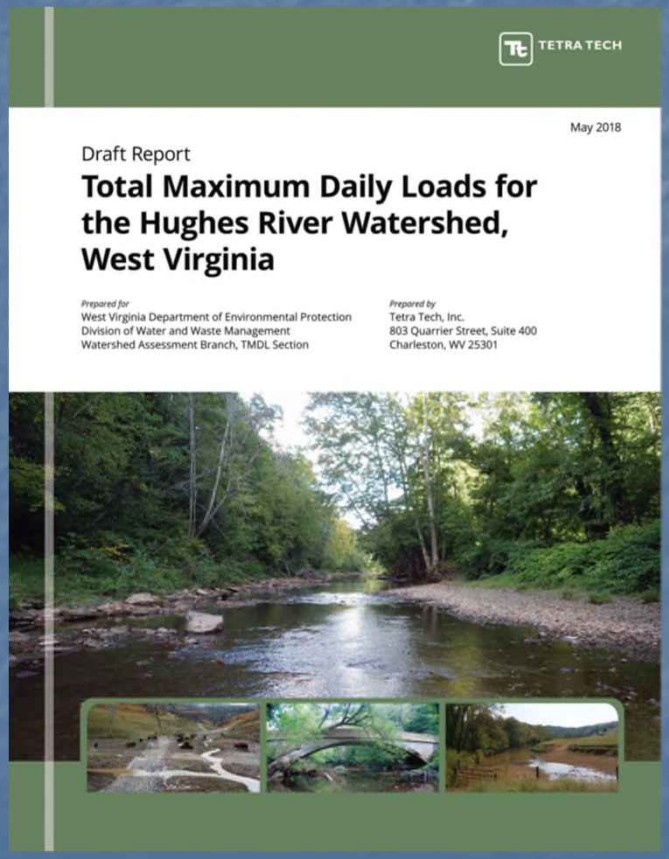
West Virginia Department of Environmental Protection



Draft TMDLs for Hughes River Watershed

June 5, 2018

Agenda

- Project Timeline/History
- TMDL/Water quality standards recap
- Overview of TMDL effort
- Explanation/demonstration of electronic documents, spreadsheets, tools
- Questions and answers

WVDEP TMDL Process (4 yrs)

- Stream Selection - (2/2014)
- Pre-TMDL monitoring, source identification and characterization - (7/2014 – 6/2015)
- Contract to model water quality and hydrology – (7/2016)
- Determine baseline condition and allocate pollutant loads
- Draft Report comment period – (5/22 – 6/22)
- **Draft TMDL Public Meeting – 6/5**
- Finalization and EPA approval

What's a TMDL?

- "Total Maximum Daily Load"
  - (1) How much pollutant a stream can receive and remain healthy
  - (2) Pollution Budget - prescribes reductions (where needed) of pollutants that result in the restoration of an impaired stream
- TMDL development required by Clean Water Act for streams impaired by a pollutant

TMDL = Σ WLA + Σ LA + MOS

- Σ = "sum of"
- WLA = "wasteload allocations"
- LA = "load allocations"
- MOS = "margin of safety"

- WLAs - pollutant loads from "point sources"
  - Discharge from point
  - Need NPDES permit
- LAs - pollutant loads from "nonpoint sources" and background
  - Precipitation/runoff driven
  - No permit required

