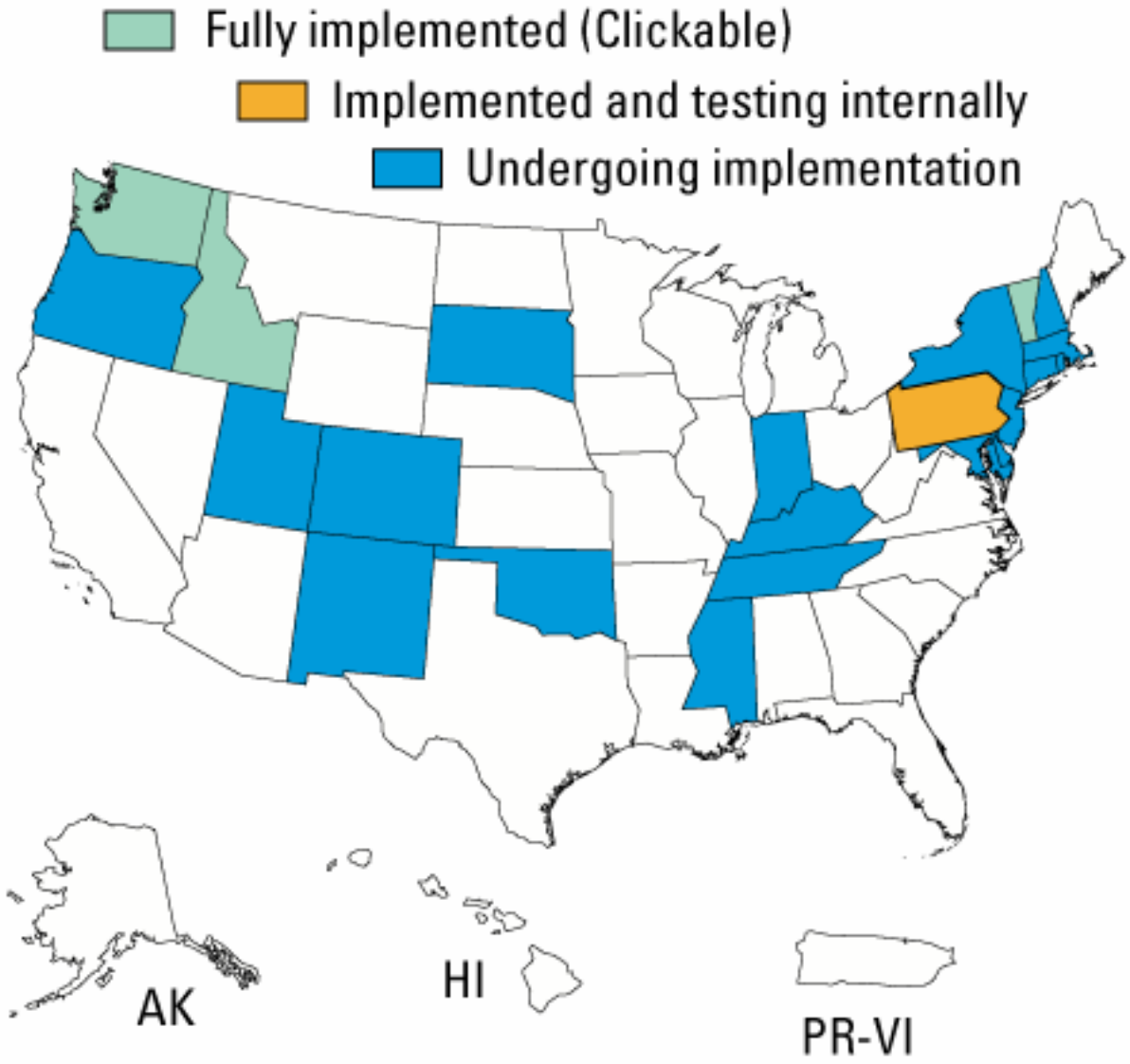
USGS
science for a changing world

StreamStats:

Delivering Streamflow Information to the Public

StreamStats Web Application

- Provides estimates of streamflow statistics, basin and climatic characteristics, and other information for user-selected points on ungaged streams
- Automatically measures basin and climatic characteristics for ungaged sites using GIS
- Provides published streamflow statistics, basin and climatic characteristics, and other information for data-collection stations


Fully implemented (Clickable)
Implemented and testing internally
Undergoing implementation
AK
HI
PR-VI

Need for Streamflow Statistics

- Water resources planning, management, and permitting
- Flood-plain mapping
- Instream flow determinations for pollution and habitat
- Design and permitting of facilities such as wastewater-treatment plants, hydropower plants, and water-supply reservoirs
- Design of structures such as roads, bridges, culverts, dams, and levees

Manually Determining Basin Characteristics

- A 10-square mile basin can take < 1 hour to > 1 day, depending on characteristics measured, source material, and expertise
- The required time increases exponentially with increasing watershed area because of the increasing dendritic patterns and logistical problems when matching between map sheets
- The manual process is not completely repeatable
- The error introduced by determining basin characteristics probably is as large as the uncertainty in the regression models

Estimates for Ungaged Sites

- Streamflow Statistics are estimated from regression equations that relate flows to basin characteristics.
- Examples of basin characteristics: Basin area, slope, shape, climate, vegetation cover, degree of urbanization, geology, . . .
- Usually developed on a State-by-State basis through the USGS cooperative program

Example Regression Equation

- **Regression equations take the form:**

$$Q_{100} = 0.471A^{0.715}E^{0.827}SH^{0.472}$$

- **where:**

Q_{100}	**is the 100-year flood flow, cubic feet per second**
A	**is drainage area, in square miles**
E	**is mean basin elevation, in feet**
SH	**is a shape factor**

