



TMDL Development Tug Fork River Watershed

May 15th & 17th , 2018

Agenda

- Background information on Water Quality Standards, impaired waters and TMDLs
- Brief history of WV TMDL development
- Overview of WVDEP's TMDL process
- Discussion of local impaired waters and their TMDL timeline
- Pre-TMDL Monitoring Plan for local waters
- Discussion – Free form questions and answers

What's a TMDL?

- “Total Maximum Daily Load” – How much of a pollutant/s a stream can receive and remain healthy
- TMDL development is required by Clean Water Act for all *impaired* streams
- TMDL is a pollutant budget – prescribes reduction in pollutants, where needed, that result in the restoration of an impaired stream

What's an impaired stream?

- Stream that doesn't meet *water quality standards*
- West Virginia Water Quality Standards are codified in 47 CSR 2
- Standards include *designated uses* for WV waters and *water quality criteria* to protect those uses
- Criteria can be numeric or narrative
- Impaired streams (streams that are not meeting criteria) are on the *303(d) List*

Numeric Criteria

➤ Fecal Coliform Bacteria

➤ Human Health Protection (Water Contact)



- 200 counts/100ml as a monthly geometric mean
- No more than 10% of samples in a month exceed 400 counts/100ml

➤ Total Iron

➤ Human Health/Aquatic Life Protection



- 1.5 mg/l as a 4 day average concentration (warmwater)
- 1.0 mg/l as a 4 day average concentration (troutwater)
- Not to be exceeded more than once every 3 years

Numeric Criteria continued

➤ Total Manganese

➤ Human Health



- Public Water - Not to exceed 1.0 mg/l
- Effective within a 5 mile zone above a public intake

➤ Dissolved Aluminum

➤ Aquatic Life



- 750 ug/l as a 1 hour or 4 day avg. concentration (warmwater)
- 750 mg/l as a 1 hour avg. concentration or 87 ug/l as a 4 day avg. concentration (troutwater)
- Not to be exceeded more than once every 3 years

Numeric Criteria continued

➤ Selenium

➤ Aquatic life criteria



- Fish Egg/Ovary Concentration ug/g 15.8
- 8.0 ug/g Fish Whole-Body Concentration Or 11.3 ug/g Fish Muscle (skinless, boneless filet)
- 5 ug/l as a 4 day average concentration
- Not to be exceeded more than once in three years

➤ Public Water - Not to exceed 50 ug/l



➤ pH



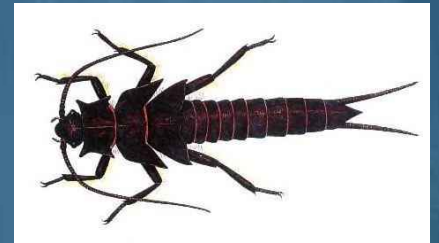
➤ Aquatic Life/Water Contact Recreation/Public Water Supply (All Uses)

- No values below 6.0 nor above 9.0.

Narrative Criteria

➤ Biological Impairment

- Conditions Not Allowable (CNA) in State Waters
- (47 CSR 2-3.2i) “.....no significant adverse impact to the chemical, physical, hydrologic or biological components of aquatic ecosystems shall be allowed.”



CNA-Biology Impairment Assessment

- Based on Benthic Macroinvertebrates
- West Virginia Stream Condition Index (WVSCI)
 - Standardized method for assessing benthic macroinvertebrates (aquatic bugs)
 - WVSCI stream scores normalized to 0 - 100 range
 - Streams scoring less than an impairment threshold value placed on the 303(d) list
 - Streams listed as impaired slated for TMDLs
 - Stressor's to aquatic life are identified to see if pollutant TMDLs can resolve 303(d) list

