

# **Continuous Instream Monitoring: Responding to Increasing Deep Well Activity**

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# Purpose and Scope

Purpose and scope is unique – results in different methodologies

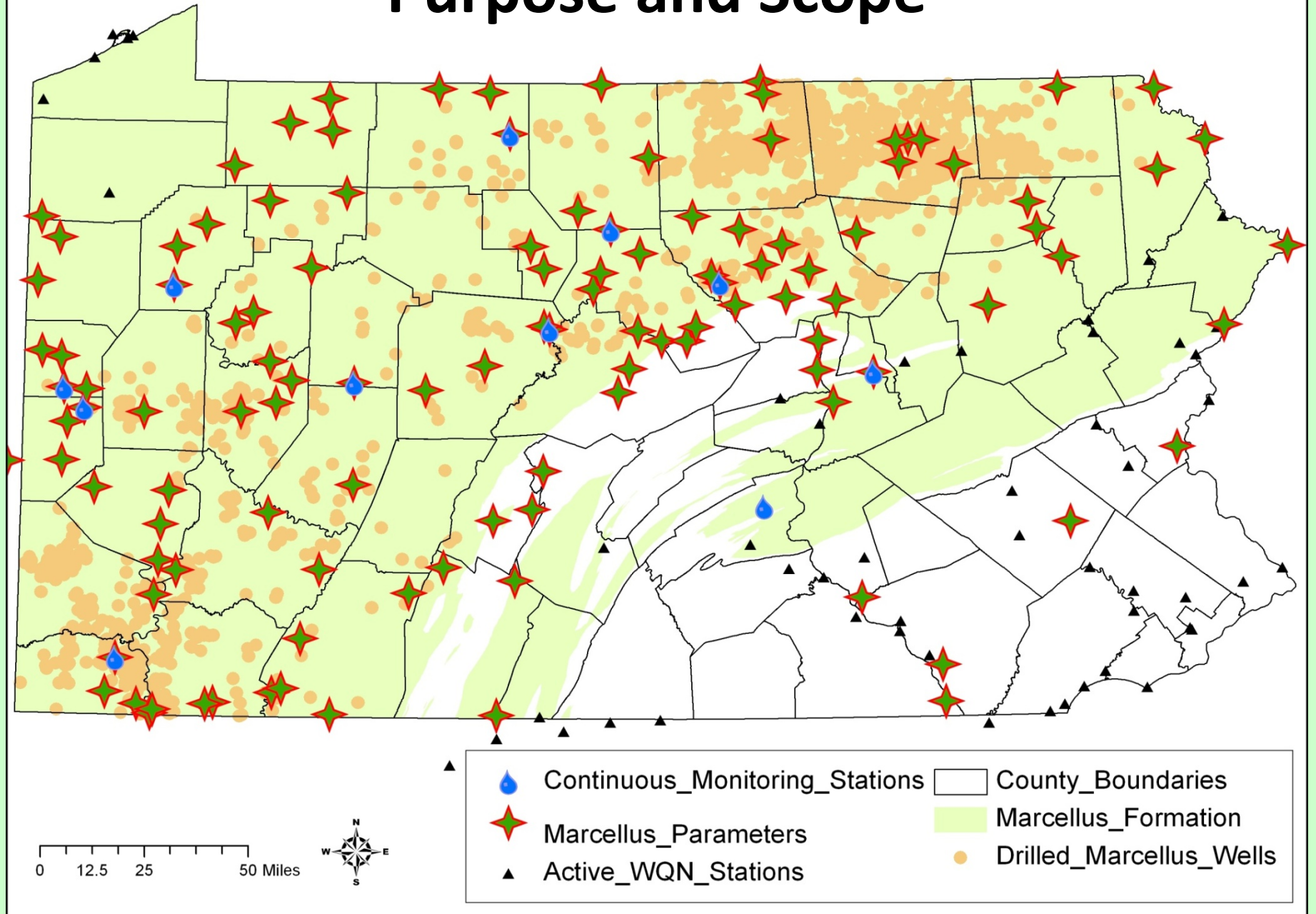
## **Objectives:**

- Measure baseline stream parameters in areas with deep well activity.
- Discover potential violations to water quality criteria.
- Data collection for Antidegradation surveys

