

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on May 15, 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		DRSS Boat Ramp		DRSS Boat Ramp		Hwy 700	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140515-DUP	EDEN-DUKE-L-SW-20140515	EDEN-HW700-C-SW-20140515			
Date	-		05/15/2014	05/15/2014	05/15/2014			
Time	-		1235	1230	1200			
Status	-		Validation Complete	Validation Complete	Validation Complete			
Type	-		Surface Water	Surface Water	Surface Water			
Dissolved metals								
Aluminum	87	µg/L	14	µg/L	19	µg/L	19	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.82J	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	19	µg/L	19	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	0.12	mg/L	0.15	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.054J	µg/L	0.049J	µg/L
Calcium	-	-	7500	µg/L	7400	µg/L	7600	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2.5U	µg/L
Cobalt	3	µg/L	0.14J	µg/L	0.14J	µg/L	0.4U	µg/L
Copper	3	µg/L	1.1	µg/L	0.98J	µg/L	0.76J	µg/L
Iron	1,000	µg/L	160	µg/L	190	µg/L	200	µg/L
Lead	0.59	µg/L	0.3U	µg/L	0.3U	µg/L	0.3U	µg/L
Magnesium	-	-	2800	µg/L	2800	µg/L	2800	µg/L
Manganese	200	µg/L	32	µg/L	31	µg/L	15	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	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1600	µg/L	1600	µg/L	1500	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	4900	µg/L	4900	µg/L	4300	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.98J	µg/L	1.2	µg/L	1.3	µg/L
Zinc	39	µg/L	20U	µg/L	3.9J	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	74	mg/L	70	mg/L	75	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	19J	mg/L	36J	mg/L	10	mg/L

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SURFACE WATER RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		DRSS Boat Ramp		DRSS Boat Ramp		Hwy 700	
Sample Information								
Sample ID	-		EDEN-DUKE-L-SW-20140515-DUP		EDEN-DUKE-L-SW-20140515		EDEN-HW700-C-SW-20140515	
Date	-		05/15/2014		05/15/2014		05/15/2014	
Time	-		1235		1230		1200	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	290	µg/L	290	µg/L	130	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	23	µg/L	23	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	0.12	mg/L	0.14	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7500	µg/L	7400	µg/L	7500	µg/L
Chromium	29	µg/L	2.2	µg/L	2	µg/L	2.1	µg/L
Cobalt	24	µg/L	0.38J	µg/L	0.42	µg/L	0.2J	µg/L
Copper	3	µg/L	1.4	µg/L	1.4	µg/L	0.81J	µg/L
Iron	2,300	µg/L	690	µg/L	720	µg/L	420	µg/L
Lead	0.6	µg/L	0.45	µg/L	0.47	µg/L	0.27J	µg/L
Magnesium	-	-	2900	µg/L	2800	µg/L	2800	µg/L
Manganese	200	µg/L	54	µg/L	63	µg/L	28	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	0.59J	µg/L	0.65J	µg/L	1U	µg/L
Potassium	53,000	µg/L	1700	µg/L	1700	µg/L	1500	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	5100	µg/L	5000	µg/L	4300	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2.1	µg/L	1.9	µg/L	1.4	µg/L
Zinc	39	µg/L	3.8J	µg/L	4.3J	µg/L	20U	µg/L
Anions								
Bromide	-	-	62	µg/L	63	µg/L	77	µg/L
Chloride	230	mg/L	8.7	mg/L	8.7	mg/L	8.8	mg/L
Sulfate	-	-	6	mg/L	6	mg/L	5.2	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹	DRSS Boat Ramp		DRSS Boat Ramp		Hwy 700		
Sample Information								
Sample ID	-	EDEN-DUKE-L-SW-20140515-DUP		EDEN-DUKE-L-SW-20140515		EDEN-HW700-C-SW-20140515		
Date	-	05/15/2014		05/15/2014		05/15/2014		
Time	-	1235		1230		1200		
Status	-	Validation Complete		Validation Complete		Validation Complete		
Type	-	Surface Water		Surface Water		Surface Water		
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	22	mg/L	23	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	31	mg/L	30	mg/L	30	mg/L
Organic Carbon, Dissolved	-	-	1.2	mg/L	1.2	mg/L	1.2	mg/L
pH	6.5 - 9.0	SU	7.47J	SU	7.47J	SU	7.46J	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

