



The USGS StreamStats Web Application for California

Presented to the California Water Quality
Monitoring Collaboration Network,
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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
 - Kernal 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>

The screenshot shows the StreamStats Home Page in Microsoft Internet Explorer. The title bar reads "Welcome to StreamStats - Microsoft Internet Explorer provided by MD-DC-DE WSC". The address bar shows the URL "http://water.usgs.gov/osw/streamstats/". The menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar includes Back, Forward, Stop, Refresh, and Search buttons. The search field contains "Google". The page content area features the USGS logo and the tagline "science for a changing world". A banner at the top right says "USGS Home", "Contact USGS", and "Search USGS". A message at the top right states "Best viewed in Internet Explorer 5 or above" and "Screen resolution of 1024x768". The main content area has a teal header "Welcome to StreamStats". On the left, a sidebar lists links: Home, News, StreamStats Description, Ungaged Sites, Data-Collection Stations, StreamStats Limitations, State Applications, USGS Station Statistics (with a red arrow pointing to it), User Instructions, Definitions, Basin Characteristics, Streamflow Statistics, StreamStats Fact Sheet, Frequently Asked Questions, Talks and Other Info, and Internal Links. The main content area describes StreamStats as a Web-based tool for obtaining streamflow statistics, drainage-basin characteristics, and other information for user-selected sites on streams. It mentions the use of a GIS program to estimate information for ungaged sites and the availability of state applications for each state.

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 ungaged 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 ungaged 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.

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

0 200 400mi



Zoom To:

- Lat/Long
- Gage Station
- Place Name
- Street Address
- State
- HUC8
- HUC12

Imagery **Street Map** **World Topo** **USA Topo**



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

Streamstats Status **News**

  **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:

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

HUC 8 HUC 12

Imagery Street Map World Topo USA Topo

0 1.5 3mi
Scale: 1 : 288,895

IDAHO

Eagle Garden City Boise Meridian

Boise County

Imagery

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

Streamstats Status News

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Streamgage Reports

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

File Edit View Favorites Tools Help

Favorites Suggested Sites Web Slice Gallery

StreamStats Data-Collection Station Report

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.

USA.gov Take Pride in AMERICA

Latitude: 41.79012 Longitude: -124.07568

Red

0 1.5 3mi

Scale: 1 : 288,895

StreamStats National Data Center

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
- Stage Only
- Low Flow, Partial Record,
- Miscellaneous Record
- Unknown

HUC 8 HUC 12

USA Topo

Forest Route

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StreamStats Home Page

<http://streamstats.usgs.gov>

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Done

Internet

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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

Favorites Suggested Sites Web Slice Gallery

USGS Water Science for Mar... State Info

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

Welcome to StreamStats

State Applications

Choose a State

StreamStats Application Status

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

A map of the United States where states are colored based on StreamStats implementation status. Most states are green (Fully implemented). Some states are orange (Delineation and basin characteristics implemented). A few states are blue (Undergoing implementation). A red arrow points to the state of California, which is colored orange.

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California Introductory Page

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

File Edit View Favorites Tools Help

Favorites Suggested Sites Web Slice Gallery

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 ungauged 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

Local intranet | Protected Mode: Off 100% □

California User Interface

The screenshot displays the California StreamStats application interface. On the left, a vertical panel is outlined in red and labeled "Panel Banners". This panel contains four sections: "Results", "Map Contents", "Navigation", and "Overview", each with a "»»" button. A red arrow points from the text "Panel Banners" up to this panel. To the right of the panel is a large white area labeled "Console" in pink text. At the top of the map area is a toolbar outlined in yellow and labeled "Toolbar". The toolbar includes various icons for zooming, panning, and data analysis, along with a "Zoom To:" dropdown set to coordinates 1:7,055,911. Below the toolbar is a map of California showing major cities like Sacramento, San Francisco, San Jose, Fresno, Bakersfield, Los Angeles, Long Beach, Riverside, San Diego, and Las Vegas. Major interstate highways are shown as red lines. A cyan line highlights a specific route across the state. The bottom of the map features a scale bar indicating distances from 0 to 150 miles. At the very bottom of the interface, there is a footer bar with links for Accessibility, FOIA, Privacy, Policies and Notices, Streamstats Status, and News. The USGS logo is also present in the bottom left corner.

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: 1:7,055,911

Toolbar

Panel Banners

Console

Results

Map Contents

Navigation

Overview

150 Miles

0 75 150

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 10:13:18

Streamstats Status News

USA.gov

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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

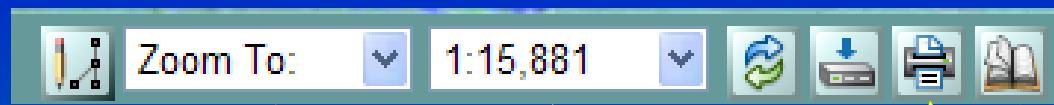
100%

Tools



Zoom In/Out
Pan
Last/Next/Full Extent
Magnify
Rule
Identity
Caging
Watershed
Station Register
Profile
Point
Print
Help

Information



Edit Delineated
Zoom To:
Scale
Refresh
Download
Print
Help

Logging (not Place, NHD+ Radio to A Collector
available for CA)

Zoom-To Tools

Lat/Long

Zoom to Latitude-Longitude - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS
Massachusetts StreamStats

Enter a valid NAD83 Latitude, Longitude

Coordinates can be in DD.dddd, DD MM.mmmm, or DDD MM SS.ss format

Latitude Longitude

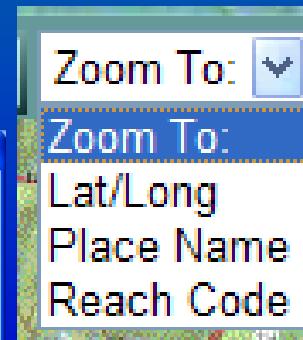
Reach Code

Zoom to NHD Reach and Measure - Microsoft Internet Explorer provided by MD-DC-DE WSC

USGS
Massachusetts StreamStats

Enter a valid NHD Reach and Measure

NHD Resolution



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

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 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

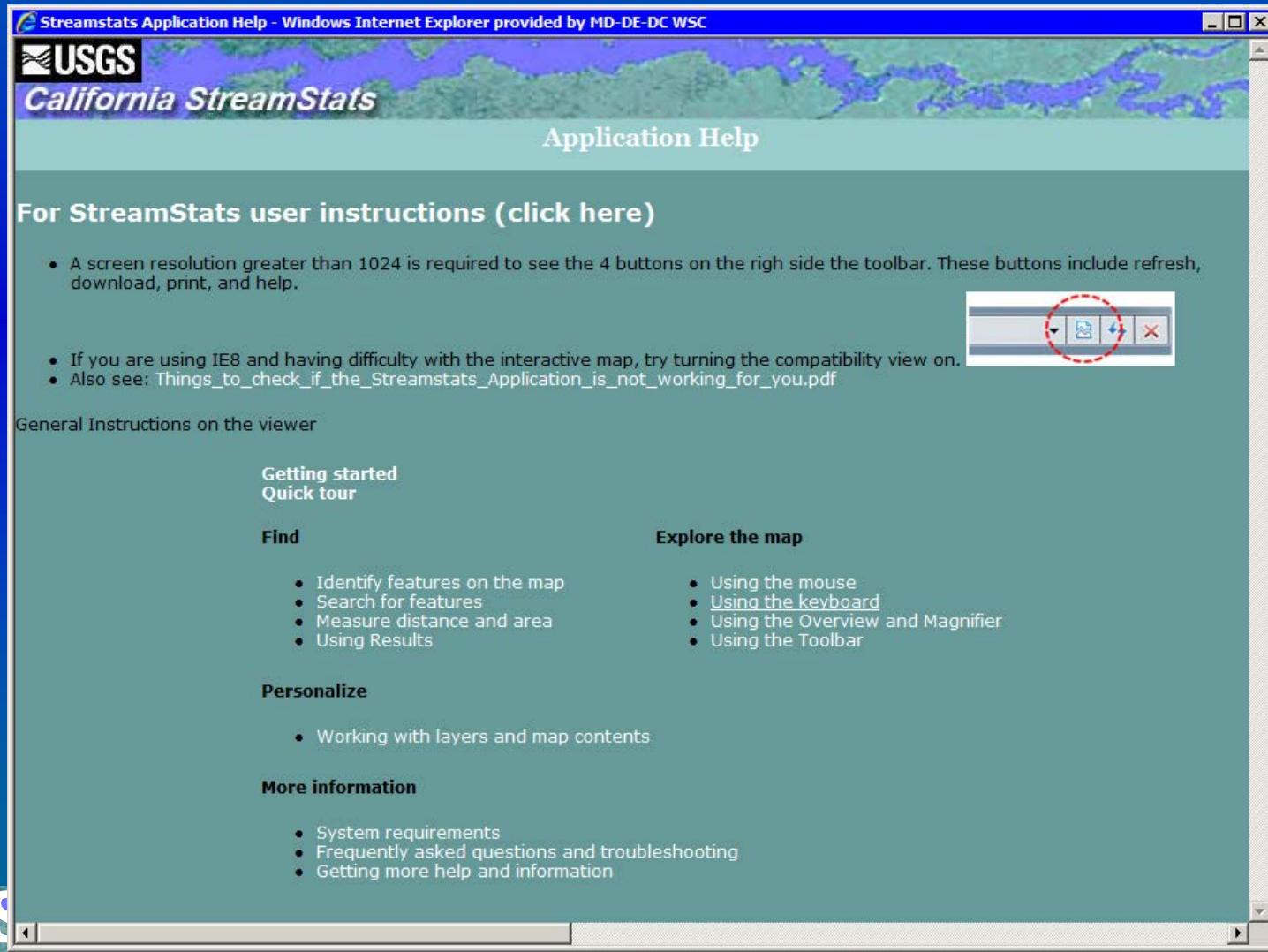
- Using the mouse
- [Using the keyboard](#)
- Using the Overview and Magnifier
- Using the Toolbar

