

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on June 19, 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		Duke Outfall B		Duke Outfall C (36 in RCP)	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140619		EDEN-48OUTFL-C-SW-20140619		EDEN-36OUTFL-C-SW-20140619	
Date	-		06/19/2014		06/19/2014		06/19/2014	
Time	-		1230		1307		1315	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	43	µg/L	43	µg/L	39	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.6J+	µg/L	1.9J+	µg/L	2.1J+	µg/L
Barium	220	µg/L	18	µg/L	18	µg/L	17	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.13	mg/L	0.13	mg/L	0.13	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7500	µg/L	7200	µg/L	7100	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.15J	µg/L	0.14J	µg/L	0.14J	µg/L
Copper	3	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Iron	1,000	µg/L	230	µg/L	220	µg/L	200	µg/L
Lead	0.59	µg/L	1.8J	µg/L	0.094J	µg/L	0.094J	µg/L
Magnesium	-	-	2800	µg/L	2800	µg/L	2700	µg/L
Manganese	200	µg/L	22	µg/L	20	µg/L	20	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.46J	µg/L	0.47J	µg/L	0.46J	µg/L
Nickel	17	µg/L	0.43J	µg/L	0.54J	µg/L	0.4J	µg/L
Potassium	53,000	µg/L	1800	µg/L	1700	µg/L	1700	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	5400	µg/L	5200	µg/L	4800	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.3	µg/L	1.6	µg/L	1.3	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	76	mg/L	78	mg/L	100	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	13	mg/L	12	mg/L	12	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		DRSS Boat Ramp		Duke Outfall B		Duke Outfall C (36 in RCP)	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140619	EDEN-48OUTFL-C-SW-20140619	EDEN-36OUTFL-C-SW-20140619			
Date	-		06/19/2014	06/19/2014	06/19/2014			
Time	-		1230	1307	1315			
Status	-		Validation Complete	Validation Complete	Validation Complete			
Type	-		Surface Water	Surface Water	Surface Water			
Total Metals								
Aluminum	2,000	µg/L	370	µg/L	390	µg/L	230	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.43J	µg/L	0.63J	µg/L	0.49J	µg/L
Barium	220	µg/L	21	µg/L	21	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	0.12	mg/L	0.13	mg/L	0.12	mg/L
Cadmium	2	µg/L	0.085J	µg/L	0.047J	µg/L	0.1U	µg/L
Calcium	-	-	7300	µg/L	7400	µg/L	7200	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.37J	µg/L	0.34J	µg/L	0.27J	µg/L
Copper	3	µg/L	1.3	µg/L	1.2	µg/L	1	µg/L
Iron	2,300	µg/L	810	µg/L	810	µg/L	570	µg/L
Lead	0.6	µg/L	0.44J	µg/L	0.41	µg/L	0.43	µg/L
Magnesium	-	-	2800	µg/L	2800	µg/L	2800	µg/L
Manganese	200	µg/L	42	µg/L	39	µg/L	34	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	0.66J	µg/L	0.67J	µg/L	0.55J	µg/L
Potassium	53,000	µg/L	1700	µg/L	1700	µg/L	1700	µg/L
Selenium	5	µg/L	0.6J	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	5200	µg/L	4900	µg/L	4800	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2.6J+	µg/L	3J+	µg/L	2.1J+	µg/L
Zinc	39	µg/L	3J	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	62J-	µg/L	59J-	µg/L	59J-	µg/L
Chloride	230	mg/L	8.5	mg/L	8.3	mg/L	8.3	mg/L
Sulfate	-	-	5.7	mg/L	5.1	mg/L	5	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	24	mg/L	23	mg/L	21	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	30	mg/L	30	mg/L	29	mg/L
