

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on April 24, 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. 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-20140424		EDEN-DUKE-L-SW-20140424		EDEN-HW700-C-SW-20140424	
Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1140		1104		1032	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	55	µg/L	28	µg/L	45	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	21	µg/L	16	µg/L	19	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	0.1U	mg/L	0.083J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,800	µg/L	5,700	µg/L	6,200	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.34J	µg/L	0.4J	µg/L
Copper	3	µg/L	0.5J	µg/L	0.63J	µg/L	0.51J	µg/L
Iron	1,000	µg/L	210	µg/L	140	µg/L	180	µg/L
Lead	0.59	µg/L	0.078J	µg/L	0.3U	µg/L	0.3U	µg/L
Magnesium	-	-	2,400	µg/L	2,400	µg/L	2,400	µg/L
Manganese	200	µg/L	2.1J	µg/L	15	µg/L	14	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	0.42J	µg/L	0.6J	µg/L	0.44J	µg/L
Potassium	53,000	µg/L	1,400	µg/L	1,300	µg/L	1,400	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	3,700	µg/L	4,300	µg/L	3,900	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	3.6J	µg/L	5.5J	µg/L	4.9	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	65	mg/L	59	mg/L	68	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	12	mg/L	11	mg/L	14	mg/L

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Sample Information								
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Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1140		1104		1032	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	180	µg/L	340	µg/L	160	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1U	µg/L	0.38J	µg/L	1U	µg/L
Barium	220	µg/L	24	µg/L	20J+	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	0.1U	mg/L	0.084J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7,000	µg/L	6,000	µg/L	6,400	µg/L
Chromium	29	µg/L	1J	µg/L	1.5J	µg/L	2U	µg/L
Cobalt	24	µg/L	0.23J	µg/L	0.41	µg/L	0.24J	µg/L
Copper	3	µg/L	1.6	µg/L	1.2	µg/L	1.1	µg/L
Iron	2,300	µg/L	530	µg/L	820	µg/L	490	µg/L
Lead	0.6	µg/L	0.45	µg/L	0.38	µg/L	0.31	µg/L
Magnesium	-	-	2,500	µg/L	2,500	µg/L	2,400	µg/L
Manganese	200	µg/L	26	µg/L	41	µg/L	29	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	0.62J	µg/L	0.74J	µg/L	0.51J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,400	µg/L	1,400	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	3,900	µg/L	4,500	µg/L	3,900	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	3.2J	µg/L	4.5	µg/L
Zinc	39	µg/L	6.3J	µg/L	3.1J	µg/L	3.5J	µg/L
Anions								
Bromide	-	-	69	µg/L	21	µg/L	47	µg/L
Chloride	230	mg/L	7.9	mg/L	5.2	mg/L	6.2	mg/L
Sulfate	-	-	4.8	mg/L	5	mg/L	4.6	mg/L

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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-20140424		EDEN-DUKE-L-SW-20140424		EDEN-HW700-C-SW-20140424	
Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1140		1104		1032	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	21	mg/L	23	mg/L	21	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	28	mg/L	25	mg/L	26	mg/L
Organic Carbon, Dissolved	-	-	1.3	mg/L	1.2	mg/L	1.3	mg/L
pH	6.5 - 9.0		std	7.41J	std	7.43J	std	7.47J

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-20140424		EDEN-DANIN-R-SW-20140424		EDEN-HW58-C-SW-20140424	
Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1005		0925		0743	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	140J	µg/L	61	µg/L	88	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	21J	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	0.072J	mg/L	0.063J	mg/L	0.066J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,200	µg/L	6,500	µg/L	6,600	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	1.2J	µg/L
Cobalt	3	µg/L	0.22J	µg/L	0.46J	µg/L	0.42J	µg/L
Copper	3	µg/L	0.85J	µg/L	0.66J	µg/L	0.89J	µg/L
Iron	1,000	µg/L	440J	µg/L	220	µg/L	260	µg/L
Lead	0.59	µg/L	0.29J	µg/L	0.078J	µg/L	0.11J	µg/L
Magnesium	-	-	2,400	µg/L	2,500	µg/L	2,600	µg/L
Manganese	200	µg/L	25J	µg/L	16	µg/L	8.1	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	0.45J	µg/L	1U	µg/L
Nickel	17	µg/L	0.44J	µg/L	0.5J	µg/L	0.59J	µg/L
Potassium	53,000	µg/L	1,400	µg/L	1,500	µg/L	1,600	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	3,900	µg/L	4,400	µg/L	6,400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	4.4J	µg/L	5.8J	µg/L	5.8	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	52J	mg/L	66	mg/L	72	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	15	mg/L	13	mg/L	22	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-20140424		EDEN-DANIN-R-SW-20140424		EDEN-HW58-C-SW-20140424	
Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1005		0925		0743	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	47J	µg/L	160	µg/L	200	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	18J	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	0.075J	mg/L	0.062J	mg/L	0.068J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,400	µg/L	6,400	µg/L	6,900	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.43	µg/L	0.25J	µg/L	0.3J	µg/L
Copper	3	µg/L	0.66J	µg/L	0.89J	µg/L	1.2	µg/L
Iron	2,300	µg/L	180J	µg/L	520	µg/L	620	µg/L
Lead	0.6	µg/L	0.065J	µg/L	0.32	µg/L	0.42	µg/L
Magnesium	-	-	2,500	µg/L	2,500	µg/L	2,700	µg/L
Manganese	200	µg/L	8.5J	µg/L	29	µg/L	32	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	0.45J	µg/L	0.44J	µg/L	0.56J	µg/L
Potassium	53,000	µg/L	1,400	µg/L	1,500	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	4,100	µg/L	4,300	µg/L	6,700	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.31J	µg/L	1.2J	µg/L	5.8	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	42	µg/L	37	µg/L	72	µg/L
Chloride	230	mg/L	5.8	mg/L	5.8	mg/L	8.9	mg/L
Sulfate	-	-	4.7	mg/L	4.9	mg/L	5.4	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-20140424		EDEN-DANIN-R-SW-20140424		EDEN-HW58-C-SW-20140424	
Date	-		04/24/2014		04/24/2014		04/24/2014	
Time	-		1005		0925		0743	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	21	mg/L	24	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	26	mg/L	26	mg/L	28	mg/L
Organic Carbon, Dissolved	-	-	1.3	mg/L	1.4	mg/L	1.6	mg/L
pH	6.5 - 9.0		std	7.42J	std	7.54J	std	7.46J

