

# **Annual Progress Report to the WV Joint Legislative Oversight Commission on State Water Resources**

**West Virginia Department of Environmental Protection  
Water Use Section  
October 18, 2015**



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



# Plan History

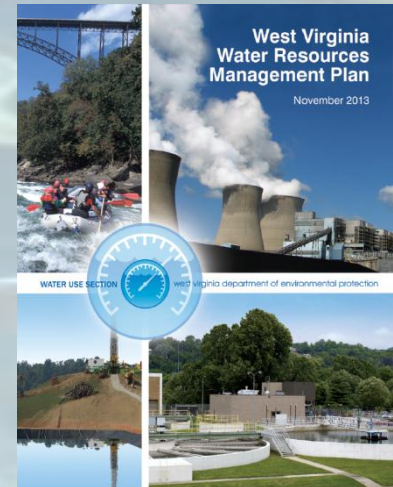
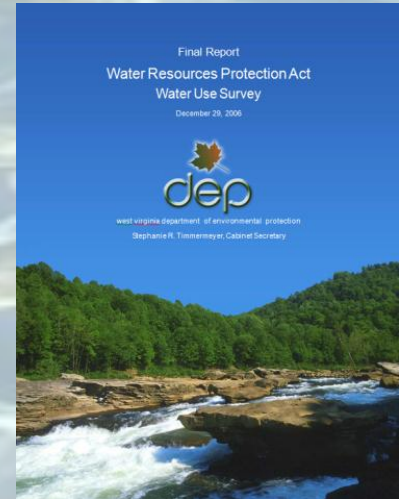
**The Act Originally passed on March 13, 2004.**

**First Large Quantity User Survey completed in 2006.**

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

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

**The West Virginia Water Resources Management Plan was submitted on November 22, 2013 and was adopted as part of Senate Bill 373.**







# **Our Mission Statement** **is straight from the Act**

**The WV Water Resources Protection and Management Act identified the need for the protection and conservation of our states water resources. It recognizes that a comprehensive assessment of the availability and use of our states water will benefit the citizens of West Virginia.**

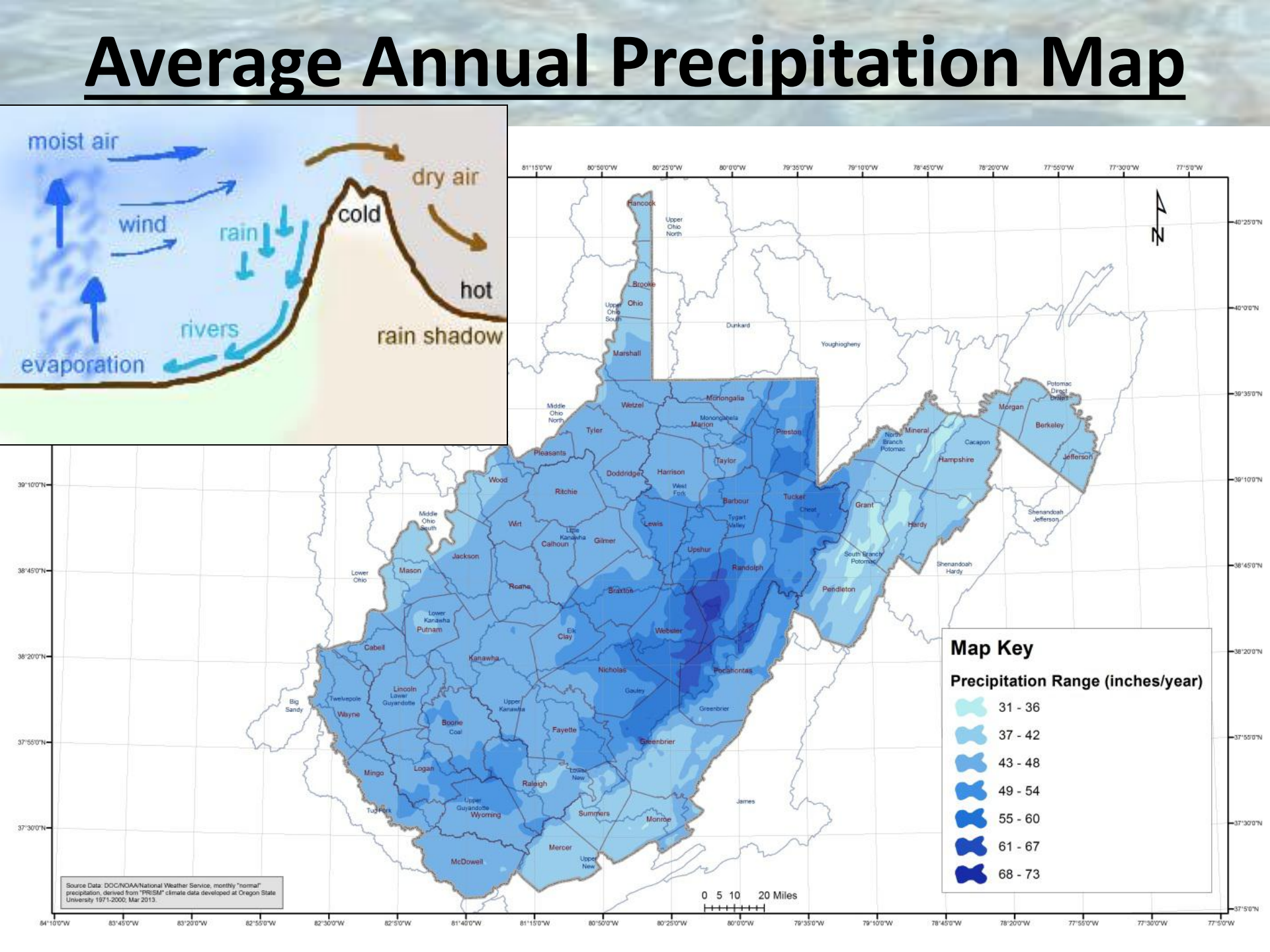
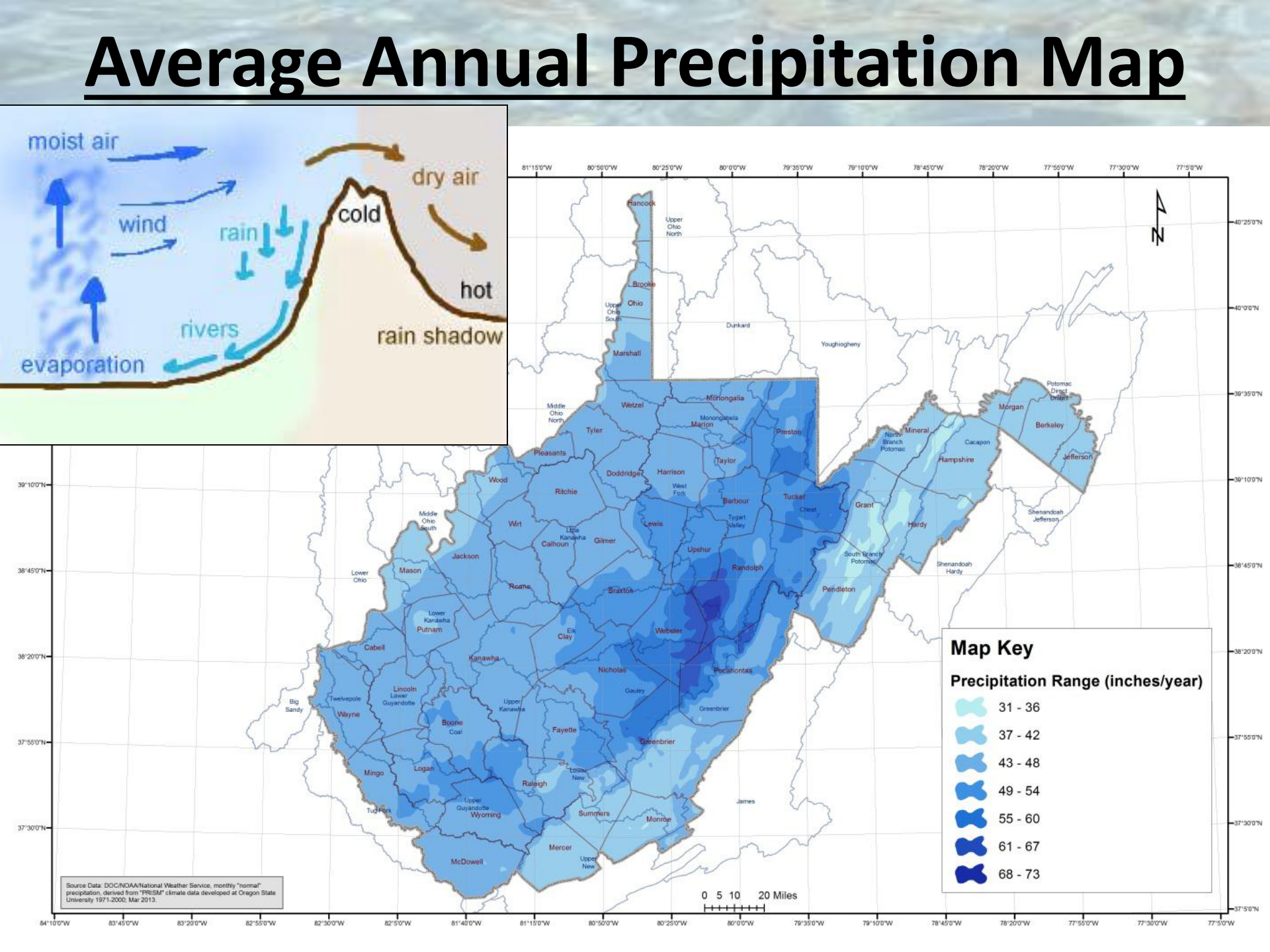
# Average Annual Precipitation Map