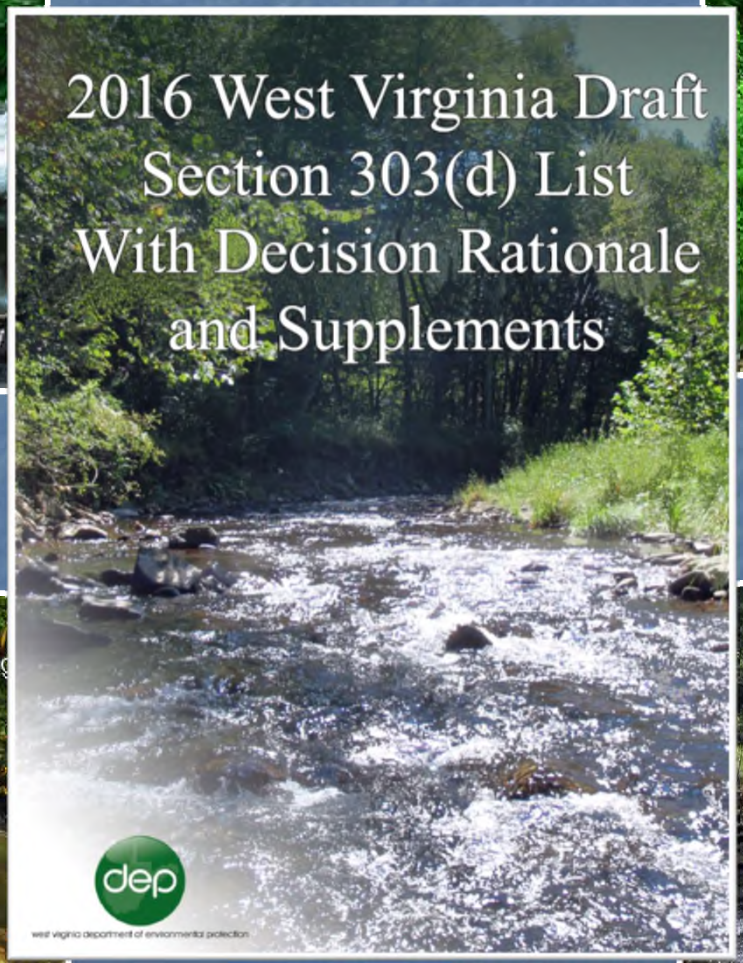
What's an impaired stream?

- Stream that doesn't meet ***water quality standards***
- West Virginia Water Quality Standards are codified in 47 CSR 2
  - http://apps.sos.wv.gov/adlaw/csr/readfile.aspx?DocId=27572&Format=PDF
- Standards include "Designated Uses" for WV waters and "water quality criteria" to protect those uses
- Criteria can be numeric or narrative

- Impaired streams are enumerated on the 303(d) list

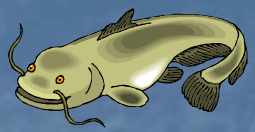
LJC1

West Virginia
Section 303(d) List / Integrated Report



Numeric Criteria of Concern

- Total Iron



  - Aquatic Life/Public Water Supply
  - Not to exceed 1.5 mg/l (warmwater) as a 4 day average concentration more than once in a three year period
  - Public Water Supply - 1.5 mg/l

- Fecal Coliform

  - Water Contact Recreation/Public Water Supply
  - Shall not exceed 200 counts/100ml as a monthly geometric mean (5 samples/month)
  - Nor to exceed 400 counts/100 ml in more than 10% of samples in a month

Narrative Criteria
Previous 47 CSR 2 - 3.2.i Assessment

- Based on Benthic Macroinvertebrates (aquatic insects)
- Stream scored based on abundance and type of benthics present
- Streams with impaired communities were placed on the 303(d) list and slated for TMDLs

Narrative Criteria
2012 Legislative Changes

- Senate Bill 562 passed by the 2012 West Virginia Legislature amended the WV Water Pollution Control Act
- Requires DEP to develop and secure legislative approval of new rules to interpret 47 CSR 2-3.2.i
- Section 22-11-7b: http://www.legis.state.wv.us/wvcode/ChapterEntire.cfm?chap=22&art=11
- No biological TMDLs are part of this effort
- Stressor Identification determines what pollutant/s impacts biology

Stressor Identification Process

- Method to evaluate stressor/s of biologically impacted streams
- Process used to evaluate if numeric criteria TMDLs (iron, fecal) will address biological stressors
- Information will be retained and may be used to delist streams in the future (Table 4.1 draft)

Hughes River

North Bend Lake – not listed as impaired and not part of this effort

Impaired Waters

Table 3-3. Waterbodies and impairments for which TMDLs have been developed.

