

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on July 10, 2014 by EPA START (Team 1) sampling teams. Water sample measurements are in milligrams per liter (mg/L) and/or micrograms per liter (µg/L) for these samples. The data is being compared to EPA ecological risk screening levels (ERSLs) to protect aquatic life in the surface water of the Dan River. Specific qualifiers and footnotes are listed below the summary table. These samples were collected at various locations along the river (refer to map for generalized locations). The detected concentrations in surface water are all below the EPA ERSLs with the exception of lead. When chemical concentrations exceed the screening values it doesn't mean there will be adverse health or ecological effects, but recommends further investigation may be needed.

Analyte	Ecological Screening Standard for Surface Water Samples ¹		DRSS Boat Ramp		Hwy 700		Hwy 880	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140710		EDEN-HW700-C-SW-20140710		EDEN-BHB-C-SW-20140710	
Date	-		07/10/2014		07/10/2014		07/10/2014	
Time	-		1214		1143		1114	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	-	-	81J	µg/L	15	µg/L
Antimony	5.6	µg/L	-	-	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	-	-	1U	µg/L	0.64J	µg/L
Barium	220	µg/L	-	-	17	µg/L	19	µg/L
Beryllium	0.66	µg/L	-	-	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	-	-	0.13	mg/L	0.2	mg/L
Cadmium	0.1	µg/L	-	-	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	-	-	7300	µg/L	8400	µg/L
Chromium	25	µg/L	-	-	1.2J	µg/L	1.5J	µg/L
Cobalt	3	µg/L	-	-	0.16J	µg/L	0.4U	µg/L
Copper	3	µg/L	-	-	0.82J	µg/L	0.89J	µg/L
Iron	1,000	µg/L	-	-	320J	µg/L	150	µg/L
Lead	0.59	µg/L	-	-	0.17J	µg/L	0.3U	µg/L
Magnesium	-	-	-	-	2800	µg/L	3100	µg/L
Manganese	200	µg/L	-	-	36J	µg/L	9.8	µg/L
Mercury	0.000012	mg/L	-	-	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	-	-	1U	µg/L	0.46J	µg/L
Nickel	17	µg/L	-	-	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	-	-	1700	µg/L	1800	µg/L
Selenium	5	µg/L	-	-	2U	µg/L	2U	µg/L
Silver	0.06	µg/L	-	-	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	-	-	4600	µg/L	5200	µg/L
Thallium	0.24	µg/L	-	-	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	-	-	1.5J	µg/L	1.6	µg/L
Zinc	39	µg/L	-	-	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	77	mg/L	67	mg/L	76	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	8	mg/L	6.5	mg/L	8.5	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		DRSS Boat Ramp		Hwy 700		Hwy 880	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140710		EDEN-HW700-C-SW-20140710		EDEN-BHB-C-SW-20140710	
Date	-		07/10/2014		07/10/2014		07/10/2014	
Time	-		1214		1143		1114	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	87	µg/L	14J	µg/L	75	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	19	µg/L	16	µg/L	20	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.18	mg/L	0.13	mg/L	0.2	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8300	µg/L	7600	µg/L	8600	µg/L
Chromium	29	µg/L	1.4J	µg/L	2U	µg/L	1J	µg/L
Cobalt	24	µg/L	0.16J	µg/L	0.4U	µg/L	0.17J	µg/L
Copper	3	µg/L	1.1	µg/L	0.59J	µg/L	0.82J	µg/L
Iron	2,300	µg/L	330	µg/L	150J	µg/L	310	µg/L
Lead	0.6	µg/L	0.17J	µg/L	0.3U	µg/L	0.22J	µg/L
Magnesium	-	-	3100	µg/L	2800	µg/L	3100	µg/L
Manganese	200	µg/L	42	µg/L	22J	µg/L	36	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1800	µg/L	1700	µg/L	1800	µg/L
Selenium	5	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	5600	µg/L	4700	µg/L	5200	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.7J+	µg/L	1.2J+	µg/L	1.5J+	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	87	µg/L	68	µg/L	100	µg/L
Chloride	230	mg/L	11	mg/L	8	mg/L	11	mg/L
Sulfate	-	-	6.2	mg/L	4.6	mg/L	5.1	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	24	mg/L	24	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	33	mg/L	31	mg/L	34	mg/L
Organic Carbon, Dissolved	-	-	1.3	mg/L	1.1	mg/L	1.2	mg/L
pH	6.5 - 9.0	SU	7.45J	SU	7.45J	SU	7.38J	SU

Notes

¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water

EPA U.S. Environmental Protection Agency

J Value is estimated

J+ Value is estimated with a possible high bias

J- Value is estimated with a possible low bias

µg/L micrograms per liter

mg/L milligrams per liter

SU standard unit

U Analyte was not detected at the listed reporting limit.

