

# Susquehanna River Basin Commission

## Non-Tidal Network Monitoring, Analyses, and Reporting Overview

Chesapeake Bay Non-Tidal Network Work Group Meeting  
12/20/2023

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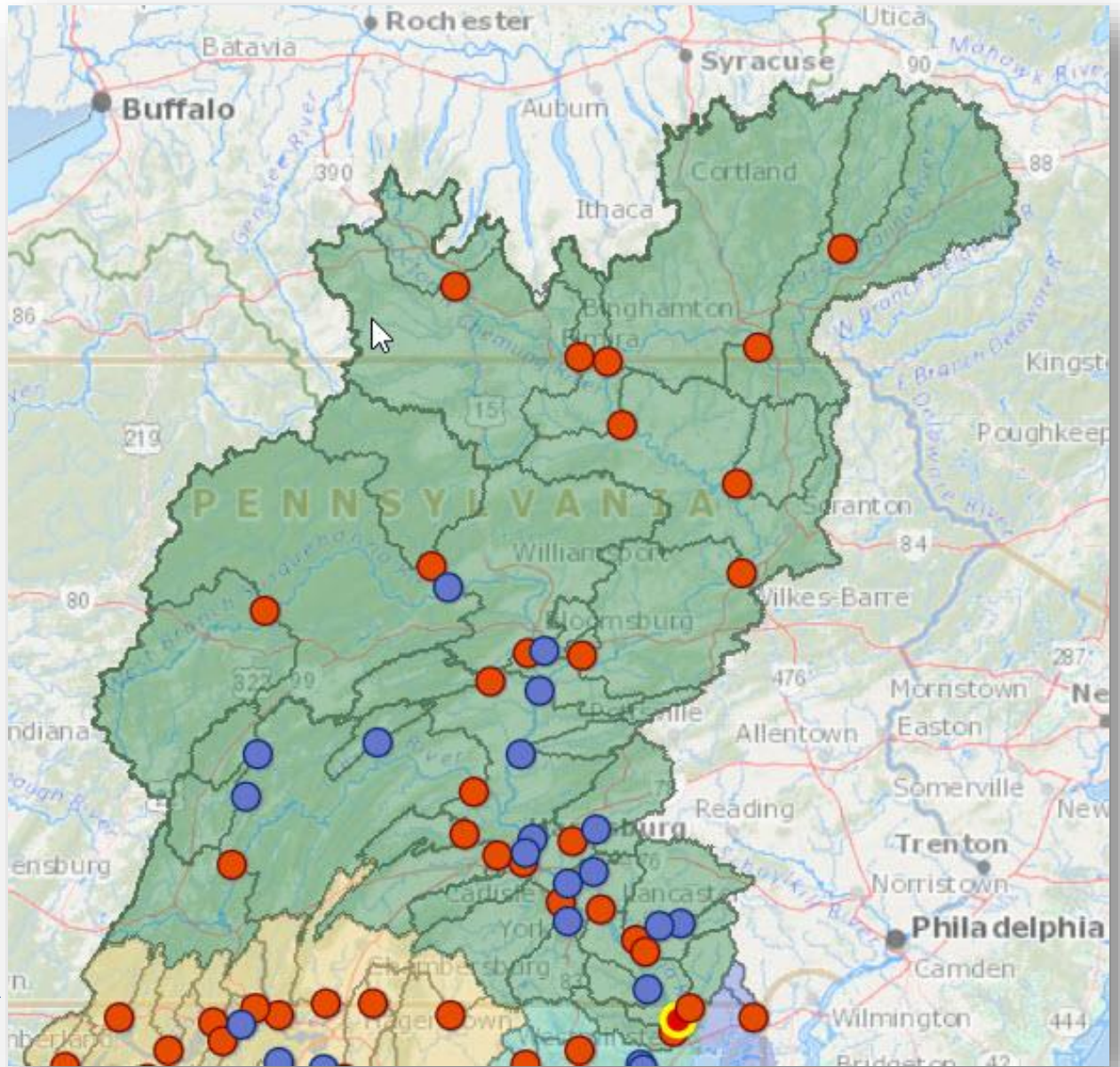
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# Susquehanna River Basin Non-Tidal Network Monitoring Station Overview

