

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on May 22, 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 copper and lead. 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-20140522		EDEN-DUKE-L-SW-20140522		EDEN-HW700-C-SW-20140522	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		14:20		13:20		12:45	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	19	µg/L	16	µg/L	19	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.2J+	µg/L	1.2	µg/L	0.91J	µg/L
Barium	220	µg/L	22	µg/L	18	µg/L	17	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.24	mg/L	0.076J	mg/L	0.094J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8600	µg/L	6800	µg/L	6800	µg/L
Chromium	25	µg/L	1J	µg/L	1.2J	µg/L	2U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	1U	µg/L	0.54J	µg/L	0.73J	µg/L
Iron	1,000	µg/L	130	µg/L	140	µg/L	150	µg/L
Lead	0.59	µg/L	0.3U	µg/L	0.3U	µg/L	0.3U	µg/L
Magnesium	-	-	2900	µg/L	2600	µg/L	2600	µg/L
Manganese	200	µg/L	4.5	µg/L	19	µg/L	8.4	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	0.41J	µg/L	1U	µg/L
Potassium	53,000	µg/L	1500	µg/L	1400	µg/L	1400	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	3700	µg/L	4200	µg/L	4400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	4.3	µg/L	4.8	µg/L	3.7	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	85	mg/L	66	mg/L	69	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	12	mg/L	17	mg/L	23	mg/L

