

Susquehanna River Basin

Remote Monitoring Network

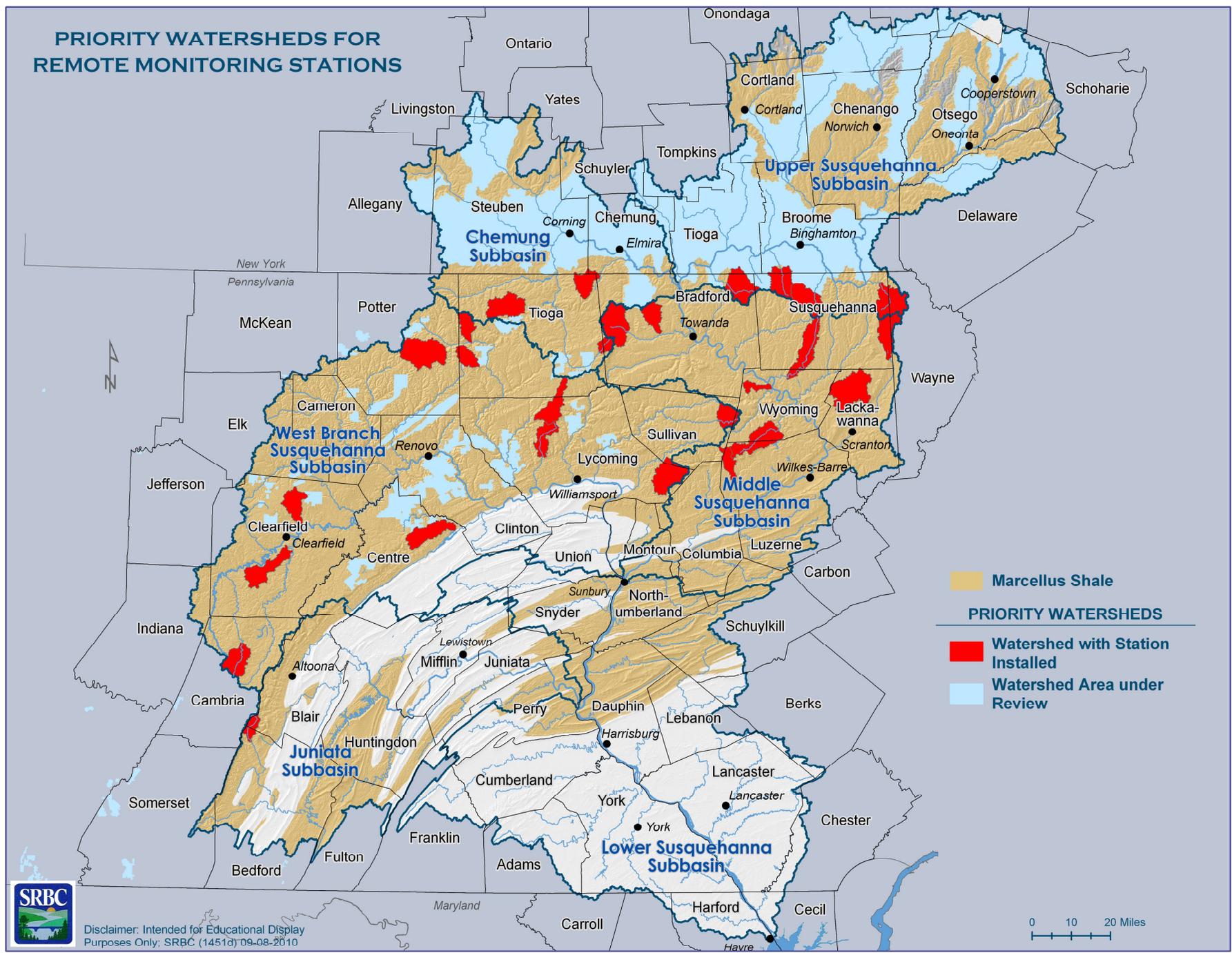


Project Update
SRBC Water Quality Advisory Committee Meeting
October 13, 2010

Remote Water Quality Monitoring Network

- Project scope - Fall 2009
- Network deployment in PA - Started January 2010
 - SRBC - \$250,000
 - East Resources Inc. - \$750,000
- Expansion into New York - Started May 2010
 - NYS Energy Research and Development Authority - \$200,000
 - SRBC - \$180,000
- Expansion into PADCNR State Forest - Started September 2010
 - \$200,000 for 10 stations in forest lease tract lands
- Established network by Spring 2011 - 50 stations