The diagram illustrates the Föhn effect. On the left, moist air is shown rising over a mountain range. As it rises, it cools, and the cooling process causes rain to fall on the windward side. The air then descends on the right side of the mountain, where it warms and dries, creating a rain shadow effect. The windward side is labeled 'moist air', 'wind', 'rain', 'evaporation', and 'rivers'. The leeward side is labeled 'dry air', 'cold', 'hot', and 'rain shadow'.

The map shows the average annual precipitation in West Virginia, with counties labeled. The precipitation ranges are indicated by shades of blue, with a map key provided. The map key shows the following precipitation ranges (inches/year):

- 31 - 36
- 37 - 42
- 43 - 48
- 49 - 54
- 55 - 60
- 61 - 67
- 68 - 73

Source Data: DOW/NOAA/National Weather Service, monthly "normal" precipitation, derived from "PRISM" climate data developed at Oregon State University 1971-2000; Mar 2013.





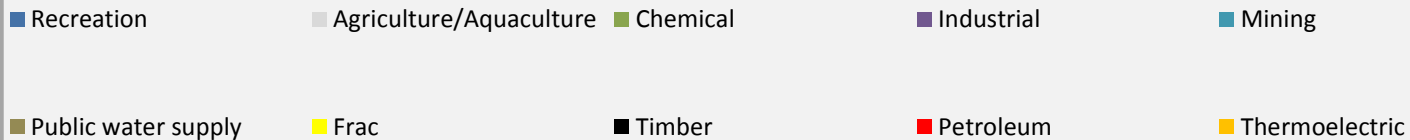
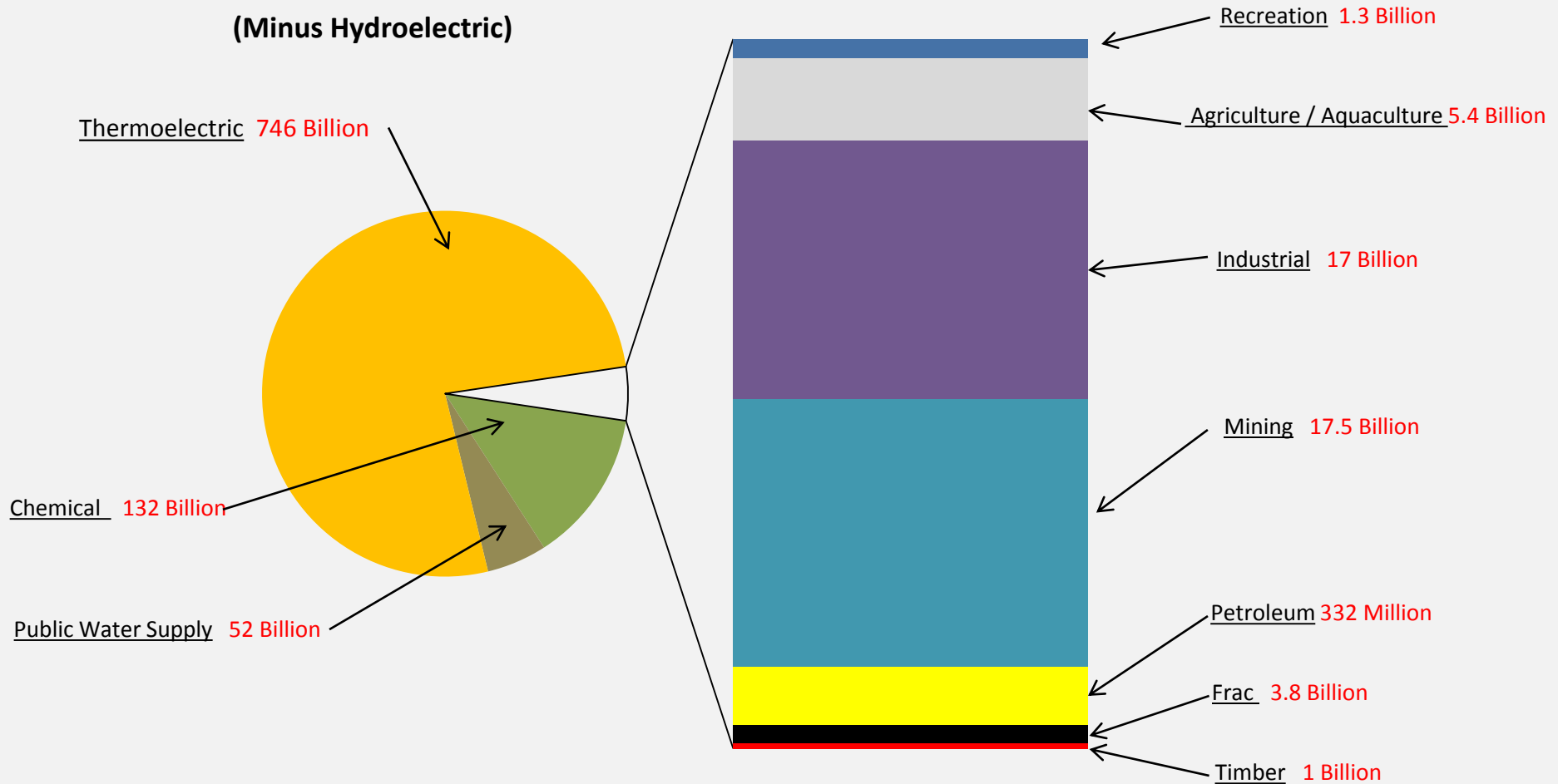
# **West Virginia Water Facts**

- **19.32 trillion gallons of precipitation – based on 44 in/year**
- **The record precipitation event in West Virginia is 19.5” of rain in 2 hours and 10 minutes at Rockport in July of 1889 (Our Probable Max Precipitation PMP)**
- **Maximum storage of dams/lakes - 1.07 trillion gallons**
- **Estimated mine pool storage - 1.48 trillion gallons**
- **Large Quantity Users, (excluding hydro-electric) withdraw ~ 978 Billion gallons/yr**
- **Only ~6% or 59 billion gallons of LQU water is consumed**
- **We have 54,961 total stream miles in our state**
- **We have ~ 42 billion gallons per day of available water in our rivers and streams**

