteristic termed Altitude Index (H). This characteristic was determined to be equivalent to the Mean Basin Elevation provided by StreamStats multiplied by 0.00083. Users should familiarize themselves with the above reports and be aware of the data limitations before using StreamStats to obtain estimates of flood-frequency statistics for ungaged sites.

Attention!

Please help us conserve our server system resources and **close** the Interactive Map window when you are finished using it. Doing so will help ensure system availability for all users. Thank you.

Note that the [User Instructions](#) for this application include discussions of some tools for network navigation and estimating flows based on similar streamgages that are not yet implemented for California. It is planned to add these tools in the future.

Also, please [bookmark this page](#), rather than the Interactive Map page, since the URL for the interactive map may change in the future.

We want your feedback! Please send any comments or questions that you have on StreamStats to the StreamStats development team at GS-W_StreamStats@usgs.gov.

StreamStats for California was developed in cooperation the [Federal Emergency Management Agency](#), the [U.S. Army Corps of Engineers](#), and the [U.S. Forest Service](#).



[Contact Us](#) if you experience any problems with this application.

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U.S. Department of the Interior | U.S. Geological Survey
URL: <http://streamstats.usgs.gov/>
Page Contact Information: GS-W_StreamStats@usgs.gov
Page Last Modified: Wednesday, 20-Apr-2011 07:13:19 EDT

USA.gov TAKE PRIDE IN AMERICA

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California User Interface

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333980781739

USGS
California StreamStats

Zoom To: 1:7,056,911

Results >>
Map Contents >>
Navigation >>
Overview >>

Panel Banners

Console

Toolbar

USGS some base map material provided by Maptech, Inc. (Copyright © 2008)

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Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 10:13:18

Streamstats Status News

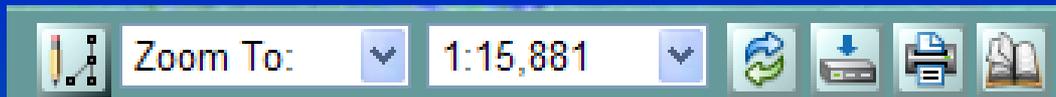
USA.gov TAKE PRIDE IN AMERICA

AutoRefreshMap:7,0,5 Mon Apr 9 10:16:05 EDT 2012/Mon Apr 9 10:19:19 EDT 2012 Local intranet | Protected Mode: Off 100%

Tools



Zoom In/Out Pan Last/Next/Full Extent Magnify Ruler Identity Gaging Station Marker Data Region Definition Spatial File Information



Edit Delineated Zoom To: Scale Refresh Download Print Help

Basin (or Place, NHD or A Selector available for CA)

Zoom-To Tools

Lat/Long

Zoom to Latitude-Longitude - Microsoft Internet Explorer provided by MD-...

USGS
Massachusetts StreamStats

Enter a valid NAD83 Latitude, Longitude

Coordinates can be in DD.ddddd, DD MM.mmm, or DDD MM SS.ss format

Latitude Longitude

Zoom To: ▼

Zoom To:

Lat/Long

Place Name

Reach Code

Named Place

GNIS Info Page - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS
Massachusetts StreamStats

Geographic Name / Feature Lookup

Geographic Names Information System (GNIS) (Help)

You must enter at least two parameters.

Feature Name

Exact Match Starts With Contains

Feature Type: (Definitions)

▼

State

▼

County

▼

Contact GNIS Manager
GNIS Frequently Asked Questions

Reach Code

Zoom to NHD Reach and Measure - Microsoft Internet Explorer provided by...

USGS
Massachusetts StreamStats

Enter a valid NHD Reach and Measure

NHD Resolution ▼

Help

Streamstats Application Help - Windows Internet Explorer provided by MD-DE-DC WSC

USGS
California StreamStats
Application Help

For StreamStats user instructions (click here)

- A screen resolution greater than 1024 is required to see the 4 buttons on the right side of the toolbar. These buttons include refresh, download, print, and help.
- If you are using IE8 and having difficulty with the interactive map, try turning the compatibility view on.
- Also see: [Things_to_check_if_the_Streamstats_Application_is_not_working_for_you.pdf](#)



General Instructions on the viewer

Getting started
Quick tour

Find

- Identify features on the map
- Search for features
- Measure distance and area
- Using Results

Explore the map

- Using the mouse
- [Using the keyboard](#)
- Using the Overview and Magnifier
- Using the Toolbar

Personalize

- Working with layers and map contents

More information

- System requirements
- Frequently asked questions and troubleshooting
- Getting more help and information

USGS

Working With Panels

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1334263674374

USGS California StreamStats

Zoom To: 1:7,055,911

Results

Map Contents

- CA@ca_ss
 - Centroid
 - GlobalWatershedPoint
 - GlobalWatershed
 - Stream Gages
 - ExcludePoly
 - ArchHvdro Data

Navigation

Overview

USGS some base map material provided by Maptech, Inc. (Copyright © 2008)

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U.S. Department of the Interior | U.S. Geological Survey
URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
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Streamstats Status | News

USA.gov | TAKE PRIDE IN AMERICA

AutoRefreshMap:3,0,5 Thu Apr 12 16:49:54 EDT 2012/Thu Apr 12 16:50:06 EDT 2012

Local intranet | Protected Mode: Off | 100%

Display Streamgages

The screenshot displays the USGS StreamStats web application in a Windows Internet Explorer browser. The browser's address bar shows the URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333985629994. The page title is "California StreamStats".

The main map area shows a topographic view of California with numerous streamgages marked by blue triangles. The map includes labels for major cities such as San Francisco, Los Angeles, and San Diego. A scale bar at the bottom right of the map indicates distances up to 150 miles. The zoom level is set to 1:7,055,911.

On the left side of the interface, there is a "Map Contents" panel with the following checked items:

- CA@ca_ss
 - Centroid
 - GlobalWatershedPoint
 - GlobalWatershed
 - Stream Gages
 - ExcludePoly
 - ArchHydro Data

Below the map content panel are sections for "Navigation" and "Overview".

At the bottom of the page, there is a footer with the following information:

- USGS logo and text: "some base map material provided by Maptech, Inc. (Copyright © 2008)"
- Links: Accessibility, FOIA, Privacy, Policies and Notices
- Page Information: U.S. Department of the Interior | U.S. Geological Survey
URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 11:43:36
- USA.gov logo and "TAKE PRIDE IN AMERICA" slogan.
- Streamstats Status and News links.

The browser's status bar at the very bottom shows "Done", "Local intranet | Protected Mode: Off", and a zoom level of 100%.

Navigation Panel

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333985629994

USGS
California StreamStats

Zoom To: 1:7,055,911

Results

Map Contents

- CA@ca_ss
 - Centroid
 - GlobalWatershedPoint
 - GlobalWatershed
 - Stream Gages
 - ExcludePoly
 - ArchHydro Data

Navigation

Overview

Click on points of compass to move map center

USGS some base map material provided by Maptech, Inc. (Copyright © 2008)

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U.S. Department of the Interior | U.S. Geological Survey
URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
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Page Last Modified: 04/09/2012 11:43:36

Streamstats Status News

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Overview Map

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333993453226

California StreamStats

Zoom To: 1:7,000,000

Results

Map Contents

- CA@ca_ss
 - Centroid
 - GlobalWatershedPoint
 - GlobalWatershed
 - Stream Gages
 - ExcludePoly
 - ArchHydro Data

Navigation

Overview

San Francisco, San Jose, Los Angeles, Long Beach, San Diego

USGS some base map material provided by Maptech, Inc. (Copyright © 2008)

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U.S. Department of the Interior | U.S. Geological Survey
URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 13:44:28

Streamstats Status **News**

USA.gov **TAKE PRIDE IN AMERICA**

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Results Panel / Identify Tool

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333993453226

California StreamStats

Zoom To: 1:760,383

Map Contents

- CA@ca_ss
 - Centroid
 - GlobalWatershedPoint
 - GlobalWatershed
 - Stream Gages
 - ExcludePoly
 - ArcHydro Data

Navigation

Overview

Results

- CA@ca_ss (-115621.0539, 114344.9783)
 - Stream Gages
 - BEAR R F REL BL CAMP FAR WEST RES NR WHEATLA
 - OBJECTID: 28324
 - Latitude: 39.04146
 - Longitude: -121.33198
 - STA_ID: 11423800
 - STA_NAME: BEAR R F REL BL CAMP FAR WEST RE WHEATLAND CA
 - STA_TYPE: GS
 - COORDSRC: NHD24K
 - SITESTATUS: A
 - REACH100: 18020108000143
 - MEASURE100: 92.6259
 - REACH24: 18020108000211
 - MEASURE24: 99.397
 - REACHLOC:
 - MEASURELOC: 0
 - FeatureURL: http://waterdata.usgs.gov/nwis/nwis/site_no=11423800
 - DRNAREA:
 - BEAR R F REL BL CAMP FAR WEST RES NR WHEATLA

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URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
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Page Last Modified: 04/09/2012 13:44:28

Streamstats Status **News**

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AutoRefreshMap:21,0,5 Mon Apr 9 14:03:53 EDT 2012/Mon Apr 9 14:04:30 EDT 2012

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Select Ungaged Site

The screenshot displays the USGS StreamStats interface in a Windows Internet Explorer browser. The browser's address bar shows the URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333993453226. The page title is "USGS California StreamStats".