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SURFACE WATER RESULTS**

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Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140522		EDEN-DUKE-L-SW-20140522		EDEN-HW700-C-SW-20140522	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		14:20		13:20		12:45	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	110	µg/L	110	µg/L	140	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.4J+	µg/L	1.5J+	µg/L	1.2J+	µg/L
Barium	220	µg/L	24	µg/L	20	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	0.24	mg/L	0.074J	mg/L	0.091J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8700	µg/L	6600	µg/L	6700	µg/L
Chromium	29	µg/L	1.5J	µg/L	1.7J	µg/L	1.4J	µg/L
Cobalt	24	µg/L	0.2J	µg/L	0.29J	µg/L	0.39J	µg/L
Copper	3	µg/L	1U	µg/L	0.72J	µg/L	1.4	µg/L
Iron	2,300	µg/L	400	µg/L	410	µg/L	500	µg/L
Lead	0.6	µg/L	0.25J	µg/L	0.32	µg/L	0.48	µg/L
Magnesium	-	-	3000	µg/L	2600	µg/L	2600	µg/L
Manganese	200	µg/L	28	µg/L	48	µg/L	65	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	1U	µg/L	1U	µg/L	0.47J	µg/L
Potassium	53,000	µg/L	1500	µg/L	1400	µg/L	1400	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	3800	µg/L	4200	µg/L	4400	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	6.2	µg/L	5.7	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	3J	µg/L
Anions								
Bromide	-	-	130	µg/L	38	µg/L	50	µg/L
Chloride	230	mg/L	12	mg/L	6.4	mg/L	7.1	mg/L
Sulfate	-	-	5.5	mg/L	5.2	mg/L	4.9	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-20140522		EDEN-DUKE-L-SW-20140522		EDEN-HW700-C-SW-20140522	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		14:20		13:20		12:45	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	23	mg/L	21	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	34	mg/L	27	mg/L	27	mg/L
Organic Carbon, Dissolved	-	-	0.9J	mg/L	0.98J	mg/L	1.3	mg/L
pH	6.5 - 9.0		SU		7.43J	SU	7.32J	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
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- µg/L micrograms per liter
- mg/L milligrams per liter
- 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		Abreu-Grogan Park Boat Dock	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140522		EDEN-DANIN-R-SW-20140522		EDEN-DANIN-R-SW-20140522-DUP	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		12:17		11:25		11:25	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	20	µg/L	25	µg/L	21	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1.2	µg/L	1.4	µg/L	1.4	µg/L
Barium	220	µg/L	19	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	0.092J	mg/L	0.13	mg/L	0.13	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7000	µg/L	7800	µg/L	7700	µg/L
Chromium	25	µg/L	1.2J	µg/L	1.3J	µg/L	1.4J	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.14J	µg/L	0.14J	µg/L
Copper	3	µg/L	0.61J	µg/L	1U	µg/L	1U	µg/L
Iron	1,000	µg/L	220	µg/L	260	µg/L	240	µg/L
Lead	0.59	µg/L	0.065J	µg/L	0.082J	µg/L	0.078J	µg/L
Magnesium	-	-	2700	µg/L	2900	µg/L	2900	µg/L
Manganese	200	µg/L	5.5	µg/L	44	µg/L	44	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.82J	µg/L	0.94J	µg/L	0.94J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Potassium	53,000	µg/L	1400	µg/L	1600	µg/L	1600	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	4300	µg/L	4800	µg/L	4700	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	4.8	µg/L	5.2	µg/L	5.6	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	74	mg/L	76	mg/L	76	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	24	mg/L	12	mg/L	12	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		Abreu-Grogan Park Boat Dock	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140522		EDEN-DANIN-R-SW-20140522		EDEN-DANIN-R-SW-20140522-DUP	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		12:17		11:25		11:25	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	150	µg/L	130	µg/L	130	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	3.1J+	µg/L	1.5J+	µg/L	1.6J+	µg/L
Barium	220	µg/L	24	µg/L	23	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	0.095J	mg/L	0.12	mg/L	0.12	mg/L
Cadmium	2	µg/L	0.047J	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7200	µg/L	7700	µg/L	7700	µg/L
Chromium	29	µg/L	1.7J	µg/L	1.6J	µg/L	1.6J	µg/L
Cobalt	24	µg/L	0.45	µg/L	0.25J	µg/L	0.24J	µg/L
Copper	3	µg/L	1.3	µg/L	0.58J	µg/L	0.68J	µg/L
Iron	2,300	µg/L	1400	µg/L	460	µg/L	470	µg/L
Lead	0.6	µg/L	0.67	µg/L	0.32	µg/L	0.28J	µg/L
Magnesium	-	-	2700	µg/L	2900	µg/L	2900	µg/L
Manganese	200	µg/L	65	µg/L	53	µg/L	53	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.71J	µg/L	0.81J	µg/L	0.79J	µg/L
Nickel	17	µg/L	0.62J	µg/L	0.4J	µg/L	0.71J	µg/L
Potassium	53,000	µg/L	1500	µg/L	1600	µg/L	1600	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	4600	µg/L	4600	µg/L
Thallium	0.24	µg/L	0.12J	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.8	µg/L	5.7	µg/L	5.9	µg/L
Zinc	39	µg/L	4.5J	µg/L	20U	µg/L	20U	µg/L
Anions								
Bromide	-	-	50	µg/L	68	µg/L	68	µg/L
Chloride	230	mg/L	7	mg/L	8.6	mg/L	8.6	mg/L
Sulfate	-	-	4.9	mg/L	5.5	mg/L	5.5	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		Abreu-Grogan Park Boat Dock	
Sample Information								
Sample ID	-		EDEN-BHB-C-SW-20140522		EDEN-DANIN-R-SW-20140522		EDEN-DANIN-R-SW-20140522-DUP	
Date	-		05/22/2014		05/22/2014		05/22/2014	
Time	-		12:17		11:25		11:25	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	26	mg/L	24	mg/L	27	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	29	mg/L	31	mg/L	31	mg/L
Organic Carbon, Dissolved	-	-	1.1	mg/L	1.1	mg/L	1.3	mg/L
pH	6.5 - 9.0		SU	7.27J	SU	7.36J	SU	7.5J