**EDEN NORTH CAROLINA COAL ASH SPILL
SURFACE WATER RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Abreu-Grogan Park Boat Dock		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140710	EDEN-DANIN-R-SW-20140710-DUP	EDEN-HW58-C-SW-20140710			
Date	-		07/10/2014	07/10/2014	07/10/2014			
Time	-		1035	1040	0848			
Status	-		Validation Complete	Validation Complete	Validation Complete			
Type	-		Surface Water	Surface Water	Surface Water			
Dissolved metals								
Aluminum	87	µg/L	21	µg/L	20	µg/L	47	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	3.2J	µg/L
Arsenic	10	µg/L	1U	µg/L	0.4J	µg/L	1.1J	µg/L
Barium	220	µg/L	17	µg/L	17	µg/L	18	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.11	mg/L	0.11	mg/L	0.091J	mg/L
Cadmium	0.1	µg/L	0.047J	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6900	µg/L	7000	µg/L	7000	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	1.7J	µg/L
Cobalt	3	µg/L	0.19J	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	0.73J	µg/L	0.75J	µg/L	1.2	µg/L
Iron	1,000	µg/L	150	µg/L	160	µg/L	190	µg/L
Lead	0.59	µg/L	0.062J	µg/L	0.3U	µg/L	0.17J	µg/L
Magnesium	-	-	2600	µg/L	2600	µg/L	2700	µg/L
Manganese	200	µg/L	47	µg/L	45	µg/L	4.7	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	1U	µg/L	1U	µg/L	0.7J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1700	µg/L	1700	µg/L	2100	µg/L
Selenium	5	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	4600	µg/L	4600	µg/L	6400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.7	µg/L	1.5	µg/L	2	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	67	mg/L	67	mg/L	73	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	10	mg/L	10	mg/L	17	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Abreu-Grogan Park Boat Dock		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140710	EDEN-DANIN-R-SW-20140710-DUP	EDEN-HW58-C-SW-20140710			
Date	-		07/10/2014	07/10/2014	07/10/2014			
Time	-		1035	1040	0848			
Status	-		Validation Complete	Validation Complete	Validation Complete			
Type	-		Surface Water	Surface Water	Surface Water			
Total Metals								
Aluminum	2,000	µg/L	110	µg/L	110	µg/L	180	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	2.8J	µg/L
Arsenic	10	µg/L	1U	µg/L	0.54J	µg/L	1UJ	µg/L
Barium	220	µg/L	18	µg/L	19	µg/L	20	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.11	mg/L	0.11	mg/L	0.089J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7000	µg/L	7300	µg/L	7100	µg/L
Chromium	29	µg/L	2U	µg/L	1.1J	µg/L	1J	µg/L
Cobalt	24	µg/L	0.24J	µg/L	0.25J	µg/L	0.29J	µg/L
Copper	3	µg/L	0.79J	µg/L	0.87J	µg/L	1.1	µg/L
Iron	2,300	µg/L	360	µg/L	370	µg/L	470	µg/L
Lead	0.6	µg/L	0.28J	µg/L	0.28J	µg/L	0.43	µg/L
Magnesium	-	-	2600	µg/L	2600	µg/L	2700	µg/L
Manganese	200	µg/L	59	µg/L	61	µg/L	46	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1700	µg/L	1700	µg/L	2200	µg/L
Selenium	5	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	4600	µg/L	4600	µg/L	6200	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.8J+	µg/L	1.9J+	µg/L	2.3J+	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	3.2J	µg/L
Anions								
Bromide	-	-	57	µg/L	56	µg/L	51	µg/L
Chloride	230	mg/L	7.2	mg/L	7.2	mg/L	8	mg/L
Sulfate	-	-	4.4	mg/L	4.4	mg/L	5.6	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	25	mg/L	21	mg/L	25	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	28	mg/L	29	mg/L	29	mg/L
Organic Carbon, Dissolved	-	-	1.3	mg/L	1.3	mg/L	1.7	mg/L
pH	6.5 - 9.0	SU	7.41J	SU	7.41J	SU	7.41J	SU

