

# **WEST VIRGINIA WATER RESOURCES MANAGEMENT PLAN**

## **SUBMISSION TO THE JOINT LEGISLATIVE OVERSIGHT COMMISSION ON STATE WATER RESOURCES**

**West Virginia Department of Environmental Protection**

**December 9, 2013**

**By:**

**Brian A. Carr, P.G.  
Program Manager  
Water Use Section**



# Today's Agenda

- **A Short History of the Water Resources Management Plan Development**
- **Interesting Water Facts**
- **Some Key Studies Performed**
- **Introduction of the New Water Use Web Page**
- **Filing of the WV Water Resources Management Plan**
  - **Future Pursuits and Recommendations**
- **Questions from the Commission**

# Plan History

**The Water Resources Protection Act was originally passed on March 13, 2004.**

**In 2006 the first Large Quantity User Survey was completed.**

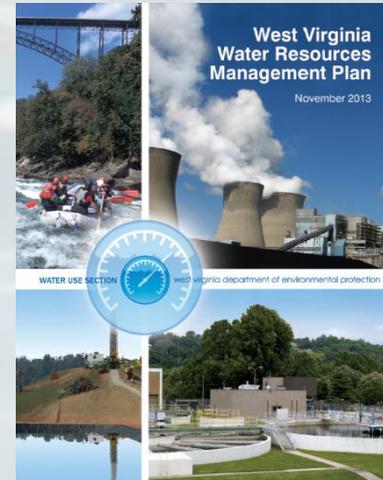
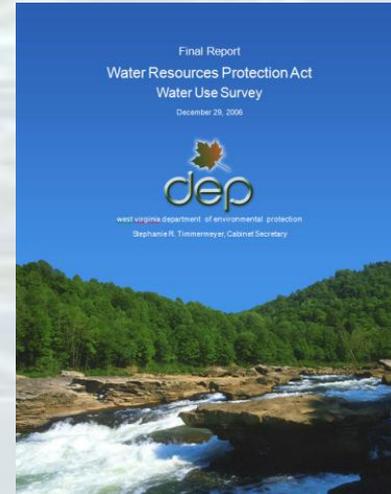
**On March 8, 2008, Senate Bill 641 was passed amending the Act and renaming it the Water Resources Protection and Management Act.**

**Requiring:**

- **Continued LQU Surveys**
- **Annual reporting to the Commission**
- **Submission of a Water Resources Management Plan by November 30, 2013.**

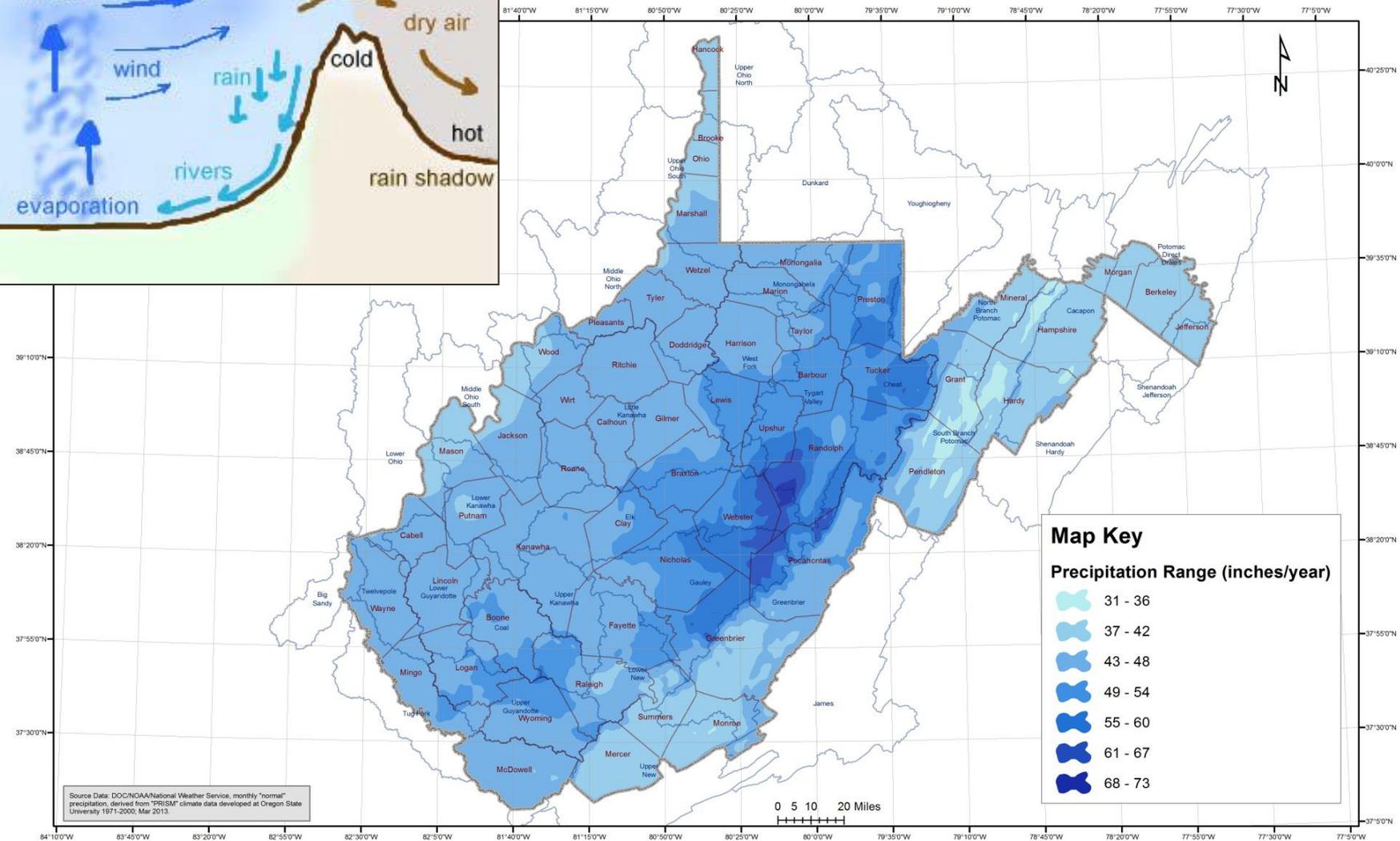
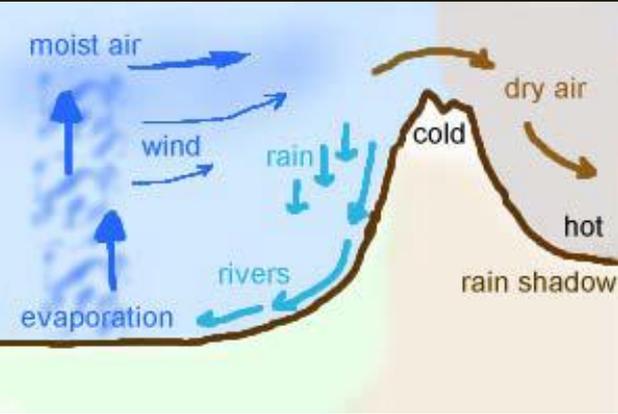
**Water Use Section created July 2008 to accomplish the additional requirements of the Act.**

**The West Virginia Water Resources Management Plan was submitted on November 22, 2013.**



# Water Facts

## Annual Precipitation Map and the Rain Shadow

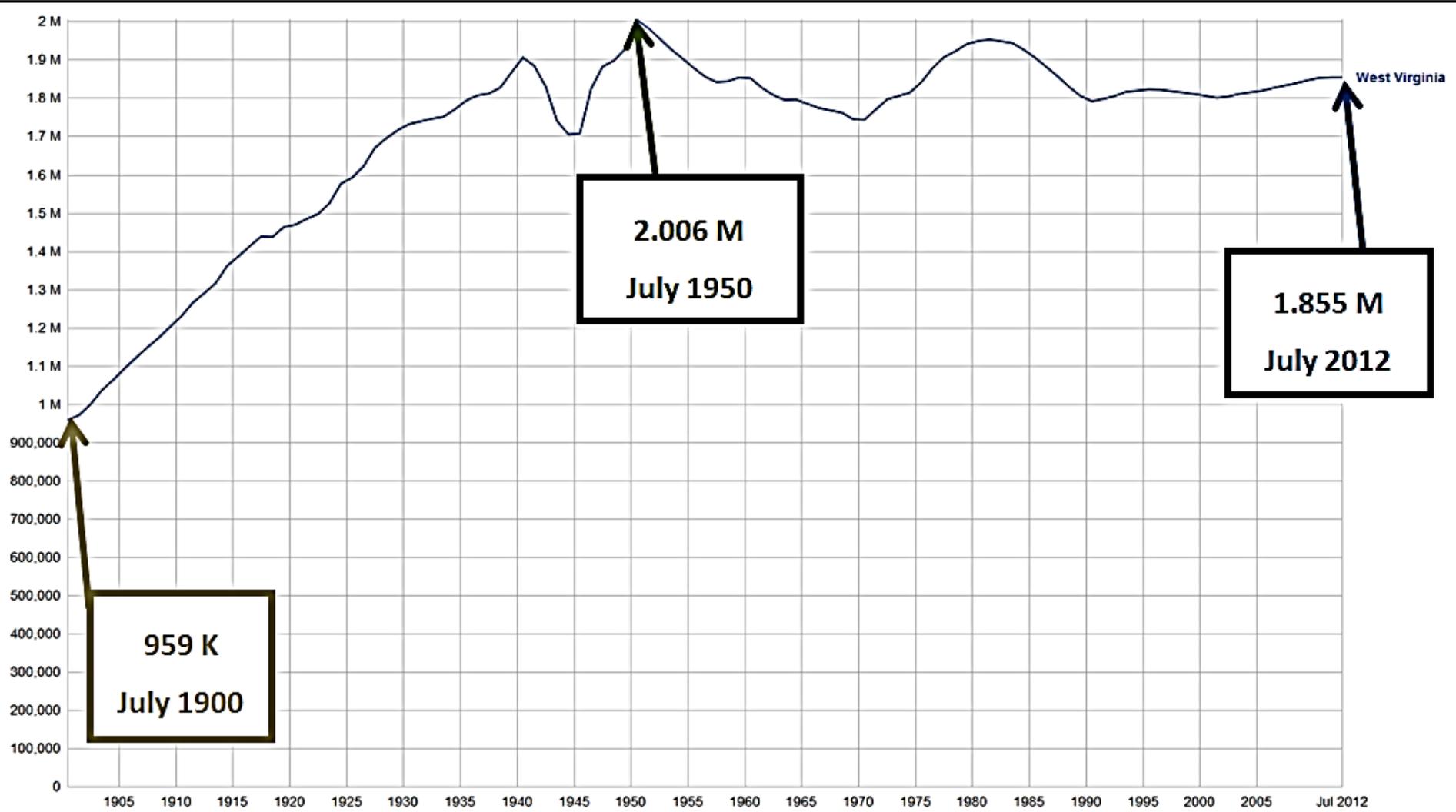


Source Data: DDC/NGAA/National Weather Service, monthly "normal" precipitation, derived from "1961SM" climate data developed at Oregon State University 1971-2000, Mar 2013.

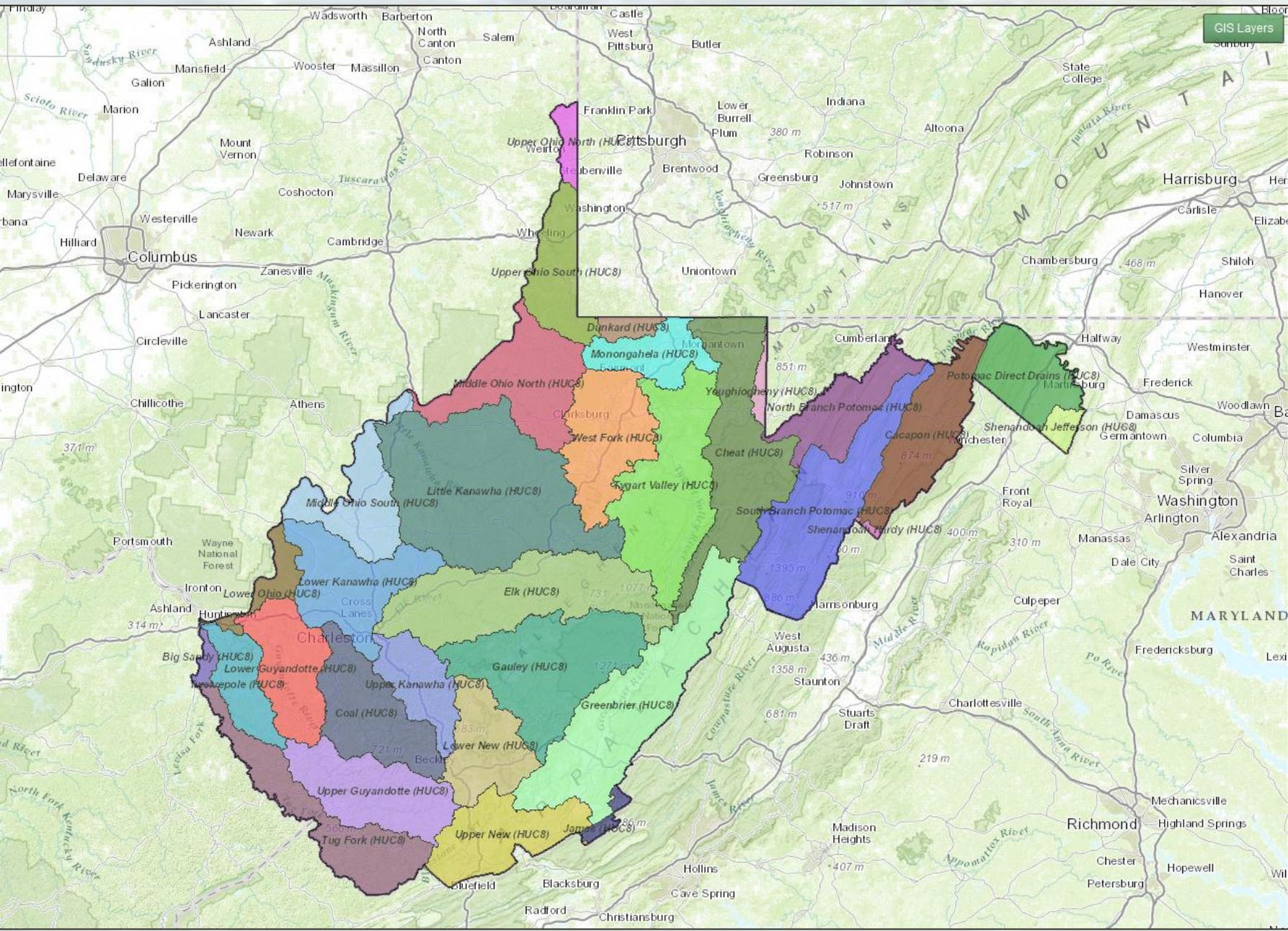


# Water Facts

## West Virginia Population 1900 - 2012



# HUC 8 Watershed Map



# Water Facts

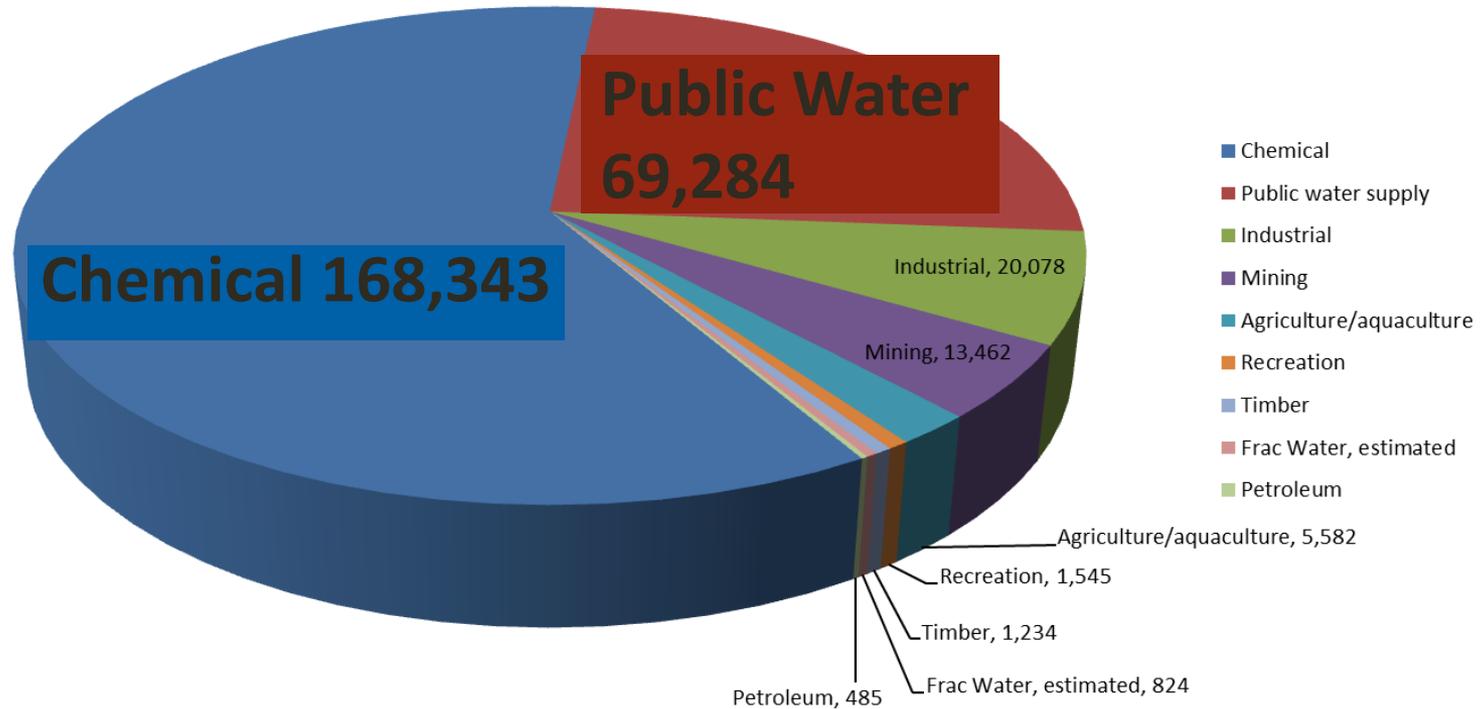
- **19.32 trillion gallons of precipitation – based on 44 in/year**
- **The record precipitation event in West Virginia is 19.5 inches of rain in two hours and 10 minutes at Rockport in July of 1889**
- **1.07 trillion gallons – maximum storage of dams/lakes**
- **388.7 billion gallons - normal storage of dams/lakes**
- **1.48 trillion gallons –potential mine pool storage**

# Water Facts

- **1.2 trillion gallons - withdrawn by Large Quantity Users annually (excluding Hydroelectric users)**
- **~6% or 72 billion gallons/year estimated consumptive use**
- **54,961 – total stream miles statewide.**
- **≥ 42 billion gallons per day - average additional available water from our rivers and streams.**

# LQU - Excluding Hydro and Thermoelectric Use.

**3 Year Average Water Use in 2011 by SIC Group (millions of gallons)  
(excluding Hydroelectric and Thermoelectric Facilities)**



# Some key studies performed enabling data collection necessary for development of the Plan.

## Annual Certification-Large Quantity Users

***NOTE: NOT TO BE USED FOR FRAC WATER REPORTING***



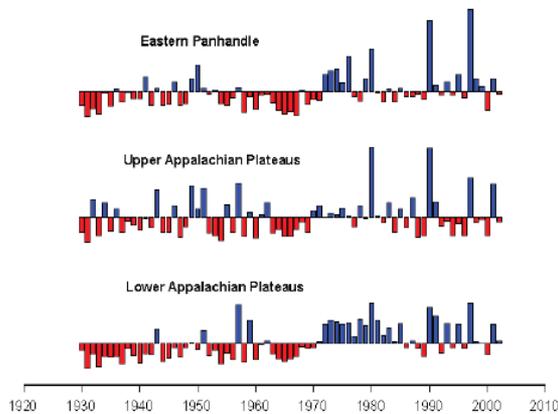
If you are a large quantity user, and are required to complete an annual user certification, please click the button below to be directed to the appropriate forms and instructions.