TMDL Watershed	NHD Code	Stream Name	WV Code	Fe	FC
Hughes River	WV-OLK-31	Hughes River	WVLKH	X	X
Silver Run	WV-OLK-31-B	Silver Run	WVLKH-1	X	X
Lyda Run	WV-OLK-31-C	Lyda Run	WVLKH-2	M	X
Gooseneck Run	WV-OLK-31-D	Gooseneck Run	WVLKH-3	M	
Goose Creek	WV-OLK-31-E	Goose Creek	WVLKH-4	M	X
Goose Creek	WV-OLK-31-E-1	Fox Run	WVLKH-4-0.5A	M	
Goose Creek	WV-OLK-31-E-2	Lick Run	WVLKH-4-A	M	X
Goose Creek	WV-OLK-31-E-3	Second Big Run	WVLKH-4-B		X
Goose Creek	WV-OLK-31-E-11	Oil Spring Run	WVLKH-4-G	X	X
Goose Creek	WV-OLK-31-E-13	Myers Fork	WVLKH-4-H		X
Goose Creek	WV-OLK-31-E-14	Lynn Run	WVLKH-4-H.5	M	
Goose Creek	WV-OLK-31-E-17	Long Run	WVLKH-4-I	M	X
Goose Creek	WV-OLK-31-E-18	Short Run	WVLKH-4-J		X
Goose Creek	WV-OLK-31-E-25	Nutter Fork	WVLKH-4-L	M	X
Goose Creek	WV-OLK-31-E-25-A	UNT/Nutter Fork RM 0.91	WVLKH-4-L-1	M	
Goose Creek	WV-OLK-31-E-31	Brushy Fork	WVLKH-4-N	M	X
Goose Creek	WV-OLK-31-E-36	Layfields Run	WVLKH-4-O	M	X
Goose Creek	WV-OLK-31-E-4	Combs Run	WVLKH-4-C	M	
Goose Creek	WV-OLK-31-E-41	Douglas Run	WVLKH-4-Q		X
Goose Creek	WV-OLK-31-E-7	Pigeonroost Run	WVLKH-4-E	M	
Rock Run	WV-OLK-31-F	Rock Run	WVLKH-5	X	X
Flint Run	WV-OLK-31-J	Flint Run	WVLKH-8		X
S. Fork/Hughes R.	WV-OLK-31-K	South Fork/Hughes River	WVLKH-9	X	X
S. Fork/Hughes R.	WV-OLK-31-K-4	Big Island Run	WVLKH-9-C		X
S. Fork/Hughes R.	WV-OLK-31-K-7	Louthers Run	WVLKH-9-E	M	
S. Fork/Hughes R.	WV-OLK-31-K-8	UNT/South Fork RM 5.98/Hughes River	WVLKH-9-E.3	M	
S. Fork/Hughes R.	WV-OLK-31-K-13	Laurel Run	WVLKH-9-F	M	X
S. Fork/Hughes R.	WV-OLK-31-K-13-B	UNT/Laurel Run RM 1.57	WVLKH-9-F-2	M	
S. Fork/Hughes R.	WV-OLK-31-K-15	MacFarlan Creek	WVLKH-9-G	X	X
S. Fork/Hughes R.	WV-OLK-31-K-15-A	Left Fork/Macfarlan Creek	WVLKH-9-G-1	M	
S. Fork/Hughes R.	WV-OLK-31-K-15-F	UNT/Macfarlan Creek RM 4.21	WVLKH-9-G-1.8	M	
S. Fork/Hughes R.	WV-OLK-31-K-16	Dutchman Run	WVLKH-9-H	M	X
S. Fork/Hughes R.	WV-OLK-31-K-16-C	Left Fork/Dutchman Run	WVLKH-9-H-1	M	
S. Fork/Hughes R.	WV-OLK-31-K-20	Indian Creek	WVLKH-9-J	X	X

