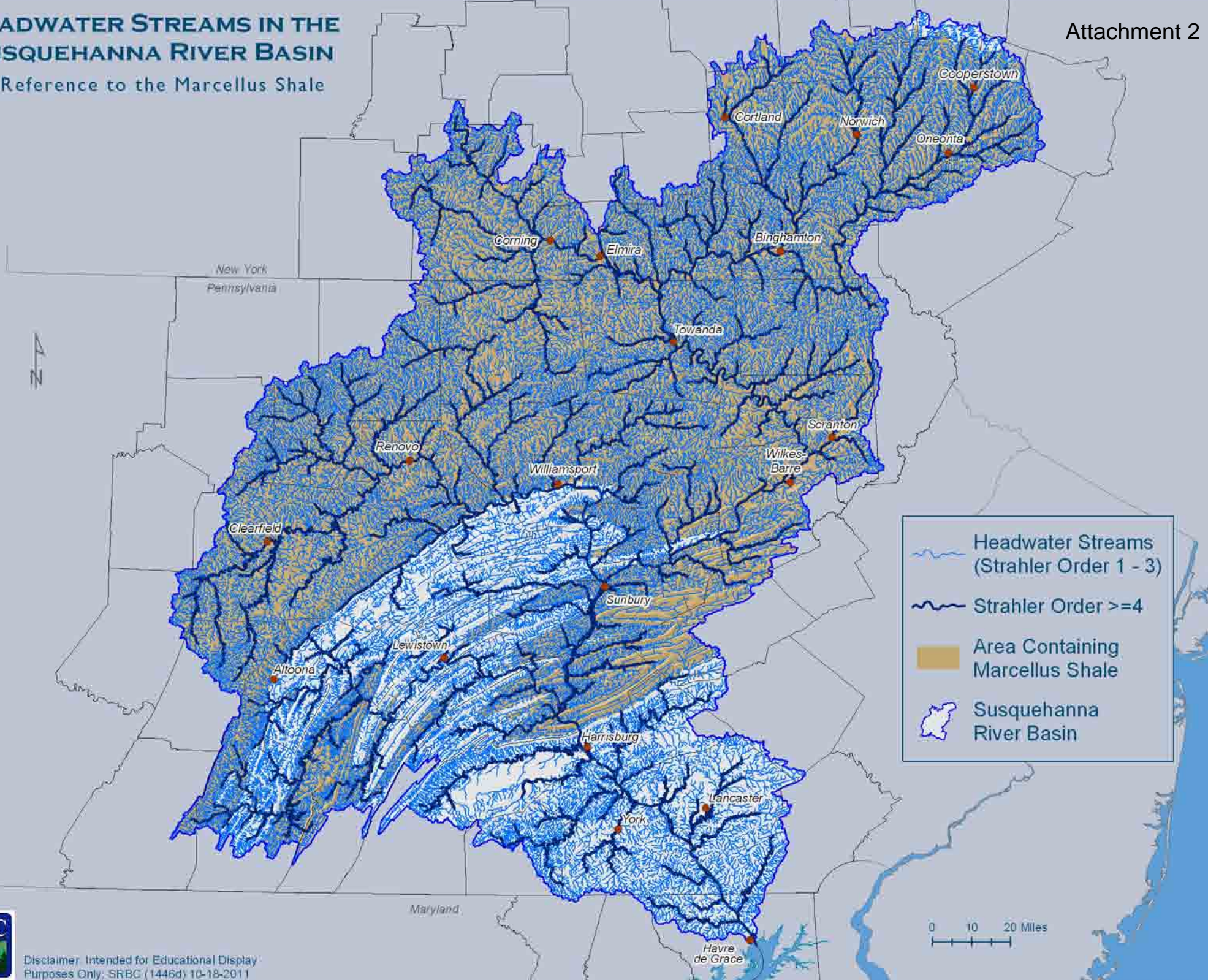




# HEADWATER STREAMS IN THE SUSQUEHANNA RIVER BASIN

in Reference to the Marcellus Shale





# Susquehanna River Basin Commission

## Protecting Your Watershed for Today and Tomorrow

### Water Withdrawals & Consumptive Use for Natural Gas Industry (Taken from Quarterly Reports on SRBC Monitoring Data Website)