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 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140424	
Date	-		04/24/2014	
Time	-		0821	
Status	-		Validation Complete	
Type	-		Surface Water	
Dissolved metals				
Aluminum	87	μg/L	94	μg/L
Antimony	5.6	μg/L	1U	μg/L
Arsenic	10	μg/L	1U	μg/L
Barium	220	μg/L	22	μg/L
Beryllium	0.66	μg/L	0.4U	μg/L
Boron	0.36	mg/L	0.064J	mg/L
Cadmium	0.1	μg/L	0.1U	μg/L
Calcium	-	-	6,700	μg/L
Chromium	25	μg/L	1.1J	μg/L
Cobalt	3	μg/L	0.41J	μg/L
Copper	3	μg/L	0.84J	μg/L
Iron	1,000	μg/L	270	μg/L
Lead	0.59	μg/L	0.11J	μg/L
Magnesium	-	-	2,600	μg/L
Manganese	200	μg/L	6.4	μg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	800	μg/L	1U	μg/L
Nickel	17	μg/L	0.52J	μg/L
Potassium	53,000	μg/L	1,700	μg/L
Selenium	5	μg/L	0.8J	μg/L
Silver	0.06	μg/L	1U	μg/L
Sodium	680,000	μg/L	6,900	μg/L
Thallium	0.24	μg/L	0.2U	μg/L
Vanadium	27	μg/L	5.6J	μg/L
Zinc	39	μg/L	20U	μg/L
Total Dissolved Solids				
Total Dissolved Solids	-	-	68	mg/L
Total Suspended Solids				
Total Suspended Solids	-	-	29	mg/L

