

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on May 1, 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, copper and lead. EPA typically screens the surface water concentrations using total metals samples, because this is a conservative practice for screening. Copper and lead 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		Leaksville Boat Access Dock		DRSS Boat Ramp		Hwy 700	
Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140501		EDEN-DUKE-L-SW-20140501		EDEN-HW700-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1305		1230		1155	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	350	µg/L	160	µg/L	170	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.52J	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	23	µg/L	21	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	0.13	mg/L	0.08J	mg/L	0.092J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,600	µg/L	6,200	µg/L	6,100	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.71J	µg/L	0.63J	µg/L
Copper	3	µg/L	0.93J	µg/L	1	µg/L	1.2	µg/L
Iron	1,000	µg/L	450	µg/L	320	µg/L	340	µg/L
Lead	0.59	µg/L	0.23J	µg/L	0.15J	µg/L	0.18J	µg/L
Magnesium	-	-	2,400	µg/L	2,400	µg/L	2,300	µg/L
Manganese	200	µg/L	3.9	µg/L	14	µg/L	9.8	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	0.66J	µg/L	0.67J	µg/L	0.68J	µg/L
Potassium	53,000	µg/L	1,600	µg/L	1,700	µg/L	1,600	µg/L
Selenium	5	µg/L	2U	µg/L	2U	µg/L	0.76J	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	3,900	µg/L	4,700	µg/L	4,000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	3.8J+	µg/L	1U	µg/L	1U	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	82	mg/L	74	mg/L	74	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	35	mg/L	20	mg/L	32	mg/L

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SURFACE WATER RESULTS**

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Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140501		EDEN-DUKE-L-SW-20140501		EDEN-HW700-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1305		1230		1155	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	1,100J+	µg/L	650J+	µg/L	390J+	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.48J	µg/L	0.48J	µg/L	1U	µg/L
Barium	220	µg/L	31J+	µg/L	26J+	µg/L	27J+	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.14	mg/L	0.081J	mg/L	0.092J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7,000J+	µg/L	6,200J+	µg/L	6,200J+	µg/L
Chromium	29	µg/L	1.6J	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.49	µg/L	0.34J	µg/L	0.4J+	µg/L
Copper	3	µg/L	1.9	µg/L	1.6	µg/L	1.9	µg/L
Iron	2,300	µg/L	1,400J+	µg/L	780J+	µg/L	630J+	µg/L
Lead	0.6	µg/L	0.93	µg/L	0.59	µg/L	0.7	µg/L
Magnesium	-	-	2,600J+	µg/L	2,400J+	µg/L	2,400J+	µg/L
Manganese	200	µg/L	44	µg/L	33	µg/L	43	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.49J	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1.1	µg/L	0.82J	µg/L	5.5	µg/L
Potassium	53,000	µg/L	1,800	µg/L	1,700	µg/L	1,700	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	4,200	µg/L	4,600	µg/L	4,100	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.7J+	µg/L	4.4J+	µg/L	1.4J+	µg/L
Zinc	39	µg/L	3.5J	µg/L	20U	µg/L	3J	µg/L
Anions								
Bromide	-	-	73	µg/L	43	ug/L	52	µg/L
Chloride	230	mg/L	8.3	mg/L	7	mg/L	6.9	mg/L
Sulfate	-	-	5.3	mg/L	5.6	mg/L	5.1	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Leaksville Boat Access Dock		DRSS Boat Ramp		Hwy 700	
Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140501		EDEN-DUKE-L-SW-20140501		EDEN-HW700-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1305		1230		1155	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	16	mg/L	22	mg/L	18	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	28	mg/L	26	mg/L	25	mg/L
Organic Carbon, Dissolved	-	-	1.9	mg/L	2.1	mg/L	2.3	mg/L
pH	6.5 - 9.0		std	7.21J	std	6.97J	std	6.96J