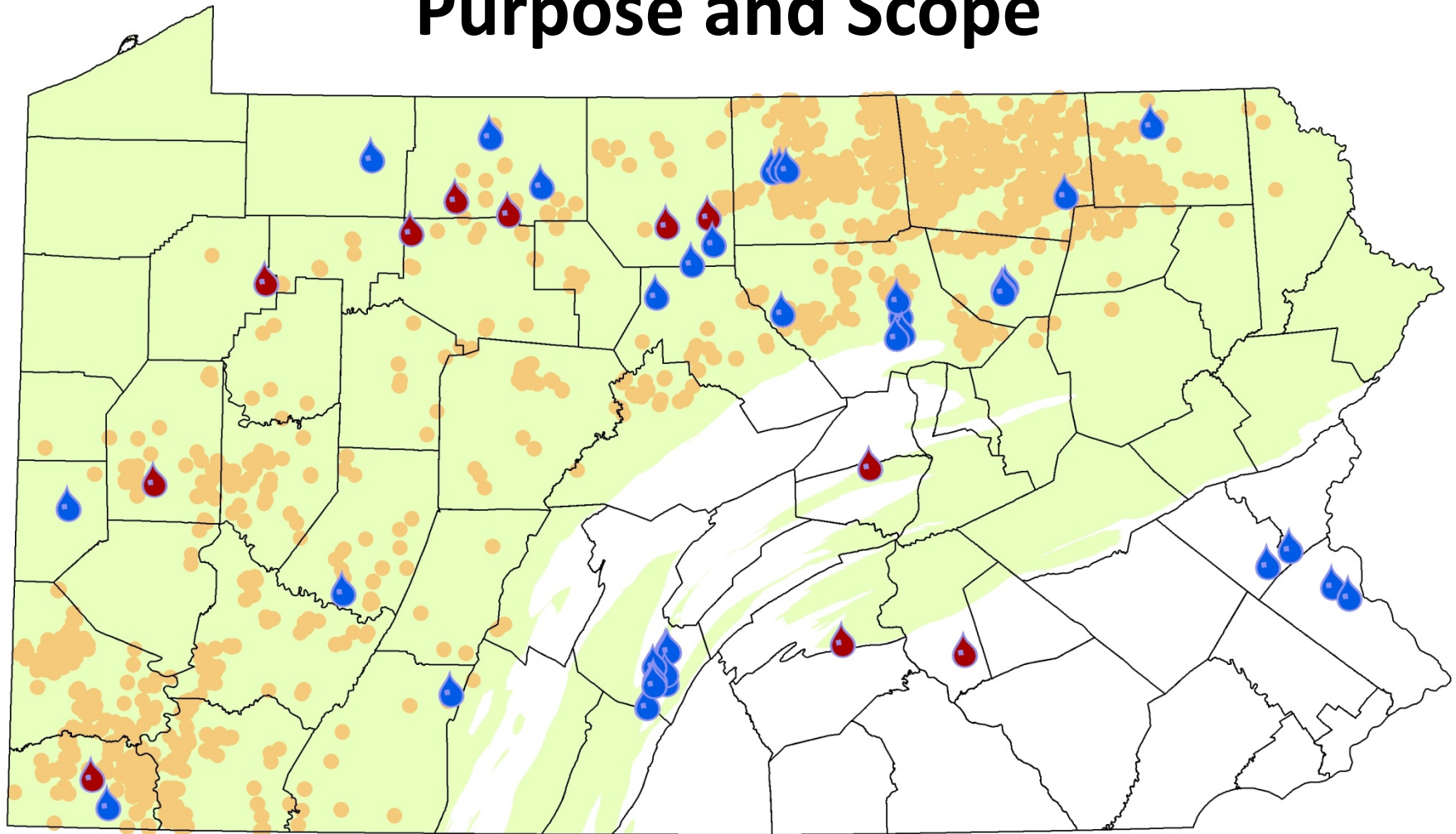
## **Current Effort:**

- Continue annual monitoring cycles
- Development/implementation of a new reporting format and protocol.