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
- µg/L micrograms per liter
- mg/L milligrams per liter
- 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 58		Hwy 360	
Sample Information						
Sample ID	-		EDEN-HW58-C-SW-20140522		EDEN-HW360-C-SW-20140522	
Date	-		05/22/2014		05/22/2014	
Time	-		09:24		10:10	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Dissolved metals						
Aluminum	87	µg/L	24	µg/L	35	µg/L
Antimony	5.6	µg/L	0.76J	µg/L	1U	µg/L
Arsenic	10	µg/L	1.2	µg/L	0.88J	µg/L
Barium	220	µg/L	24	µg/L	25	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.11	mg/L	0.11	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7900	µg/L	7300	µg/L
Chromium	25	µg/L	1.1J	µg/L	2U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	5.3J	µg/L	0.93J	µg/L
Iron	1,000	µg/L	240	µg/L	260	µg/L
Lead	0.59	µg/L	0.12J	µg/L	0.12J	µg/L
Magnesium	-	-	3000	µg/L	2800	µg/L
Manganese	200	µg/L	7.1	µg/L	8.2	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.97J	µg/L	0.61J	µg/L
Nickel	17	µg/L	0.59J	µg/L	1U	µg/L
Potassium	53,000	µg/L	1900	µg/L	1900	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	9900	µg/L	5100	µg/L
Thallium	0.24	µg/L	0.12J	µg/L	0.2U	µg/L
Vanadium	27	µg/L	4.6	µg/L	3.1J+	µg/L
Zinc	39	µg/L	5.2J	µg/L	20U	µg/L
Total Dissolved Solids						
Total Dissolved Solids	-	-	97	mg/L	80	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	18	mg/L	18	mg/L