Organic Carbon, Dissolved	-	-	1.1	mg/L	1.3	mg/L	1.2	mg/L
pH	6.5 - 9.0	SU	7.3J	SU	7.32J	SU	7.25J	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 units
- 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 700		Hwy 880		Abreu-Grogan Park Boat Dock	
Sample Information								
Sample ID	-		EDEN-HW700-C-SW-20140619		EDEN-BHB-C-SW-20140619		EDEN-DANIN-R-SW-20140619	
Date	-		06/19/2014		06/19/2014		06/19/2014	
Time	-		1148		1120		1038	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	29	µg/L	18	µg/L	20	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	2.2J+	µg/L	1.6J+	µg/L	1.8J+	µg/L
Barium	220	µg/L	17	µg/L	20	µg/L	22	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.12	mg/L	0.18	mg/L	0.2	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.053J	µg/L	0.1U	µg/L
Calcium	-	-	6900	µg/L	8000	µg/L	8600	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.14J	µg/L	0.12J	µg/L	0.16J	µg/L
Copper	3	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Iron	1,000	µg/L	190	µg/L	140	µg/L	160	µg/L
Lead	0.59	µg/L	0.078J	µg/L	0.072J	µg/L	0.073J	µg/L
Magnesium	-	-	2600	µg/L	3000	µg/L	3200	µg/L
Manganese	200	µg/L	20	µg/L	11	µg/L	35	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.47J	µg/L	0.57J	µg/L	0.65J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1500	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	4200	µg/L	5000	µg/L	5400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.2	µg/L	1.1	µg/L	1.2	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	73	mg/L	70	mg/L	74	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	11	mg/L	13	mg/L	11	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 700		Hwy 880		Abreu-Grogan Park Boat Dock	
Sample Information								
Sample ID	-		EDEN-HW700-C-SW-20140619		EDEN-BHB-C-SW-20140619		EDEN-DANIN-R-SW-20140619	
Date	-		06/19/2014		06/19/2014		06/19/2014	
Time	-		1148		1120		1038	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	260	µg/L	230	µg/L	230	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.52J	µg/L	0.58J	µg/L	0.6J	µg/L
Barium	220	µg/L	20	µg/L	23	µg/L	24	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.12	mg/L	0.18	mg/L	0.2	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.047J	µg/L
Calcium	-	-	7000	µg/L	8100	µg/L	8600	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.32J	µg/L	0.31J	µg/L	0.31J	µg/L
Copper	3	µg/L	0.9J	µg/L	1.5	µg/L	1.1	µg/L
Iron	2,300	µg/L	640	µg/L	570	µg/L	570	µg/L
Lead	0.6	µg/L	0.59	µg/L	0.37	µg/L	0.32	µg/L
Magnesium	-	-	2700	µg/L	3000	µg/L	3200	µg/L
Manganese	200	µg/L	40	µg/L	35	µg/L	50	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L	0.51J	µg/L	0.54J	µg/L
Nickel	17	µg/L	1.9	µg/L	0.5J	µg/L	0.53J	µg/L
Potassium	53,000	µg/L	1600	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	4300	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	2.2J+	µg/L	2.2J+	µg/L	2.3J+	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	62J-	µg/L	83J-	µg/L	100J-	µg/L
Chloride	230	mg/L	7.6	mg/L	9.5	mg/L	11	mg/L
Sulfate	-	-	4.2	mg/L	4.8	mg/L	4.9	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	22	mg/L	22	mg/L	23	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	29	mg/L	33	mg/L	35	mg/L
Organic Carbon, Dissolved	-	-	0.94J	mg/L	0.88J	mg/L	1.1	mg/L
