

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

NOTE: The data below represents surface water samples that were collected on March 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 with the exception of aluminum, copper, iron, lead, manganese, and vanadium. EPA typically screens the surface water concentrations using total metals samples because this is a conservative practice for screening. These analytes were not detected above screening levels in any of the samples of the dissolved fraction of surface water (i.e., samples that were filtered to remove particulates). 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		S Boston WTP Intake		Staunton River State Park Boat Ramp		Staunton River State Park Boat Ramp	
Sample Information								
Sample ID	-		EDEN-SBWTP-RAW-1-20140308		EDEN-SRSPBR-L-SW-20140308		EDEN-SRSPBR-L-SW-20140308-DUP	
Date	-		03/08/2014		03/08/2014		03/08/2014	
Time	-		1420		1110		1115	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Water Quality Monitoring								
Temperature	-		-	-	3.82	°C	3.82	°C
Dissolved Oxygen	<6	mg/L	-	-	10	mg/L	10	mg/L
Specific Conductance	-		-	-	0.112	mS/cm	0.112	mS/cm
pH	6.5 - 9.0	std	-	-	7.24	std	7.24	std
Turbidity	50	NTU	-	-	31	NTU	31	NTU
Dissolved metals								
Aluminum	87	µg/L	14.9	µg/L	14.9	µg/L	16.6	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.187J	µg/L	0.12J	µg/L	0.121J	µg/L
Barium	220	µg/L	21.4	µg/L	13.3	µg/L	15.1	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.0705U	mg/L	0.05U	mg/L	0.05U	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,560	µg/L	4,930J	µg/L	5,460	µg/L
Chromium	25	µg/L	0.244J	µg/L	0.152J	µg/L	0.156J	µg/L
Cobalt	3	µg/L	0.138J	µg/L	0.137J	µg/L	0.141J	µg/L
Copper	3	µg/L	0.889J	µg/L	1.66J	µg/L	1.27J	µg/L
Iron	1,000	µg/L	180	µg/L	190	µg/L	232	µg/L
Lead	0.59	µg/L	0.5U	µg/L	0.197J	µg/L	0.5U	µg/L
Magnesium	-	-	2,740J	µg/L	1,990J	µg/L	2,170J	µg/L
Manganese	200	µg/L	15.3	µg/L	14.8	µg/L	18.1	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	5U	µg/L	5U	µg/L	5U	µg/L
Nickel	17	µg/L	0.488J	µg/L	0.262J	µg/L	0.49J	µg/L
Potassium	53,000	µg/L	1,860J	µg/L	1,110J	µg/L	1,240J	µg/L
Selenium	5	µg/L	4.5U	µg/L	4.5U	µg/L	4.5U	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	14,400	µg/L	4,930J	µg/L	5,990	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.401J	µg/L	0.677J	µg/L	0.605J	µg/L
Zinc	39	µg/L	10U	µg/L	10U	µg/L	2.55J	µg/L

