

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on March 11, 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, boron, copper, iron, and lead. EPA typically screens the surface water concentrations using total metals samples, because this is a conservative practice for screening. 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		Abreu-Grogan Park Boat Dock		Mud Flats at Kerr Reservoir	
Sample Information						
Sample ID	-		EDEN-DWTP-RAW-3-20140311		EDEN-MF-C-SW-20140311	
Date	-		03/11/2014		03/11/2014	
Time	-		2245		1350	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Water Quality Monitoring						
Temperature	-		-	-	8.96	°C
Dissolved Oxygen	<6	mg/L	-	-	10	mg/L
Specific Conductance	-		-	-	0.136	mS/cm
pH	6.5 - 9.0	std	-	-	7.5	std
Turbidity	50	NTU	-	-	16	NTU
Dissolved metals						
Aluminum	87	µg/L	47.6	µg/L	56.3	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.173J	µg/L	0.173J	µg/L
Barium	220	µg/L	19.6	µg/L	25.2	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.0902U	mg/L	0.057U	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	5,720	µg/L	11,200	µg/L
Chromium	25	µg/L	0.235J	µg/L	0.217J	µg/L
Cobalt	3	µg/L	5U	µg/L	0.173J	µg/L
Copper	3	µg/L	2U	µg/L	0.825J	µg/L
Iron	1,000	µg/L	576	µg/L	547	µg/L
Lead	0.59	µg/L	0.193J	µg/L	0.272J	µg/L
Magnesium	-	-	2,360J	µg/L	4,570J	µg/L
Manganese	200	µg/L	5.01	µg/L	24	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	5U	µg/L	5U	µg/L
Nickel	17	µg/L	0.288J	µg/L	0.289J	µg/L
Potassium	53,000	µg/L	1,670J	µg/L	1,800J	µg/L
Selenium	5	µg/L	4.5U	µg/L	4.5U	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	4,450J	µg/L	4,640J	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.598J	µg/L	0.775J	µg/L
Zinc	39	µg/L	10U	µg/L	4.01J	µg/L

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Sample Information						
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Date	-		03/11/2014		03/11/2014	
Time	-		2245		1350	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Total Dissolved Solids						
Total Dissolved Solids	-	-	33	mg/L	14	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	33	mg/L	11.5	mg/L
Total Metals						
Aluminum	2,000	µg/L	846	µg/L	37.6	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.393J	µg/L	0.187J	µg/L
Barium	220	µg/L	26.7	µg/L	23.7	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.125U	mg/L	0.05U	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,290	µg/L	11,100	µg/L
Chromium	29	µg/L	2.5U	µg/L	2.5U	µg/L
Cobalt	24	µg/L	0.616J	µg/L	5U	µg/L
Copper	3	µg/L	1.39J	µg/L	0.976J	µg/L
Iron	2,300	µg/L	2,640	µg/L	175	µg/L
Lead	0.6	µg/L	1.25	µg/L	0.138J	µg/L
Magnesium	-	-	2,580J	µg/L	4,410J	µg/L
Manganese	200	µg/L	36.3	µg/L	13.6	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	5U	µg/L	5U	µg/L
Nickel	17	µg/L	5U	µg/L	5U	µg/L
Potassium	53,000	µg/L	5,000U	µg/L	1,580J	µg/L
Selenium	5	µg/L	4.5U	µg/L	4.5U	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	4,710J	µg/L	4,630J	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5U	µg/L	0.615J	µg/L
Zinc	39	µg/L	10.2U	µg/L	10U	µg/L
Anions						
Bromide	-	-	1U	mg/L	1U	mg/L
Chloride	230	mg/L	8.31	mg/L	7.66	mg/L
Sulfate	-	-	4.77	mg/L	6.42	mg/L

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Sample ID	-		EDEN-DWTP-RAW-3-20140311		EDEN-MF-C-SW-20140311	
Date	-		03/11/2014		03/11/2014	
Time	-		2245		1350	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Wet Chemistry						
Alkalinity, Total (As CaCO ₃)	-	-	12.2	mg/L	36.8	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	26.3	mg/L	45.8	mg/L
Organic Carbon, Dissolved	-	-	3	mg/L	1.5	mg/L
pH	6.5 - 9.0	std	6.17J	std	6.81J	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