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		Hwy 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140501		EDEN-DANIN-R-SW-20140501		EDEN-HW58-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1128		1049		0851	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	230	µg/L	180	µg/L	290J	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	19	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	0.069J	mg/L	0.062J	mg/L	0.053J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,700	µg/L	5,600	µg/L	6,100	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.73J	µg/L	0.65J	µg/L	0.84	µg/L
Copper	3	µg/L	1.4	µg/L	1.1	µg/L	1.3	µg/L
Iron	1,000	µg/L	410	µg/L	330	µg/L	520J	µg/L
Lead	0.59	µg/L	0.22J	µg/L	0.21J	µg/L	0.27J	µg/L
Magnesium	-	-	2,200	µg/L	2,200	µg/L	2,400	µg/L
Manganese	200	µg/L	6.5	µg/L	8.4	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	0.74J	µg/L	0.9J	µg/L	0.95J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,600	µg/L	1,900	µg/L
Selenium	5	µg/L	0.69J	µg/L	0.64J	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Sodium	680,000	µg/L	3,900	µg/L	4,000	µg/L	6,000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.1J+	µg/L	1U	µg/L	1.6J+	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	81	mg/L	79	mg/L	94	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	61	mg/L	50	mg/L	98	mg/L

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

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140501		EDEN-DANIN-R-SW-20140501		EDEN-HW58-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1128		1049		0851	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	480J+	µg/L	520J+	µg/L	710J+	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.55J	µg/L	0.56J	µg/L	1U	µg/L
Barium	220	µg/L	31J+	µg/L	28J+	µg/L	41J+	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.067J	mg/L	0.063J	mg/L	0.052J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.07J	µg/L
Calcium	-	-	5,900J+	µg/L	5,700J+	µg/L	6,300J+	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.59J	µg/L	0.35J	µg/L	0.97	µg/L
Copper	3	µg/L	2.5	µg/L	1.7	µg/L	2.3	µg/L
Iron	2,300	µg/L	760J+	µg/L	630J+	µg/L	1,100J+	µg/L
Lead	0.6	µg/L	1.1	µg/L	1.1	µg/L	1.7	µg/L
Magnesium	-	-	2,300J+	µg/L	2,200J+	µg/L	2,500J+	µg/L
Manganese	200	µg/L	60	µg/L	29	µg/L	120J	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	0.84J	µg/L	0.8J	µg/L	0.98J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,700	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	4,100	µg/L	4,000	µg/L	6,000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	4.6J+	µg/L	4.3J+	µg/L	3J+	µg/L
Zinc	39	µg/L	3.1J	µg/L	2.9J	µg/L	4.5J	µg/L
Anions								
Bromide	-	-	39	µg/L	36	µg/L	57	µg/L
Chloride	230	mg/L	5.8	mg/L	5.7	mg/L	7.8	mg/L
Sulfate	-	-	5	mg/L	4.6	mg/L	5.3	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140501		EDEN-DANIN-R-SW-20140501		EDEN-HW58-C-SW-20140501	
Date	-		05/01/2014		05/01/2014		05/01/2014	
Time	-		1128		1049		0851	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	22	mg/L	20	mg/L	25	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	24	mg/L	23	mg/L	26	mg/L
Organic Carbon, Dissolved	-	-	2.5	mg/L	2.7	mg/L	4	mg/L
pH	6.5 - 9.0		std	7.21J	std	7.09J	std	6.96J