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SURFACE WATER RESULTS**

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Sample Information								
Sample ID	-		EDEN-SBWTP-RAW-1-20140308		EDEN-SRSPBR-L-SW-20140308		EDEN-SRSPBR-L-SW-20140308-DUP	
Date	-		03/08/2014		03/08/2014		03/08/2014	
Time	-		1420		1110		1115	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Total Dissolved Solids								
Total Dissolved Solids	-	-	44	mg/L	153J	mg/L	104J	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	75	mg/L	41.5	mg/L	36	mg/L
Total Metals								
Aluminum	2,000	µg/L	2,040	µg/L	11,800J	µg/L	7,030J	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.544J	µg/L	0.851J	µg/L	0.619J	µg/L
Barium	220	µg/L	46.3	µg/L	79.6J	µg/L	43.7J	µg/L
Beryllium	0.66	µg/L	0.13J	µg/L	0.368J	µg/L	0.242J	µg/L
Boron	0.36	mg/L	0.146U	mg/L	0.05U	mg/L	0.05U	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	7,160	µg/L	7,580	µg/L	5,980	µg/L
Chromium	29	µg/L	4.12	µg/L	16.8J	µg/L	8.87J	µg/L
Cobalt	24	µg/L	1.65J	µg/L	6.7	µg/L	2.66J	µg/L
Copper	3	µg/L	5.74	µg/L	14	µg/L	17.4	µg/L
Iron	2,300	µg/L	4,730	µg/L	13,900J	µg/L	1,250J	µg/L
Lead	0.6	µg/L	2.07	µg/L	2.61	µg/L	2.46	µg/L
Magnesium	-	-	3,150J	µg/L	4,700J	µg/L	2,570J	µg/L
Manganese	200	µg/L	124	µg/L	262J	µg/L	110J	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	5U	µg/L	5U	µg/L	5U	µg/L
Nickel	17	µg/L	2.31J	µg/L	8.43	µg/L	4.15J	µg/L
Potassium	53,000	µg/L	1,940J	µg/L	1,680J	µg/L	1,220J	µg/L
Selenium	5	µg/L	4.5U	µg/L	0.486J	µg/L	4.5U	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	14,200	µg/L	5,380	µg/L	5,940	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	8.06	µg/L	38.2J	µg/L	22.5J	µg/L
Zinc	39	µg/L	17.8U	µg/L	24.2U	µg/L	13.1U	µg/L
Anions								
Bromide	-	-	1U	mg/L	1U	mg/L	1U	mg/L
Chloride	230	mg/L	24.1	mg/L	10.2	mg/L	7.71	mg/L
Sulfate	-	-	5.28	mg/L	4.07	mg/L	3.52	mg/L

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Sample Information								
Sample ID	-		EDEN-SBWTP-RAW-1-20140308		EDEN-SRSPBR-L-SW-20140308		EDEN-SRSPBR-L-SW-20140308-DUP	
Date	-		03/08/2014		03/08/2014		03/08/2014	
Time	-		1420		1110		1115	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water		Surface Water	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	18.3	mg/L	10U	mg/L	10U	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	30.8	mg/L	38.3J	mg/L	25.5J	mg/L
Organic Carbon, Dissolved	-	-	5.20	mg/L	3.9J	mg/L	5.6J	mg/L
pH	6.5 - 9.0		std	7.21J	std	6.62J	std	6.81J

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 Swim Beach - Public Swimming Area		Bluestone Location on Kerr Reservoir	
Sample Information						
Sample ID	-		EDEN-BSB-R-SW-20140308	EDEN-BLST-L-SW-20140308		
Date	-		03/08/2014	03/08/2014		
Time	-		1411	1326		
Status	-		Validation Complete	Validation Complete		
Type	-		Surface Water	Surface Water		
Water Quality Monitoring						
Temperature	-		-	-	8.51	°C
Dissolved Oxygen	<6	mg/L	8	mg/L	8	mg/L
Specific Conductance	-		-	-	0.115	mS/cm
pH	6.5 - 9.0	std	-	-	7.54	std
Turbidity	50	NTU	27	NTU	20	NTU
Dissolved metals						
Aluminum	87	µg/L	6.66J	µg/L	15.1	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.166J	µg/L	0.182J	µg/L
Barium	220	µg/L	22.3	µg/L	18.3	µg/L
Beryllium	0.66	µg/L	0.65U	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.133U	mg/L	0.05U	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	8,720	µg/L	8,060	µg/L
Chromium	25	µg/L	0.111J	µg/L	0.157J	µg/L
Cobalt	3	µg/L	5U	µg/L	5U	µg/L
Copper	3	µg/L	0.802J	µg/L	1.3J	µg/L
Iron	1,000	µg/L	138	µg/L	253	µg/L
Lead	0.59	µg/L	0.5U	µg/L	0.5U	µg/L
Magnesium	-	-	3,460J	µg/L	3,530J	µg/L
Manganese	200	µg/L	12.5	µg/L	10.6	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	0.222J	µg/L	0.293J	µg/L
Potassium	53,000	µg/L	1,660J	µg/L	1,680J	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	5,660	µg/L	5,400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	0.323J	µg/L	0.43J	µg/L
Zinc	39	µg/L	10U	µg/L	2.14U	µg/L