# West Virginia

## Water Use 2014 in Gallons (Minus Hydroelectric)

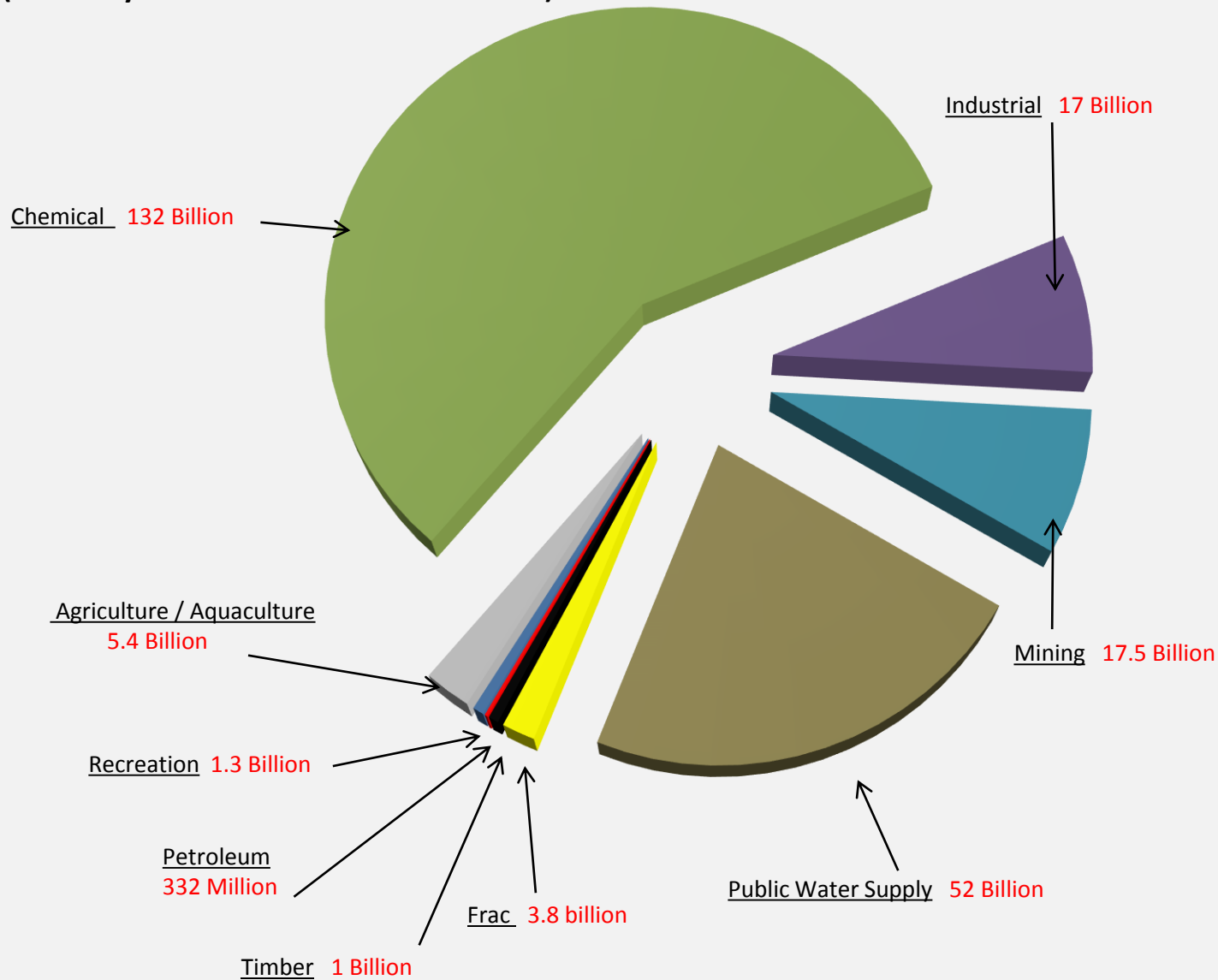
Total amount withdrawn is ~ 978 Billion gallons.



# West Virginia

## Water Use 2014 in Gallons

(Minus Hydroelectric and Thermoelectric)



- Recreation
- Agriculture/Aquaculture
- Chemical
- Industrial
- Mining
- Public water supply
- Frac
- Timber
- Petroleum

# 2014 WV Bottled Water in Gal/year



• BERKELEY CLUB BEVERAGES INC.	4,168,800
• SWEET SPRINGS VALLEY WATER COMPANY	1,700,000
• GREEN ACRES REGIONAL CENTER INC	800,000
• UNITED DAIRY, INC. (CHARLESTON)	475,000
• WEST VIRGINIA PRIDE OF THE MOUNTAINS CO	200,000
• CAPON SPRINGS & FARMS, INC.	16,000
• TYLER MOUNTAIN WATER COMPANY, INC (now bottled in Oakland, PA)	0
• ALLEGHENY LODGE ENTERPRISES, LLC	Closed

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**Total 7,359,800**





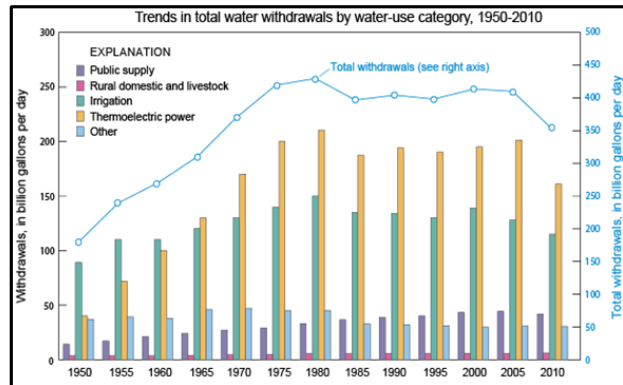
# 2014 LQU Survey Report

## Trends in Water Reporting

WV Department of Environmental Protection

Division of Water and Waste Management  
Water Use Section

The United States Geological Survey (USGS) has kept trends of national water use since 1950. Since the early part of the new century overall water use in the United States has declined. In 1980 water use peaked in the United States, but then started to decrease a bit, possibly due to the Nation making more use of water-conservation measures.

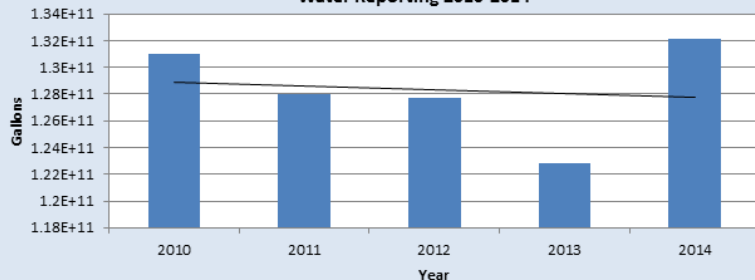


Almost all of the freshwater used in the United States comes from surface water, only 25% comes from groundwater, the largest user of surface water is the thermoelectric power industry (excluding once through hydroelectric facilities). The public-supply sector was the only water-use category that increased continually since 1950.

(<http://water.usgs.gov/watuse/wutrends.html>)