Col 1	Col 2	Col 3	Col 4	Col 5 (Col 4/Col 3)	Col 6	Col 7 (Col 6/Col 4)	Col 8 (Col 6/ Col 3)	Col 9	Col 10 (Col 6/Col 4)	Col 11 (Col 6/ Col 3)
Quarter/Year	Period Ending	Length of Period (Days)	Total Consumptive Water Use <sup>1</sup> (CU) (Mgal) <sup>2</sup>	Ave. Daily CU Rate by Quarter (MGD) <sup>2</sup>	Total Docketed Water Withdrawals (Mgal) <sup>2</sup>	As a Percent of Total CU (%)	Ave. Daily With. Rate by Quarter (MGD) <sup>2</sup>	Total Non-Docketed Water Sources (Mgal) <sup>3</sup>	As a Percent of Total CU (%)	Ave. Daily Rate by Quarter (MGD) <sup>2</sup>
Q3-2008	30-Sep-08	92	21	0.23	2	10	0.02	19	90	9.36
Q4-2008	31-Dec-08	92	35	0.38	14	41	0.16	20	59	1.42
Q1-2009	31-Mar-09	90	38	0.43	4	10	0.04	34	90	8.71
Q2-2009	30-Jun-09	91	76	0.83	36	48	0.40	39	52	1.09
Q3-2009	30-Sep-09	92	142	1.54	54	38	0.59	88	62	1.62
Q4-2009	31-Dec-09	92	222	2.41	191	86	2.08	31	14	0.16
Q1-2010	31-Mar-10	90	300	3.33	232	77	2.57	68	23	0.30
Q2-2010	30-Jun-10	91	543	5.97	460	85	5.06	83	15	0.18
Q3-2010	30-Sep-10	92	745	8.10	608	82	6.60	138	18	0.23
Q4-2010	31-Dec-10	92	716	7.78	752	105	8.17	158	22	0.21
Q1-2011	31-Mar-11	90	752	8.35	580	77	6.44	172	23	0.30
Q2-2011	30-Jun-11	91	909	9.99	660	73	7.25	249	27	0.38
<b>Totals</b>	----	----	4,498	----	3,593	----	----	1,100	----	----

Footnotes:

<sup>1</sup> Consumptive water use from all docketed withdrawal sources, plus other sources approved pursuant to 806.22(f).<sup>2</sup> Abbreviations: MDW, SRBC Monitoring Data Website; Mgal, Million Gallons; MGD, Million Gallons per Day.<sup>3</sup> The vast majority of the non-docketed water sources are comprised of public water systems (PWS's); however, these sources also include impaired waters such as abandoned mine discharges (AMD), industrial and municipal wastewaters, pad stormwaters, tophole waters, etc.<sup>4</sup> In any given quarter, there will be differences between the Total Consumptive Water Use (Col. 4) and the combination of Total Docketed Water Withdrawals (Col. 6) plus Total Non-Docketed Water Sources (Col. 9) due to the dynamic changes in the amounts of water moving into or out of storage impoundments and storage tanks located on specific pads or in centralized locations.



