

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on May 8, 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. 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-20140508		EDEN-DUKE-L-SW-20140508		EDEN-HW700-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1250		1215		1146	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	14	µg/L	15	µg/L	26	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.5	µg/L	1.1	µg/L	1.5	µg/L
Barium	220	µg/L	23	µg/L	18	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	0.23	mg/L	0.082J	mg/L	0.1	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8,500	µg/L	6,800	µg/L	6,900	µg/L
Chromium	25	µg/L	1.7J	µg/L	1.5J	µg/L	1.7J	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L	0.17J	µg/L
Copper	3	µg/L	0.56J	µg/L	0.89J	µg/L	0.92J	µg/L
Iron	1,000	µg/L	74	µg/L	150	µg/L	150	µg/L
Lead	0.59	µg/L	0.3U	µg/L	0.3U	µg/L	0.3U	µg/L
Magnesium	-	-	2,900	µg/L	2,800J	µg/L	2,600	µg/L
Manganese	200	µg/L	2.5U	µg/L	18	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	0.45J	µg/L	1U	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1,500	µg/L	1,600J	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	5,100	µg/L	4,900	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	1.2	µg/L	1.5	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/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-20140508		EDEN-DUKE-L-SW-20140508		EDEN-HW700-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1250		1215		1146	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Dissolved Solids								
Total Dissolved Solids	-	-	73	mg/L	60	mg/L	63	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	9.5	mg/L	14	mg/L	13	mg/L
Total Metals								
Aluminum	2,000	µg/L	80	µg/L	110	µg/L	130	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.4	µg/L	2	µg/L	1.9	µg/L
Barium	220	µg/L	26	µg/L	20	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	0.27	mg/L	0.073J	mg/L	0.1	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	9,200	µg/L	6,500	µg/L	6,900	µg/L
Chromium	29	µg/L	1.8J	µg/L	2	µg/L	2.1	µg/L
Cobalt	24	µg/L	0.17J	µg/L	0.27J	µg/L	0.27J	µg/L
Copper	3	µg/L	0.89J	µg/L	1.2	µg/L	1.5	µg/L
Iron	2,300	µg/L	370	µg/L	390	µg/L	430	µg/L
Lead	0.6	µg/L	0.24J	µg/L	0.29J	µg/L	0.34	µg/L
Magnesium	-	-	3,300	µg/L	2,500J	µg/L	2,600	µg/L
Manganese	200	µg/L	25	µg/L	41	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	0.43J	µg/L	0.61J	µg/L	0.43J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,400J	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	4,200	µg/L	4,800	µg/L	4,500	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	6.2	µg/L	5.6	µg/L
Zinc	39	µg/L	4.1J	µg/L	20U	µg/L	20U	µg/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-20140508		EDEN-DUKE-L-SW-20140508		EDEN-HW700-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1250		1215		1146	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Anions								
Bromide	-	-	-	-	-	-	-	-
Chloride	230	mg/L	12	mg/L	6.9	mg/L	7.2	mg/L
Sulfate	-	-	5.4	mg/L	5.1	mg/L	4.6	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	24	mg/L	25	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	36	mg/L	27	mg/L	28	mg/L
Organic Carbon, Dissolved	-	-	1.4	mg/L	1.5	mg/L	1.3	mg/L
pH	6.5 - 9.0	std	7.23J	std	7.29J	std	7.35J	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