Personalize

- Working with layers and map contents

More information

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



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 Bing

USGS California StreamStats

Results

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

Map Contents

Navigation

Overview

Zoom To: 1:7,055,911

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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: 04/12/2012 16:48:04

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USA.gov Government Maps Eats

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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

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC
http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333985629994

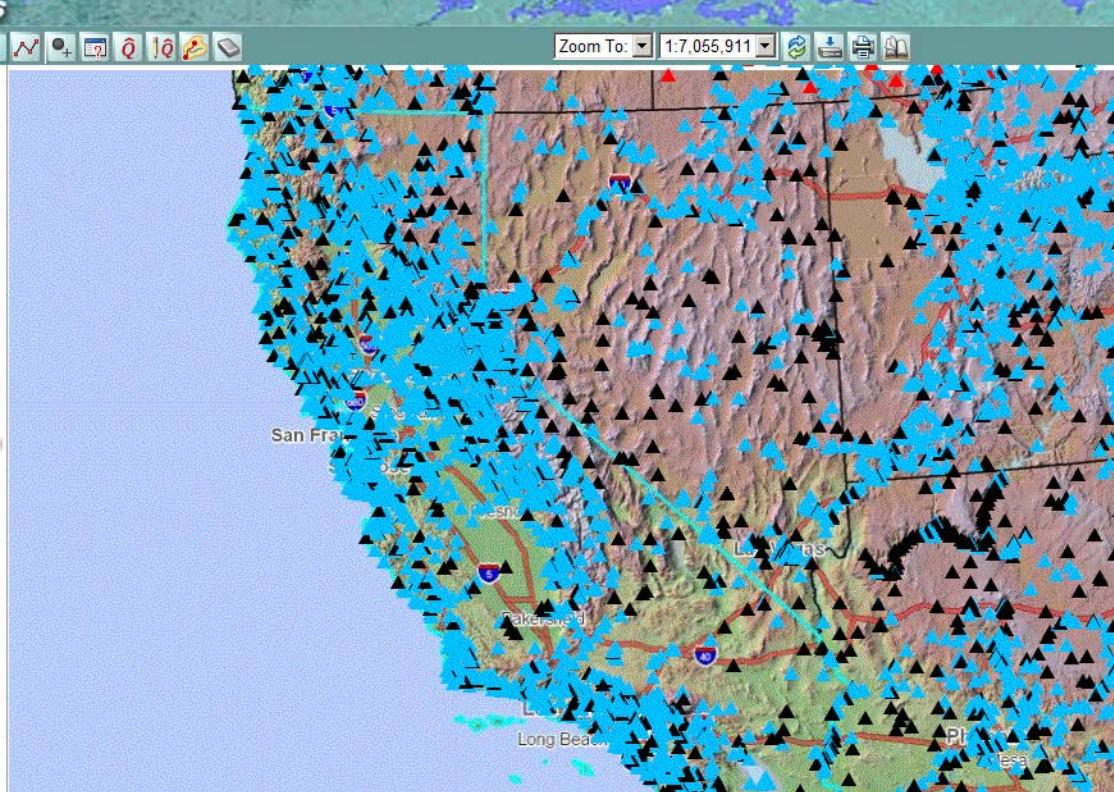
USGS California StreamStats

Map Contents

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

Navigation

Overview



San Fran
Los Angeles
Palo Alto
Long Beach
Sacramento
Folsom
Placer
Mesa
San
150 Miles

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URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 11:43:36

Streamstats Status News

USA.gov
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Navigation Panel

The screenshot shows the USGS StreamStats interface in Internet Explorer. The main window displays a map of Southern California with a dense distribution of blue triangles representing stream gage locations. A red arrow points from a green callout box to a compass rose located in the navigation panel on the left side of the map.

**Click on points of
compass to move map center**

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC
http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333985629994

Map Contents

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

Navigation

N
W E
S

Overview

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

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URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
Page Contact Information: StreamStats Help
Page Last Modified: 04/09/2012 11:43:36

