

Request to Renew Sni-A-Bar Creek Site-Specific Dissolved Oxygen Criteria

City of Blue Springs, MO



MDNR Water Protection Forum
December 11, 2018

Project Background

- Planned Expansion of Treatment Facility
- Data Document Low Dissolved Oxygen (DO) Conditions
 - West Fork Sni-A-Bar Creek 2006 TMDL
 - Sni-A-Bar Creek 2006 303(d) Listing
- City Completes Sni-A-Bar Creek Stream Evaluation 2006 - 2008



Site-Specific DO Criteria Development Approach

- Water Quality Modeling (Qual2K) to Identify the **Highest Attainable Water Quality Condition** in the Receiving Stream
- Reference Stream DO Investigations to Identify Conditions that Support **Aquatic Life Beneficial Use** in the Ecoregion

Sni-A-Bar Creek Stream Evaluation Project Report



Prepared For:

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&

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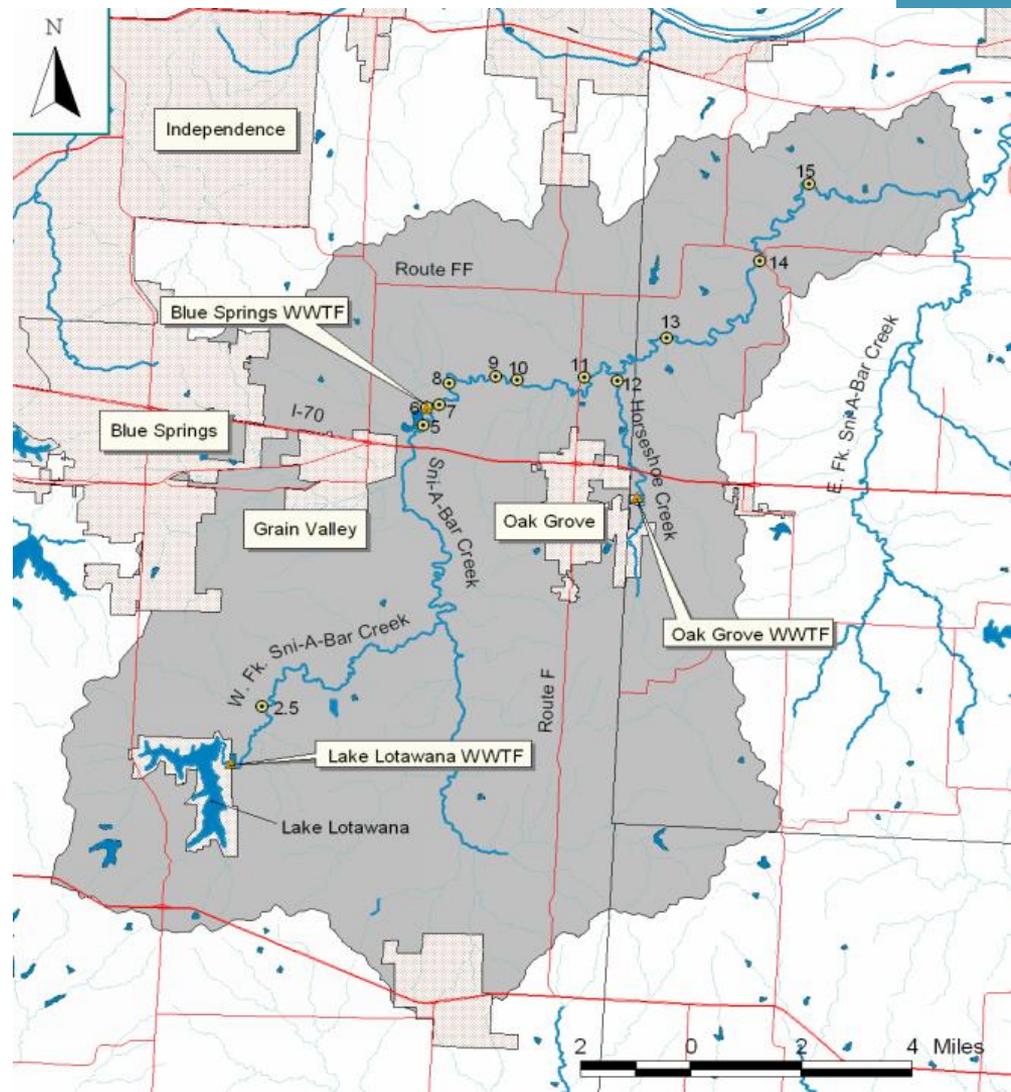
Prepared by:

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Columbia, MO 65201

March 2006
Revised January 2008
MEC Project Number 5067.01

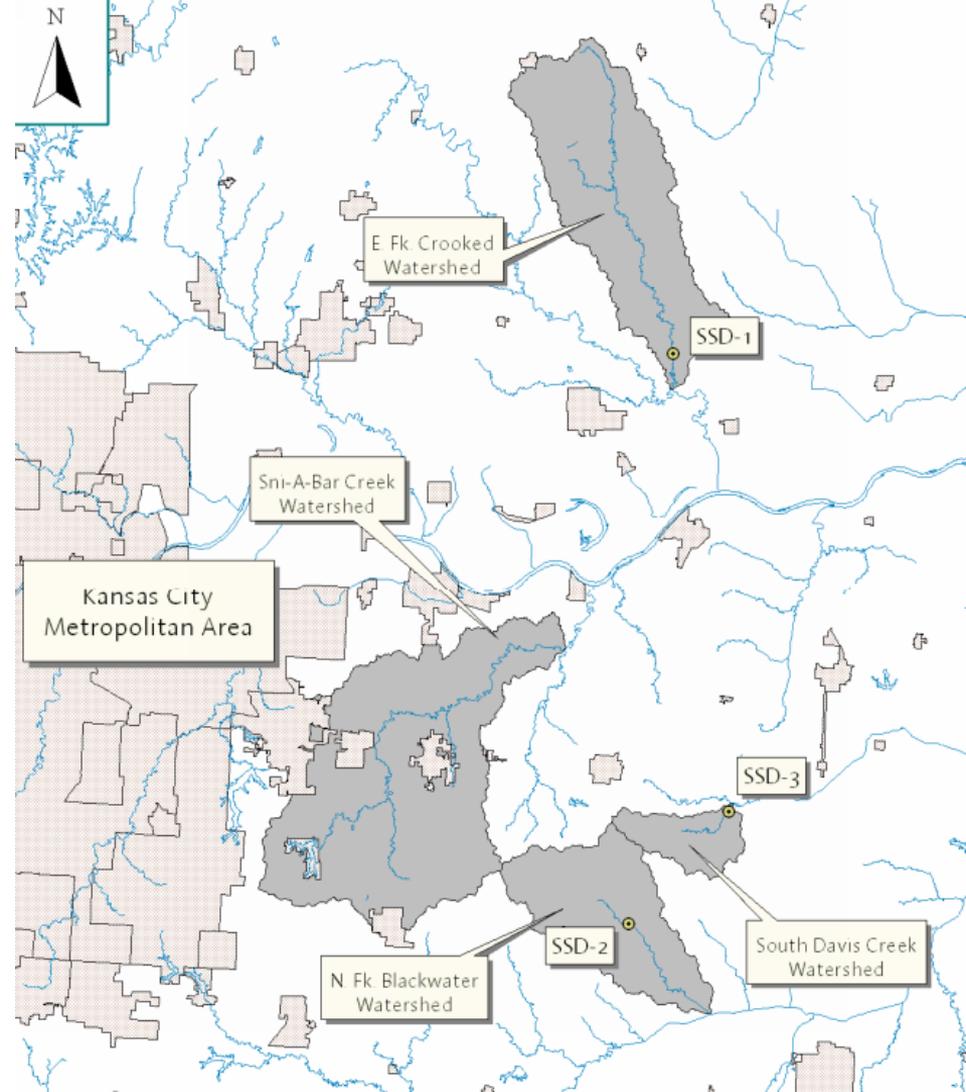
Monitoring to Support Model Development

- 30 Miles of West Fork Sni-A-Bar and Sni-A-Bar Creeks
- Travel Time/Dye Studies (2)
- 48-Hour WLA Studies (2)
 - Continuous Monitoring (8)
 - Water Quality Monitoring (12)



Reference Stream Monitoring

- Three Reference Streams Selected
- Approximately Eight Weeks Continuous DO, Temperature, Conductivity