1. The Susquehanna River Basin (green region) is the largest source of freshwater as well as sediment & nutrient loads to Chesapeake Bay;
2. Of 123 Non-Tidal Network stations (active as-of water year 2023), 43 or 35% were in the SRB; and,
3. Eight NTN stations in the SRB have record periods that began in the 1980s and continue to present.

click image for hyperlink to USGS web portal



# Susquehanna River Basin Non-Tidal Network Monitoring Station List

Initial Characterization

1st Expansion

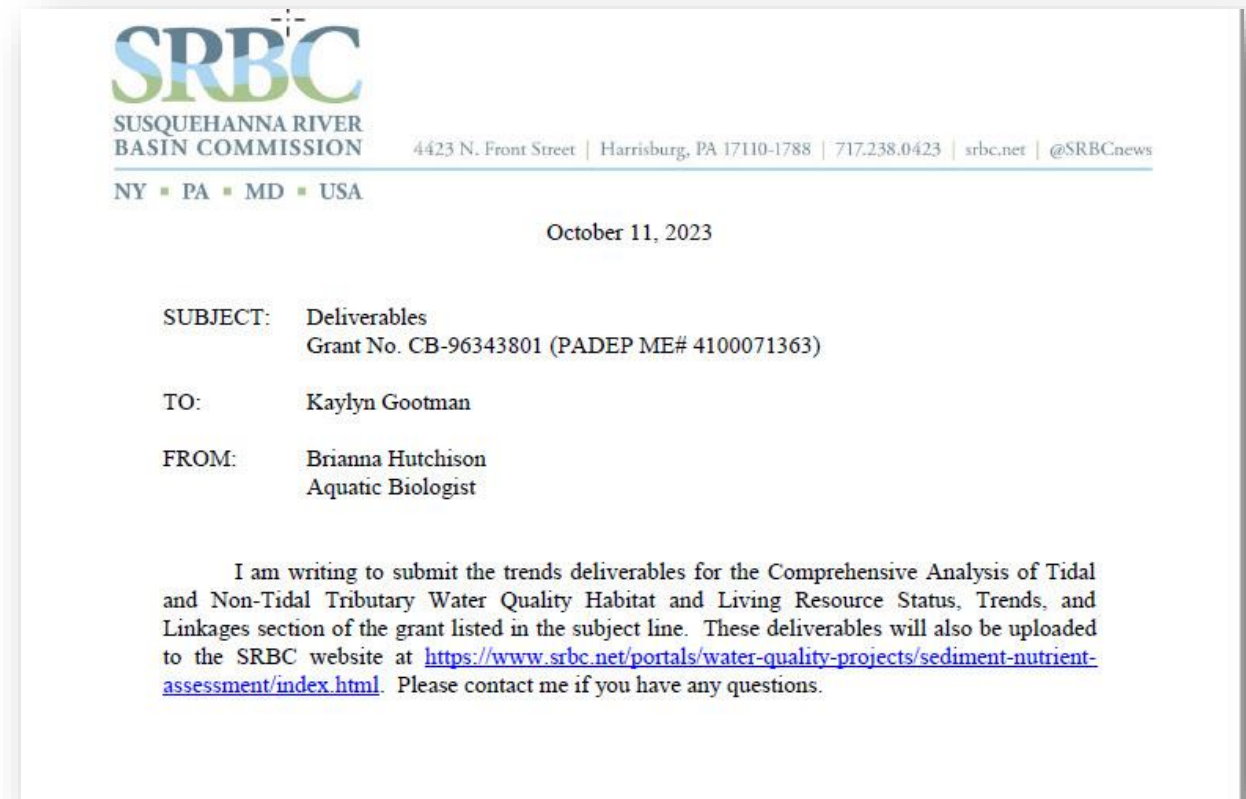
SUSQUEHANNA RIVER BASIN NON-TIDAL NETWORK MONITORING STATIONS					
NO.	STAID	STATION NAME	FIRST YEAR	Comments	AGENCY
1	1531500	Susquehanna River at Towanda, PA	1985	Long-Term	SRBC
2	1540500	Susquehanna River at Danville, PA	1985	Long-Term	SRBC
3	1553500	West Branch Susquehanna River at Lewisburg, PA	1985	Long-Term	SRBC
4	1567000	Juniata River at Newport, PA	1985	Long-Term	SRBC
5	1576754	Conestoga River at Conestoga, PA	1985	Long-Term	SRBC
6	1578310	SUSQUEHANNA RIVER AT CONOWINGO, MD	1985	Long-Term	USGS
7	1568750	Stony Creek near Dauphin, PA	1985	Initial only	N/A
8	1571005	Paxton Creek near Glenwood, PA	1985	Initial 5 yr; 1st expansion	SRBC
9	1575585	Codorus Creek at Pleasureville, PA	1985	Initial 5 yr; 2nd expansion	USGS
10	1568000	Sherman Creek at Shermans Dale, PA	1985	Initial 5 yr; 1st expansion	SRBC
11	1573560	Swatara Creek near Hershey, PA	1985	Initial 5 yr; 1st expansion	SRBC
12	1574000	West Conewago Creek near Manchester, PA	1985	Initial 5 yr; 1st expansion	USGS
13	1576000	Susquehanna River at Marietta, PA	1987	Long-Term	USGS
14	1536500	Susquehanna River at Wilkes-Barre, PA	1989	Long-Term	SRBC
15	1502500	UNADILLA RIVER AT ROCKDALE NY	2005	1st expansion	SRBC
16	1515000	SUSQUEHANNA RIVER NEAR WAVERLY NY	2005	1st expansion	SRBC
17	1531000	CHEMUNG RIVER AT CHEMUNG NY	2005	1st expansion	SRBC
18	1542500	WB Susquehanna River at Karthaus, PA	2005	1st expansion	SRBC
19	1555000	Penns Creek at Penns Creek, PA	2005	1st expansion	SRBC
20	1562000	Raystown Branch Juniata River at Saxton, PA	2005	1st expansion	SRBC
21	1570000	Conodoguinet Creek near Hogestown, PA	2005	1st expansion	SRBC
22	1571500	Yellow Breeches Creek near Camp Hill, PA	2005	1st expansion	SRBC
23	1576787	Pequea Creek at Martic Forge, PA	2005	1st expansion	SRBC