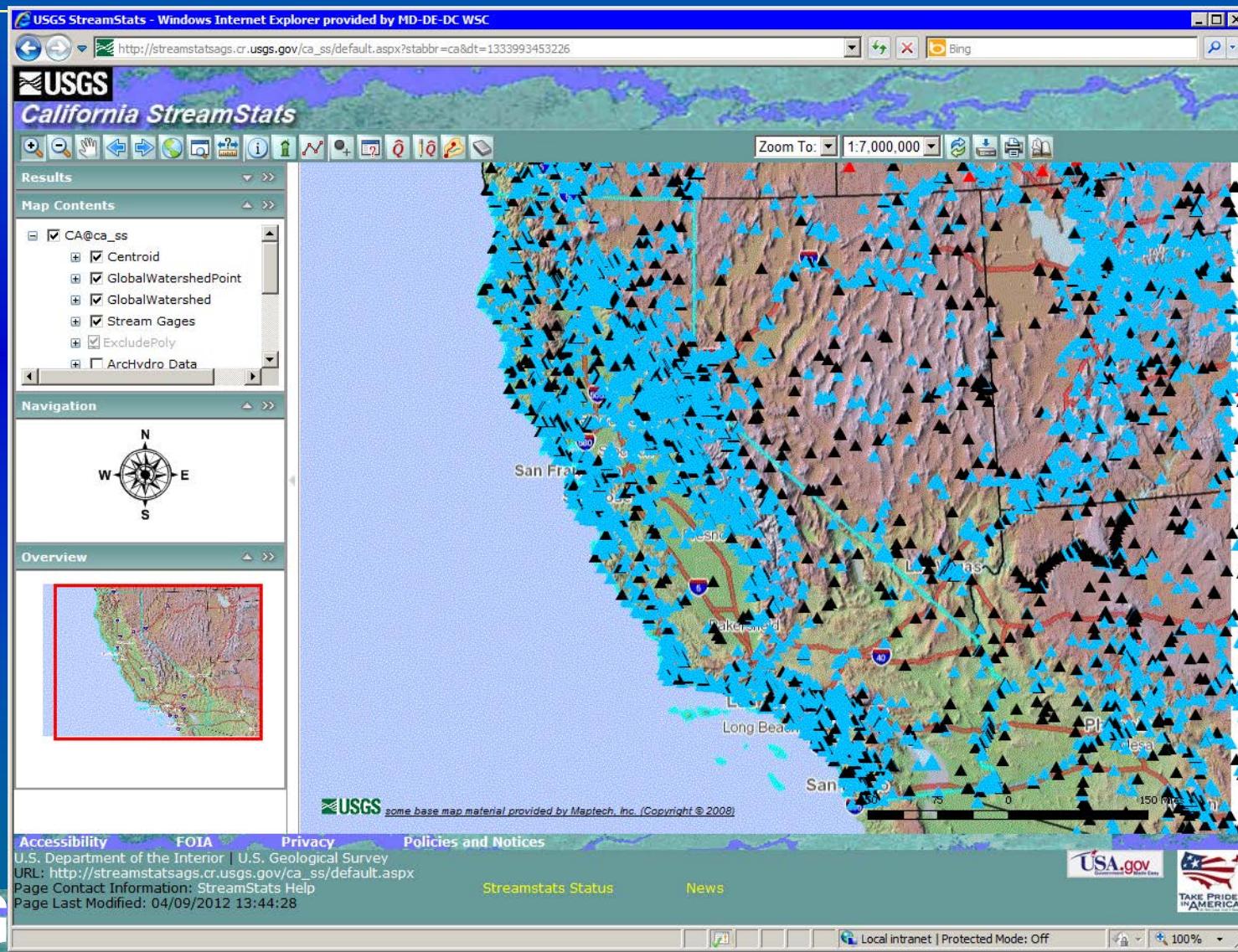
Streamstats Status News

Local intranet | Protected Mode: Off

AutoRefreshMap: 19,0,5 Mon Apr 9 12:00:43 EDT 2012/Mon Apr 9 12:01:40 EDT 2012

100%

Overview Map



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

Bing

USGS
California StreamStats

Map Contents

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

Navigation



Overview

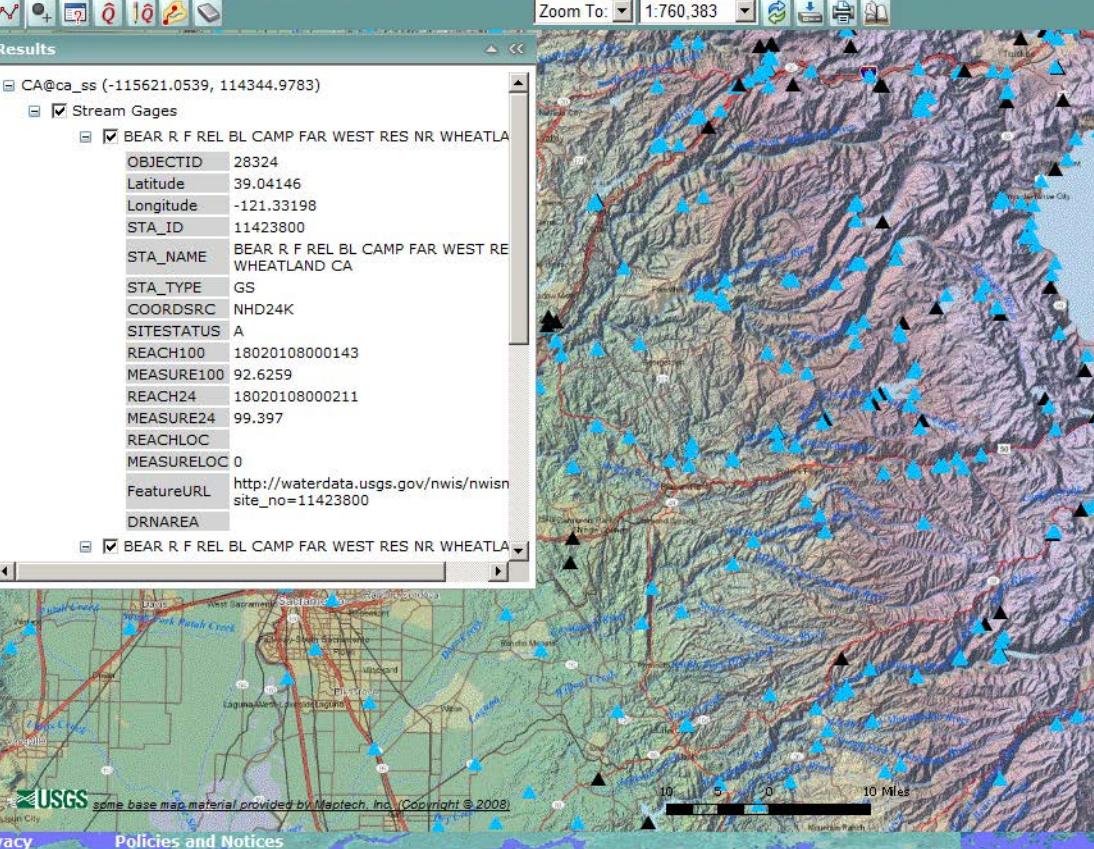


Results

- 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	0
MEASURELOC	0
FeatureURL	http://waterdata.usgs.gov/nwis/nwisan
DRNAREA	

- BEAR R F REL BL CAMP FAR WEST RES NR WHEATLA



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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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100%

Select Ungaged Site

The screenshot shows the USGS StreamStats application running in Internet Explorer. The main window displays a topographic map of a watershed area. A blue dashed line outlines the watershed boundary. A red arrow points to the 'Zoom To' button in the toolbar at the top right. Another red arrow points to the 'Scale' dropdown menu, which is set to '1:10,131'. A third red arrow points to a point on the blue watershed delineation line. The map includes contour lines, stream names like 'Creek' and 'Yokohl E.', roads labeled 'M 452' and 'BM 46', and a 'Siphon' feature.

USGS StreamStats - Windows Internet Explorer provided by MD-DE-DC WSC
http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx?stabbr=ca&dt=1333993453226

Click on Watershed Delineation from a Point

Scale must indicate 1:24,000 or greater

Note canal is not included in stream network used for delineation

USGS StreamStats

Results

Map Contents

CA@ca_ss

- Centroid
- GlobalWatershedPoint
- GlobalWatershed
- Stream Gages
- ExcludePoly
- Archydro Data

Navigation

Overview

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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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100%

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

Results

Map Contents

CA@ca_ss

- Centroid
- GlobalWatershedPoint
- GlobalWatershed
- Stream Gages
- ExcludePoly
- ArchHydro Data

Navigation

N

W E

Overview



Map

The map displays a topographic elevation model of a basin area. A large, irregularly shaped area is highlighted in pink, representing the delineated basin boundary. The map includes contour lines, stream networks, and place names such as Lincove, Exeter, Lindsay, and Round Valley. A scale bar indicates distances up to 3 miles.

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URL: http://streamstatsags.cr.usgs.gov/ca_ss/default.aspx
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Streamstats Status News

USA.gov Take Pride in America

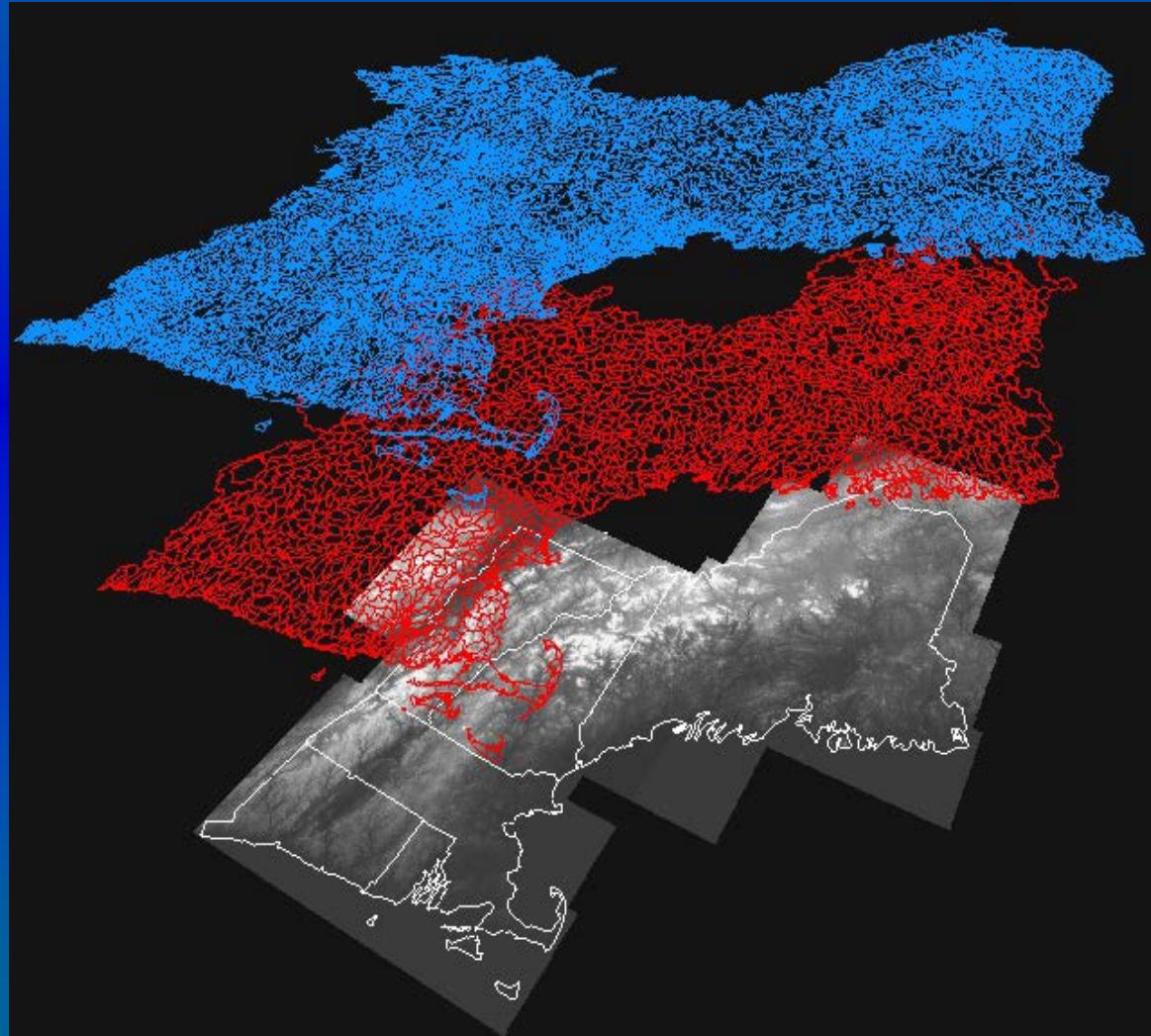
AutoRefreshMap:67,0,5 Mon Apr 9 14:46:58 EDT 2012/Mon Apr 9 14:50:31 EDT 2012 Local intranet | Protected Mode: Off 100%