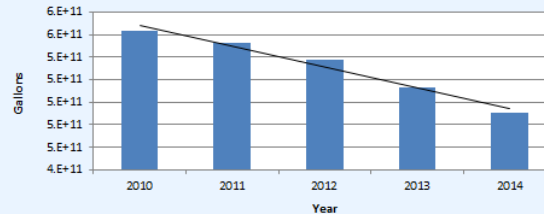
### WV Chemical Industry

Water Reporting 2010-2014



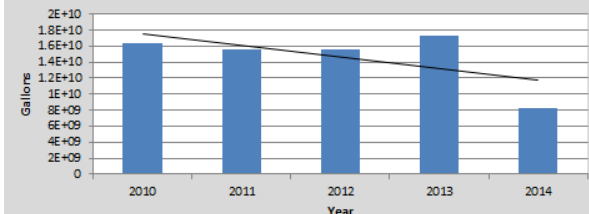
### West Virginia Large Quantity Users

Water Reporting 2010-2014



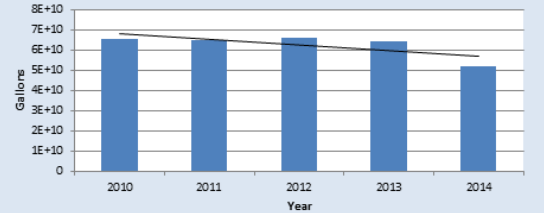
### West Virginia Coal Mining

Water Reporting 2010-2014



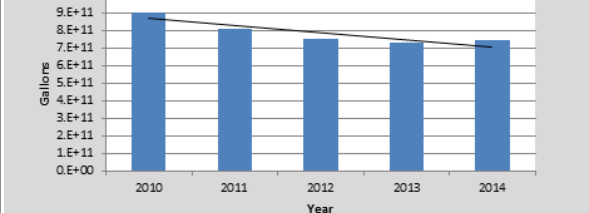
### WV Public Water Supply

Water Reporting 2010-2014



### WV Thermoelectric Power

Water Reporting 2010-2014



### Consumption by Source

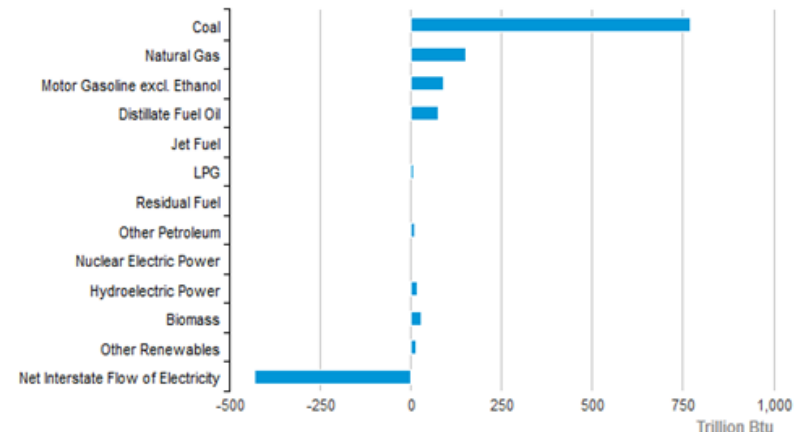
### Consumption by Sector

### Production

### Electricity

### Prices

### West Virginia Energy Consumption Estimates, 2013



[http://www.wvcommerce.org/energy/renewable\\_energy/hydro.aspx](http://www.wvcommerce.org/energy/renewable_energy/hydro.aspx)

# Searching for the New LQU's

## 300,000 gallons per 30 days

121 Golf Courses

318 Nursing Homes

66 Mobile Home Parks

199 Public Water Supplies

162 Campgrounds

55 Jails

25 College & University

9 Resorts

88 Parks

55 Courthouses

107 Cemeteries

85 Nurseries

151 Lumber Facilities

7 Paper Manufacturers

2 Ammunition Manufacturers

314 Concrete Producers

12 Meat Processors

25 Furniture Makers

20 Highway Rest Stops

Total quantity of water withdrawn each month must now be reported annually!



# Consumptive Use

West Virginia Department of Environmental Protection

Large Quantity User's (LQU) 2014

Water Use Section



*Procedure:*

## Coefficient Method by SIC Code

(USGS, Scientific Investigations Report 2009, <http://pubs.er.usgs.gov/publication/sir20095096>)



# What is 100% Consumptive Use?



*“Consumptive withdrawal” means any withdrawal of water which returns less water to the water body than is withdrawn.*



# 2014 Consumptive Use Totals

Water use category	Total gallons of water withdrawn in 2014	Consumptive use coefficient	Quantity of water consumed
Agriculture/Aquaculture	5,400,000,000	0.12	648,000,000
Chemical	132,000,000,000	0.2	26,400,000,000
<u>Frac</u> Water	3,800,000,000	1	3,800,000,000
Industrial	17,000,000,000	0.13	2,210,000,000
Mining	17,500,000,000	0.17	2,975,000,000
Petroleum	332,000,000	0.27	89,640,000
Public Water Supply	52,000,000,000	0.18	9,360,000,000
Recreation	1,300,000,000	0.1	130,000,000
Thermoelectric	746,000,000,000	0.03	22,380,000,000
Timber	1,000,000,000	0.25	250,000,000

For the purposes of this study a coefficient of 3% was used for thermoelectric power as provided by the USGS. A new national USGS study of thermoelectric power plants consumptive water use has been initiated to verify this data.



# Consumptive Use

State of West Virginia 2014

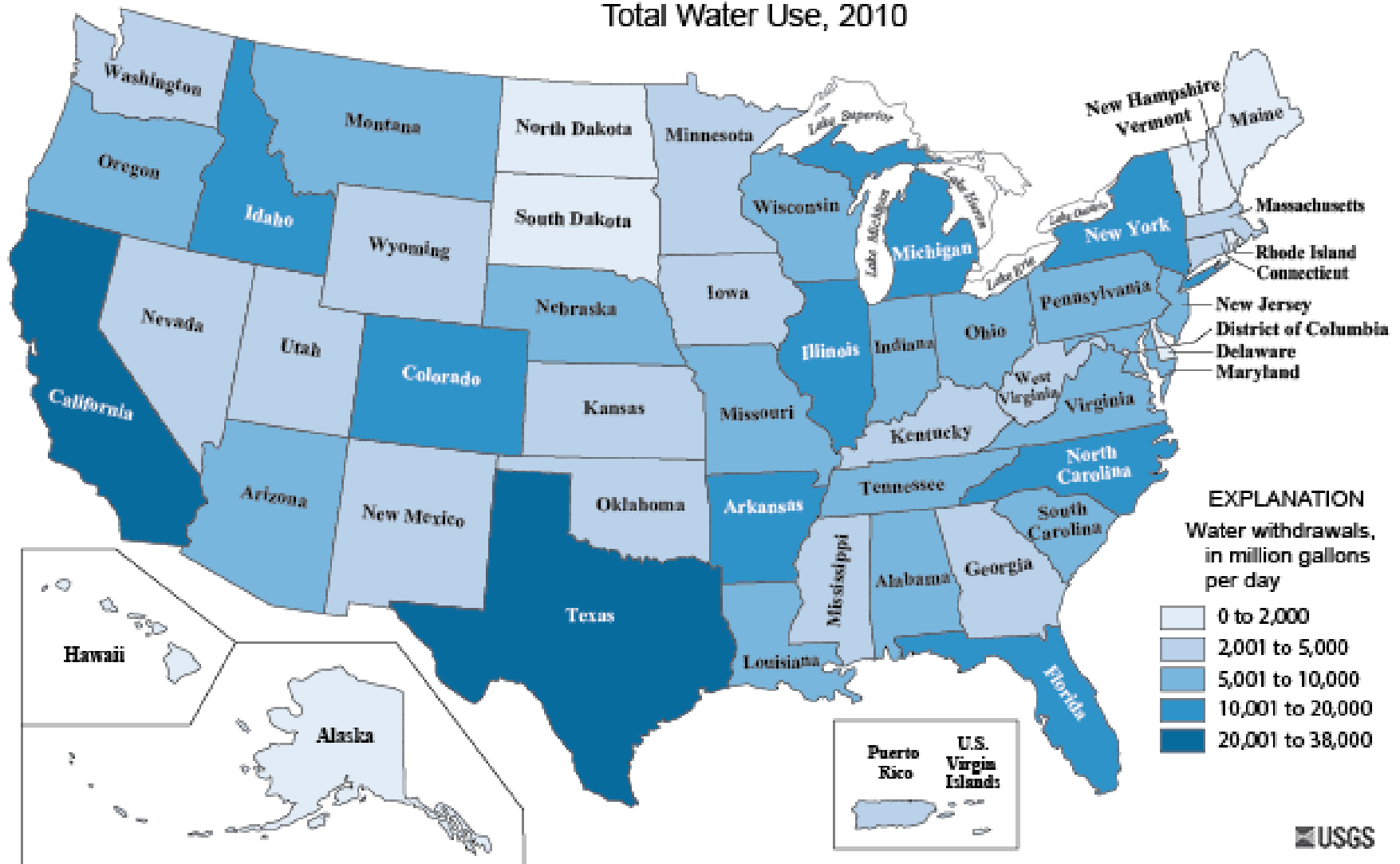


Total Gallons of Water Withdrawn in 2014	976,332,000,000
Total Gallons of Water Consumed in 2014	68,242,640,000
Percent Consumptive	6.99%