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		Hwy 58		Hwy 360	
Sample Information						
Sample ID	-		EDEN-HW58-C-SW-20140501-DUP		EDEN-HW360-C-SW-20140501	
Date	-		05/01/2014		05/01/2014	
Time	-		0857		0937	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Dissolved metals						
Aluminum	87	µg/L	86J	µg/L	240	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	23	µg/L	23	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.051J	mg/L	0.052J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,900	µg/L	5,300	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.17J	µg/L	0.57	µg/L
Copper	3	µg/L	1.2	µg/L	1.7	µg/L
Iron	1,000	µg/L	200J	µg/L	400	µg/L
Lead	0.59	µg/L	0.11J	µg/L	0.22J	µg/L
Magnesium	-	-	2,300	µg/L	2,100	µg/L
Manganese	200	µg/L	7.9	µg/L	10	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	0.71J	µg/L	0.94J	µg/L
Potassium	53,000	µg/L	1,900	µg/L	2,000	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	5,900	µg/L	5,500	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1U	µg/L	1.6J+	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids						
Total Dissolved Solids	-	-	98	mg/L	110	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	110	mg/L	270	mg/L

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

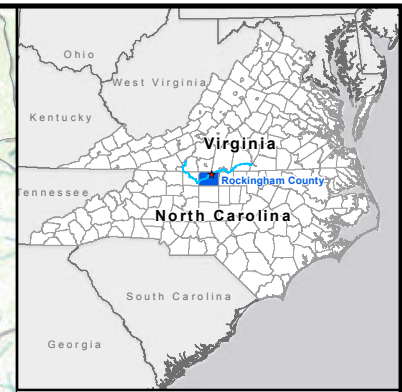
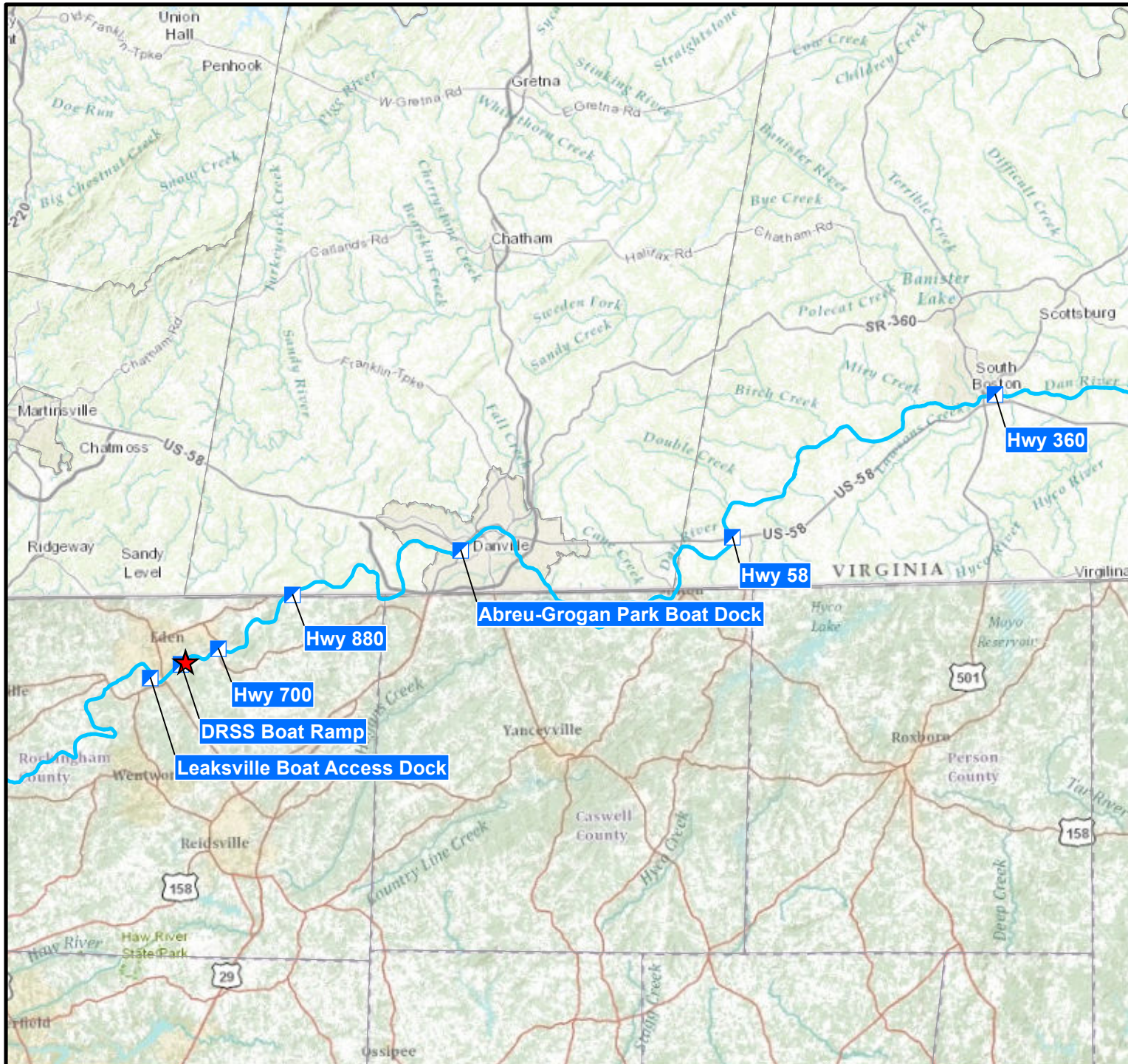
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 58		Hwy 360	
Sample Information						
Sample ID	-		EDEN-HW58-C-SW-20140501-DUP		EDEN-HW360-C-SW-20140501	
Date	-		05/01/2014		05/01/2014	
Time	-		0857		0937	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Total Metals						