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.nrcc.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



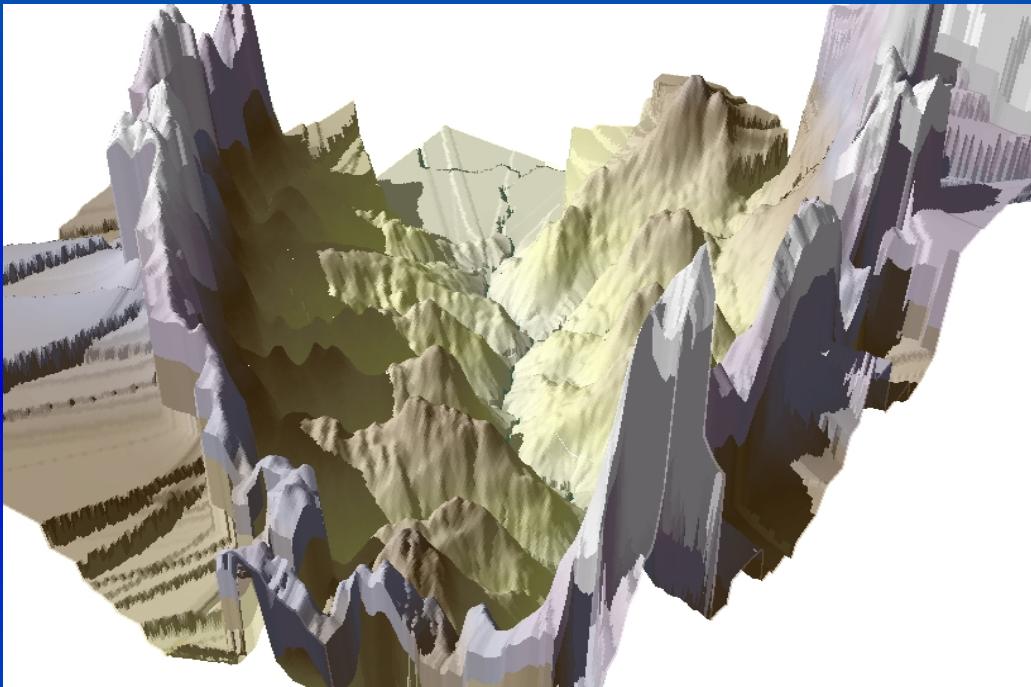
National
Hydrography
Dataset (NHD)

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

File Edit View Favorites Tools Help

Favorites Suggested Sites Web Slice Gallery

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

Horizon Systems Corporation

National Hydrography Dataset Plus

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).

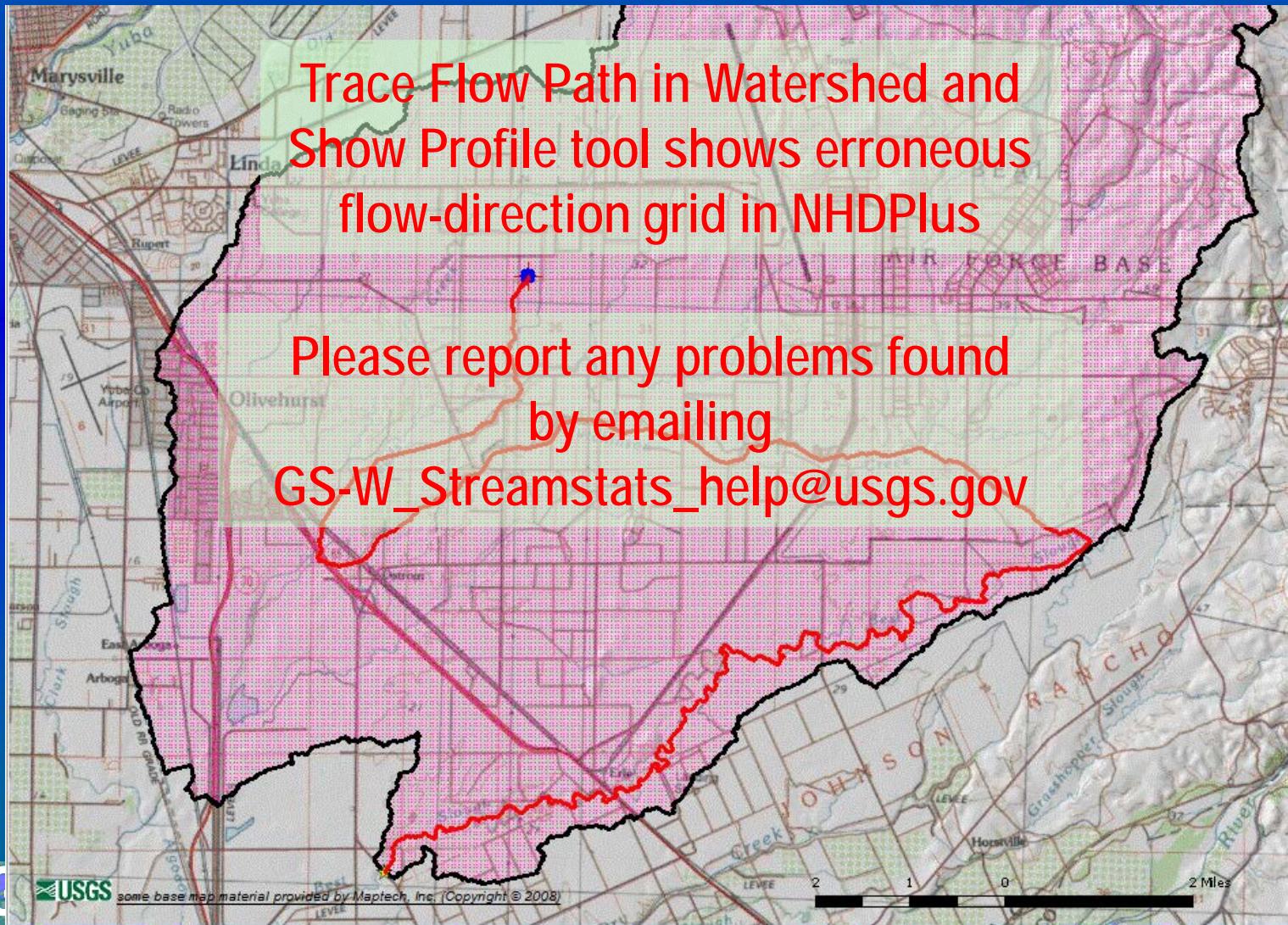
First released in 2006, the NHDPlus consists of nine components:

- 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

USGS StreamStats - Windows Internet Explorer

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: 3 mi²
Percent Urban: 0.1%
Percent Impervious: 0.1%

• Regression equation estimates assume natural flow conditions at the selected site

Peak-Flow Streamflow Statistics

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

• Availability of equations varies among states

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

Favorites Suggested Sites Web Slice Gallery

Page Safety Tools ? N

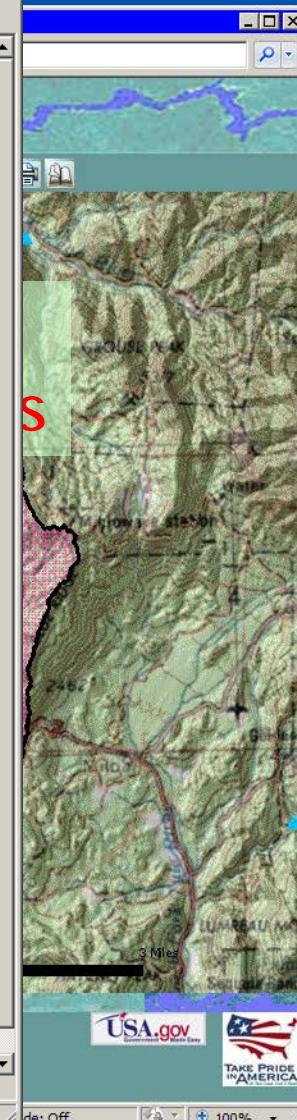
USGS California StreamStats Streamstats Ungaged Site Report