2012 Legislative Changes

- Senate Bill 562 passed by the 2012 West Virginia Legislature amended the WV Water Pollution Control Act
- Requires “evaluation of the holistic health of the aquatic ecosystem”
- Requires DEP to develop and secure legislative approval of new rules to interpret 47 CSR 2-3.2.i
- <http://www.legis.state.wv.us/wvcode/ChapterEntire.cfm?chap=22&art=11>
- Work to develop assessment methodology is ongoing

WVDEP TMDL Process

- Stream Selection
- Pre-TMDL monitoring, source identification and characterization
- Contract to model water quality and hydrology
- Allocation process
- Draft Report development
- Finalization including EPA approval

Process Highlights

- Synchronized with WV Watershed Management Framework
- 48 month process (Stream selection – EPA approval)
- Multiple opportunities for public outreach/stakeholder input
- Pre-TMDL water quality monitoring
- Source identification and characterization

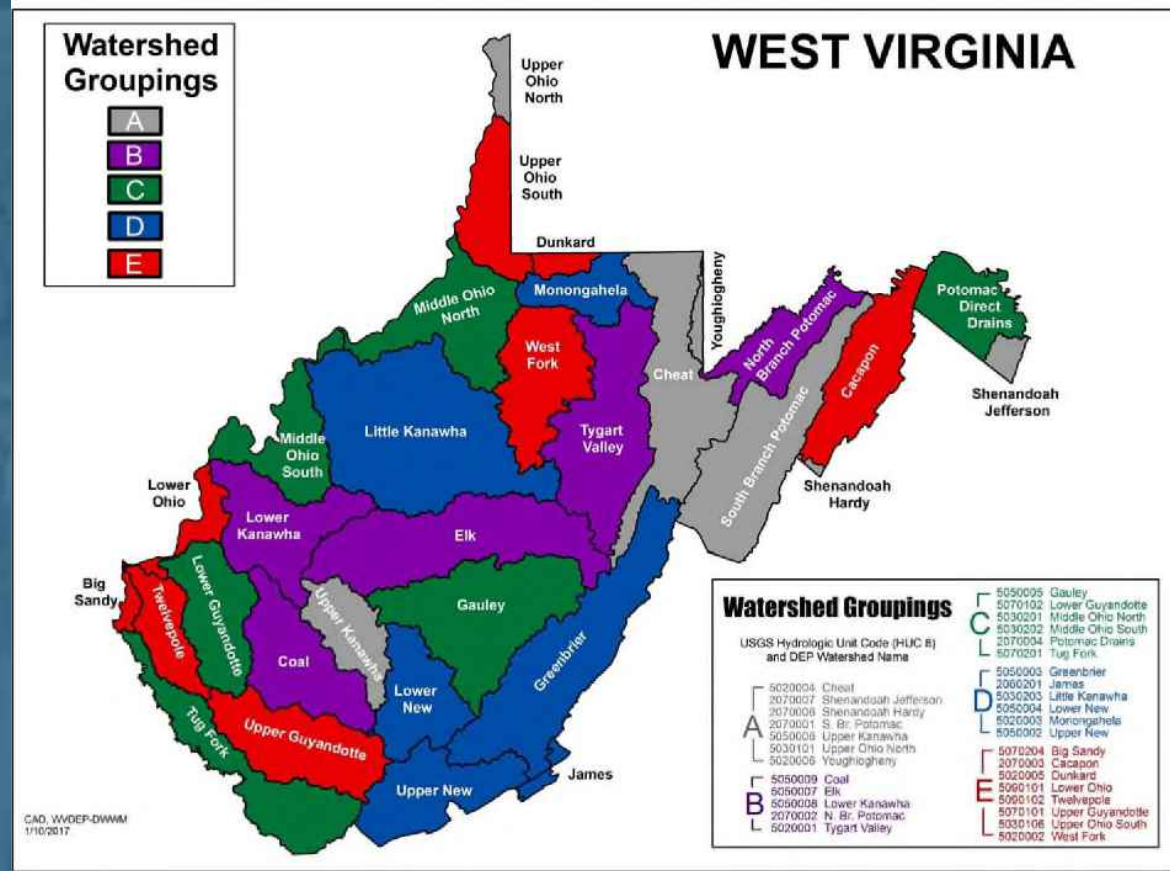
TMDL Stream Selection Process

- Spread development over State
- Evaluate list of impaired waters
- Consider Watershed Management Framework
- Maximize efficiency
 - focus geographically
 - address all known or suspected impairments
- Agency Resources