# Purpose and Scope



# Purpose and Scope

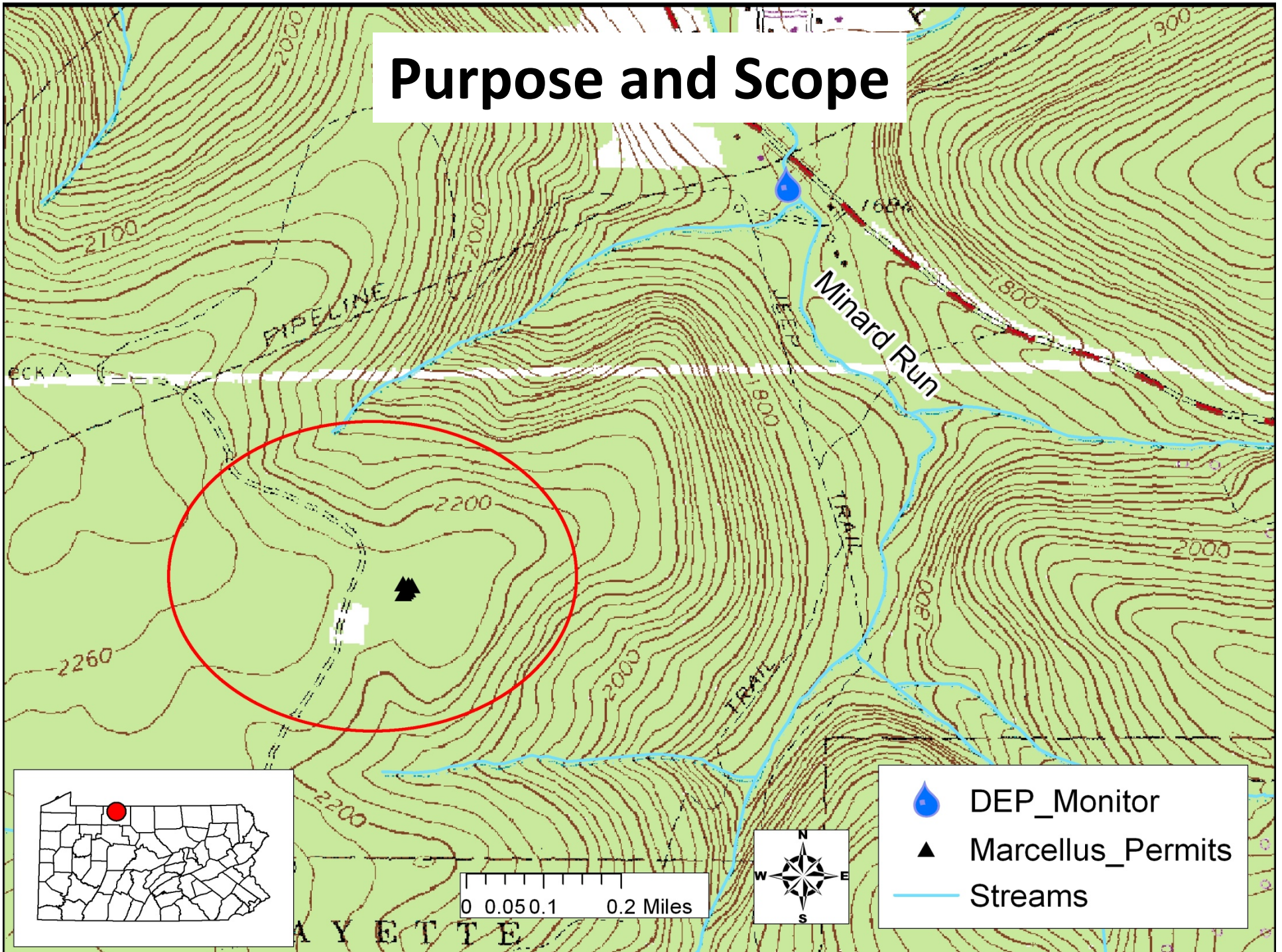


0 12.5 25 50 Miles

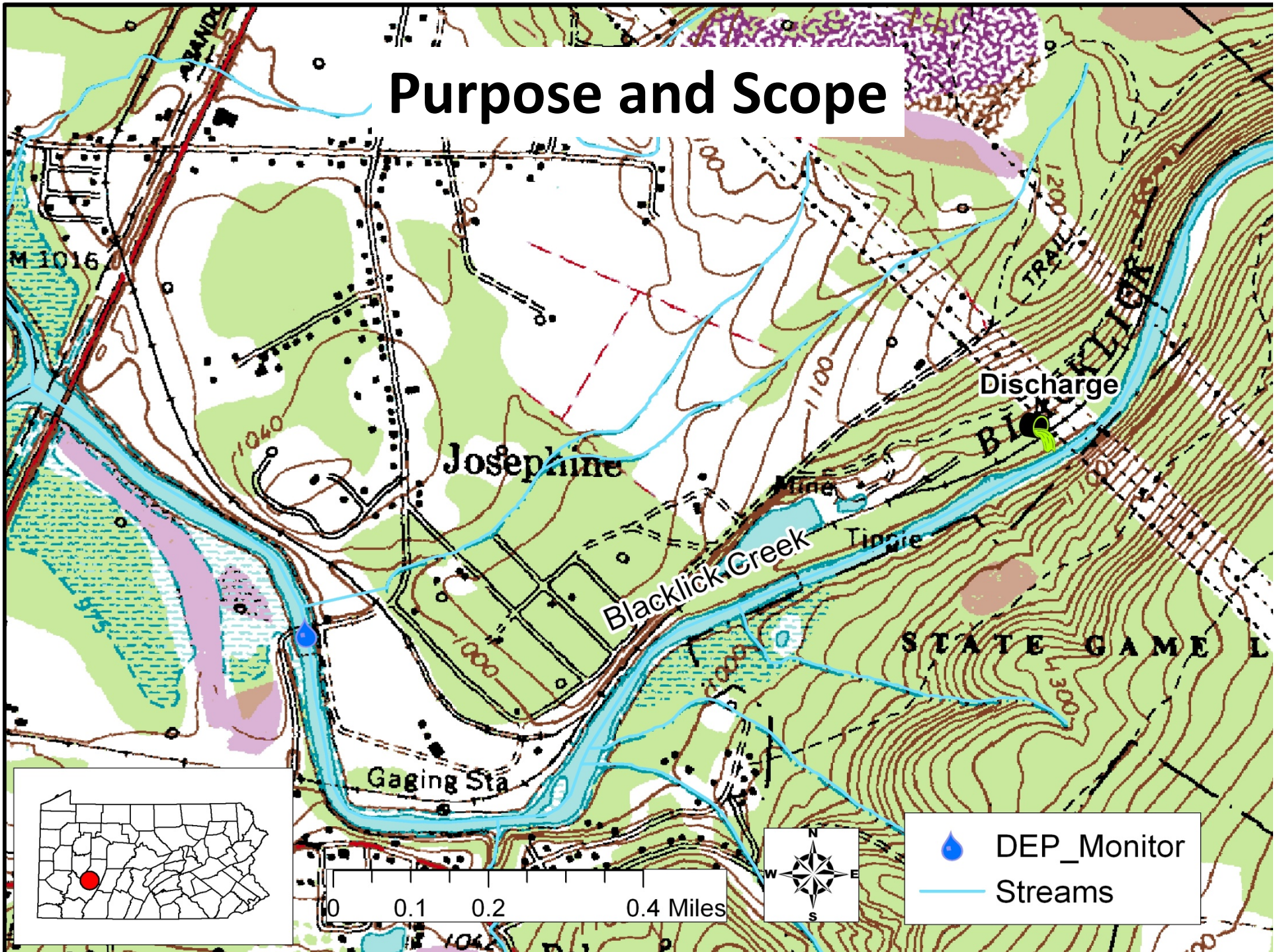


DEP_SONDES	County_Boundaries
Active	Marcellus_Formation
Pulled	Drilled_Marcellus_Wells