Results Map Contents Navigation Overview Accessibility FOIA

U.S. Department of the Interior | U.S. Geological Survey | USGS Page Last Modified: 04/09/2012 13:01:23

AutoRefreshMap:81,0,5 Mon Apr 9 15:01:06

Local intranet | Protected Mode: Off 100% 100%



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

Favorites Suggested Sites Web Slice Gallery

Page Safety Tools ? N N

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%

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

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

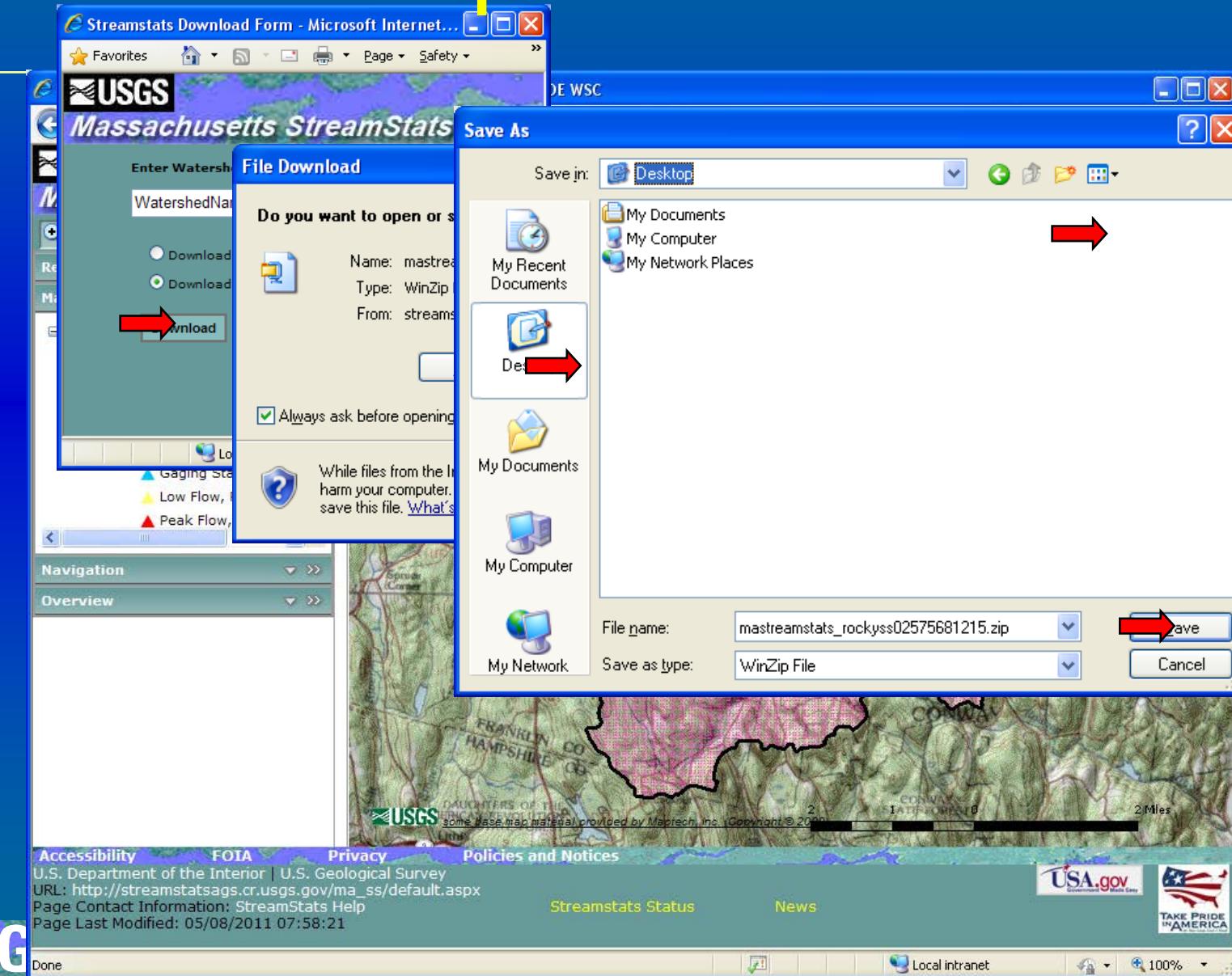
Streamstats Status News

USA.gov Take Pride in America

AutoRefreshMap:69,0,5 Mon Apr 9 14:52:14 EDT 2012/Mon Apr 9 14:52:31 EDT 2012

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Download Shapefile



Printing the Map

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

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

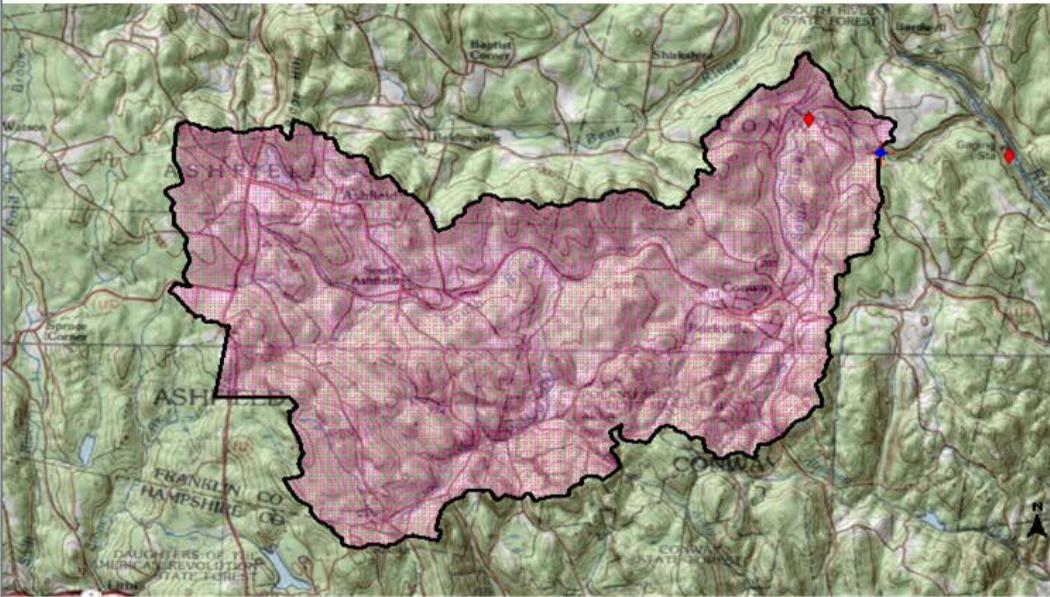
File Edit View Favorites Tools Help

Favorites Home Page Safety Tools ? Print

USGS
Massachusetts StreamStats

StreamStats Print Page

New Bridge Site on South River at Conway, MA



Explanation

- ★ GlobalWatershedPoint
- ◆ NHDHGage
- NHDHD am
- 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
- huopoly

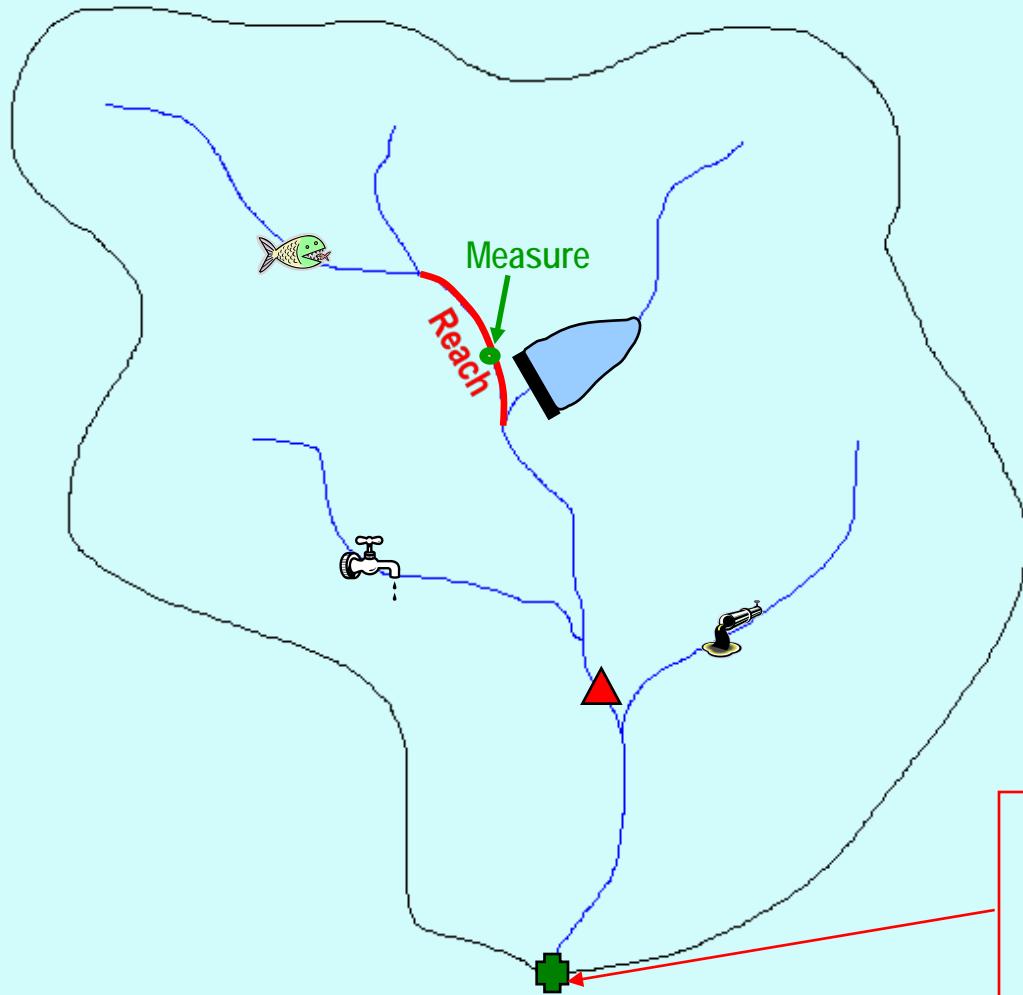
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Other Tools for Use With Delineated Basins Not Yet Available for CA