**User Certification**

**Currently, any user who withdrawals more than 750,000 gallons per month.**

In cooperation with the West Virginia Department of Environmental Protection,  
Division of Water and Waste Management

**Low-Flow Analysis and Selected Flow Statistics  
Representative of 1930–2002 for Streamflow-Gaging  
Stations In or Near West Virginia**

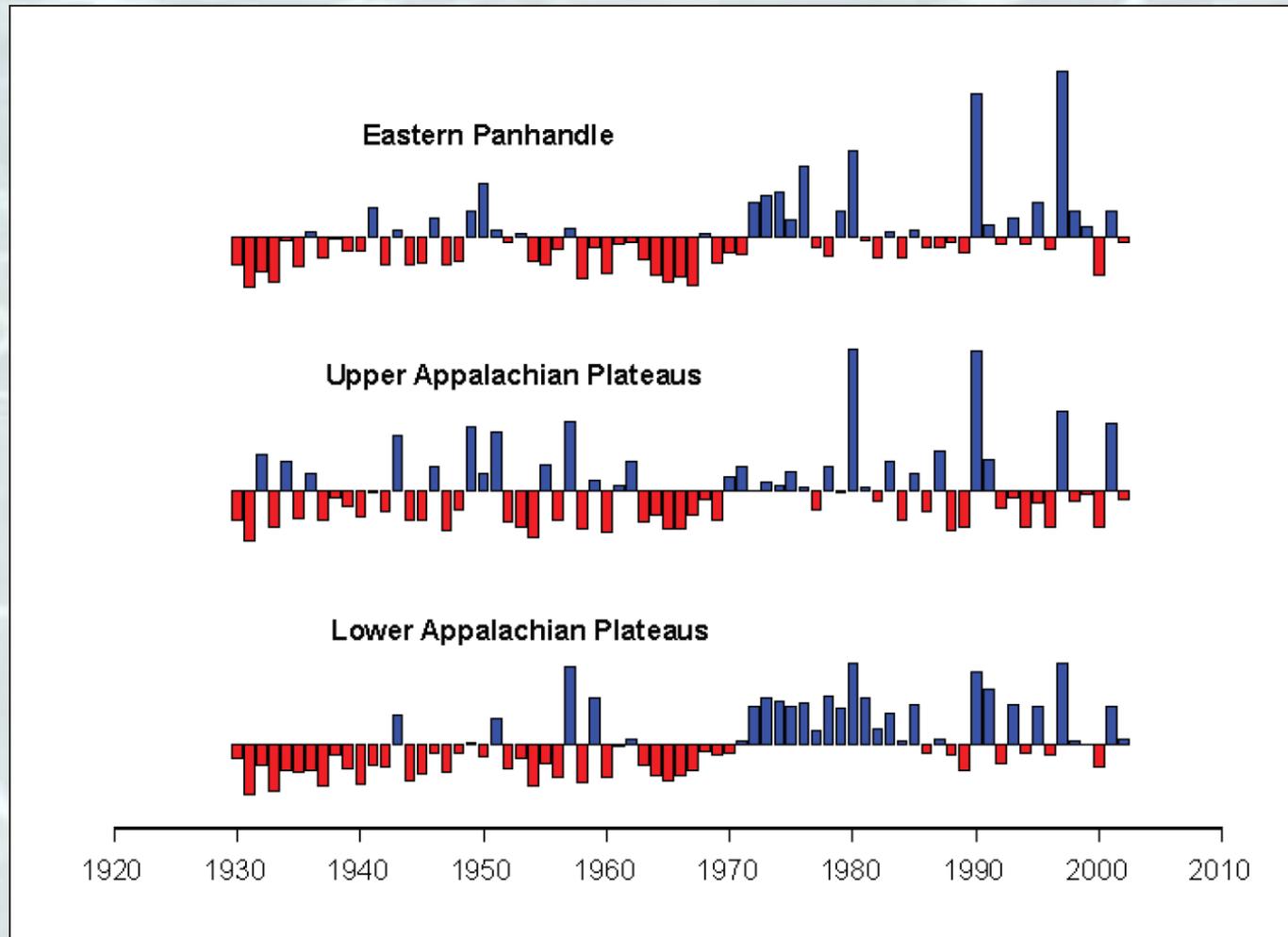


Scientific Investigations Report 2006–5002

U.S. Department of the Interior  
U.S. Geological Survey

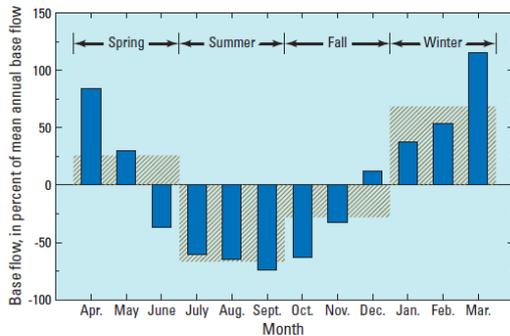
Stream flow  
statistics at gage  
locations on  
unregulated  
streams across  
the state were  
updated.

# Flooding and Drought are discussed in detail in the Plan.



Prepared in cooperation with the West Virginia Department of Environmental Protection,  
Division of Water and Waste Management

### Comparison of Base Flows to Selected Streamflow Statistics Representative of 1930–2002 in West Virginia



Scientific Investigations Report 2012–5121

U.S. Department of the Interior  
U.S. Geological Survey

A study to equate stream flow statistics to base flow of the streams to identify the inter-connection of surface and groundwater.

West Virginia  
*Geological Survey*

West Virginia Mine Pool Atlas



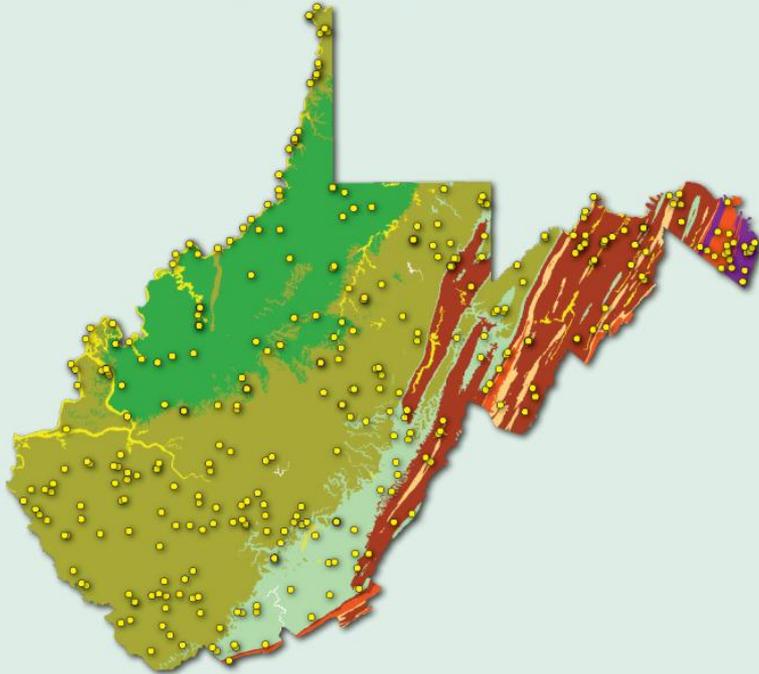
*West Virginia*  
WEST VIRGINIA

A mine pool atlas was produced by documenting the location and potential storage capacity of mapped mines in the state.



Prepared in cooperation with the West Virginia Department of Environmental Protection,  
Division of Water and Waste Management

## Groundwater Quality in West Virginia, 1993–2008



Scientific Investigations Report 2012–5186

U.S. Department of the Interior  
U.S. Geological Survey

A study of the groundwater quality of selected wells across the state.





In cooperation with the West Virginia Department of Environmental Protection Division of Water and Wastewater, Water Use Section

**Correlations of daily flows at streamgages in and near West Virginia, 1895-2011, and implications for managing withdrawals from ungaged streams**

Scientific Investigations Report 2013-XXXX

U.S. Department of the Interior  
U.S. Geological Survey

A new study (under final review) which will better predict flows on un-gaged streams. (improved WMP for Horizontal well industry)



# WEST VIRGINIA

## WATER LAWS WATER REGULATIONS AND WATER RIGHTS



WV department of environmental protection – Promoting a healthy environment

By:

West Virginia Department of Environmental Protection

Office of Legal Services

2013

The DEP Office of Legal Services put together a collection of legal facts concerning ownership and regulation of the states waters.

# WVWRMP Mapping Tool

Google search: wvwaterplan and click the Blue Button

west virginia State Agency Directory | Online Services Search WV DEP

west virginia department of environmental protection  
- Promoting a Healthy Environment

DEP Offices | Agency History | News | Outlook Web Access | Text size A A A

Home > Water and Waste Management > Water Use Section > WV Water Resources Management Plan

**West Virginia Water Resources Management Plan**

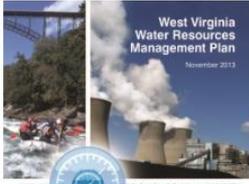
Welcome to the WVDEP Water Use Section Public Information Portal. This website was developed in cooperation with the Center of Environmental, Geotechnical, and Applied Sciences (CEGAS) at Marshall University. It serves as a public information portal for data related to water use in West Virginia. The Water Use Section of the WV DEP was developed as a result of the Water Resources Protection and Management Act of 2008. On this site, you have access to reports from the Large Quantity User and Marcellus Shale Frac Water databases. Additionally, there are many other related datasets displayed for the West Virginia Water Plan Mapping Tool.

Please click the button below to proceed to the mapping tool:

**WV Water Resources Management Plan Mapping Tool**

To view the "West Virginia Water Resources Management Plan", the "West Virginia Watershed Atlas", or the "West Virginia Watersheds: A Closer Look" documents please click on the corresponding image below.  
*\*Please note that the files are quite large and may take several minutes to load into your browser.*

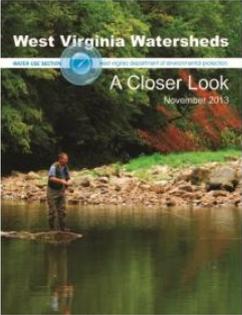
Water Withdrawal Guidance Tool
WV Water Resources Management Plan
Progress Reports - Water Resources Protection & Management Act
State Rules and other related documents
Frac Water Reporting Form
Annual Certification-Large Quantity Users
Mine Pool Atlas
WV Water Laws, Regulations, and Rights
Helpful Links



West Virginia Water Resources Management Plan  
November 2013



West Virginia Watershed Atlas  
November 2013



West Virginia Watersheds  
A Closer Look  
November 2013

Filetype: PDF (45 MB)      Link to Watershed Maps      Filetype: PDF (30 MB)



# Mapping Tool Instructions

## Instructions

WV Water Use Mapping Tool

This document includes instructions on using the WV Water Use Mapping Tool.

9/14/2017

### I. Map Viewer Overview

The layout of the map viewer is shown below.



Map Viewer Overview

### II. Navigation

This section describes how to navigate. Below is a picture of the navigation widget. It is found on the left side of the map viewer. It becomes transparent when the cursor is not hovering over a navigation control.



In addition to using the "Zoom slider" on the navigation widget, you can also roll the mouse wheel forward or backwards to zoom in or out respectively.

### III. View GIS Layers

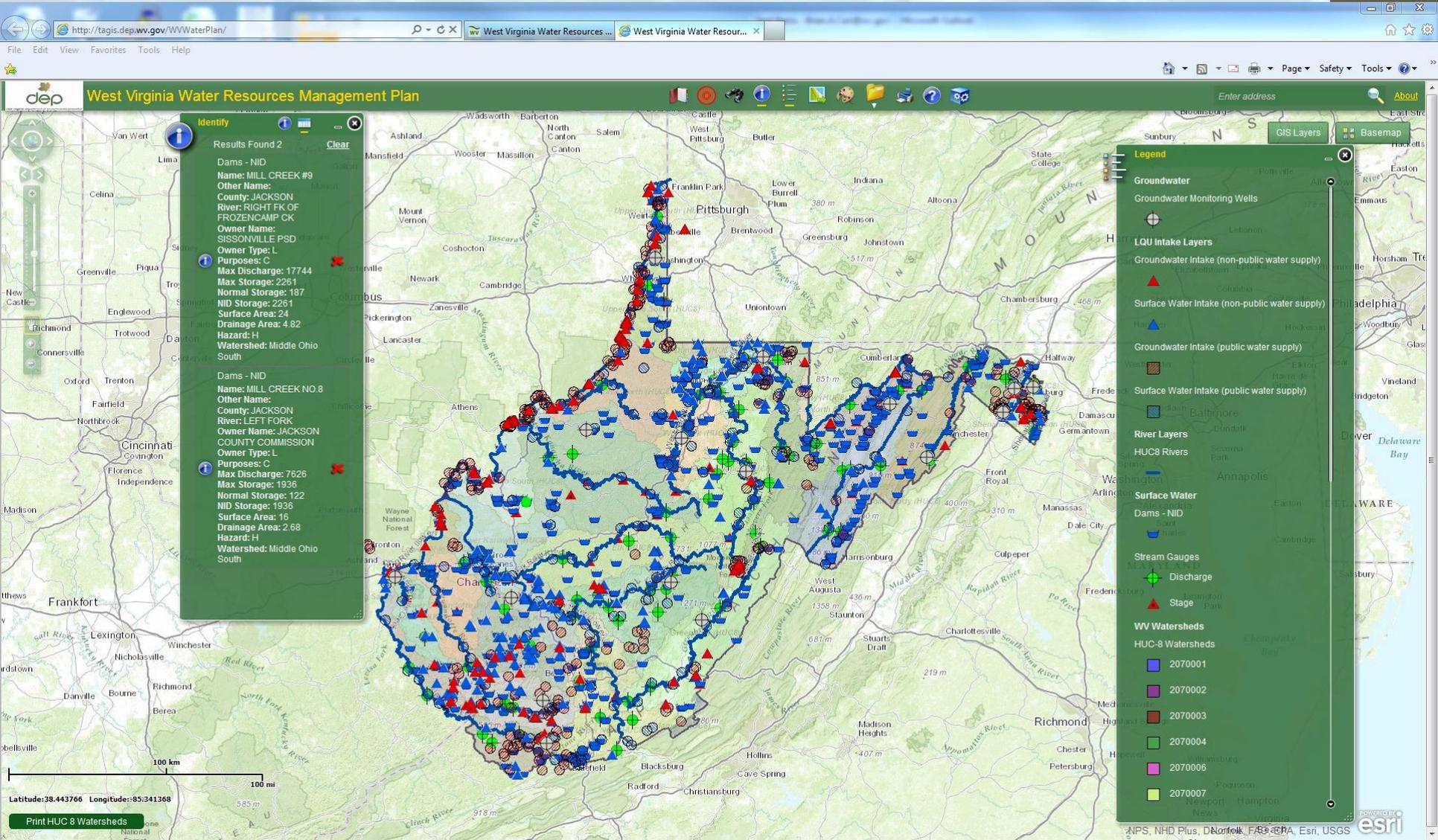
Switch between base layers by selecting one of the buttons labeled "Streets", "Aerial" or "Topo". Base layers are used in the viewer to display background imagery and street data.



Additional layers can be displayed in the viewer by selecting the "GIS Layers" button and then selecting the checkbox beside the layer to display. Note: not all layers will be displayed at all scales/zoom levels.



# Water Data, DEM, Aerial Photography, Demographics & Links to much more



# Locate Widget (address or Lat and Long)

The image displays two screenshots of the WV Water Use Mapping Tool interface, demonstrating the 'Locate' widget's functionality.

