

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on April 16, 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 aluminum, barium, copper, iron, lead and manganese. EPA typically screens the surface water concentrations using total metals samples, because this is a conservative practice for screening. Copper, barium, and manganese were not detected above screening levels in any of the samples of the dissolved fraction of surface water (i.e., samples that were filtered to remove particulates), therefore there is no threat of toxicity from these compounds to aquatic organisms. 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-20140416		EDEN-HW700-C-SW-20140416		EDEN-BHB-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		1218		1155		1130	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	210	µg/L	410	µg/L	260	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	20	µg/L	20	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	0.1U	mg/L	0.1U	mg/L	0.1U	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	4,500	µg/L	4,300	µg/L	4,500	µg/L
Chromium	25	µg/L	2.2	µg/L	1.9J	µg/L	2U	µg/L
Cobalt	3	µg/L	0.34J	µg/L	0.35J	µg/L	0.43	µg/L
Copper	3	µg/L	1.6	µg/L	1.9	µg/L	2.1	µg/L
Iron	1,000	µg/L	400	µg/L	430	µg/L	340	µg/L
Lead	0.59	µg/L	0.19J	µg/L	0.23J	µg/L	0.27J	µg/L
Magnesium	-	-	1,800	µg/L	1,700	µg/L	1,800	µg/L
Manganese	200	µg/L	17	µg/L	12	µg/L	11	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	1U	µg/L
Nickel	17	µg/L	0.7J	µg/L	0.76J	µg/L	0.8J	µg/L
Potassium	53,000	µg/L	1,900	µg/L	1,900	µg/L	2,000	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	3,500	µg/L	3,400	µg/L	3,600	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	18J+	µg/L	20J+	µg/L	1.1	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/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-20140416		EDEN-HW700-C-SW-20140416		EDEN-BHB-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		1218		1155		1130	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Dissolved Solids								
Total Dissolved Solids	-	-	83	mg/L	86	mg/L	110	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	180	mg/L	210	mg/L	230	mg/L
Total Metals								
Aluminum	2,000	µg/L	1,000	µg/L	590	µg/L	2,700	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	0.66J	µg/L
Barium	220	µg/L	47	µg/L	50	µg/L	58	µg/L
Beryllium	0.66	µg/L	0.17J	µg/L	0.19J	µg/L	0.25J	µg/L
Boron	0.36	mg/L	0.1U	mg/L	0.1U	mg/L	0.1U	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,000	µg/L	5,000	µg/L	5,000	µg/L
Chromium	29	µg/L	2.3	µg/L	2.3	µg/L	4.4	µg/L
Cobalt	24	µg/L	1.5	µg/L	1.6	µg/L	2.2	µg/L
Copper	3	µg/L	3.5	µg/L	4.2	µg/L	5.4	µg/L
Iron	2,300	µg/L	1,200	µg/L	1,200	µg/L	3,700	µg/L
Lead	0.6	µg/L	2.4	µg/L	2.9	µg/L	3.4	µg/L
Magnesium	-	-	2,000	µg/L	2,000	µg/L	2,200	µg/L
Manganese	200	µg/L	130	µg/L	140	µg/L	150	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	1.4	µg/L	1.2	µg/L	2.5	µg/L
Potassium	53,000	µg/L	1,900	µg/L	2,000	µg/L	2,300	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	3,400	µg/L	3,600	µg/L	3,500	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	7.2J+	µg/L	23J+	µg/L	12	µg/L
Zinc	39	µg/L	5.9J	µg/L	6.8J	µg/L	12J	µg/L
Anions								
Bromide	-	-	-	-	-	-	-	-
Chloride	230	mg/L	4.1	mg/L	4.1	mg/L	4.1	mg/L
Sulfate	-	-	5.4	mg/L	4.3	mg/L	4.3	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-20140416		EDEN-HW700-C-SW-20140416		EDEN-BHB-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		1218		1155		1130	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO3)	-	-	15	mg/L	14	mg/L	13	mg/L
Hardness, Calcium/Magnesium (As CaCO3)	-	-	21	mg/L	21	mg/L	21	mg/L
Organic Carbon, Dissolved	-	-	4.3	mg/L	4.8	mg/L	5.1	mg/L
pH	6.5 - 9.0		std	7.18J	std	7.21J	std	7.12J

