

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on June 26, 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 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		Duke Outfall B	
Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140626		EDEN-DUKE-L-SW-20140626		EDEN-48OUTFL-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1346		1333		1246	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	14	µg/L	28	µg/L	21	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	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	0.27	mg/L	0.12	mg/L	0.13	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	9000	µg/L	6900	µg/L	7200	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.17J	µg/L	0.4U	µg/L
Copper	3	µg/L	0.56J	µg/L	0.68J	µg/L	0.55J	µg/L
Iron	1,000	µg/L	130	µg/L	190	µg/L	200	µg/L
Lead	0.59	µg/L	0.3U	µg/L	0.064J	µg/L	0.3U	µg/L
Magnesium	-	-	3200	µg/L	2700	µg/L	2800	µg/L
Manganese	200	µg/L	2.5U	µg/L	21	µg/L	18	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.5J	µg/L	0.48J	µg/L	0.47J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	0.41J	µg/L
Potassium	53,000	µg/L	1800	µg/L	1700	µg/L	1700	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	4000	µg/L	5000	µg/L	4900	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.82J	µg/L	1.1	µg/L	1.1	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	97	mg/L	87	mg/L	86	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	12	mg/L	7.5	mg/L	7.5	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		Duke Outfall B	
Sample Information								
Sample ID	-		EDEN-LBA-R-SW-20140626		EDEN-DUKE-L-SW-20140626		EDEN-48OUTFL-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1346		1333		1246	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	280	µg/L	180	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	1U	µg/L	1U	µg/L
Barium	220	µg/L	23	µg/L	21	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	0.25	mg/L	0.13	mg/L	0.13	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8500	µg/L	7600	µg/L	7400	µg/L
Chromium	29	µg/L	1.1J	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.3J	µg/L	0.28J	µg/L	0.26J	µg/L
Copper	3	µg/L	0.76J	µg/L	1	µg/L	1.2	µg/L
Iron	2,300	µg/L	700	µg/L	580	µg/L	530	µg/L
Lead	0.6	µg/L	0.36	µg/L	0.32	µg/L	0.29J	µg/L
Magnesium	-	-	3000	µg/L	2900	µg/L	2900	µg/L
Manganese	200	µg/L	50	µg/L	44	µg/L	42	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	0.44J	µg/L	0.55J	µg/L	0.45J	µg/L
Potassium	53,000	µg/L	1700	µg/L	1800	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	3900	µg/L	5500	µg/L	5100	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2	µg/L	1.9	µg/L	1.7	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	2.8J	µg/L
Anions								
Bromide	-	-	140	µg/L	68	µg/L	67	µg/L
Chloride	230	mg/L	12	mg/L	9.2	mg/L	8.9	mg/L
Sulfate	-	-	4.8	mg/L	6.1	mg/L	5.4	mg/L
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	31	mg/L	30	mg/L
Organic Carbon, Dissolved	-	-	6.6J-	mg/L	7J-	mg/L	6.9J-	mg/L
pH	6.5 - 9.0	SU	7.37J	SU	5.23J	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
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- J- Value is estimated with a possible low bias
- µg/L micrograms per liter
- mg/L milligrams per liter
- Sulfate 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		Duke Outfall C (36 in RCP)		Hwy 700		Hwy 880	
Sample Information								
Sample ID	-		EDEN-36OUTFL-C-SW-20140626		EDEN-HW700-C-SW-20140626		EDEN-BHB-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1259		1147		1119	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	23	µg/L	23	µg/L	23	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	17	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	0.13	mg/L	0.11	mg/L	0.16	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7100	µg/L	6700	µg/L	7500	µg/L
Chromium	25	µg/L	2U	µg/L	2U	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	0.55J	µg/L	1U	µg/L	1.2	µg/L
Iron	1,000	µg/L	200	µg/L	190	µg/L	180	µg/L
Lead	0.59	µg/L	0.073J	µg/L	0.067J	µg/L	0.075J	µg/L
Magnesium	-	-	2700	µg/L	2600	µg/L	2900	µg/L
Manganese	200	µg/L	18	µg/L	18	µg/L	9.5	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.51J	µg/L	1U	µg/L	0.88J	µg/L
Nickel	17	µg/L	1U	µg/L	1U	µg/L	0.46J	µg/L
Potassium	53,000	µg/L	1700	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	4700	µg/L	4000	µg/L	5000	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.1	µg/L	1.1	µg/L	1.1	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	99	mg/L	92	mg/L	79	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	7.5	mg/L	9	mg/L	9.5	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Duke Outfall C (36 in RCP)		Hwy 700		Hwy 880	
Sample Information								
Sample ID	-		EDEN-36OUTFL-C-SW-20140626		EDEN-HW700-C-SW-20140626		EDEN-BHB-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1259		1147		1119	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	190	µg/L	210	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	1U	µg/L	0.49J	µg/L
Barium	220	µg/L	20	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	0.13	mg/L	0.11	mg/L	0.16	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7200	µg/L	6600	µg/L	7800	µg/L
Chromium	29	µg/L	2U	µg/L	2U	µg/L	2U	µg/L
Cobalt	24	µg/L	0.27J	µg/L	0.29J	µg/L	0.26J	µg/L
Copper	3	µg/L	0.85J	µg/L	0.71J	µg/L	2.3	µg/L
Iron	2,300	µg/L	560	µg/L	580	µg/L	490	µg/L
Lead	0.6	µg/L	0.3	µg/L	0.35	µg/L	0.35	µg/L
Magnesium	-	-	2800	µg/L	2600	µg/L	3000	µg/L
Manganese	200	µg/L	41	µg/L	48	µg/L	39	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.45J	µg/L	1U	µg/L	0.78J	µg/L
Nickel	17	µg/L	0.41J	µg/L	0.44J	µg/L	0.43J	µg/L
Potassium	53,000	µg/L	1700	µg/L	1600	µg/L	1900	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	4800	µg/L	4100	µg/L	5200	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.8	µg/L	1.8	µg/L	1.8	µg/L
Zinc	39	µg/L	20U	µg/L	3.6J	µg/L	2.9J	µg/L
Anions								
Bromide	-	-	69	µg/L	66	µg/L	87	µg/L
Chloride	230	mg/L	8.9	mg/L	7.7	mg/L	9.5	mg/L
Sulfate	-	-	5.2	mg/L	4.5	mg/L	5.2	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	24	mg/L	24	mg/L	24	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	30	mg/L	27	mg/L	32	mg/L
Organic Carbon, Dissolved	-	-	6.5J-	mg/L	6.9J-	mg/L	7.4J-	mg/L
pH	6.5 - 9.0	SU	7.1J	SU	7.26J	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
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- J- Value is estimated with a possible low bias
- µg/L micrograms per liter
- mg/L milligrams per liter
- Sulfate standard units
- U Analyte was not detected at the listed reporting limit.