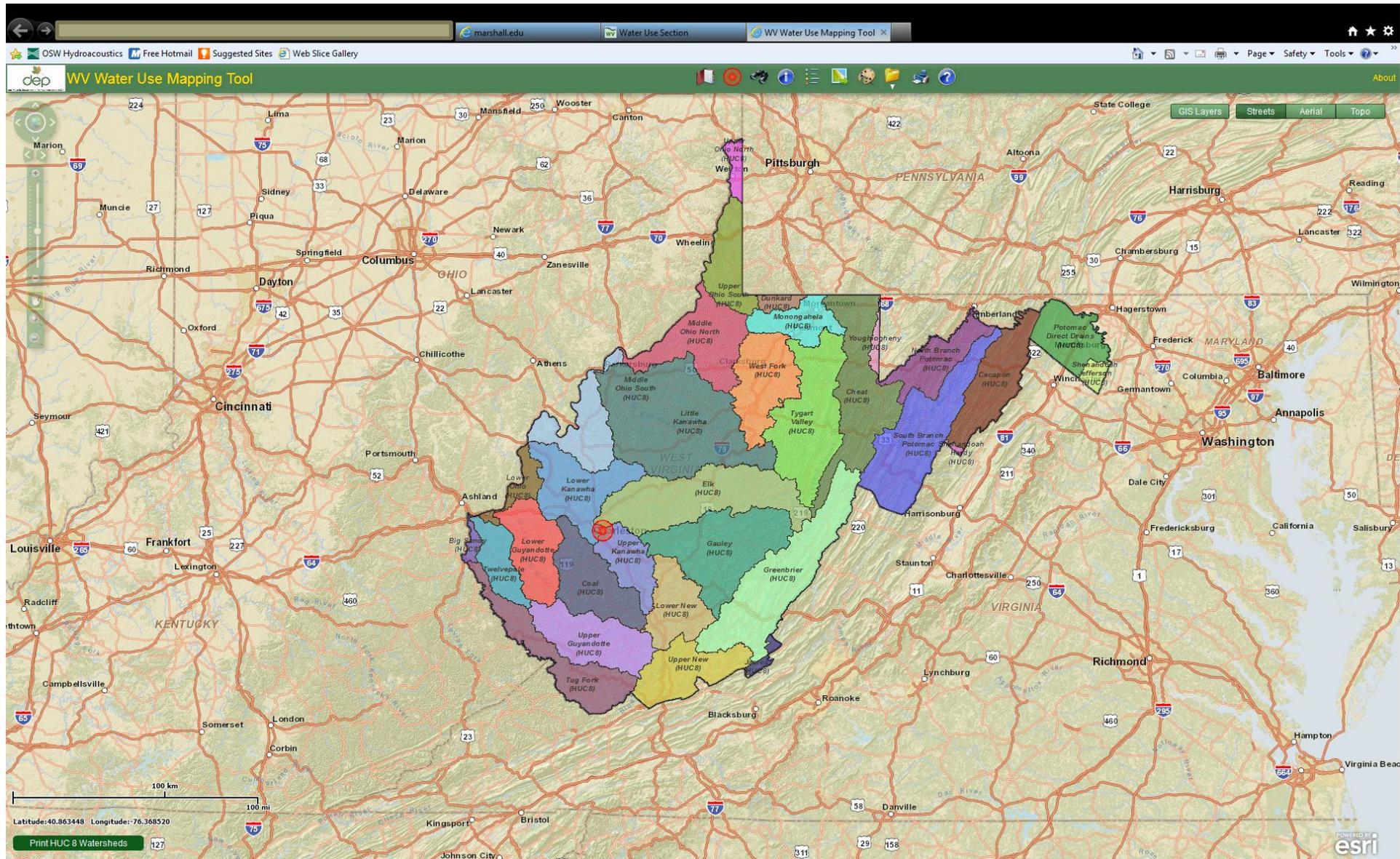
**Left Screenshot:** The 'Find an address' widget is active, showing the input field containing the address '601 57th street se charleston ww'. The 'Locate' and 'Clear' buttons are visible. The map background shows a topographic view of the Charleston area.

**Right Screenshot:** The 'Find an address' widget displays search results for the entered address. The results list includes:

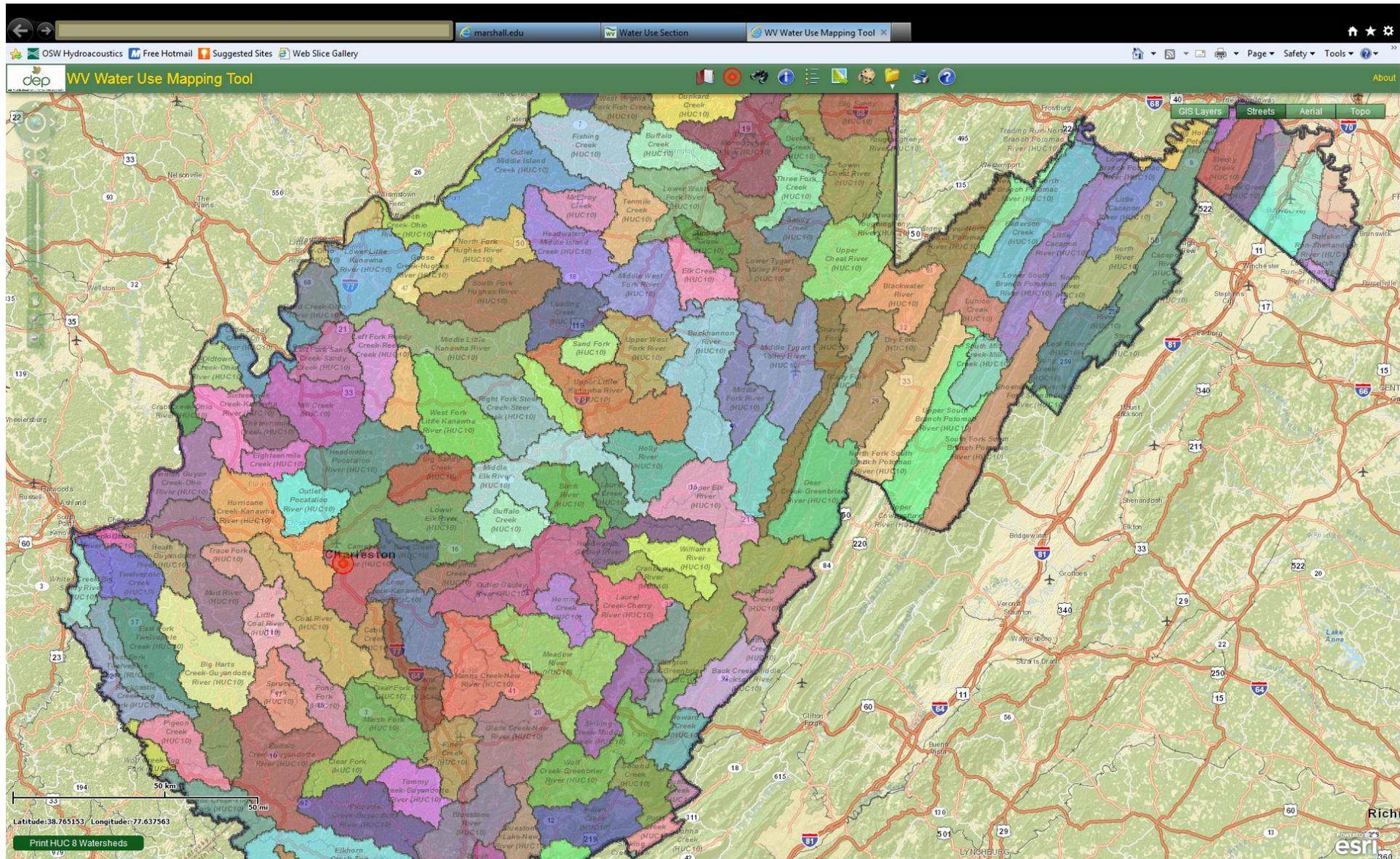
- 601 57th St SE, Charleston, WV, 25304 (Score: 100)
- 602 57th St SE, Charleston, WV, 25304 (Score: 79)
- 57th St SE, Charleston, WV, 25304 (Score: 100)
- Charleston, WV (Score: 100)
- South Charleston, WV (Score: 95.5)

The map shows a red pin placed on the location corresponding to the first search result. The interface includes navigation controls, a scale bar (300 m / 1000 ft), and a 'Print HUC 8 Watersheds' button.

# HUC 8 Watersheds

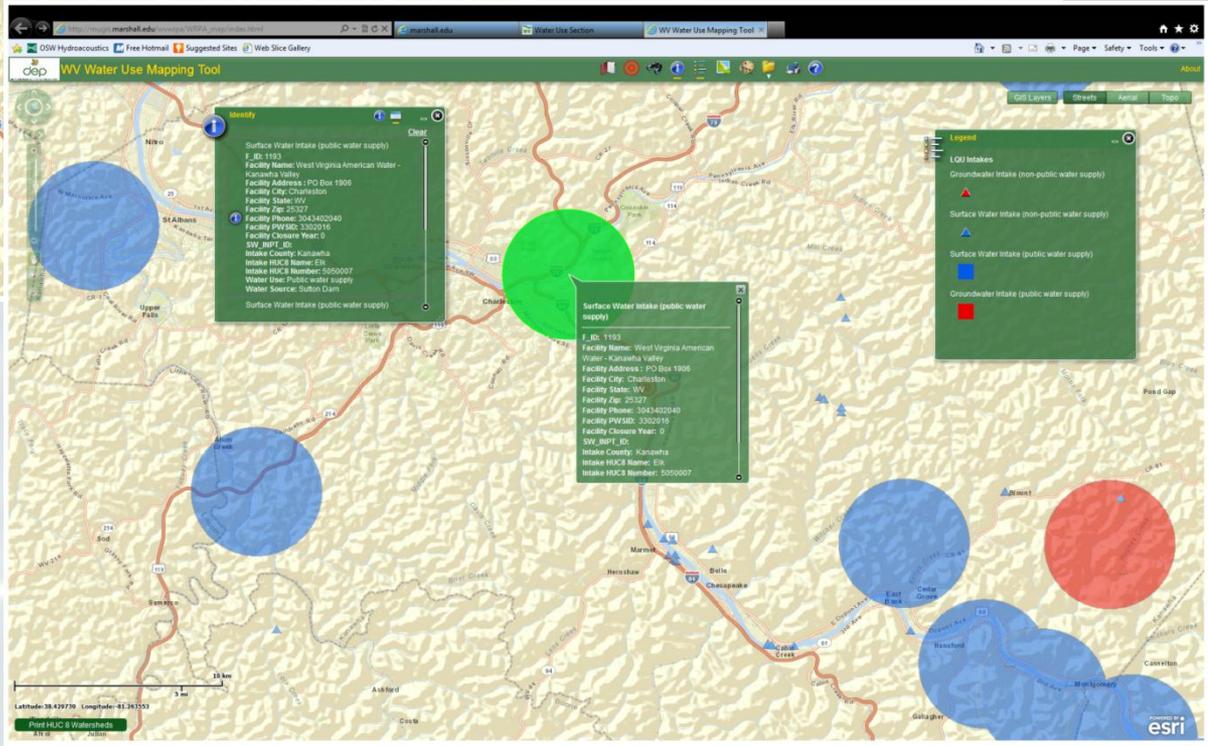
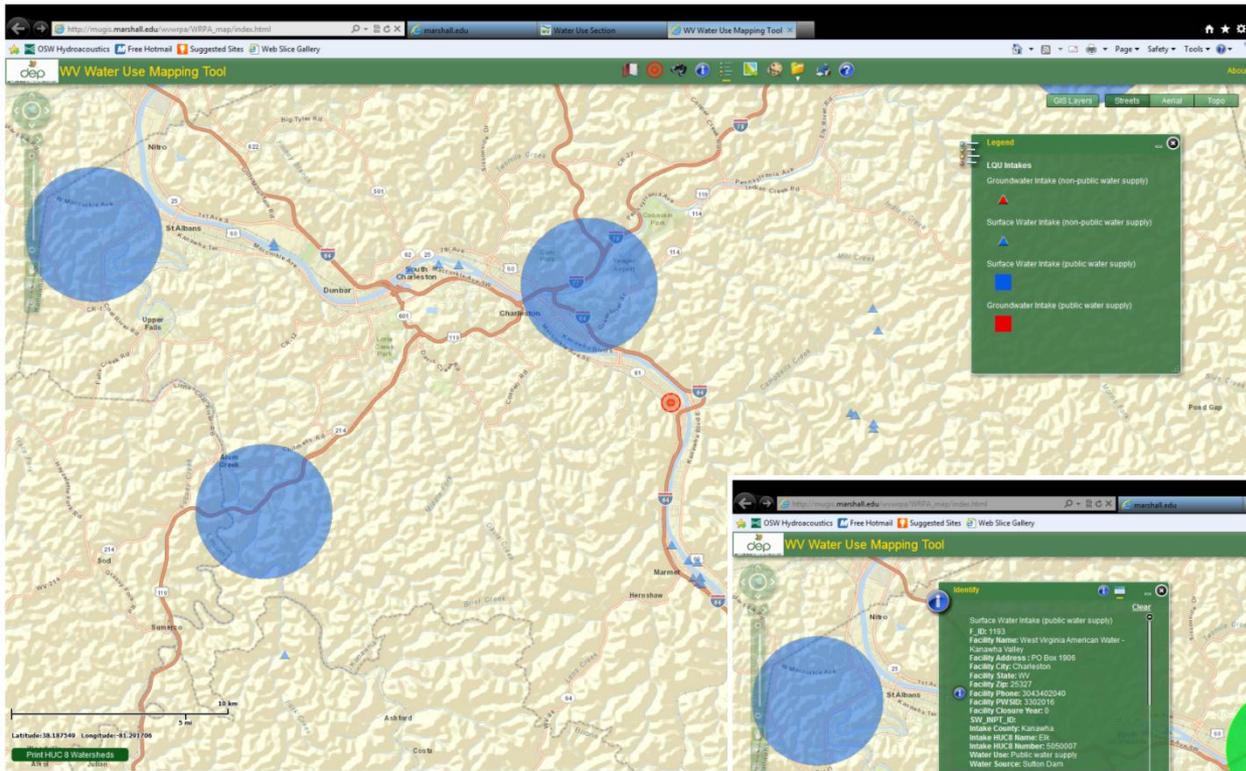


# HUC 10 Watersheds





# LQU Locations



# LQU Search Widget

The screenshot displays the WV Water Use Mapping Tool interface. The main map shows various watersheds in West Virginia, with red circles indicating selected areas. A search widget is overlaid on the map, and a detailed information panel is open on the right side.

**Search: LQU Intake Locations**

Search Layer: Surface Water Intake (non-public water supply)

County: Marion

Watersheds:

- Available Watersheds
- All watersheds listed below
- Monongahela
- Tygart Valley

Water Uses: All water uses

Search

**Search: LQU Intake Locations**

Features Selected: 6

Facility City: Fairview  
Facility County: Marion  
Facility State: WV  
Facility Zipcode: 26570  
Facility Phone: 3046621214  
Facility PWSID:  
Facility Closure Year: 0  
County: Marion  
Water Use: Mining  
HUC-8 Code: 5020003  
Watershed Name(HUC-8): Monongahela  
Water Source Name: Paw Paw Creek at Sugar Run

**Consol Energy - Loveridge**

Facility ID: 77  
Facility Address: PO Box 40  
Facility City: Fairview  
Facility County: Marion  
Facility State: WV  
Facility Zipcode: 26570  
Facility Phone: 3046621214  
Facility PWSID:  
Facility Closure Year: 0  
County: Marion  
Water Use: Mining  
HUC-8 Code: 5020003  
Watershed Name(HUC-8): Monongahela  
Water Source Name: Plant Freshwater System

**Consol Energy - Loveridge**

Facility ID: 78  
Facility Address: PO Box 40  
Facility City: Fairview  
Facility County: Marion  
Facility State: WV  
Facility Zipcode: 26570  
Facility Phone: 3046621214  
Facility PWSID:  
Facility Closure Year: 0  
County: Marion  
Water Use: Mining  
HUC-8 Code: 5020005  
Watershed Name(HUC-8): Dunkard  
Water Source Name: Miracle Run Freshwater