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

std standard

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-DWTP-RAW-2-20140416		EDEN-DANIN-R-SW-20140416		EDEN-HW58-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		0852		1048		0854	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	2,100J	µg/L	250	µg/L	230	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.3J	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	27J+	µg/L	19	µg/L	21	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.1U	mg/L	0.1U	mg/L	0.042J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	4,400	µg/L	4,400	µg/L	5,200	µg/L
Chromium	25	µg/L	4J	µg/L	1.6J	µg/L	2U	µg/L
Cobalt	3	µg/L	0.36J	µg/L	0.52	µg/L	0.36J	µg/L
Copper	3	µg/L	2.4	µg/L	2.1	µg/L	1.8	µg/L
Iron	1,000	µg/L	1,700J	µg/L	1,100	µg/L	370	µg/L
Lead	0.59	µg/L	0.91	µg/L	0.2J	µg/L	0.24J	µg/L
Magnesium	-	-	1,800	µg/L	1,700	µg/L	2,000	µg/L
Manganese	200	µg/L	9.8	µg/L	33	µg/L	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	1U	µg/L
Nickel	17	µg/L	2.2	µg/L	0.93J	µg/L	0.72J	µg/L
Potassium	53,000	µg/L	1,900	µg/L	1,800	µg/L	2,000	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	3,500	µg/L	3,300	µg/L	4,600	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	9.3J	µg/L	6.2	µg/L	1.3	µg/L
Zinc	39	µg/L	3J	µg/L	20U	µg/L	20U	µg/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-DWTP-RAW-2-20140416		EDEN-DANIN-R-SW-20140416		EDEN-HW58-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		0852		1048		0854	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Dissolved Solids								
Total Dissolved Solids	-	-	73	mg/L	85	mg/L	95	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	280	mg/L	220	mg/L	240	mg/L
Total Metals								
Aluminum	2,000	µg/L	740J+	µg/L	1,200	µg/L	1,300	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1UJ	µg/L	0.74J	µg/L	0.71J	µg/L
Barium	220	µg/L	60J+	µg/L	52	µg/L	59	µg/L
Beryllium	0.66	µg/L	0.24J	µg/L	0.17J	µg/L	0.22J	µg/L
Boron	0.36	mg/L	0.1U	mg/L	0.1U	mg/L	0.042J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,000	µg/L	5,000	µg/L	5,900	µg/L
Chromium	29	µg/L	2.1J	µg/L	1.5J	µg/L	1.6J	µg/L
Cobalt	24	µg/L	2.4	µg/L	1.6	µg/L	2	µg/L
Copper	3	µg/L	4.8	µg/L	4.1	µg/L	4.5	µg/L
Iron	2,300	µg/L	1,400J+	µg/L	1,400	µg/L	1,600	µg/L
Lead	0.6	µg/L	3.6	µg/L	2.5	µg/L	3	µg/L
Magnesium	-	-	1,900	µg/L	1,900	µg/L	2,300	µg/L
Manganese	200	µg/L	210	µg/L	160	µg/L	180	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	2.2	µg/L	2	µg/L	2.1	µg/L
Potassium	53,000	µg/L	1,900	µg/L	2,000	µg/L	2,200	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	3,400	µg/L	3,400	µg/L	4,600	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	7.8J	µg/L	7.1	µg/L	5.7	µg/L
Zinc	39	µg/L	7.8J	µg/L	6J	µg/L	8.3J	µg/L
Anions								
Bromide	-	-	80U	µg/L	-	-	-	-
Chloride	230	mg/L	4.2	mg/L	4.1	mg/L	5.7	mg/L
Sulfate	-	-	4.1	mg/L	4	mg/L	4.4	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-DWTP-RAW-2-20140416		EDEN-DANIN-R-SW-20140416		EDEN-HW58-C-SW-20140416	
Date	-		04/16/2014		04/16/2014		04/16/2014	
Time	-		0852		1048		0854	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	15	mg/L	14	mg/L	17	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	20	mg/L	20	mg/L	24	mg/L
Organic Carbon, Dissolved	-	-	4.3	mg/L	5	mg/L	4.9	mg/L
pH	6.5 - 9.0		std	7.21J	std	7.24J	std	7.25J