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

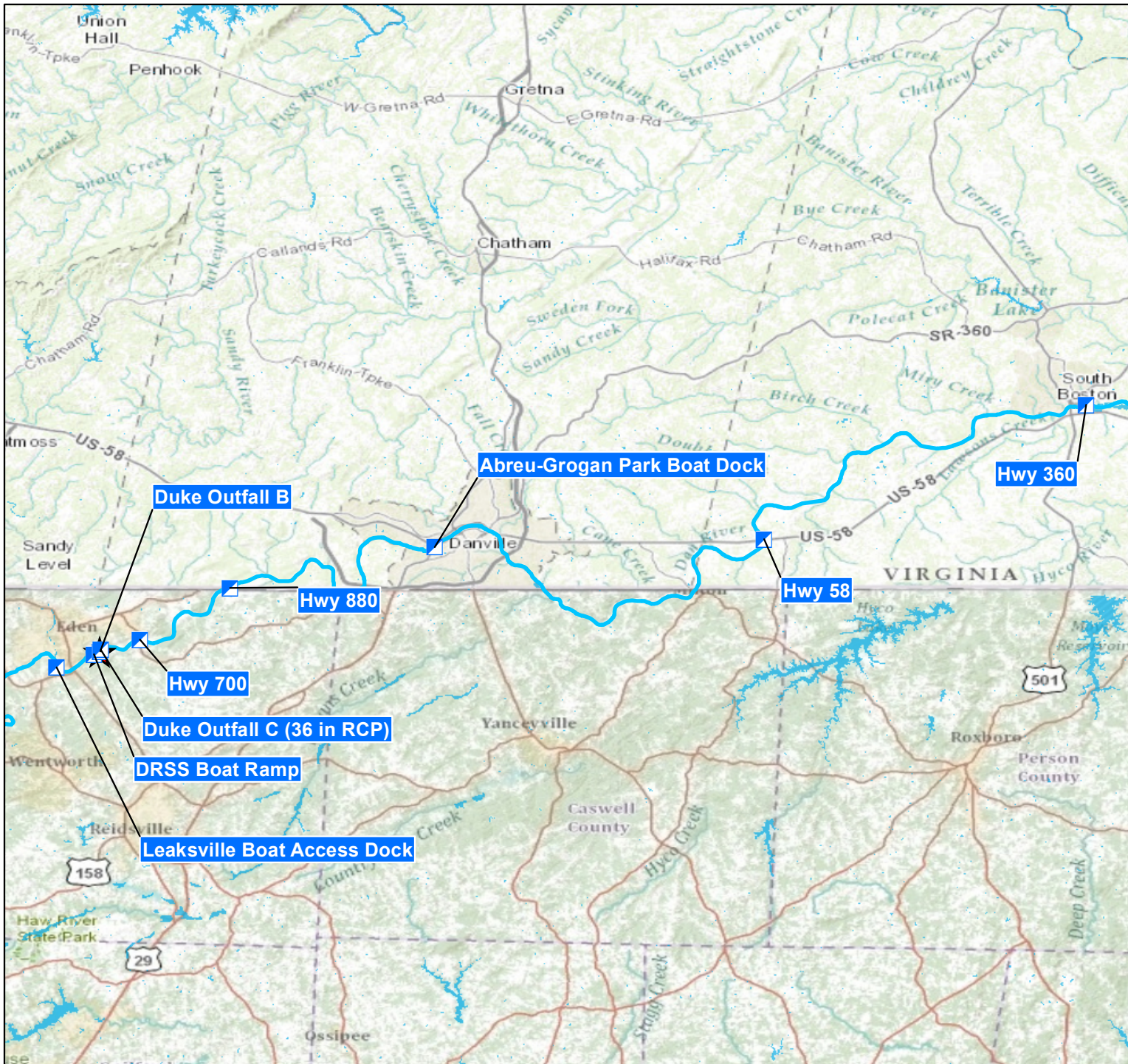
Analyte	Ecological Screening Standard for Surface Water Samples ¹		Abreu-Grogan Park Boat Dock		Hwy 58		Hwy 360	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140626		EDEN-HW58-C-SW-20140626		EDEN-HW360-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1038		0854		0931	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Dissolved metals								
Aluminum	87	µg/L	23	µg/L	26	µg/L	20	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.38J	µg/L	0.41J	µg/L	0.39J	µg/L
Barium	220	µg/L	21	µg/L	21	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	0.15	mg/L	0.13	mg/L	0.14	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7500	µg/L	7100	µg/L	7800	µg/L
Chromium	25	µg/L	2U	µg/L	2U	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	0.61J	µg/L	0.69J	µg/L	0.77J	µg/L
Iron	1,000	µg/L	180	µg/L	190	µg/L	160	µg/L
Lead	0.59	µg/L	0.072J	µg/L	0.11J	µg/L	0.091J	µg/L
Magnesium	-	-	2900	µg/L	2700	µg/L	2900	µg/L
Manganese	200	µg/L	35	µg/L	5.4	µg/L	6.7	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	1.1	µg/L	0.61J	µg/L	0.71J	µg/L
Nickel	17	µg/L	1U	µg/L	0.54J	µg/L	0.42J	µg/L
Potassium	53,000	µg/L	1800	µg/L	2000	µg/L	2100	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	6800	µg/L	8200	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	1.6	µg/L	1.4	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L
Total Dissolved Solids								
Total Dissolved Solids	-	-	110	mg/L	100	mg/L	380	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	8.5	mg/L	24	mg/L	29	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS



Analyte	Ecological Screening Standard for Surface Water Samples ¹		Abreu-Grogan Park Boat Dock		Hwy 58		Hwy 360	
Sample Information								
Sample ID	-		EDEN-DANIN-R-SW-20140626		EDEN-HW58-C-SW-20140626		EDEN-HW360-C-SW-20140626	
Date	-		06/26/2014		06/26/2014		06/26/2014	
Time	-		1038		0854		0931	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Metals								
Aluminum	2,000	µg/L	200	µg/L	580	µg/L	610	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.5J	µg/L	0.45J	µg/L	0.45J	µg/L
Barium	220	µg/L	23	µg/L	27	µg/L	30	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	0.13	mg/L	0.14	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7900	µg/L	7500	µg/L	7900	µg/L
Chromium	29	µg/L	2U	µg/L	1.5J	µg/L	1.7J	µg/L
Cobalt	24	µg/L	0.28J	µg/L	0.54	µg/L	0.58	µg/L
Copper	3	µg/L	1	µg/L	1.3	µg/L	2	µg/L
Iron	2,300	µg/L	520	µg/L	1100	µg/L	1100	µg/L
Lead	0.6	µg/L	0.32	µg/L	0.79	µg/L	0.83	µg/L
Magnesium	-	-	3000	µg/L	2900	µg/L	3100	µg/L
Manganese	200	µg/L	51	µg/L	64	µg/L	61	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	0.99J	µg/L	0.54J	µg/L	0.62J	µg/L
Nickel	17	µg/L	0.53J	µg/L	0.88J	µg/L	0.85J	µg/L
Potassium	53,000	µg/L	1900	µg/L	2100	µg/L	2200	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	5400	µg/L	7100	µg/L	8400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	2	µg/L	3.4	µg/L	3.5	µg/L
Zinc	39	µg/L	6.6J	µg/L	3.9J	µg/L	4J	µg/L
Anions								
Bromide	-	-	85	µg/L	100	µg/L	130	µg/L
Chloride	230	mg/L	9.8	mg/L	11	mg/L	14	mg/L
Sulfate	-	-	5.4	mg/L	5.5	mg/L	5.9	mg/L
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	27	mg/L	25	mg/L	26	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	32	mg/L	31	mg/L	32	mg/L
Organic Carbon, Dissolved	-	-	7.7J-	mg/L	8.1J-	mg/L	8.1J-	mg/L
pH	6.5 - 9.0	SU	7.5J	SU	7.41J	SU	7.43J	SU

Notes

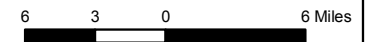
- ¹ Value obtained from the GL Tier 2 Values; National Recommended Water Quality Criteria; Suter and Tsao (1996); Reference condition for EcoRegion XI (25 percentile); NCDENR State Standards for surface water
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- J Value is estimated
- J- Value is estimated with a possible low bias
- µg/L micrograms per liter
- mg/L milligrams per liter
- Sulfate 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
June 26, 2014