The interface includes a navigation toolbar with a red arrow pointing to the "Watershed Delineation from a Point" icon. The "Map Contents" panel on the left lists several layers, all of which are checked: CA@ca_ss, Centroid, GlobalWatershedPoint, GlobalWatershed, Stream Gages, ExcludePoly, and ArchHydro Data. The "Zoom To" dropdown menu is set to "1:10,131".

Three red arrows point to specific features on the map: one to the "Watershed Delineation from a Point" icon, one to the "Scale must indicate 1:24,000 or greater" text, and one to the "Note canal is not included in stream network used for delineation" text. A red arrow also points to a "Siphon" feature on the map.

The map shows a watershed boundary in blue, a stream network in green, and a canal in red. The map includes labels for "Creek", "Yokohl", and "Siphon". The map also shows contour lines and a scale bar.

At the bottom of the page, there is a footer with the following text: "Accessibility", "FOIA", "Privacy", "Policies and Notices", "U.S. Department of the Interior | U.S. Geological Survey", "URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx", "Page Contact Information: StreamStats Help", "Page Last Modified: 04/09/2012 13:44:28", "Streamstats Status", "News", "USA.gov", and "TAKE PRIDE IN AMERICA".

Delineated Basin

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC

http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333993453226

USGS
California StreamStats

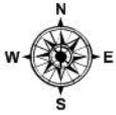
Zoom To: 1:158,068

Results

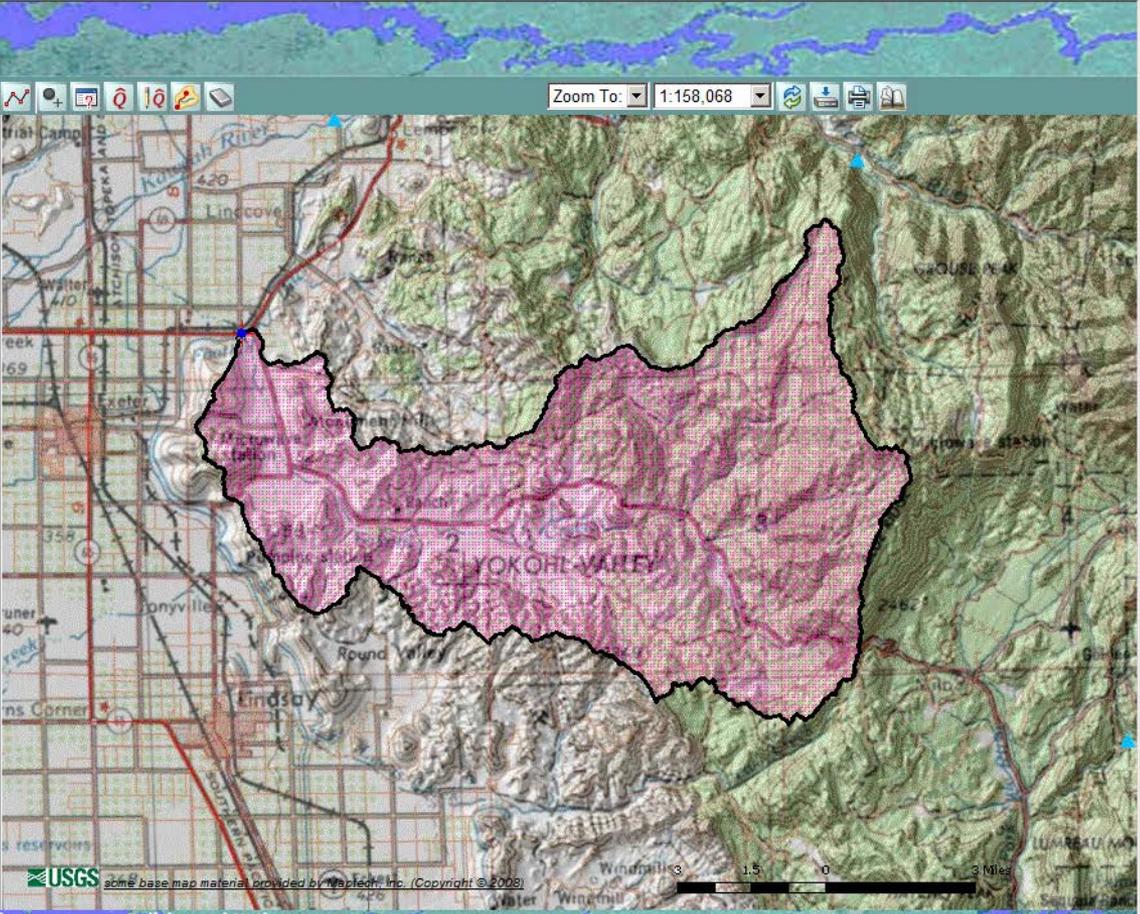
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Navigation



Overview



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[Streamstats Status](#) [News](#)

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AutoRefreshMap:67,0,5 Mon Apr 9 14:46:58 EDT 2012/Mon Apr 9 14:50:31 EDT 2012

Local intranet | Protected Mode: Off 100%

GIS Data for Watershed Delineations

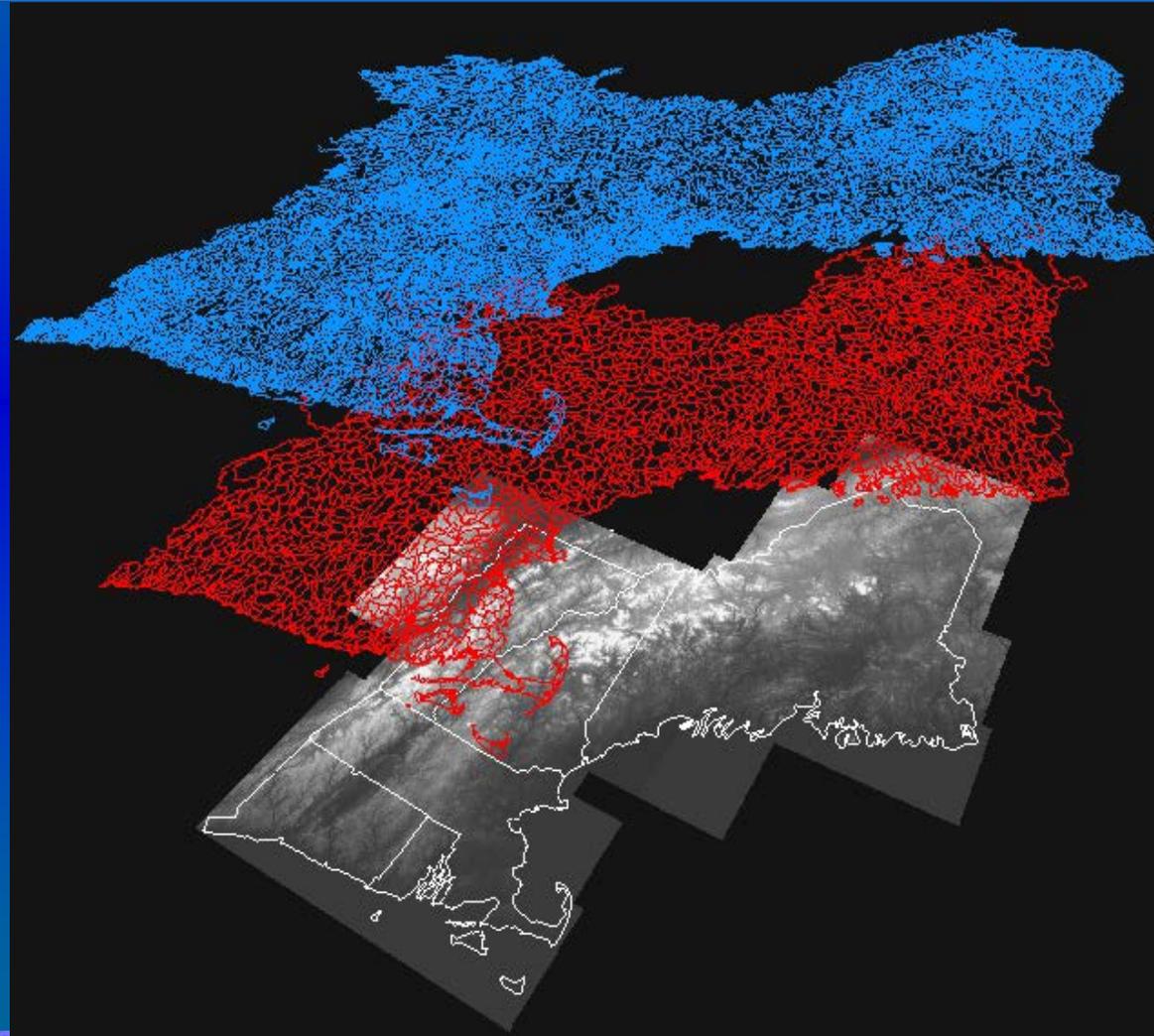
- Data preparation is done by local offices using ArcHydro Data Model and Tools

