

West Virginia: A Comprehensive Approach to Watershed TMDLs

Efficiency + Detail = Better Implementation

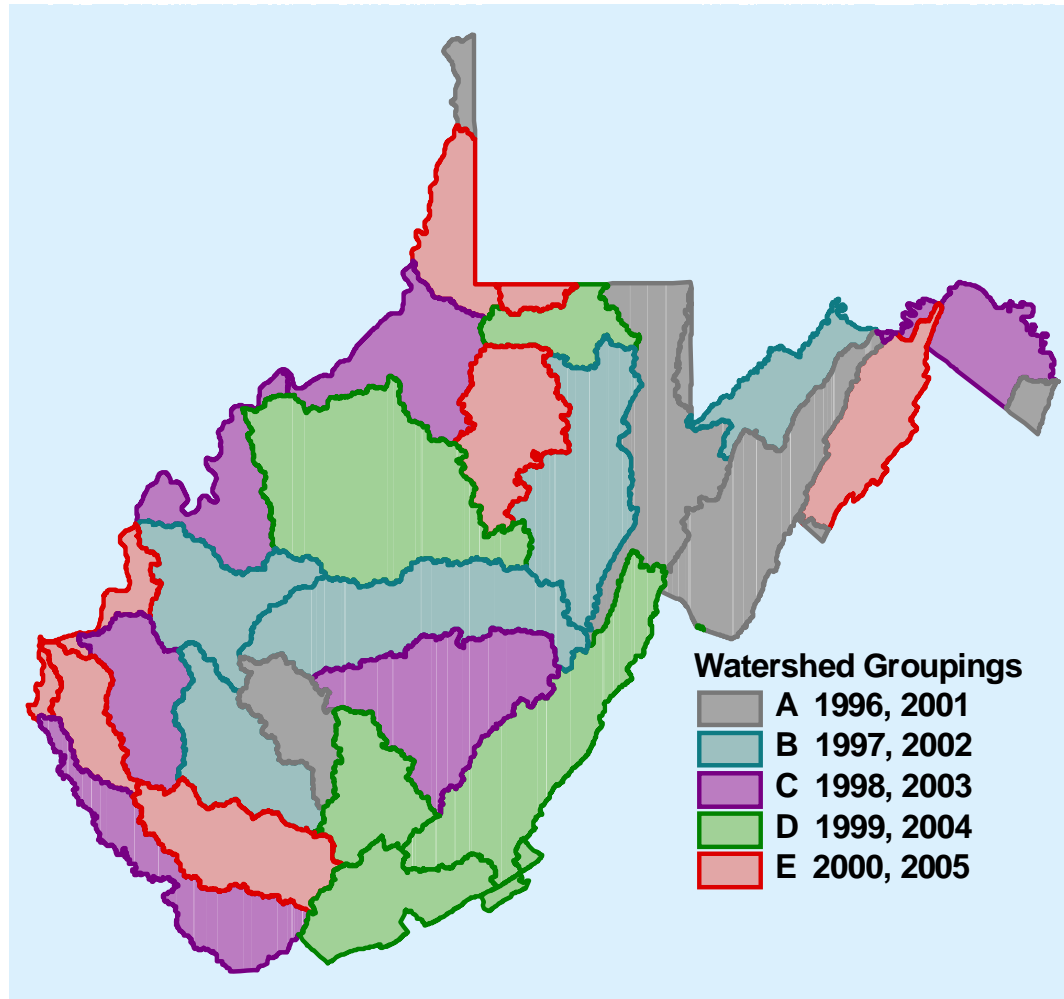
How we got started...

- Consent Decree:
AMD Required for 500+ streams in 10 years
- While in the watershed, do other potential impairments
 - Streams not previously listed as impaired
 - Additional parameters

Watershed Approach

- Multiple Impaired Streams in one basin
- Multiple Impairments within one basin
 - Fecal Coliform
 - Iron (Dissolved and Sediment)
 - Aluminum
 - pH (AMD and Acid precipitation)
 - Biological
- New River Example
 - 2004 303(d) listing: 47 streams/60 impairments
 - TMDLs developed for 127 streams/164 impairments
 - Removed 14 previously listed impairments because of new data