# Total Countrywide Water Use

Total Water Use, 2010




# 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

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

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

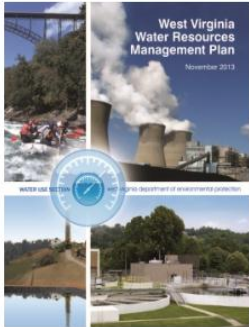
**West Virginia Water Resources Management Plan**

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**

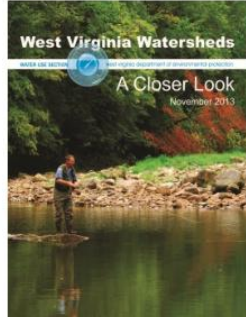
To view the "West Virginia Water Resources Management Plan", the "West Virginia Watershed Atlas", or the "West Virginia Watersheds: A Closer Look" documents please click on the corresponding image below.  
*\*Please note that the files are quite large and may take several minutes to load into your browser.*



Filetype: PDF (45 MB)



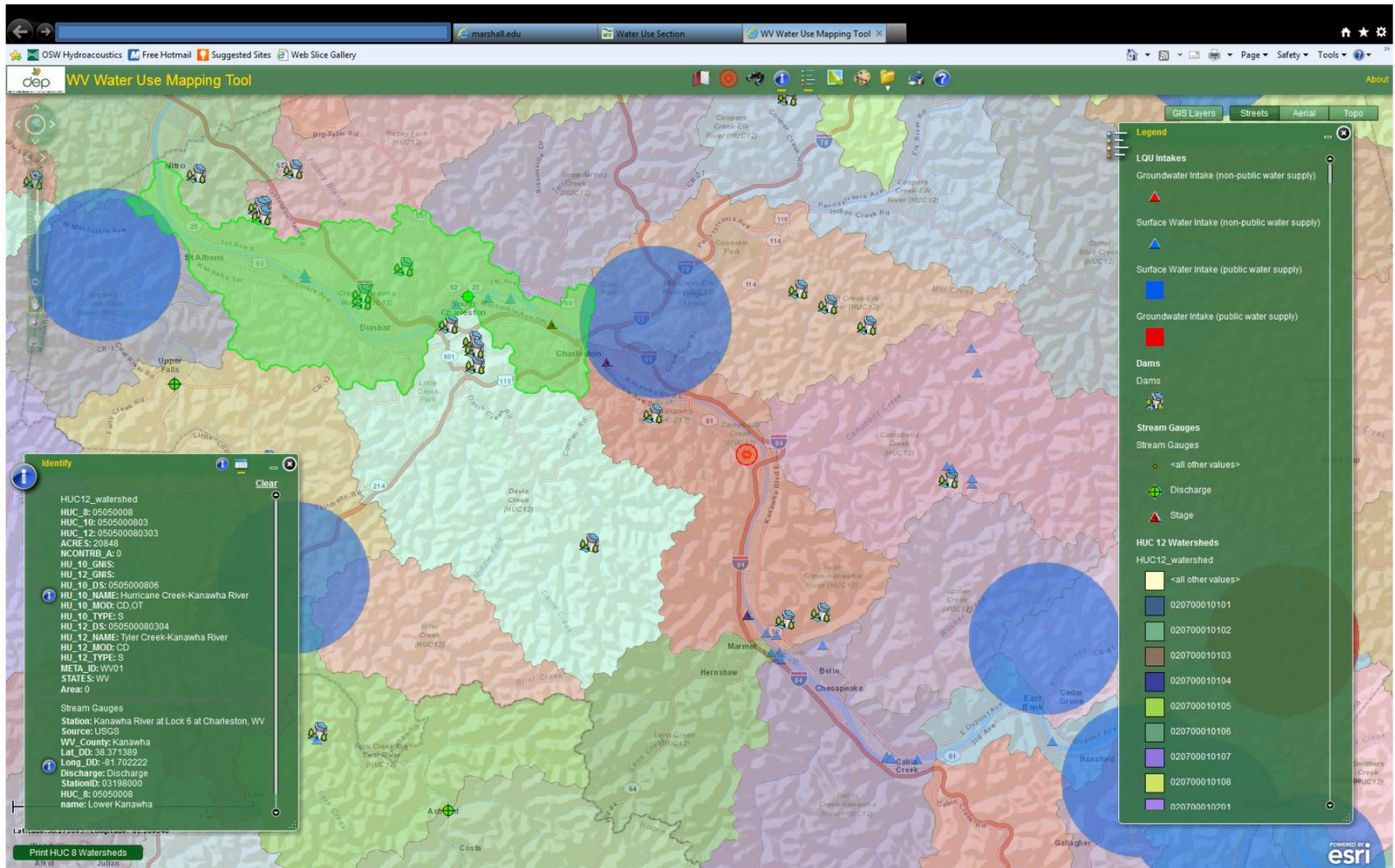
Link to Watershed Maps



Filetype: PDF (30 MB)