<http://support.esri.com/en/downloads/datamodel/detail/15>

- Data for boundary delineations

- Elevation grid – usually 10-m NED (<http://ned.usgs.gov>)
- Stream network – usually hi-res (1:24K) NHD (<http://nhd.usgs.gov>)
- Basin boundaries – usually WBD (<http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/>)
- NHDPlus (<http://www.horizon-systems.com/nhdplus/index.php>)
was used for CA, OR, and WA

StreamStats Integrates NHD Streams, WBD Boundaries and NED Elevation in ArcHydro

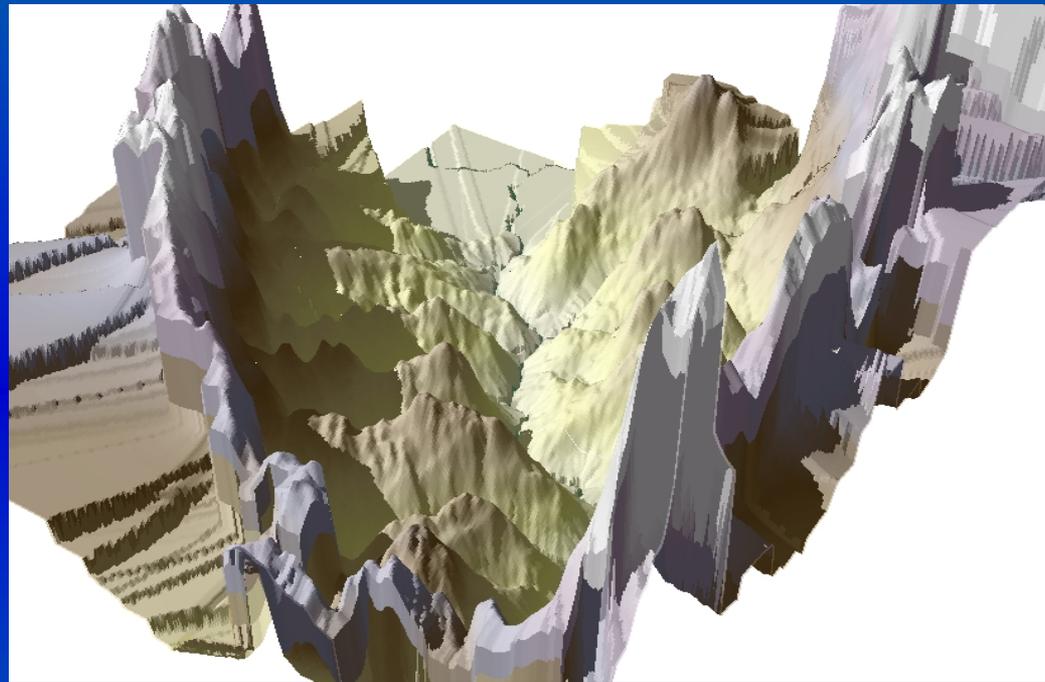


National
Hydrography
Dataset (NHD)

Watershed
Boundary
Dataset (WBD)

National
Elevation
Dataset (NED)

Burning and Walling of DEM



Forces DEM to agree with stream network and WBD or locally digitized drainage boundaries

NHDPlus

NHD Plus - NHDPlus Home - Windows Internet Explorer provided by MD-DE-DC WSC

http://www.horizon-systems.com/NHDPlus/index.php

File Edit View Favorites Tools Help

USGS Water Science for Mar... StreamStats in California NHD Plus - NHDPlus Home

National Hydrography Dataset Plus

Horizon Systems Corporation

Horizon Systems => NHD Plus => NHDPlus Home

« NHDPlus Home »

NHDPLUS Version 2 IS COMING!!

NHDPlus Version 2 (NHDPlusV2) will soon begin its public debut on this website. The data will be released by hydrologic region beginning in late April/early May. An announcement will be sent to those who have signed up for the NHDPlus email list. To sign up for the email list, please send an email with your contact information to NHDPlus@hscnet.com

The NHDPlus Team can be reached at NHDPlus@hscnet.com.

Horizon Systems and NHD Plus

As a member of the [NHDPlus team](#), Horizon Systems is pleased to host the NHDPlus WEB site. NHDPlus is a project envisioned by the US Environmental Protection Agency. The EPA Office of Water, assisted by the US Geological Survey, has supported the development of NHDPlus to enhance the [EPA WATERS](#) application. NHDPlus is an integrated suite of application-ready geospatial data sets that incorporate many of the best features of the National Hydrography Dataset (NHD), the National Elevation Dataset (NED), the National Land Cover Dataset (NLCD), and the Watershed Boundary Dataset (WBD).

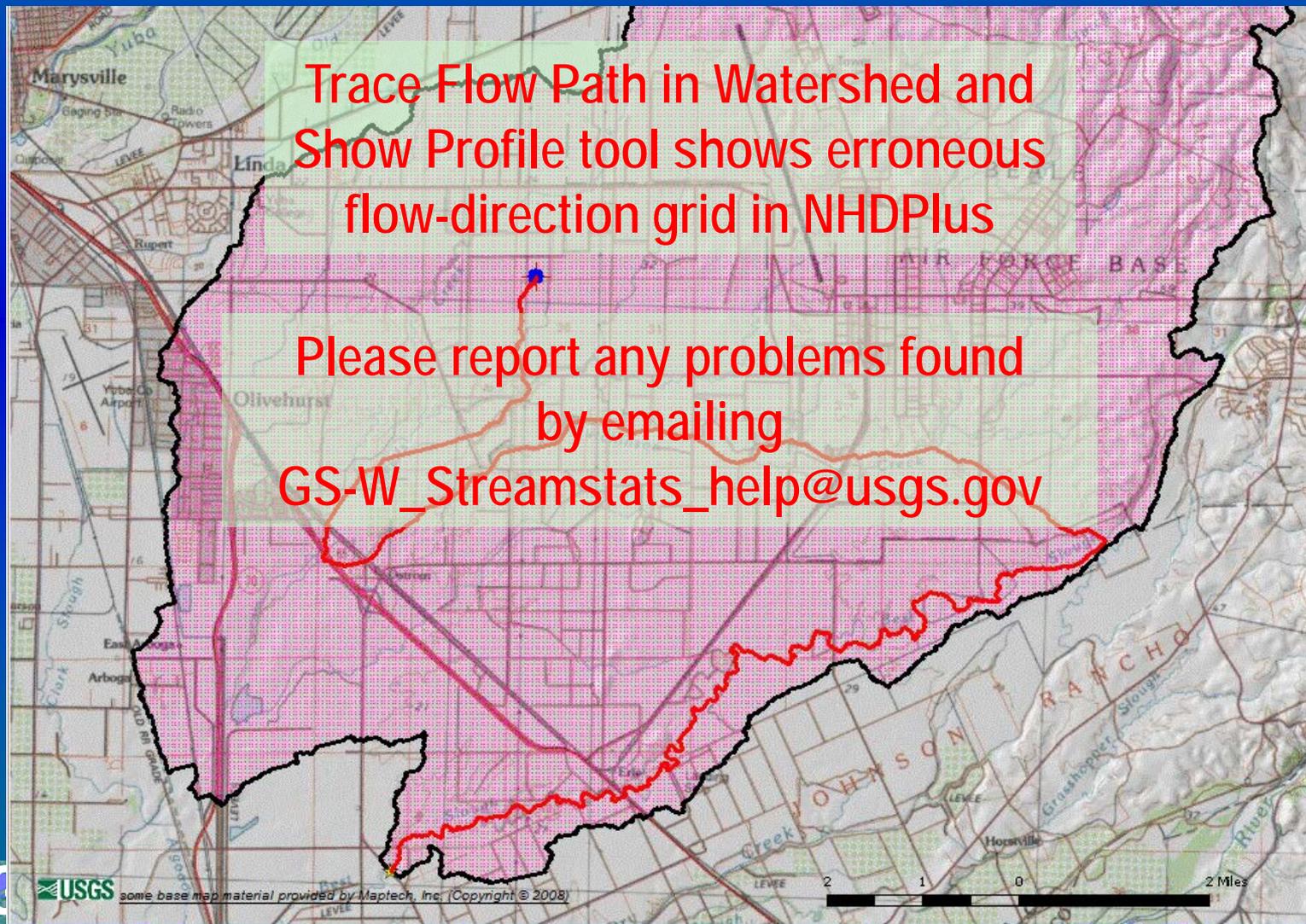
First released in 2006, the NHDPlus consists of nine components:

- Greatly improved 1:100K National Hydrography Dataset (NHD)
- A set of value added attributes to enhance stream network navigation, analysis and display
- An elevation-based catchment for each flowline in the stream network
- Catchment characteristics
- Headwater node areas
- Cumulative drainage area characteristics
- Flow direction, flow accumulation and elevation grids
- Flowline min/max elevations and slopes
- Flow volume & velocity estimates for each flowline in the stream network

In addition to working on the construction of the NHDPlus, Horizon Systems conducts NHDPlus training and technical support and develops [tools](#) for use with the NHDPlus data.