# Purpose and Scope



# Purpose and Scope



# Deployment

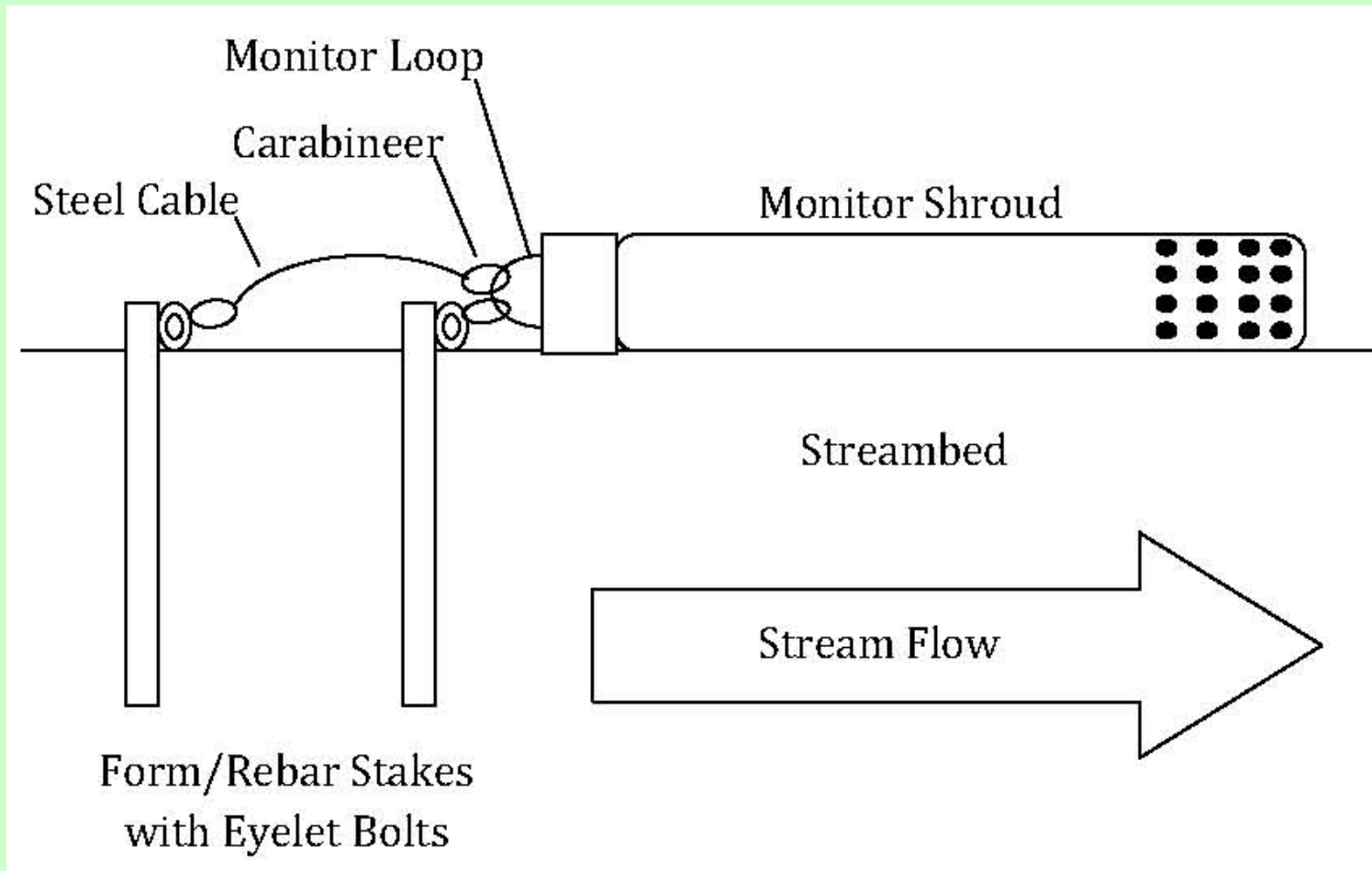


# Deployment





# Deployment



# Field Maintenance

- Download and review data
- Side-by-side before and after cleaning checks (Fouling Drift)
- Calibration checks (Calibration Drift)
- Final side-by-side