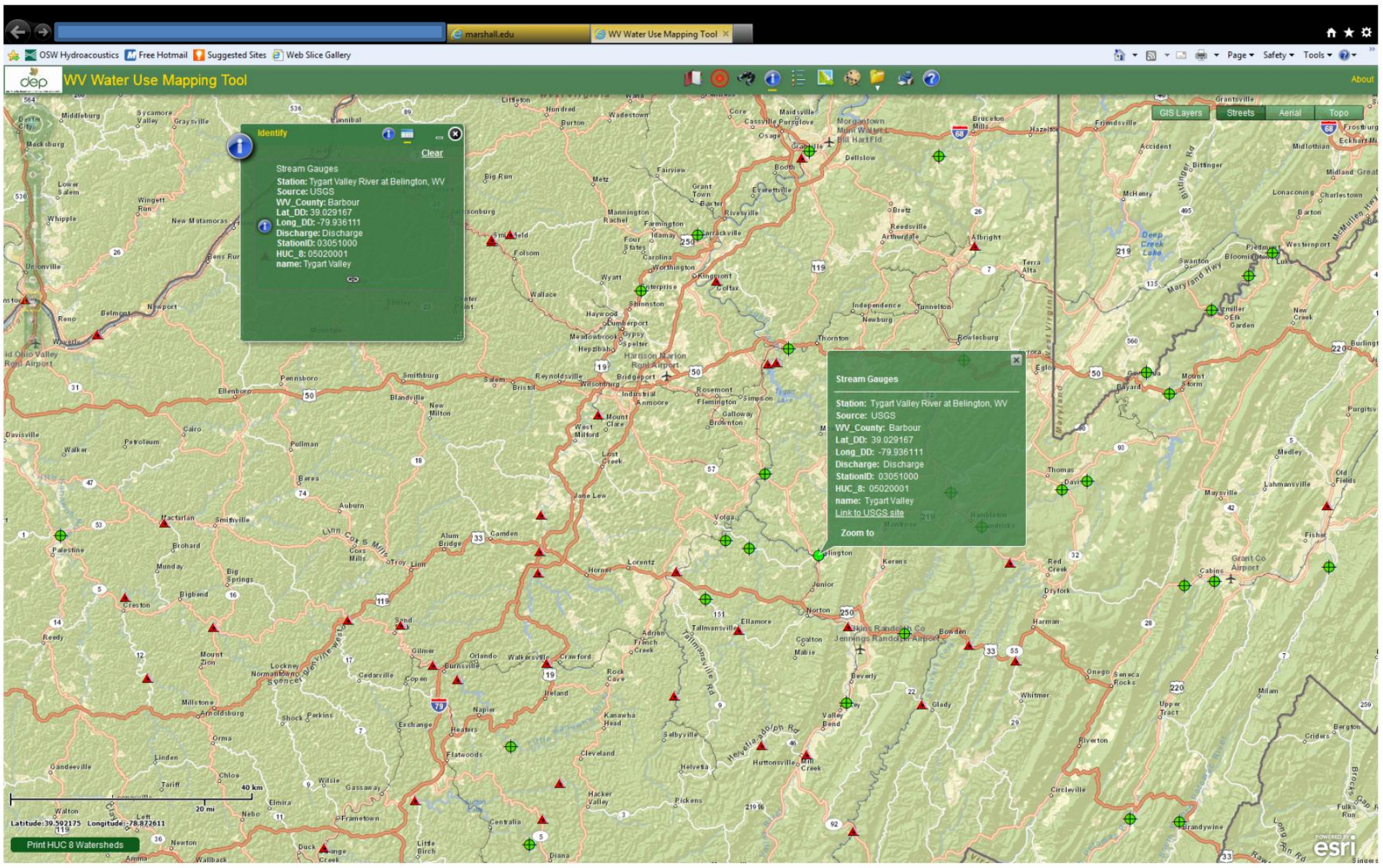


# Overlap multiple GIS Layers





# Stream Gauge Layers



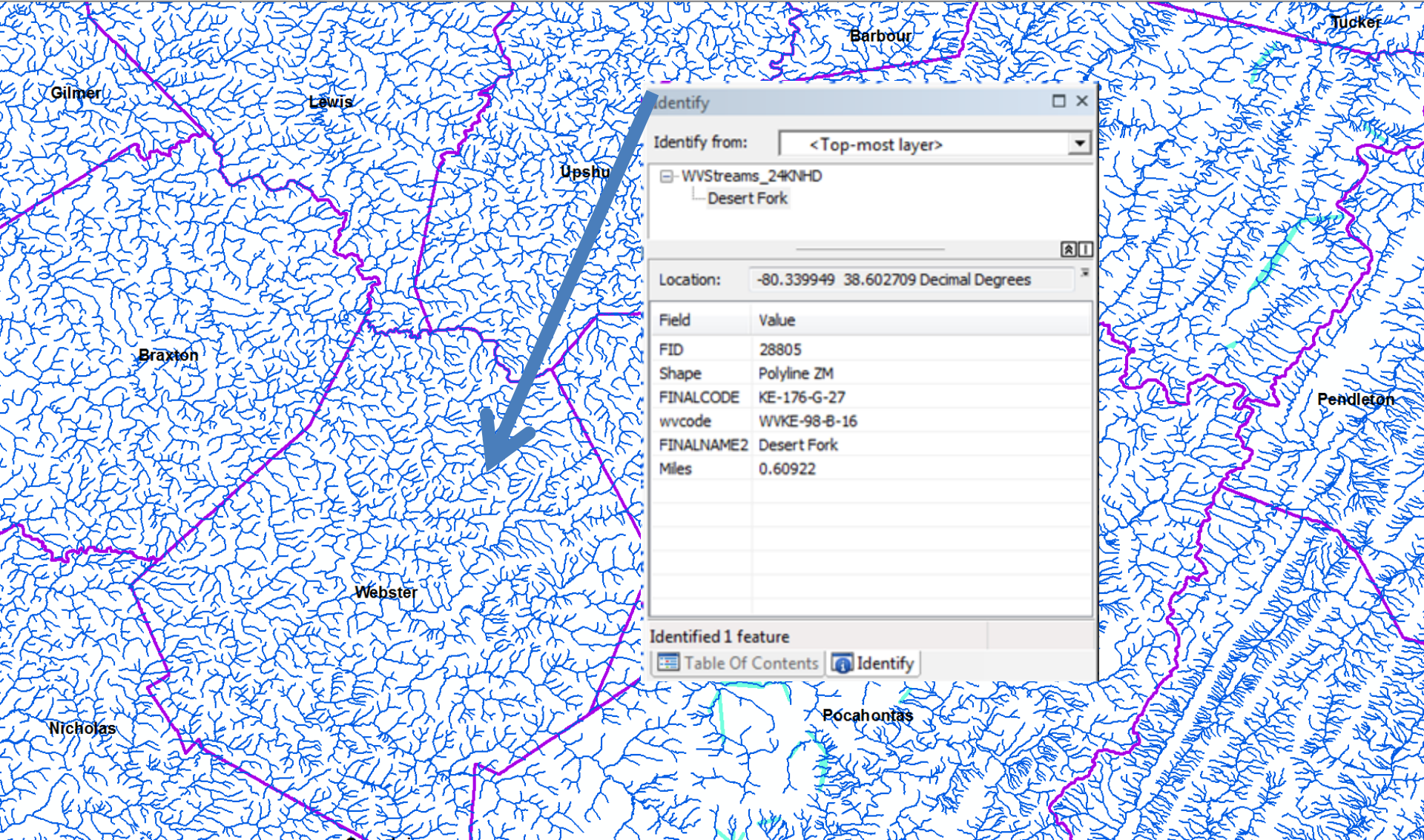
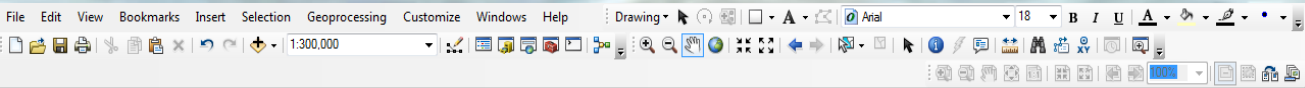


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shape files are  
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individuals,  
companies,  
consultants and  
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professionals.**

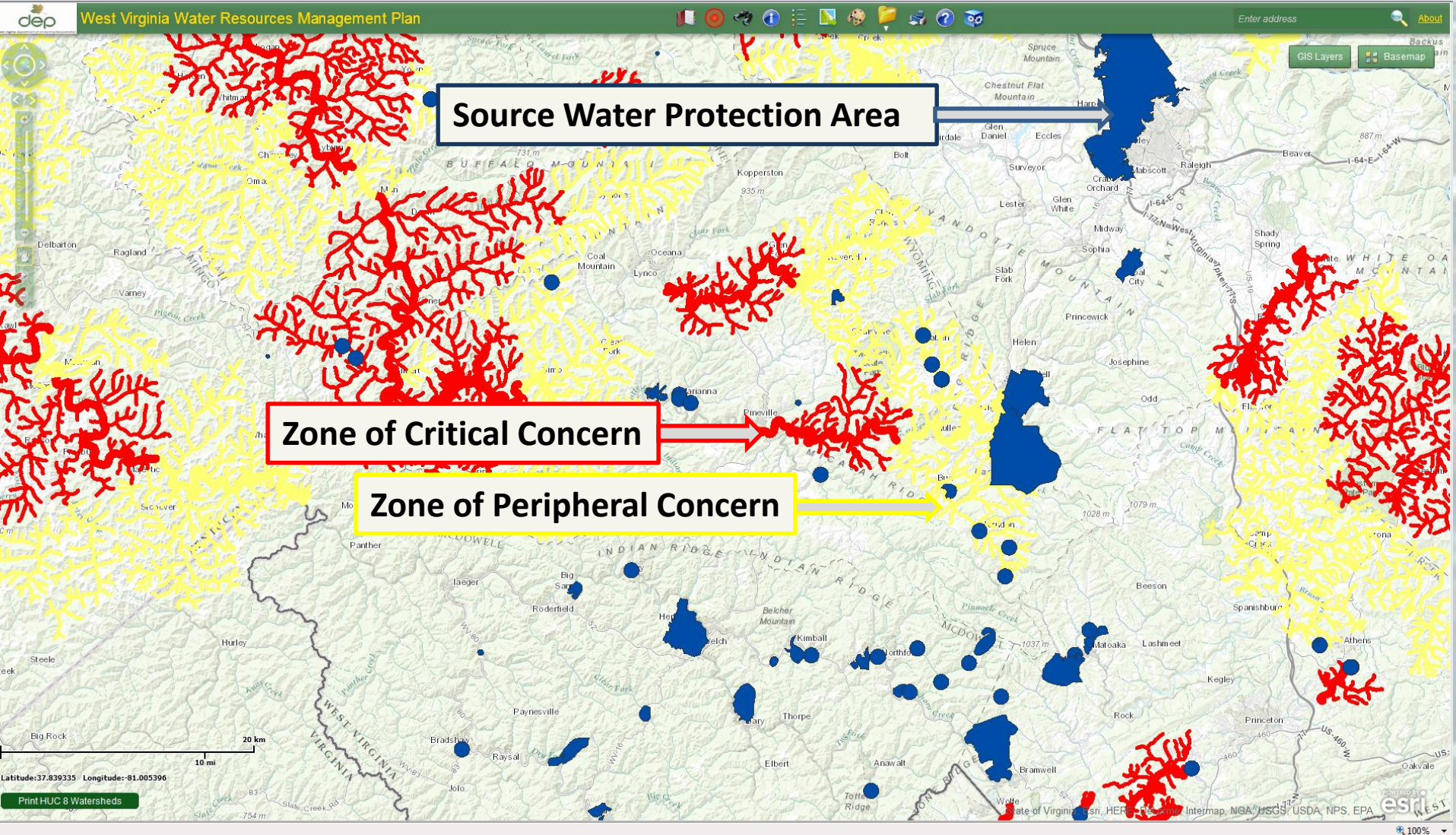
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# New NHD24 Stream Layer