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

std standard

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		S Boston WTP Intake		Hwy 360	
Sample Information						
Sample ID	-		EDEN-SBWTP-RAW-2-20140416		EDEN-HW360-C-SW-20140416	
Date	-		04/16/2014		04/16/2014	
Time	-		1500		0935	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Dissolved metals						
Aluminum	87	µg/L	2,700J	µg/L	190	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.6J	µg/L	1U	µg/L
Barium	220	µg/L	27J+	µg/L	22	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.1U	mg/L	0.054J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	4,900	µg/L	6,000	µg/L
Chromium	25	µg/L	3.6J	µg/L	2U	µg/L
Cobalt	3	µg/L	0.44	µg/L	0.51	µg/L
Copper	3	µg/L	2.9	µg/L	1.6	µg/L
Iron	1,000	µg/L	2,000	µg/L	300	µg/L
Lead	0.59	µg/L	1.1	µg/L	0.2J	µg/L
Magnesium	-	-	2,000	µg/L	2,300	µg/L
Manganese	200	µg/L	11	µg/L	6.8	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1.6	µg/L	0.62J	µg/L
Potassium	53,000	µg/L	2,000	µg/L	1,900	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	4,600	µg/L	5,600	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	11	µg/L	1.2	µg/L
Zinc	39	µg/L	5.8J	µg/L	20U	µg/L

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

Analyte	Ecological Screening Standard for Surface Water Samples ¹		S Boston WTP Intake		Hwy 360	
Sample Information						
Sample ID	-		EDEN-SBWTP-RAW-2-20140416		EDEN-HW360-C-SW-20140416	
Date	-		04/16/2014		04/16/2014	
Time	-		1500		0935	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Total Dissolved Solids						
Total Dissolved Solids	-	-	71	mg/L	86	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	330	mg/L	230	mg/L
Total Metals						
Aluminum	2,000	µg/L	990J+	µg/L	1,300	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.81J	µg/L	1U	µg/L
Barium	220	µg/L	69J+	µg/L	51	µg/L
Beryllium	0.66	µg/L	0.28J	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.1U	mg/L	0.052J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,800	µg/L	6,400	µg/L
Chromium	29	µg/L	2.2J	µg/L	1.3J	µg/L
Cobalt	24	µg/L	2.9	µg/L	1.5	µg/L
Copper	3	µg/L	5.5	µg/L	3.8	µg/L
Iron	2,300	µg/L	2,300J+	µg/L	1,300	µg/L
Lead	0.6	µg/L	5.9	µg/L	2.1	µg/L
Magnesium	-	-	2,300	µg/L	2,400	µg/L
Manganese	200	µg/L	260	µg/L	160	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1.5	µg/L	1.2	µg/L
Potassium	53,000	µg/L	2,100	µg/L	2,000	µg/L
Selenium	5	µg/L	0.59J	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	4,700	µg/L	5,400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	11	µg/L	4.9	µg/L
Zinc	39	µg/L	17J	µg/L	6.4J	µg/L
Anions						
Bromide	-	-	28J-	µg/L	-	-
Chloride	230	mg/L	5.5	mg/L	6.8	mg/L
Sulfate	-	-	4.2	mg/L	4.8	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		S Boston WTP Intake		Hwy 360	
Sample Information						
Sample ID	-		EDEN-SBWTP-RAW-2-20140416		EDEN-HW360-C-SW-20140416	
Date	-		04/16/2014		04/16/2014	
Time	-		1500		0935	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Wet Chemistry						
Alkalinity, Total (As CaCO ₃)	-	-	16	mg/L	21	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	24	mg/L	26	mg/L
Organic Carbon, Dissolved	-	-	4.7	mg/L	3.4	mg/L
pH	6.5 - 9.0		std	7.17J	std	7.25J