Internet | Protected Mode: On 100%

Bad Delineation from NHDPlus v1



Flow Statistics from Regression Equations

California StreamStats
Streamstats Ungaged Site Report

Date: Mon Apr 9 2012 13:01:23 Mountain Daylight Time
 Site Location: California
 NAD27 Latitude: 36.3254 (36 19 31)
 NAD27 Longitude: -119.0791 (-119 04 45)
 NAD83 Latitude: 36.3253 (36 19 31)
 NAD83 Longitude: -119.0800 (-119 04 48)
 Drainage Area: 72.3 mi²
 Percent Urban: 0.0
 Percent Impervious: 0.0

Peak-Flow Statistics
 100% Sierra Region (72.3 mi²)

Parameter	Mean	Standard Error	Minimum	Maximum
Drainage Area (square miles)	72.3	0.14	0	9020
Mean Annual Precipitation (inches)	7	7	0	85
Altitude Index (thousand feet)	1.43	0.1	0	9.7

Peak-Flow Streamflow Statistics

Statistic	Flow (cfs)	Standard Error (cfs)	Equivalent Years Return	90 Percent Prediction Interval	
				Minimum	Maximum
PK2	1070		92		
PK5	2270		85		
PK10	3220		69		
PK25	5230		78		
PK50	6700		92		
PK100	8710		100		
PK500	14800				

Regression equation estimates natural flow conditions at the selected site

Availability of equations varies among states

U.S. Department of the Interior | U.S. Geological Survey
 URL: <http://streamstatsags.cr.usgs.gov>
 Page Contact Information: StreamStats
 Page Last Modified: 04/09/2012 13:01:23



Example Regression Equation

- Regression equations take the form:

$$Q_{100} = 15.7A^{0.77}P^{1.02}H^{-0.43}$$

- where:

- Q_{100} is the 100-year flood flow, cubic feet per second
- A is drainage area, in square miles
- P is a mean annual precipitation, in inches
- H is an altitude index, in 1000 feet

This equation is for the California Sierra Region
from Waananen and Crippen, 1977

Get Basin Characteristics

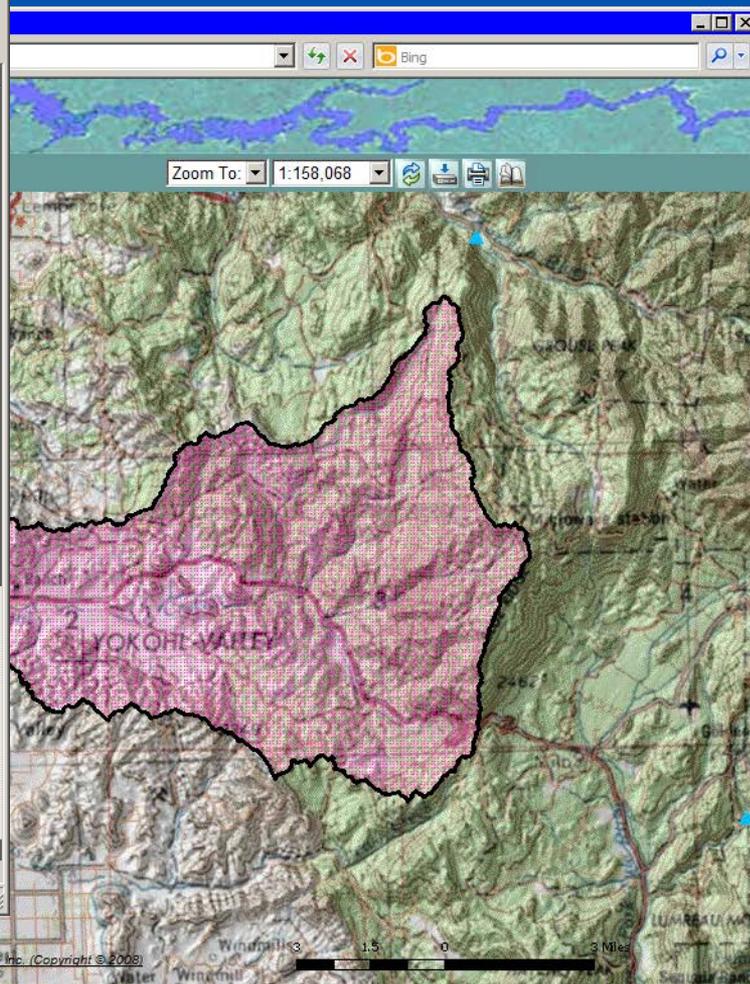
Basin Characteristics Report - Windows Internet Explorer provided by MD-DE-DC WSC

USGS
California StreamStats
Basin Characteristics Report

Date: Mon Apr 9 2012 12:56:06 Mountain Daylight Time
NAD27 Latitude: 36.3254 (36 19 31)
NAD27 Longitude: -119.0791 (-119 04 45)
NAD83 Latitude: 36.3253 (36 19 31)
NAD83 Longitude: -119.0800 (-119 04 48)

Parameter	Value
Area, in square miles	72.3
Mean annual precipitation, in inches	22.5
Average maximum January temperature, in degrees Fahrenheit	55.4
Average minimum January temperature, in degrees Fahrenheit	36.5
Maximum elevation, in feet	5741
Minimum elevation, in feet	462
Relief, in feet	5279
Elevation at outlet, in feet	462
Average basin elevation, in feet	1728
Relative relief - Basin relief divided by basin perimeter, in feet per mile	79.2
High Elevation Index - Percent of area above 6000 feet	0
Altitude Index, in thousands of feet. Estimated as 0.00083 times mean basin elevation.	1.43
Mean basin slope computed from 30 m DEM, in percent	25.9
Percentage of basin covered by forest	10.4

Done Local intranet | Protected Mode: Off 100%



Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: http://streamstats.sgs.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 13:44:28

[Streamstats Status](#) [News](#)

Printing the Map

USGS StreamStats - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS StreamStats - Microsoft Internet Explorer provided by MD-DC-DE WSC

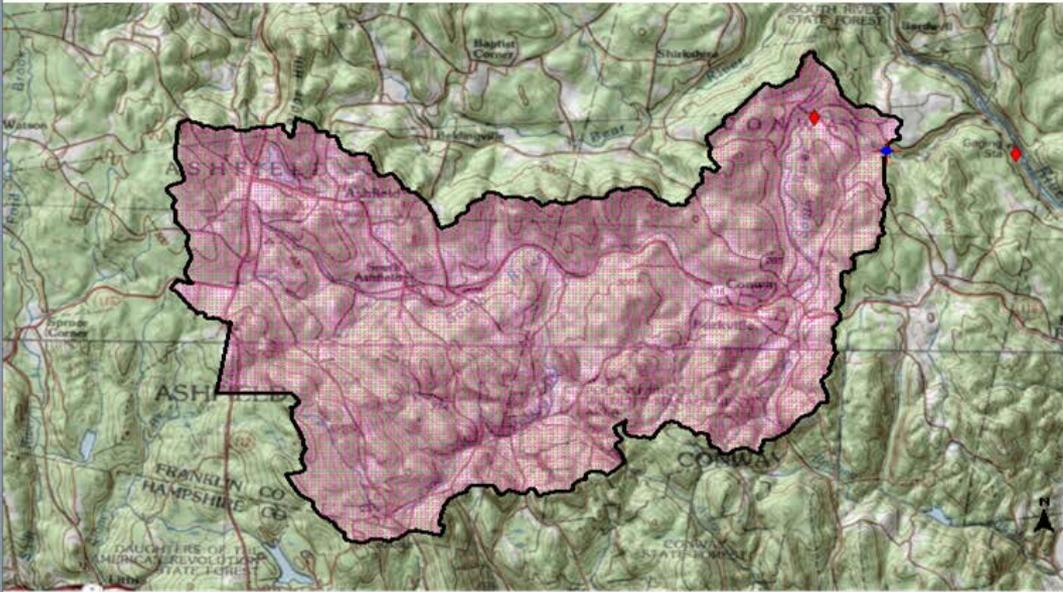
File Edit View Favorites Tools Help

★ Favorites Home RSS Print Page Safety Tools ?