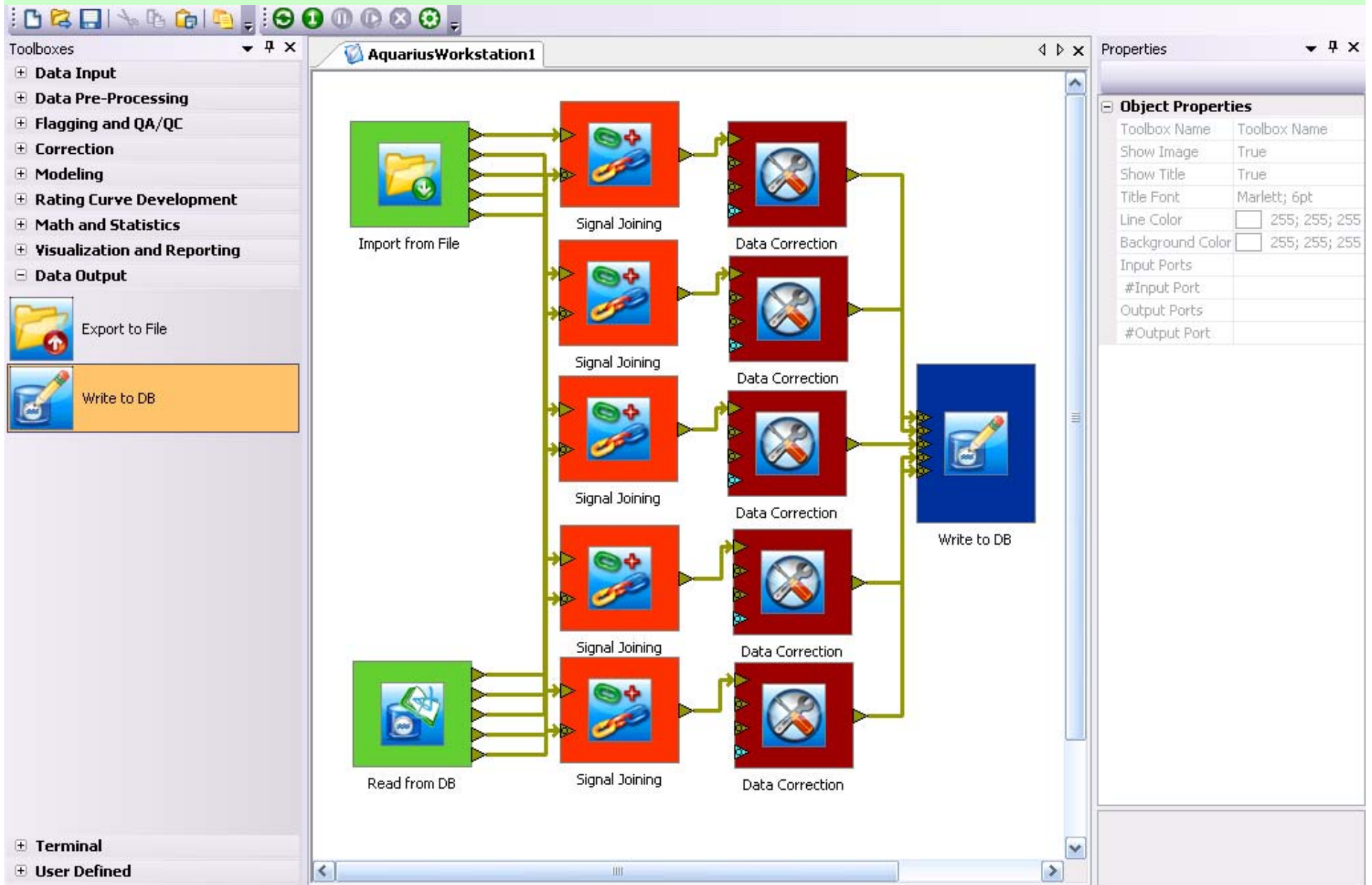
## Appendix 3, Field Form

Station Name															
Inspected By															
Date															
Time															
Monitor Make/Model															
Monitor Serial No.															
Field Meter Make/Model															
Field Meter Serial No.															
Comments/File Name															
<b>MONITOR FOULING CHECKS</b>															
	Before Cleaning	After Cleaning													
	Time	Time													
Parameter	Recorded/Use Value	Field Meter	Recorded/Use Value	Field Meter											
Temp (°C)															
pH (mV)															
DO (mg/L)															
SC (µS/cm)															
Turbidity (NTU)															
Other:															
<b>CALIBRATION DRIFT CHECKS</b>															
SPECS		Calibration Check/Recalibration													
		Time													
Baro Pressure(mmHg):		Start Depth	Recalibrated Depth												
Comments:															
<b>SPECIFIC CONDUCTANCE</b>		Calibration Criteria: (mg/liter at 25 °C) 1µm at 25°C		Time											
Measured Value		STD	THEORET	SP	STD	SC	SR	SPRO							
		VALUE	TYPE	IC	DAT	TEN	P	READING	R.1%	P	IC	READI	NG	F	R.1%
100															
1000															
Cell Range*		Reading in air** (Should be 0)													
Comments:															