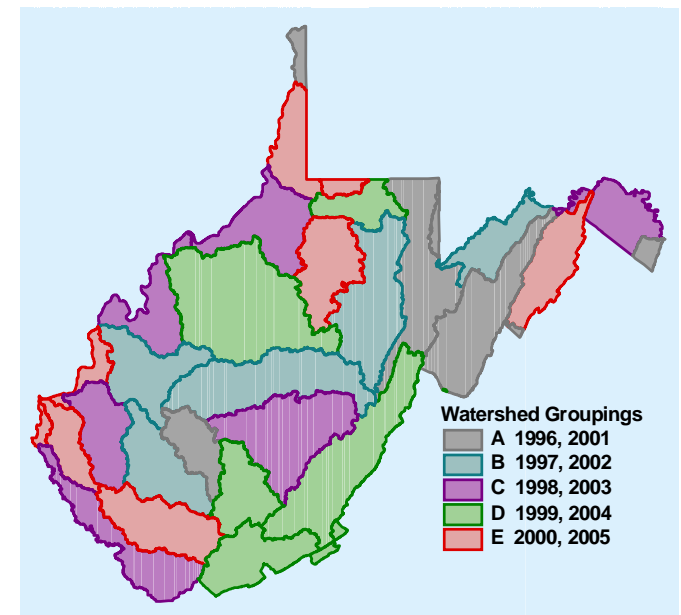
Watershed Framework (8 digit HUCs)



Watershed Framework Integration

- 5 watershed groups on rotation
- TMDL revisited in 15 years
- All NPDES permits within watershed group are issued the same year

Example: Greenbrier River TMDL finalized in spring
All permits in the Greenbrier basin issued July-June



Efficiency

- Modeling: $\sim \$3,500/\text{TMDL}$
- Analytical: $\sim \$300/\text{TMDL}$
- +staff (field, public info, technical, administrative)
- $< \$10,000/\text{TMDL}$

Efficiency

(While we're there...)

- Geographically close
 - Sampling
 - Public input
- Add parameters for other potential impairments
 - Single source-multiple impairments
 - (agriculture source: bacteria & biological impairment)
- Hydrologic calibration & Subwatershed Delineation
- Interaction: sediment-Fe correlation for Bio impairments

Detail

- Finer scale subwatershed delineation
 - 9 vs. 160
- Robust water quality data
 - 12 monthly samples @ ~300 stations
- Detailed source tracking
 - Source samples
 - BMP evaluation

Results

- More implementable TMDL
 - Fuller picture of problems=> better solutions
 - Reduction @ “subwatershed/individual source” level
- “TMDL on CD”
 - Arc Explorer GIS Project
 - “pre-tooled” Excel Tables
 - Water Quality Sample results
 - Narrative

Normal Page Layout Page Break Preview Custom Views Full Screen

Ruler Formula Bar Gridlines Headings Message Bar

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View Side by Side Synchronous Scrolling Reset Window Position