TMDL Development Stream Selection Process

Watershed Management Framework Consideration

- Group C Watersheds:
 - Gauley
 - Lower Guyandotte
 - Middle Ohio North
 - Middle Ohio South
 - Potomac Direct Drains
- Tug Fork
- Tug Fork priority for TMDLs based on 303d list



TMDL Stream Selection Process

- DEP advertised proposal of Tug Fork River TMDL development & provided opportunity for public comment (February 6th – March 9th), No Comments received.
- Tug Fork River watershed selected for TMDL development, effort includes re-evaluation of previous EPA TMDLs for Fe, pH, Mn.
- TMDLs will be developed for any new impairments identified in pre-TMDL monitoring (with possible exception of Bio Impairment)

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
TUG FORK WATERSHED - HUC# 05070201						117 streams 543 miles	
Tug Fork	WVBST	CNA-Biological	Unknown	131.2	RM 27.5 to HW	2022	Yes
Tug Fork	WVBST	Fecal Coliform	Unknown	158.7	Entire length	2022	Yes
Tug Fork	WVBST	Selenium	Unknown	13.9	RM 143.2 to RM 157.1	2022	No
Mill Creek	WVBST-1	CNA-Biological	Unknown	8.7	Entire length	2022	Yes
Vinson Branch	WVBST-2	pH	Unknown	0.3	Mouth to RM 0.3	2022	No
Lost Creek	WVBST-7	CNA-Biological	Unknown	4.5	Entire length	2022	Yes
Silver Creek	WVBST-16	CNA-Biological	Unknown	2.5	Entire length	2022	Yes
Jennie Creek	WVBST-17	CNA-Biological	Unknown	12.0	Entire length	2022	Yes
Jennie Creek	WVBST-17	Iron	Unknown	1.4	RM 5.1 to RM 6.5	2022	No
Marrowbone Creek	WVBST-19	CNA-Biological	Unknown	14.1	Entire length	2022	Yes
Upper Burning Creek	WVBST-22	CNA-Biological	Unknown	1.4	Mouth to RM 1.4	2022	No
Laurel Fork	WVBST-22-B	Iron	Unknown	1.7	Entire length	2022	No
Parsley Big Branch	WVBST-23	CNA-Biological	Unknown	1.4	Mouth to RM 1.4	2022	Yes
Pigeon Creek	WVBST-24	CNA-Biological	Unknown	32.0	Entire length	2022	Yes
Pigeon Creek	WVBST-24	Selenium	Unknown	1.0	RM 31.0 to HW	2022	No
Big Branch	WVBST-24-B	Selenium	Unknown	3.9	Entire length	2022	Yes
Right Fork/Laurel Fork/Pigeon Creek	WVBST-24-E-1	CNA-Biological	Unknown	6.7	Mouth to RM 6.7	2022	Yes
Spruce Fork	WVBST-24-E-2	CNA-Biological	Unknown	3.0	Entire length	2022	No
Middle Fork/Spruce Fork	WVBST-24-E-2-A-1	Selenium	Unknown	2.2	Entire length	2022	Yes
UNT/Laurel Fork RM 9.61	WVBST-24-E-7.3	CNA-Biological	Unknown	0.7	Entire length	2022	Yes
UNT/Pigeon Creek RM 6.72 (White Branch)	WVBST-24-G	Iron	Unknown	0.9	Entire length	2022	No
Right Fork/Trace Fork	WVBST-24-K-4	Selenium	Unknown	3.0	Entire length	2022	Yes
Left Fork/Right Fork/Trace Fork	WVBST-24-K-4-A	Selenium	Unknown	1.9	Entire length	2022	Yes
Left Fork/Elk Creek	WVBST-24-N-4	CNA-Biological	Unknown	2.6	Entire length	2022	Yes
Middle Fork/Elk Creek	WVBST-24-N-5	Selenium	Unknown	3.8	Entire length	2022	Yes