Notes

¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water

EPA U.S. Environmental Protection Agency

J Value is estimated

J+ Value is estimated with a possible high bias

J- Value is estimated with a possible low bias

µg/L micrograms per liter

mg/L milligrams per liter

SU standard unit

U Analyte was not detected at the listed reporting limit.

**EDEN NORTH CAROLINA COAL ASH SPILL
SURFACE WATER RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140710	
Date	-		07/10/2014	
Time	-		0926	
Status	-		Validation Complete	
Type	-		Surface Water	
Dissolved metals				
Aluminum	87	μg/L	61	μg/L
Antimony	5.6	μg/L	2.5	μg/L
Arsenic	10	μg/L	1U	μg/L
Barium	220	μg/L	20	μg/L
Beryllium	0.66	μg/L	0.4U	μg/L
Boron	0.36	mg/L	0.16	mg/L
Cadmium	0.1	μg/L	0.1U	μg/L
Calcium	-	-	7600	μg/L
Chromium	25	μg/L	1.2J	μg/L
Cobalt	3	μg/L	0.4U	μg/L
Copper	3	μg/L	1.1	μg/L
Iron	1,000	μg/L	150	μg/L
Lead	0.59	μg/L	0.078J	μg/L
Magnesium	-	-	2900	μg/L
Manganese	200	μg/L	5	μg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	800	μg/L	1U	μg/L
Nickel	17	μg/L	1U	μg/L
Potassium	53,000	μg/L	2100	μg/L
Selenium	5	μg/L	2U	μg/L
Silver	0.06	μg/L	1U	μg/L
Sodium	680,000	μg/L	5200	μg/L
Thallium	0.24	μg/L	0.2U	μg/L
Vanadium	27	μg/L	1.7	μg/L
Zinc	39	μg/L	20U	μg/L
Total Dissolved Solids				
Total Dissolved Solids	-	-	73	mg/L
Total Suspended Solids				
Total Suspended Solids	-	-	23	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140710	
Date	-		07/10/2014	
Time	-		0926	
Status	-		Validation Complete	
Type	-		Surface Water	
Total Metals				
Aluminum	2,000	µg/L	210	µg/L
Antimony	5.6	µg/L	2.4	µg/L
Arsenic	10	µg/L	0.43J	µg/L
Barium	220	µg/L	23	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.16	mg/L
Cadmium	2	µg/L	0.1U	µg/L
Calcium	-	-	7700	µg/L
Chromium	29	µg/L	1.5J	µg/L
Cobalt	24	µg/L	0.29J	µg/L
Copper	3	µg/L	1.1	µg/L
Iron	2,300	µg/L	410	µg/L
Lead	0.6	µg/L	0.47	µg/L
Magnesium	-	-	2900	µg/L
Manganese	200	µg/L	47	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L
Nickel	17	µg/L	1U	µg/L
Potassium	53,000	µg/L	2100	µg/L
Selenium	5	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L
Sodium	680,000	µg/L	5100	µg/L
Thallium	0.24	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2.2J+	µg/L
Zinc	39	µg/L	20U	µg/L
Anions				
Bromide	-	-	80	µg/L
Chloride	230	mg/L	9.3	mg/L
Sulfate	-	-	5.2	mg/L
Wet Chemistry				
Alkalinity, Total (As CaCO ₃)	-	-	23	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	31	mg/L
Organic Carbon, Dissolved	-	-	1.8	mg/L
pH	6.5 - 9.0	SU	7.39J	SU