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

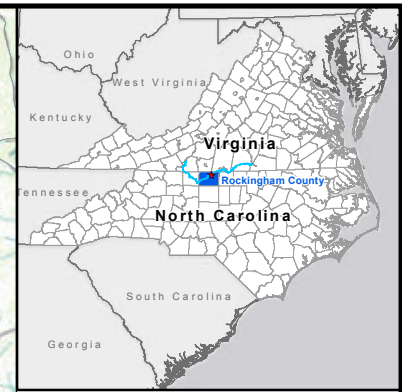
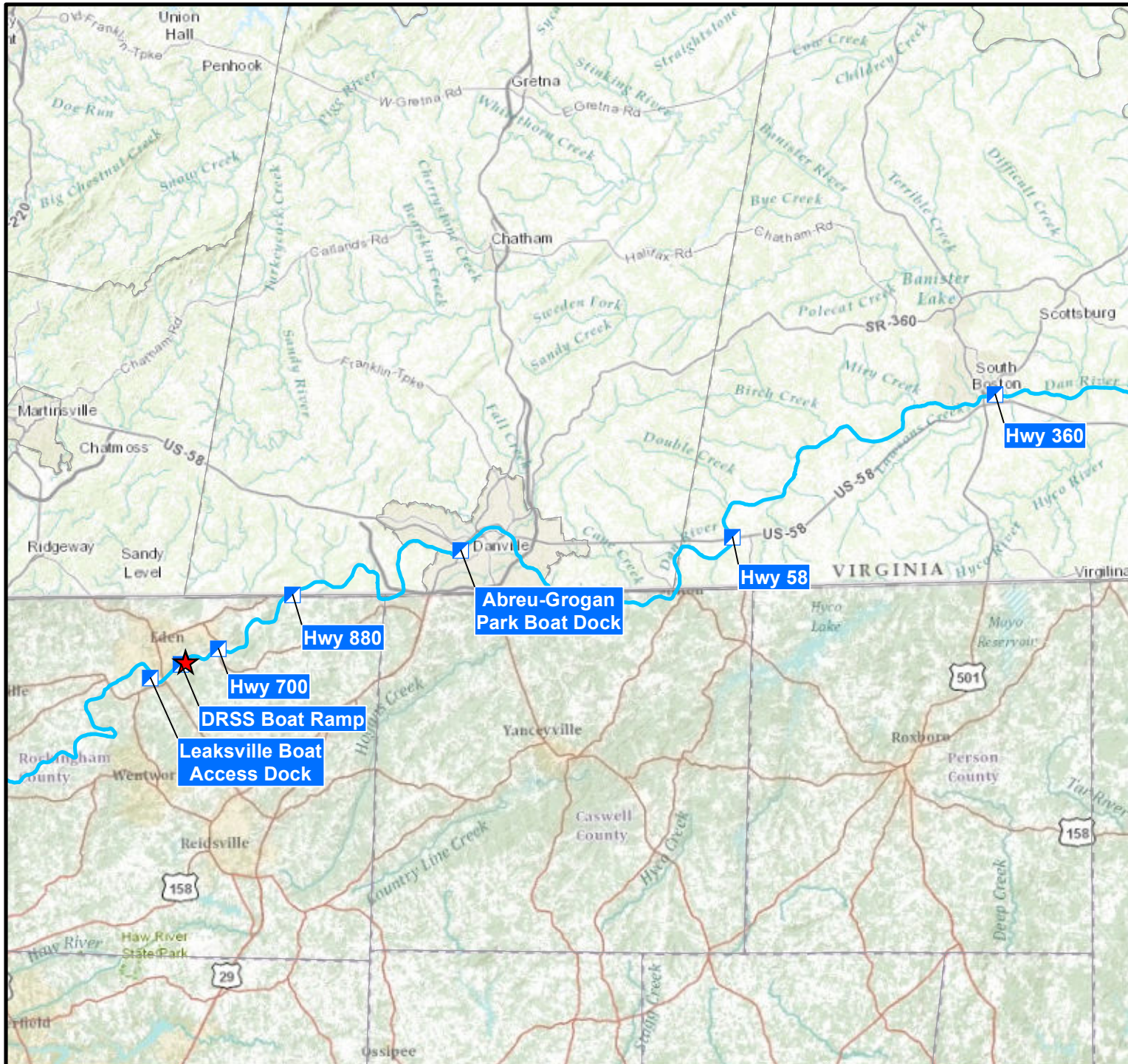
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140424	
Date	-		04/24/2014	
Time	-		0821	
Status	-		Validation Complete	
Type	-		Surface Water	
Total Metals				
Aluminum	2,000	μg/L	210	μg/L
Antimony	5.6	μg/L	1U	μg/L
Arsenic	10	μg/L	1U	μg/L
Barium	220	μg/L	27	μg/L
Beryllium	0.66	μg/L	0.4U	μg/L
Boron	0.36	mg/L	0.065J	mg/L
Cadmium	2	μg/L	0.1U	μg/L
Calcium	-	-	7,000	μg/L
Chromium	29	μg/L	2U	μg/L
Cobalt	24	μg/L	0.34J	μg/L
Copper	3	μg/L	1.2	μg/L
Iron	2,300	μg/L	640	μg/L
Lead	0.6	μg/L	0.51	μg/L
Magnesium	-	-	2,700	μg/L
Manganese	200	μg/L	38	μg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	μg/L
Nickel	17	μg/L	0.5J	μg/L
Potassium	53,000	μg/L	1,700	μg/L
Selenium	5	μg/L	2U	μg/L
Silver	0.06	μg/L	1U	μg/L
Sodium	680,000	μg/L	7,100	μg/L
Thallium	0.24	μg/L	0.2U	μg/L
Vanadium	27	μg/L	4.8J	μg/L
Zinc	39	μg/L	20U	μg/L
Anions				
Bromide	-	-	79	μg/L
Chloride	230	mg/L	9.7	mg/L
Sulfate	-	-	5.7	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-20140424	
Date	-		04/24/2014	
Time	-		0821	
Status	-		Validation Complete	
Type	-		Surface Water	
Wet Chemistry				
Alkalinity, Total (As CaCO ₃)	-	-	22	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	28	mg/L
Organic Carbon, Dissolved	-	-	1.6	mg/L
pH	6.5 - 9.0	std	7.53J	std

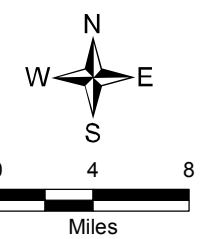
Notes

- 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 24, 2014**