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Macros

A14 Twentymile Creek

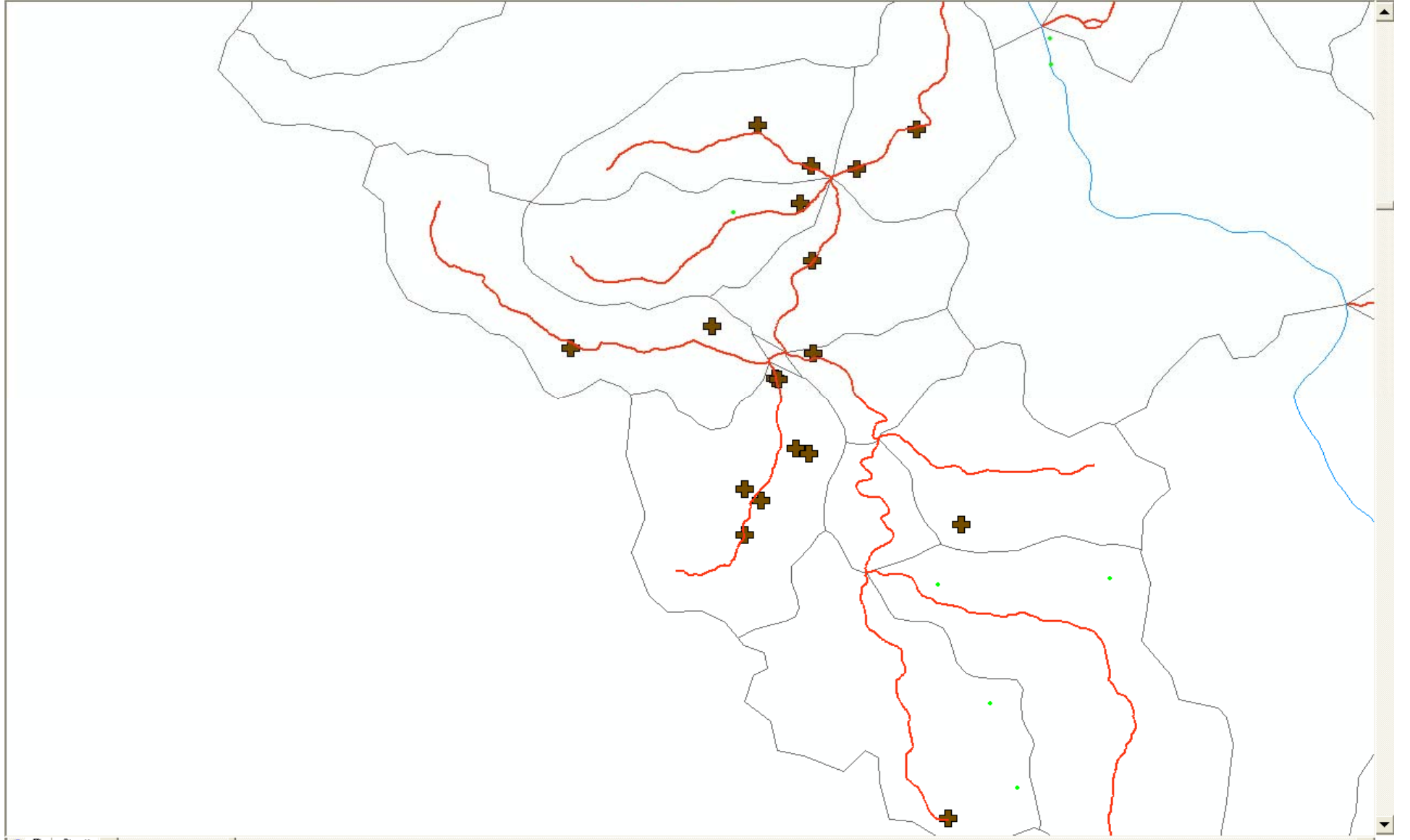
1 Gauley River Watershed Iron and Aluminum Load Allocations

