

# UMRA-Watershed Group Meeting

## Specific Conductivity Trends in the Monongahela River Watershed

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Pittsburgh District

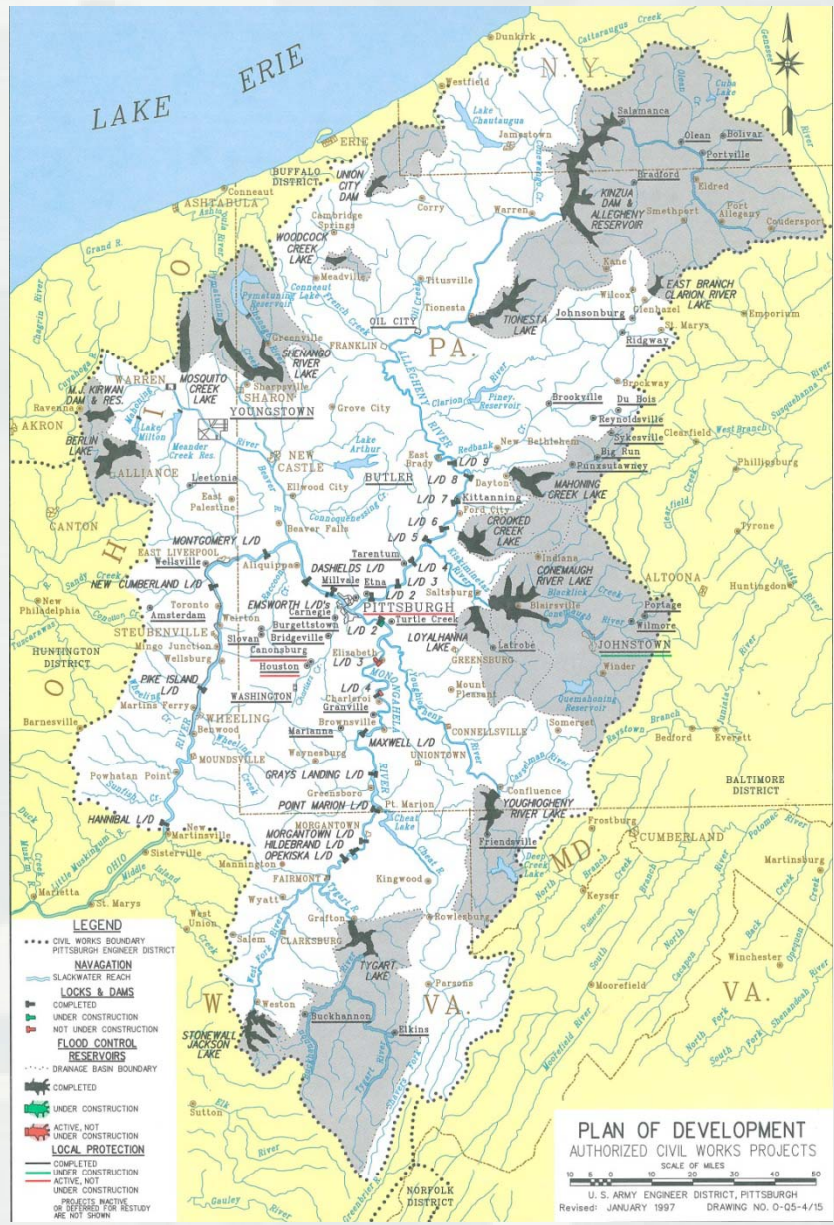
5 January 2011



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# Pittsburgh District



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# Water Quality Mission

Operate reservoir projects for optimum water quality benefits to restore, maintain, and improve ambient chemical, physical, and biological integrity of the surface waters of the upper Ohio River drainage basin