Aluminum	2,000	µg/L	670J+	µg/L	880J+	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.37J	µg/L	0.56J	µg/L
Barium	220	µg/L	48J+	µg/L	62J+	µg/L
Beryllium	0.66	µg/L	0.18J+	µg/L	0.24J+	µg/L
Boron	0.36	mg/L	0.052J	mg/L	0.053J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,600J+	µg/L	6,200J+	µg/L
Chromium	29	µg/L	2U	µg/L	1.2J	µg/L
Cobalt	24	µg/L	1.4	µg/L	1.9	µg/L
Copper	3	µg/L	2.8	µg/L	4	µg/L
Iron	2,300	µg/L	1,200J+	µg/L	1,300J+	µg/L
Lead	0.6	µg/L	2.2	µg/L	3.2	µg/L
Magnesium	-	-	2,500J+	µg/L	2,400J+	µg/L
Manganese	200	µg/L	190J	µg/L	190	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	1.2	µg/L	1.5	µg/L
Potassium	53,000	µg/L	2,000	µg/L	2,100	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	6,000	µg/L	5,500	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	3.3J+	µg/L	7.4J+	µg/L
Zinc	39	µg/L	6.3J	µg/L	6.8J	µg/L
Anions						
Bromide	-	-	56	µg/L	53	µg/L
Chloride	230	mg/L	7.7	mg/L	7.2	mg/L
Sulfate	-	-	5.3	mg/L	4.7	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS




Analyte	Ecological Screening Standard for Surface Water Samples ¹	Hwy 58	Hwy 360
Sample Information			
Sample ID	-	EDEN-HW58-C-SW-20140501-DUP	EDEN-HW360-C-SW-20140501
Date	-	05/01/2014	05/01/2014
Time	-	0857	0937
Status	-	Validation Complete	Validation Complete
Type	-	Surface Water	Surface Water
Wet Chemistry			
Alkalinity, Total (As CaCO ₃)	-	23	24
Hardness, Calcium/Magnesium (As CaCO ₃)	-	27	25
Organic Carbon, Dissolved	-	4	5.4
pH	6.5 - 9.0	6.91J	7.02J

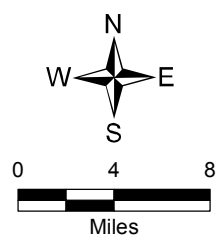
Notes

- 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
May 1, 2014**