**Consol Energy - Loveridge**

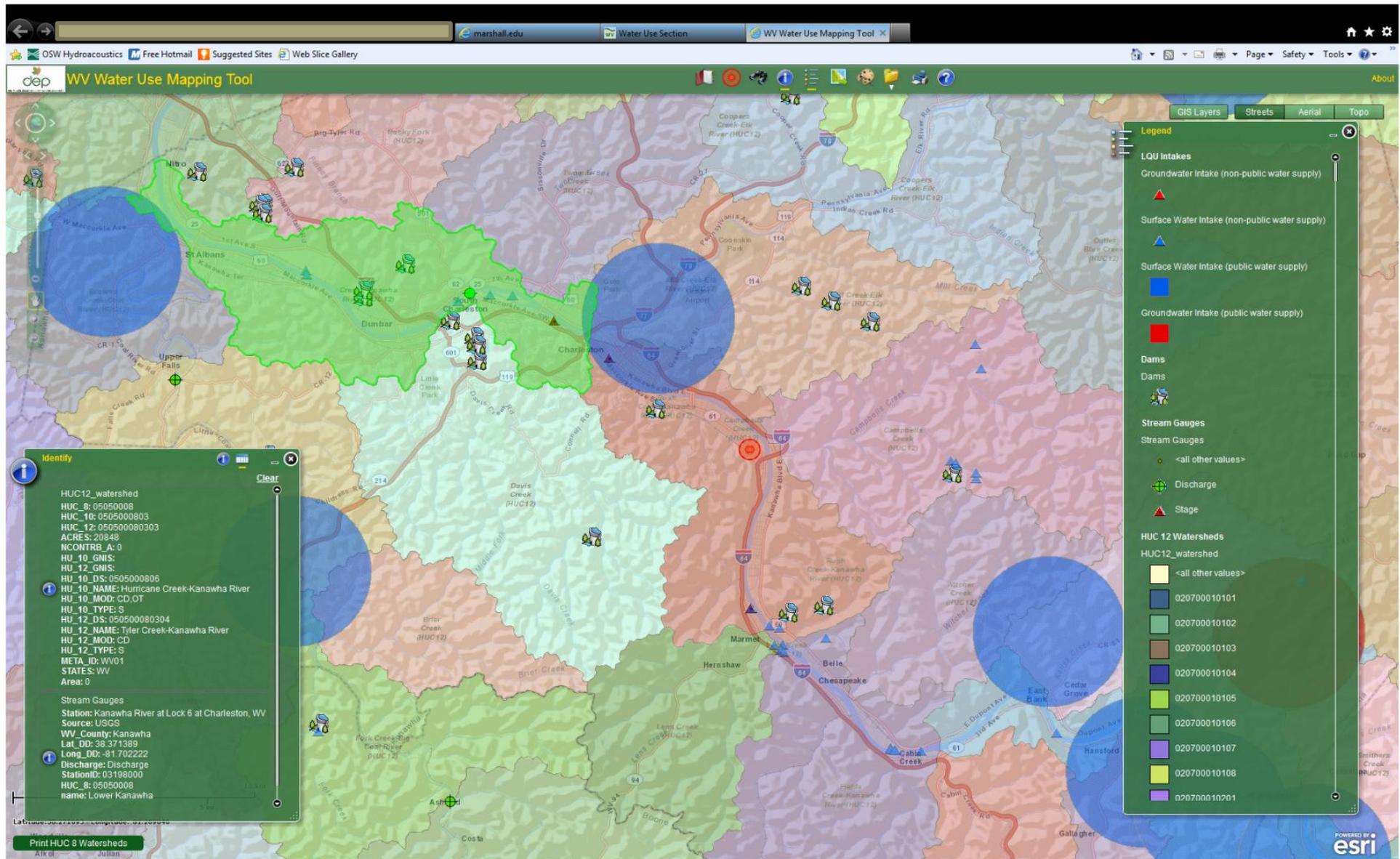
Facility ID: 79  
Facility Address: PO Box 40  
Facility City: Fairview  
Facility County: Marion  
Facility State: WV  
Facility Zipcode: 26570  
Facility Phone: 3046621214  
Facility PWSID:  
Facility Closure Year: 0  
County: Marion  
Water Use: Mining  
HUC-8 Code: 5020003  
Watershed Name(HUC-8): Monongahela  
Water Source Name: Hibbs Run Pump

Latitude: 39.859830 Longitude: -80.530245

Print HUC 8 Watersheds

esri

# Overlap multiple GIS Layers





# USGS Stream Gauge Link

OSW Hydroacoustics | Free Hotmail | Suggested Sites | Web Slice Gallery

National Water Information System: Web Interface

USGS Water Resources (Cooperator Access)

News - updated September 2012

Data Category: Surface Water | Geographic Area: United States | GO

## USGS 03051000 TYGART VALLEY RIVER AT BELINGTON, WV

### PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site | Time-series: Daily data | GO

**LOCATION.**--Lat 39°01'45", long 79°56'10", referenced to North American Datum of 1927, Barbour County, WV, Hydrologic Unit 05020001, on left bank opposite mouth of Mill Creek, 0.2 mi downstream from highway bridge at Belington, and at mile 62.4.

**DRAINAGE AREA.**--406 mi<sup>2</sup>, excluding that of Mill Creek.

**PERIOD OF RECORD.**--June 1907 to current year (daily discharge and peaks).

Prior to October 1960, published as Tygart River at Belington.

**REVISED RECORDS.**--WSP 953: 1933(M), 1941(M). WSP 1335: 1912, 1914-15, 1916(M),

1921-22(M), 1925(M), 1928, 1933. WSP 1385: 1909(M), 1913-15(M), 1917-18, 1924(M),

1928(M), 1932, 1934, 1936, 1938-39, 1948-49. WDR WV-97-1: Drainage area. WDR-US-2009: 1926(M).

**GAGE.**--Water-stage recorder with satellite telemeter. Datum of gage is 1,679.62 ft above MVD 88 (1,680.35 ft above NGVD 29, 1,679.49 ft above COE 12). Prior to Apr. 25, 1939, nonrecording gage at site 0.2 mi upstream at same datum.

**EXTREMES OUTSIDE PERIOD OF RECORD.**--Flood of July 1888, reached a stage of 21.7 ft, from floodmarks at former site, discharge, 21,200 ft<sup>3</sup>/s.

This gaging station is maintained in cooperation with:

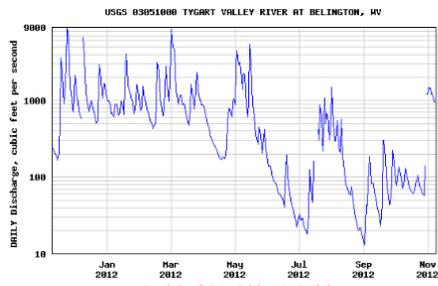
U.S. Army Corps of Engineers, Pittsburgh District  
State of West Virginia

This station managed by the Charleston Field Office.

Available Parameters	Period of Record	Output format	Days (365)
<input type="checkbox"/> All 1 Available Parameters for this site		<input checked="" type="radio"/> Graph	-- or --
<input checked="" type="checkbox"/> 00060 Discharge(Mean)	1907-06-05 2012-11-07	<input type="radio"/> Graph w/ stats	Begin date
		<input type="radio"/> Graph w/ meas	2011-11-08
		<input type="radio"/> Table	End date
		<input type="radio"/> Tab-separated	2012-11-07

[Summary of all available data for this site](#)  
[Instantaneous-data availability statement](#)

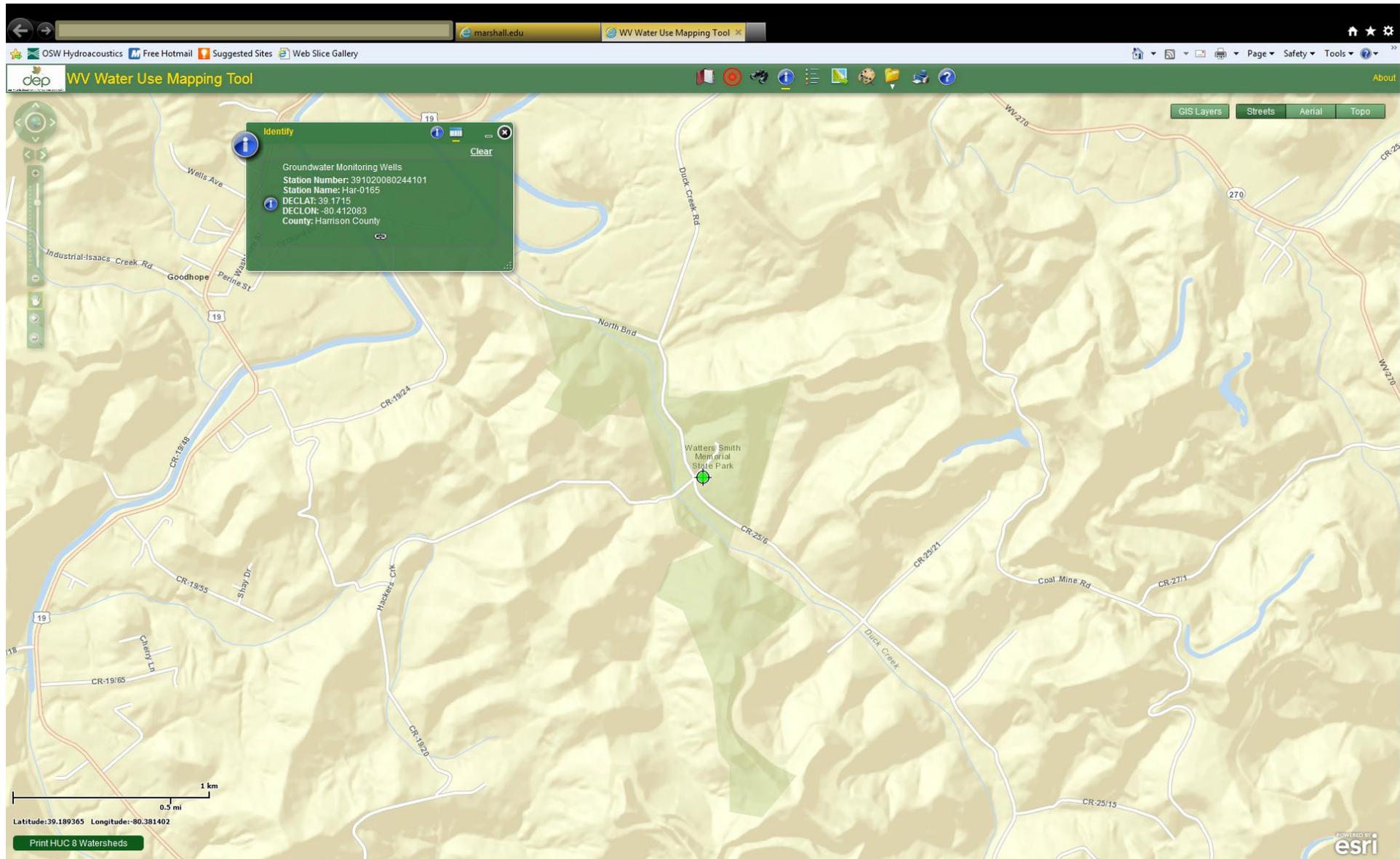
### Discharge, cubic feet per second



Create [presentation-quality](#) graph.

P00060 0001

# GW Well Layer



# USGS GW Well Link





**Groundwater Watch**

USGS Home  
Contact USGS  
Search USGS

Latest News...

Site Number: 391020080244101 - Har-0165



**DESCRIPTION:**  
 Latitude 39°10'17.4", Longitude 80°24'43.5" NAD83  
 Harrison County, West Virginia, Hydrologic Unit 05020002  
 Well depth: 218. feet  
 Hole depth: 218. feet  
 Land surface altitude: 1,048.42feet above NAVD88.  
 Well completed in "Pennsylvanian aquifers" (N300PNSLVN) national aquifer.  
 Well completed in "Conemaugh Formation" (321CNMG) local aquifer

**AVAILABLE DATA FROM NWISWeb:**

	2008	2012
<b>Current / Historical Observations</b>	-10-	-07-
	07	22

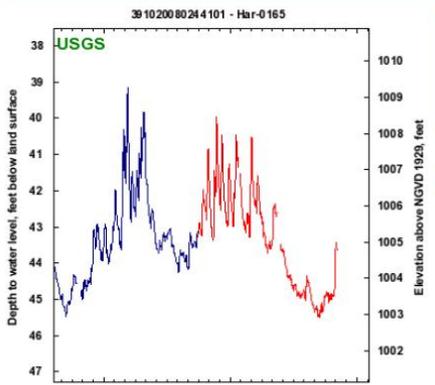
**Daily Data**  
 Field groundwater-level measurements  
 Field/Lab water-quality samples

Additional Data Sources	Begin Date	End Date	Count
<b>Annual Water-Data Report (pdf)</b> **offsite**	2009	2010	2
<b>Groundwater Watch</b> **offsite**	2008	2012	1281

**OPERATION:**  
 Record for this site is maintained by the USGS West Virginia Water Science Center  
 Email questions about this site to West Virginia Water Science Center Water-Data Inquiries

[Groundwater Watch Help Page](#)

## Daily Groundwater Data



Most recent **Provisional** daily data value: **43.65** on 11/07/12

Summary for Period of Continuous Record  
 Depth to water level, feet below land surface  
**Approved** Daily Values Data Used in Analysis

Begin Date	End Date	Days	% Complete
10/07/08	09/30/11	986	90

- Daily Data Options**
- View latest data from NWISWeb
  - View data in calendar format
  - Download data in text format
  - View daily medians

# Precipitation Sites

Identify

Identify from: <Top-most layer>

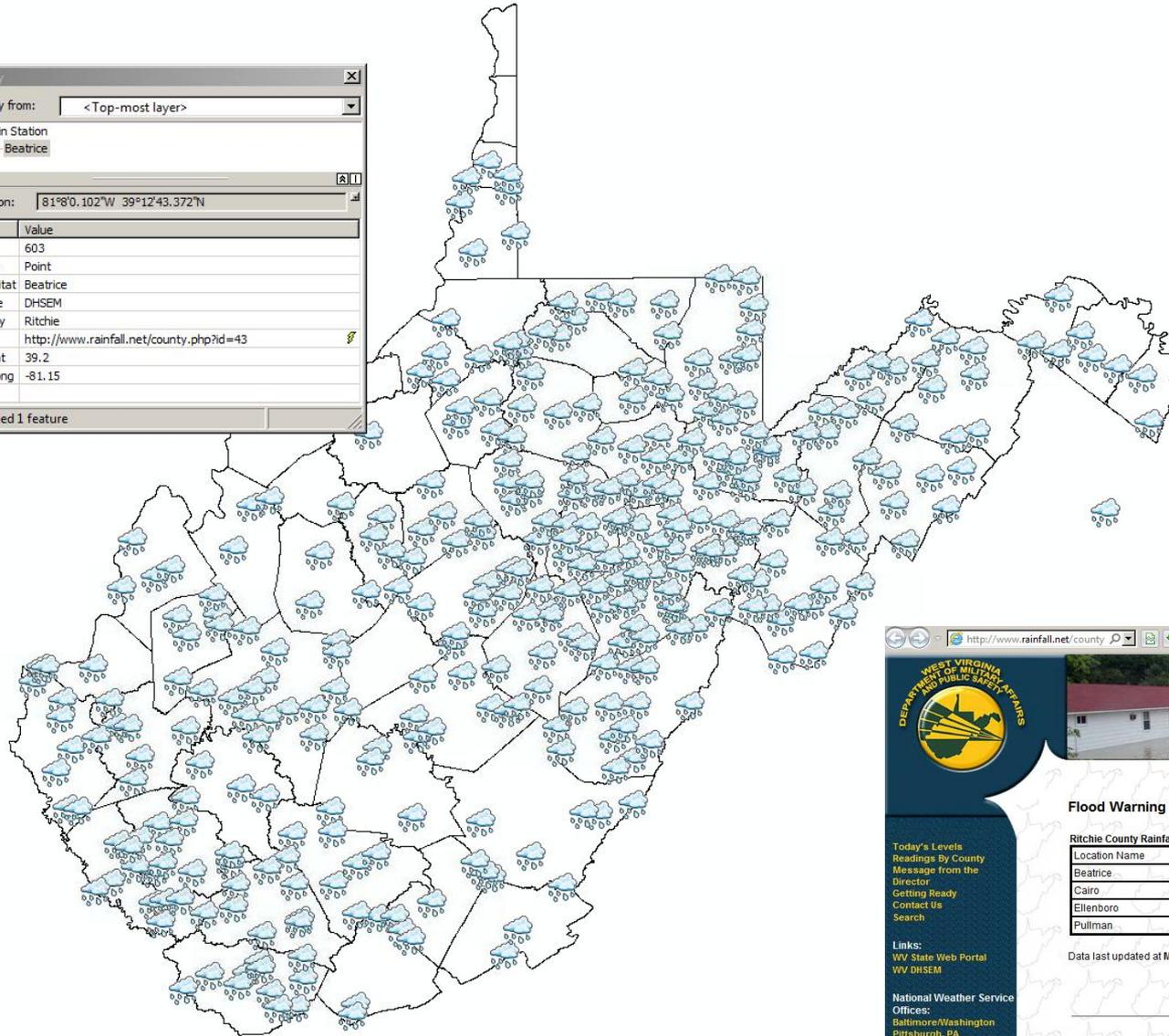
Rain Station

Beatrice

Location: 81°8'0.102"W 39°12'43.372"N

Field	Value
FID	603
Shape	Point
Precipitat	Beatrice
Source	DHSEM
County	Ritchie
Link	<a href="http://www.rainfall.net/county.php?id=43">http://www.rainfall.net/county.php?id=43</a>
DD_Lat	39.2
DD_Long	-81.15

Identified 1 feature



http://www.rainfall.net/county | Flood Warning System | Internet Explorer 9 - Microsof...



Division of Homeland Security and Emergency Management

## Flood Warning System

### Ritchie County Rainfall Data (Units in Inches)

Location Name	15 Min.	30 Min.	1 Hr.	3 Hr.	6 Hr.	12 Hr.	24 Hr.
Beatrice	0.00	0.00	0.00	0.00	0.04	0.08	0.08
Cairo	0.00	0.00	0.00	0.00	0.00	0.12	0.12
Ellenboro	0.00	0.00	0.00	0.00	0.04	0.12	0.12
Pullman	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Data last updated at Monday, December 17, 2012 at 11:45 am EST.