SUSQUEHANNA RIVER BASIN NON-TIDAL NETWORK MONITORING STATIONS					
NO.	STAID	STATION NAME	FIRST YEAR	Comments	AGENCY
24	1548085	Bald Eagle Creek near Castenea, PA	2005	1st expansion; not gaged	SRBC
25	1549760	WB Susquehanna River at Jersey Shore, PA	2005	1st expansion	SRBC
26	1503000	SUSQUEHANNA RIVER AT CONKLIN NY	2006	1st expansion	SRBC
27	1529500	COHOCTON RIVER NEAR CAMPBELL NY	2006	1st expansion	SRBC
28	1580520	DEER CREEK NEAR DARLINGTON, MD	2006	1st expansion	USGS
29	1549700	Pine Creek bl L Pine Creek near Waterville, PA	2007	1st expansion	USGS
30	1578475	Octoraro Creek near Richardsmere, MD	2007	1st expansion	SRBC
31	1534000	Tunkhannock Creek near Tunkhannock, PA	2009	1st expansion	USGS
32	1554000	Susquehanna River at Sunbury, PA	2012	2nd expansion	USGS
33	1555500	East Mahantango Creek near Dalmatia, PA	2012	2nd expansion	SRBC
34	1556000	Frankstown Br Juniata River at Williamsburg, PA	2012	2nd expansion	SRBC
35	1558000	Little Juniata River at Spruce Creek, PA	2012	2nd expansion	SRBC
36	1565000	Kishacoquillas Creek at Reedsville, PA	2012	2nd expansion	SRBC
37	1570500	Susquehanna River at Harrisburg, PA	2012	2nd expansion	USGS
38	1573710	Conewago Creek near Falmouth, PA	2012	2nd expansion	USGS
39	15765195	Big Spring Run near Mylin Corners, PA	2012	2nd expansion	USGS
40	1573160	Quittapahilla Creek near Bellegrove, PA	2013	2nd expansion	USGS
41	1573695	Conewago Creek near Bellaire, PA	2013	2nd expansion	USGS
42	1576767	Pequea Creek near Ronks, PA	2013	2nd expansion	USGS
43	1553850	Chillisquaque Creek near Potts Grove, PA	2014	2nd expansion	USGS
44	1577500	Muddy Creek at Castle Fin, PA	2015	2nd expansion	USGS
45	1576381	Hammer Creek near Schafferstown, PA	2024	3rd expansion	SRBC
46	1573684	Little Conewago Creek at Upper Lawn, PA	2024	3rd expansion	PSU-AEC