pH	6.5 - 9.0	SU	7.02J	SU	7.21J	SU	7.16J	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 units
- 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		Hwy 58		Hwy 360	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140619-DUP		EDEN-HW58-C-SW-20140619		EDEN-HW360-C-SW-20140619	
Date	-		06/19/2014		06/19/2014		06/19/2014	
Time	-		1040		0850		0928	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	19	µg/L	21	µg/L	17	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	2.4J+	µg/L	1.6J+	µg/L	1U	µg/L
Barium	220	µg/L	22	µg/L	22	µg/L	24	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.2	mg/L	0.17	mg/L	0.14	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8600	µg/L	8300	µg/L	8200	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.15J	µg/L	0.15J	µg/L	0.12J	µg/L
Copper	3	µg/L	1U	µg/L	1.1J+	µg/L	1.1J+	µg/L
Iron	1,000	µg/L	160	µg/L	190	µg/L	160	µg/L
Lead	0.59	µg/L	0.083J	µg/L	0.16J	µg/L	0.11J	µg/L
Magnesium	-	-	3200	µg/L	3100	µg/L	3100	µg/L
Manganese	200	µg/L	35	µg/L	6.8	µg/L	6.2	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.63J	µg/L	0.7J	µg/L	0.74J	µg/L
Nickel	17	µg/L	0.46J	µg/L	0.53J	µg/L	0.5J	µg/L
Potassium	53,000	µg/L	1800	µg/L	2000	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	5300	µg/L	9200	µg/L	10000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.4	µg/L	1.7	µg/L	1.5	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	82	mg/L	180	mg/L	100	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	10	mg/L	15	mg/L	20	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		Hwy 58		Hwy 360	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140619-DUP		EDEN-HW58-C-SW-20140619		EDEN-HW360-C-SW-20140619	
Date	-		06/19/2014		06/19/2014		06/19/2014	
Time	-		1040		0850		0928	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	200	µg/L	240	µg/L	460	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.64J	µg/L	0.62J	µg/L	0.83J	µg/L
Barium	220	µg/L	23	µg/L	24	µg/L	29	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.19	mg/L	0.17	mg/L	0.14	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8200	µg/L	8300	µg/L	8400	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.29J	µg/L	0.36J	µg/L	0.47	µg/L
Copper	3	µg/L	1	µg/L	1.4	µg/L	1.8	µg/L
Iron	2,300	µg/L	500	µg/L	620	µg/L	960	µg/L
Lead	0.6	µg/L	0.29J	µg/L	0.48	µg/L	0.62	µg/L
Magnesium	-	-	3100	µg/L	3200	µg/L	3200	µg/L
Manganese	200	µg/L	47	µg/L	44	µg/L	46	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.53J	µg/L	0.55J	µg/L	0.54J	µg/L
Nickel	17	µg/L	0.52J	µg/L	0.64J	µg/L	0.87J	µg/L
Potassium	53,000	µg/L	1800	µg/L	2100	µg/L	2300	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	5000	µg/L	9300	µg/L	10000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2.1J+	µg/L	2.6J+	µg/L	3.3J+	µg/L
Zinc	39	µg/L	20U	µg/L	2.8J	µg/L	3.1J	µg/L
Anions								
Bromide	-	-	100J-	µg/L	150J-	µg/L	160J-	µg/L
Chloride	230	mg/L	8.3	mg/L	15	mg/L	16	mg/L
Sulfate	-	-	5	mg/L	5.6	mg/L	5.6	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	24	mg/L	23	mg/L	25	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	33	mg/L	34	mg/L	34	mg/L
Organic Carbon, Dissolved	-	-	1.1	mg/L	1.3	mg/L	1.3	mg/L
pH	6.5 - 9.0	SU	7.37J	SU	7.24J	SU	7.13J	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