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

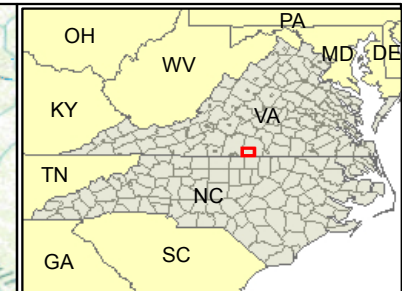
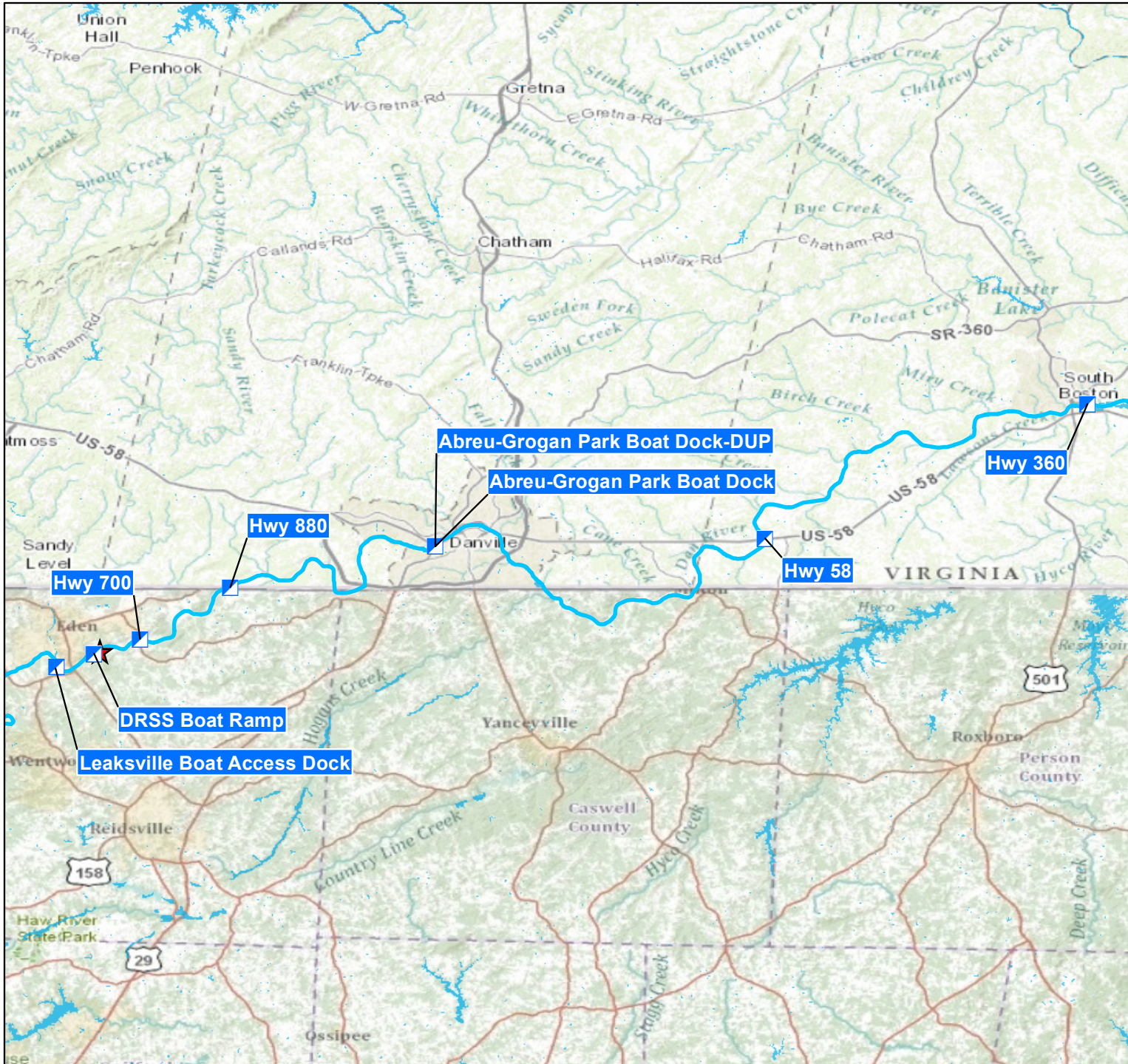
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Hwy 58		Hwy 360	
Sample Information						
Sample ID	-		EDEN-HW58-C-SW-20140522		EDEN-HW360-C-SW-20140522	
Date	-		05/22/2014		05/22/2014	
Time	-		09:24		10:10	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Total Metals						
Aluminum	2,000	µg/L	150	µg/L	150	µg/L
Antimony	5.6	µg/L	0.73J	µg/L	1U	µg/L
Arsenic	10	µg/L	1.4J+	µg/L	1.2J+	µg/L
Barium	220	µg/L	27	µg/L	29	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.11	mg/L	0.11	mg/L
Cadmium	2	µg/L	0.043J	µg/L	0.046J	µg/L
Calcium	-	-	7900	µg/L	7400	µg/L
Chromium	29	µg/L	1.5J	µg/L	1.4J	µg/L
Cobalt	24	µg/L	0.26J	µg/L	0.27J	µg/L
Copper	3	µg/L	0.92J	µg/L	1.5	µg/L
Iron	2,300	µg/L	540	µg/L	540	µg/L
Lead	0.6	µg/L	0.41	µg/L	0.49	µg/L
Magnesium	-	-	3000	µg/L	2800	µg/L
Manganese	200	µg/L	34	µg/L	38	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.58J	µg/L	0.49J	µg/L
Nickel	17	µg/L	0.62J	µg/L	0.44J	µg/L
Potassium	53,000	µg/L	1900	µg/L	1900	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	10000	µg/L	5100	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.6	µg/L	5.4	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L
Anions						
Bromide	-	-	160	µg/L	67	µg/L
Chloride	230	mg/L	16	mg/L	8.3	mg/L
Sulfate	-	-	6.4	mg/L	5.8	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-20140522	EDEN-HW360-C-SW-20140522
Date	-	05/22/2014	05/22/2014
Time	-	09:24	10:10
Status	-	Validation Complete	Validation Complete
Type	-	Surface Water	Surface Water
Wet Chemistry			
Alkalinity, Total (As CaCO ₃)	-	28	27
Hardness, Calcium/Magnesium (As CaCO ₃)	-	32	30
Organic Carbon, Dissolved	-	1.7	1.8
pH	6.5 - 9.0	6.98J	7.48J

Notes

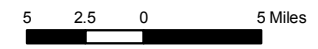
- ¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- µg/L micrograms per liter
- mg/L milligrams per liter
- 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 22, 2014