<b>DISSOLVED OXYGEN</b>		Calibration Check					Recalibration								
Calibration Criteria: 1.02 mg/L		Time					Time								
TEMP	DO	DO	DO	DO	DO	TEMP	DO	DO	DO	DO	TEMP	DO	DO	DO	DO
PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK	PAK
FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT	FACT
ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%	ERR%
SALINITY:		SALINITY CORRECTION APPLIED?		DO CHARGE		DO GAIN		Date Sensor/ Meter Calibrated							
Comments:															
<b>pH</b>		Calibration Check					Recalibration								
Calibration Criteria: ±0.2 pH units		Time					Time								
pH Buffer	Theoretical pH from Table	Buffer Lot No.	EXP. DATE	TEMP	pH	TEMP	pH	TEMP	pH	TEMP	pH	TEMP	pH	TEMP	WELL-VOLTS
pH 7															
pH 4															
pH 10															
Comments:															
<b>TURBIDITY</b>		Calibration Check					Recalibration								
Calibration Criteria: ±0.5 Turbidity units or 0.2%		Time					Time								
	Lot No. or Date Pkg'd	CONC	TEMP	READING	ERR	CONC	TEMP	READING	ERR	CONC	TEMP	READING	ERR	CONC	%
Std. Std.															
Line Standard (SP10)															
Standard 1															
Standard 2															
Standard 3															
Turbidity Sensor Model	Comments:														
FINAL READINGS		Time					Time								
Parameter	Recorded/Use Value					Field Meter									
Temp (°C)															
pH (mV)															
DO (mg/L)															
SC (µS/cm)															
Turbidity (NTU)															
Other:															
FILE NAME															
LOGGING START TIME															
BATTERY LIFE (DAYS)															
MEMORY (DAYS)															
SONDE LOGGING OR PULLED?															

# Data Management



# Data Management

### Correction Control (pH Units, UTC-0...

**Start Point**  
Date:   
No.:

**End Point**  
Date:   
No.:

Snap to: Target Signal

**Action**  
Set Approval

Apply

### Target: pH Little\_K\_AT\_Blumenthal\_5/18/2010\_5/11/2011

Raw \*Corrected

Little\_K\_AT\_Blumenthal\_5/18/2010\_5/11/2011 (pH Units)

6.0 6.5 7.0 7.5 8.0

Jun Jul Aug Sep Oct Nov Dec Jan 2011 Feb Mar Apr May

2010 UTC-05:00

Grading Approval

### Time Series Grid

N.	Date/... YYYY-MM-DD UTC-0...	R.. pH U..	C.. pH U..	G	A	T
0	2010-...	7...	7...	3	3	1.
1	2010-...	7...	7...	3	3	1.
2	2010-...	7...	7...	3	3	1.
3	2010-...	7...	7...	3	3	1.
4	2010-...	7...	7...	3	3	1.
5	2010-...	7...	7...	3	3	1.
6	2010-...	7...	7...	3	3	1.
7	2010-...	7...	7...	3	3	1.
8	2010-...	7...	7...	3	3	1.
9	2010-...	7...	7...	3	3	1.
10	2010-...	7...	7...	3	3	1.
11	2010-...	7...	7...	3	3	1.
12	2010-...	7...	7...	3	3	1.
13	2010-...	7...	7...	3	3	1.
14	2010-...	7...	7...	3	3	1.
15	2010-...	7...	7...	3	3	1.
16	2010-...	7...	7...	3	3	1.
17	2010-...	7...	7...	3	3	1.
18	2010-...	7...	7...	3	3	1.
19	2010-...	7...	7...	3	3	1.
20	2010-...	7...	7...	3	3	1.
21	2010-...	7...	7...	3	3	1.
22	2010-...	7...	7...	3	3	1.
23	2010-...	7...	7...	3	3	1.
24	2010-...	7...	7...	3	3	1.
25	2010-...	7...	7...	3	3	1.
26	2010-...	7...	7...	3	3	1.
27	2010-...	7...	7...	3	3	1.

### Change List

N..	<input checked="" type="checkbox"/>	Type	Creator	Comment	From Time YYYY-MM-DD_H... UTC-05:00	To Time YYYY-MM-DD_H... UTC-05:00	Applied Time YYYY-MM-DD_H... UTC-05:00
1	<input checked="" type="checkbox"/>	Approval	dushull	Set Approval: 3 - Ap...	2011-04-14 14:0...	2011-05-11 13:0...	2012-02-23 07:3...
2	<input checked="" type="checkbox"/>	Approval	dushull	Set Approval: 3 - Ap...	2010-12-01 00:3...	2011-02-16 22:1...	2012-02-23 07:3...
3	<input checked="" type="checkbox"/>	Approval	dushull	Set Approval: 3 - Ap...	2010-07-20 19:0...	2010-08-31 17:0...	2012-02-23 07:3...
4	<input checked="" type="checkbox"/>	Grade	mlookenbil	Set Grade: -2 - UNU...	2010-12-01 00:3...	2011-02-16 22:1...	2012-02-08 10:5...
5	<input checked="" type="checkbox"/>	Grade	mlookenbil	Set Grade: 21 - FAI...	2010-11-24 13:0...	2010-12-01 00:3...	2012-02-08 10:5...

Change ...
Correct...
Grade List
Flag List
Approv...
Note List
Interpol...
Overview

T..
D.
M.
D.

# Reporting

**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF WATER

**Continuum Database Monitoring Report**  
**QUALITY CONTROL QUALITY**

**Station Details**  
 STN ID: 0201-1-001  
 STN NAME: LITTLEKILL Creek  
 STN TYPE: Stream/Run

**Control Objectives**  
 LANTHANUM/ANTHRAQUINONE/THYRONE  
 BENTHONIN

**Lab Method**  
 LANTHANUM/ANTHRAQUINONE/THYRONE: USE  
 BENTHONIN: USE

**Method Area (1/1/2018)**  
 BENTHONIN: USE  
 LANTHANUM/ANTHRAQUINONE/THYRONE: USE

**Quality Control Objectives**  
 1. LANTHANUM/ANTHRAQUINONE/THYRONE: USE  
 2. BENTHONIN: USE



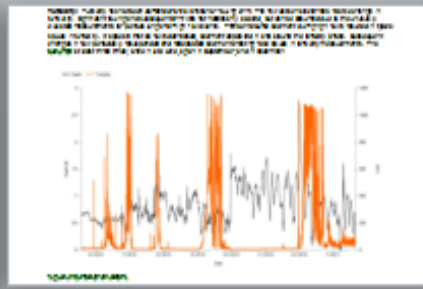
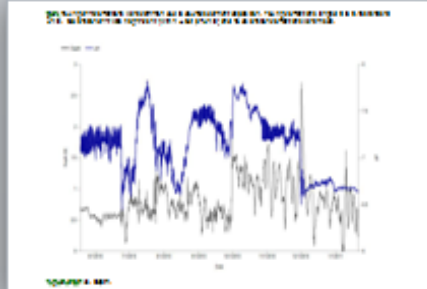
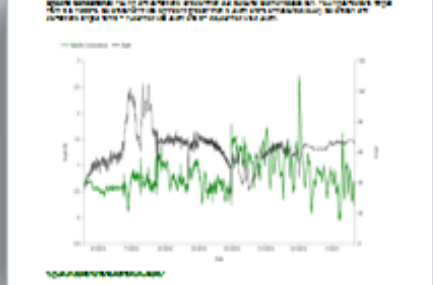
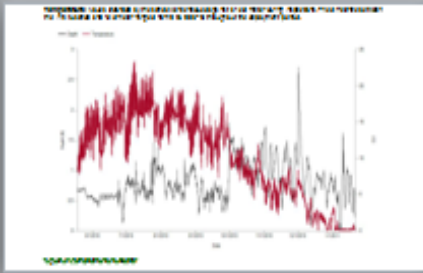
**REPORT QUALITY INFORMATION**

Report ID:	
Station ID:	0201-1-001
Report Date:	2018-01-01
Report Type:	Quality Control

**Summary**  
 This report provides information on the quality control objectives for the LANTHANUM/ANTHRAQUINONE/THYRONE and BENTHONIN parameters. The objectives are based on the quality control objectives for the parameters and the quality control objectives for the parameters.