	Major Watershed	Stream Code	Stream Name	Metal	SWS	ABANDONED MINES			Bond Forfeiture Sites			FOREST HARVEST	
						Baseline Load (lbs/yr)	Allocated Load (lbs/yr)	% Reduction	Baseline Load (lbs/yr)	Allocated Load (lbs/yr)	% Reduction	Baseline Load (lbs/yr)	Allocated Load (lbs/yr)
4	Twentymile Creek	WVKG-5	Twentymile Creek	Iron	501	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Twentymile Creek	WVKG-5-A	Buckles Branch	Iron	502	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Twentymile Creek	WVKG-5	Twentymile Creek	Iron	503	50.4	50.4	0.0	0.0	0.0	0.0	0.0	0.0
7	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	504	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Twentymile Creek	WVKG-5-B-1	Open Fork	Aluminum	505	1,075.8	1,075.8	0.0	0.0	0.0	0.0	0.0	0.0
9	Twentymile Creek	WVKG-5-B-1	Open Fork	Iron	505	274.5	274.5	0.0	0.0	0.0	0.0	0.0	0.0
10	Twentymile Creek	WVKG-5-B-1-B	Williams Hollow	Aluminum	506	567.3	567.3	0.0	0.0	0.0	0.0	0.0	0.0
11	Twentymile Creek	WVKG-5-B-1-B	Williams Hollow	Iron	506	159.1	159.1	0.0	0.0	0.0	0.0	0.0	0.0
12	Twentymile Creek	WVKG-5-B-1	Open Fork	Iron	507	14.3	1.4	90.0	0.0	0.0	0.0	0.0	0.0
13	Twentymile Creek	WVKG-5-B-1	Open Fork	Aluminum	507	56.1	5.6	90.0	0.0	0.0	0.0	0.0	0.0
14	Twentymile Creek	WVKG-5-B-1-C	Sangamore Fork	Aluminum	508	35,930.3	748.6	97.9	0.0	0.0	0.0	0.0	0.0
15	Twentymile Creek	WVKG-5-B-1-C	Sangamore Fork	Iron	508	4,732.1	990.1	79.1	0.0	0.0	0.0	0.0	0.0
16	Twentymile Creek	WVKG-5-B-1	Open Fork	Aluminum	509	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	Twentymile Creek	WVKG-5-B-1	Open Fork	Iron	509	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	510	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	Twentymile Creek	WVKG-5-B-2	Smith Branch	Iron	511	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	512	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	Twentymile Creek	WVKG-5-B-4	Hughes Fork	Iron	513	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	Twentymile Creek	WVKG-5-B-5	Rockcamp Fork	Iron	514	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	515	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Twentymile Creek	WVKG-5-B-6	Laurel Fork	Iron	516	24.2	24.2	0.0	0.0	0.0	0.0	0.0	0.0
25	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	517	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Twentymile Creek	WVKG-5-B-7	Campbell Fork	Iron	518	171.4	171.4	0.0	0.0	0.0	0.0	0.0	0.0
27	Twentymile Creek	WVKG-5-B	Bells Creek	Iron	519	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	Twentymile Creek	WVKG-5	Twentymile Creek	Iron	520	38.0	38.0	0.0	0.0	0.0	0.0	964.3	964.3
29	Twentymile Creek	WVKG-5-D	Backus Branch	Iron	521	53.7	53.7	0.0	0.0	0.0	0.0	0.0	0.0
30	Twentymile Creek	WVKG-5	Twentymile Creek	Iron	522	2,745.1	2,745.1	0.0	0.0	0.0	0.0	830.7	830.7
31	Twentymile Creek	WVKG-5-F	Rockcamp Fork	Iron	523	3.1	0.3	89.0	0.0	0.0	0.0	0.0	0.0
32	Twentymile Creek	WVKG-5-F	Rockcamp Fork	Aluminum	523	11.0	1.2	89.0	0.0	0.0	0.0	0.0	0.0
33	Twentymile Creek	WVKG-5-F-1	Spring Branch	Iron	524	2,151.8	199.3	90.7	0.0	0.0	0.0	0.0	0.0