PRIORITY WATERSHEDS FOR REMOTE MONITORING STATIONS



- Marcellus Shale
- PRIORITY WATERSHEDS**
- Watershed with Station Installed
- Watershed Area under Review



Disclaimer: Intended for Educational Display Purposes Only; SRBC (1451d) 09-08-2010





NEXSENS
technology

SUSQUEHANNA RIVER BASIN
WATER QUALITY MONITORING STATION

This station is operated by the Susquehanna River Water Commission.
The station is located at the Susquehanna River Water Commission
Station, 1000 West 10th Street, Annapolis, MD 21403.
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The station is a product of the Susquehanna River Water Commission.



Network Design

Station Locations

- Activities associated with natural gas development
 - (Drilling activity, wastewater/chemical storage and transport, water withdrawals, etc.)
- Sensitivity and value of headwater areas
 - (Aquatic life, recreation, public water supply)
- Coordination with existing monitoring efforts
- Public concerns

Network Design

Station Locations

- Site considerations
 - Watershed size (~ 30 to 60 square miles)
 - Channel morphology and flow ranges
 - Seasonal conditions (i.e., ice, summer low flow)
 - Land use
 - Property access

Network Design

Data Collection

Continuous monitoring

- Conductance
- Temperature, pH,
- dissolved oxygen,
- turbidity
- Depth



REMOTE WATER QUALITY MONITORING NETWORK

Susquehanna River Basin Commission 

OVERVIEW

MAP

DATA

GRAPH

STATS

PANEL

GO LIVE

FORUM

Meshoppen Creek
near Kaiserville, PA

- Temp
- Sp Cond
- pH
- Turb+
- ODO

Chocanut Creek
near Vestal Center, NY

- Temp
- Sp Cond
- pH
- Turb+
- ODO

Hammond Creek
near Millerton, PA

SELECT ALL GO

DAY

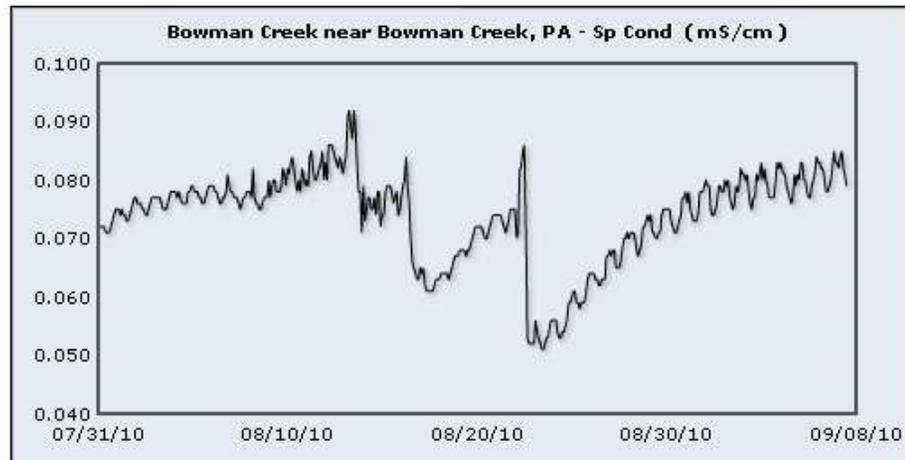
WEEK

MONTH

YEAR

8/30/2010 

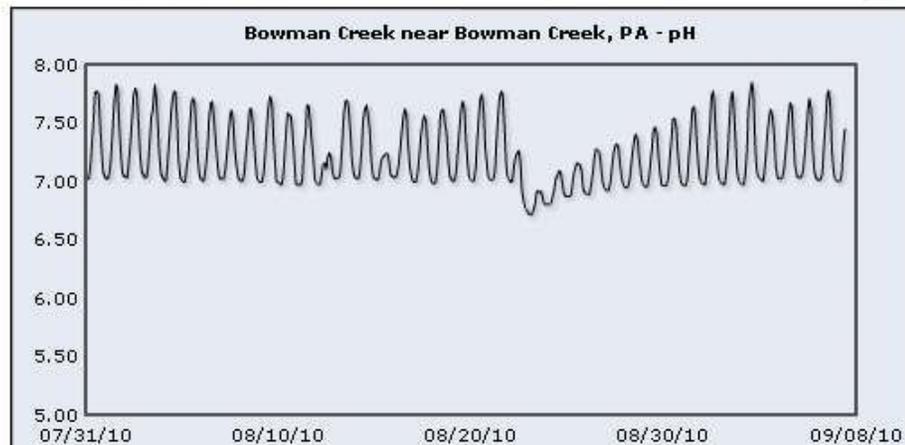
09/08/2010 



Min Y Value

Max Y Value

Go



| | Bowman Creek near Bowman Creek, PA | Bowman Creek near Bowman Creek, PA |
|---------------|------------------------------------|------------------------------------|
| Time | Sp Cond | pH |
| mm/dd/yy h:m | mS/cm | |