96 named streams

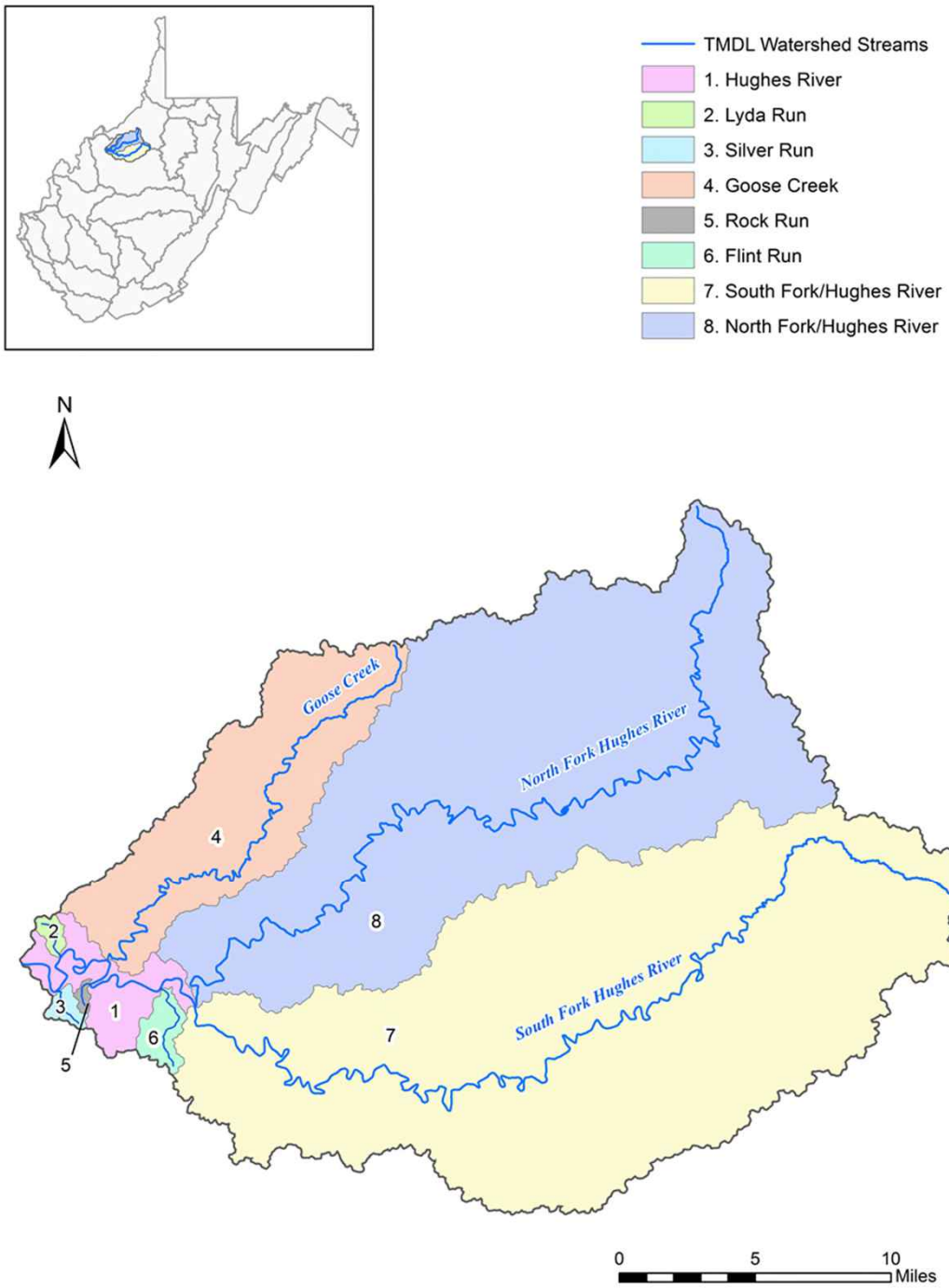
Table 3.3 beginning on page 11

MDAS Model

- Watershed Model
- Runs dynamically on a 1-hour time step
- Represents land use (hydrologic processes) and river processes
- Recognizes exposure duration and exceedance frequency components of criteria
- Can include nonpoint and point sources
- Streambank Erosion component

Modeling Approach

- Segment watershed
- Configure model to represent all sources
- Calibrate model for hydrology (flow) and water quality
  - Iron
  - Fecal
  - Sediment
- Run MDAS for Baseline conditions (existing)
- Run MDAS for TMDL scenario(s)