2016 Section 303(d) List

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
UNT/Pigeon Creek RM 20.01	WVBST-24-S.3	Aluminum (d)	Unknown	0.7	Entire length	2022	No
UNT/Pigeon Creek RM 20.01	WVBST-24-S.3	Iron	Unknown	0.7	Entire length	2022	No
UNT/Pigeon Creek RM 20.01	WVBST-24-S.3	pH	Unknown	0.7	Entire length	2022	No
UNT/Oldfield Branch RM 0.46	WVBST-24-T-1	Selenium	Unknown	0.6	Entire length	2022	Yes
Slick Rock Branch	WVBST-24-AA	Selenium	Unknown	1.4	Entire length	2022	Yes
Grant Branch	WVBST-24-DD	Iron	Unknown	0.6	Mouth to RM 0.6	2022	No
Road Branch	WVBST-26	Iron	Unknown	2.4	Entire length	2022	No
Mill Fork	WVBST-27-C	Selenium	Unknown	1.9	Entire length	2022	No
Peg Fork	WVBST-27-D	Selenium	Unknown	1.4	Mouth to RM 1.4	2022	No
Dans Branch	WVBST-29	Iron	Unknown	2.0	Entire length	2022	No
Ferrell Branch	WVBST-39	CNA-Biological	Unknown	1.7	Entire length	2022	Yes
UNT/Ferrell Branch RM 0.83	WVBST-39-B	Aluminum (d)	Unknown	0.5	Entire length	2022	No
UNT/Ferrell Branch RM 0.83	WVBST-39-B	pH	Unknown	0.5	Entire length	2022	No
Sulphur Creek	WVBST-41	CNA-Biological	Unknown	1.7	Entire length	2022	Yes
Thacker Creek	WVBST-42	Aluminum (d)	Unknown	3.0	Entire length	2022	No
Wolfpen Fork	WVBST-43-B	CNA-Biological	Unknown	1.6	Entire length	2022	Yes
Millseat Branch	WVBST-43-B.5	CNA-Biological	Unknown	1.9	Entire length	2022	Yes
Millseat Branch	WVBST-43-B.5	Iron	Unknown	1.9	Entire length	2022	No
Grapevine Fork	WVBST-46-B	CNA-Biological	Unknown	0.2	Mouth to RM 0.2	2022	Yes
UNT/Grapevine Fork RM 0.22	WVBST-46-B-1	CNA-Biological	Unknown	1.1	Entire length	2022	Yes
UNT/Grapevine Fork RM 0.22	WVBST-46-B-1	Iron	Unknown	1.1	Entire length	2022	No
Ben Creek	WVBST-52	CNA-Biological	Unknown	8.2	Entire length	2022	Yes
Ben Creek	WVBST-52	Selenium	Unknown	8.2	Entire length	2022	Yes
Left Fork/Ben Creek	WVBST-52-B	Selenium	Unknown	7.1	Entire length	2022	No
UNT/Left Fork RM 6.36/Ben Creek	WVBST-52-B-7	Selenium	Unknown	0.6	Entire length	2022	No
White Oak Hollow	WVBST-52-G.5	CNA-Biological	Unknown	0.8	Entire length	2022	Yes
Beech Fork	WVBST-52-K	Selenium	Unknown	1.7	Entire length	2022	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
Bull Creek	WVBST-57	Fecal Coliform	Unknown	4.9	Entire length	2022	Yes
Bull Creek	WVBST-57	Selenium	Unknown	4.9	Entire length	2022	No
Left Fork/Bull Creek	WVBST-57-B	Fecal Coliform	Unknown	2.0	Entire length	2022	Yes
UNT/Bull Creek RM 4.71	WVBST-57-G	Selenium	Unknown	0.9	Entire length	2022	No
Mohawk Branch	WVBST-58	CNA-Biological	Unknown	1.1	Entire length	2022	Yes
Panther Creek	WVBST-60	CNA-Biological	Unknown	7.4	Mouth to RM 7.4	2022	Yes
Greenbrier Fork	WVBST-60-A	CNA-Biological	Unknown	3.5	Entire length	2022	Yes
Horse Creek	WVBST-63	CNA-Biological	Unknown	4.6	Entire length	2022	Yes
Dry Fork	WVBST-70	CNA-Biological	Unknown	34.5	Entire length	2022	Yes
Dry Fork	WVBST-70	Fecal Coliform	Unknown	34.5	Entire length	2022	Yes
Dry Fork	WVBST-70	Iron (trout)	Unknown	0.6	RM 27.5 to RM 28.1	2022	No
Mile Branch	WVBST-70-C	Iron	Unknown	0.7	RM 0.7 to RM 1.4	2022	No
Crane Creek	WVBST-70-D	Iron	Unknown	0.7	Mouth to RM 0.7	2022	No
Betsy Branch	WVBST-70-E	Iron	Unknown	1.9	RM 0.6 to HW	2022	No