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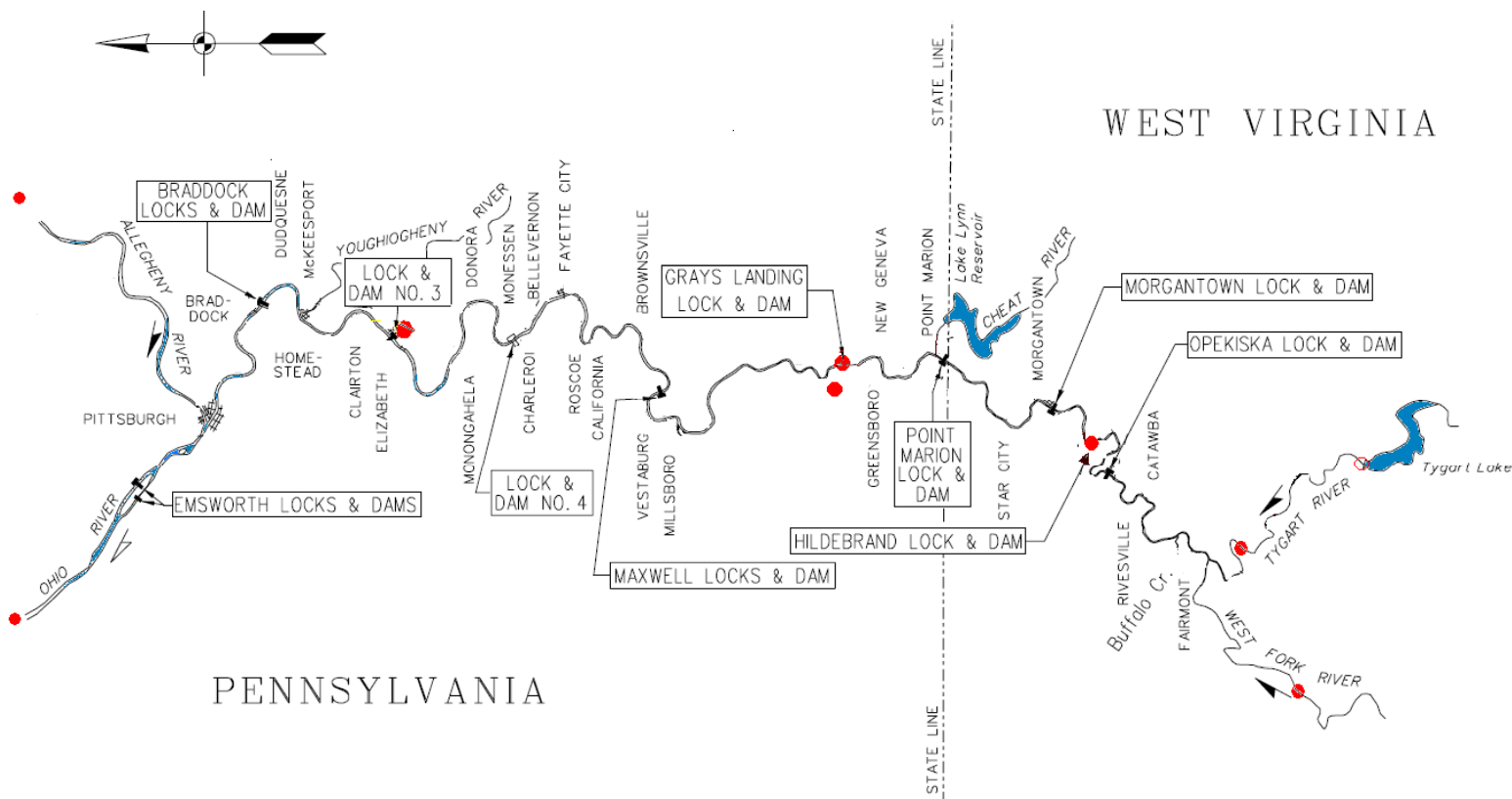
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# Monongahela River Continuous, Real-time, Water Quality Monitoring Sites

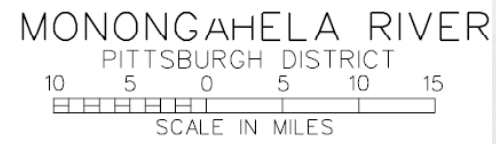
**Real-time** continuously recording monitors: DO, Conductivity, pH, & water temperature ([www.waterdata.gov](http://www.waterdata.gov))

- **Tygart River (Mon River Mile 128.7)**
  - ▶ Tygart Dam Outflow, Mile 23.3 (Advanced Hydro Solutions)
  - ▶ Tygart River @ Colfax, WV, Mile 6.3 (WV DEP)
- **West Fork River (Mon River Mile 128.7)**
  - ▶ West Fork River at Stonewall Jackson Dam, Mile 74.5
  - ▶ West Fork River @ Enterprise, WV, Mile 12.0 (WV DEP)
- **Mon River**
  - ▶ Hildebrand L/D, Mile 108
  - ▶ Point Marion L/D, Mile 92.8 (WV DEP)
  - ▶ **Dunkard Creek @ Shannopin, PA (Mon River Mile 87.2)** (WV DEP)
  - ▶ Elizabeth PA, Mile 23.8 (PA DEP)
- **Youghiogheny River (Mon River Mile 15.5)**
  - ▶ Youghiogheny Dam outflow, mile 74.3
  - ▶ Casselman River @ Markelton, PA, mile 15.2, mile 73.3
  - ▶ Youghiogheny River at Confluence, PA, mile 72.8
  - ▶ Youghiogheny River @ Connellsville, PA, mile 44.7 (Westmoreland Water)
  - ▶ Youghiogheny River @ Sutersville, PA, mile 15.3 (PA DEP)