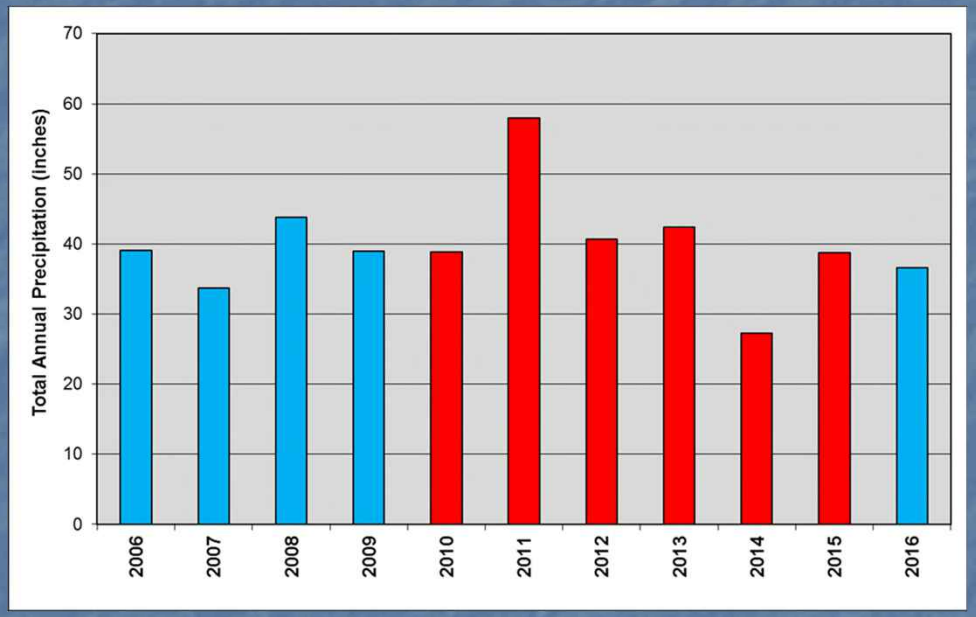
186 streams

8 TMDL Watersheds

447 subwatersheds

Baseline Condition

- Design precipitation period
  - Hourly precipitation data for a six-year period
  - Design period includes wet and dry years
- Applied to present day land uses
- Permitted discharges equal to permit limits



Annual precipitation totals for the Mid-Ohio Valley Regional Airport (WBAN 03804) weather station