- 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

Favorites Page Safety Tools ? Help

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

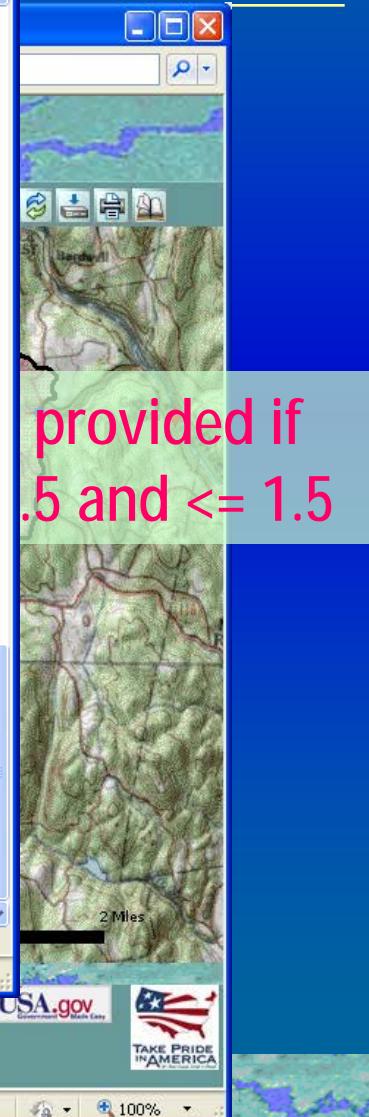
Low-Flow Statistics

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	

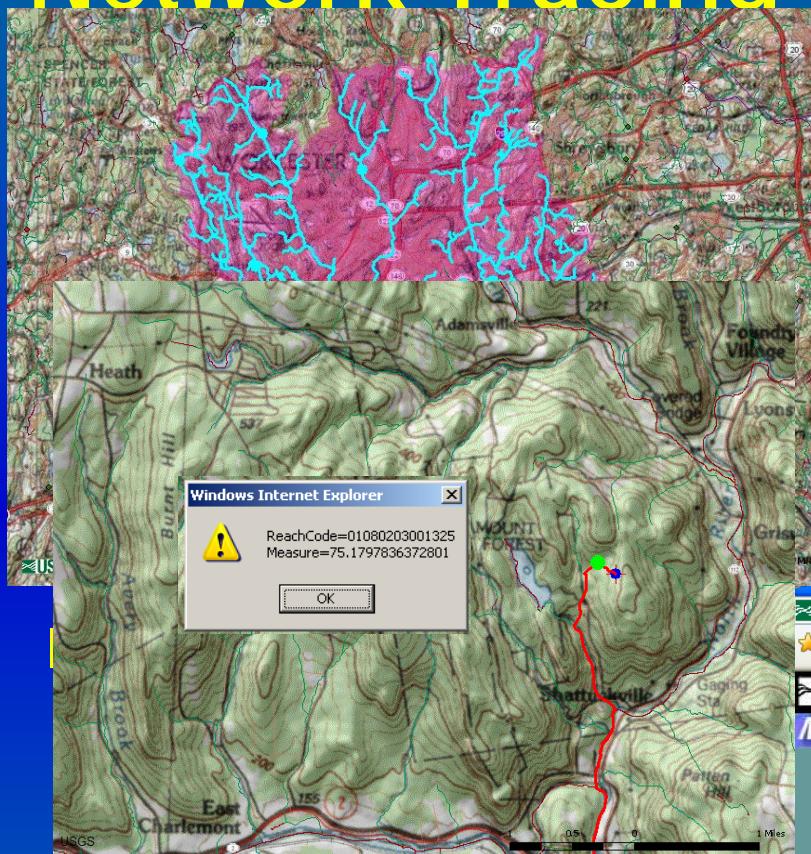
Flow-Duration Statistics

Flow types	Flow description	Regression estimates	Drainage-area ratio estimates	Weighted estimates	Weighted equivalent years of record
D99	99_Percent_Duration	2.5399996	3.8	3.66	
D98	98_Percent_Duration	3.5	5.5	5.3	
D95	95_Percent_Duration	4.6900005	5.91	5.78	
D90	90_Percent_Duration	6.3	7.5	7.49	
D85	85_Percent_Duration	8.1499961	9.61	9.44	
D80	80_Percent_Duration	10.3	11.5	11.3	
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



Network Tracing in StreamStats



The screenshot shows the StreamStats Trace Report interface in Microsoft Internet Explorer. The main window displays a map of Massachusetts with a traced path highlighted in red and cyan. Below the map is a table titled "NHDHgage_MA" showing reach codes and measures for various features. A detailed inset map shows a close-up view of a stream network with flow accumulation values.

Source_FeatureID	ReachCode	Measure
01110000	01090003000106	64.59123672
01109730	01090003000317	8.62007276
01110500	01090003005705	81.42261045
01109439	01090003000341	54.97050468
01109595	01090003006172	53.00156966
01109500	01090003000326	38.06402122

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

Network Profile Plots

■ Trace f



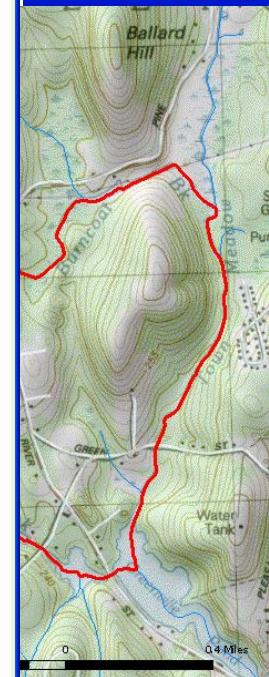
Plot of distance vs elevation - Microsoft Internet Explorer provided by MD-DC-DE WSC

Elevation (Feet) (10^3)

DataView[1].xls

	S	Z	X	Y	UserPoint
3	0	9345.338	2443635	1475355	TRUE
4	0.06	9214.426	2443555	1475315	TRUE
5	0.13	9060.317	2443455	1475295	TRUE
6	0.19	8975.799	2443355	1475295	TRUE
7	0.27	8949.846	2443305	1475395	TRUE
8	0.36	8834.289	2443255	1475515	TRUE
9	0.45	8671.453	2443225	1475635	TRUE
10	0.55	8636.084	2443305	1475745	TRUE
11	0.64	8603.996	2443375	1475865	TRUE
12	0.72	8579.946	2443375	1475985	TRUE
13	0.8	8534.997	2443415	1476105	TRUE
14	0.89	8477.317	2443455	1476225	TRUE
15	0.99	8341.024	2443555	1476345	TRUE
16	1.08	8230.52	2443615	1476465	TRUE
17	1.17	8145.509	2443715	1476555	TRUE
18	1.27	8074.869	2443815	1476675	TRUE
19	1.37	7999.439	2443905	1476795	TRUE
20	1.46	7927.421	2443975	1476915	TRUE
21	1.56	7870.955	2444065	1477025	TRUE
22	1.64	7808.813	2444185	1477045	TRUE
23	1.73	7779.481	2444255	1477155	TRUE
24	1.82	7751.723	2444315	1477275	TRUE
25	1.9	7729.216	2444355	1477395	TRUE
26	2	7683.741	2444455	1477505	TRUE
27	2.09	7652.67	2444545	1477605	TRUE
28	2.18	7623.436	2444645	1477695	TRUE
29	2.28	7602.778	2444735	1477805	TRUE
30	2.37	7595.974	2444855	1477835	TRUE
31	2.46	7567.069	2444965	1477915	TRUE
32	2.55	7546.989	2445045	1478035	TRUE

ershed



Terrain Profile Tool

The screenshot illustrates the USGS StreamStats Terrain Profile Tool interface, showing a plot of distance vs elevation and a corresponding topographic map.