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

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Buffalo Swim Beach - Public Swimming Area		Bluestone Location on Kerr Reservoir	
Sample Information						
Sample ID	-		EDEN-BSB-R-SW-20140308	EDEN-BLST-L-SW-20140308		
Date	-		03/08/2014	03/08/2014		
Time	-		1411	1326		
Status	-		Validation Complete	Validation Complete		
Type	-		Surface Water	Surface Water		
Total Dissolved Solids						
Total Dissolved Solids	-	-	77	mg/L	197	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	25	mg/L	11.5	mg/L
Total Metals						
Aluminum	2,000	µg/L	2,490J+	µg/L	859J+	µg/L
Antimony	5.6	µg/L	5U	µg/L	5U	µg/L
Arsenic	10	µg/L	0.621J	µg/L	0.34J	µg/L
Barium	220	µg/L	33.9	µg/L	23.8	µg/L
Beryllium	0.66	µg/L	0.145J	µg/L	0.65U	µg/L
Boron	0.36	mg/L	0.12U	mg/L	0.05U	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	9,260	µg/L	8,400	µg/L
Chromium	29	µg/L	2.19J	µg/L	1.21J	µg/L
Cobalt	24	µg/L	0.679J	µg/L	0.307J	µg/L
Copper	3	µg/L	2.9	µg/L	2U	µg/L
Iron	2,300	µg/L	2,510	µg/L	1,340	µg/L
Lead	0.6	µg/L	1.74	µg/L	0.485J	µg/L
Magnesium	-	-	3,680J	µg/L	3,650J	µg/L
Manganese	200	µg/L	53.9	µg/L	37.8	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	1.32J	µg/L	0.788J	µg/L
Potassium	53,000	µg/L	1,700J	µg/L	1,640J	µg/L
Selenium	5	µg/L	0.38J	µg/L	4.5U	µg/L
Silver	0.06	µg/L	0.05U	µg/L	0.05U	µg/L
Sodium	680,000	µg/L	6,000	µg/L	5,650	µg/L
Thallium	0.24	µg/L	0.553U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.66	µg/L	2.94J	µg/L
Zinc	39	µg/L	10U	µg/L	10U	µg/L
Anions						
Bromide	-	-	1U	mg/L	1U	mg/L
Chloride	230	mg/L	11.2	mg/L	8.62	mg/L
Sulfate	-	-	6.98	mg/L	5.88	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SURFACE WATER RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Buffalo Swim Beach - Public Swimming Area		Bluestone Location on Kerr Reservoir	
Sample Information						
Sample ID	-		EDEN-BSB-R-SW-20140308		EDEN-BLST-L-SW-20140308	
Date	-		03/08/2014		03/08/2014	
Time	-		1411		1326	
Status	-		Validation Complete		Validation Complete	
Type	-		Surface Water		Surface Water	
Wet Chemistry						
Alkalinity, Total (As CaCO ₃)	-	-	21.2	mg/L	25.9	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	38.2	mg/L	37.8	mg/L
Organic Carbon, Dissolved	-	-	2.2	mg/L	0.822J	mg/L
pH	6.5 - 9.0		std	6.37J	std	7.36J