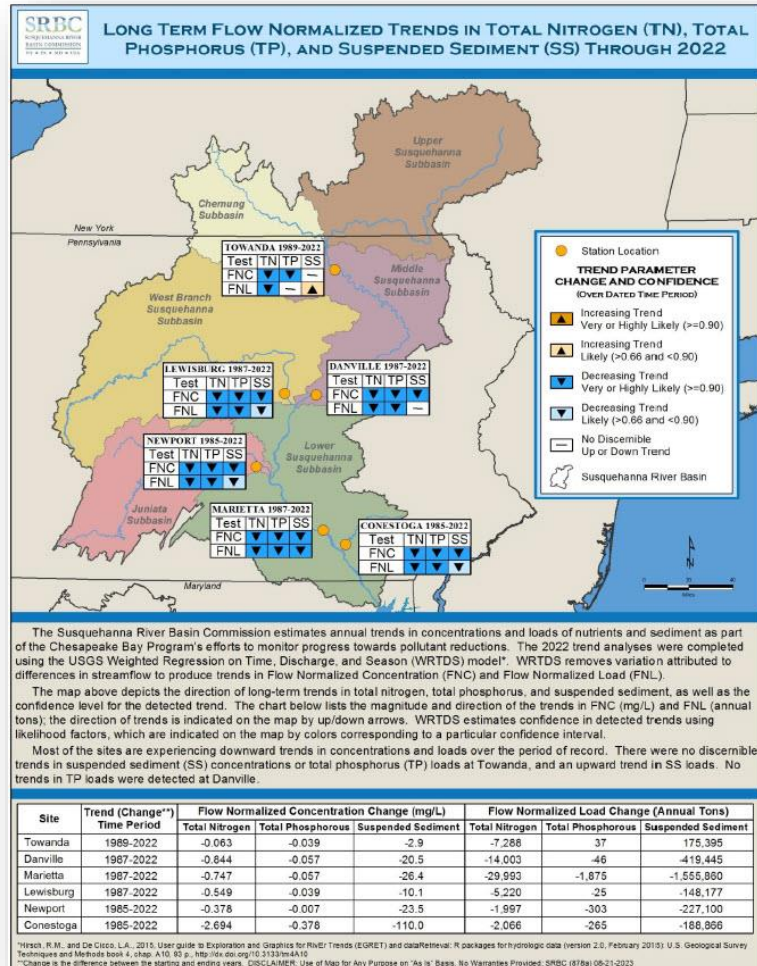
## Questions for SRBC to Address:

1. What is the Deliverable requirement for SRBC's Susquehanna Loads & Trends?
2. How are new data obtained?
3. What is the source of Water Quality data used to compute Loads and Trends?



Cover Page for "Hard Copy" report submitted to CBP.

# SRBC Deliverables for Susquehanna Loads & Trends



Example Page from "Hard Copy" report

**SRBC** SUSQUEHANNA RIVER BASIN COMMISSION  
NY ■ PA ■ MD ■ USA

ABOUT OUR WORK REGULATORY PORTALS

**SNAP** ABOUT METHODS MAP SUMMARY STATISTICS SITES

Home > Portals > Water Quality Projects > Sediment & Nutrient Assessment

## Sediment and Nutrient Assessment Program (SNAP)

SRBC's Sediment and Nutrient Assessment Program sampling network is an integral part of the Chesapeake Bay Program's Non-tidal Water Quality Monitoring Network. The SNAP network consists of 26 sites monitored for various nitrogen and phosphorus species and suspended sediment. Data are used to quantify the amount of nitrogen, phosphorus, and suspended sediment transported at each site and to calculate trends in loads and concentrations. The [Chesapeake Bay Program Quality Assurance: Nontidal Water Quality Monitoring Program web page](#) provides a means to explore the network and the results of a variety of data analyses.