# Susquehanna River Basin Commission

## Protecting Your Watershed for Today and Tomorrow

### Periodic Summary of Water Use Profile - Per Well Basis (Taken from SRBC Post Hydrofracture Reports)

#### ITEM

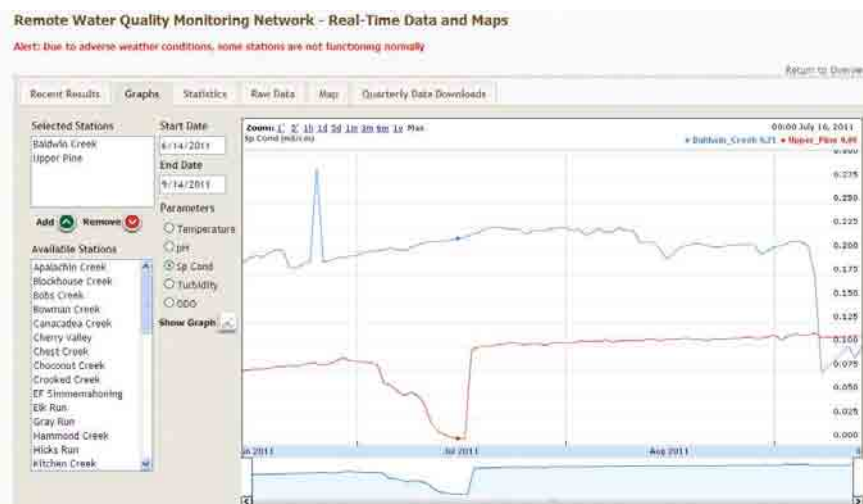
- 1 Date on which this summary period began; 10/1/2010
- 2 Date on which this summary period ended: 9/30/2011
- 3 Number of wells reportedly hydro-fractured during this period: 654 wells
- 4 Water used on-site as percent of water brought on-site: 90%  
*(Balance, 10%, is temporarily stored on-site or transferred to other pad[s]).*
- 5 Average total volume of water used for hydro-fracturing (per well basis): 4.46 Mgal
- 6 Average freshwater used per well fracturing event: 3.92 Mgal (88%)
- 7 Average flowback reused per well fracturing event: 0.54 Mgal (12%)
- 8 Range in percent of injected water recovered as flowback (first 30-days after fracing event): 5-12 %

# Susquehanna River Basin Commission Information Sheet

## Remote Water Quality Monitoring Network



**Network Overview** – In 2010, the Susquehanna River Basin Commission (SRBC) initiated a network designed to remotely monitor water quality conditions to maintain and protect surface waters in select portions of the Susquehanna basin. The monitoring network uses state-of-the-art monitoring and communication technology to collect and transmit real-time water quality data. Increasing demands for water throughout the basin, coupled with increasing wastewater flows, require the application of this advanced technology to effectively monitor rapid changes in water quality conditions. SRBC previously operated and maintained such a system only on the mainstem of the Susquehanna River for the purpose of monitoring drinking water sources; however, expanding the existing system meets a greater need to track water quality conditions within smaller rivers and streams throughout the portion of the basin experiencing natural gas development.



*Internet-accessible data provided by the monitoring network*

Each monitoring station includes a datasonde and data platform, powered by a solar panel or other power source. Observations may be made as frequently as five-minute intervals, with transmission to a web site at predetermined intervals. The web site interface also provides user-friendly access to other critical information and tools, such as tables, graphs, maps, and statistics.