[Printable Version](#)

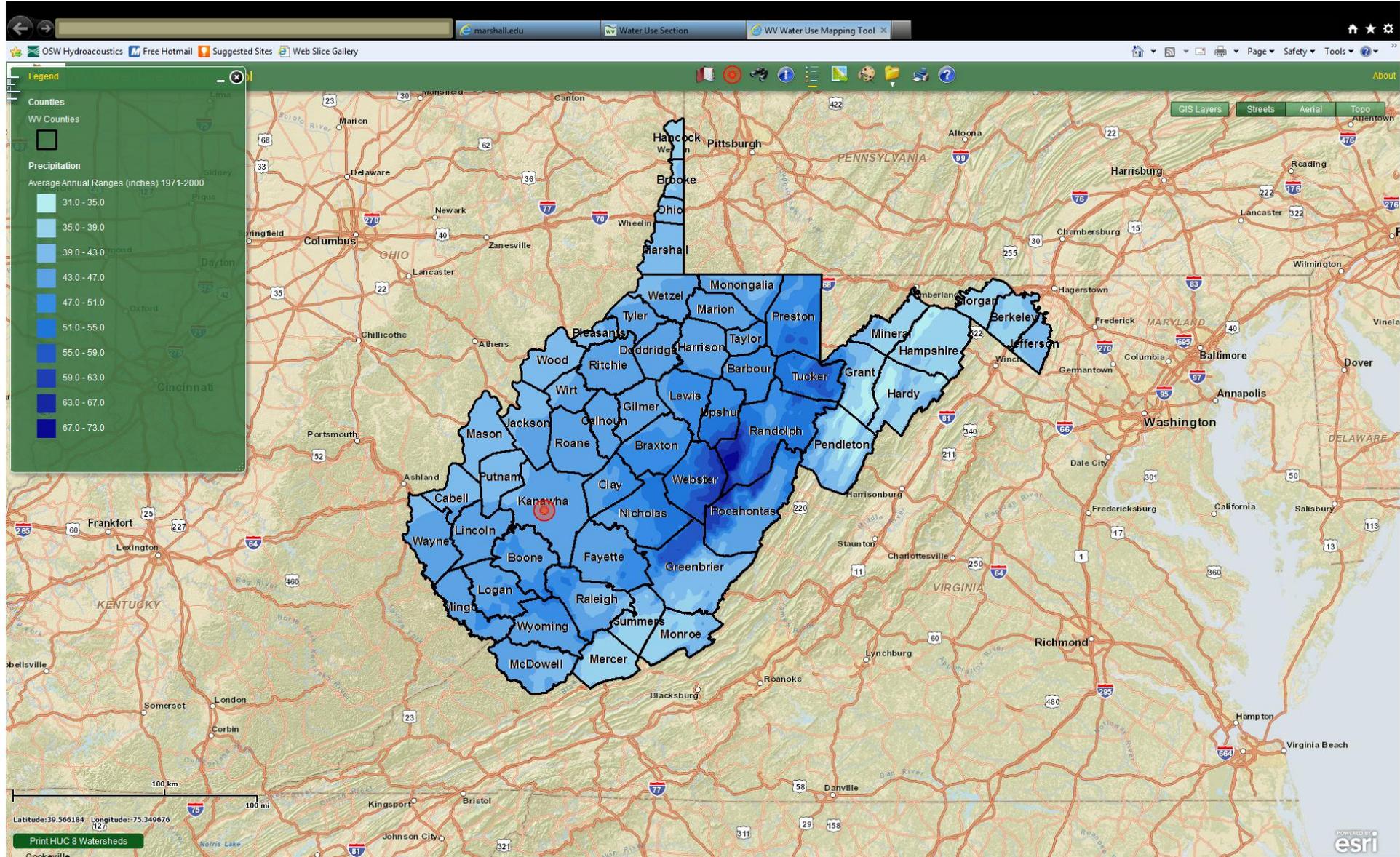
Today's Levels  
Readings By County  
Message from the  
Director  
Getting Ready  
Contact Us  
Search

Links:  
WV State Web Portal  
WV DHSEM

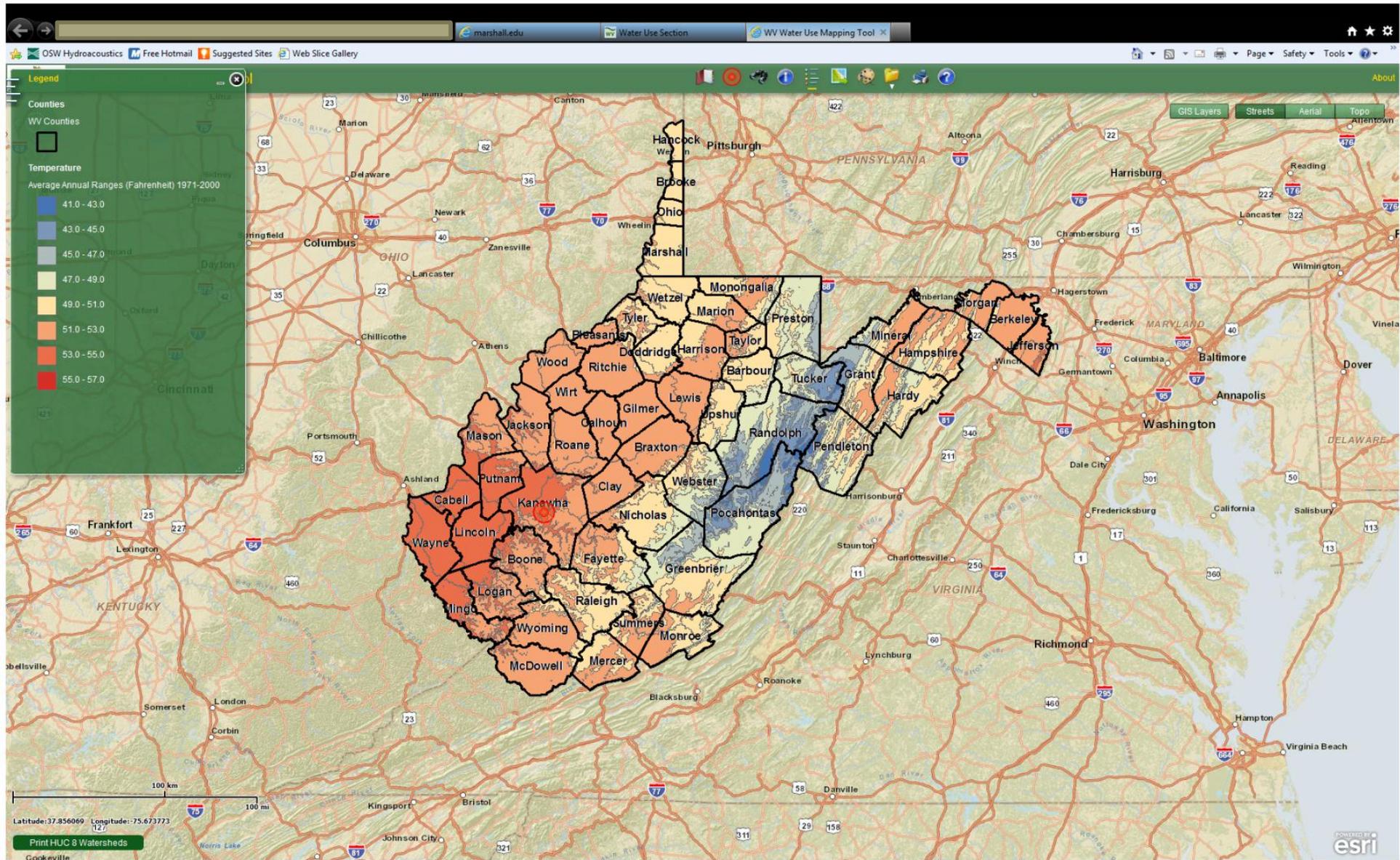
National Weather Service  
Offices:  
Baltimore/Washington  
Pittsburgh, PA  
Blacksburg, VA  
Charleston, WV