Grapevine Branch	WVBST-70-F	CNA-Biological	Unknown	1.8	Entire length	2022	Yes
Bradshaw Creek	WVBST-70-M	Fecal Coliform	Unknown	5.5	Entire length	2022	Yes
Wolfpen Branch	WVBST-70-M-3	CNA-Biological	Unknown	1.6	Entire length	2022	Yes
Little Slate Creek	WVBST-70-N	CNA-Biological	Unknown	4.5	Mouth to RM 4.5	2022	Yes
Little Slate Creek	WVBST-70-N	Fecal Coliform	Unknown	6.8	Entire length	2022	Yes
Johnnycake Hollow	WVBST-70-P	Aluminum (d)	Unknown	1.8	Entire length	2022	No
Johnnycake Hollow	WVBST-70-P	pH	Unknown	1.8	Entire length	2022	No
Pruett Branch	WVBST-70-S	CNA-Biological	Unknown	1.4	Entire length	2022	Yes
Jacobs Fork	WVBST-70-W	Fecal Coliform	Unknown	10.6	Entire length	2022	Yes
UNT/Big Creek RM 1.98	WVBST-70-W-1-0.7A	CNA-Biological	Unknown	1.1	Entire length	2022	No
Mountain Fork	WVBST-70-W-1-A	CNA-Biological	Unknown	4.2	Entire length	2022	Yes
North Fork/Big Creek	WVBST-70-W-1-F	Selenium	Unknown	2.7	Entire length	2022	Yes
UNT/North Fork RM 1.52/Big Creek	WVBST-70-W-1-F-2	Selenium	Unknown	1.1	Entire length	2022	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
Middle Fork/Big Creek	WVBST-70-W-1-G	CNA-Biological	Unknown	1.6	Entire length	2022	Yes
Middle Fork/Big Creek	WVBST-70-W-1-G	Selenium	Unknown	1.6	Entire length	2022	No
Road Fork	WVBST-70-W-1-G-1	Selenium	Unknown	1.4	Entire length	2022	No
Horsepen Creek	WVBST-70-W-6	Selenium	Unknown	2.2	RM 1.5 to HW	2022	No
UNT/Horsepen Creek RM 1.48	WVBST-70-W-6-0.5A	Iron	Unknown	0.6	Entire length	2022	No
Big Branch	WVBST-70-X	Iron	Unknown	1.3	Entire length	2022	No
Beech Fork	WVBST-70-AA	CNA-Biological	Unknown	1.0	Entire length	2022	Yes
Clear Fork	WVBST-76	Fecal Coliform	Unknown	10.5	Entire length	2022	Yes
Spice Creek	WVBST-78	CNA-Biological	Unknown	5.7	Entire length	2022	Yes
Badway Branch	WVBST-78-G	CNA-Biological	Unknown	1.3	Entire length	2022	Yes
Davy Branch	WVBST-85	CNA-Biological	Unknown	4.1	Entire length	2022	Yes
Davy Branch	WVBST-85	Fecal Coliform	Unknown	4.1	Entire length	2022	Yes
UNT/Davy Branch RM 3.28	WVBST-85-G	Iron	Unknown	0.6	RM 0.3 to HW	2022	No
Upper Shannon Branch	WVBST-95	CNA-Biological	Unknown	2.4	Entire length	2022	Yes
Browns Creek	WVBST-98	CNA-Biological	Unknown	5.1	Entire length	2022	Yes
Browns Creek	WVBST-98	Fecal Coliform	Unknown	5.1	Entire length	2022	Yes
Puncheoncamp Branch	WVBST-98-A	CNA-Biological	Unknown	3.0	Entire length	2022	Yes
Trail Fork	WVBST-98-B	Fecal Coliform	Unknown	2.4	Entire length	2022	Yes
Elkhorn Creek	WVBST-99	CNA-Biological	Unknown	19.5	Mouth to RM 19.5	2022	Yes
Elkhorn Creek	WVBST-99	Iron (trout)	Unknown	22.7	Entire length	2022	Yes
Laurel Branch	WVBST-99-E	Iron	Unknown	3.2	RM 1.0 to RM 4.2	2022	No
Rockhouse Branch	WVBST-99-F	Iron	Unknown	1.8	Entire length	2022	No
Coalbank Branch	WVBST-99-I	Iron	Unknown	1.0	RM 0.4 to RM 1.4	2022	No
Coalbank Branch	WVBST-99-I	Selenium	Unknown	1.9	Entire length	2022	No
UNT/Coalbank Branch RM 1.43	WVBST-99-I-2	Selenium	Unknown	0.5	Entire length	2022	No
Clark Branch	WVBST-99-J	Selenium	Unknown	1.8	Entire length	2022	Yes
Burk Creek	WVBST-99-K	Selenium	Unknown	2.0	Entire length	2022	No
North Fork/Elkhorn Creek	WVBST-99-L	Fecal Coliform	Unknown	8.0	Entire length	2022	Yes