| 9/08/10 12:00 | 0.079 | 7.44 |
| 9/08/10 11:55 | 0.079 | 7.44 |
| 9/08/10 11:50 | 0.079 | 7.43 |
| 9/08/10 11:45 | 0.079 | 7.43 |
| 9/08/10 11:40 | 0.076 | 7.42 |
| 9/08/10 11:35 | 0.079 | 7.41 |
| 9/08/10 11:30 | 0.079 | 7.39 |
| 9/08/10 11:25 | 0.080 | 7.39 |
| 9/08/10 11:20 | 0.080 | 7.39 |
| 9/08/10 11:15 | 0.080 | 7.37 |
| 9/08/10 11:10 | 0.080 | 7.36 |
| 9/08/10 11:05 | 0.080 | 7.36 |
| 9/08/10 11:00 | 0.080 | 7.35 |
| 9/08/10 10:55 | 0.080 | 7.34 |
| 9/08/10 10:50 | 0.079 | 7.33 |
| 9/08/10 10:45 | 0.080 | 7.33 |
| 9/08/10 10:40 | 0.080 | 7.32 |
| 9/08/10 10:35 | 0.080 | 7.31 |
| 9/08/10 10:30 | 0.079 | 7.30 |
| 9/08/10 10:25 | 0.080 | 7.31 |
| 9/08/10 10:20 | 0.081 | 7.28 |
| 9/08/10 10:15 | 0.080 | 7.28 |
| 9/08/10 10:10 | 0.080 | 7.28 |
| 9/08/10 10:05 | 0.080 | 7.28 |

Provisional Data Results**

To date for all stations (25 installed)

>2 million WQ observations

Example data records over the past month

| | |
|------------------------------|---------------|
| Average temperature | 19.8 °C |
| Average specific conductance | 170 microS/cm |
| Average pH | 7.5 |
| Average turbidity | 6.1 NTU |
| Average dissolved oxygen | 8.4 mg/l |

Maximum specific conductance
for all sites

596 microS/cm

****Not corrected yet for calibration drift, out of range values, probe malfunctions, etc.**

Website Interface - www.srbc.net

REMOTE WATER QUALITY MONITORING NETWORK
Susquehanna River Basin Commission

OVERVIEW | MAP | DATA | GRAPH | STATS | PANEL | GO LIVE | FORUM

Project Description
The Susquehanna River Basin Commission (SRBC) initiated the establishment of the Remote Water Quality Monitoring Network (RWQMN) in January, 2010, in the Pennsylvania and New York portions of the Susquehanna Basin. The stations continuously monitor and record the following water quality parameters:

- Temperature (C)
- pH
- Conductance (mS/cm)
- Dissolved oxygen concentration (mg/L)
- Turbidity (NTU)

These data will enable water resource agencies, water users, and the public to make informed decisions regarding management and use of the resource.