Approved Site-Specific Dissolved Oxygen Criteria

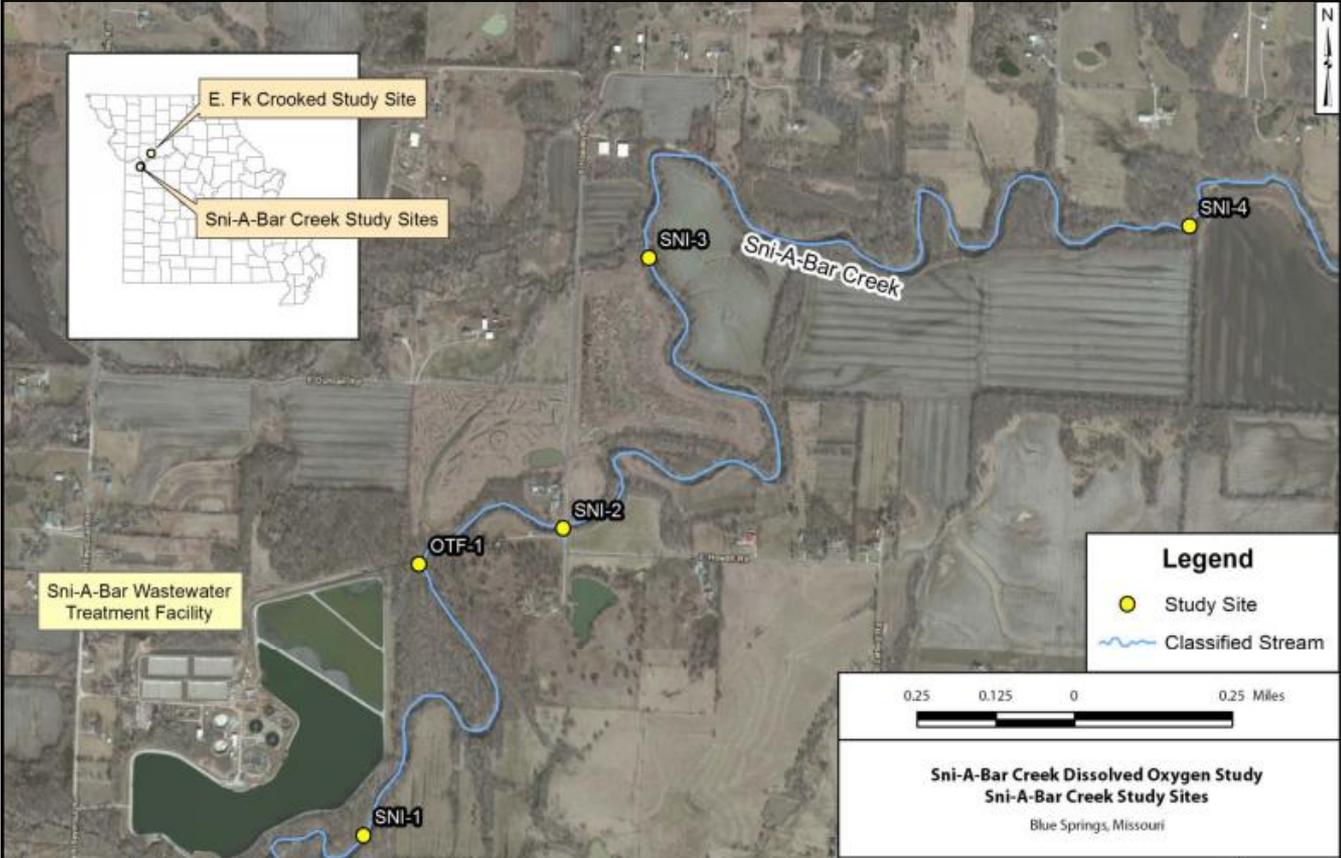
Parameter:	Dissolved Oxygen	Daily Average Criterion*	4.4 mg/L
Waterbody:	Sni-a-Bar Creek	Daily average dissolved oxygen concentrations shall not fall below 4.4 mg/L between July 1 and September 30 as measured by a minimum of four samples collected within a 24-hour period. All measurements shall be spaced a minimum of 5 hours apart.	
Season:	July – September		
Hydrology:	Baseflow Conditions		
County:	Jackson	Daily Minimum Criterion*	4.0 mg/L
Miles:	5.0	Daily minimum dissolved oxygen concentration shall not fall below 4.0 mg/L between July 1 and September 30.	
From:	Confluence with Horseshoe Creek, Section 21, T49N, R29W		
To:	Entry of tributary carrying discharge from Blue Springs Sni-a-Bar wastewater treatment plant, Section 35, T49N, R30W		
*These criteria shall expire on October 31, 2014. After October 31, 2014, the criteria shall be as stated in Table A.			