Notes

¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water

EPA U.S. Environmental Protection Agency

J Value is estimated

J+ Value is estimated with a possible high bias

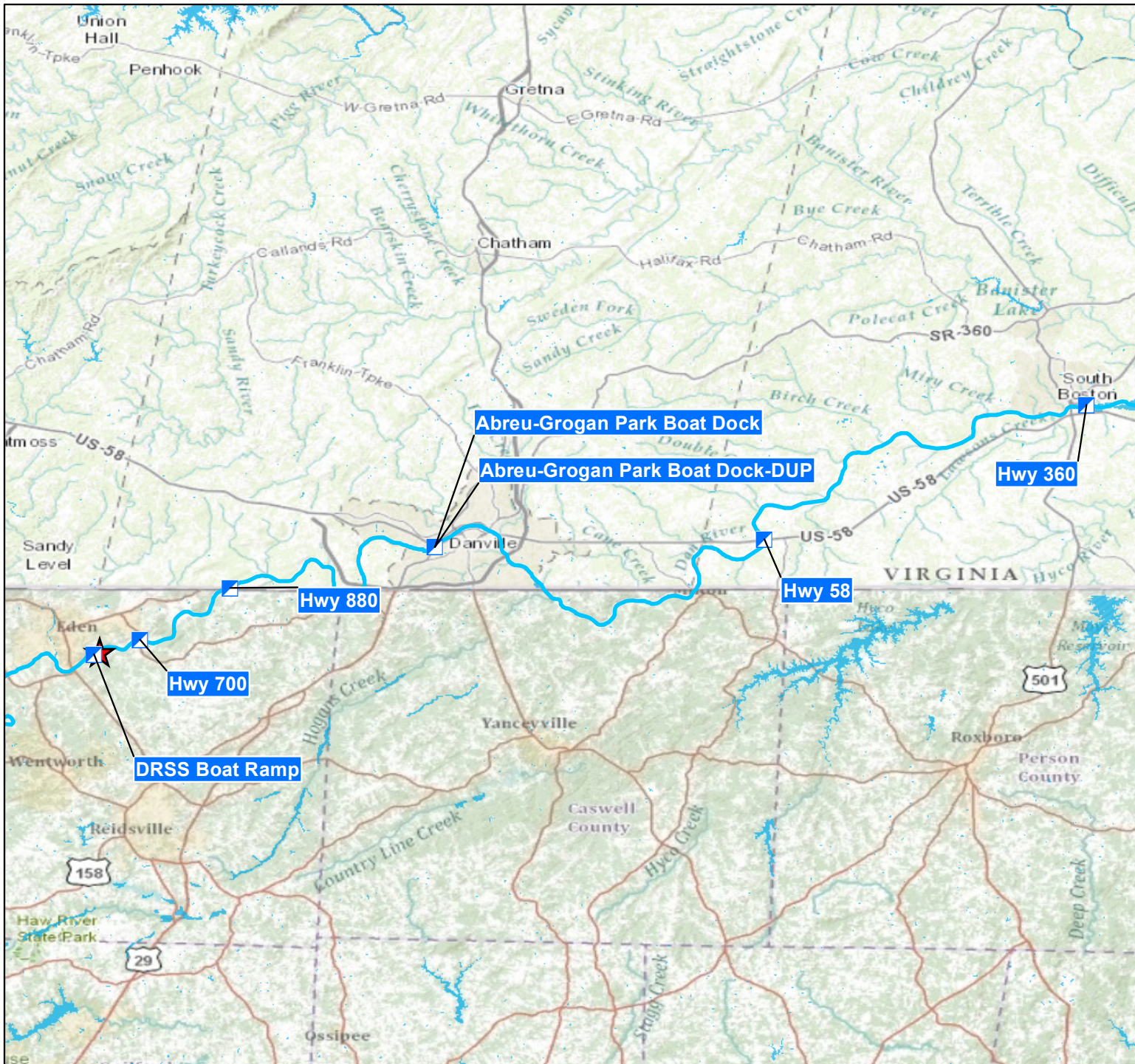
J- Value is estimated with a possible low bias

µg/L micrograms per liter



mg/L milligrams per liter

SU standard unit

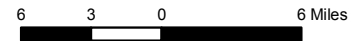
U Analyte was not detected at the listed reporting limit.



Legend

-  Approximate Spill Location
-  Surface Water Sample Location

Imagery Source:
ESRI, USGS Mapping Service, 2013



Eden Coal Ash Spill
Eden, North Carolina

Surface Water
Sample Locations
July 10, 2014