**Method Information**  
 The method used for the LANTHANUM/ANTHRAQUINONE/THYRONE and BENTHONIN parameters is USE. The method is based on the quality control objectives for the parameters and the quality control objectives for the parameters.

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**QUALITY CONTROL OBJECTIVES**

Parameter	Objective	Method	Quality Control Objective
LANTHANUM/ANTHRAQUINONE/THYRONE	USE	USE	USE
BENTHONIN	USE	USE	USE

**QUALITY CONTROL OBJECTIVES**

Parameter	Objective	Method	Quality Control Objective
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BENTHONIN	USE	USE	USE

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**Table 1**

Parameter	Objective	Method	Quality Control Objective
LANTHANUM/ANTHRAQUINONE/THYRONE	USE	USE	USE
BENTHONIN	USE	USE	USE

**Summary**  
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LANTHANUM/ANTHRAQUINONE/THYRONE	USE	USE	USE
BENTHONIN	USE	USE	USE

# Reporting

## Continuous Instream Monitoring Report (CIMR)

### STATION DESCRIPTION

**STREAM CODE:**

**STREAM NAME:**

**SITE NAME:**

**MOST RECENT REVISION:**

**REVISED BY:**

**LATITUDE: LONGITUDE:**

**COUNTY:**

**HUC:**

**LOCATION DESCRIPTION:**

**DRAINAGE AREA:**

**BACKGROUND AND HISTORY:**

**WATER QUALITY PARAMETERS (Table):**

**EQUIPMENT:**

**PERIOD OF RECORD:**

**DATA:**

**Depth:**

**Temperature:**

**Specific Conductance:**

**pH:**

**Turbidity:**

**In-situ Water Chemistry:**

**Biology:**

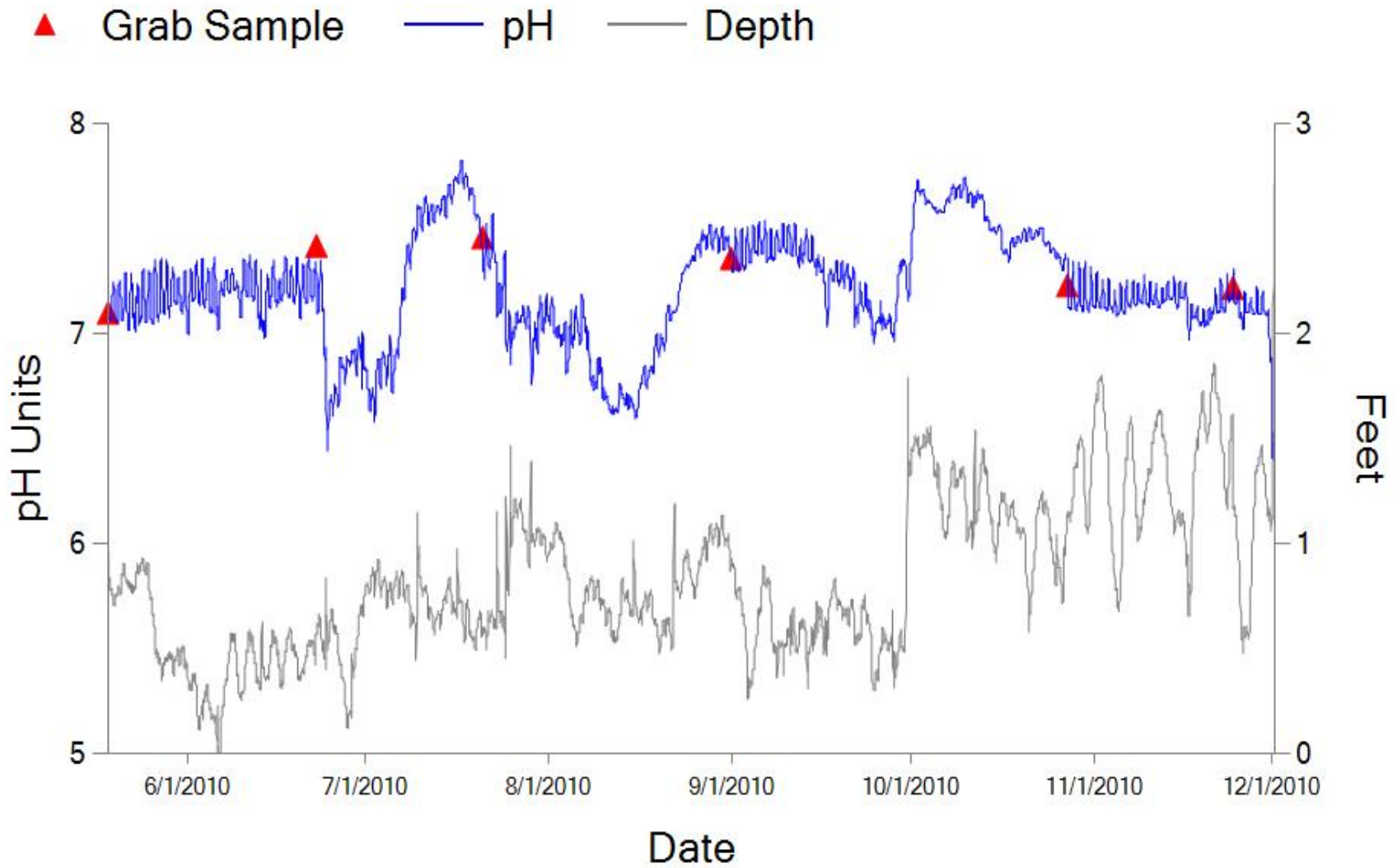
**ASSESSMENT:**

**Conductivity/TDS relationship:**

**Biological:**

**SUMMARY:**

# Reporting

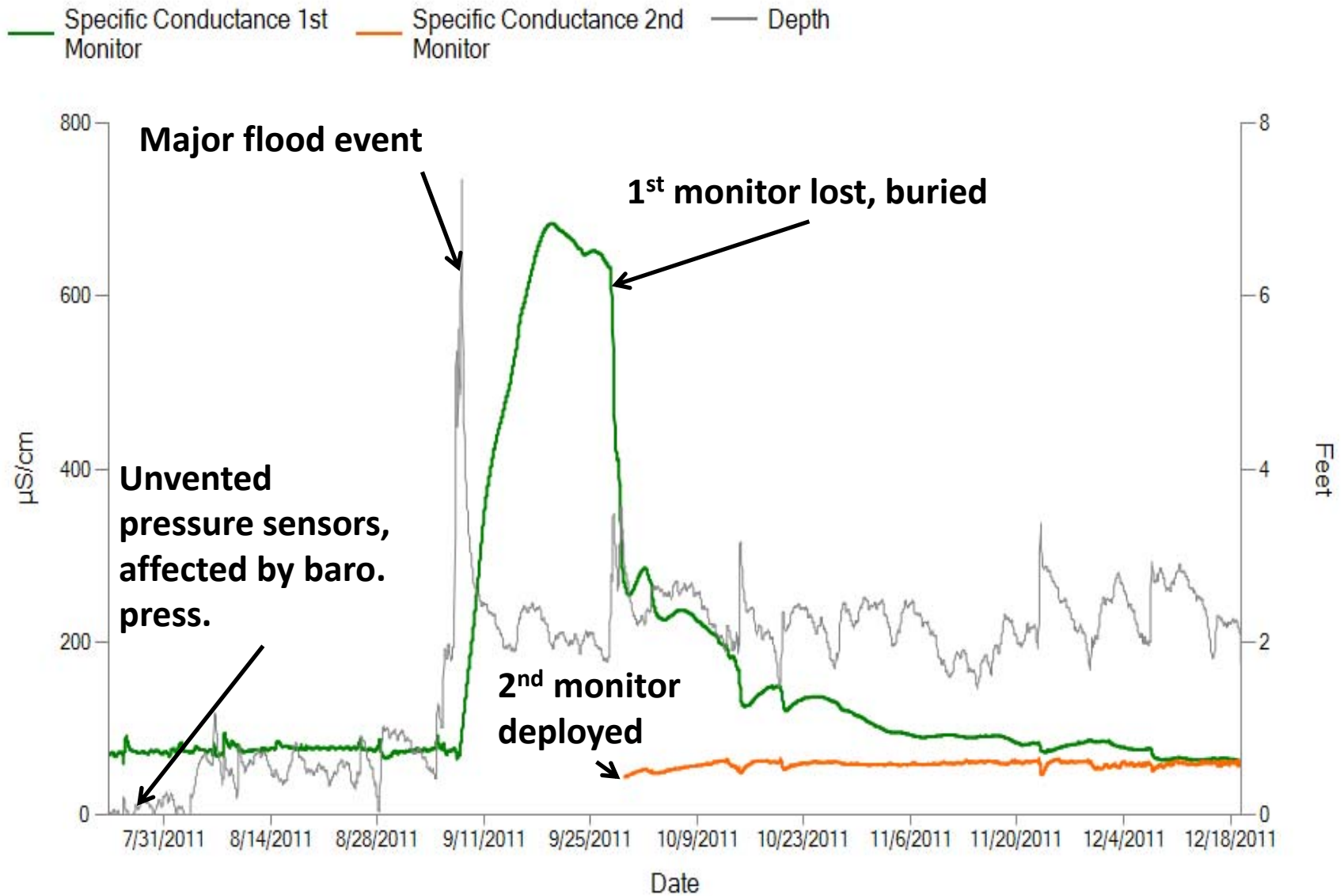


# Lessons Learned

- **Importance of field form documentation for corrections and data interpretation**
  - Sediment fouling – product of deployment methodology
  - Sensor integrity – operation and life span
- **Identifying data needs vs. equipment and supplies used**
  - Turbidity Calibration Standard
  - Depth/Discharge