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

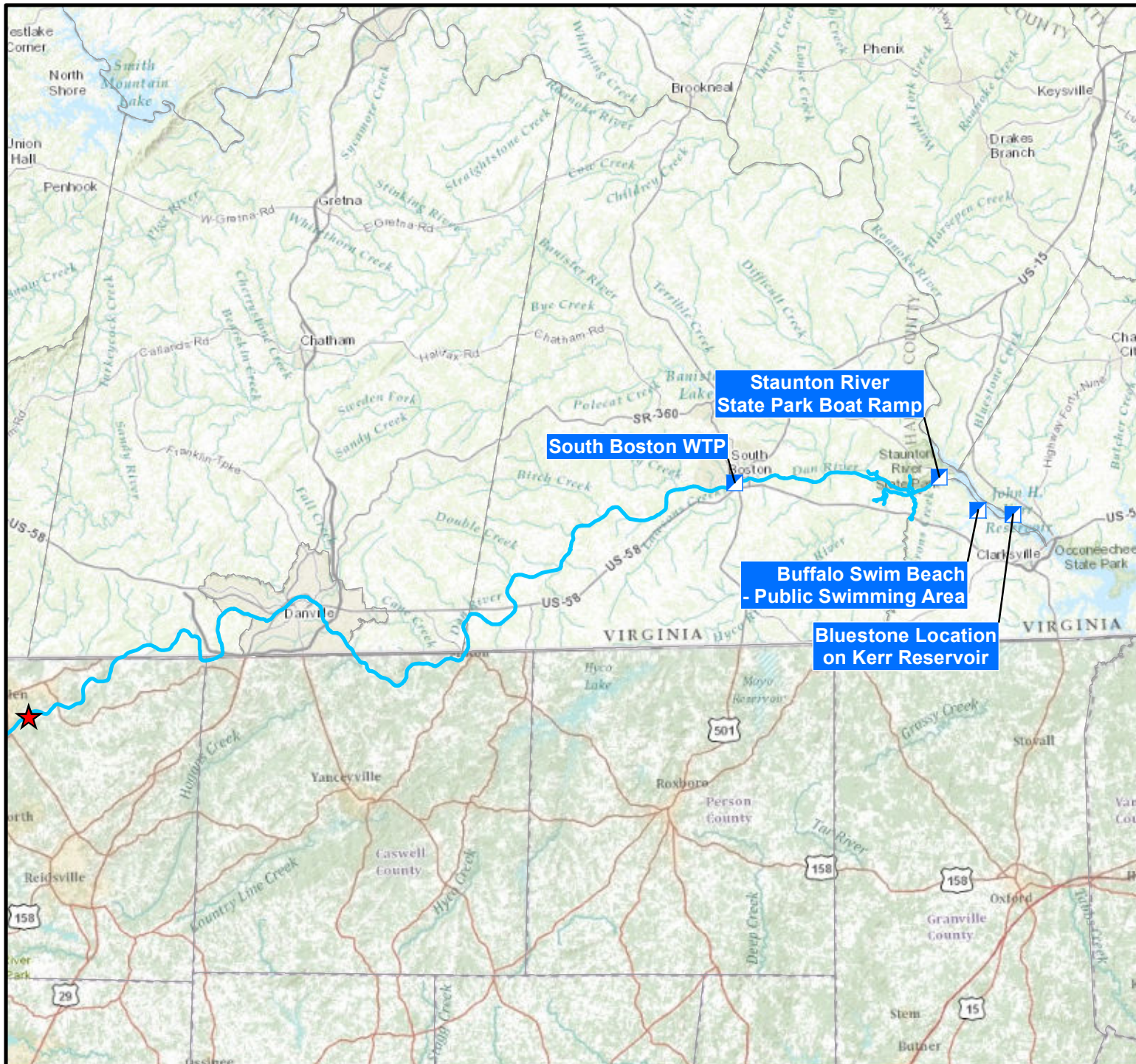
mg/L milligrams per liter

mS/cm milliSiemens per centimeter

NTU Nephelometric turbidity units

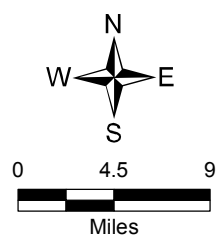
std standard

U Analyte was not detected at the listed reporting limit.



Legend

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



Map Source: ArcGIS Online World Map Topo, 2014

**Surface Water
Sample Locations
March 8, 2014**