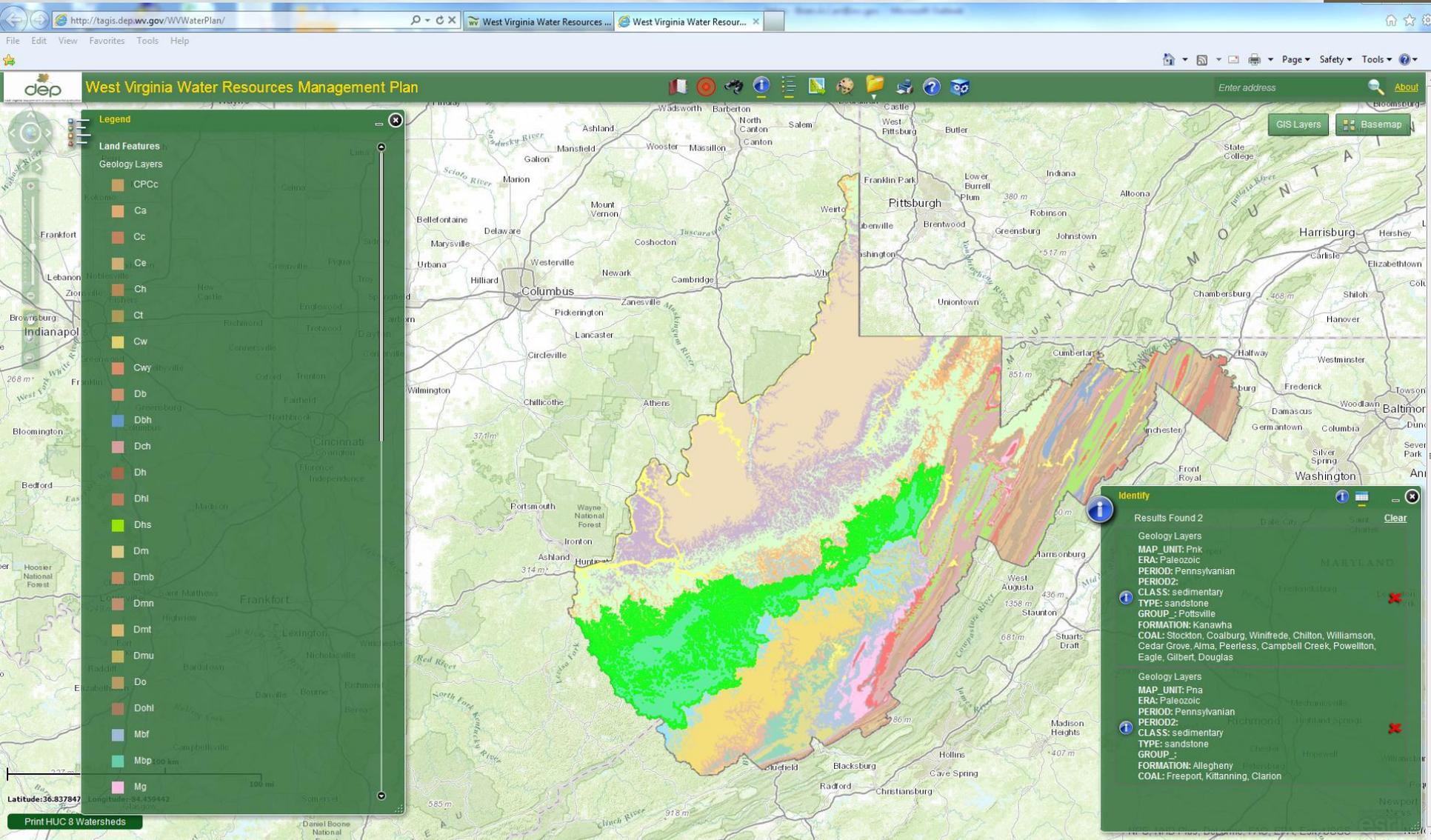
# GIS Layers – Annual Precipitation



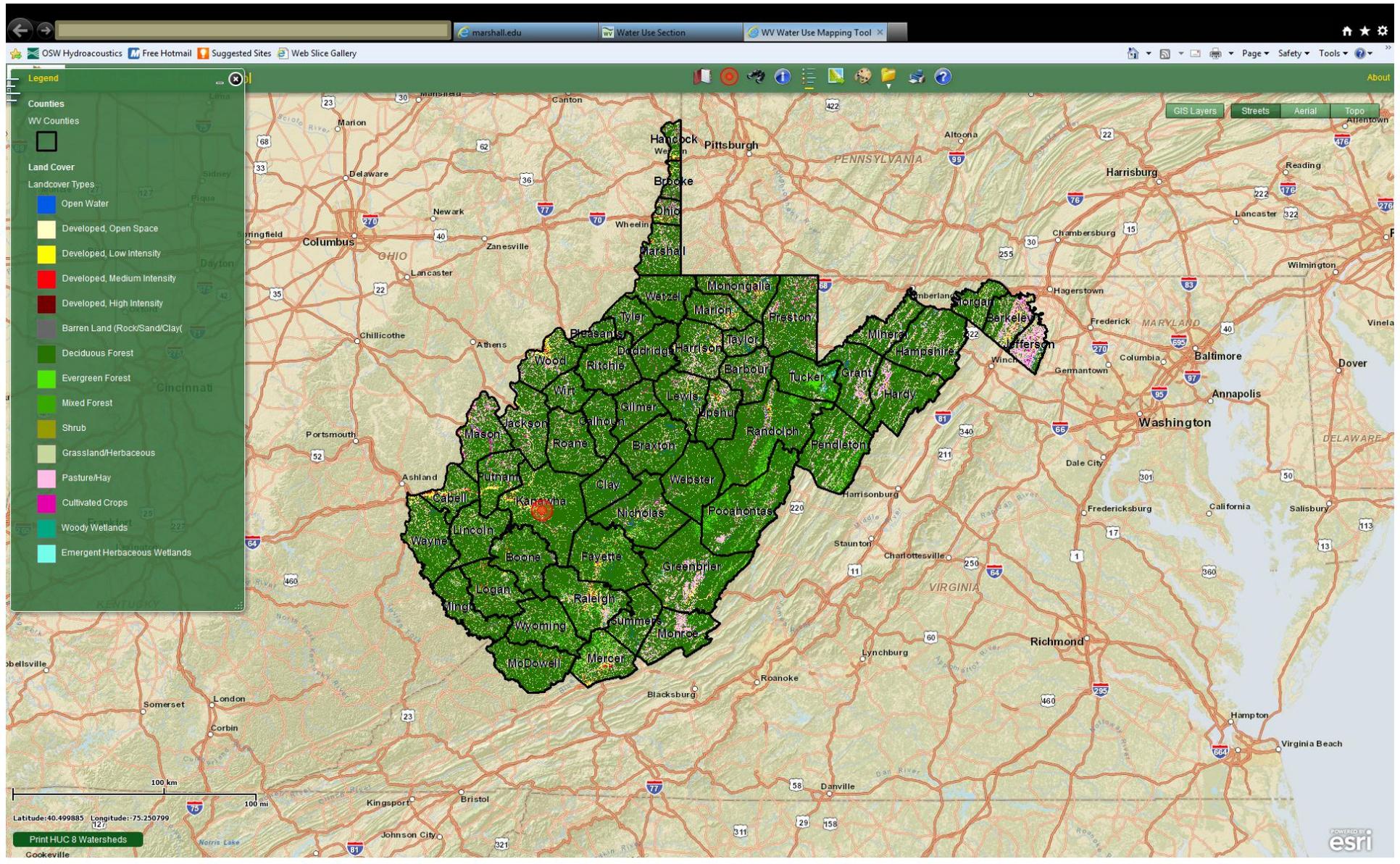
# GIS Layers – Annual Temperature



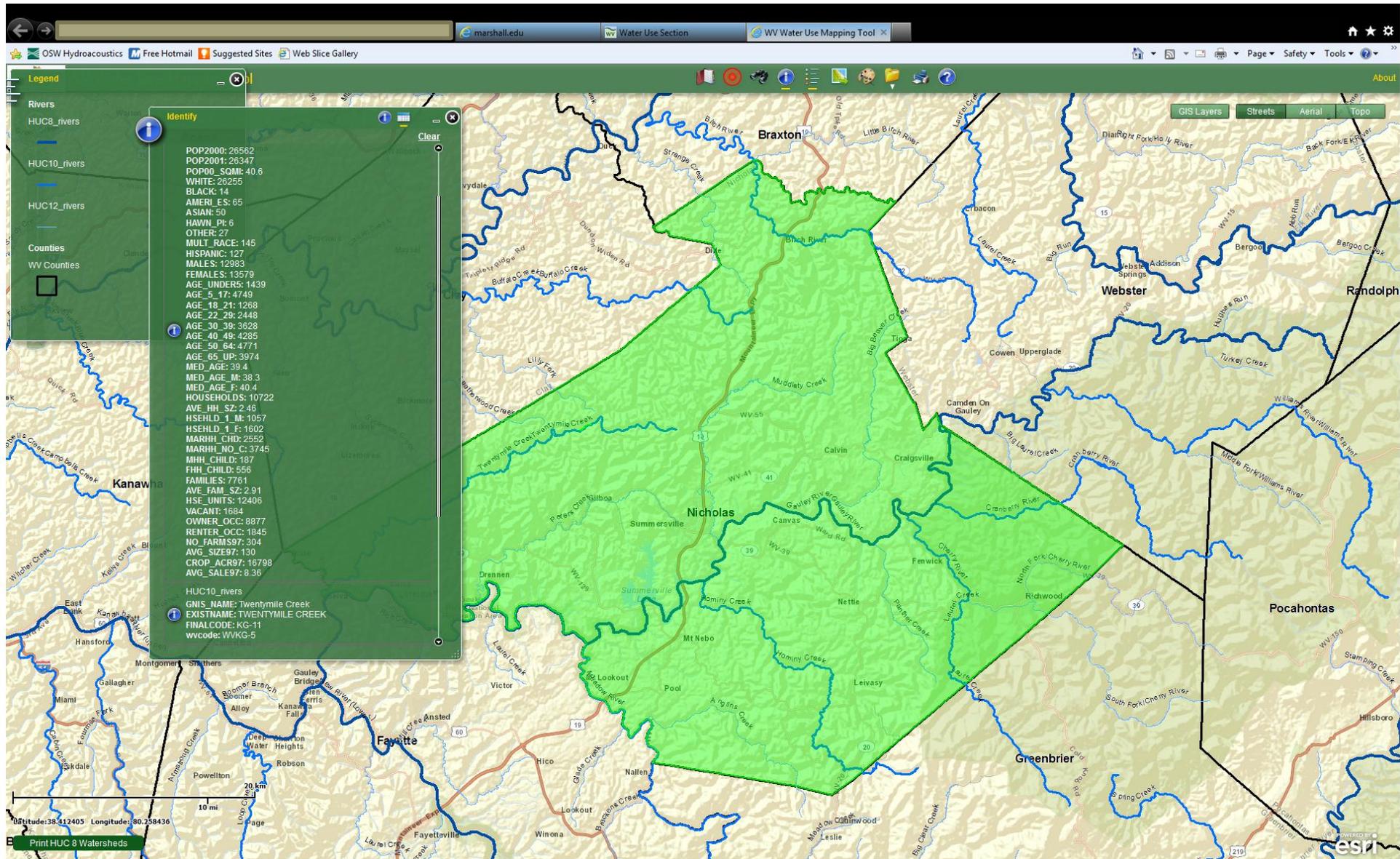
# GIS Layers – Surface Bedrock



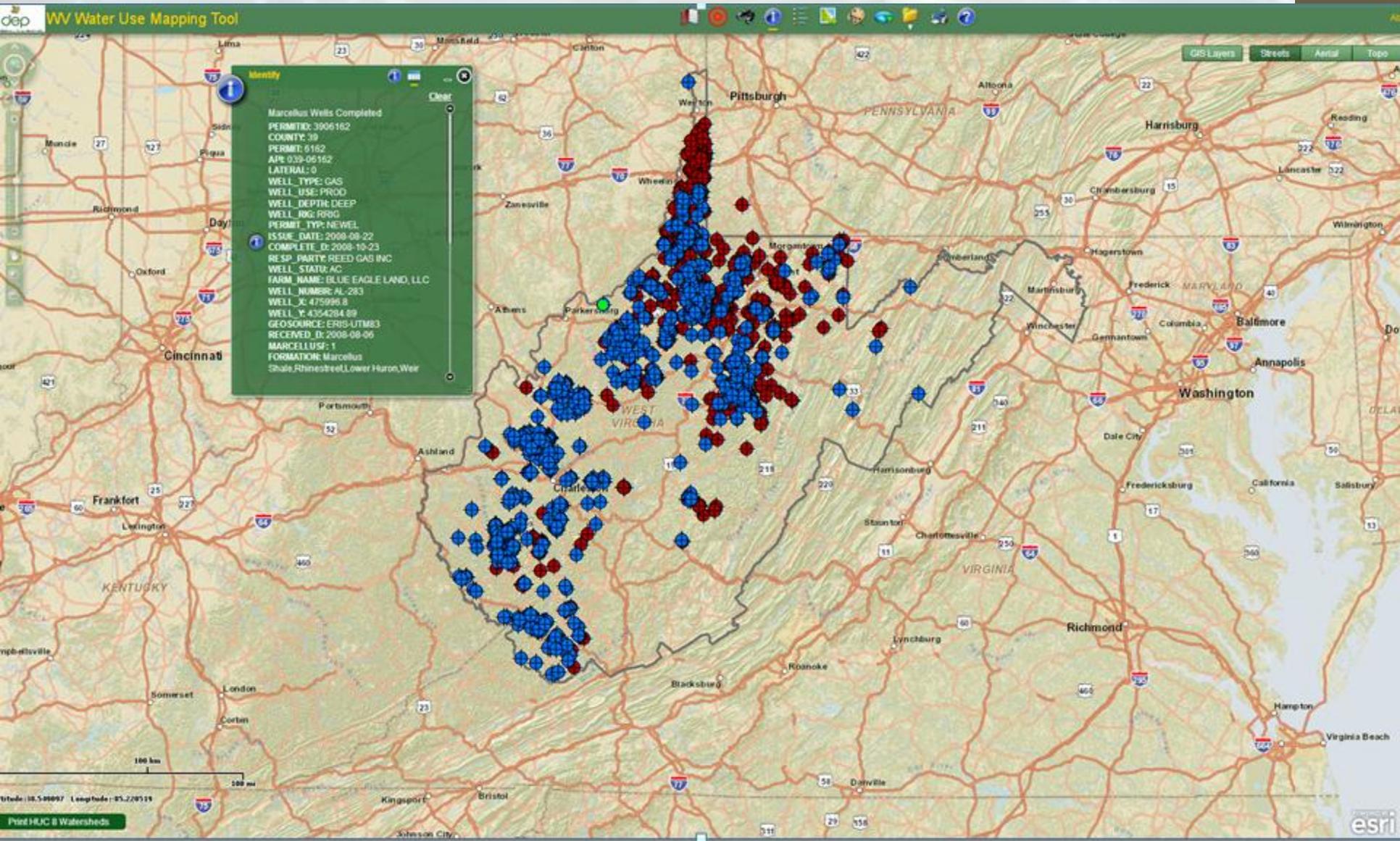
# GIS Layers - Landcover



# GIS Layers – 2010 Census Data



# GIS Layers - Marcellus Wells



# Link to WVGES O&G Well Pipeline



File Edit View Favorites Tools Help

Page Safety Tools



"Pipeline"

Select County: (103) Wetzel    Select datatypes:  (Check All)

Enter Permit #: 2439

Location     Production     Plugging  
 Owner/Completion     Stratigraphy     Sample  
 Pay/ShowWater     Logs     Btm Hole Loc

- [Table Descriptions](#)
- [County Code Translations](#)
- [Permit-Numbering Series](#)
- [Usage Notes](#)
- [Contact Information](#)
- [Disclaimer](#)
- [WVGES Main](#)
- ["Pipeline-Plus" New](#)

WV Geological & Economic Survey:

**Well: County = 103 Permit = 2439**

Report Time: Friday, December 07, 2012 10:33:42 AM

Location Information: [View Map](#)

API	COUNTY	PERMIT	TAX_DISTRICT	QUAD_75	QUAD_15	LAT_DD	LON_DD	UTME	UTMN
4710302439	Wetzel	2439	Proctor	Wileyville	Littleton	39.70032	-80.647649	530207.7	4394555.9

Bottom Hole Location Information:

API	EP	FLAG	UTME	UTMN	LON_DD	LAT_DD
4710302439	1	As Proposed	531364	4394403	-80.634169	39.698901

Owner Information:

API	CMP_DT	SUFFIX	STATUS	SURFACE_OWNER	WELL_NUM	CO_NUM	LEASE	LEASE_NUM	MINERAL_OWN	OPERATOR	PROP_VD	PROP_TRGT_FM
4710302439	3/10/2010	Dvtd Orgnl Loc	Completed	Chesapeake Appalachia LLC	10H	627258	Brogan	26759/26451/1245772/1243544/1243545	Chesapeake Appalachia LLC	Chesapeake Appalachia, LLC	7200	Marcellus Sh

Completion Information:

API	CMP_DT	SPUD_DT	ELEV	DATUM	FIELD	DEEPEST_FM	DEEPEST_FMT	INITIAL_CLASS	FINAL_CLASS	TYPE	RIG	CMP_MTHD	TVD	TMD	NEW_FTG	G_BE	G_AFT	O_BE	O_AFT	P_BE	P_AFT	TL_AFT
4710302439	3/10/2010	4/4/2009	1379	Ground Level	Kausooth	Marcellus Sh	Marcellus Sh	Development Well	Development Well	Gas	Rotary Acid+Frac	5860	11707	11707	2790							4727

Pay/Show/Water Information:

API	CMP_DT	ACTIVITY	PRODUCT	SECTION	DEPTH_TOP	FM_TOP	DEPTH_BOT	FM_BOT	G_BE	G_AFT	O_BE	O_AFT	WATER_QNTY
4710302439	3/10/2010	Water	Fresh Water	Vertical			358	Pennsylvanian System					
4710302439	3/10/2010	Pay	Gas	Deviated	8029	Marcellus Sh	8191	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	8269	Marcellus Sh	8431	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	8509	Marcellus Sh	8684	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	8749	Marcellus Sh	9071	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	9149	Marcellus Sh	9471	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	9549	Marcellus Sh	9871	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	9949	Marcellus Sh	10271	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	10349	Marcellus Sh	10671	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	10749	Marcellus Sh	11071	Marcellus Sh					
4710302439	3/10/2010	Pay	Gas	Deviated	11149	Marcellus Sh	11471	Marcellus Sh					

Production Gas Information:

API	OPERATOR	PRD_YEAR	ANN_GAS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4710302439	Chesapeake Appalachia, LLC	2010	273014	0	0	31251	34433	46092	39814	49362	52771	0	0	0	19291
4710302439	Chesapeake Appalachia, LLC	2011	804558	83892	64628	66892	69614	57331	32047	87064	73224	74156	71974	50829	72907

Production Oil Information:

API	OPERATOR	PRD_YEAR	ANN_OIL	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DCM
4710302439	Chesapeake Appalachia, LLC	2010	694	0	0	112	7	40	6	134	102	0	288	0	5
4710302439	Chesapeake Appalachia, LLC	2011	3744	254	311	412	502	339	93	436	326	315	256	203	297

Stratigraphy Information:

API	SUFFIX	FM	FM_QUALITY	DEPTH_TOP	DEPTH_QUALITY	THICKNESS	THICKNESS_QUALITY	ELEV	DATUM
4710302439	Dvtd Orgnl Loc	Maxton	Well Record	2200	Reasonable	50	Reasonable	1379	Ground Level
4710302439	Dvtd Orgnl Loc	Big Lime	Well Record	2259	Reasonable	16	Reasonable	1379	Ground Level
4710302439	Dvtd Orgnl Loc	Big Injun (undiff)	Well Record	2275	Reasonable	225	Reasonable	1379	Ground Level
4710302439	Dvtd Orgnl Loc	Tully Ls	Well Record	7096	Reasonable	24	Reasonable	1379	Ground Level
4710302439	Dvtd Orgnl Loc	Hamilton	Well Record	7120	Reasonable	89	Reasonable	1379	Ground Level
4710302439	Dvtd Orgnl Loc	Marcellus Sh	Well Record	7209	Reasonable			1379	Ground Level

There is no Wireline (E-Log) data for this well

There is no Plugging data for this well

# Draw Tool

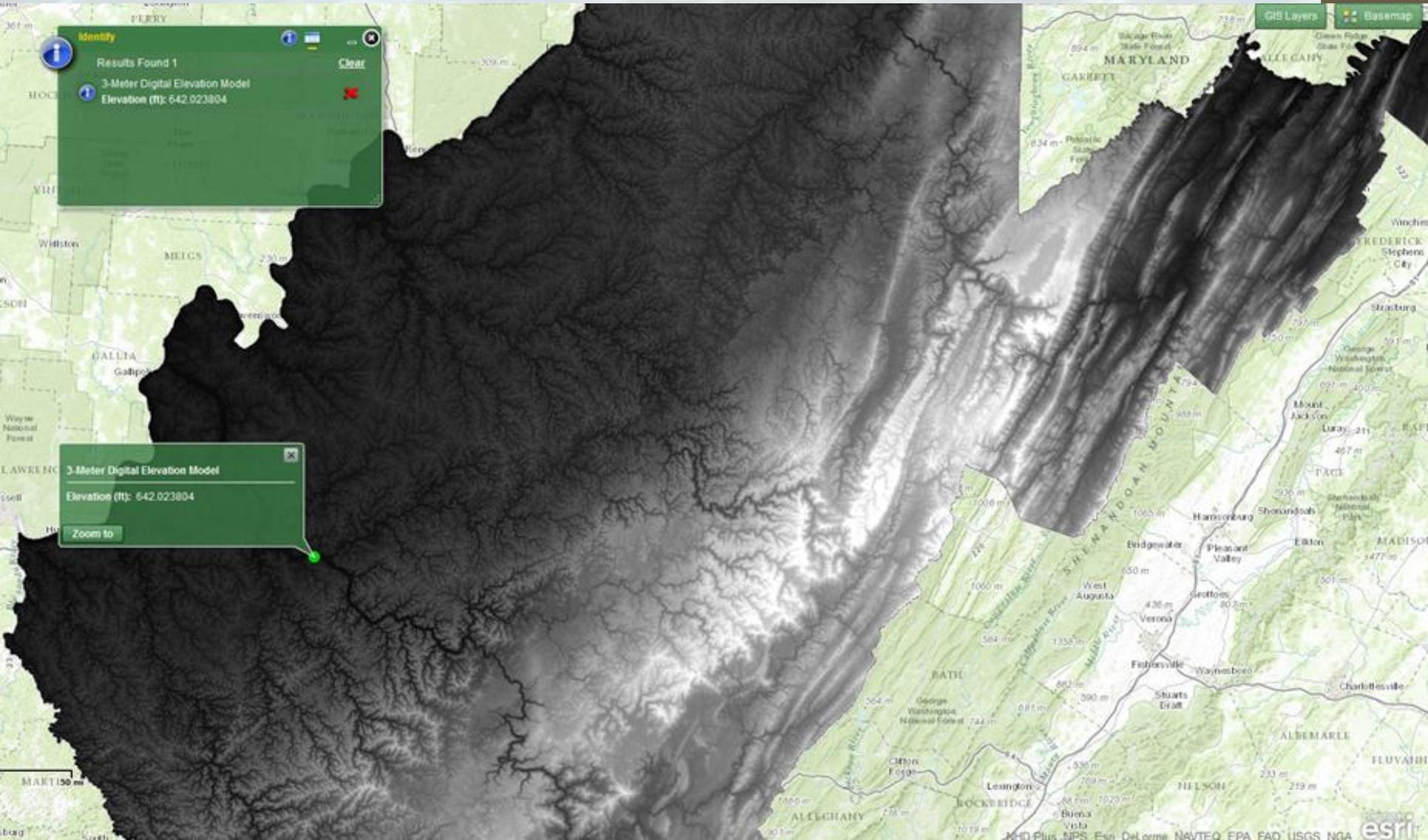
The screenshot displays the WV Water Use Mapping Tool interface. The main map shows a topographic view of a region with two highlighted areas in light blue. A circular area on the left is labeled "IMPACT ZONE" in red text, with a data box indicating "Area: 1,548.98 ac" and "Perimeter: 29,123.26 ft". A larger, irregular polygonal area on the right is labeled "TARGET AREA" in red text, with a data box indicating "Area: 2,838.61 ac" and "Perimeter: 50,919.58 ft". A smaller data box within the target area shows "Area: 36.37 ac" and "Perimeter: 5,162.50 ft".

The "Draw and Measure" panel on the left includes the following controls:

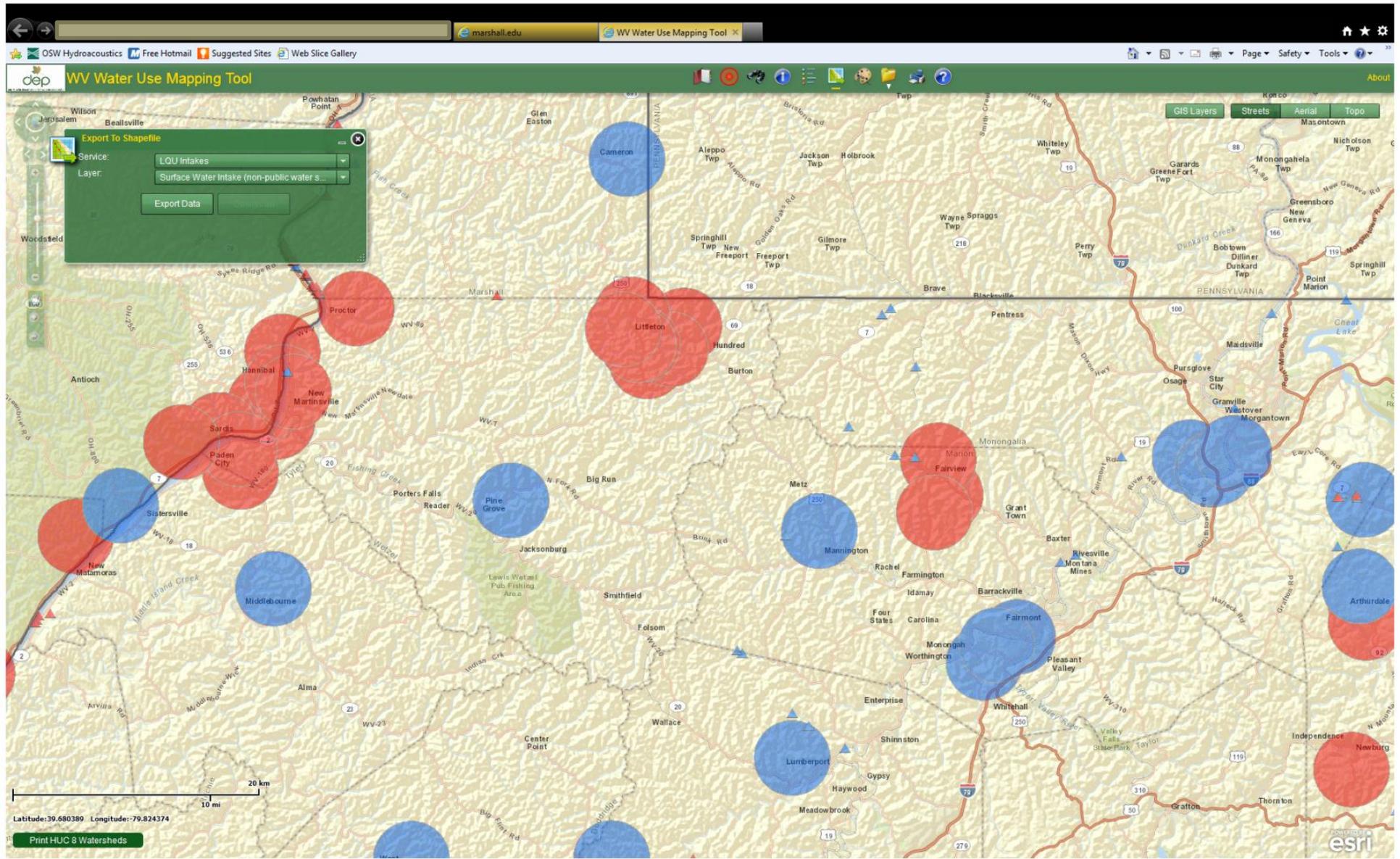
- Draw and Measure title bar
- Navigation icons (pan, zoom, home)
- Clear drawings button
- Text input field: "IMPACT ZONE" with bold (B), italic (I), and underline (U) options
- Font dropdown: "Arial"
- Color selection: a red square
- Size input: "20"

At the bottom left, a scale bar shows 1 mile and 2 kilometers. The coordinates are Latitude: 38.281286 and Longitude: -81.581746. A "Print HUC 8 Watersheds" button is located at the bottom left. The ESRI logo is in the bottom right corner.