# Mon River Basin Real-time WQ Monitoring Stations

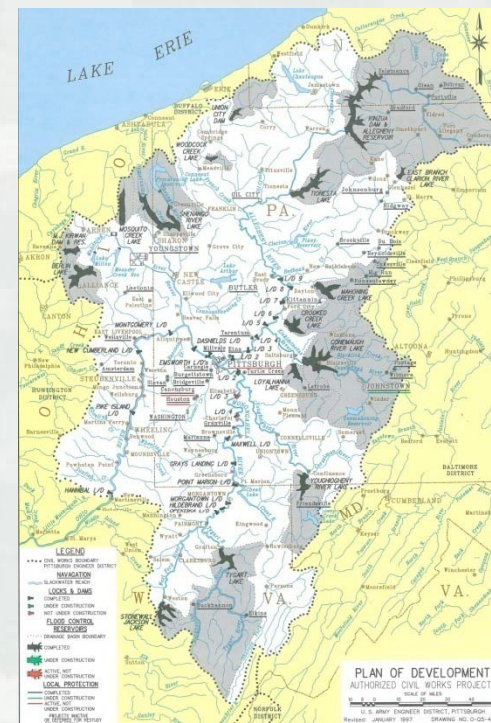


# WQ Problems

- Mine drainage
- Traditional gas drilling
- Industrial & municipal pollution
- Land use
- Dramatic increase in Marcellus Shale gas development
  - Surface disturbance, impacts on forest connectivity, erosion and turbidity
  - Fracwater disposal & increasing TDS
  - Increasing water withdrawals
  - Lost / fragmented forest



# Marcellus Shale Distribution & Pittsburgh District



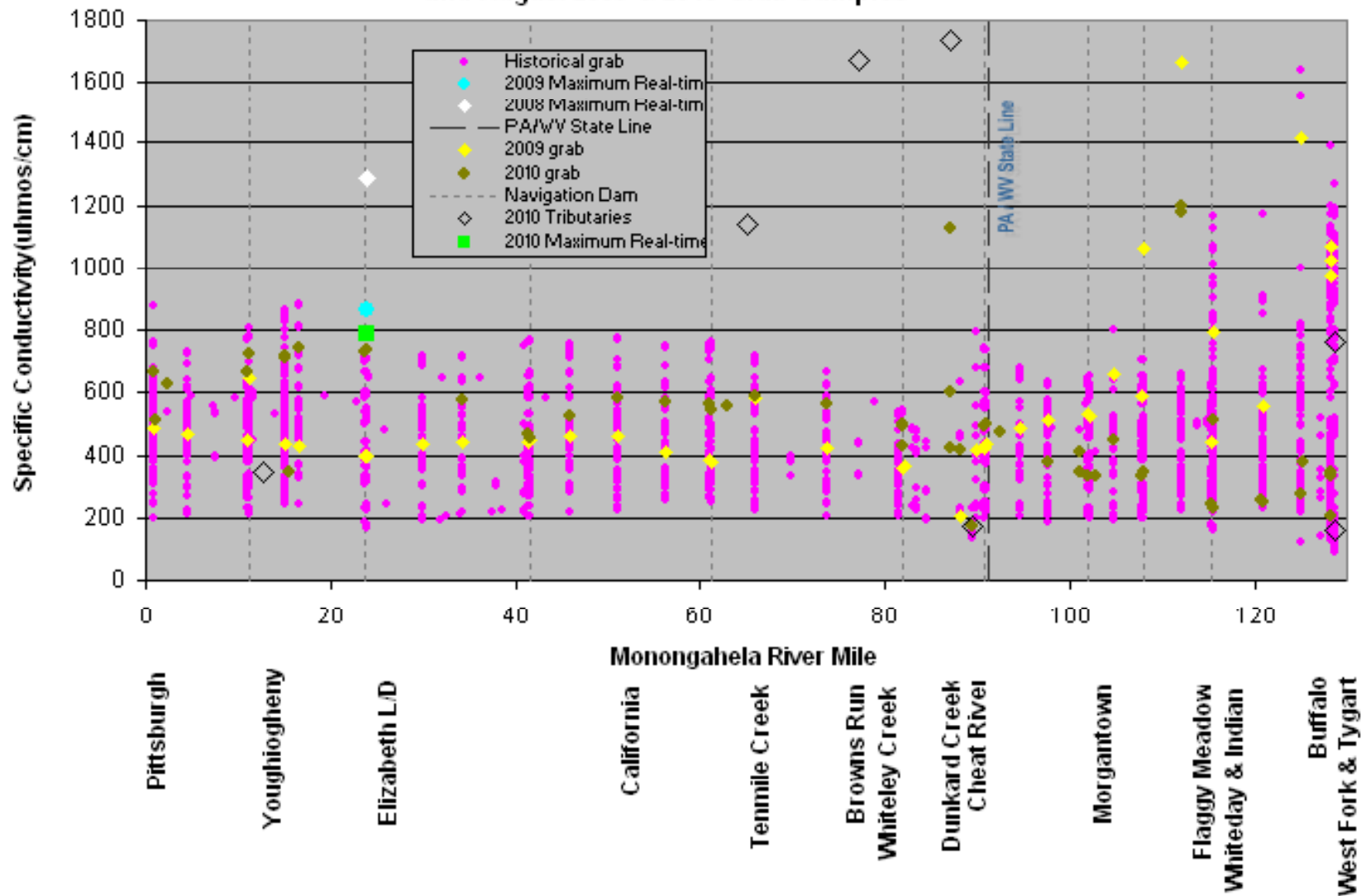
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## What the Data Show