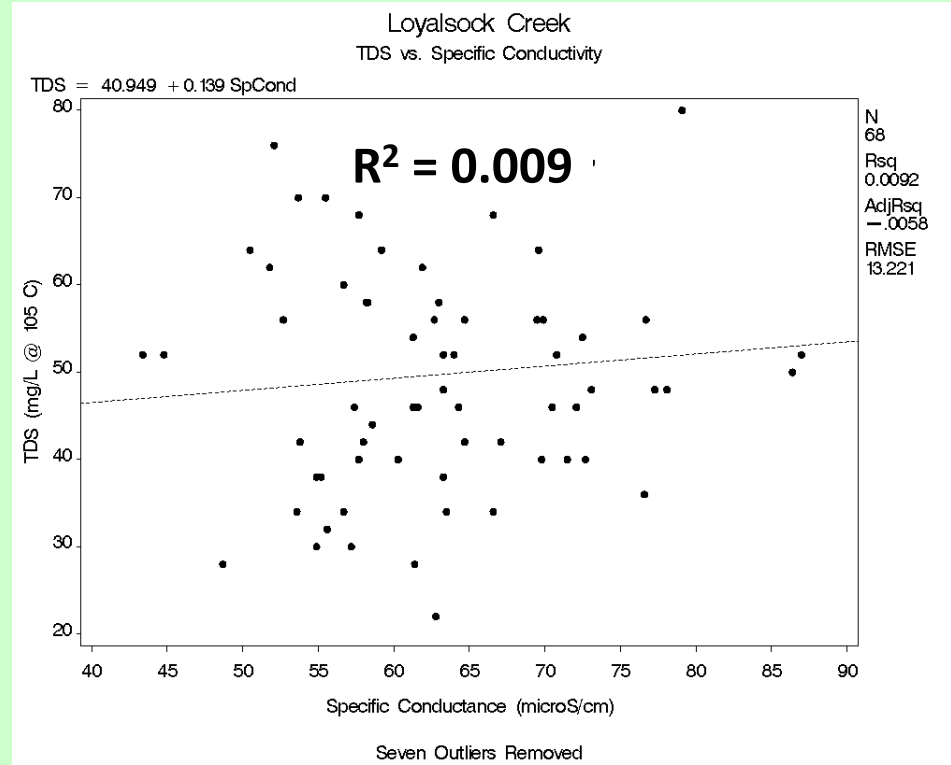
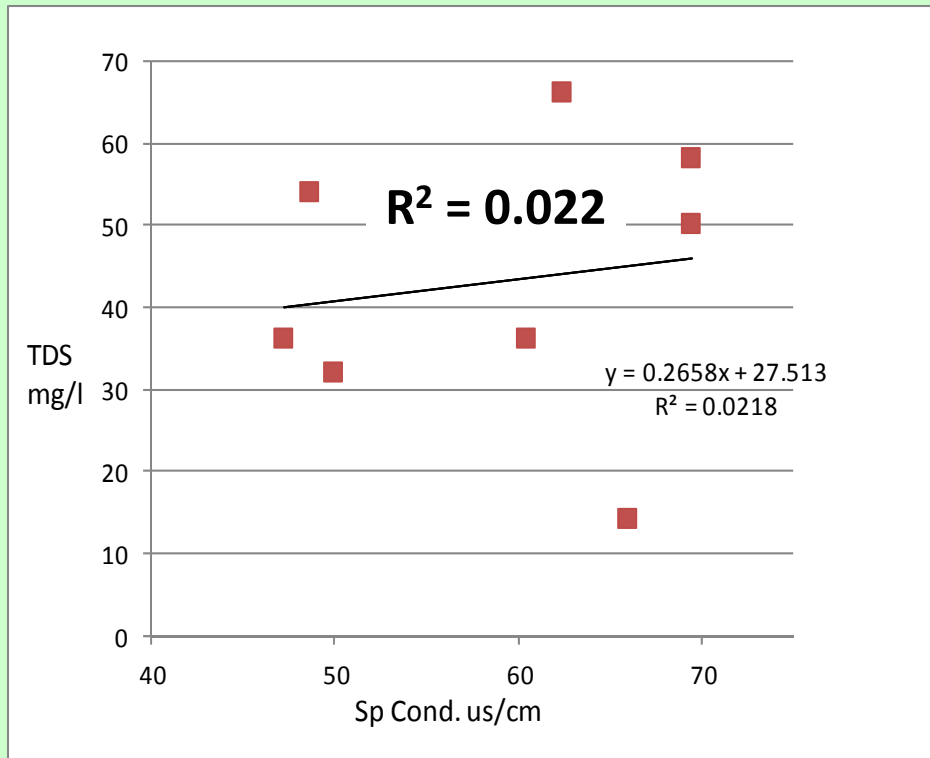


# Lessons Learned



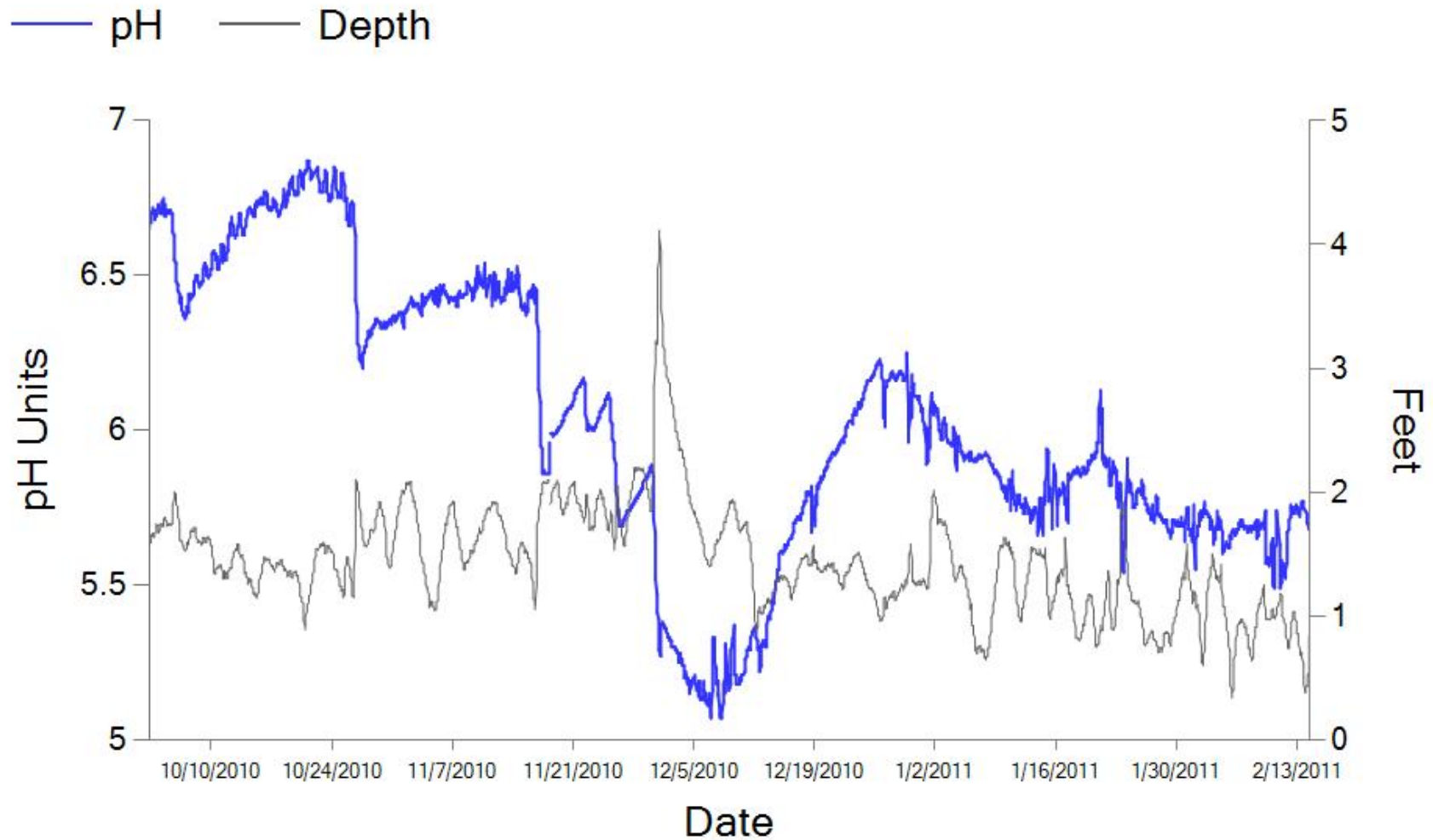
# Lessons Learned

## Relating TDS to Specific Conductance



# Lessons Learned

## Characterizing acid deposition issues



# Lessons Learned

Wetsuit jackets and gloves are great for cold weather field checks!!!



# Questions?

**Contact:**

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(717) 783-7574



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

