

TMDL Developments

New TMDL Studies
Highlights of on-going TMDLs
Future Steps

New studies in Hangman

- Review

- Phosphorus effort didn't address DO & pH impairments – may have role as limiting nutrient
- Only focused on meeting P allocation at mouth
- Demonstrated need for better background P levels
- Demonstrated need for better boundary conditions

Dissolved Oxygen & pH Listings

- 2004 303(d) listings
 - Hangman Creek at Stateline (DO)
 - Hangman Creek at Bradshaw Road (DO)
 - Hangman Creek at Mouth (pH)
 - Rock Creek at Jackson Road (DO)

Dissolved Oxygen & pH Listings

- 2008 Category 5 & 2 listings
 - Spangle Creek (pH)
 - Hangman Creek at Mouth (DO)
 - Hangman Creek at Duncan (pH & DO)
 - Cove Creek (DO & pH)
 - Hangman Creek at Roberts Road (DO)
 - Hangman Creek at Tekoa (DO)
 - Hangman Creek at Stateline (pH)
 - Hangman Creek at RM 21.4 (pH)
 - Rock Creek at Rockford (pH)
 - Rock Creek at Mouth (pH)
 - Little Hangman Creek (DO)
 - Marshall Creek at Mouth (DO & pH)
 - Marshall Creek at McKenzie Road (DO)

Study Plan Development

- Synoptic surveys in 2008 & 2009
- Continuous monitoring at 4 border sites
- Reference condition monitoring
- Storm event monitoring

Study Goals and Objectives

- Goals:
 - Complete DO & pH TMDLs for Hangman Creek
 - Integrate phosphorus and nitrogen load and wasteload allocations with Spokane River TMDL
- Objectives:
 - Confirm 303(d) and Category 5 & 2 listings through diurnal sampling and nutrient sample collection
 - Estimate time-of-travel for water balance & transport
 - Use synoptic sampling to estimate drivers and geographic scope of pH and DO problems
 - Collect additional data:
 - Washington/Idaho border (Rock, Little Hangman & Hangman)
 - WWTP effluent
 - Reference sites in 4 Ecoregions
 - Run-off events

Synoptic Surveys

- Time of Travel study
 - Dye or channel measurement calculations
- 48-hr DO, pH & temperature monitoring
- Nutrient sampling upstream to downstream
- Periphyton sampling & macrophyte estimates
- Discharge measurements

Border & Reference Surveys

- Washington/Idaho Border Monitoring
 - Little Hangman, Hangman, Rock Creek branches
 - Monthly Oct. 2008 – Sept. 2009
 - Bimonthly March – June
 - Nutrients, TSS, discharge (continuous Q if possible)
 - Foundation for run-off event monitoring
 - 1 Winter, 2-3 Spring
 - Include key sites and WWTPs/storm drains downstream
- Reference Site Monitoring
 - At least one in each of four ecoregions: best potential or minimal impact
 - Monthly and part of run-off events
 - 48-hr DO, pH & temperature monitoring
 - Nutrients, TSS,
 - Periphyton sampling & macrophyte estimates
 - Discharge measurements