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
Bearwallow Branch	WVBST-99-L-2	Selenium	Unknown	2.8	Entire length	2022	Yes
UNT/Elkhorn Creek RM 20.15	WVBST-99-O-7	Selenium	Unknown	0.8	Entire length	2022	No
Rock Narrows Branch	WVBST-103	CNA-Biological	Unknown	1.7	Entire length	2022	Yes
Sandlick Creek	WVBST-109	Selenium	Unknown	5.3	Entire length	2022	Yes
Right Fork/Sandlick Creek	WVBST-109-A	CNA-Biological	Unknown	3.0	Entire length	2022	No
UNT/Left Fork RM 0.89/Sandlick Creek	WVBST-109-B-3	Iron	Unknown	1.2	Entire length	2022	No
UNT/Left Fork RM 0.89/Sandlick Creek	WVBST-109-B-3	Selenium	Unknown	0.5	Mouth to RM 0.5	2022	Yes
UNT/UNT RM 0.01/Left Fork RM 0.89/Sandlick Creek	WVBST-109-B-3-A	Aluminum (d)	Unknown	0.5	Entire length	2022	No
UNT/UNT RM 0.01/Left Fork RM 0.89/Sandlick Creek	WVBST-109-B-3-A	Iron	Unknown	0.5	Entire length	2022	No
UNT/UNT RM 0.01/Left Fork RM 0.89/Sandlick Creek	WVBST-109-B-3-A	pH	Unknown	0.5	Entire length	2022	No
UNT/Sandlick Creek RM 3.00	WVBST-109-D	Selenium	Unknown	1.2	Entire length	2022	No
Harmon Branch	WVBST-113	Selenium	Unknown	3.1	Entire length	2022	No
Leslie Branch	WVBST-114	Iron	Unknown	1.5	Mouth to RM 1.5	2022	No
Leslie Branch	WVBST-114	Selenium	Unknown	2.4	Entire length	2022	No
UNT/Tug Fork RM 145.75	WVBST-114.2	Selenium	Unknown	0.9	Entire length	2022	Yes
UNT/Tug Fork RM 146.21	WVBST-114.4	Selenium	Unknown	1.5	Entire length	2022	No
South Fork/Tug Fork	WVBST-115	Selenium	Unknown	5.8	Entire length	2022	No
Tea Branch	WVBST-115-A	Selenium	Unknown	1.1	Entire length	2022	No
McClure Branch	WVBST-115-B	Selenium	Unknown	1.3	Entire length	2022	No
Milam Branch	WVBST-115-C	Selenium	Unknown	1.3	Entire length	2022	No
Jump Branch	WVBST-115-D	Selenium	Unknown	1.7	Entire length	2022	No
Spice Creek	WVBST-115-E	Selenium	Unknown	0.6	RM 3.3 to HW	2022	No