USGS **Massachusetts StreamStats** Print

StreamStats Print Page

New Bridge Site on South River at Conway, MA



Explanation

- ★ GlobalWatershedPoint
- ◆ NHDHGage
- ◆ NHDHDam
- huc_net_Junctions
- ▲ Gaging Station, Continuous Record
- Low Flow, Partial Record
- ▲ Peak Flow, Partial Record
- ▲ Peak and Low Flow, Partial Record
- ▲ Miscellaneous Record
- ▲ Unknown
- Dendritic Stream Network
- streams
- ▭ GlobalWatershed
- ⊗ Excludepoly
- hucpoly

2 1 0 2 Miles

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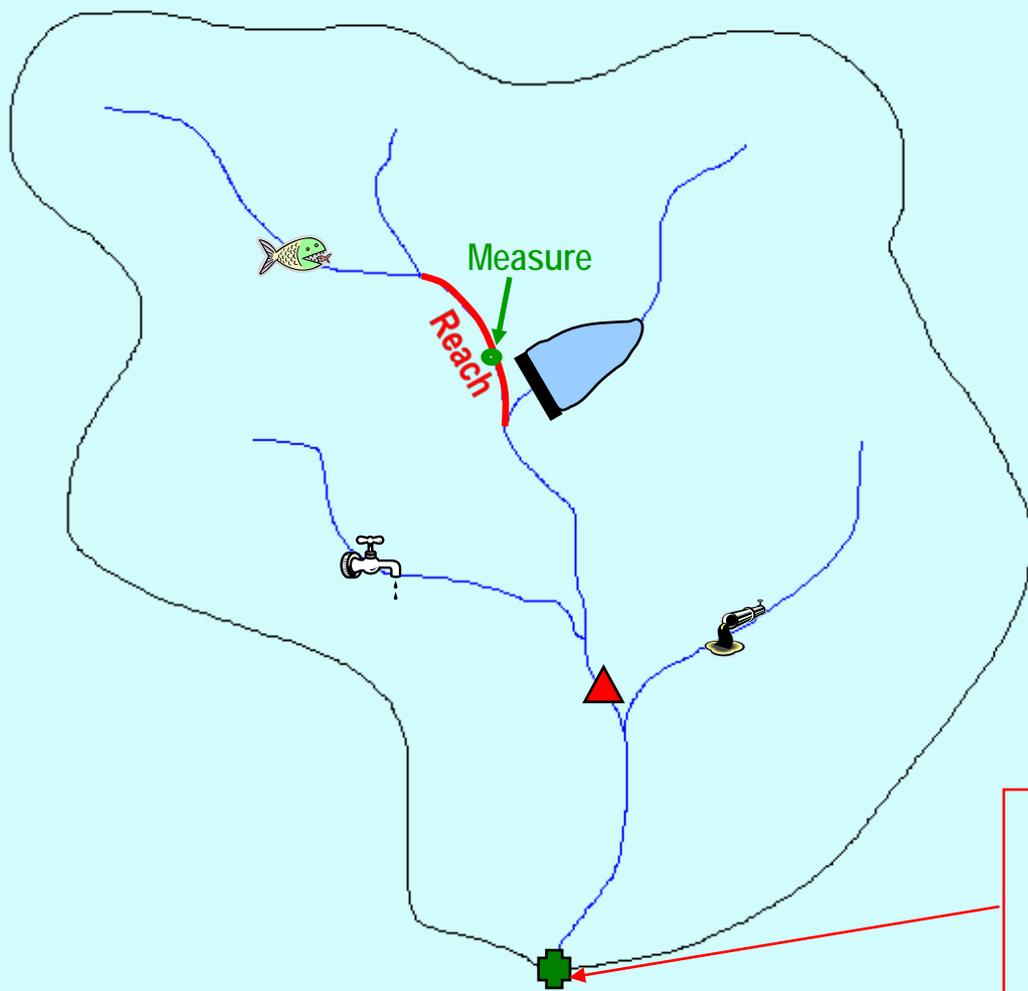
Done Local intranet 100%



Other Tools for Use With Delineated Basins Not Yet Available for CA

- Edit a Delineated Basin
 - Add or remove areas
- Edit Parameters and Recompute Flows
 - Allows testing of scenarios
- Estimate Flows Based on Similar Streamgaging Stations
 - Estimates flows using nearby streamgages and drainage-area ratio method
 - Relies on stream network navigation

Network Navigation/NHD Reach Indexing



Explanation

-  User-selected site
-  Streamgaging station
-  Dam site
-  Point discharge
-  Water withdrawal
-  Biological sampling site

StreamStats provides reach addresses for user-selected sites, consisting of reach number and percentage distance from downstream end of reach

Flow Estimation Based on Similar Gages

Flows Report based on gages - Microsoft Internet Explorer provided by MD-DC-DE WSC

MAXDV Maximum_daily_flow 1.0557 1570 37 1660

Estimated flows for the user-selected site determined by weighting of regression equation-based estimates and nearby streamgaging station estimates.

Weighted flows based on regression and gage station estimates

Low-Flow Statistics

Flow types	Flow description	Regression estimates	Drainage-area ratio estimates	Weighted estimates	Weighted equivalent years of record
M7D10Y	7_Day_10_Year_Low_Flow	2.5	3.5	3.39	
M7D2Y	7_Day_2_Year_Low_Flow	4.23999977	5.67	5.51	

Flow-Duration Statistics

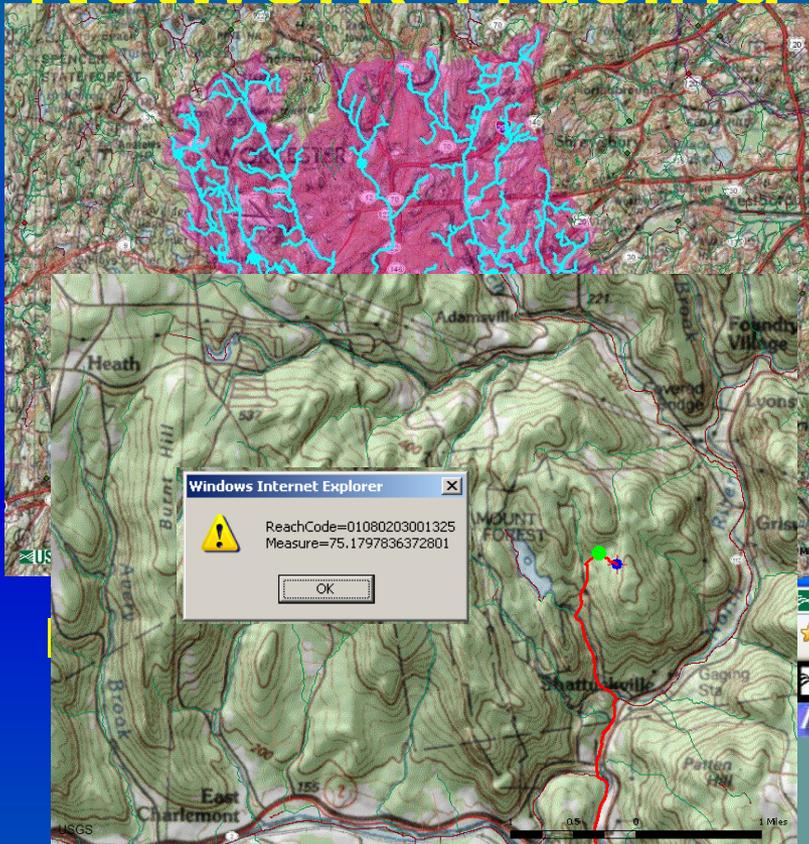
Flow types	Flow description	Regression estimates	Drainage-area ratio estimates	Weighted estimates	Weighted equivalent years of record
D99	99_Percent_Duration	2.53999996	3.8	3.66	
D98	98_Percent_Duration	3.5	5.5	5.5	
D95	95_Percent_Duration	4.69000005	5.91	5.78	
D90	90_Percent_Duration	6.3	7.6	7.49	
D85	85_Percent_Duration	8.14999961	9.61	9.44	
D80	80_Percent_Duration	11.1	13.7	13.4	
D75	75_Percent_Duration	11.10000038	13.7	13.4	
D70	70_Percent_Duration	13.5	16.9	16.5	
D60	60_Percent_Duration	18.29999923	23.2	22.7	
D50	50_Percent_Duration	25.89999961	31.7	31	

See Ries, 2006, USGS
Techniques and Methods
Book 4-A6, p 9 for
weighting equations

provided if
.5 and <= 1.5



Network Tracing in StreamStats



Trace Report - Microsoft Internet Explorer provided by MD-...