°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

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 880		Abreu-Grogan Park Boat Dock		Hwy 58	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140515		EDEN-DANIN-R-SW-20140515		EDEN-HW58-C-SW-20140515	
Date	-		05/15/2014		05/15/2014		05/15/2014	
Time	-		1132		1055		0905	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	15	µg/L	17	µg/L	19	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	4.1	µg/L
Arsenic	10	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	21	µg/L	23	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	0.16	mg/L	0.15	mg/L	0.13	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7600	µg/L	8100	µg/L	8100	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2.5U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.13J	µg/L	0.4U	µg/L
Copper	3	µg/L	1.6	µg/L	0.93J	µg/L	1.1	µg/L
Iron	1,000	µg/L	160	µg/L	170	µg/L	190	µg/L
Lead	0.59	µg/L	0.065J	µg/L	0.3U	µg/L	0.076J	µg/L
Magnesium	-	-	2800	µg/L	3000	µg/L	3000	µg/L
Manganese	200	µg/L	8.1	µg/L	36	µg/L	4.8	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.64J	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1500	µg/L	1600	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	4400	µg/L	4700	µg/L	8900	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.79J	µg/L	1.2	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	-	-	70	mg/L	71	mg/L	90	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	5.5	mg/L	8	mg/L	10	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-20140515		EDEN-DANIN-R-SW-20140515		EDEN-HW58-C-SW-20140515	
Date	-		05/15/2014		05/15/2014		05/15/2014	
Time	-		1132		1055		0905	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	98	µg/L	130	µg/L	110	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	4.1	µg/L
Arsenic	10	µg/L	1U	µg/L	0.96J	µg/L	1U	µg/L
Barium	220	µg/L	22	µg/L	25	µg/L	23	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.16	mg/L	0.15	mg/L	0.13	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7800	µg/L	8100	µg/L	8200	µg/L
Chromium	29	µg/L	1.5J	µg/L	1.8J	µg/L	1.7J	µg/L
Cobalt	24	µg/L	0.15J	µg/L	0.22J	µg/L	0.2J	µg/L
Copper	3	µg/L	2.2	µg/L	1	µg/L	1	µg/L
Iron	2,300	µg/L	340	µg/L	420	µg/L	420	µg/L
Lead	0.6	µg/L	0.23J	µg/L	0.24J	µg/L	0.29J	µg/L
Magnesium	-	-	2900	µg/L	3000	µg/L	3000	µg/L
Manganese	200	µg/L	18	µg/L	47	µg/L	23	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.59J	µg/L	1U	µg/L	0.52J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	0.41J	µg/L
Potassium	53,000	µg/L	1500	µg/L	1600	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	4500	µg/L	4700	µg/L	8900	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	1.5	µg/L	1.5	µg/L
Zinc	39	µg/L	3.2J	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	80	µg/L	79	µg/L	130	µg/L
Chloride	230	mg/L	9.2	mg/L	9.1	mg/L	14	mg/L
Sulfate	-	-	5.2	mg/L	5.2	mg/L	6	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-20140515	EDEN-DANIN-R-SW-20140515	EDEN-HW58-C-SW-20140515
Date	-	05/15/2014	05/15/2014	05/15/2014
Time	-	1132	1055	0905
Status	-	Validation Complete	Validation Complete	Validation Complete
Type	-	Surface Water	Surface Water	Surface Water
Wet Chemistry				
Alkalinity, Total (As CaCO ₃)	-	24	26	28
Hardness, Calcium/Magnesium (As CaCO ₃)	-	31	33	33
Organic Carbon, Dissolved	-	1.3	1.4	1.6
pH	6.5 - 9.0	7.45J	7.5J	7.55J

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

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 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140515	
Date	-		05/15/2014	
Time	-		0945	
Status	-		Validation Complete	
Type	-		Surface Water	
Dissolved metals				
Aluminum	87	μg/L	17	μg/L
Antimony	5.6	μg/L	4.4	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	0.15	mg/L
Cadmium	0.1	μg/L	0.043J	μg/L
Calcium	-	-	8400	μg/L
Chromium	25	μg/L	2.1U	μg/L
Cobalt	3	μg/L	0.4U	μg/L
Copper	3	μg/L	1.3	μg/L
Iron	1,000	μg/L	180	μg/L
Lead	0.59	μg/L	0.085J	μg/L
Magnesium	-	-	3100	μg/L
Manganese	200	μg/L	6.3	μg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	800	μg/L	1U	μg/L
Nickel	17	μg/L	0.41J	μg/L
Potassium	53,000	μg/L	1900	μg/L
Selenium	5	μg/L	2U	μg/L
Silver	0.06	μg/L	1U	μg/L
Sodium	680,000	μg/L	9400	μg/L
Thallium	0.24	μg/L	0.2U	μg/L
Vanadium	27	μg/L	1.4	μg/L
Zinc	39	μg/L	20U	μg/L
Total Dissolved Solids				
Total Dissolved Solids	-	-	8	mg/L
Total Suspended Solids				
Total Suspended Solids	-	-	14	mg/L