### Sampling Sites

Begun in 1984, the initial Sediment and Nutrient Monitoring Program (SNAP) network consisted of two mainstem sites on the Susquehanna River and 10 tributary sites. Since 1989, several modifications to the network were made including adding 20 sites as part of the CBPO non-tidal water quality monitoring network. The current SNAP network consists of six sites on the mainstem of the Susquehanna River and 20 tributary sites. The 26-site network contains five sites in New

### Monitoring Sites in the Susquehanna River Basin



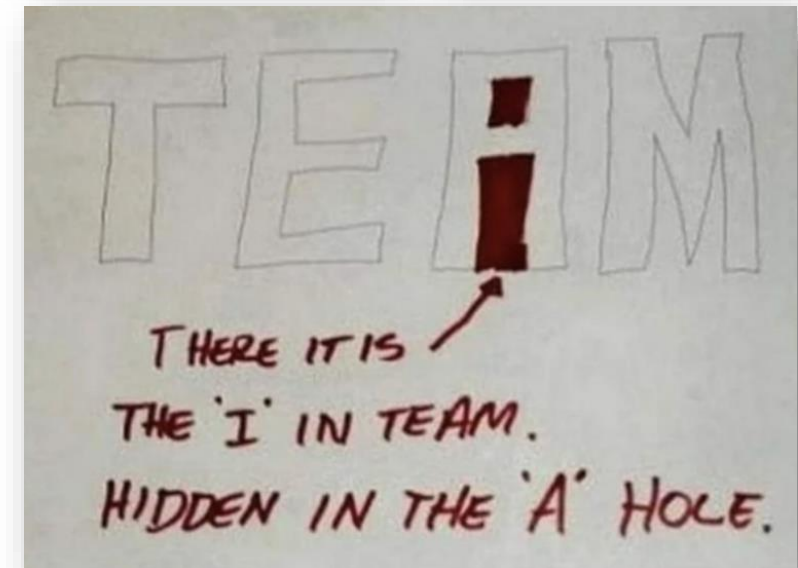
Click image for hyperlink to SRBC's SNAP webpage

## Questions for SRBC to Address:

1. What is the Deliverable requirement for SRBC's Susquehanna Loads & Trends?
2. How are new data obtained?
3. What is the source of Water Quality data used to compute Loads and Trends?

SRBC employs two full-time technicians who lead NTN sample collection activities at more than 25 NTN stations. Extra staff are utilized during storm event collections.

Additional staff manage data resources internally and uploads thru DUET to CEDR; analyze Loads & Trends using WRTDS/-Kalman; develop and maintain QAP and progress reports; support web content; and, manage project.



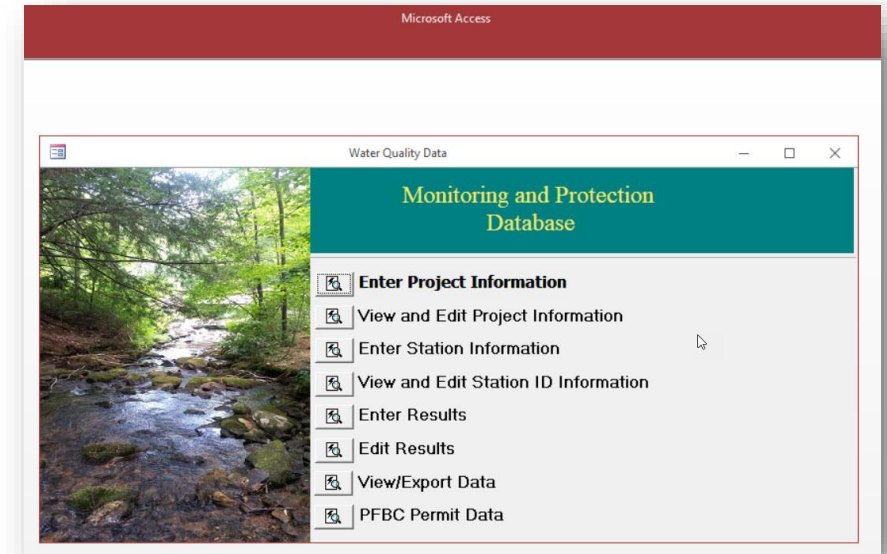
## **SRBC's Water Quality samples are analyzed at several facilities:**

- 1. PADEP Laboratory (Pennsylvania and Octoraro Creek at Richardsmere, MD stations)**
- 2. ALS Global Rochester, NY (New York stations)**
- 3. USGS Kentucky – Suspended Sediment grain size fraction**
- 4. SRBC Harrisburg – Suspended Sediment Concentration from 5 (formerly 6) Long-term stations during routine mid-month collections only)**