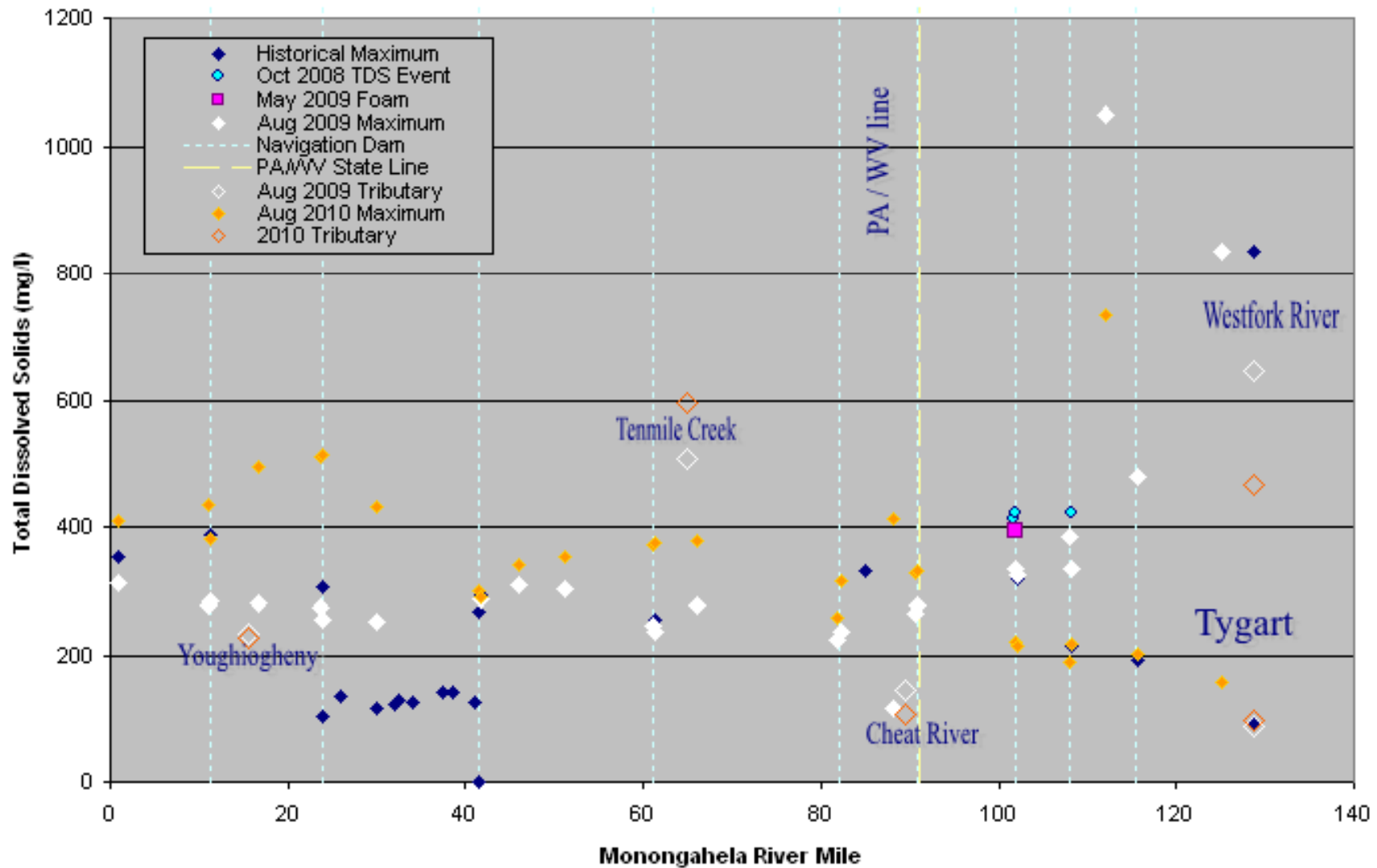
- Low Specific Conductivity in headwater reservoirs and historical trend towards improvement. However, Tygart Lake outflow shows higher levels since 2008.
- Tygart River at Colfax, WV (Mi 6.3): Conductivity levels spike on Fridays and Saturdays independent of flow.
- Since 2008, Mon River @ Elizabeth (Mi 24), specific conductivity levels have exceed historical maximums during low flow periods.
- Inverse relationship between flow and conductivity @ Elizabeth PA, & historical maximum levels are exceeded when flow < 2000 cfs.
- Mon River Conductivity levels were average during our August 2009 & 2010 surveys, except in the upper pools during both years, where TDS, conductivity, and Na were 2X as high as the historical maximums, and the lower few pools in 2010, where conductivities were close to the historical maximums.
- Dunkard Creek (Mi 87) conductivity was extremely elevated before and during the Sept 2009 fish kill, and impacts were observable at Elizabeth (Mi 24).
- Mon River foam contains exceptionally high metal concentrations (Fe, Mn, Al, Ba, Sr).
- The West Fork River @ Enterprise (Mi 12.0) and the Youghiogheny River @ Sutersville (mi 15.3) conductivity values ran close to historical maximums during 2009 and 2010, a normal and a dry water year, respectively. In Feb 2010, Sutersville conductivity levels exceeded historical maximum levels.