°C degrees Celsius

EPA U.S. Environmental Protection Agency

J Value is estimated

µg/L micrograms per liter

mg/L milligrams per liter

mS/cm milliSiemens per centimeter

NTU Nephelometric turbidity units

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-20140508		EDEN-DANIN-R-SW-20140508		EDEN-HW58-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1121		1050		0856	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	18	µg/L	18	µg/L	23	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.3	µg/L	0.9J	µg/L	1.3	µg/L
Barium	220	µg/L	20	µg/L	22	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	0.14	mg/L	0.13	mg/L	0.074J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7,500	µg/L	7,600	µg/L	7,400	µg/L
Chromium	25	µg/L	1.7J	µg/L	1.1J	µg/L	1.8J	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	0.75J	µg/L	0.66J	µg/L	0.84J	µg/L
Iron	1,000	µg/L	180	µg/L	180	µg/L	230	µg/L
Lead	0.59	µg/L	0.3U	µg/L	0.3U	µg/L	0.076J	µg/L
Magnesium	-	-	2,800	µg/L	2,900	µg/L	2,800	µg/L
Manganese	200	µg/L	7	µg/L	23	µg/L	6.6	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	0.53J	µg/L	1U	µg/L
Nickel	17	µg/L	1U	µg/L	1.2J	µg/L	0.45J	µg/L
Potassium	53,000	µg/L	1,500	µg/L	1,600	µg/L	1,800	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	4,500	µg/L	9,400J	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	µg/L	1.7	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		Hwy 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140508		EDEN-DANIN-R-SW-20140508		EDEN-HW58-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1121		1050		0856	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Dissolved Solids								
Total Dissolved Solids	-	-	68	mg/L	71	mg/L	74	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	12	mg/L	9.5	mg/L	15	mg/L
Total Metals								
Aluminum	2,000	µg/L	130	µg/L	500	µg/L	160	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	2	µg/L	2.1	µg/L	1.5	µg/L
Barium	220	µg/L	22	µg/L	29	µg/L	25	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	0.12	mg/L	0.075J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.084J	µg/L	0.1U	µg/L
Calcium	-	-	7,200	µg/L	7,700	µg/L	7,500	µg/L
Chromium	29	µg/L	2	µg/L	2.8	µg/L	2	µg/L
Cobalt	24	µg/L	0.21J	µg/L	0.35J	µg/L	0.23J	µg/L
Copper	3	µg/L	1.1	µg/L	1.4	µg/L	1.1	µg/L
Iron	2,300	µg/L	380	µg/L	850	µg/L	510	µg/L
Lead	0.6	µg/L	0.49	µg/L	1.3	µg/L	0.36	µg/L
Magnesium	-	-	2,700	µg/L	2,800	µg/L	2,800	µg/L
Manganese	200	µg/L	23	µg/L	47	µg/L	27	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	0.55J	µg/L	0.74J	µg/L	0.52J	µg/L
Potassium	53,000	µg/L	1,400	µg/L	1,500	µg/L	1,800	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	4,500	µg/L	8,400J	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.8	µg/L	7.5	µg/L	2.1	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		Hwy 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140508		EDEN-DANIN-R-SW-20140508		EDEN-HW58-C-SW-20140508	
Date	-		05/08/2014		05/08/2014		05/08/2014	
Time	-		1121		1050		0856	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Anions								
Bromide	-	-	-	-	-	-	-	-
Chloride	230	mg/L	7.9	mg/L	8.2	mg/L	12	mg/L
Sulfate	-	-	4.8	mg/L	4.9	mg/L	5.4	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	22	mg/L	25	mg/L	30	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	29	mg/L	31	mg/L	30	mg/L
Organic Carbon, Dissolved	-	-	1.3	mg/L	1.3	mg/L	1.6	mg/L
pH	6.5 - 9.0	std	7.38J	std	7.27J	std	7.46J	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

°C degrees Celsius

EPA U.S. Environmental Protection Agency

J Value is estimated

µg/L micrograms per liter

mg/L milligrams per liter

mS/cm milliSiemens per centimeter

NTU Nephelometric turbidity units

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-20140508	
Date	-		05/08/2014	
Time	-		0941	
Status	-		Validation Complete	
Type	-		Surface Water	
Dissolved metals				
Aluminum	87	μg/L	24	μg/L
Antimony	5.6	μg/L	1U	μg/L
Arsenic	10	μg/L	1.9J	μg/L
Barium	220	μg/L	24	μg/L
Beryllium	0.66	μg/L	0.4U	μg/L
Boron	0.36	mg/L	0.099J	mg/L
Cadmium	0.1	μg/L	0.1U	μg/L
Calcium	-	-	7,700	μg/L
Chromium	25	μg/L	2.3	μg/L
Cobalt	3	μg/L	0.4U	μg/L
Copper	3	μg/L	0.98J	μg/L
Iron	1,000	μg/L	250	μg/L
Lead	0.59	μg/L	0.083J	μg/L
Magnesium	-	-	3,100	μg/L
Manganese	200	μg/L	6.7	μg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	800	μg/L	1U	μg/L
Nickel	17	μg/L	0.4J	μg/L
Potassium	53,000	μg/L	2,000	μg/L
Selenium	5	μg/L	2U	μg/L
Silver	0.06	μg/L	1U	μg/L
Sodium	680,000	μg/L	9,200	μg/L
Thallium	0.24	μg/L	0.2U	μg/L
Vanadium	27	μg/L	2	μg/L
Zinc	39	μg/L	20U	μg/L