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

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		Buffalo Creek Point at Kerr Reservoir		Buffalo Creek Point at Kerr Reservoir	
Sample Information						
Sample ID	-		EDEN-BCP-C-SW-20140311		EDEN-BCP-C-SW-20140311-DUP	
Date	-		03/11/2014		03/11/2014	
Time	-		1310		1315	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Water Quality Monitoring						
Temperature	-		7.61	°C	7.61	°C
Dissolved Oxygen	<6	mg/L	10	mg/L	10	mg/L
Specific Conductance	-		0.181	mS/cm	0.181	mS/cm
pH	6.5 - 9.0	std	7.11	std	7.11	std
Turbidity	50	NTU	55	NTU	55	NTU
Dissolved metals						
Aluminum	87	µg/L	126J	µg/L	14.9J	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.511J	µg/L	0.365J	µg/L
Barium	220	µg/L	35.7J	µg/L	31.1	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.413	mg/L	0.473J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	13,400	µg/L	13,300	µg/L
Chromium	25	µg/L	0.291J	µg/L	0.154J	µg/L
Cobalt	3	µg/L	0.438J	µg/L	0.152J	µg/L
Copper	3	µg/L	1.69J	µg/L	1.46J	µg/L
Iron	1,000	µg/L	770J	µg/L	157J	µg/L
Lead	0.59	µg/L	0.625J	µg/L	0.5UJ	µg/L
Magnesium	-	-	5,030	µg/L	4,940J	µg/L
Manganese	200	µg/L	67.9J	µg/L	38.2J	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	5U	µg/L	5U	µg/L
Nickel	17	µg/L	0.493J	µg/L	0.461J	µg/L
Potassium	53,000	µg/L	2,140J	µg/L	2,010J	µg/L
Selenium	5	µg/L	0.436J	µg/L	0.337J	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	5,800	µg/L	5,770	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	1.44J	µg/L	0.438J	µg/L
Zinc	39	µg/L	3.43J	µg/L	2.21J	µg/L

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SURFACE WATER RESULTS**

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Sample Information						
Sample ID	-		EDEN-BCP-C-SW-20140311	EDEN-BCP-C-SW-20140311-DUP		
Date	-		03/11/2014	03/11/2014		
Time	-		1310	1315		
Status	-		Validation Complete	Validation Complete		
Type	-		Surface Water	Surface Water		
Total Dissolved Solids						
Total Dissolved Solids	-	-	24	mg/L	20	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	34	mg/L	30.5	mg/L
Total Metals						
Aluminum	2,000	µg/L	30.4J	µg/L	1,330J	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.456J	µg/L	0.758J	µg/L
Barium	220	µg/L	30.8J	µg/L	40.7	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.424	mg/L	0.422J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	13,300	µg/L	13,900	µg/L
Chromium	29	µg/L	2.5U	µg/L	2.17J	µg/L
Cobalt	24	µg/L	0.168J	µg/L	0.911J	µg/L
Copper	3	µg/L	1.39J	µg/L	3.01	µg/L
Iron	2,300	µg/L	122J	µg/L	2,960J	µg/L
Lead	0.6	µg/L	0.133J	µg/L	1.26J	µg/L
Magnesium	-	-	4,870J	µg/L	5,190	µg/L
Manganese	200	µg/L	36.6J	µg/L	80.8J	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	5U	µg/L	5U	µg/L
Nickel	17	µg/L	5U	µg/L	5U	µg/L
Potassium	53,000	µg/L	1,840J	µg/L	2,100J	µg/L
Selenium	5	µg/L	0.576J	µg/L	0.539J	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	5,780	µg/L	5,940	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.61J	µg/L	5.32	µg/L
Zinc	39	µg/L	10U	µg/L	10U	µg/L
Anions						
Bromide	-	-	1U	mg/L	1U	mg/L
Chloride	230	mg/L	26.7	mg/L	25.4	mg/L
Sulfate	-	-	12.9	mg/L	12.8	mg/L

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Date	-		03/11/2014		03/11/2014	
Time	-		1310		1315	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Wet Chemistry						
Alkalinity, Total (As CaCO ₃)	-	-	7.3J	mg/L	11.8	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	53.4	mg/L	56	mg/L
Organic Carbon, Dissolved	-	-	5.7	mg/L	5.4	mg/L
pH	6.5 - 9.0	std	6.31J	std	5.98J	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