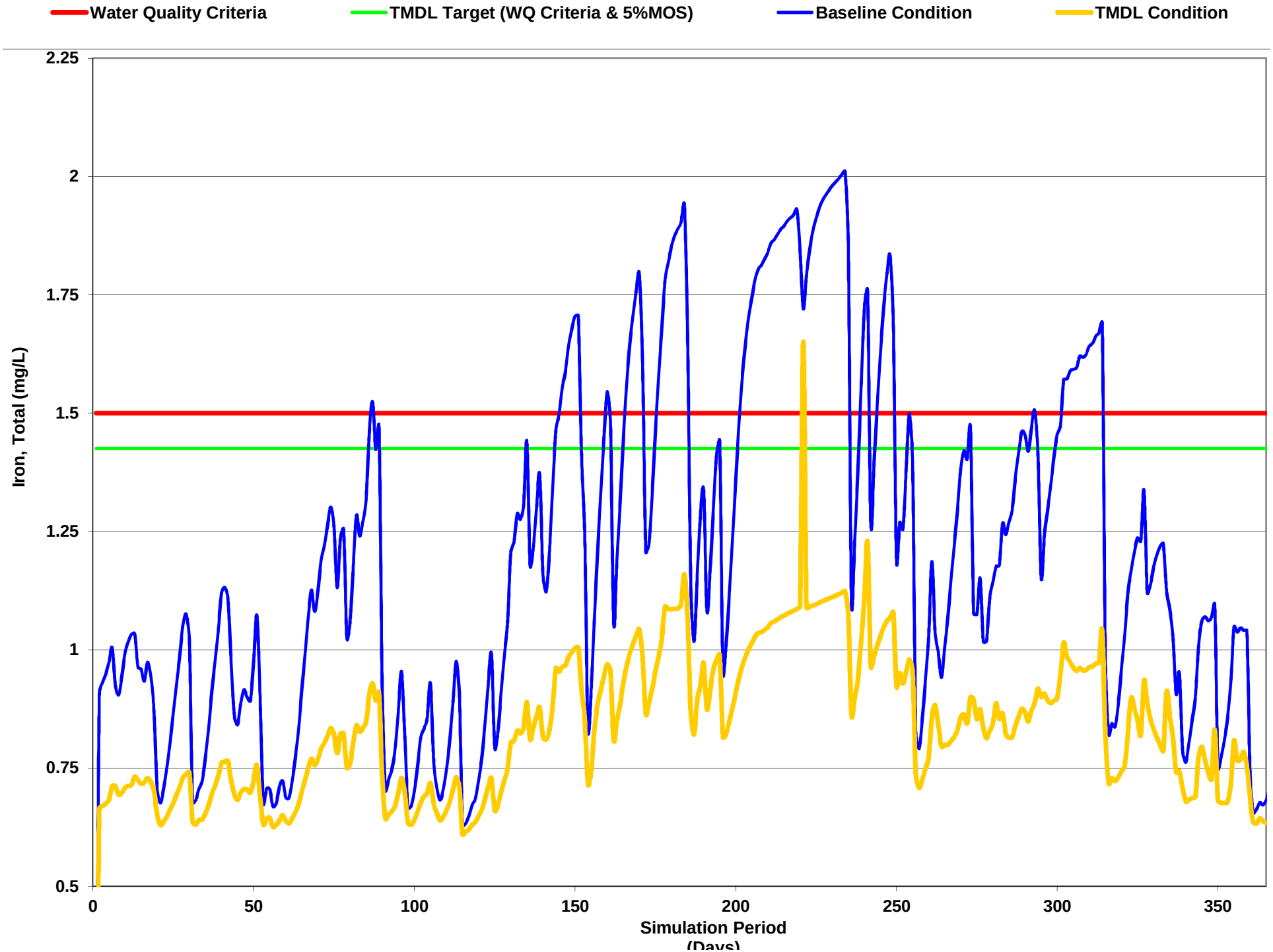
TMDL Condition

- Existing pollutant sources reduced such that TMDL endpoints are achieved in each modeled subwatershed recognizing
  - Criteria value, duration and exceedence frequency
  - Margin of safety

Margin of Safety

- Required component of TMDLs
- Explicit 5% used in most TMDLs
- TMDL endpoints for numeric criteria are 95% of criterion value

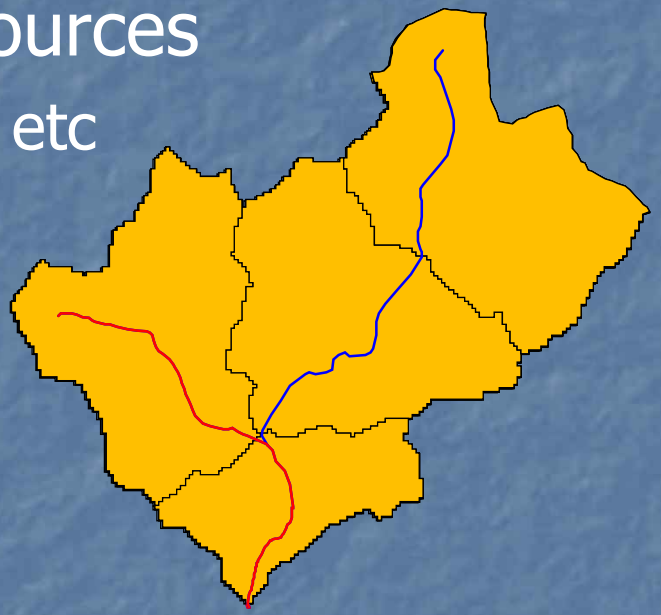
(ex.1.425 mg/l for 1.5 mg/l Fe criterion)


Water Quality Criteria
TMDL Target (WQ Criteria & 5%MOS)
Baseline Condition
TMDL Condition
Iron, Total (mg/L)
2.25
2
1.75
1.5
1.25
1
0.75
0.5
0
50
100
150
200
250
300
350
Simulation Period
(Days)

Allocation Methodology

- Universal Reduction of targeted sources
  - Streambank erosion, Failing Septics, etc
- Top-down approach
  - Headwater subwatersheds

  analyzed first
- Allocation strategy dictates order and magnitude of reduction
- If necessary, loads are reduced then routed to downstream subwatershed



Allocation Methodology

- WVDEP priorities:
  - Ensure criteria compliance at all sws outlets
  - Target the primary causative sources
- Strategy in general
  - Critical conditions must be considered
  - Sometimes only one significant source in sws
  - Always some amount of professional judgement

Fecal Coliform Sources

- Point sources
  - HAUs
  - Package Plants
  - Municipal Sewage Plant
- Nonpoint source
  - Failing septic systems and/or straight pipe illicit discharges
  - Stormwater runoff from urban/residential lands outside of MS4 areas
  - Stormwater runoff from agricultural lands

Fecal Coliform Strategy

- 100% reduction of all untreated sewage discharges (failing septics, straight pipes) as required by WV Bureau for Public Health regulations
- Sensitivity analysis to address severity of agricultural vs. urban/residential impacts