# 3 Meter Digital Elevation Model



# Export/Print



# Web Site Links



west virginia State Agency Directory | Online Services

Search WV DEP



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- Promoting a Healthy Environment

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[Office of Oil and Gas](#)  
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#### Water and Waste

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[Water Withdrawal Guidance Tool](#)  
[Permitting](#)  
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#### Agency Geospatial Technologies

[GIS and ITO's TAGIS Unit](#)

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#### Events

[Special Reclamation Fund Advisory Council \(SRFAC\) ... 11/07/2012](#)

[WVDEP regulations for manufacturers seminar 11/08/2012](#)

[Public meeting on water quality standards 11/08/2012](#)

[See More](#)

#### IMPORTANT NOTICE: Upcoming vacancy announcements for Oil and Gas Inspectors

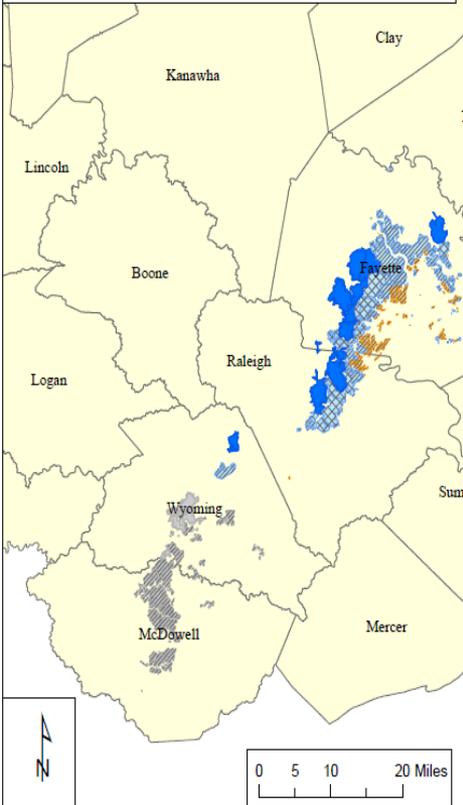
Due to recent legislative changes to the Oil and Gas statute, DEP has created class specifications for Oil and Gas Inspector, Oil and Gas Inspector Specialist, and Oil and Gas Inspector Supervisor. These class specifications have been approved by the State Personnel Board and are available on the Division of Personnel's (DOP) website.

#### Spotlight

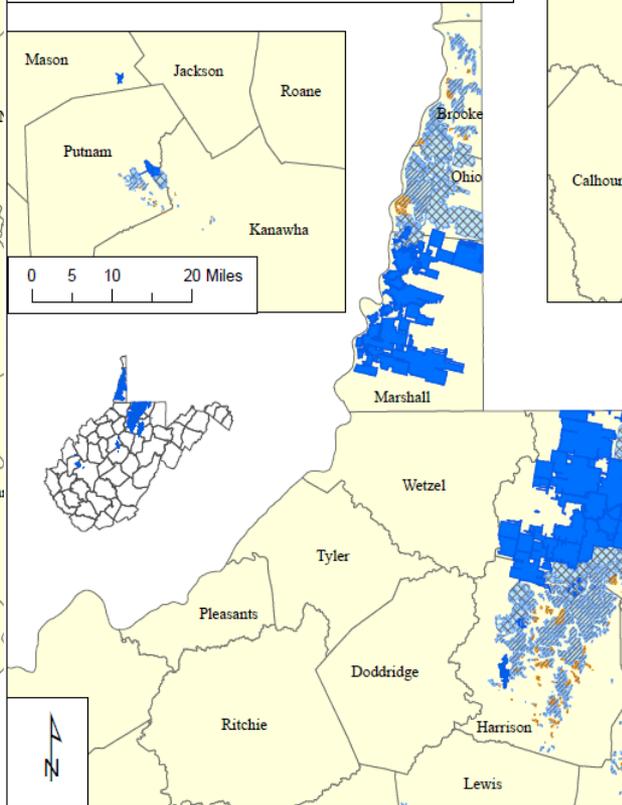


# Mine Pool Atlas Link

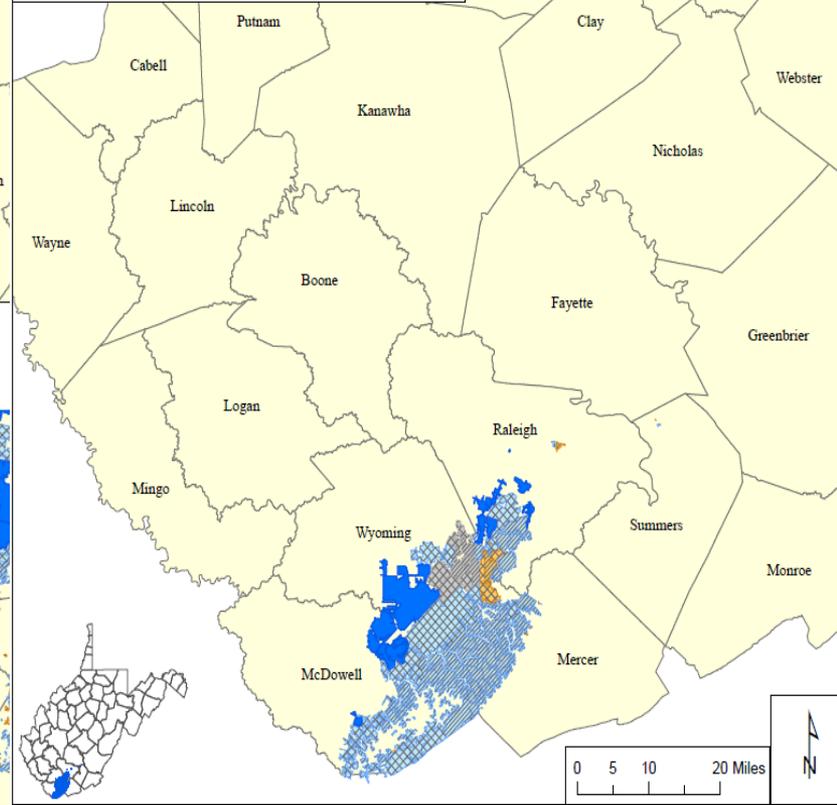
## Sewell Mine Pools Seam Overview



## Pittsburgh Mine Pools Seam Overview



## Pocahontas No. 3 Mine Pools Seam Overview



### Legend

- Position**
- Above Drainage
  - Near Drainage
  - Below Drainage
- Potential Extent of Flooding**
- Undetermined
  - Flooded areas unlikely
  - Partially flooded
  - Totally flooded

### Sewell M

No. of Mines	
Mean coal thickness (feet)	
Min. foot print area (acres)	
Max. foot print area (acres)	
Mean foot print area (acres)	
Median foot print area (acres)	
Total foot print area (acres)	
Estimated void volume (acre feet)	
Max. potential storage (million gallons)	

### Legend

- Position**
- Above Drainage
  - Near Drainage
  - Below Drainage
- Potential Extent of Flooding**
- Undetermined
  - Flooded areas unlikely
  - Partially flooded
  - Totally flooded

### Pittsburgh Mine F

No. of Mines	0
Mean coal thickness (feet)	0.00
Min. foot print area (acres)	0.00
Max. foot print area (acres)	0.00
Mean foot print area (acres)	0.00
Median foot print area (acres)	0.00
Total foot print area (acres)	0.00
Estimated void volume (acre feet)	0.00
Max. potential storage (million gallons)	0.00

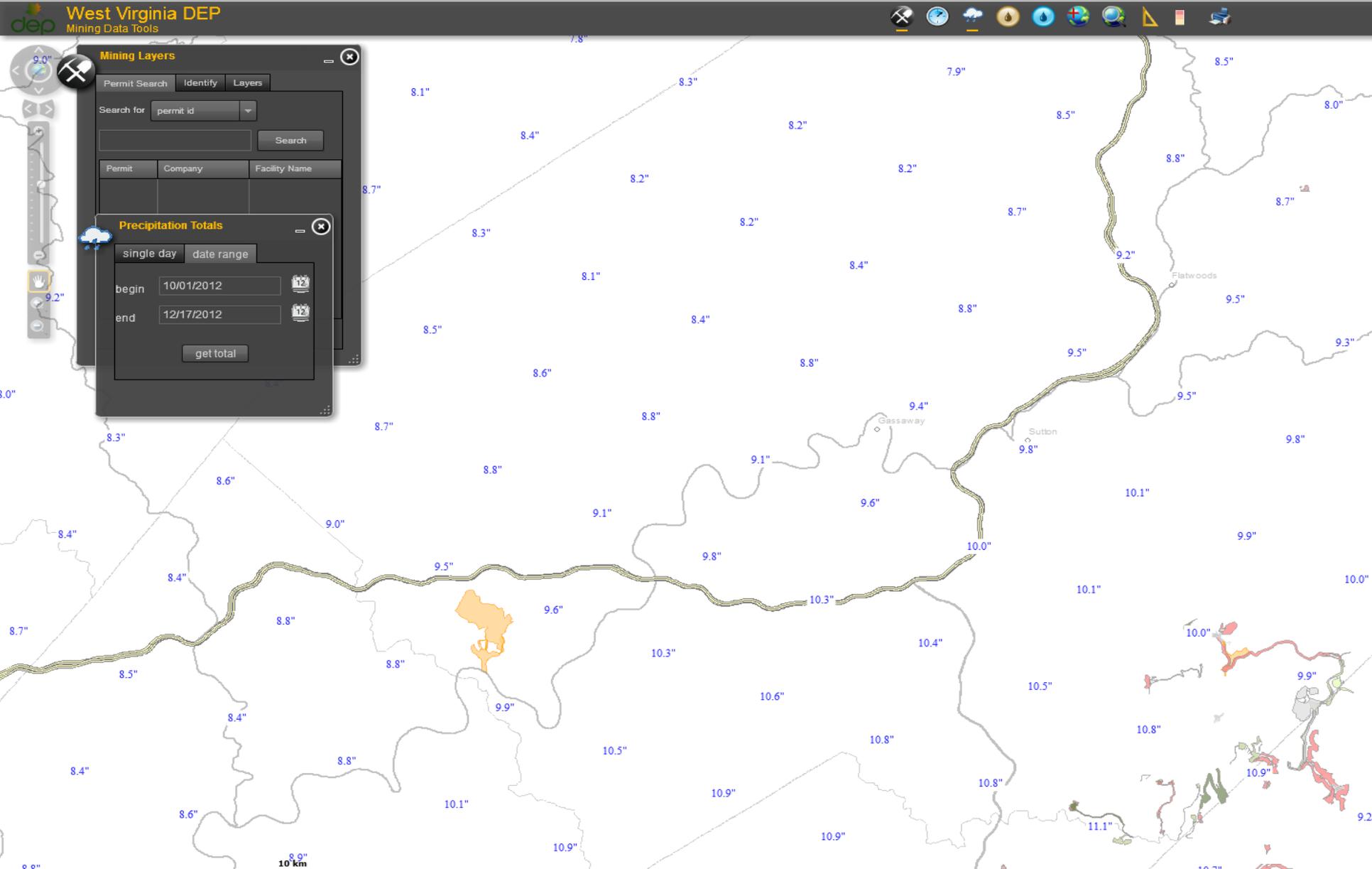
### Legend

- Position**
- Above Drainage
  - Near Drainage
  - Below Drainage
- Potential Extent of Flooding**
- Undetermined
  - Flooded areas unlikely
  - Partially flooded
  - Totally flooded

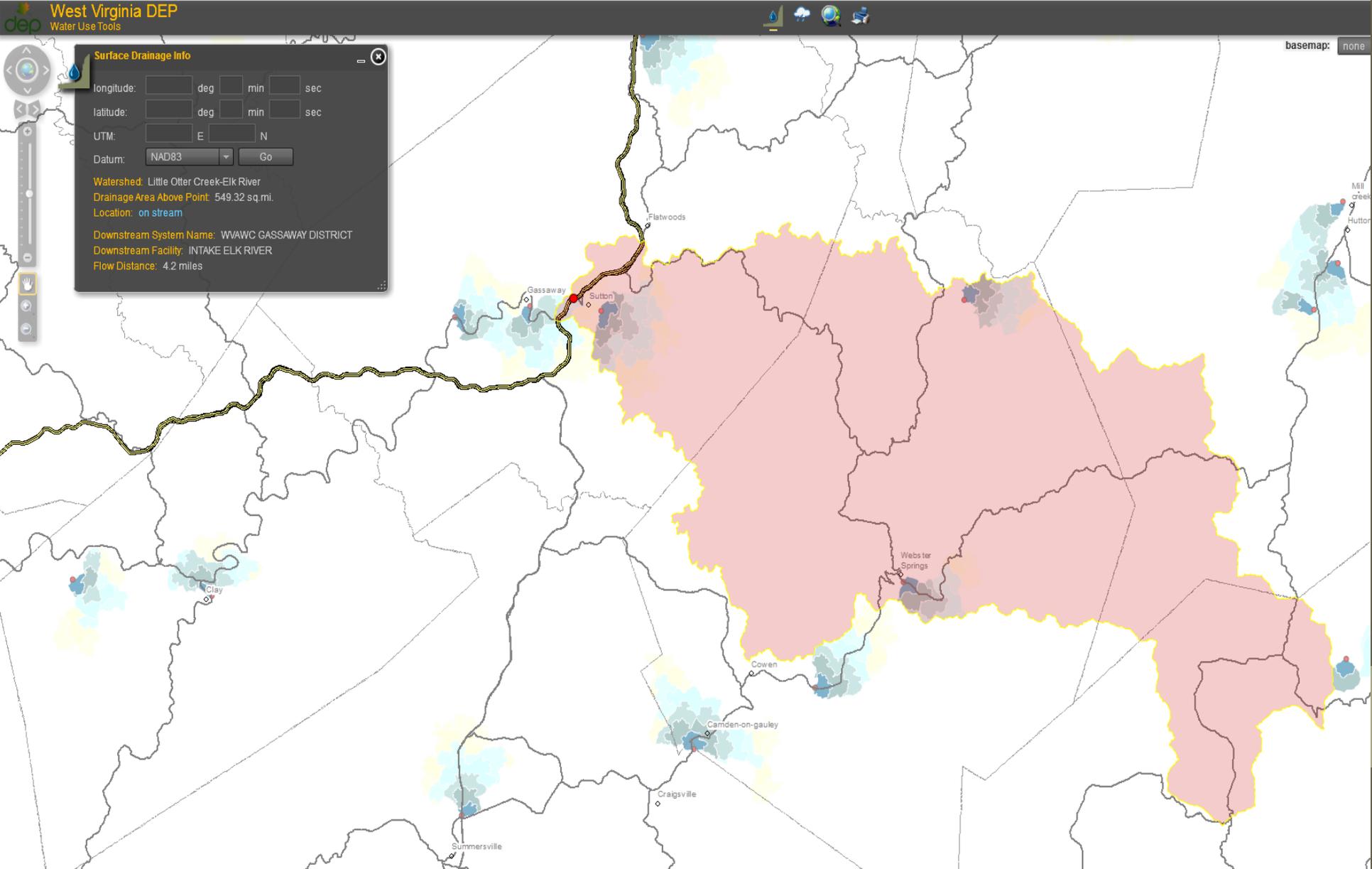
### Pocahontas No. 3 Mine Pool Statistics

	Potentially flooded areas		Potentially partially flooded	
	Undetermined	unlikely	partially flooded	Potentially totally flooded
No. of Mines	19	56	211	13
Mean coal thickness (feet)	3.63	4.27	4.72	4.10
Min. foot print area (acres)	1.00	0.02	0.03	23.38
Max. foot print area (acres)	7,469.50	4,312.28	24,666.84	21,361.85
Mean foot print area (acres)	990.66	142.19	771.26	3,350.77
Median foot print area (acres)	174.18	0.73	168.10	1,247.45
Total foot print area (acres)	18,822.60	7,962.37	162,736.63	43,560.05
Estimated void volume (acre feet)	37,037.88	13,978.94	386,114.19	98,167.56
Max. potential storage (million gallons)	12,070.64	4,555.74	129,093.61	31,992.81