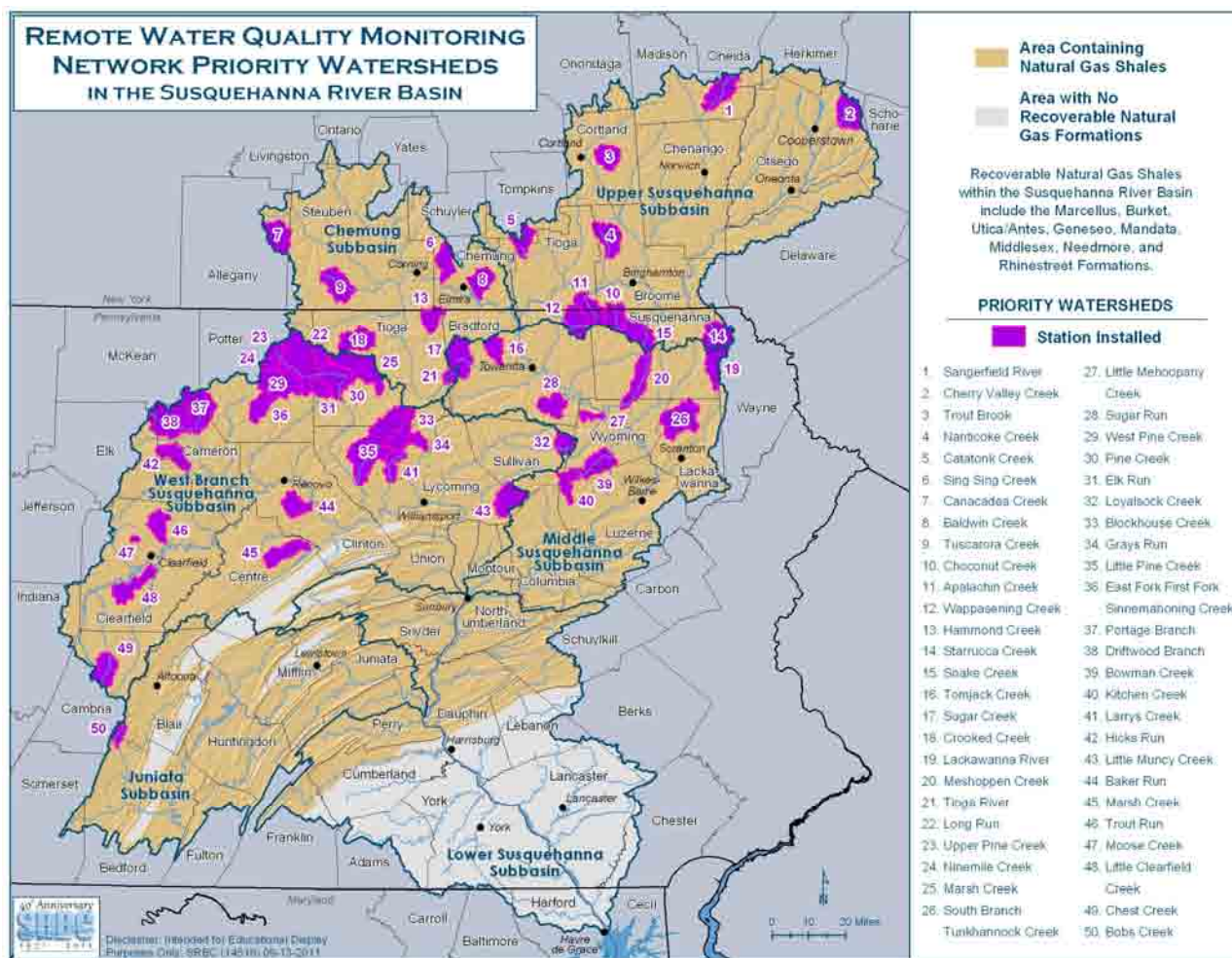
The network implementation process included SRBC staff:

- Determining optimal locations for monitoring stations and obtaining access approval;
- Installing and maintaining 50 monitoring stations;
- Establishing a data management system for the monitoring network; and
- Providing a framework for data sharing among partners.



*Water quality datasonde*

(over)



**Network Coverage** – The network area mostly spans the northern portion of the Susquehanna basin, with additional focus along the Pennsylvania–New York border.

The network provides enhanced capability for maintaining and protecting the quality and reliability of water resources in the basin, and fosters communication and data sharing among partners. These goals represent those supported by SRBC’s Comprehensive Plan, with respect to the *Priority Management Areas* related to water quality, water supply, ecosystems, and coordination. A contribution from East Resources Inc. provided the initial funding for the project. In 2010, the New York State Energy Research and Development Authority provided additional funding for the expansion of the network into the New York portion of the basin. In 2011, the Pennsylvania Department of Conservation and Natural Resources provided funding to expand the network into state forest lands. SRBC is covering the ongoing maintenance costs for the entire network.

**Operation and Maintenance** – SRBC staff visit each station at approximately six- to eight-week intervals to perform routine maintenance. At certain times, some stations require additional visits depending on site-specific conditions. During any such site visits, staff collects additional data to assist with characterizing water quality conditions (i.e., streamflow measurements, water samples for more extensive lab analyses). The aquatic life community at each station location is also assessed once a year.

**Contact** – For more information on the network, please contact **Andrew Gavin**, Manager, Monitoring and Protection, at (717) 238-0426, ext. 107, or [agavin@srbc.net](mailto:agavin@srbc.net).

For further information or to view “real-time” data for the stations installed to date, please visit the SRBC web page: <http://mdw.srbc.net/remotewaterquality/>.