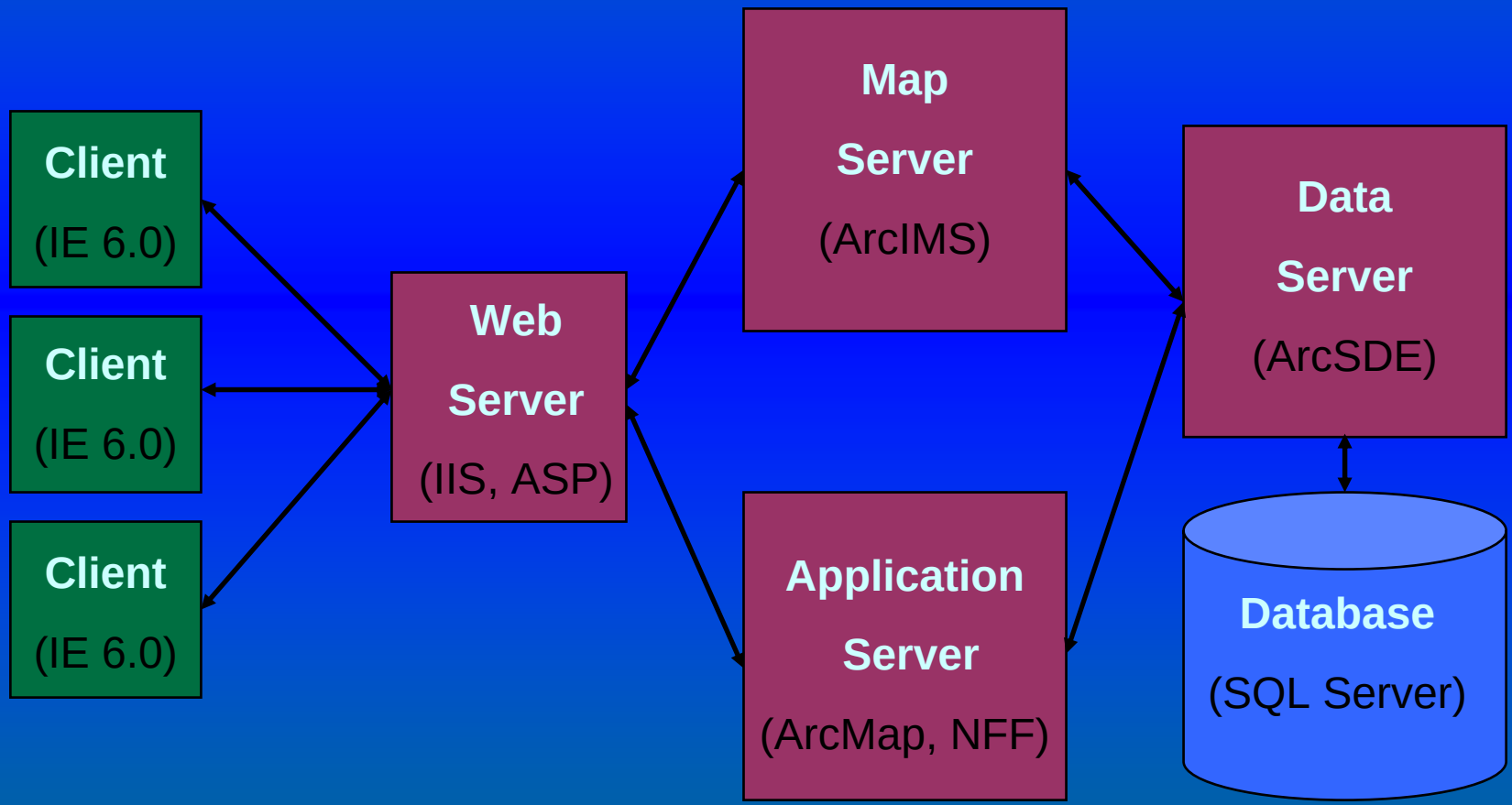
Regression Equations Available for Wyoming

- Miller, K.A., 2003, Peak-flow characteristics of Wyoming streams: U.S. Geological Survey Water-Resource Investigations Report 03-4107, 79 p.
  - Statewide peak-flow equations
- Lowham, H.W., 1988, Streamflows in Wyoming: U.S. Geological Survey Water-Resources Investigations Report 88-4045, 78 p., 1 pl.
  - Statewide annual-mean flow equations

Regression Equations Available for Wyoming (continued)