2009 EPA Approval and Follow Up Monitoring Activities

- 2009 EPA Approved Time-Limited Site-Specific Criteria
 - Provide Additional Information about the Aquatic Community
 - Demonstrate the Level of Sediment Oxygen Demand (SOD) Observed in Sni-A-Bar Creek Represents a “Naturally Occurring Condition”

- 2013 Field Activities (Sni-A-Bar Creek, East Fork Crooked River)
 - Continuous DO – July through October
 - SOD Measurements
 - Habitat Assessments
 - Fall Macroinvertebrate Collections
 - Summer Fish Collections

2013 Sni-A-Bar Monitoring Sites

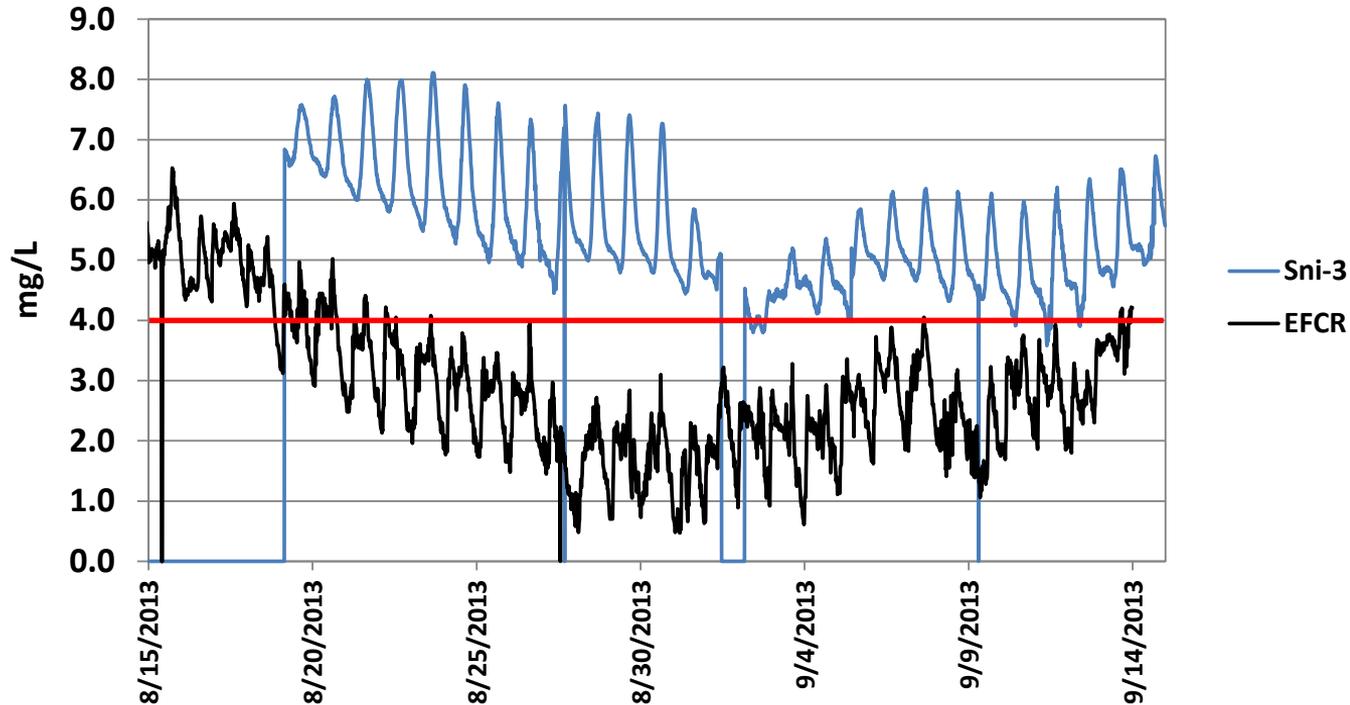


2013 DO Data Demonstrate that the Site-Specific Criteria were Attained

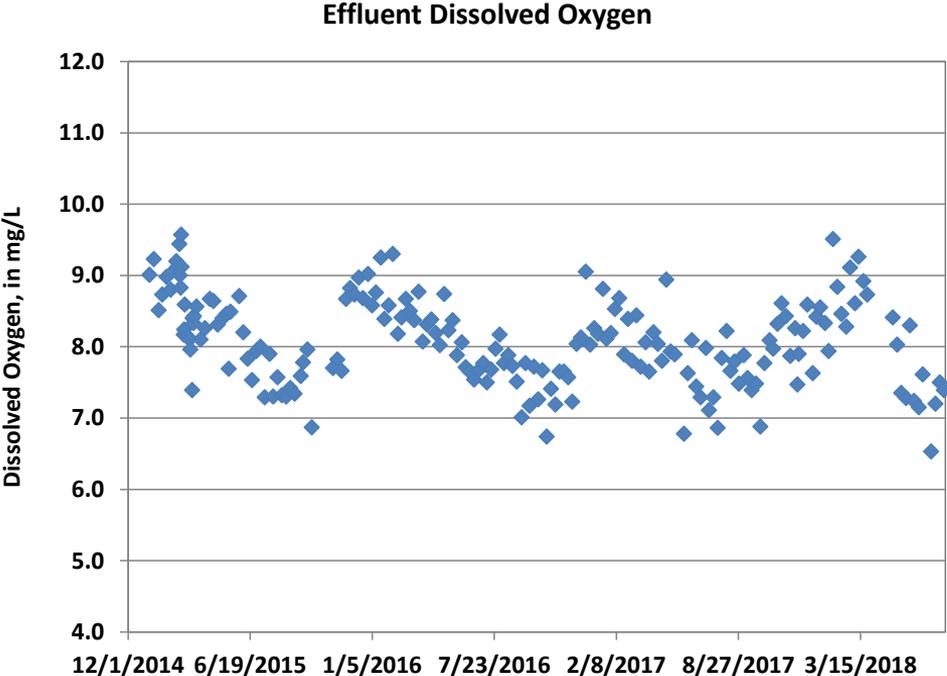