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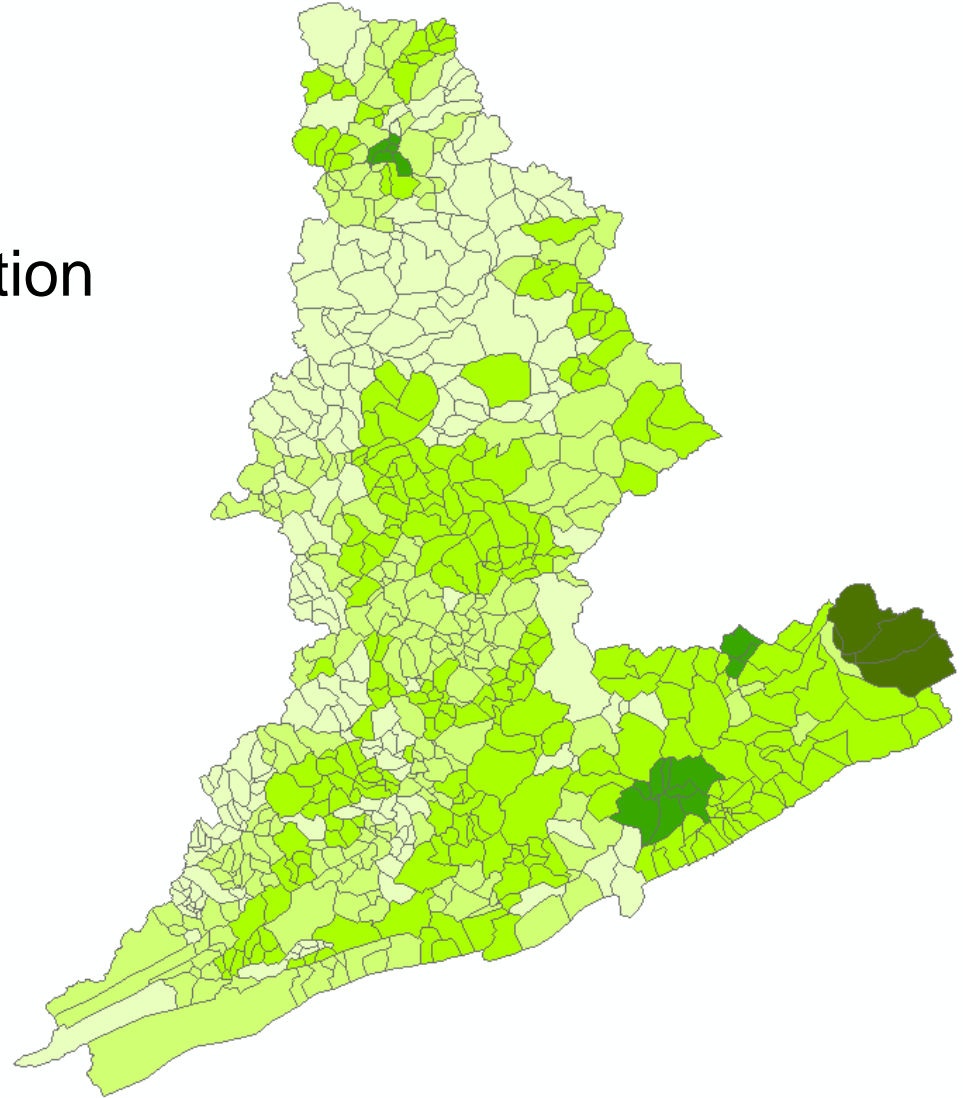
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	A	B	C	D	E	F	G	H
1	Gauley River Watershed AML Discharges							
2	Major Watershed	Stream Name	Metal	SWS	Discharge Number	Baseline Load (lbs/yr)	Reduced Load (lbs/yr)	% Reduction
45	Twentymile Creek	Sangamore Fork	Aluminum	508	WVKG5B1CPA20-200	30,280.0	133.2	99.6
46	Twentymile Creek	Sangamore Fork	Aluminum	508	WVKG5B1CPAM20-10	1,825.9	329.2	82.0
47	Twentymile Creek	Sangamore Fork	Aluminum	508	WVKG5B1CPAM20-101	3,597.6	59.4	98.4
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Pasturing Runoff Potential

- Pasture-Grassland Distinction
- Number of animals
- Management Practices
 - Stream access
 - Buffer zones



http://www.wvdep.org/item.cfm?ssid=11&ss1id=930

Total Maximum Daily Load - Windows Internet Explorer

http://www.wvdep.org/item.cfm?ssid=11&ss1id=930

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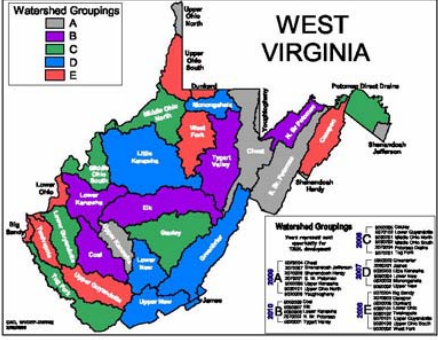
Total Maximum Daily Load

Why are TMDLs necessary

Public awareness and a desire to control water pollution led to passage of the federal Clean Water Act in 1972. The Clean Water Act established the basis for the regulation of discharging pollutants into streams. Pollution control programs greatly reduced the amount of pollutants that went into streams and navigable waters. Section 303(d) of the Clean Water Act and regulations developed by the Environmental Protection Agency (EPA), require states to identify all waters that do not meet water quality standards even after pollution controls required by law are in place. Water bodies not meeting the appropriate water quality standards are considered to be impaired. The Impaired Segments identified by the states comprise each state's 303(d) list (or Section 303 (d) list). The 303 (d) list of impaired waters must be submitted to EPA for review and approval. TMDL's must be developed for all water bodies on the approved 303 (d) list.

Completed TMDLs

West Virginia has worked diligently with the Environmental Protection Agency and many other important stakeholders to assure the completion of TMDLs. A listing of these can be found following this link. As electronic versions of the document are available links will be provided. To receive a hard copy, call (304) 926-0495, TTY/TDD 926-0489.