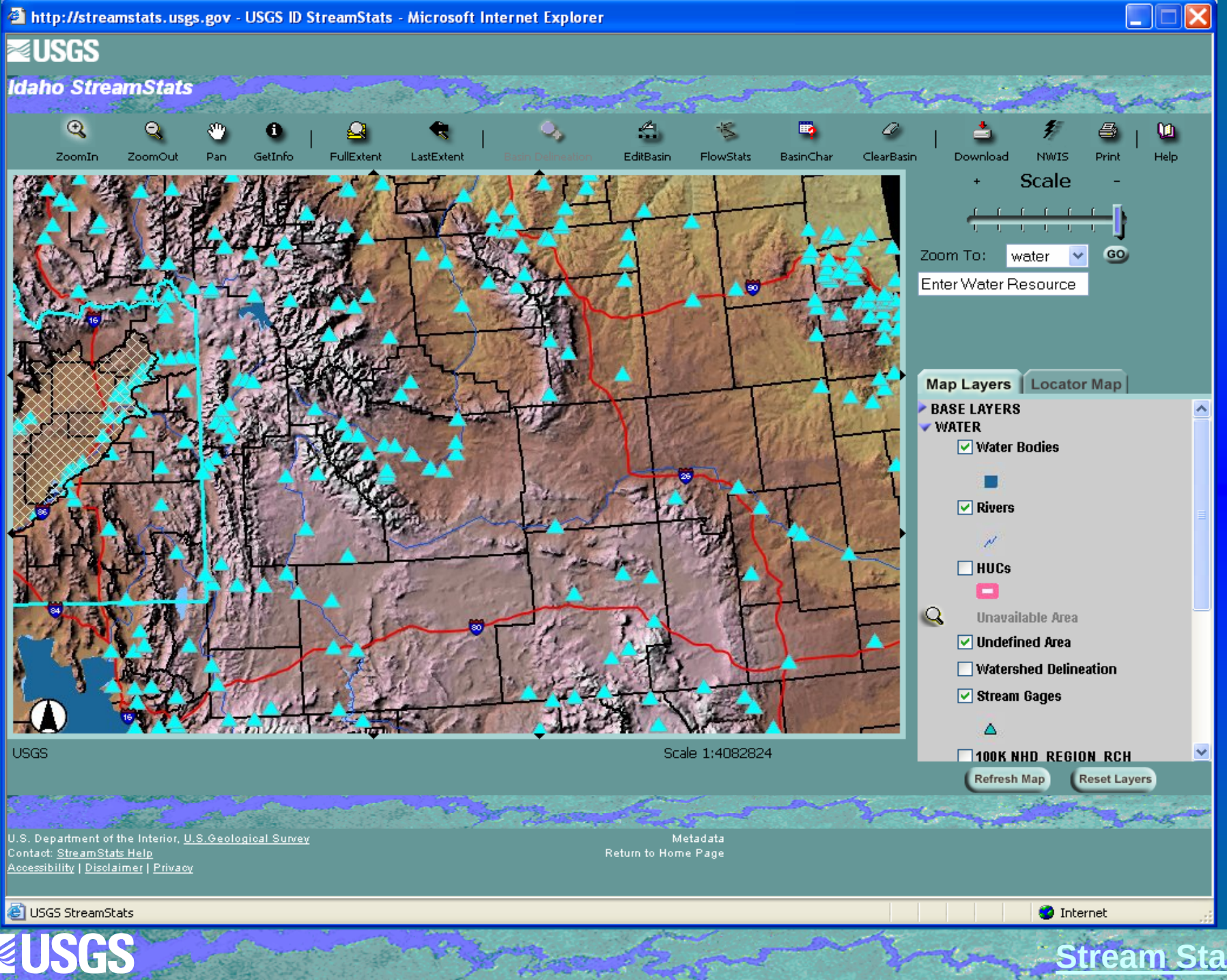
- Rankl & others, 1994, Wind River and part of Bighorn River, WRIR 94-4014
  - Monthly flow equations for Wind River and part of Bighorn River drainage basins
- Mason & others, 2005, Sweetwater County
  - Annual, monthly, low, peak flow, and flow-duration equations, 29 sites
- Bartos & others, 2006, Carbon County
  - Annual, monthly, low, peak flow, and flow-duration equations, 26-42 sites

System Design



User Interface Stream Stats

- Displays maps and enables site selection
- Displays default data layers for selected scale ranges and allows adding/subtracting map layers
- Zoom and pan to places of interest
- Zoom to named geographic location or stream
- Evaluate basin boundaries in the map frame
- Print maps and download data shown in the map frame