Plot of distance vs elevation HUC:01080204 63 points.

Map Contents:

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

Navigation:

Overview: A small map showing the location of the profile line on a larger regional map.

Table: A table listing the 63 data points used to generate the profile plot.

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

Topographic Map: A detailed map showing contour lines, roads, and other geographical features. A red line indicates the profile path. A scale bar shows 0.4 Miles.

Logos: USA.gov and Take Pride in America.

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 gallons]

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%

Net = Σ Discharges – Σ 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	November
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	0.0001
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	0.0001
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

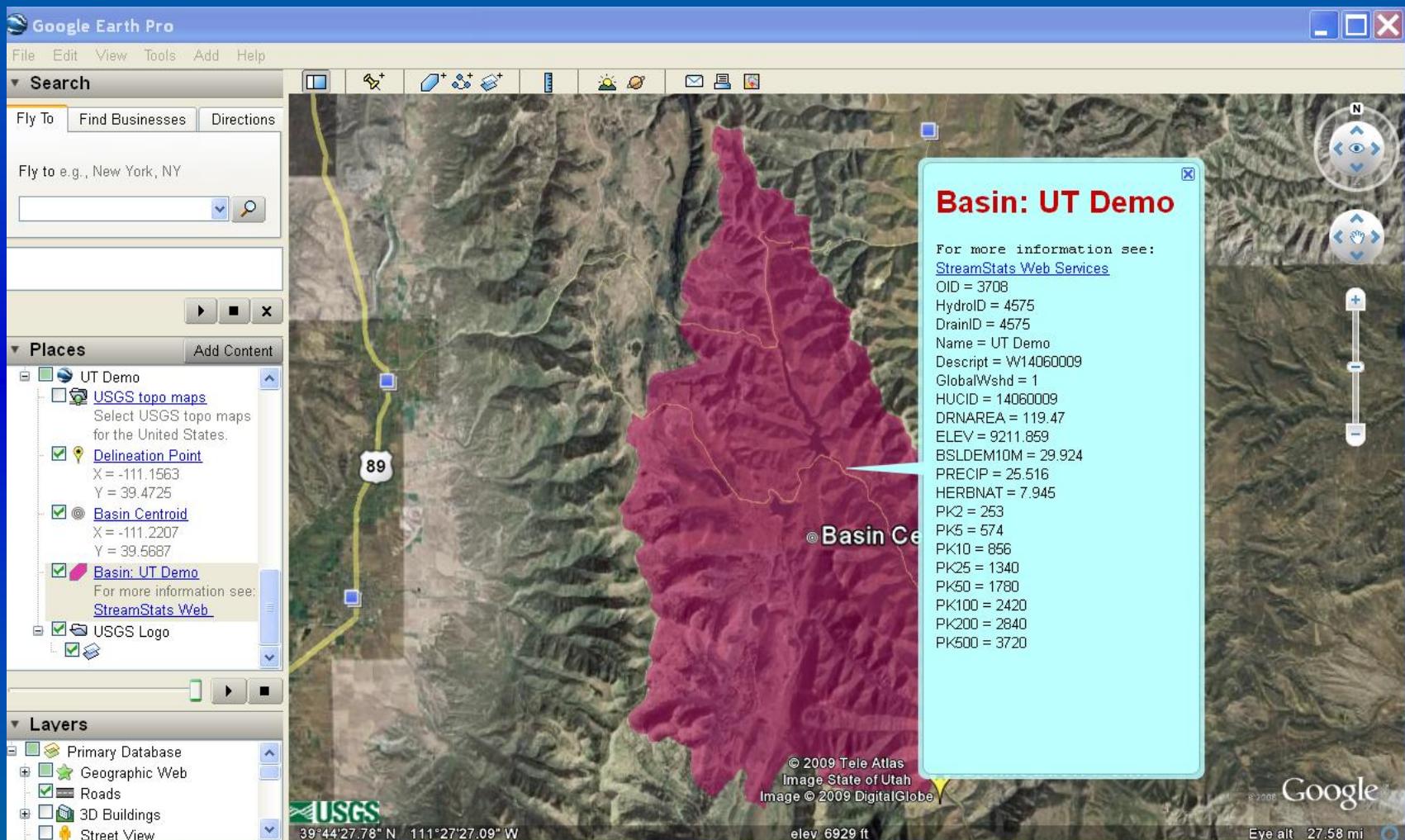
See Available Web Services link from StreamStats home page for more information

The screenshot shows the Streamstats Web Service Query Builder interface. At the top, there's a logo for USGS Streamstats. Below it, the title "Web Service Query Builder" is displayed. The interface includes several dropdown menus and input fields:

- "Request": A dropdown set to "DoDelineation" which "Returns the geometry for the basin boundary starting at the user-requested point."
- "State": A dropdown set to "Kentucky".
- "Output Format": A dropdown set to "Simple GML".
- "Input CRS": A dropdown set to "EPSG:6.6:3089" which corresponds to "NAD83 State Plane Kentucky FIPS 1600 US Feet".
- "X": An input field containing "5871440".
- "Y": An input field containing "3689777".

At the bottom of the form, there's a "Submit" button. Below the form, a section titled "The request to Server:" shows the URL and parameters: `http://streamstats09.cr.usgs.gov/ss_ws_client/ngi.aspx?request=DoDelineation&stabbr=KY&outputformat=application/gml+xml&x=5871440&y=3689777&CRS=EPSG:6.6:3089`. The final section, "The response from Server:", displays the XML output of the delineation request.