# DHHR ZCC, ZPC and SWPA Layer





# DEP AST WEB PAGE

Find out more about  
reporting timelines,  
forms and the DEP's  
Final Interpretive Rule

INDEX-alphabetic
HOT TOPICS
Aboveground Storage Tanks
Enrolled Final Version Senate Bill No. 373
Industry Standards, Organizations & Other Resources
Interim Spill Prevention Response Plan Guidance for ASTs
Submitting a Spill Plan or Spill Plan Certification
Interim Guidance for Certification of Annual Inspection of AST System
Submitting an Inspection Certification
Interim Tank Closure Guidance
Required Signage
Frequently Asked Questions
Definitions
Public Input Received for AST Rulemaking
AST Contacts
Final 47CSR62 Interpretive Rule
Proposed Rule 47 CSR 63
Working Meeting PowerPoint Presentations
Inspection and Enforcement
Resources and Education for public
Permitting
Regulations
Data
Water Use Section
Watershed Management
Programs
Contact information

## Aboveground Storage Tanks (ASTs)



### Overview of the Aboveground Storage Tank Act and Its Implementation

Senate Bill 373, containing the Aboveground Storage Tank Act §22-30 and the Public Water Supply Protection Act §22-31 was approved by the 2014 Legislature and signed into law by Governor Earl Ray Tomblin on April 1, 2014. The law officially took effect on June 6, 2014, 90 days from its date of passage on March 8, 2014. The bill requires an inventory and registration of aboveground storage tanks. The bill also requires development of a variety of aboveground storage tank regulations for consideration in the 2015 Legislative session.

DEP is still accepting online AST registrations via the **Electronic Submission System (ESS)**. The registration process includes questions about tank size, contents, construction, age and location. To assist in the registration process, there is a comprehensive AST Registration User's Guide available at the link below or on the ESS sign up/login page that provides screen-by-screen instructions. DEP employees also are on hand to assist tank owners who are subject to the requirements of a newly enacted law intended to help prevent future leaks such as the one on Jan. 9 that contaminated the drinking water of approximately 300,000 West Virginia residents.

[See if you need to register your AST](#)

[See sample of electronic registration form](#)

[See the Registration User's Guide](#)

[Sign up for a login ID or log in to start registering](#)

On Oct. 1, 2014, DEP hosted a working meeting to discuss the rough draft of the AST Emergency Rule. This meeting allowed DEP to receive input and ideas on ways to ensure the rule fulfills its intended purpose.

[See the PowerPoint presentations from the meeting](#)

The coming year will be a busy one for DEP staff as they work to implement the new program. Please check back frequently as this website will contain the latest information available on SB 373's implementation.

### Featured Links

[Enrolled Final Version Senate Bill No. 373](#)

[Industry Standards, Organizations, & Other Resources](#)

[Interim Spill Prevention Response Plan Guidance](#)

[Interim Tank Certification Guidance](#)

[Interim Tank Closure Guidance](#)

[Required Signage](#)

[Frequently Asked Questions](#)

[Definitions](#)

[Public Input Received for AST Rulemaking](#)

[AST Contacts](#)

[Hazardous Substances as Defined in Section 101\(14\) of CERCLA](#)

[Learn more about the Final 47 CSR 62 Interpretive Rule filed on Oct. 21, 2014, after the comment period. See comments and responses; the public hearing transcript; and the final rule here](#)

[Learn more about the Proposed Rule 47 CSR 63 - Aboveground Storage Tanks, filed on Dec. 22, 2014](#)

[WV Rural Water Seminar Schedule for Source Water Protection Plans](#)

### Important Dates

- June 6, 2014 - Statute becomes effective
- June 10, 2014 - Registration period opening
- Sept. 1, 2014 - NPDES General Permit holders having ASTs within the zone of critical concern must have applied for an NPDES Individual Permit (WVa. Code §22-31-9)
- Oct. 1, 2014 - All tanks must be registered (WVa. Code §22-30-4)
- Dec. 3, 2014 - Spill Prevention Response Plan Submittals due (WVa. Code §22-30-9)
- Jan. 1, 2015 - Inspections and certifications of all ASTs by a qualified person due (WVa. Code §22-30-6)

If you also want to learn about the  
**Underground Storage Tank Program**



[click here](#)

# Large Quantity Water User Reporting Requirements for the Horizontal Gas Well Drilling Industry

- \* Most Oil & Gas operators are already familiar with the LQU reporting requirements and regularly submit data to the DEP's frac-water reporting database.
- \* *HOWEVER, the frac-water reporting system needs modernized*
  - \* *we are creating a new point of entry and database for online submission.*



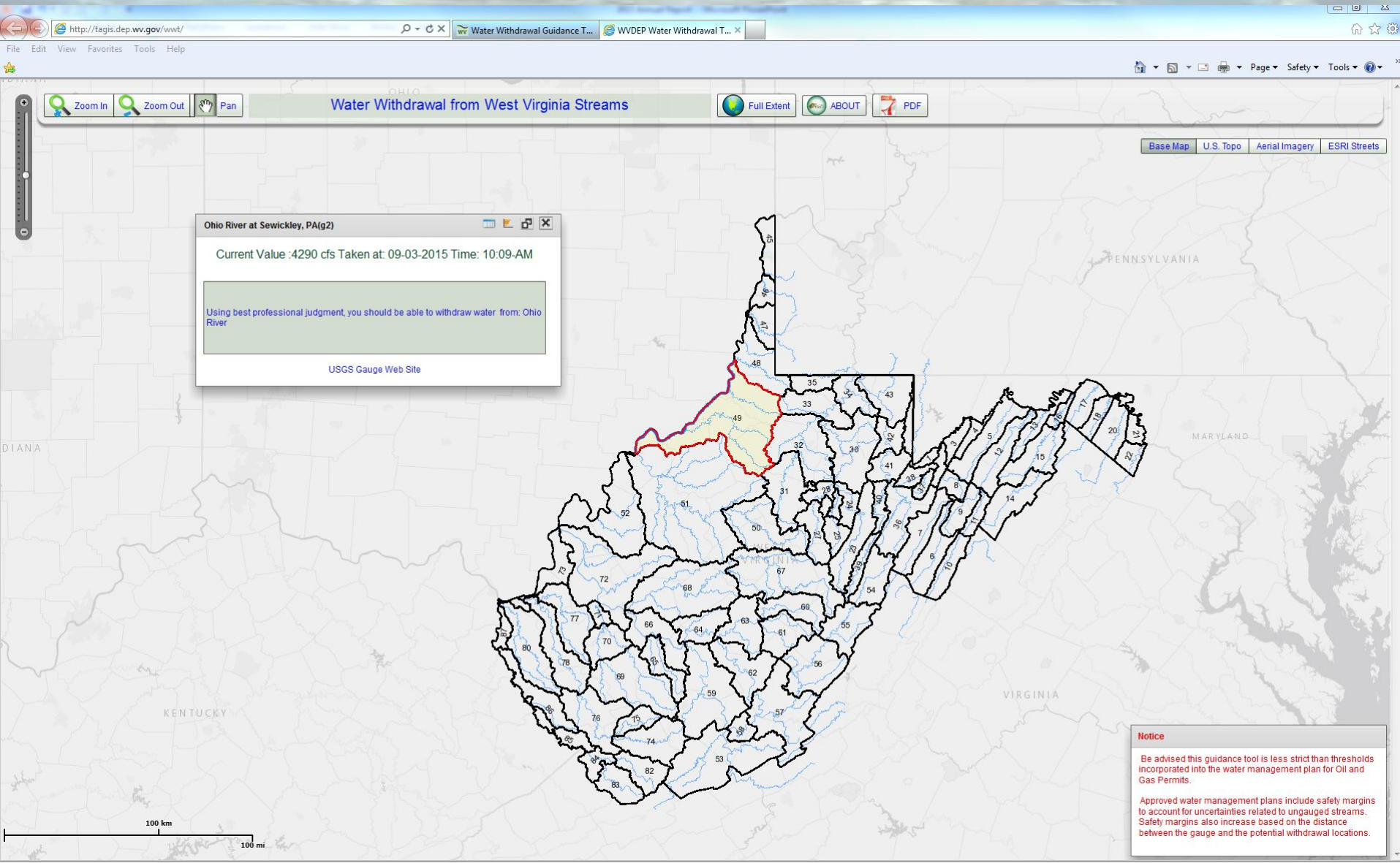
# Why a new database?