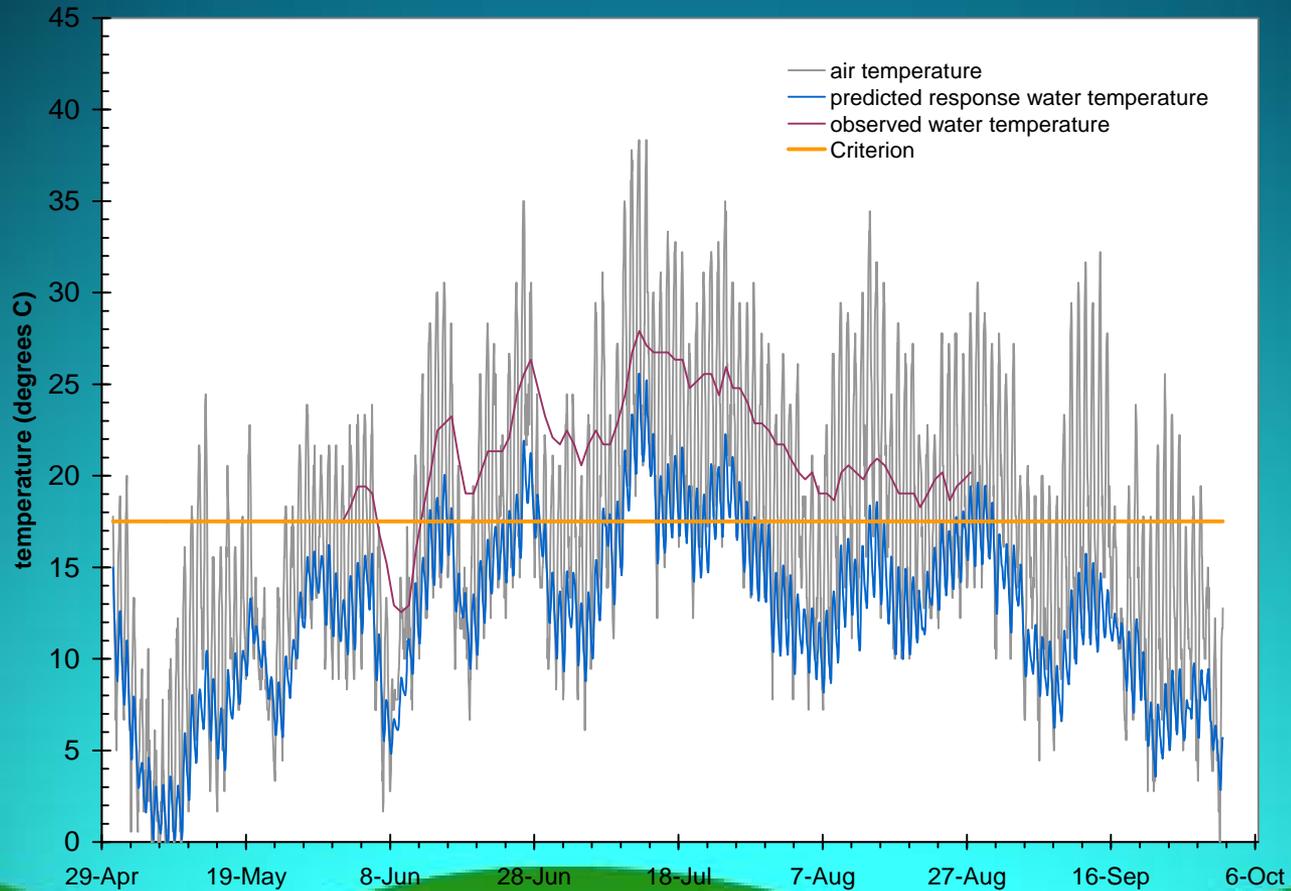
Highlights of Current TMDL

- Fecal coliform bacteria
 - Sites need between 0 – 85% reduction
 - High variability in loading – no chronic sources
 - Storm events increase violations
 - WWTTPs limits will be 100 cfu/100mL monthly geometric mean; 200 cfu/100mL weekly max
 - Stormwater – 72% reduction through BMPs; require monitoring

Highlights - Continued

- Temperature
 - Based on system potential shade
 - Need to increase shading 21-50% to reach system potential
 - Streams naturally warmer than criteria June – August
 - Tekoa & Spangle limits based on natural conditions estimates (June-August)
 - If other WWTPs discharge will need to meet these same limits

Temperature



June			July			August		
Day	°C	7DADM	Day	°C	7DADM	Day	°C	7DADM
6/11	14.2		7/7	18.2	21.5	8/9	16.2	
6/12	15.5		7/8	17.9	22.1	8/10	16.6	
6/13	18.1		7/9	18.6	22.3	8/11	15.4	
6/14	18.8	17.1	7/10	21.4	22.6	8/12	16.2	17.0
6/15	20.1		7/11	23.4	22.6	8/13	18.4	
6/16	18.2		7/12	25.6	22.6	8/14	18.6	
6/17	14.7		7/13	25.2	22.6	8/15	17.4	
			7/14	22.3	22.6			
6/23	17.6		7/15	20.0	22.6	8/23	17.5	
6/24	18.1		7/16	20.6	22.6	8/24	17.0	
6/25	19.0		7/17	21.1	22.6	8/25	17.7	
6/26	21.9	19.2	7/18	21.6	22.3	8/26	18.1	18.4
6/27	21.2		7/19	19.5	21.5	8/27	19.4	
6/28	19.0		7/20	19.3	20.6	8/28	19.6	
6/29	17.4		7/21	19.0	20.2	8/29	19.4	
			7/22	20.6	20.3			
			7/23	20.5	20.3			
			7/24	22.3	20.3			
			7/25	21.0	20.3			
			7/26	19.7	20.3			
			7/27	18.6	20.2			
			7/28	17.7	20.1			
Average		18.2			21.5			17.7

Highlights - Continued

- Turbidity/Total Suspended Solids
 - Turbidity listing not ‘technically’ appropriate
 - Used Best Potential Scenario as Loading Capacity
 - Used WARMF model; analysis similar to P
 - Estimate that between 8 – 26 percent of the current load of suspended sediment can be reduced in sub-watersheds
 - Biggest reductions come from conversion to ag conservation practices and controlling streambank erosion.
 - Current WWTP limits are adequate

Where we go from here

- Committee reviews and provides feedback
- Ecology & SCCD incorporate changes
- Agree to begin public comment process
- Minimum 30 day public comment period
- Revise in response to comments
- Submit to EPA for approval
- Develop the Implementation Plan

Publish Phosphorus Modeling and Findings in separate technical report