http://streamstats.usgs.gov - USGS ID StreamStats - Microsoft Internet Explorer
USGS
Idaho StreamStats
ZoomIn
ZoomOut
Pan
GetInfo
FullExtent
LastExtent
Basin Delineation
EditBasin
FlowStats
BasinChar
ClearBasin
Download
NWIS
Print
Help
+ Scale -
Zoom To:
water
GO
Enter Water Resource
Map Layers
Locator Map
BASE LAYERS
WATER
Water Bodies
Rivers
HUCs
Unavailable Area
Undefined Area
Watershed Delineation
Stream Gages
100K NHD REGION RCH
Refresh Map
Reset Layers
USGS
Scale 1:4082824
U.S. Department of the Interior, U.S.Geological Survey
Contact: StreamStats Help
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Metadata
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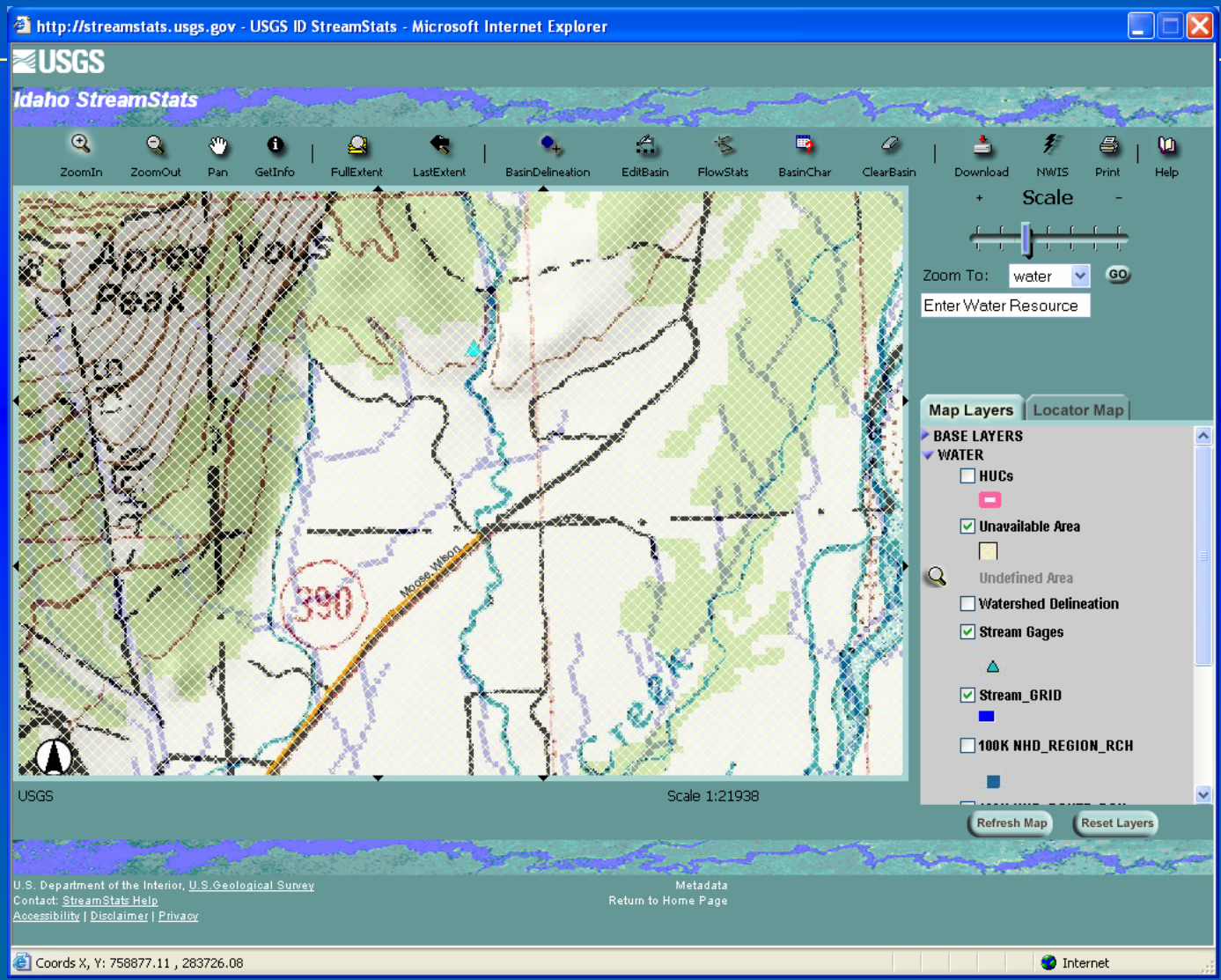
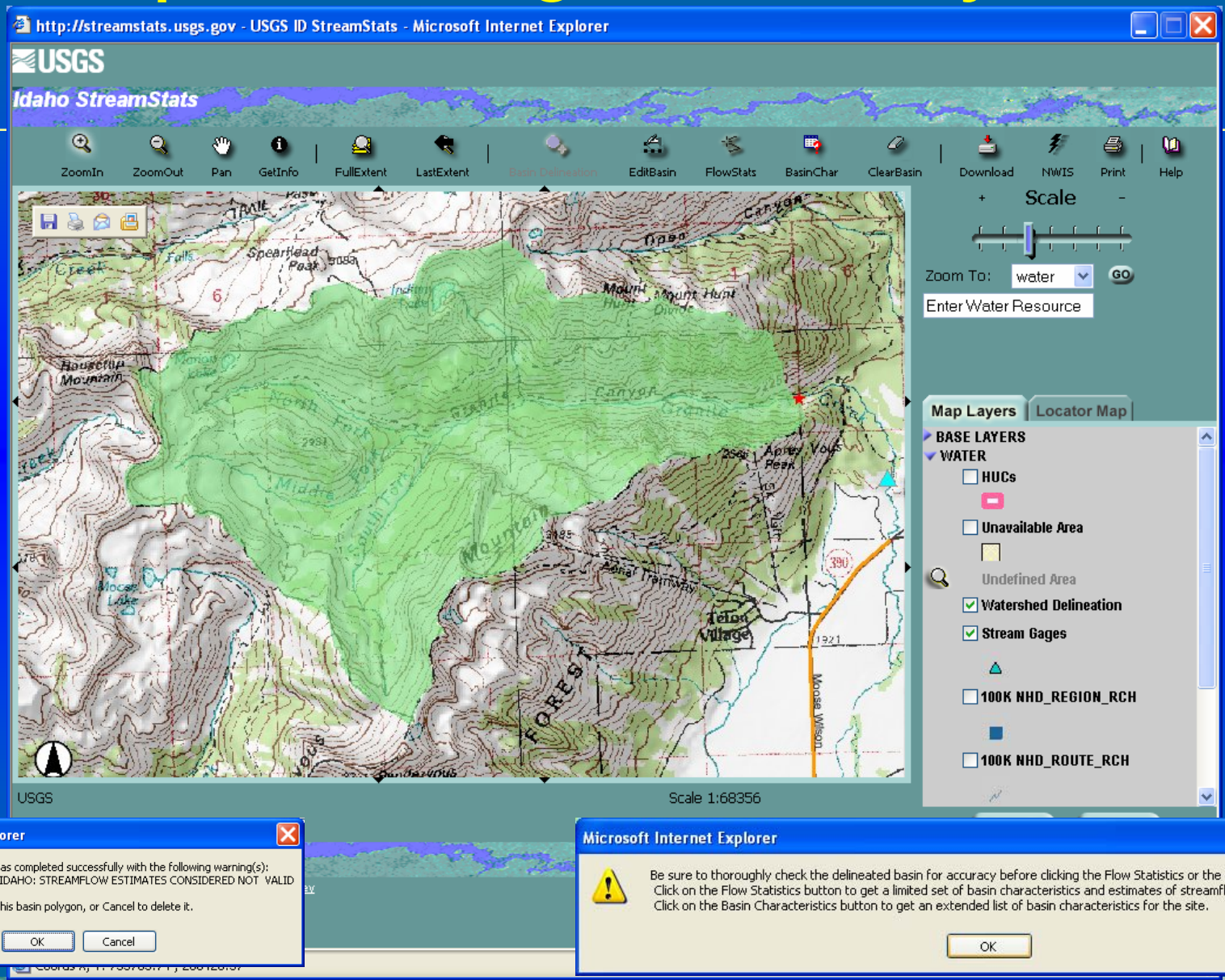
Example Point Selection