Dissolved Oxygen Compliance Assessment <i>(July through October, Baseflow Only)</i>			
DO Metric	EFCR (Reference)	SNI-1 (US WWTP)	DS WWTP (3 Sites)
10 th Percentile Daily Minimum	0.9	4.0	4.3 (4.0 Criterion)
10 th Percentile Daily Average	2.0	4.9	5.0 (4.4 Criterion)
Days of Data	75	44	73

Sni-A-Bar Creek DO Concentrations Were Higher than the Those in the Biocriteria Reference Stream

Diurnal Dissolved Oxygen Comparison
August 15 - September 15



The WWTP Produces a High Quality Effluent



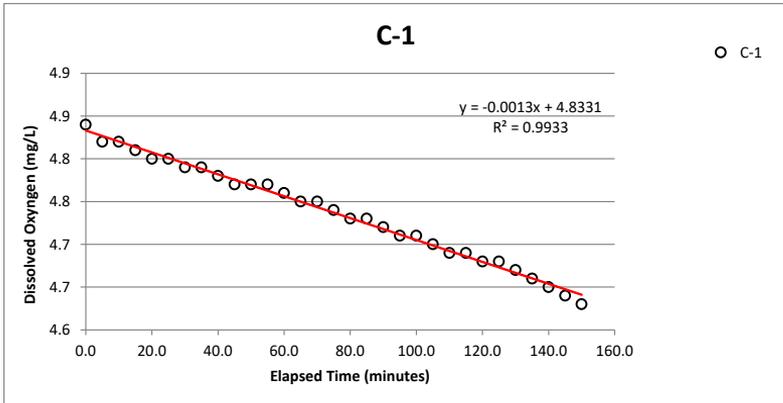
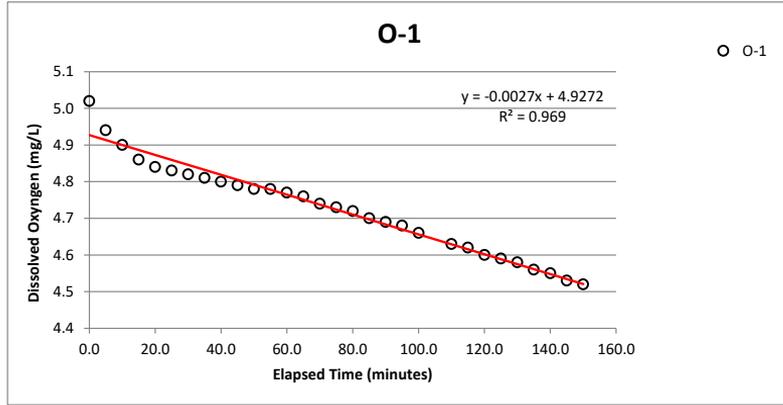
January 2015 – July 2018		
Ammonia (n=375)	Maximum	Average
Summer	2.2 mg/L	0.39 mg/L
Winter	3.5 mg/L	0.34 mg/L
BOD (n=340)	Maximum	Average
Summer	12.5 mg/L	3.6 mg/L
Winter	7.2 mg/L	3.7 mg/L