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SURFACE WATER RESULTS**

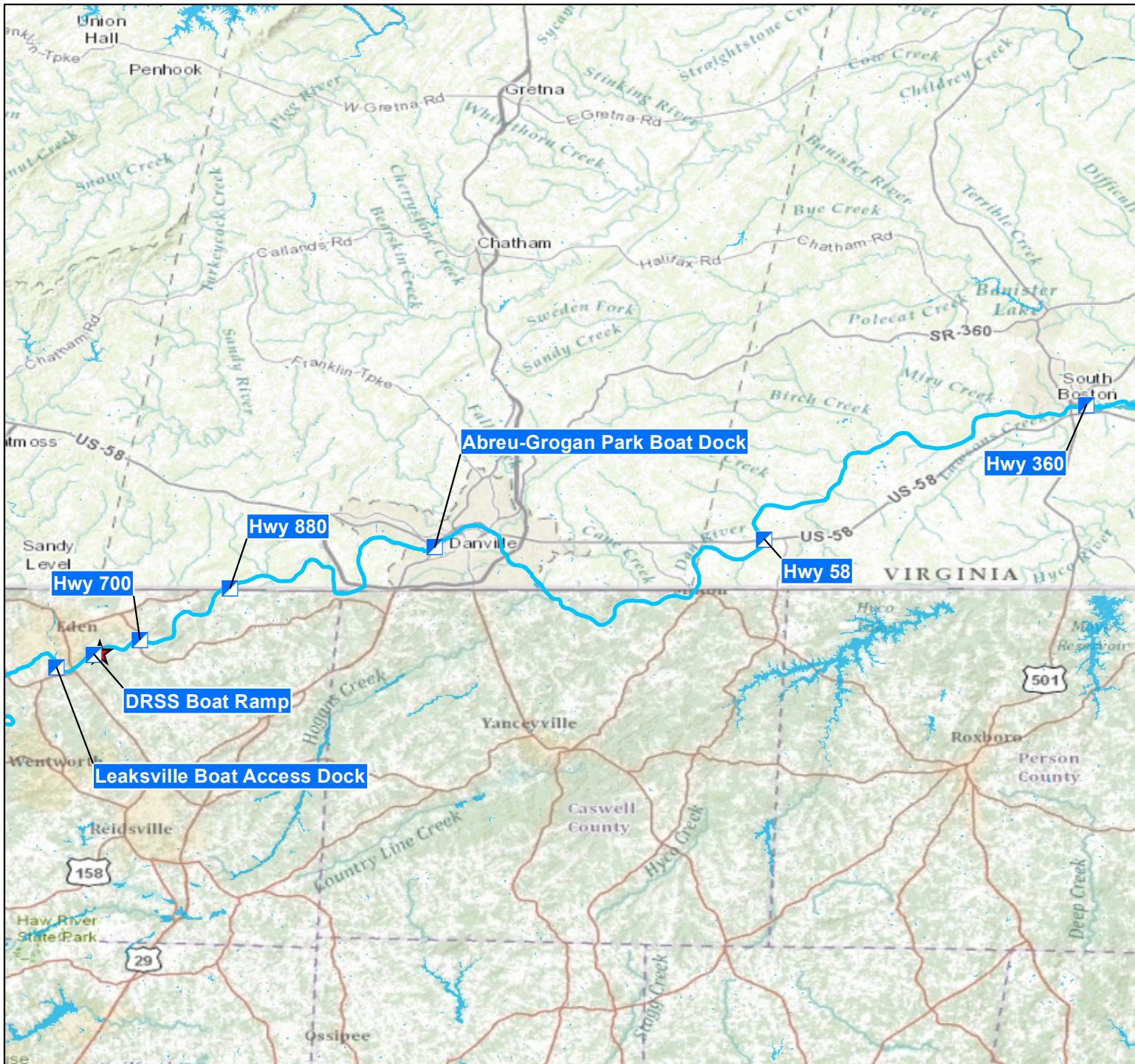
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140508	
Date	-		05/08/2014	
Time	-		0941	
Status	-		Validation Complete	
Type	-		Surface Water	
Total Dissolved Solids				
Total Dissolved Solids	-	-	78	mg/L
Total Suspended Solids				
Total Suspended Solids	-	-	17	mg/L
Total Metals				
Aluminum	2,000	µg/L	200	µg/L
Antimony	5.6	µg/L	1U	µg/L
Arsenic	10	µg/L	1.4J	µg/L
Barium	220	µg/L	28	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.086J	mg/L
Cadmium	2	µg/L	0.15	µg/L
Calcium	-	-	7,400	µg/L
Chromium	29	µg/L	2.1	µg/L
Cobalt	24	µg/L	0.27J	µg/L
Copper	3	µg/L	1.6	µg/L
Iron	2,300	µg/L	540	µg/L
Lead	0.6	µg/L	0.46	µg/L
Magnesium	-	-	2,800	µg/L
Manganese	200	µg/L	34	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L
Nickel	17	µg/L	0.51J	µg/L
Potassium	53,000	µg/L	1,800	µg/L
Selenium	5	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L
Sodium	680,000	µg/L	8,600	µg/L
Thallium	0.24	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2.2	µg/L
Zinc	39	µg/L	20U	µg/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-20140508	
Date	-		05/08/2014	
Time	-		0941	
Status	-		Validation Complete	
Type	-		Surface Water	
Anions				
Bromide	-	-	-	-
Chloride	230	mg/L	13	mg/L
Sulfate	-	-	5.3	mg/L
Wet Chemistry				
Alkalinity, Total (As CaCO ₃)	-	-	27	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	30	mg/L
Organic Carbon, Dissolved	-	-	1.7	mg/L
pH	6.5 - 9.0	std	7.3J	std

Notes

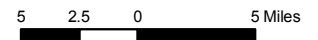
- ¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water
- °C degrees Celsius
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- µg/L micrograms per liter
- mg/L milligrams per liter
- mS/cm milliSiemens per centimeter
- NTU Nephelometric turbidity units
- std standard
- 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
May 08, 2014