Stream Name	Stream Code	Criteria Affected	Source	Impaired Size (stream-miles) (lake-acres)	Reach Description	Projected TMDL Year (No Later Than)	2014 list?
UNT/South Fork RM 5.46/Tug Fork	WVBST-115-I	Selenium	Unknown	1.1	Entire length	2022	No
UNT/UNT RM 0.15/South Fork RM 5.85/Tug Fork	WVBST-115-J-1	Iron	Unknown	1.0	Entire length	2022	No
UNT/Tug Fork RM 148.42	WVBST-115.2	Selenium	Unknown	1.3	Entire length	2022	No
UNT/Tug Fork RM 148.86	WVBST-115.6	Iron	Unknown	0.7	Entire length	2022	No
UNT/Tug Fork RM 148.86	WVBST-115.6	Selenium	Unknown	0.7	Entire length	2022	No
UNT/Tug Fork RM 151.49	WVBST-118.3	Selenium	Unknown	0.5	Entire length	2022	No
UNT/Tug Fork RM 152.09	WVBST-118.7	Selenium	Unknown	0.9	Entire length	2022	No
Little Creek	WVBST-120	Fecal Coliform	Unknown	4.2	Entire length	2022	Yes
Puncheoncamp Branch	WVBST-120-B	Selenium	Unknown	2.1	Entire length	2022	No
UNT/Tug Fork RM 154.02	WVBST-120.3	Selenium	Unknown	0.5	Entire length	2022	No
Ballard Harmon Branch	WVBST-122	Selenium	Unknown	1.4	RM 0.6 to HW	2022	Yes
UNT/Ballard Harmon Branch RM 1.49	WVBST-122-A	Selenium	Unknown	0.5	Entire length	2022	Yes
UNT/Tug Fork RM 157.07	WVBST-124	Selenium	Unknown	0.4	Entire length	2022	No

Previous EPA TMDLs are listed in Appendix B of 303d List

C5 TMDL Timeline

- Stream selection
2/6 – 3/9
- Monitoring plan development
2/20 - 2/23
- **Outreach (TMDL process + monitoring plan specifics)**
4/30 – 5/30
- Stream Monitoring and Source Tracking
7/2018 – 6/2019

C5 TMDL Timeline

- Modeling

1/2019 – 3/2021

- Outreach (Status Update)

7/2020 - 9/2020

- Draft TMDLs (Internal Review)

3/2021

- Outreach (PN/PC on Drafts)