For more information, visit the SRBC web page:
<http://www.srbc.net/programs/remotetwork.htm>

Meshoppen Creek near Kaisersville, PA
at 09/07/10 4:15PM

Temp **22.96** C
Sp Cond **0.164** mS/cm
pH **8.01**
Turb+
ODO

Choconut Creek near Vestal Center, NY
ALL DATA

REMOTE WATER QUALITY MONITORING NETWORK
Susquehanna River Basin Commission

OVERVIEW | MAP | DATA | GRAPH | STATS | PANEL | GO LIVE | FORUM

Meshoppen Creek near Kaisersville, PA
 Temp
 Sp Cond
 pH
 Turb+
 ODO
 Choconut Creek near Vestal Center, NY
 Temp

| Parameter | Samples | Average | Max | Min | St Dev |
|---|---------|---------|--------|-------|--------|
| Bowman Creek near Bowman Creek, PA | | | | | |
| Temp (C) | 11339 | 18.06 | 23.33 | 12.85 | 1.73 |
| Sp Cond (mS/cm) | 11339 | 0.072 | 0.092 | 0.047 | 0.006 |
| pH | 11339 | 7.17 | 7.85 | 6.69 | 0.24 |
| Turb+ (NTU+) | 11339 | 4.58 | 267.60 | 2.00 | 1.25 |
| DO (mg/L) | 11339 | 9.83 | 11.83 | 8.46 | 0.73 |
| West Pine Creek near Galeton, PA | | | | | |
| Temp (C) | 11378 | 18.74 | 25.05 | 11.85 | 1.83 |
| Sp Cond (mS/cm) | 11378 | 0.060 | 0.068 | 0.053 | 0.002 |
| pH | 11378 | 7.18 | 7.54 | 6.88 | 0.11 |
| Turb+ (NTU+) | 11378 | 2.20 | 545.10 | 0.90 | 10.07 |
| DO (mg/L) | 11378 | 8.94 | 10.65 | 7.59 | 0.46 |
| Loyalsock Creek near Ringdale, PA | | | | | |
| Temp (C) | 11377 | 19.92 | 26.72 | 11.53 | 2.30 |
| Sp Cond (mS/cm) | 11377 | 0.062 | 0.275 | 0.040 | 0.015 |
| pH | 11377 | 6.93 | 7.27 | 6.51 | 0.13 |
| Turb+ (NTU+) | 11377 | 0.48 | 109.60 | -0.40 | 4.97 |
| DO (mg/L) | 11377 | 8.36 | 10.22 | 6.68 | 0.65 |

Limitation & Disclaimer
Uncertainty associated with data. Data users should carefully review the information before using it for decisions that concern the conduct of substantial consequences. No warranty, as to the accuracy, completeness, or timeliness of the data contained on this website.