WWTP Meeting Permit Limits

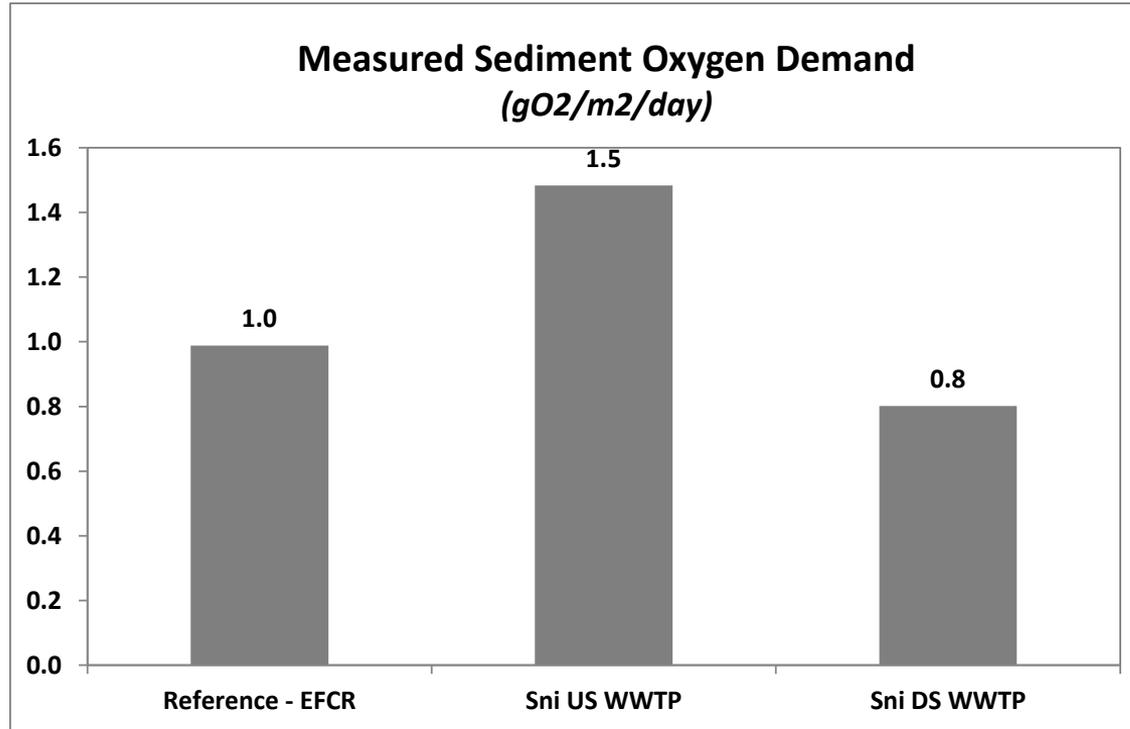
Recent Instream Monitoring Data Demonstrate the Site-Specific Targets are being Achieved

Summer Dissolved Oxygen (2015 – 2018)		
Site	Average	Minimum
Site S1 Upstream (n=8)	5.9 mg/L	3.6 mg/L
S2 1/4 mile Downstream (n=8)	6.4 mg/L	5.5 mg/L