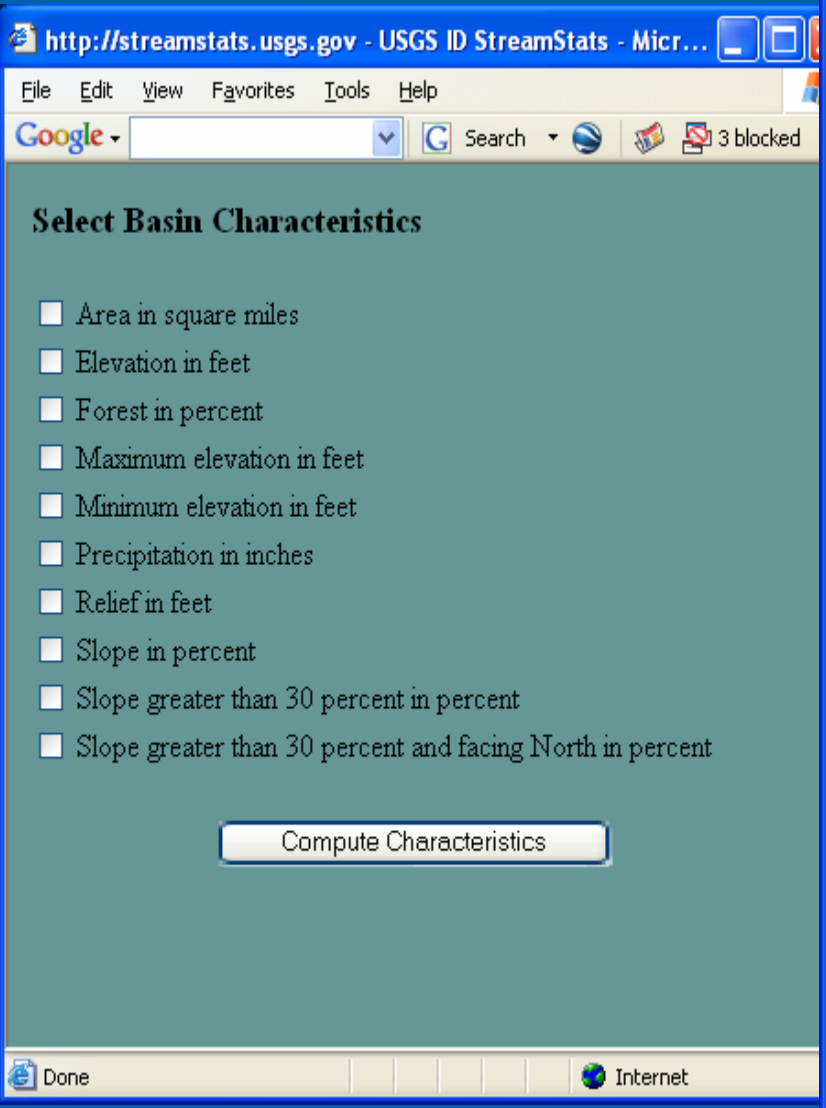
Drainage Boundaries

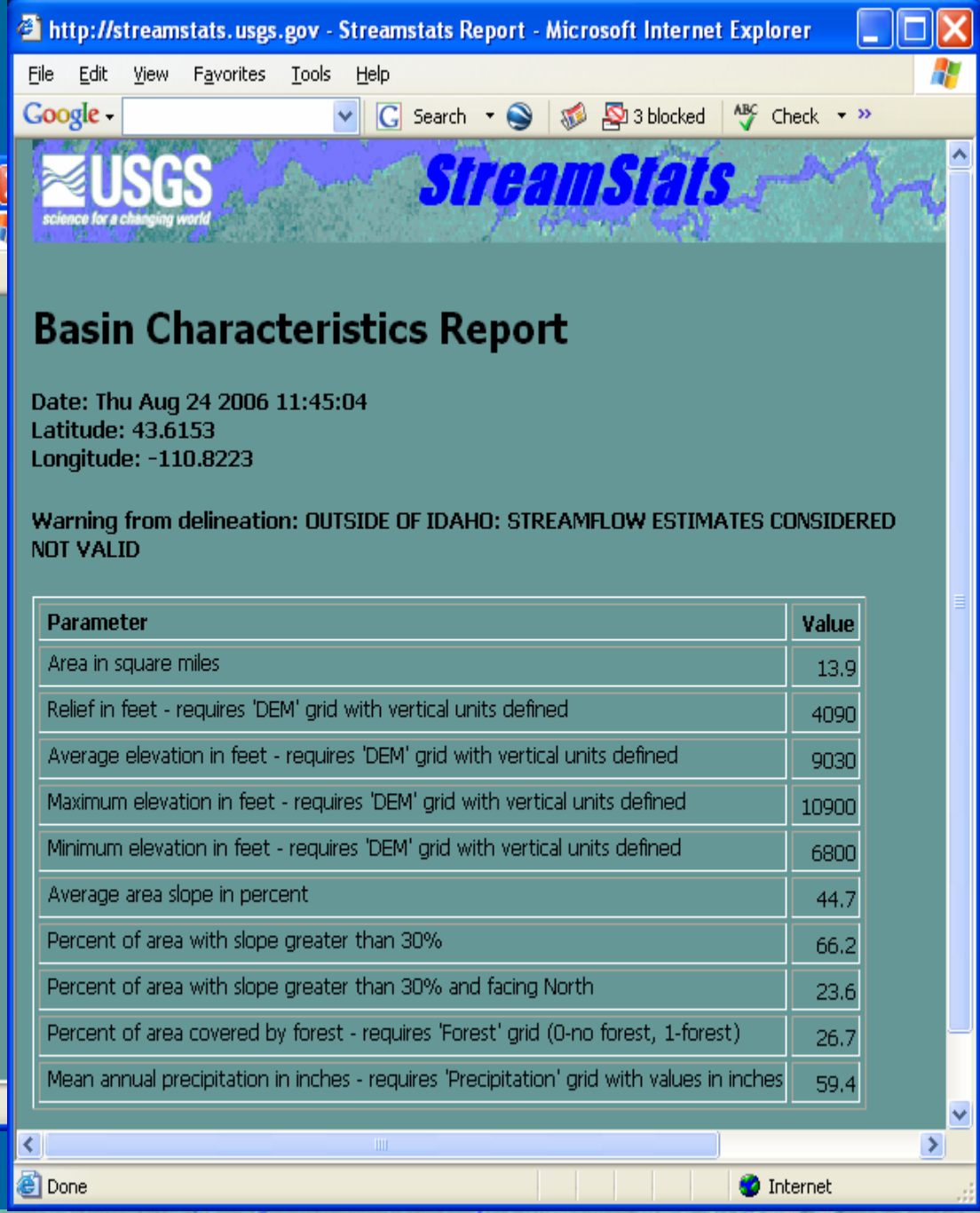
1. User selects point on stream
2. Point is transferred to a cell in a flow-direction grid derived from a DEM
3. GIS determines boundary from flow-direction grid up to points at which the boundary for the new site intersects boundaries in boundary map layer
4. GIS accumulates all upstream areas and dissolves internal boundaries