REMOTE WATER QUALITY MONITORING NETWORK
Susquehanna River Basin Commission

OVERVIEW | MAP | DATA | GRAPH | STATS | PANEL | GO LIVE | FORUM

Terrain | Satellite | Map | Hybrid

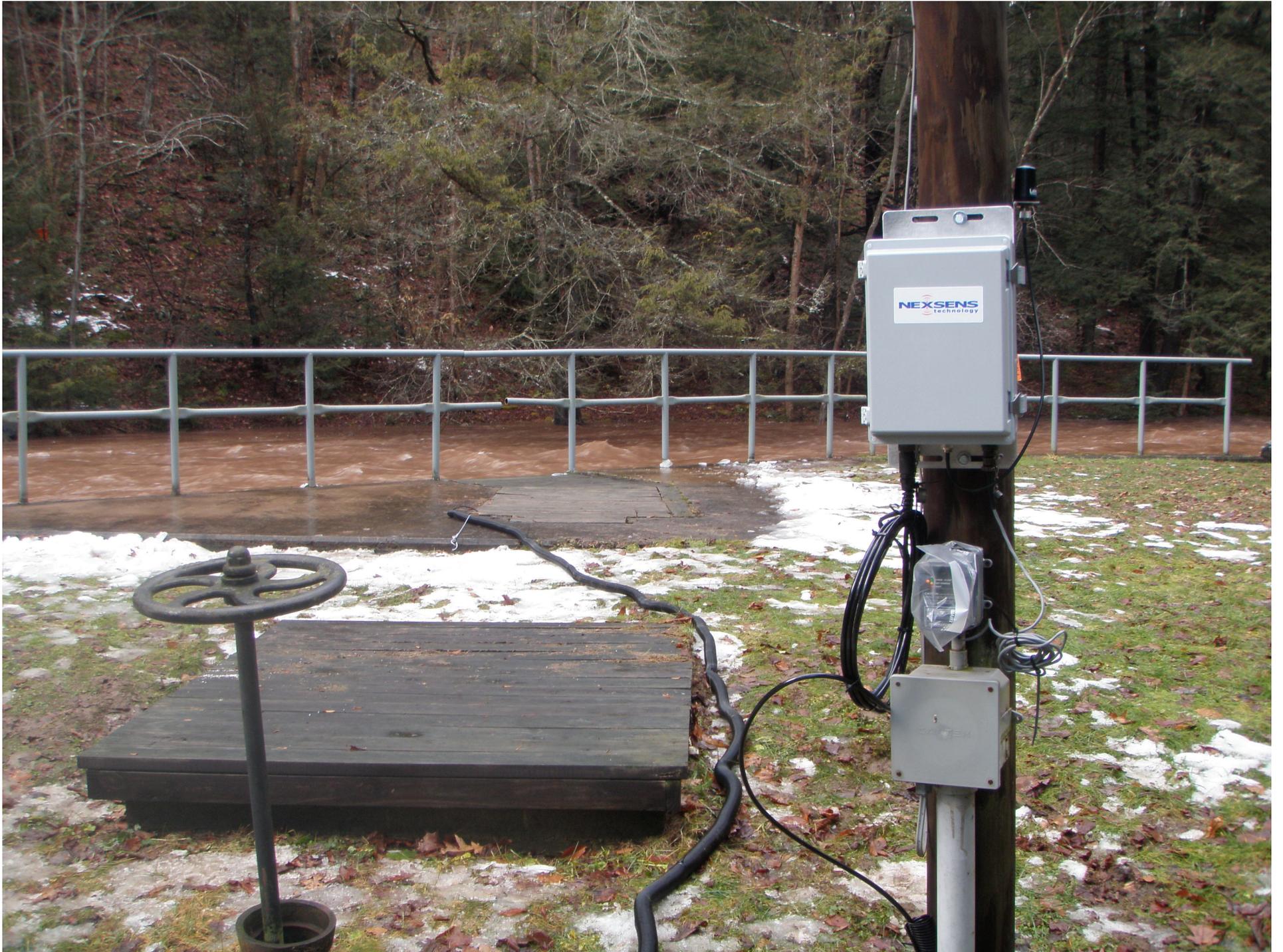
Meshoppen Creek near Kaisersville, PA
 Choconut Creek near Vestal Center, NY
 Hammond Creek near Millerton, PA
 Tomjack Creek near Burlington, PA
 Trout Run near Shawville, PA
 Sugar Creek near Troy, PA
 Bowman Creek near Bowman Creek, PA
 West Pine Creek near Galeton, PA
 Loyalsock Creek near Ringdale, PA

SELECT ALL GO

DAY
WEEK
MONTH
YEAR

8/30/2010
09/08/2010

Marsh Creek near Blanchard, PA
09/08/10 12:05PM
Temp **20.18**C
Sp Cond **0.185**mS/cm
pH **7.56**
Turb+ **1.20**NTU+
ODO **8.47**mg/L
Click the dot to see all parameters



REMOTE WATER QUALITY MONITORING NETWORK

Susquehanna River Basin Commission

| Site Information | Report Summary |
|--|--|
| Project: Remote Water Quality Monitoring Network | Content: 07/09/10 12:00 AM - 07/16/10 12:00 PM |
| Site: Larrys Creek near Saladsburg, PA | Author: H.Hardenan |
| Device Profile: | Site Description: |
| YSI (8000 V2-4) | Jersey Shore Water Treatment Plant Intake |