**Monongahela River Specific Conductivity**  
**"Worse Case" Summer Season For Period of Record (1974 - 2006),**  
**Maximum Specific Conductivity Recorded at @ Elizabeth PA 2008- 2010,**  
**and August 2009 & 2010 Grab Samples**



**Monongahela River and Major Tributaries Total Dissolved Solids  
 Maximum Summer Season 1975 - 2004, Oct 2008 Grab,  
 May 2009 Foam, and Maximum August 2009 & 2010 Grab**



# Concerns

- Increasing TDS loads and water withdrawals interfere with / reduce benefits of authorized Corps reservoir project purposes (water quality, fish & wildlife, water supply)
  - ▶ Withdrawal of low TDS water for Marcellus hydrofracing from reservoir inflows
    - loss of dilution
    - interference with reservoir operation schedules
    - loss of highest quality streams/biodiversity
  - ▶ Withdrawal of augmented flow Congressionally designated for water quality
  - ▶ Disposal of treated/untreated Marcellus fracwater (brine) or other sources of high TDS into surface waters or on land
- Resource extraction degrading streams in areas not traditionally impacted (reservoir tributaries, headwaters)
- Mon River TDS assimilative capacity has been reached. Similar WQ problems developing in other Upper Ohio watersheds (Allegheny, Youghiogheny, Kiskiminetas, etc.)
- Corps Mon River basin reservoirs have little or no capacity to release enough water to meet PA drinking water TDS criteria during low flow periods
- Marcellus drilling (TDS) projected to increase dramatically
- Potential direct impacts to Corps lands, waters, and easements.



# Recommendations

- Adequate regulation of water withdrawals & point and non point source pollution, ensuring adoption and enforcement of appropriate standards addressing withdrawals and discharge, treatment, and/ or storage of fracwater by watershed.
  - ▶ Sustainable water withdrawals to assure protection of water quality & aquatic life (biologically diverse headwater tributaries)
  - ▶ Seasonal TDS TMDLs for the Mon River basin
  - ▶ Ambient end of pipe treatment of fracwater & other high TDS pollution sources
- Protection of Congressionally authorized reservoir augmented flow (water quality storage) and the sources of reservoir storage (inflow tributaries)
- Continue agency coordination, engage stakeholders, share information
- Upper Ohio River Basin Commission for Water Resource Management (withdrawals, interbasin water transfers, TDS TMDL's, WQ Criteria)