Hydrologic Groups and Watersheds

Hydrologic Group A Page - Includes Cheat, Shenandoah Jefferson, Shenandoah Hardy, South Branch of the Potomac, Upper Kanawha, Upper Ohio North and Younghigheny watersheds.
Hydrologic Group B Page - Includes Coal, Elk, Lower Kanawha, North Branch of Potomac and Tygart Valley watersheds.
Hydrologic Group C Page - Includes Gauley, Lower Guyandotte, Middle Ohio North, Middle Ohio South, Potomac Direct Drains and Tug Fork watersheds.
Hydrologic Group D Page - Includes Greenbrier, James, Little Kanawha, Lower New, Monongahela and Upper New watersheds.
Hydrologic Group E Page - Includes Big Sandy, Cacapon, Dunkard, Lower Ohio, Twelvepole, Upper Guyandotte, Upper Ohio South and West Fork watersheds.

Timelines for TMDL Development

Update	TMDL Timeline Charts - These Charts Show when the TMDL for streams will be completed. The IMPLEMENTATION of the TMDL will continue for years after a finalized TMDL.
3/03/2004	TMDLs "At A Glance" - Overview of projected due dates for each Hydrological Group.
12/08/2004	Timeline for Completion of 2004 TMDLs - Hydrological Group A for the Upper Kanawha River and Upper Ohio North watersheds
12/08/2004	Timeline for Completion of 2005 TMDLs - Hydrological Group B for the Coal River, Little Kanawha River, and North Branch of the Potomac watersheds
12/08/2004	Timeline for Completion of 2006 TMDLs - Hydrological Group C for the Gauley River and Potomac Direct Drains watersheds
12/08/2004	Timeline for Completion of 2007 TMDLs - Hydrological Group D for the Greenbrier, James, Little Kanawha, Lower New River and Upper New River watersheds
12/08/2004	Timeline for Completion of 2008 TMDLs - Hydrological Group E for the Dunkard, Twelvepole, Upper Ohio South and Younghigheny* watersheds (*Youghigheny TMDLs are being completed with Group E and not Group A).
1/13/2004	Overall Timeline for all Hydrological Groups

Water Permit Documents

- Solid Waste Permitting
 - Solid Waste Permitting
 - SW Permitting Forms
- Hazardous Waste Permitting
 - Hazardous Waste Permitting
 - Proposed Updated Rule 33 CSR 20
- Wastewater Loan Fund
 - Clean Water State Revolving Fund
- Watershed Management
 - Watershed Management Programs
 - Water Quality Monitoring
 - Watershed Assessment Reports
 - Ambient Sampling Data
 - Watershed Management Framework
 - Antidegradation
 - Total Maximum Daily Load
 - 303(d)/Impaired Streams Listing
 - Fish Kill and Intersex
 - Fish Consumption Advisories
 - Chesapeake Bay
 - Watershed Associations and Project Teams
- Program Support
 - Hazardous Waste Program Data Management
 - FAQ Episodic Generation/Hazardous Waste
 - RCRA Subtitle C Site ID Instructions
 - Temporary Identification Number Request
 - Hazardous Waste Management Fee
 - Hazardous Waste Emergency Response Fee
 - Hazardous Waste Manifest Form
 - NPDES Discharge Monitoring (DMR)
- Other Programs
 - Laboratory Quality Assurance
 - Nonpoint Source
 - Groundwater / UIC
 - Monitoring Well Construction
 - Water Resources Protection Act/Water Use
- Other Links
 - Related Links
 - DEP Home Page
 - Groundwater Remediation Program
 - C-8 Investigation Reports
 - 2004 Biennial Report
- Community Infrastructure Investment
 - Community Infrastructure Investment
- Resources
 - Universal Waste Lamps
 - 48-Hour Response Policy
 - Recyclable Shop Towels Policy
 - RCRA GWMonitoring Consultants

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Navigation to TMDL webpage

- wvdep.org
- Click “offices” and select “Division of Water and Waste Management”
- From the list of programs on the right side of the page, select “Total Maximum Daily Load” under the “Watershed Management” heading
- Select one of the watershed groups and then select a TMDL to view. (Select a newer TMDL for the best example of what we’re doing now; we try to make improvements with each watershed group.)

Contacts

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