Example Drainage Boundary

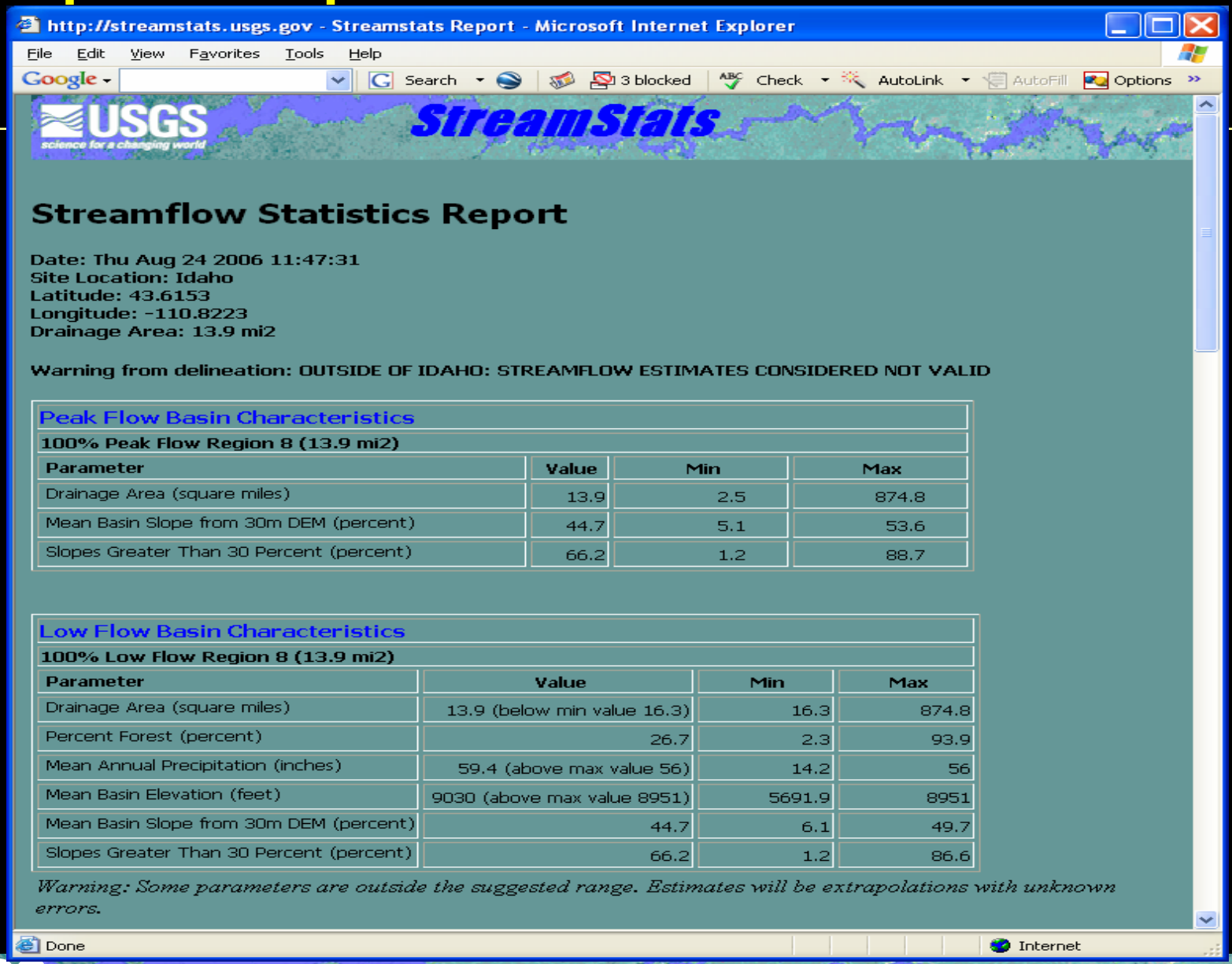


Example Output

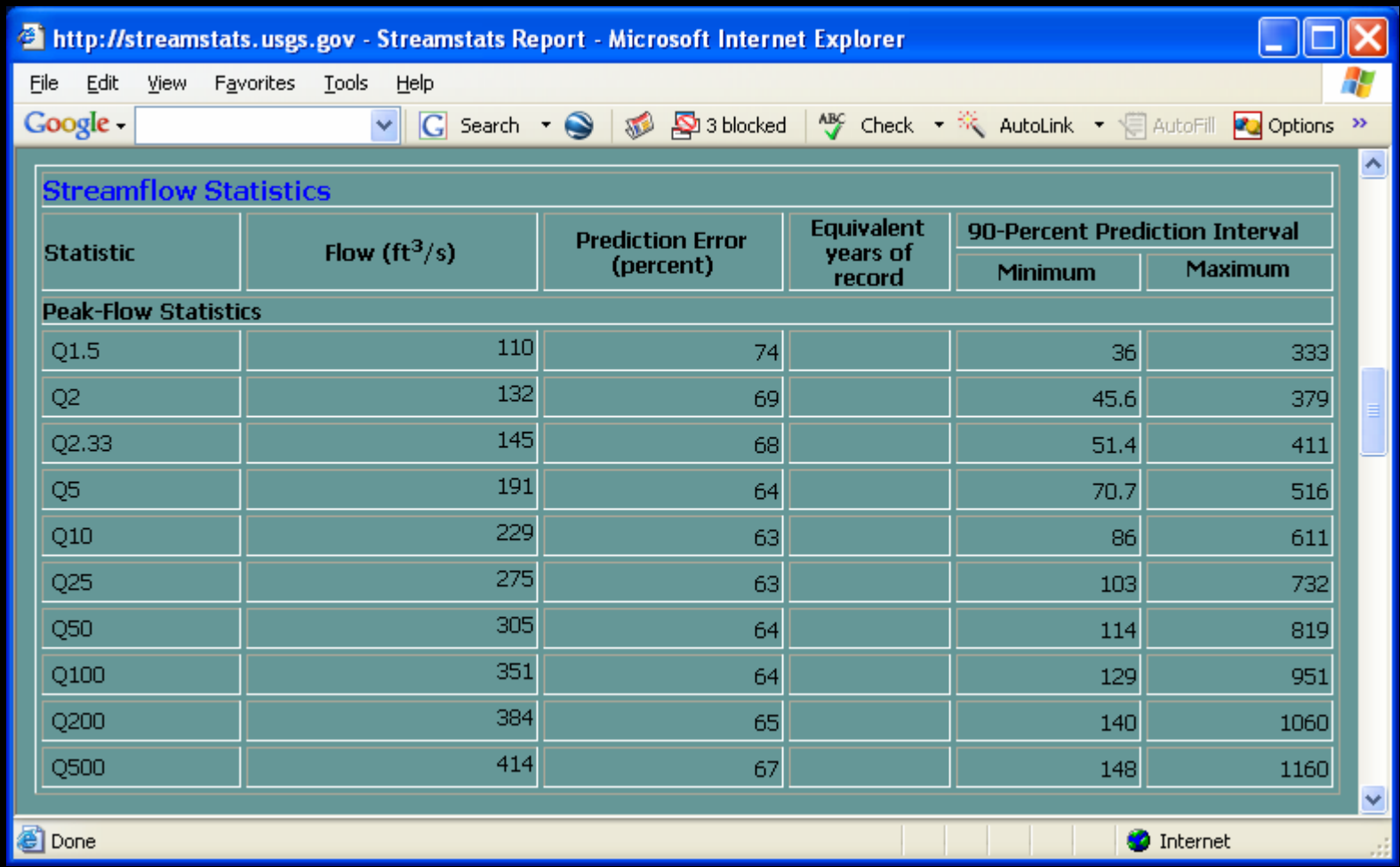




Example Output



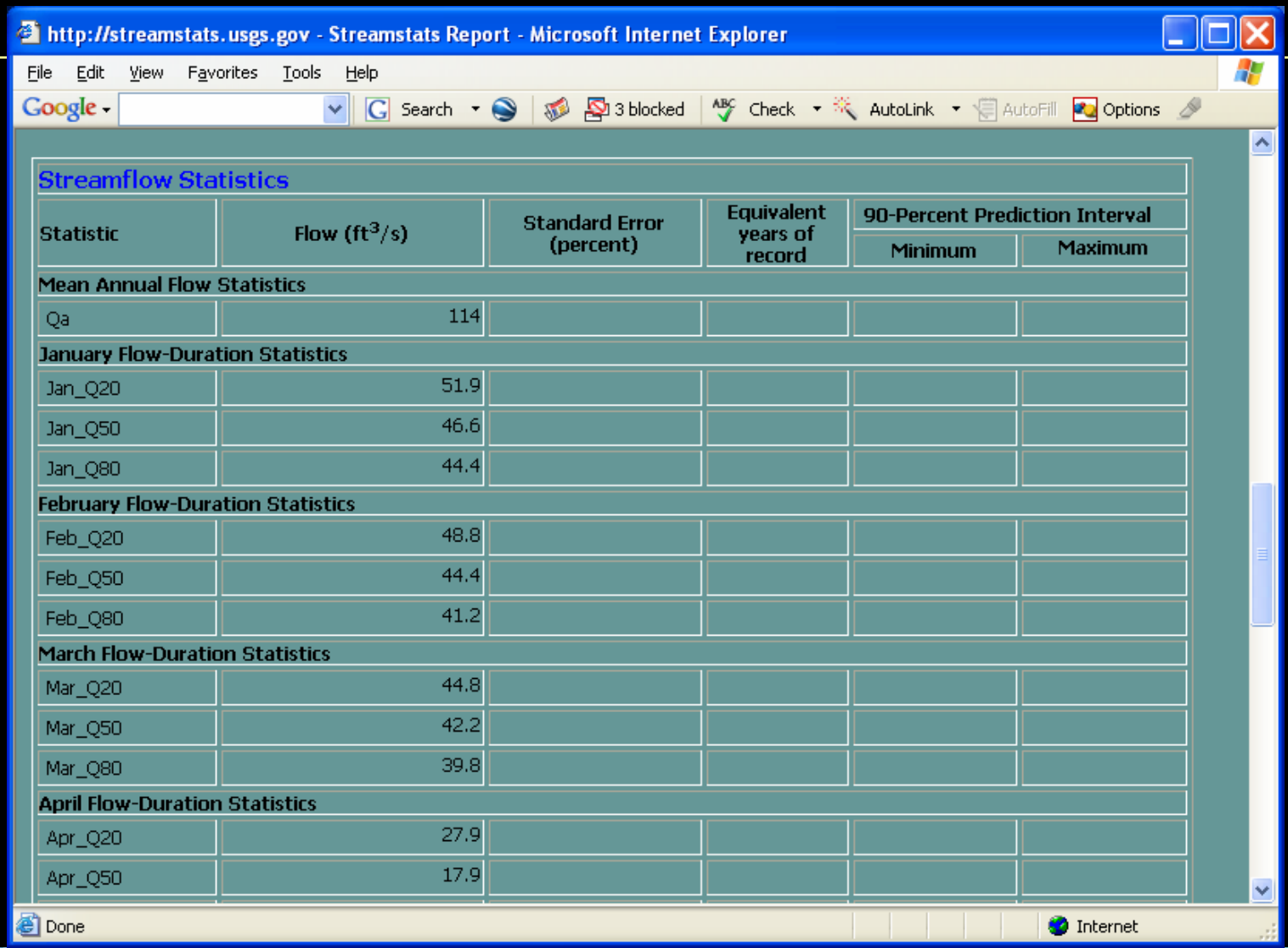
Example Output



Streamflow Statistics

Statistic	Flow (ft^3/s)	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Peak-Flow Statistics					
Q1.5	110	74		36	333
Q2	132	69		45.6	379
Q2.33	145	68		51.4	411
Q5	191	64		70.7	516
Q10	229	63		86	611
Q25	275	63		103	732
Q50	305	64		114	819
Q100	351	64		129	951
Q200	384	65		140	1060
Q500	414	67		148	1160

Example Output



Streamflow Statistics

Statistic	Flow (ft^3/s)	Standard Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
				Minimum	Maximum
Mean Annual Flow Statistics					
Qa	114				
January Flow-Duration Statistics					
Jan_Q20	51.9				
Jan_Q50	46.6				
Jan_Q80	44.4				
February Flow-Duration Statistics					
Feb_Q20	48.8				
Feb_Q50	44.4				
Feb_Q80	41.2				
March Flow-Duration Statistics					
Mar_Q20	44.8				
Mar_Q50	42.2				
Mar_Q80	39.8				
April Flow-Duration Statistics					
Apr_Q20	27.9				
Apr_Q50	17.9				

USGS

District Access Water Resources

National Water Information System: Web Interface

Data Category: Site Information | Geographic Area: United States | GO