Iron Sources

- Streambank erosion
- Upland Sediment Sources
  - Barren land
  - Harvested/Burned Forest
  - Oil and Gas
  - Agriculture
  - Urban Residential outside MS4 areas
  - Roads
- Construction Stormwater General Permits

Iron Allocation Strategy

- Streambank erosion loadings reduced to best available in watershed
- Sediment sources set to iron loadings equivalent to 100 mg/l TSS
- Harvested Forest were reduced to loadings associated with Forest
- Point sources were at 1.5 mg/l end of pipe in impaired watersheds – no reductions needed

Iron Allocation Strategy continued

- Future growth for Construction Stormwater area initially allocated at 4% of undeveloped subwatershed area with some raised to 6% for operations currently permitted

Future Growth Highlights

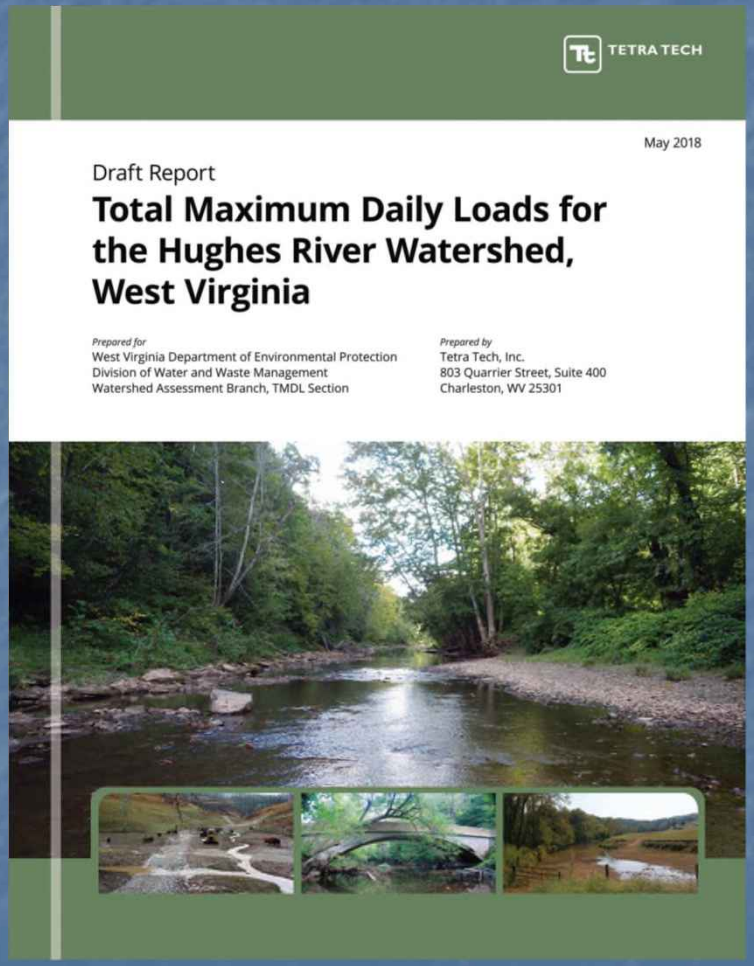
- New facility anywhere in watershed if meeting water quality criteria end of pipe
- Subwatershed-specific future growth allowances have been provided, where possible, for site registrations under the Construction Stormwater General Permit
- Further details on Future Growth can be found in Section 9.0 of the Draft report

Hughes River Watershed TMDL Path Forward

- Formal public comment period ends 6/22/2018
- Address comments, prepare final draft and submit to EPA for approval (final draft will include Response Summary)