http://ssdev.cr.usgs.gov/gisimg/Reports/NHDTraceReport3072_2009926125417.htm

bing 63°F

USGS
Massachusetts StreamStats

Date: Sat Sep 26 2009 10:54:17 Mountain Daylight Time

Network
Linear
Trace
Reach
Measure

NHD
Sou

USGS

60 30 0 60 Miles

NHDHgage_MA

Source_FeatureID	ReachCode	Measure
01110000	01090003000106	64.59123672
01109730	01090003000317	8.62007276
01110500	010900030005705	81.42261045
01109439	01090003000341	54.97050468
01109595	010900030006172	53.00156966
01109500	01090003000235	28.05402123

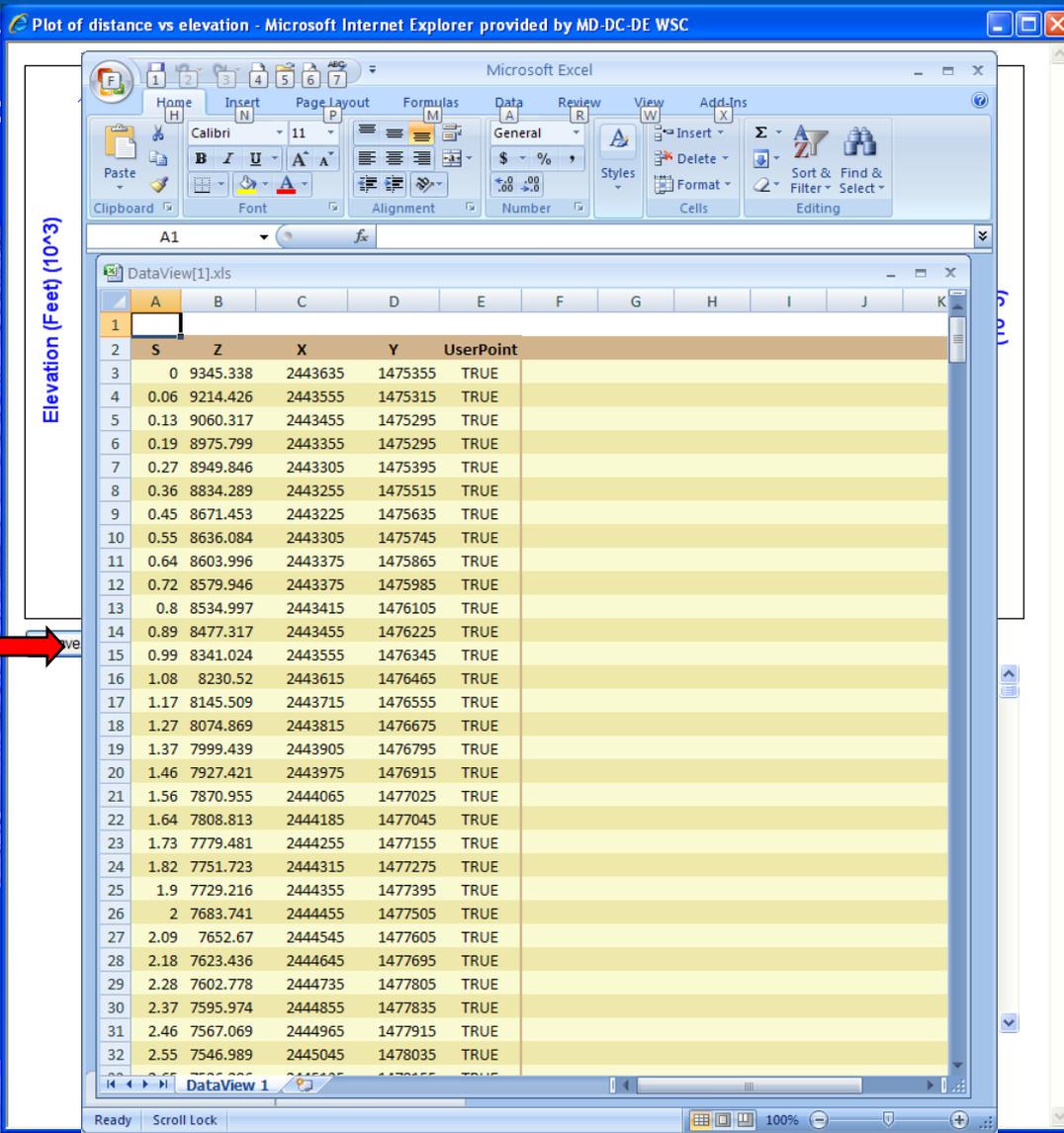
Done Internet 100%

- Raindrop trace to network
- Display path from point
- Compute reach address

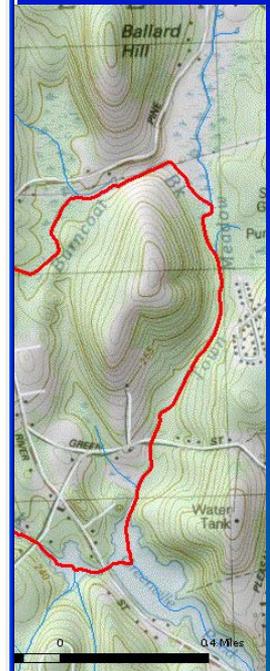
Stream

Network Profile Plots

Trace f



ershed



Terrain Profile Tool

USGS StreamStats - Microsoft Internet Explorer

http://ssdev.cr.usgs.gov/ma...

Results

Map Contents

- MA@ma_ss
- SDE92data.DE
- SDE92data.DE
- Stream Gages
- High Res NHD
- State Boundaries
- Dendritic Stream

Navigation

Overview

Accessibility

U.S. Department of the Interior
 URL: http://ssdev.cr.usgs.gov
 Page Contact Information:
 Page Last Modified: 09/25/2007

Plot of distance vs elevation HUC:01080204 63 points. - Microsoft Internet Explorer provided by MD-DC-DE WSC

http://ssdev.cr.usgs.gov/ma_ss/plot.aspx?stabbr=MA

Plot of distance vs elevation HUC:01080204 63 points.

S	Z	X	Y	UserPoint
0	212.89	131083.06	893314.08	True
10.24	212.51	131073.04	893311.95	False
20.49	211.24	131063.02	893309.82	False
30.73	210.19	131053	893307.7	False
40.98	208.96	131042.97	893305.57	False
51.22	207.43	131032.95	893303.45	False
61.46	205.44	131022.93	893301.32	False
71.71	202.32	131012.91	893299.2	False
81.95	199.4	131002.89	893297.07	False
92.2	196.14	130992.87	893294.94	False
102.44	192.49	130982.85	893292.82	False
112.69	188.21	130972.83	893290.69	False

Save2Excel

Done Internet 100% 100%

Maryland Water-Use Summaries

Streamflow Statistics Report - Microsoft Internet Explorer provided by MD-DC-DE WSC

Water-Use Report
Withdrawal-Discharge Summary Report for 2005
[values are in million g]

Available to all users

Totals	January	February	March	April	May	June	July	August	September	October	November	December	Annual mean	Annual sum
Withdrawals	0.0027	0.0027	0.0027	0.024	0.0293	0.0497	0.04	0.0343	0.073	0.0087	0.0027	0.0007	0.0225	8.223
Discharges	0.009	0.009	0.1	0.01	0.01	0.01	0.01	0.008	0.009	0.01	0.01	0.01	0.0171	0.205
Net	0.0063	0.0063	0.0973	-0.014	-0.0193	-0.0397	-0.03	-0.0263	-0.064	0.0013	0.0073	0.0093	-0.022	-8.018

Done Local intranet 100%

$$\text{Net} = \sum \text{Discharges} - \sum \text{Withdrawals}$$

Detailed Water-Use Site Information

Streamflow Statistics Report - Microsoft Internet Explorer provided by MD-DC-DE WSC

Detailed Site Report

[values are in million gallons per day; FA-DV is a surface-water withdrawal, FA-OF is a surface-water discharge, GW is a ground-water withdrawal]

NAME	TYPE	WATUSECD	PERMITNUM	PERMITCODE	SWUDSID	YEAR	January	February	March	April	May	June	July	August	September	October	Nov
SW Intake-Deer Creek near Mine Field, MD	FA-DV	IR	HA1												0.007	0.004	0.001
SW Intake-Deer Creek at Street, MD	FA-DV	IR	HA1												0.04	0.002	0
HA Ba 89	GW	CO	HA1												0	0	0
HA Bc 40	GW	IR	HA1992G010	ALLC	2147446188	2005	0	0	0	0.003	0.003	0.004	0.005	0.006	0.006	0.002	0.001
HA Bc 39	GW	IR	HA1989G026	ALLC	2147446191	2005	0.0003	0.0003	0.0003	0.005	0.0057	0.0083	0.003	0.0047	0.01	0.0003	0.000
HA Bc 36	GW	IR	HA1989G026	ALLC	2147446082	2005	0.0003	0.0003	0.0003	0.005	0.0057	0.0083	0.003	0.0047	0.01	0.0003	0.000
BA Ad 152	GW	IR	BA1992G027	ALLC	2147447410	2005	0	0	0	0	0	0	0	0	0	0	0
SW Outfall-Deer Creek at Federal Hill, MD	FA-OF		MD0024953	NPDS	2147446325	2005	0.009	0.009	0.1	0.01	0.01	0.01	0.01	0.008	0.009	0.01	0.01