USGS 13016305 GRANITE C AB GRANITE C SUPPLEMENTAL, NR MOOSE, WY

Available data for this site: Site home page | GO

Stream/River Site Description

LOCATION

Latitude 43°36'14", Longitude 110°48'17" NAD27
Teton County, Wyoming , Hydrologic Unit 17040103

DESCRIPTION

Drainage area: 14.9 square miles
Datum of gage: 6,400 feet above sea level NGVD29.

AVAILABLE DATA:

Data Type	Begin Date	End Date	Count
Real-time	This is a real-time site		
Peak streamflow	1995-07-09	2005-06-22	11
Daily Data			
Discharge, cubic feet per second	1995-06-02	2006-08-23	4101
Daily Statistics			
Discharge, cubic feet per second	1995-06-02	2005-09-30	3774
Monthly Statistics			
Discharge, cubic feet per second	1995-06	2005-09	
Annual Statistics			
Discharge, cubic feet per second	1995	2005	

OPERATION:

Record for this site is maintained by the USGS Wyoming Water Science Center
Email questions about this site to Water Webserver Team

http://nwis.waterdata.usgs.gov - USGS Real-Time Water Data for USGS 13016305 GRANITE C AB GRANI - Microsoft Internet Explorer

USGS

District Access Water Resources

National Water Information System: Web Interface

Data Category: Real-time | Geographic Area: United States | GO

USGS 13016305 GRANITE C AB GRANITE C SUPPLEMENTAL, NR MOOSE, WY