J+ Value is estimated with a possible high bias

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µg/L micrograms per liter

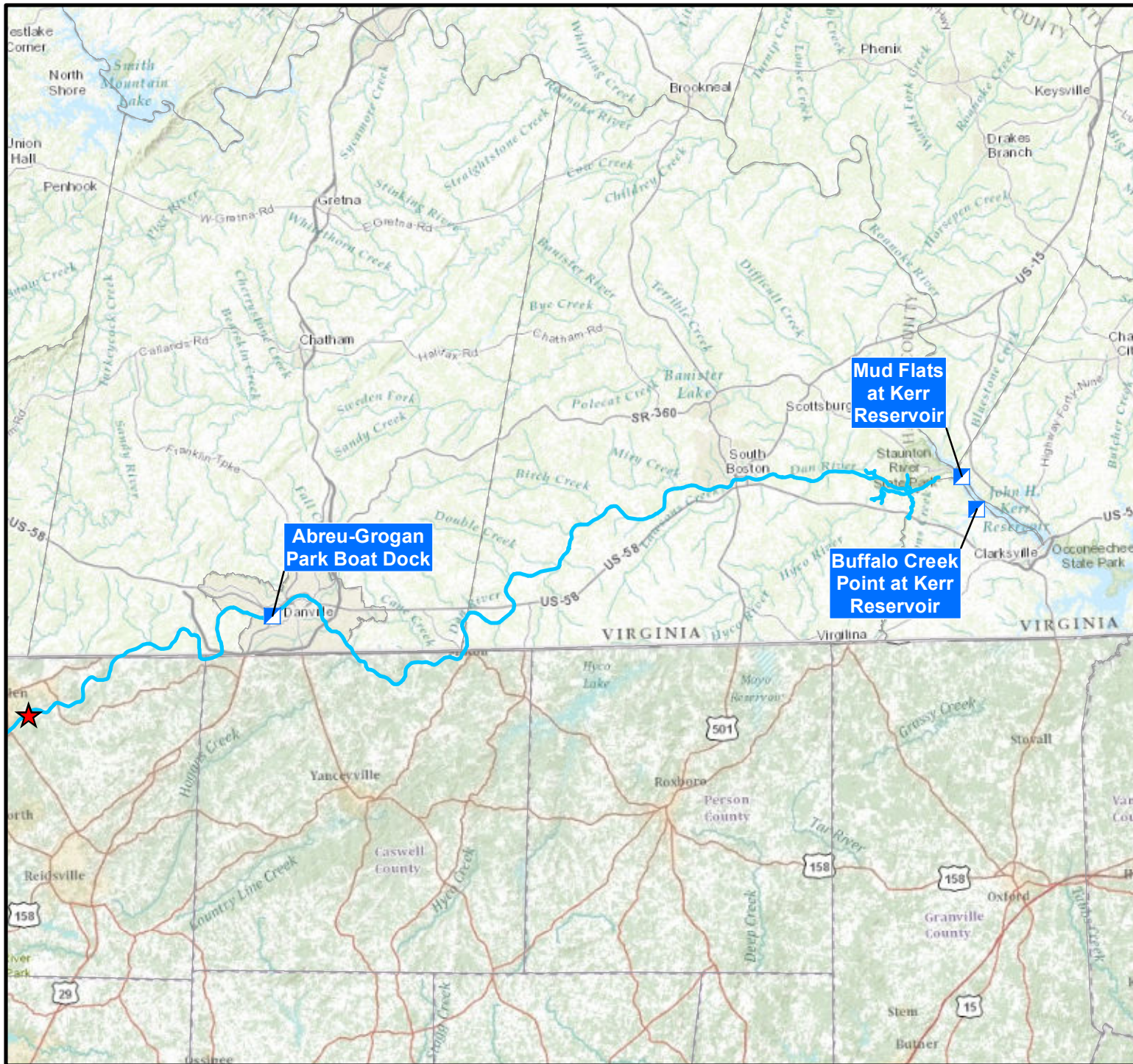
mg/L milligrams per liter

mS/cm milliSiemens per centimeter

NTU Nephelometric turbidity units

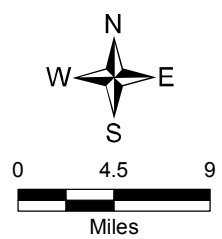
std standard

U Analyte was not detected at the listed reporting limit.



Legend

- ★ Approximate Spill Location
- Surface Water Sample Location
- Dan River



Map Source: ArcGIS Online World Map Topo, 2014

**Surface Water
Sample Locations
March 11, 2014**