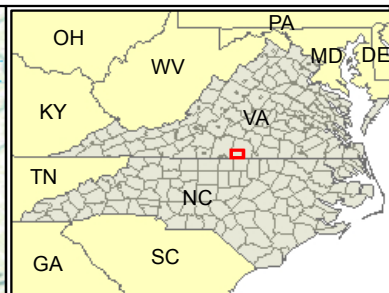
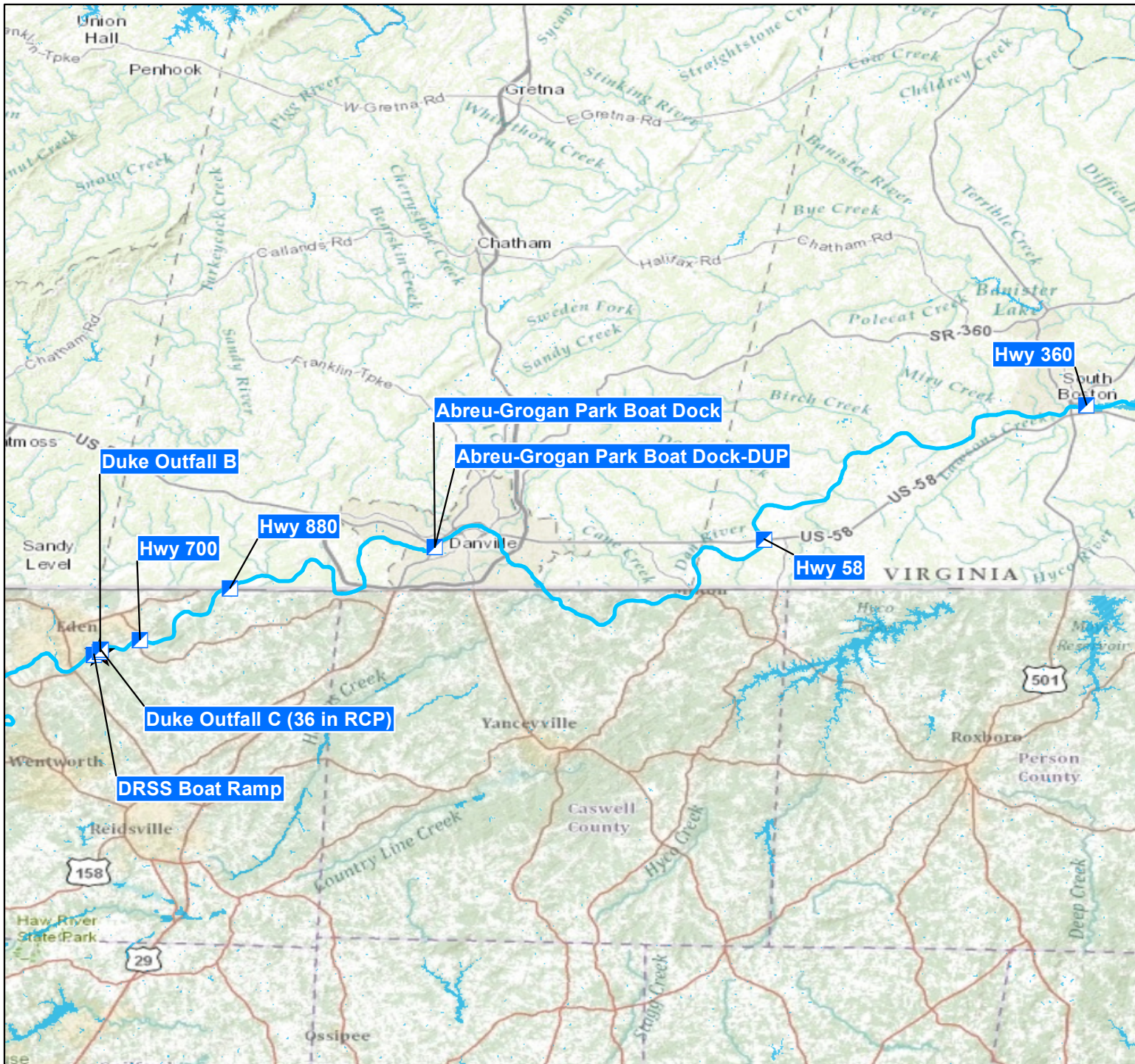
J- Value is estimated with a possible low bias

µg/L micrograms per liter



mg/L milligrams per liter

SU standard units

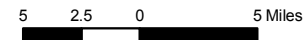
U Analyte was not detected at the listed reporting limit.



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
June 19, 2014