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site | Time-series: Real-time data | GO

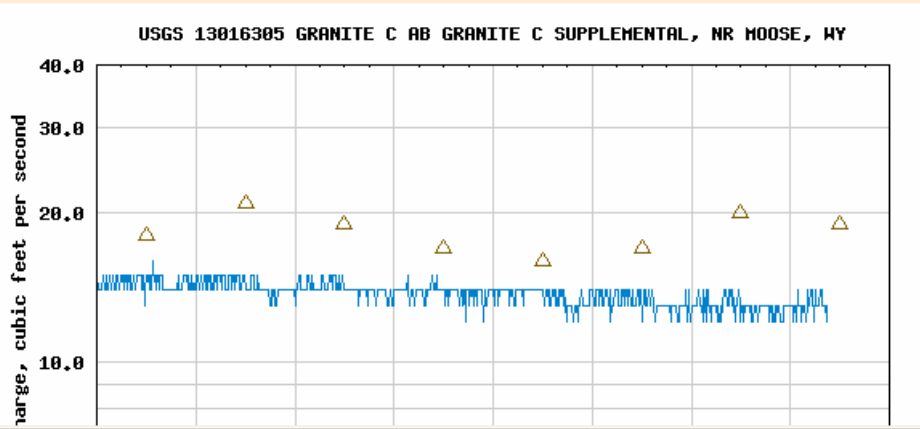
- Site home page
- Site inventory review (internal)
- Site map
- Time-series: Real-time data
- Time-series: Daily data
- Time-series: Daily statistics
- Time-series: Monthly statistics
- Time-series: Annual statistics
- Surface-water: Peak streamflow
- Surface-water: Field measurements
- Offsite: EPA Surf your Watershed
- Check national server for more information

Station operated by the U.S. Geolog ... servation District.

Available Parameters
All 4 Available Parameters fo
00060 Discharge
00065 Gage height (from DC
70969 DCP battery voltage
72114 DCP TransmittedPower

Discharge, cubic feet per second

Most recent value: 13 08-24-2006 09:00



Done | Internet

StreamStats Benefits

- Published statistics are readily available
- Ungaged site process takes < 10 minutes
- Large collections of maps, equipment, and software are not necessary
- Consistent information delivery
- Little or no additional error is introduced
- Only basic understanding of hydrology, computer science, geographic analysis is needed
- Reduced information requests


USGS
Stream Stats