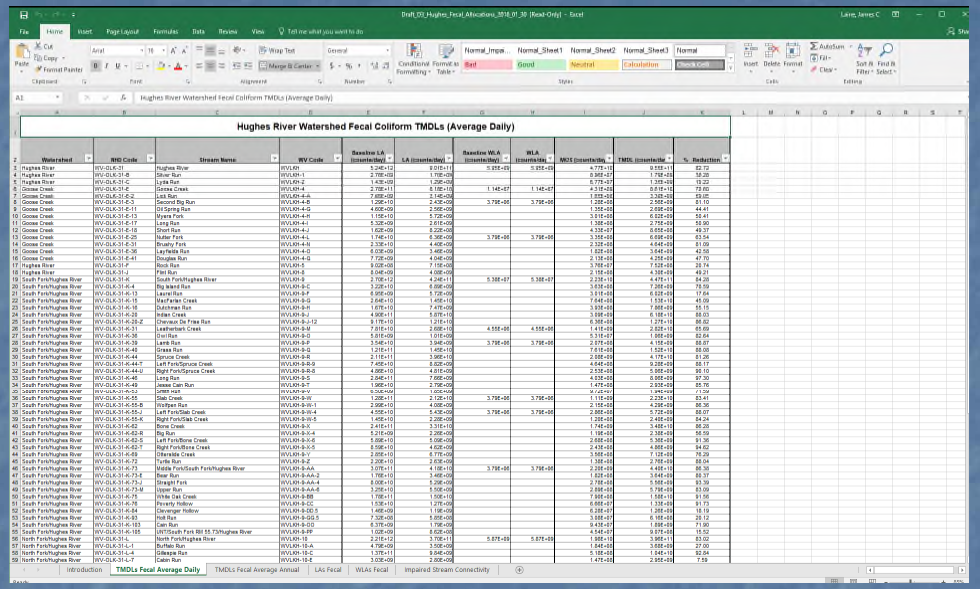
TMDL Products

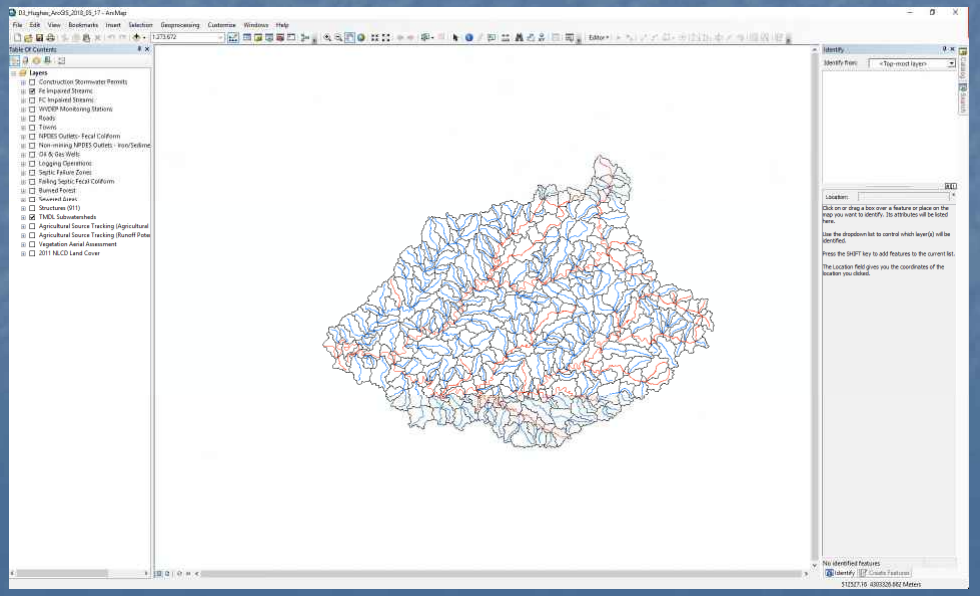
- Main Report – Overall description of the TMDL development process for the Hughes River watersheds
- Technical Report with detailed appendices



TMDL Products

- Allocation spreadsheets:
  - Fecal Coliform, Iron
  - TMDL for each stream, WLAs and LAs by SWS
  - Filterable
- GIS shapefiles, along with Technical Report and Appendices, available on CD





Public Comment

- Public Comment period ends **June 22, 2018**
- Documents may be reviewed/downloaded from DEP webpage: **www.dep.wv.gov/tmdl**
- CD available upon request – ***CD includes GIS Shapefiles and Technical Report***
- Comments should be submitted to Mindy Ramsey at **Mindy.S.Ramsey@wv.gov**
- Questions - contact Mindy Ramsey, Jim Laine, Mike McDaniel
- **(304) 926-0499 (Ext 1063, 1061, 1055)**
  - **Mindy.S.Ramsey@wv.gov**
  - **James.C.Laine@wv.gov**
  - **Michael.L.McDaniel@wv.gov**

Spreadsheet/GIS Demonstration

Discussion/Questions