StreamStats Results in Google Earth

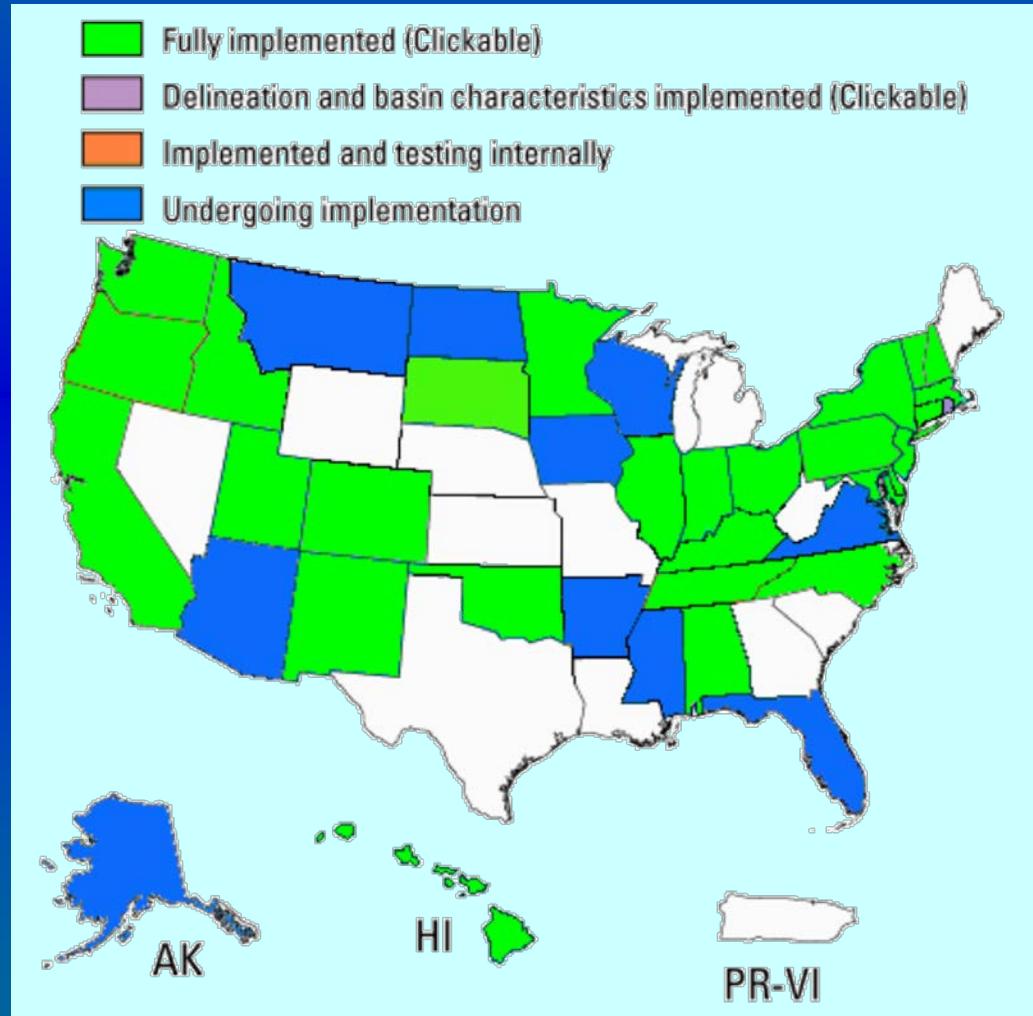




Batch Processing

- 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

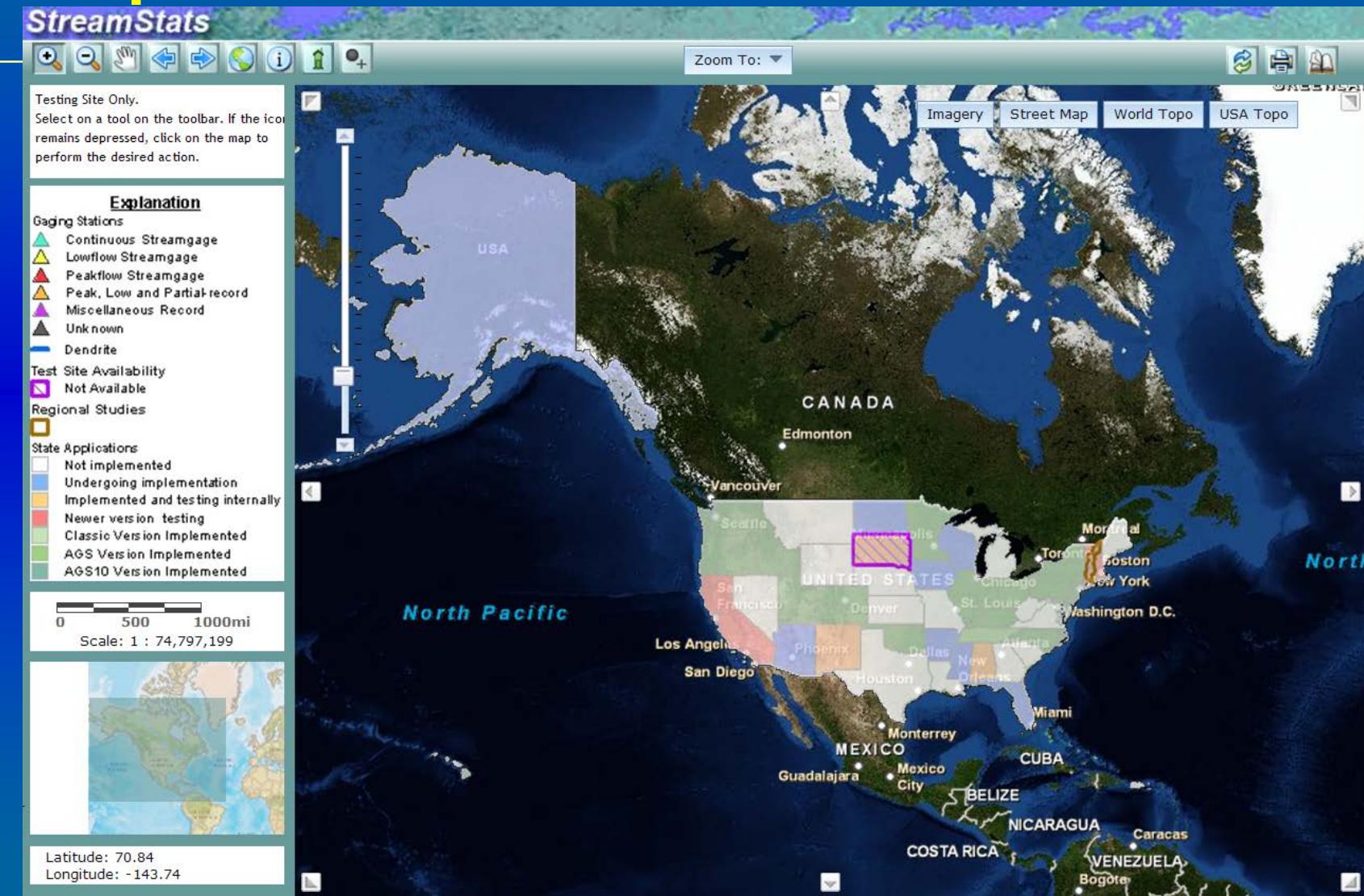


- 27 states fully implemented
- 1 state partly implemented
- 10 states in implementation process

Planned StreamStats Enhancements

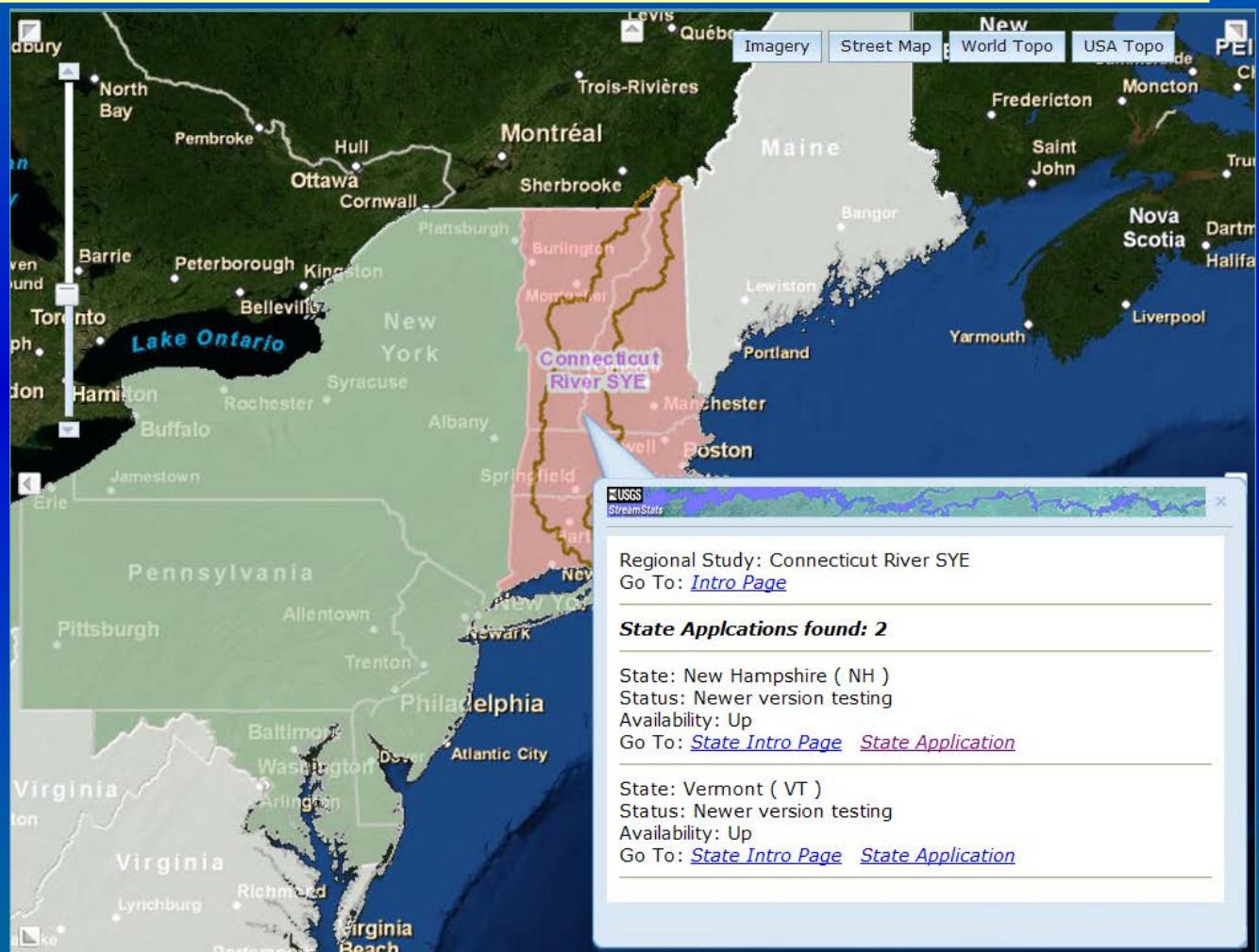
- Migration from ArcGIS Server 9.2 to 10, with web services for all functionality
- A single user interface for seamless access to all state and regional applications
- Estimation of daily flows for Connecticut R. and Delaware R. Basins, MA, PA, NY, IA, probably others
- Automated annual update of non-interpretive 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