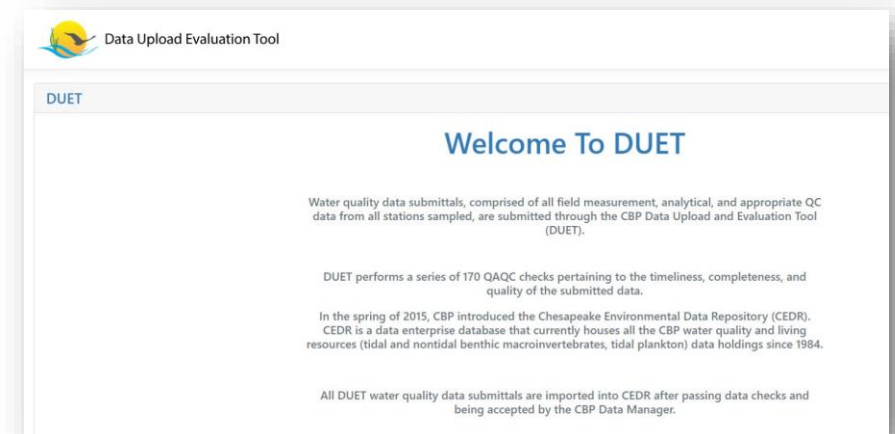


## Questions for SRBC to Address:

1. What is the Deliverable requirement for SRBC's Susquehanna Loads & Trends?
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**SRBC uses a Microsoft Access Database to manage environmental data internally.**





Open Access

## Weighted Regressions on Time, Discharge, and Season (WRTDS), with an Application to Chesapeake Bay River Inputs<sup>†</sup>

Robert M. Hirsch, Douglas L. Moyer, Stacey A. Archfield

First published: 07 September 2010 | <https://doi.org/10.1111/j.1752-1688.2010.00482.x> | Citations: 313

✉ (E-Mail/Hirsch: [rhirsch@usgs.gov](mailto:rhirsch@usgs.gov))

<sup>†</sup> Paper No. JAWRA-10-0082-P of the *Journal of the American Water Resources Association* (JAWRA).

**Discussions are open until six months from print publication.**

<sup>‡</sup> Re-use of this article is permitted in accordance with the Terms and Conditions set out at [http://wileyonlinelibrary.com/onlineopen#OnlineOpen\\_Terms](http://wileyonlinelibrary.com/onlineopen#OnlineOpen_Terms)

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### Abstract

Hirsch, Robert M., Douglas L. Moyer, and Stacey A. Archfield, 2010. Weighted Regressions on Time, Discharge, and Season (WRTDS), With an Application to Chesapeake Bay River

<https://onlinelibrary.wiley.com/doi/10.1111/j.1752-1688.2010.00482.x>

## EGRET



CRAN 3.0.9 downloads 508/month downloads 65K

Exploration and Graphics for RivEr Trends ( EGRET ): An R-package for the analysis of long-term changes in water quality and streamflow, including the water-quality method Weighted Regressions on Time, Discharge, and Season (WRTDS).

Look for new and improved documentation here: <https://rconnect.usgs.gov/EGRET/>

The link for the official USGS publication user guide is here:

<https://pubs.usgs.gov/tm/04/a10/>

A companion package [EGRETci](#) implements a set of approaches to the analysis of uncertainty associated with WRTDS trend analysis.

If you are familiar with the traditional EGRET workflow, check out the [Overview and Updates](#) to see how all the latest updates relate.

<https://doi-usgs.github.io/EGRET/>

## Review Answers from SRBC:

1. What is the Deliverable requirement for SRBC's Susquehanna Loads & Trends?
2. How are new data obtained?
3. What is the source of Water Quality data used to compute Loads and Trends?

1. SRBC analyzes Loads & Trends with each successive Water Year for NTN stations that we monitor. Output summary is submitted as a Technical Report to CBP and PADEP and WRTDS outputs are incorporated to SRBC's SNAP web portal
2. Crews collect samples at >25 NTN stations and samples are analyzed at 4 different laboratories.
3. SRBC pulls Water Quality data from our internal database (rather than CEDR) for analyses by WRTDS and WRTDS-Kalman using R code from EGRET.

## Questions for the group to discuss together:

- How can we better coordinate (1) NTN water-quality used, (2) methodology for computing loads and trends, and (3) timing of release of loads and trends?
- How to better communicate with the NTN WG SRBC plans for computing/releasing Susquehanna loads and trends?



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