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

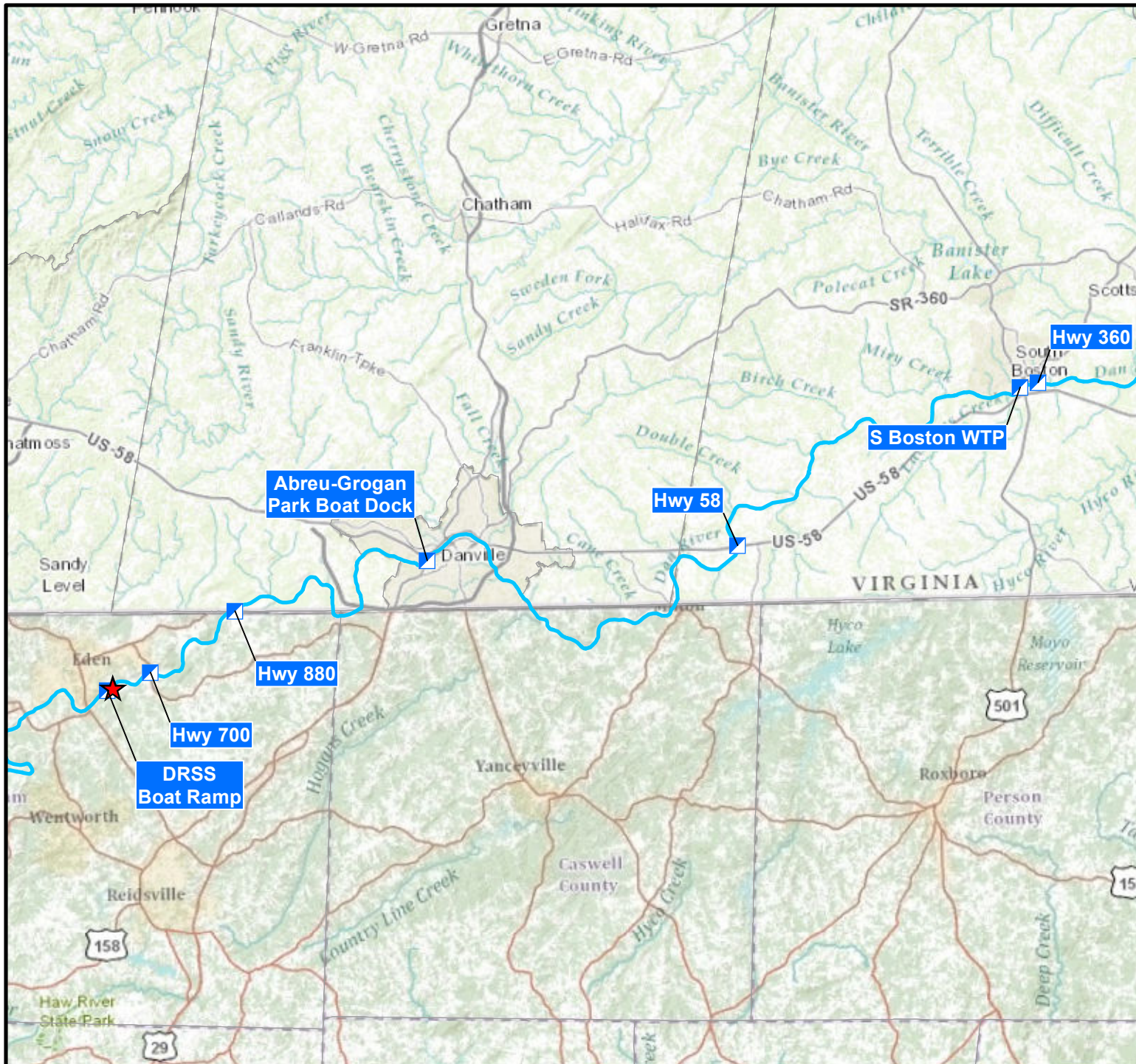
J- Value is estimated with a possible low bias

µg/L micrograms per liter




mg/L milligrams per liter

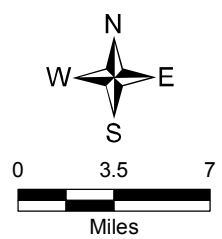
std standard

U Analyte was not detected at the listed reporting limit.



Legend

-  Approximate Spill Location
-  Surface Water Sample Location
-  Dan River



Map Source: ArcGIS Online World Map Topo, 2014

**Surface Water
Sample Locations
April 16, 2014**