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

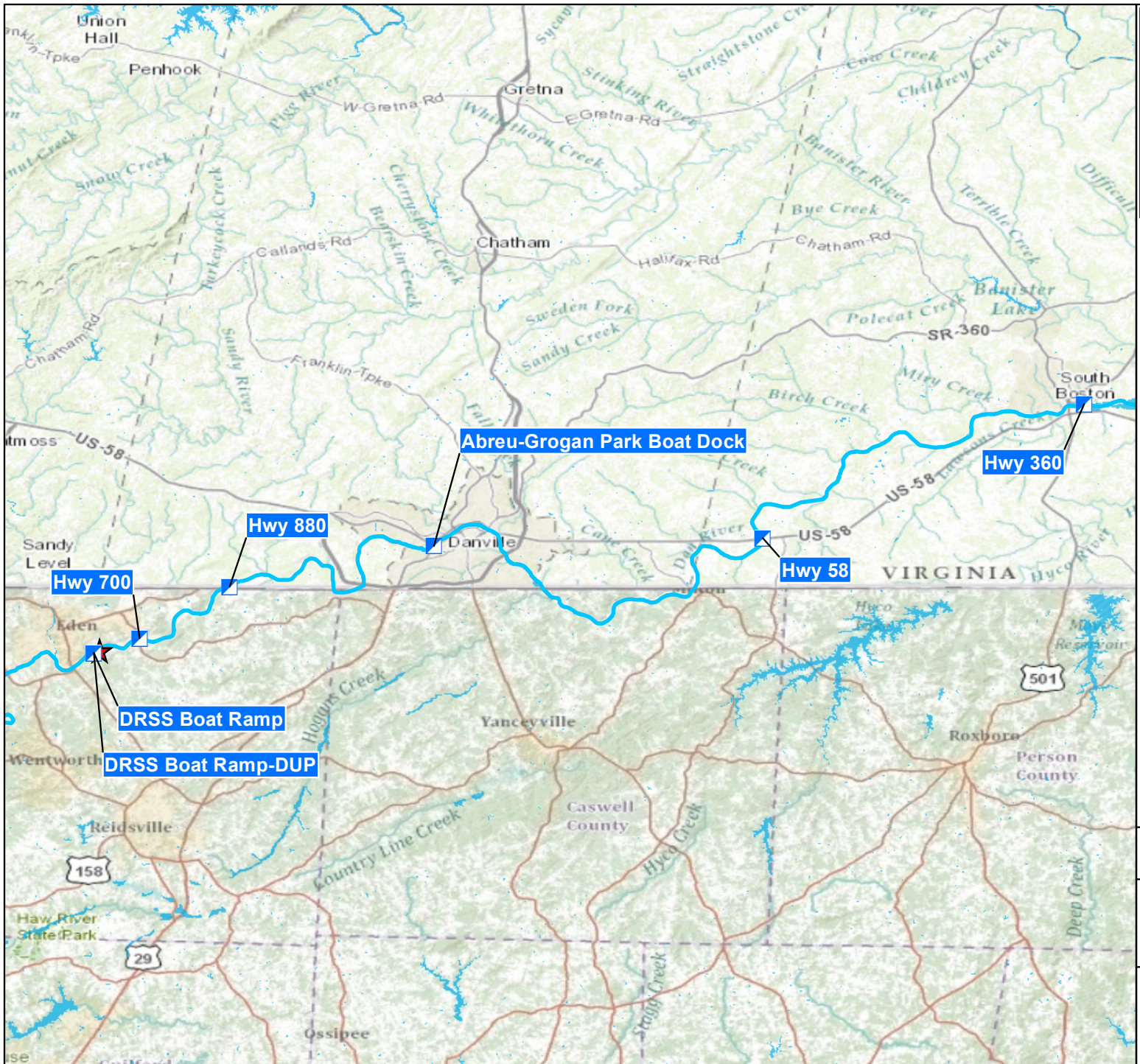
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 360	
Sample Information				
Sample ID	-		EDEN-HW360-C-SW-20140515	
Date	-		05/15/2014	
Time	-		0945	
Status	-		Validation Complete	
Type	-		Surface Water	
Total Metals				
Aluminum	2,000	µg/L	130	µg/L
Antimony	5.6	µg/L	4.1	µg/L
Arsenic	10	µg/L	1U	µg/L
Barium	220	µg/L	29	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.14	mg/L
Cadmium	2	µg/L	0.1U	µg/L
Calcium	-	-	8300	µg/L
Chromium	29	µg/L	1.8J	µg/L
Cobalt	24	µg/L	0.23J	µg/L
Copper	3	µg/L	1.5	µg/L
Iron	2,300	µg/L	460	µg/L
Lead	0.6	µg/L	0.37	µg/L
Magnesium	-	-	3100	µg/L
Manganese	200	µg/L	30	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L
Nickel	17	µg/L	1U	µg/L
Potassium	53,000	µg/L	1900	µg/L
Selenium	5	µg/L	2U	µg/L
Silver	0.06	µg/L	1U	µg/L
Sodium	680,000	µg/L	9100	µg/L
Thallium	0.24	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.6	µg/L
Zinc	39	µg/L	20U	µg/L
Anions				
Bromide	-	-	150	µg/L
Chloride	230	mg/L	16	mg/L
Sulfate	-	-	6.2	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-20140515	
Date	-		05/15/2014	
Time	-		0945	
Status	-		Validation Complete	
Type	-		Surface Water	
Wet Chemistry				
Alkalinity, Total (As CaCO ₃)	-	-	26	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	34	mg/L
Organic Carbon, Dissolved	-	-	1.6	mg/L
pH	6.5 - 9.0	SU	7.49J	SU

Notes

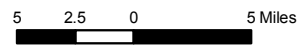
- ¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water
- °C degrees Celsius
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- µg/L micrograms per liter
- mg/L milligrams per liter
- mS/cm milliSiemens per centimeter
- NTU Nephelometric turbidity units
- 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
May 15, 2014