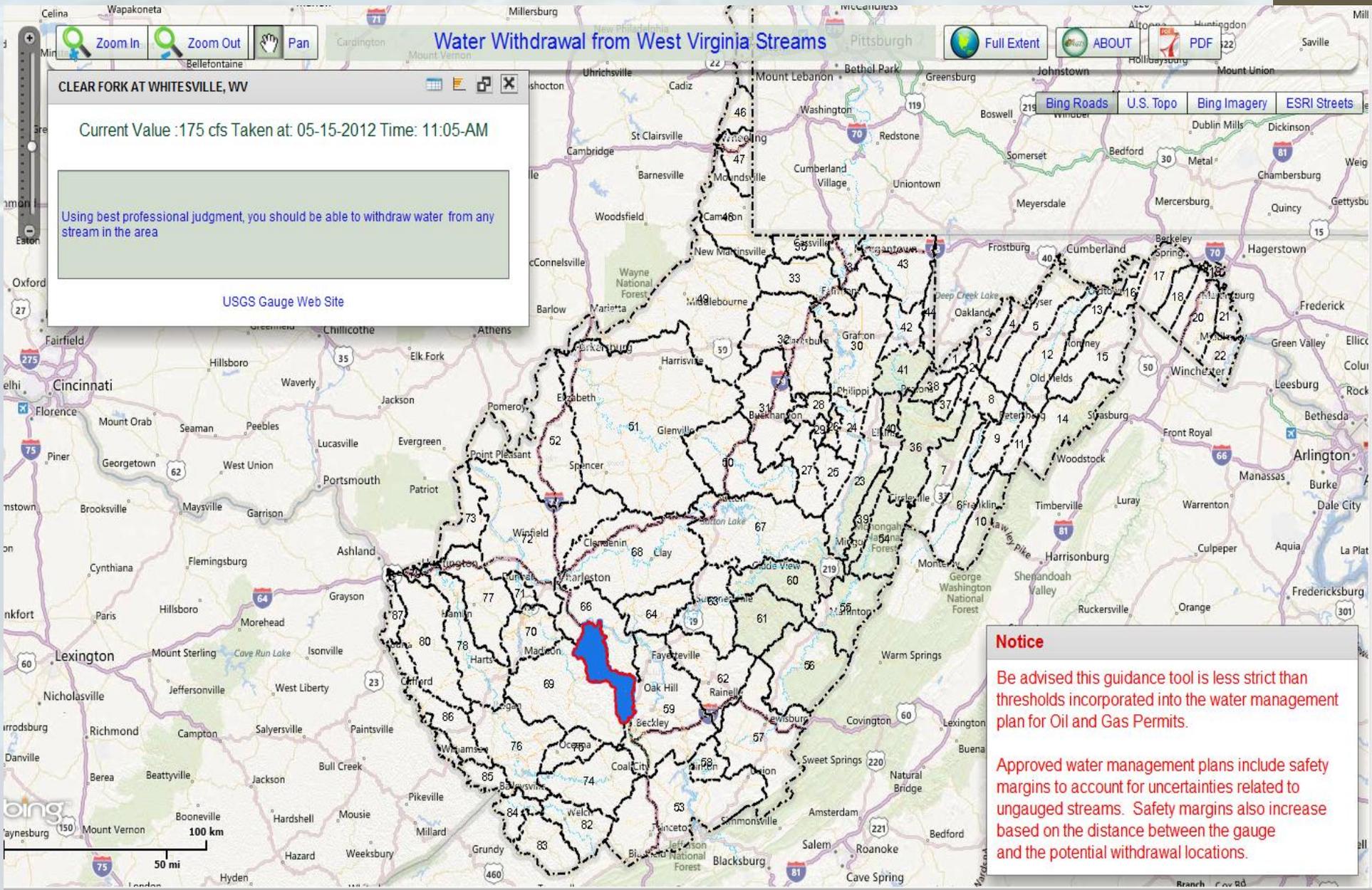
# Precipitation - Total Over Date Range



# Basin Size Widget



# Water Withdrawal Tool





# WV Flood Tool Site

The screenshot shows the landing page of the WV Flood Tool. At the top, there is a navigation bar with links for Home, Getting Started, FAQ, and User Manual. Below this is a large banner image of a flooded area with a house. The text on the banner reads "WV Flood Tool" and "Remember: When In Doubt, It's not Out!". A prominent red button labeled "Launch Tool" is positioned to the right of the banner. To the right of the banner is a box titled "Agency Information" which lists the Department of Homeland Security, FEMA, the West Virginia Division of Homeland Security and Emergency Management, and the West Virginia GIS Technical Center. At the bottom of the page, there is a navigation menu with links for Overview, Features, Contacts, Data Layers, Resources, and Glossary.

## Data Layers

Data layers are divided into three major categories: (1) base map or background layers, (2) overlay reference layers, and (3) flood layers.

### Base Map (Background) Layers

The WV Flood Tool provides access to 12 base map layers from commercial and governmental web services. Road base high resolution pictures of the earth's surface. The best leaf-off imagery layer includes high resolution imagery combined with a road network overlay.

### Reference Layers

Overlay reference layers consist of vector framework layers such as transportation, hydrography, elevation contours, and flood layers.

### Flood Layers

Flood layers encompass information about flood hazards and mitigating flood risks. The flood layers include the best available flood hazard data. See the User Guide in the Resources Tab for more information.

The screenshot shows the interactive map interface of the WV Flood Tool. The map displays a topographic view of a region in West Virginia, with a red-shaded area indicating a flood hazard. The interface includes a search bar at the top with the text "Input your address", a navigation menu with tabs for Public, Expert, Risk MAP, Flood, Reference, and Basemap, and a toolbar with various map controls. Two information popups are visible: "Flood Hazard" and "Selected Site within Floodplain".

**Flood Hazard**

Flood Hazard Area: Selected site is WITHIN the FEMA 100-year floodplain

Additional Hazard Info: [Click here](#)

Elevation: About 597 feet

Location (long, lat): (-81.570998, 38.316658)

Location (UTM 17N): (450084, 4241104)

FEMA Issued Flood Map: 54038C0429E

Contacts: Kanawha County

**Selected Site within Floodplain**

**Flood Risk Information**

**Flood Insurance:** Go to [www.floodsmart.gov](http://www.floodsmart.gov) to get an idea of the cost of flood insurance and to find an agent close to you who wants to help you obtain it.

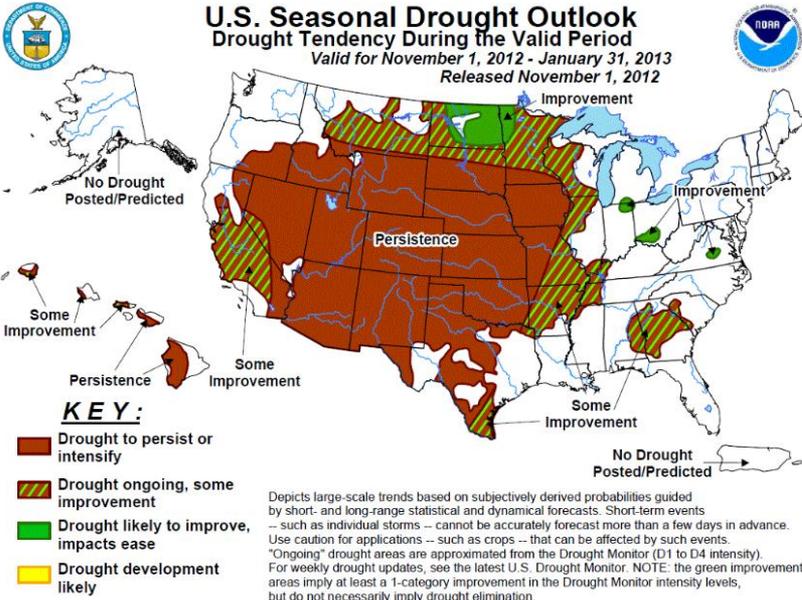
**Surveyed Elevation:** A surveyor can provide more exact elevation data and your local Floodplain Manager can review this information with you to help assess your risk of flooding. This elevation data can also be used to rate or re-rate a flood insurance policy and may result in significant cost savings if you do not have a basement.

**Basement:** Click [here](#) to get a better idea of risk consider whether your house is built on a basement, "slab on grade" (flat on the ground) or elevated on a crawlspace or above an enclosed area (not a basement) that is used for limited storage, parking or access to the upstairs.

Supported Browsers: Internet Explorer 7.8.9, Firefox 3+, Chrome, Safari. Please contact [info@wv.gov](mailto:info@wv.gov) with questions or comments related to this tool.

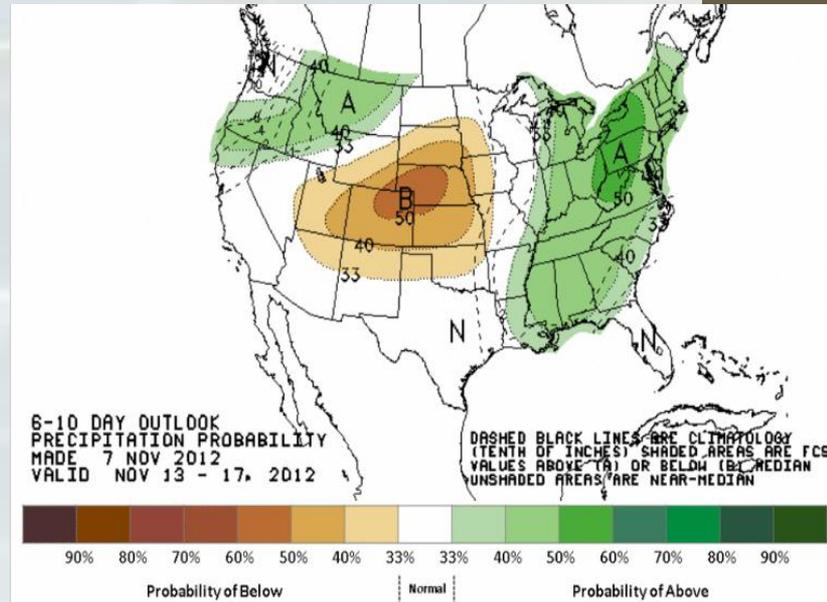
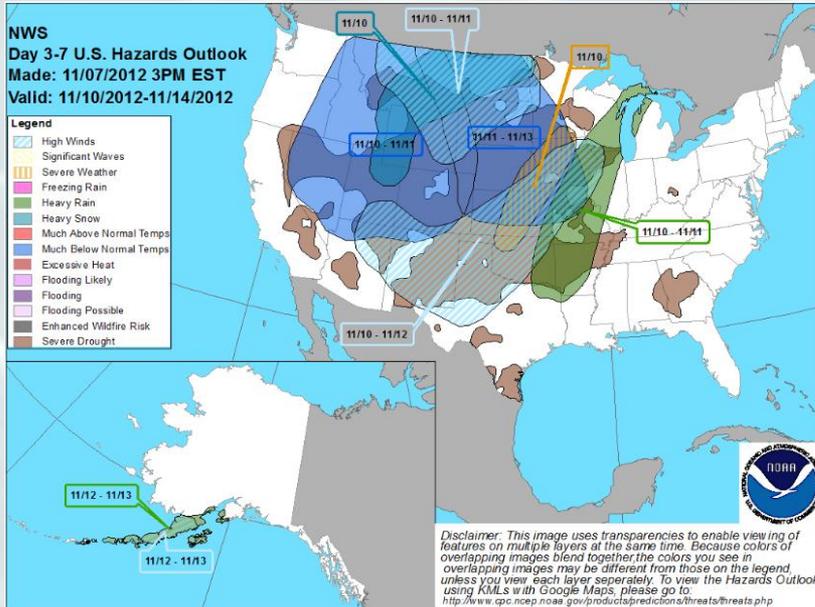
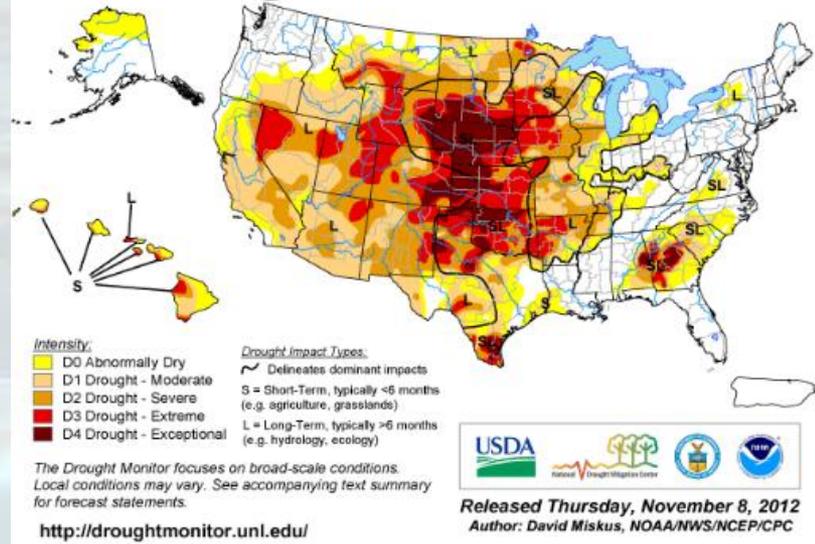
# Drought Monitoring Sites

## U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period Valid for November 1, 2012 - January 31, 2013 Released November 1, 2012

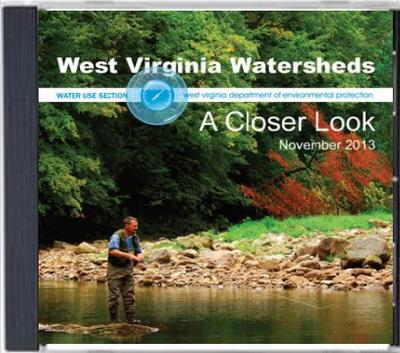
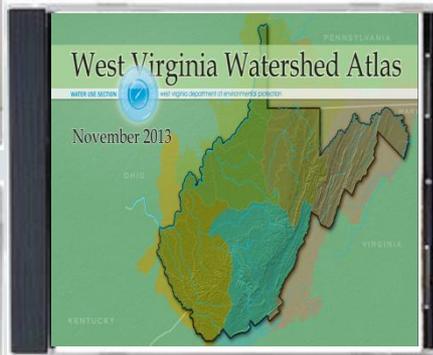
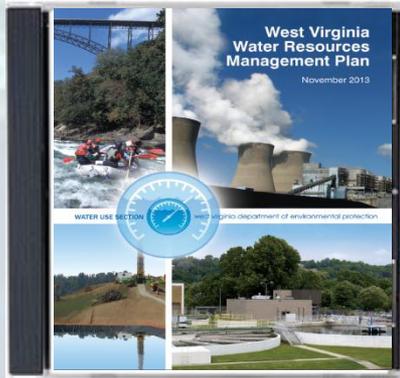


## U.S. Drought Monitor

November 6, 2012  
Valid 7 a.m. EST



# The WVWRMP and Companion Reports were Submitted November 22, 2013



A set of 3 CD's were hand delivered to the Senate and House Chairs of this Commission

The Plan was posted on the Legislative State Agency Report Submission site.

West Virginia Legislature  
1ST SESSION OF THE 81ST LEGISLATURE

Enter Search Terms

Senate House Joint Bill Status WV Code Audits/ Reports Educational Contact

### State Agency Report Submission

Reports must be saved as a Portable Document Format (.pdf) file. After submitting the form below, a new file name for the document will be e-mailed to the agency contact. Please copy this new document name and paste it over the old to rename it properly. Please ensure that any "Hide Extension" box is unchecked in your save window so files are not saved with duplicate ".pdf" extensions. After renaming, please reply to the email with the .pdf file attached.

If possible, please send a .pdf copy of your report made from the original document and NOT a scanned version of the report. Scanned .pdf files are much larger and are not searchable. Almost all word processing and layout programs can "Save As" or "Export" as a .pdf file.

If you have any questions or your agency's name does not appear in the menu below, contact our [Website Administrators](#).

Agency:

What section of WV Code requires this report?

Title of the report

What type of report is this?

Select Year Type

The year the report covers   
If more than one year, enter last year report covers

Agency contact for report information

Email address for agency contact   
Must be a valid e-mail address

Who produced this report, if not produced by your agency?

Enter the text of the image below:

# WVWRMP Mapping Tool

Google search: wvwaterplan and click the Blue Button

west virginia State Agency Directory | Online Services Search WV DEP

dep west virginia department of environmental protection - Promoting a Healthy Environment

DEP Offices | Agency History | News | Outlook Web Access | Text size A A A

Home > Water and Waste Management > Water Use Section > WV Water Resources Management Plan

**West Virginia Water Resources Management Plan**

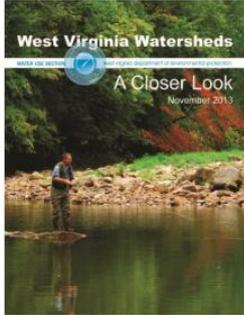
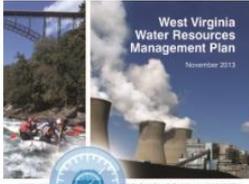
Welcome to the WVDEP Water Use Section Public Information Portal. This website was developed in cooperation with the Center of Environmental, Geotechnical, and Applied Sciences (CEGAS) at Marshall University. It serves as a public information portal for data related to water use in West Virginia. The Water Use Section of the WV DEP was developed as a result of the Water Resources Protection and Management Act of 2008. On this site, you have access to reports from the Large Quantity User and Marcellus Shale Frac Water databases. Additionally, there are many other related datasets displayed for the West Virginia Water Plan Mapping Tool.

Please click the button below to proceed to the mapping tool:

**WV Water Resources Management Plan Mapping Tool**

To view the "West Virginia Water Resources Management Plan", the "West Virginia Watershed Atlas", or the "West Virginia Watersheds: A Closer Look" documents please click on the corresponding image below.  
*\*Please note that the files are quite large and may take several minutes to load into your browser.*

Water Withdrawal Guidance Tool
WV Water Resources Management Plan
Progress Reports - Water Resources Protection & Management Act
State Rules and other related documents
Frac Water Reporting Form
Annual Certification-Large Quantity Users
Mine Pool Atlas
WV Water Laws, Regulations, and Rights
Helpful Links



Filetype: PDF (45 MB)      Link to Watershed Maps      Filetype: PDF (30 MB)

west virginia dep

# Example Future Pursuits

- Develop a guidance document describing the appropriate procedures for protection against spread of invasive species and other best management practices relative to water withdrawals.
- Gather water quality data for mine pool waters in order to improve the Mine Pool Atlas and better identify the resource's potential for use by new and existing industry.
- Better identify the state's groundwater by improved data collection methods, ongoing USGS studies, and computer modeling.
- Identify regional water resource issues based on the five defined water regions of the state.

# Example Future Pursuits

- Host an Annual Statewide Water Resources Conference in different locations across the state. The principal objectives of the conference will be:
- Publish online reports in order to update data contained within the Plan.
- Continue to enhance the water withdrawal tool by incorporating the results of scientific studies and continuing stream flow data collection at partial record stations.

# Recommendations

- **The Commission should consider amending the statutory definition of “large quantity user” at W. Va. Code § 22-26-2(i).**
- **The Commission should consider amending the statutory survey and registration requirements of the Act to eliminate variances.**
- **The Commission should consider assisting in efforts to continue funding stream gages and amending the Act to require notification if a funding partner becomes unable to contribute.**
- **The Commission should consider whether the state should acquire Light Detection and Ranging (LIDAR) coverage for the 70% of the state that has not yet been so mapped.**
- **The Commission should encourage continued collaboration among all affected agencies to improve data collection regarding the state’s water resources.**

# Thank You



WV department of environmental protection  
-Promoting a healthy environment

# QUESTIONS ?



WV department of environmental protection  
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