Report Notes:
5-min sample interval, 4-hr avg

Statistical Summary

| Parameter | Samples | Avg | Max | Min | Std |
|------------------|---------|-------|-----------------------------------|----------------------------------|-------|
| Larrys Creek: | | | | | |
| Temperature (C) | 56 | 19.26 | 21.98 7/9/2010 4:00:00 PM | 16.59 7/11/2010 5:00:00 AM | 1.23 |
| Sp Cond (mS/cm) | 56 | 0.053 | 0.057 7/13/2010 12:00:00 PM | 0.040 7/10/2010 5:00:00 AM | 0.003 |
| Depth (ft) | 56 | 3.662 | 3.857 7/15/2010 5:00:00 AM | 3.512 7/9/2010 4:00:00 PM | 0.072 |
| pH | 56 | 7.22 | 7.59 7/17/2010 4:00:00 PM | 6.95 7/10/2010 8:00:00 AM | 0.18 |
| Turbidity (NTU+) | 56 | 1.07 | 7.81 7/10/2010 5:00:00 AM | 0.97 7/12/2010 12:00:00 PM | 0.93 |
| ODOsat (%) | 56 | 95.8 | 104.8 7/17/2010 4:00:00 PM | 80.0 7/10/2010 12:00:00 AM | 4.4 |
| ODO (mg/L) | 56 | 8.25 | 9.71 7/12/2010 12:00:00 PM | 6.04 7/10/2010 12:00:00 AM | 0.42 |

Tuesday, July 20, 2010 15:31:50

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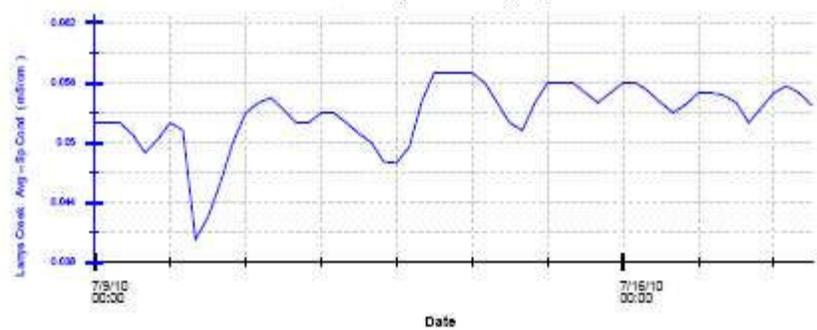
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Data Graph

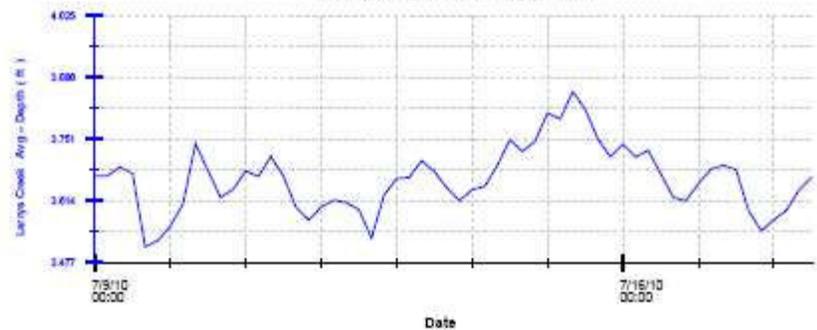
RWQN Larrys Creek Avg -- Temperature



RWQN Larrys Creek Avg -- Sp Cond



RWQN Larrys Creek Avg -- Depth



Tuesday, July 20, 2010 15:31:50

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Network Design

Data Collection

Routine “grab sample” monitoring with streamflow measurements

- Approximately six times a year

Acidity/Alkalinity, Chloride, Barium, Bromide, Strontium, Total Dissolved Solids (TDS), Sulfate, Total Organic Carbon (TOC), and the typical field parameters (pH, conductance, etc.)

- Approximately four times a year

Ca, Mg, Na, K, Nitrate, Carbonate Alkalinity, Bicarbonate Alkalinity, Carbonate

Gross alpha and beta

Network Management

Real-time data collection/transmission

- Intervals can vary by station
- “Alarms” to go to SRBC staff for further investigation (deviations from any baseline)

Web site interface

- Data access - considered provisional, with no “filtering” of data for the public
- Public education (with all the usual disclaimers)

Annual Data Report

- Incorporates real-time and “grab sample” data
- Summary of overall conditions and activities for the network

Susquehanna River Basin

Remote Monitoring Network

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Protection

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October 13, 2010