8/2021 – 10/2021

C5 TMDL Timeline

- Finalization (including EPA approval)
12/2021
- Implementation begins
 - 7/2022 – NPDES Water Permits
 - 1/2023 – NPDES Mining Permits

Pre-TMDL Monitoring Plan

Goal – to generate robust/ recent data to:

- Make accurate impairment assessments
- Calibrate watershed models
- Quantify the impacts of significant pollutant sources

Today's presentation is a preliminary plan; to be refined via WVDEP field recon and stakeholder input

Pre-TMDL Monitoring Plan

- Monitoring period = July 2018 – June 2019
- Sampling frequency
 - Water chemistry (monthly) & selected parameters (quarterly)
 - Flow measurement (selected locations, monthly)
 - Benthic macroinvertebrates (1-2 times in WVSCI Index period)
 - RBP habitat evaluations (w/benthic assessment)

Pre-TMDL Monitoring Plan

- Sample site map on DEP webpage - GIS available
- Impairment/potential impairment sampling suites:
 - Sed – TSS, T. & Dis. Iron
 - Se – T. Selenium
 - Fecal - fecal coliform
 - Mn – T. Manganese
- AMD – Hot Acidity, Alkalinity, TDS, TSS, Ammonia*, T. & Dis. Al, T & Dis. Iron, Mg, Ca, (Sulfate, Chloride, K and Na – quarterly)
- Bio (Bugs &/or Fish) 1-2 samples during applicable season to evaluate current stream status
- Ion – Alkalinity, Sulfate, Chloride, Bromide, TDS, TSS, Mg, Ca, K, Na and Ammonia (if suspected)

Tug Fork TMDL Proposed Sample Sites

337 sites on 271 streams

Legend

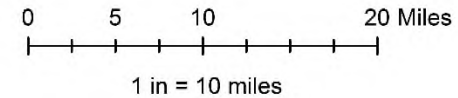
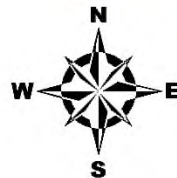
2018-2019 TMDL PROPOSED SITES

Sample Type

- AMD/FECAL/ION
- AMD/FECAL/ION/BIO
- AMD/FECAL/ION/Mn
- AMD/FECAL/ION/Mn/BIO
- AMD/FECAL/ION/SE
- AMD/FECAL/ION/SE/BIO
- AMD/FECAL/ION/Se/Mn
- AMD/FECAL/ION/Se/Mn/BIO
- BIO
- PRS
- SED/FECAL
- SED/FECAL/BIO
- SED/FECAL/Mn
- SED/FECAL/Mn/BIO
- SED/FECAL/SE
- SED/FECAL/SE/BIO
- Towns

Roads

- US Route
- Major Streams
- Tributaries
- County Lines
- WV Boundary Mask
- Tug Fork



Map by Michael Whitman, ERA
Date: 20180321

west virginia department of environmental protection

Watershed Branch

Source Tracking Efforts

- Abandoned Mine Lands
- Limits of POTW collection systems
- Assessment of failing onsite systems
- AFOs, Livestock counts, livestock stream access
- Riparian zone condition
- Qualitative assessment of sediment sources
- Active Mining Point Source Info

Stakeholder Input

- General comments regarding plan's adequacy in addressing goals
- Does the plan provide for monitoring of particularly bad or good streams that you know about?
- Does the plan provide monitoring sufficient to characterize significant pollutant sources?
- Do you have water quality data to contribute?

Future Input Opportunities

Public meeting to present TMDL status update

- Format and date to be determined

Public Meeting to present Draft TMDL
and formal Public Notice/Public Comment

- Fall 2021

WVDEP Contact Information

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- FAX: (304) 926-0496
- 601 57th Street SE, Charleston WV 25304
- www.dep.wv.gov
 - Select Water and Waste Home
 - On left select Watershed Management, click on
“Total Maximum Daily Load”



Questions???