- \* Capture actual water withdrawal totals from each unique withdrawal location
- \* Alleviate redundancy to increase reporting compliance. O&G operators are already required to submit a lot of the required data to [fracfocus.org](http://fracfocus.org)

# When will the new system take effect?

- \* We are currently testing a beta version in-house
- \* Our tentative date to go online is January, 2016
- \* In the meantime, users will continue to submit water use data to the existing frac water reporting database

# Water Withdrawal Tool





# Cooperators Contributing to Stream Gage Network Costs

Agency	Support Dollars
DNR	12,500
Independent Cities	25,000
DOH	65,000
WVCA	177,000
DEP	218,000

Plus 110,000 Federal match money by the USGS and additional money from some private investors.

There will likely be a 3 percent increase in 2017

# Gas Companies Contributing For Past 5 Years

West Virginia Department of Environmental Protection

Division of Waste Water Management

U.S. Geological Survey - West Virginia Water Science Center

Energy Company Flow Monitoring Program

FY 2015

Site Number	Station Name	Collection Type	Cooperator Cost	Other Funding	Annual Cost	Comments
03052120	BUCKHANNON RIVER AT ALTON, WV	Discharge	\$16,000	\$0	\$16,000	CNX Gas
03111955	WHEELING CREEK NEAR MAJORSVILLE, WV	Discharge	\$16,000	\$0	\$16,000	Consol Energy
03188900	LAUREL CREEK NEAR FENWICK, WV	Discharge	\$16,000	\$0	\$16,000	BRC Operating Company LLC
		Total	\$48,000	\$0	\$48,000	

# DEP Water Use Sole Supporter for the GW Monitoring Network

West Virginia Department of Environmental Protection							
Division of Waste Water Management							
U.S. Geological Survey - West Virginia Water Science Center							
Groundwater Monitoring Program							
FY 2015							
Site Number	Station Name	Collection Type	Cooperator Cost	USGS Matching Cost	Other Funding	Annual Cost	
372322081241501	Mcd-0204	Water Level	\$2,970	\$1,900	\$0	\$4,870	
373839081255201	Wyo-0148	Water Level	\$1,434	\$1,100	\$2,336	\$4,870	*
380653080155301	Poc-0256	Water Level	\$1,434	\$1,100	\$2,336	\$4,870	*
381447081393101	Kan-0946	Water Level	\$2,970	\$1,900	\$0	\$4,870	
382008080292801	Web-0167	Water Level	\$2,970	\$1,900	\$0	\$4,870	
382205082304501	Way-0144	Water Level	\$2,970	\$1,900	\$0	\$4,870	
385849079563901	Bar-0136	Water Level	\$2,970	\$1,900	\$0	\$4,870	
390333078370801	Hrd-0301	Water Level	\$2,970	\$1,900	\$0	\$4,870	
391020080244101	Har-0165	Water Level	\$2,970	\$1,900	\$0	\$4,870	
391308081064201	Rit-0116	Water Level	\$2,970	\$1,900	\$0	\$4,870	
391920078032201	Ber-0840	Water Level	\$2,970	\$1,900	\$0	\$4,870	
392200078532001	Min-0173	Water Level	\$2,970	\$1,900	\$0	\$4,870	
392725077582401	Ber-0445	Water Level	\$2,970	\$1,900	\$0	\$4,870	
392757077501001	Jef-0797	Water Level	\$2,970	\$1,900	\$0	\$4,870	
393814079484601	Mng-0585	Water Level	\$2,970	\$1,900	\$0	\$4,870	
401216080362703	Brk-0066	Water Level	\$1,013	\$0	\$3,857	\$4,870	*
		Total	\$42,491	\$26,900	\$8,529	\$77,920	
* Other funding all or partially provided by the USGS National groundwater monitoring program							



# Stream Gage Funding

- All of our water resource science and web tools are dependent on the USGS Stream Gaging network.
- It costs about 1.3 million per year to fully fund our states stream gage, groundwater and water quality network.
- The cost is currently supported by five state agencies, the ACoE, the USGS and some private industries.
- The WRPMA requires any state agency to notify this Commission if they are reducing their supporting funds:
  - §22-26-3(p) *Should a cooperating state agency become unable to maintain its contribution level, it should notify the USGS and the commission of its inability to continue funding for the subsequent federal fiscal year by July 1 in order to allow for the possible identification of alternative funding resources.*

## Other Projects and Studies Underway

- **Geophysical Well Logging - Groundwater Aquifer Study**
- **Mine Pool Study – Location, Quantity, Quality and Sustainability**
- **Source Water Protection and Stream Time of Travel Study**
- **Aboveground Storage Tanks ZCC, ZPC and SWPA's**
- **Water Conservation Award in 2016**



# 2015 WV Annual Water Conference



## Water Use Section



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Robert D. Biller  
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## West Virginia Water Resources Conference

In conjunction with  
The WVRWA 30th Annual Training and Technical Conference

### Meet the Water Use Section

The West Virginia Water Resources Protection and Management Act identifies the need for the protection and conservation of our state's water resources. It recognizes that a comprehensive assessment and statewide management plan for water resources will benefit the citizens of West Virginia. West Virginia Code Chapter 22, Article 26.

In support of this, the Water Use Section of the DEP's Division of Water and Waste Management was formed. We have many responsibilities. This meeting focuses on the Statewide Water Management Plan for West Virginia. Legislation, Resource Mapping, Large Quantity Users, Flood and Drought, and Marcellus Shale.

### Here are the group members:

Brian A. Carr, P.G., Program Manager  
Mark Collins, Engr., Resources Analyst  
Carson Wright, Hydrologist  
Robert D. Biller, LQU Coordinator  
Fini Bya, GIS Coordinator



### Water Resources Management Plan

§22-26-8. State Water Resources Management Plan; powers and duty of secretary.

(a) The Secretary of the Department of Environmental Protection shall oversee the development of a State Water Resources Management Plan to be completed no later than the thirtieth day of November, two thousand thirteen.

The plan shall be reviewed and revised as needed after its initial adoption. The plan was developed with the cooperation and involvement of local and state agencies with regulatory, research or other functions relating to water resources.

To view the "West Virginia Water Resources Management Plan", the "West Virginia

<http://dep.wv.gov/WVWaterPlan>



## ABOVEGROUND STORAGE TANK ACT SB's 373 & 423



April 2014

## SB373/64CSR3 Public Water Systems Rule and SB 423

- In 2014 - Senate Bill 373 addressed regulation of public water systems (utilities) and source water protection guidelines.
- Developed in response to the Charleston chemical spill.
- Requires public water utilities as regulated by the state WV Public Service Commission, for surface water and surface water influenced groundwater supply systems to submit Source Water Protection Plans to the WV Bureau for Public Health (BPH) by July 1, 2016.
- Public hearing will be held by the BPH Commissioner and consult with the county health department.
- Plans will be updated every three years or when a substantial change occurs.

# QUESTIONS ?



WV department of environmental protection

-Promoting a healthy environment