Sediment Oxygen Demand Collection Methods



Sediment Oxygen Demand Levels Comparable Across Monitoring Sites

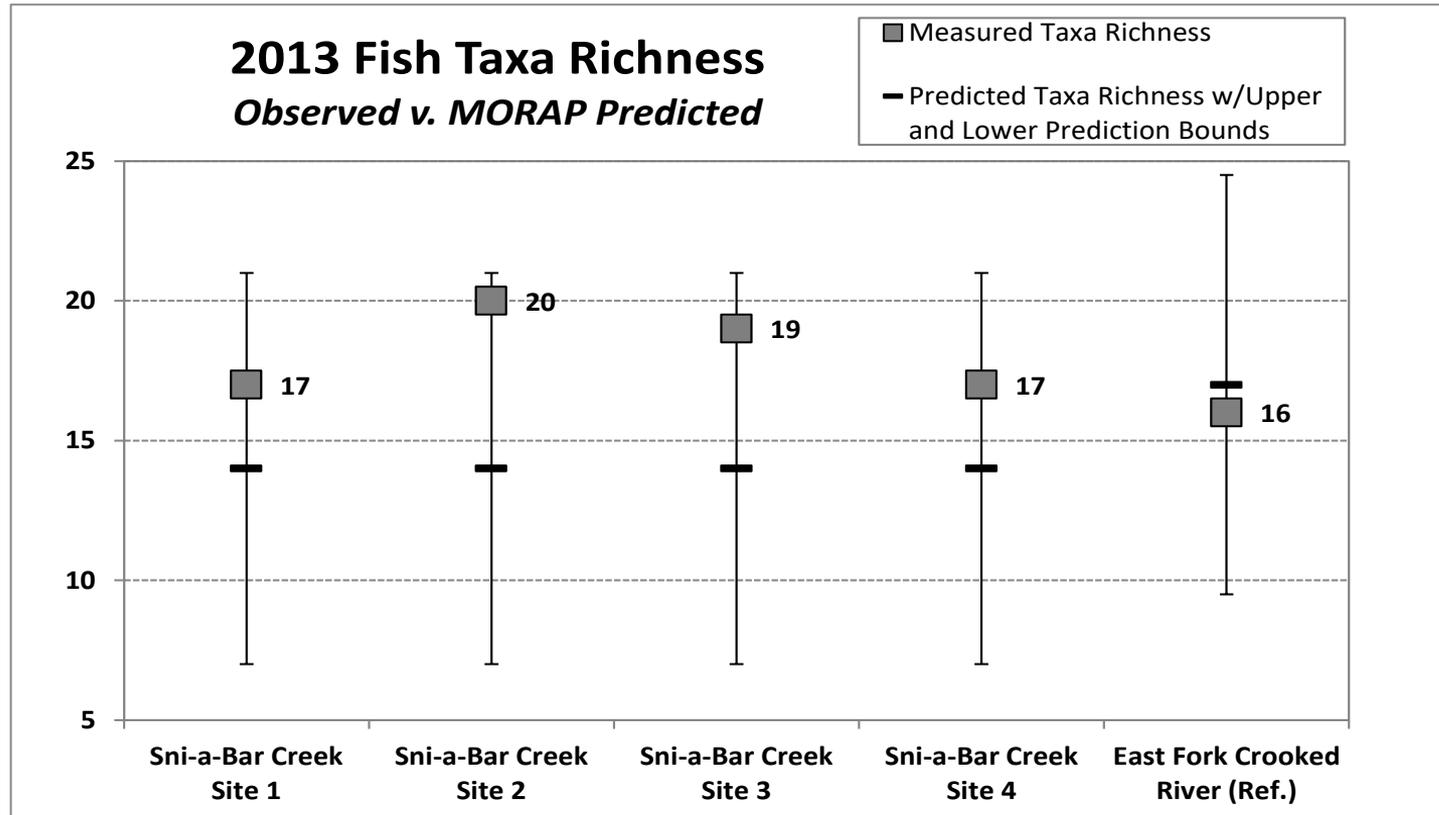


Sni-A-Bar Creek SOD Similar to Reference Stream

Macroinvertebrate Data Indicate Aquatic Life Use is Attained

Fall 2013 Macroinvertebrate Sampling Results					
Stream	East Fork Crooked River	Sni-A-Bar Creek			
Site Location	Site 1 Reference	Site 1 Upstream	Site 2 Downstream	Site 3 Downstream	Site 4 Downstream
MSCI Score	18	16	20	18	20
MSCI Interpretation	Fully Attains Aquatic Life Use	Fully Attaining Aquatic Life Use			

Fish Data Indicate Aquatic Life Use is Attained



Sni-A-Bar Creek Site-Specific DO Criteria Renewal Request Summary

- Original Site-Specific Criteria Expired in 2014
- Items Requested by EPA have been Addressed
- 2013 Data Demonstrate
 - DO Targets were Attained
 - SOD were Comparable to Background and Reference*
 - Aquatic Life Beneficial Uses were Attained*
- Request to Renew Original Site-Specific Criteria Permanently
Going Forward