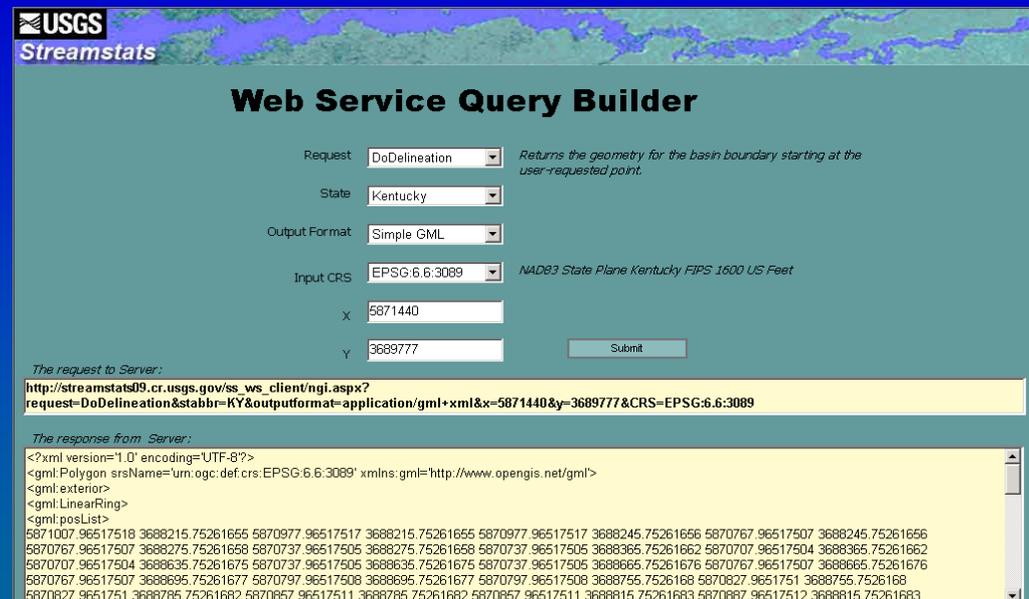
Available only for users with login privileges (mostly gov't agencies)

StreamStats Web Services

Available for:

- Basin delineation
- Gaging station statistics
- Ungaged site statistics
- Compute NHD reach and measure
- More coming

See [Available Web Services](#) link from StreamStats home page for more information



USGS Streamstats

Web Service Query Builder

Request: Returns the geometry for the basin boundary starting at the user-requested point.

State:

Output Format:

Input CRS: NAD83 State Plane Kentucky FIPS 1600 US Feet

X:

Y:

The request to Server:
`http://streamstats09.cr.usgs.gov/ss_ws_client/ngi.aspx?request=DoDelineation&stabbr=KY&outputformat=application/gml+xml&x=5871440&y=3688777&CRS=EPSG:6.6:3089`

The response from Server:
`<?xml version='1.0' encoding='UTF-8'?>
<gml:Polygon srsName='urn:ogc:def:crs:EPSG:6.6:3089' xmlns:gml='http://www.opengis.net/gml'>
<gml:exterior>
<gml:LinearRing>
<gml:posList>
5871007 96517518 3688215 75261655 5870977 96517517 3688215 75261655 5870977 96517517 3688245 75261656 5870767 96517507 3688245 75261656 5870767 96517507 3688365 75261662 5870707 96517504 3688365 75261662 5870707 96517504 3688635 75261675 5870737 96517505 3688635 75261675 5870737 96517505 3688665 75261676 5870767 96517507 3688665 75261676 5870767 96517507 3688695 75261677 5870797 96517508 3688695 75261677 5870797 96517508 3688755 75261688 5870827 9651751 3688755 75261688 5870827 9651751 3688785 75261682 5870857 96517511 3688785 75261682 5870857 96517511 3688815 75261683 5870887 96517512 3688815 75261683`

StreamStats Results in Google Earth

The screenshot displays the Google Earth Pro interface with a 3D topographic map of a watershed area shaded in red. A yellow line representing a stream network is overlaid on the terrain. A callout window titled "Basin: UT Demo" provides the following data:

Basin: UT Demo

For more information see:
[StreamStats Web Services](#)

OID = 3708
HydroID = 4575
DrainID = 4575
Name = UT Demo
Descript = W14060009
GlobalWshd = 1
HUCID = 14060009
DRNAREA = 119.47
ELEV = 9211.859
BSLDEM10M = 29.924
PRECIP = 25.516
HERBNAT = 7.945
PK2 = 253
PK5 = 574
PK10 = 856
PK25 = 1340
PK50 = 1780
PK100 = 2420
PK200 = 2840
PK500 = 3720

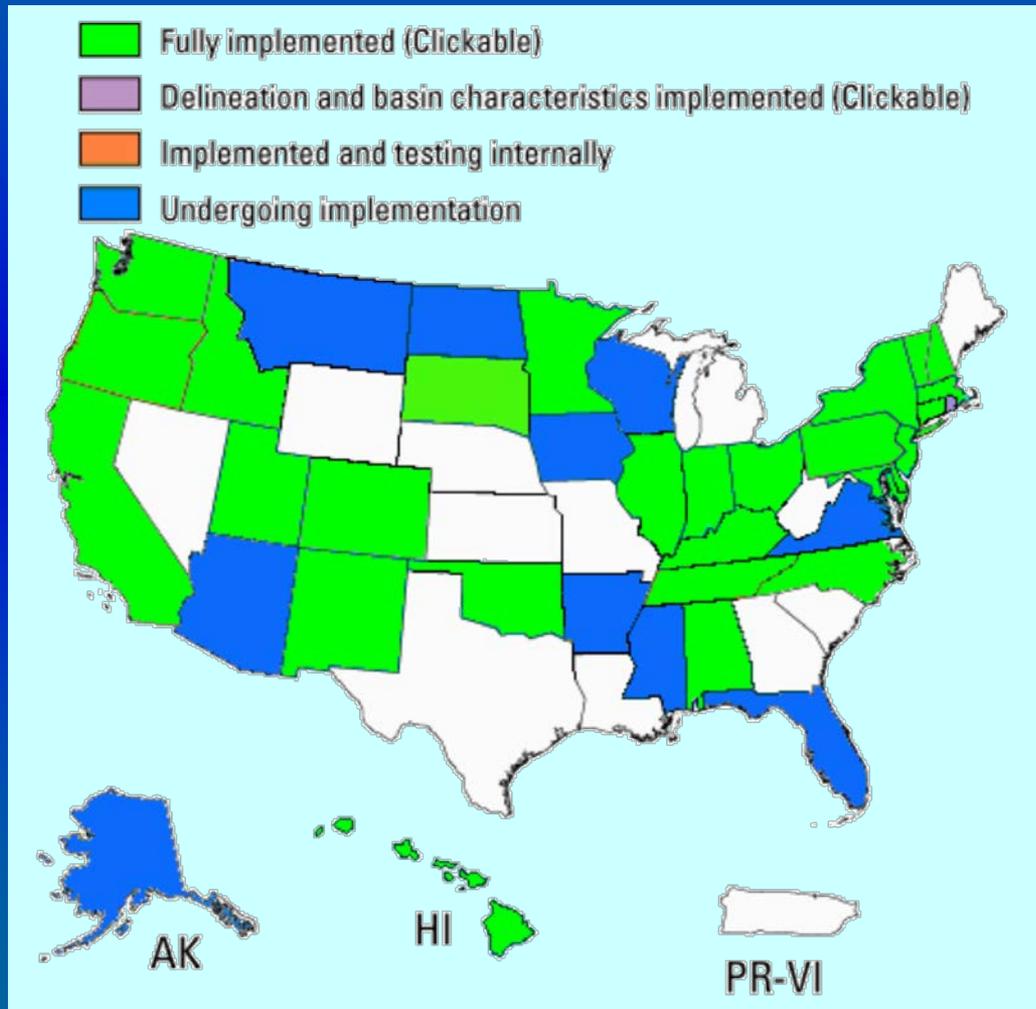
The interface also shows a "Places" panel on the left with a tree view containing "UT Demo", "USGS topo maps", "Delineation Point", "Basin Centroid", "Basin: UT Demo", and "USGS Logo". The "Layers" panel at the bottom left includes "Primary Database", "Geographic Web", "Roads", "3D Buildings", and "Street View". The status bar at the bottom indicates coordinates (39°44'27.78" N, 111°27'27.09" W) and an elevation of 6929 ft.



Batch Processing

- http://streamstatsags.cr.usgs.gov/ss_bp/
- Input: a point shapefile snapped to the stream grid
- Uses Web Services to perform the computations
- Emails the user when the output is available

National Implementation Status

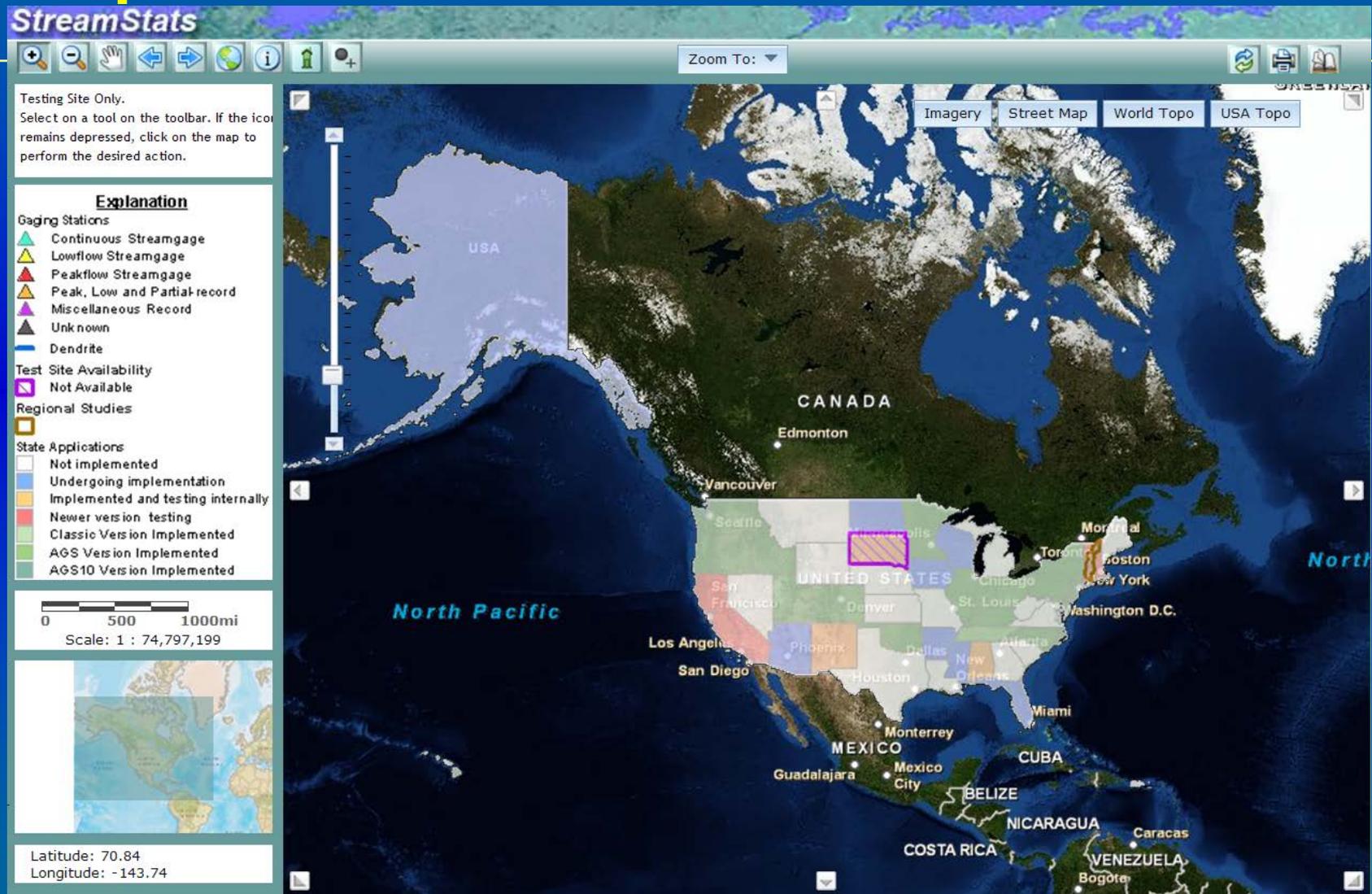


- 27 states fully implemented
- 1 state partly implemented
- 10 states in implementation process

Planned StreamStats Enhancements

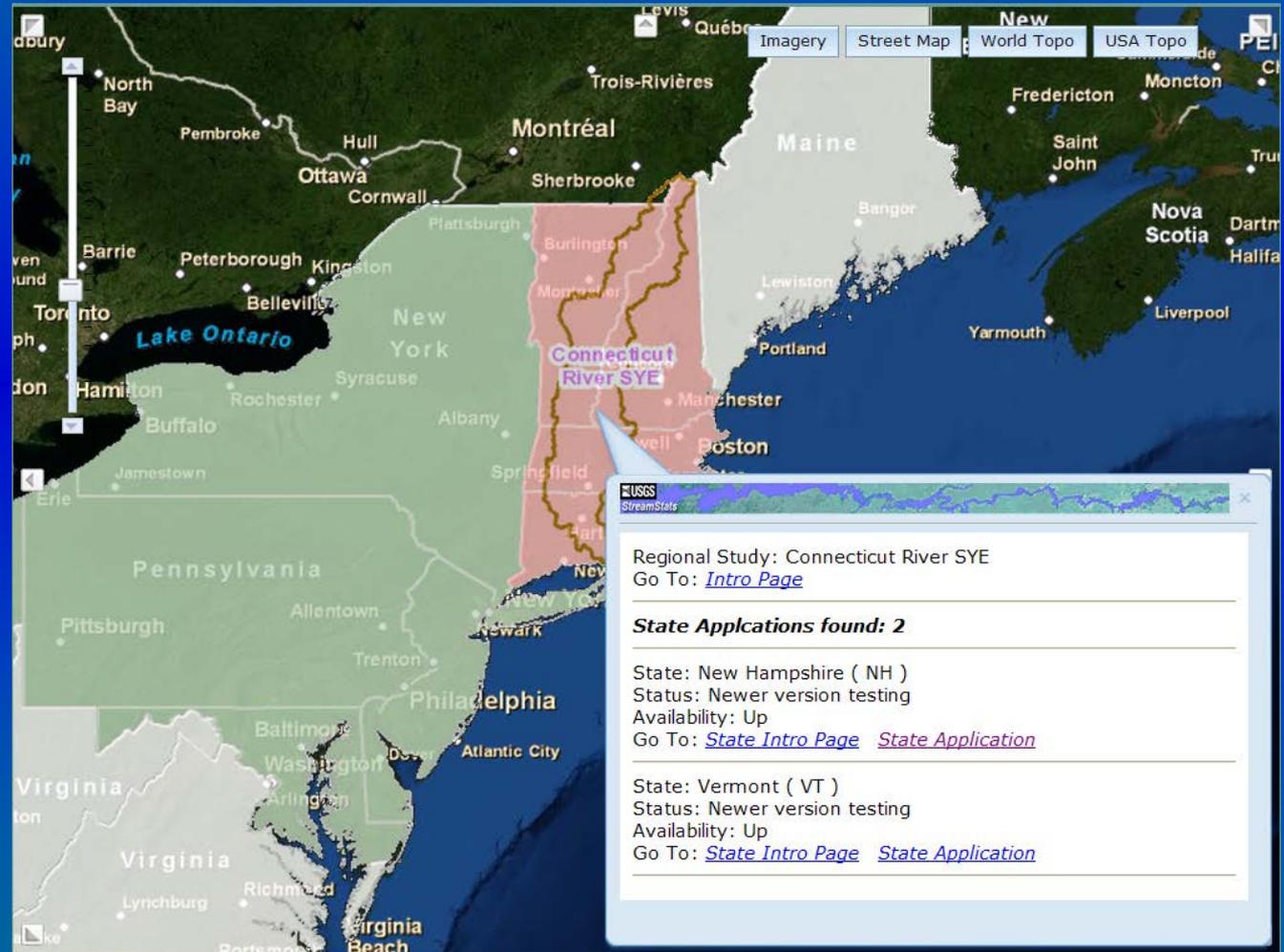
- Migration from ArcGIS Server 9.2 to 10, with web services for all functionality
- A single user interface for seamless access to all state and regional applications
- Estimation of daily flows for Connecticut R. and Delaware R. Basins, MA, PA, NY, IA, probably others
- Automated annual update of non-interpretive streamflow statistics
- Enhanced descriptive information and indicators of errors of computed statistics for streamgages
- Improved and expanded tracking of water use
- Improved documentation

Proposed new user interface



Proposed new user interface

■ Displays all regional studies and state applications near the point that was clicked



Questions or Suggestions?

■ URL

- <http://streamstats.usgs.gov>

■ Team email

- [GS-W StreamStats@usgs.gov](mailto:GS-W_StreamStats@usgs.gov)