

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT-WATER INTERFACE RESULTS

NOTE: The data below represents sediment-water interface samples that were collected on April 21, 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 sediment-water interface are all below the EPA ERSLs with the exception of aluminum and lead. EPA typically screens the water concentrations using total metals samples, because this is a conservative practice for screening. Because lead was not detected above screening levels in any of the samples of the dissolved fraction of water (i.e., samples that were filtered to remove particulates), therefore there is no threat of toxicity from lead to aquatic organisms. 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		Transect DUKE DRB Left Descending		Transect DUKE DRE Left Descending		Transect DUKE SBD Left Descending	
Sample Information								
Sample ID	-		EDEN-DUKEDRB-L-BW-20140421		EDEN-DUKEDRE-L-BW-20140421		EDEN-DUKESBD-L-BW-20140421	
Date	-		04/21/2014		04/21/2014		04/21/2014	
Time	-		1135		1315		1120	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface		Sediment-Water Interface	
Dissolved metals								
Aluminum	87	µg/L	220	µg/L	180	µg/L	290	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	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	0.078J	mg/L	0.079J	mg/L	0.071J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,600	µg/L	6,500	µg/L	6,500	µg/L
Chromium	25	µg/L	2U	µg/L	2U	µg/L	1.3J	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	0.67J	µg/L	0.74J	µg/L	0.72J	µg/L
Iron	1,000	µg/L	380	µg/L	360	µg/L	470	µg/L
Lead	0.59	µg/L	0.17J	µg/L	0.16J	µg/L	0.19J	µg/L
Magnesium	-	-	2,500	µg/L	2,500	µg/L	2,600	µg/L
Manganese	200	µg/L	5.5	µg/L	6.3	µg/L	3.9	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	0.45J	µg/L	0.48J	µg/L	1U	µg/L
Nickel	17	µg/L	0.61J	µg/L	0.56J	µg/L	0.55J	µg/L
Potassium	53,000	µg/L	1,800	µg/L	1,700	µg/L	1,700	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	9,300	µg/L	6,800	µg/L	6,900	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	3.4	µg/L	4.5	µg/L	4.7	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L	20U	µg/L

**EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT-WATER INTERFACE RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Transect DUKE DRB Left Descending		Transect DUKE DRE Left Descending		Transect DUKE SBD Left Descending	
Sample Information								
Sample ID	-		EDEN-DUKEDRB-L-BW-20140421		EDEN-DUKEDRE-L-BW-20140421		EDEN-DUKESBD-L-BW-20140421	
Date	-		04/21/2014		04/21/2014		04/21/2014	
Time	-		1135		1315		1120	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface		Sediment-Water Interface	
Total Dissolved Solids								
Total Dissolved Solids	-	-	80J	mg/L	77J	mg/L	73	mg/L
Total Suspended Solids								
Total Suspended Solids	-	-	32	mg/L	30	mg/L	26	mg/L
Total Metals								
Aluminum	2,000	µg/L	260J+	µg/L	250J+	µg/L	290J+	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	0.45J	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	32J+	µg/L	28J+	µg/L	30J+	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.083J	mg/L	0.084J	mg/L	0.073J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,900	µg/L	6,800	µg/L	6,700	µg/L
Chromium	29	µg/L	1.4J	µg/L	2	µg/L	3.4	µg/L
Cobalt	24	µg/L	0.59	µg/L	0.43	µg/L	0.48	µg/L
Copper	3	µg/L	1.5	µg/L	1.1	µg/L	1.3	µg/L
Iron	2,300	µg/L	780J+	µg/L	710J+	µg/L	830J+	µg/L
Lead	0.6	µg/L	1	µg/L	0.66	µg/L	0.8	µg/L
Magnesium	-	-	2,600	µg/L	2,600	µg/L	2,600	µg/L
Manganese	200	µg/L	63	µg/L	59	µg/L	59	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	0.48J	µg/L
Nickel	17	µg/L	0.89J	µg/L	0.6J	µg/L	0.67J	µg/L
Potassium	53,000	µg/L	1,800	µg/L	1,700	µg/L	1,700	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	9,200	µg/L	6,800	µg/L	6,400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	6	µg/L	11	µg/L	12	µg/L
Zinc	39	µg/L	6.5J	µg/L	3.1J	µg/L	4.3J	µg/L
Anions EPA 300.1								
Bromide	-	-	140	µg/L	97	µg/L	88	µg/L
Anions								
Chloride	230	mg/L	15	mg/L	11	mg/L	10	mg/L
Sulfate	-	-	6.2	mg/L	6.1	mg/L	6.2	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT-WATER INTERFACE RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Transect DUKE DRB Left Descending		Transect DUKE DRE Left Descending		Transect DUKE SBD Left Descending	
Sample Information								
Sample ID	-		EDEN-DUKEDRB-L-BW-20140421		EDEN-DUKEDRE-L-BW-20140421		EDEN-DUKESBD-L-BW-20140421	
Date	-		04/21/2014		04/21/2014		04/21/2014	
Time	-		1135		1315		1120	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface		Sediment-Water Interface	
Wet Chemistry								
Alkalinity, Total (As CaCO ₃)	-	-	17	mg/L	21	mg/L	21	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	28	mg/L	27	mg/L	27	mg/L
Organic Carbon, Dissolved	-	-	1.8	mg/L	1.8	mg/L	1.9	mg/L
pH	6.5 - 9.0		std	7.59J	std	7.55J	std	7.54J

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 high bias

J- Value is estimated with a possible low bias

µg/L micrograms per liter

mg/L milligrams per liter

std standard

U Analyte was not detected at the listed reporting limit.

**EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT-WATER INTERFACE RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Transect EPA 06 Mid-Channel		Transect EPA 07 Left Descending	
Sample Information						
Sample ID	-		EDEN-EPA06-C-BW-20140421		EDEN-EPA07-L-BW-20140421	
Date	-		04/21/2014		04/21/2014	
Time	-		1329		1500	
Status	-		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface	
Dissolved metals						
Aluminum	87	µg/L	290	µg/L	400J	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	22	µg/L	24	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.068J	mg/L	0.065J	mg/L
Cadmium	0.1	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,400	µg/L	6,400	µg/L
Chromium	25	µg/L	1.3J	µg/L	1.5J	µg/L
Cobalt	3	µg/L	0.4U	µg/L	0.4U	µg/L
Copper	3	µg/L	0.77J	µg/L	0.81J	µg/L
Iron	1,000	µg/L	470	µg/L	530	µg/L
Lead	0.59	µg/L	0.19J	µg/L	0.2J	µg/L
Magnesium	-	-	2,500	µg/L	2,500	µg/L
Manganese	200	µg/L	3.3	µg/L	7.1	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	800	µg/L	1U	µg/L	1U	µg/L
Nickel	17	µg/L	0.52J	µg/L	0.52J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,700	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	6,500	µg/L	6,400	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	5.5	µg/L	5.5	µg/L
Zinc	39	µg/L	20U	µg/L	20U	µg/L

**EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT-WATER INTERFACE RESULTS**

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Transect EPA 06 Mid-Channel		Transect EPA 07 Left Descending	
Sample Information						
Sample ID	-		EDEN-EPA06-C-BW-20140421		EDEN-EPA07-L-BW-20140421	
Date	-		04/21/2014		04/21/2014	
Time	-		1329		1500	
Status	-		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface	
Total Dissolved Solids						
Total Dissolved Solids	-	-	71	mg/L	79	mg/L
Total Suspended Solids						
Total Suspended Solids	-	-	45	mg/L	33	mg/L
Total Metals						
Aluminum	2,000	µg/L	270J+	µg/L	240J+	µg/L
Antimony	5.6	µg/L	1U	µg/L	1U	µg/L
Arsenic	10	µg/L	1U	µg/L	1U	µg/L
Barium	220	µg/L	29J+	µg/L	31J+	µg/L
Beryllium	0.66	µg/L	0.4U	µg/L	0.4U	µg/L
Boron	0.36	mg/L	0.072J	mg/L	0.07J	mg/L
Cadmium	2	µg/L	0.1U	µg/L	0.1U	µg/L
Calcium	-	-	6,600	µg/L	6,700	µg/L
Chromium	29	µg/L	2.2	µg/L	2	µg/L
Cobalt	24	µg/L	0.48	µg/L	0.52	µg/L
Copper	3	µg/L	1.3	µg/L	1.2	µg/L
Iron	2,300	µg/L	790J+	µg/L	830J+	µg/L
Lead	0.6	µg/L	0.82	µg/L	0.84	µg/L
Magnesium	-	-	2,600	µg/L	2,600	µg/L
Manganese	200	µg/L	50	µg/L	64	µg/L
Mercury	0.000012	mg/L	0.0002U	mg/L	0.0002U	mg/L
Molybdenum	-	-	1U	µg/L	1U	µg/L
Nickel	17	µg/L	0.63J	µg/L	0.59J	µg/L
Potassium	53,000	µg/L	1,700	µg/L	1,700	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	6,300	µg/L	6,300	µg/L
Thallium	0.24	µg/L	0.2U	µg/L	0.2U	µg/L
Vanadium	27	µg/L	8	µg/L	12	µg/L
Zinc	39	µg/L	20U	µg/L	3.2J	µg/L
Anions EPA 300.1						
Bromide	-	-	85	µg/L	78	µg/L
Anions						
Chloride	230	mg/L	9.8	mg/L	9.8	mg/L
Sulfate	-	-	6.3	mg/L	6.3	mg/L

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT-WATER INTERFACE RESULTS

Analyte	Ecological Screening Standard for Surface Water Samples ¹		Transect EPA 06 Mid-Channel		Transect EPA 07 Left Descending	
Sample Information						
Sample ID	-		EDEN-EPA06-C-BW-20140421		EDEN-EPA07-L-BW-20140421	
Date	-		04/21/2014		04/21/2014	
Time	-		1329		1500	
Status	-		Validation Complete		Validation Complete	
Type	-		Sediment-Water Interface		Sediment-Water Interface	
Wet Chemistry						
Alkalinity, Total (As CaCO ₃)	-	-	21	mg/L	22	mg/L
Hardness, Calcium/Magnesium (As CaCO ₃)	-	-	27	mg/L	27	mg/L
Organic Carbon, Dissolved	-	-	1.9	mg/L	2	mg/L
pH	6.5 - 9.0		std	7.52J	std	7.51J

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 high bias

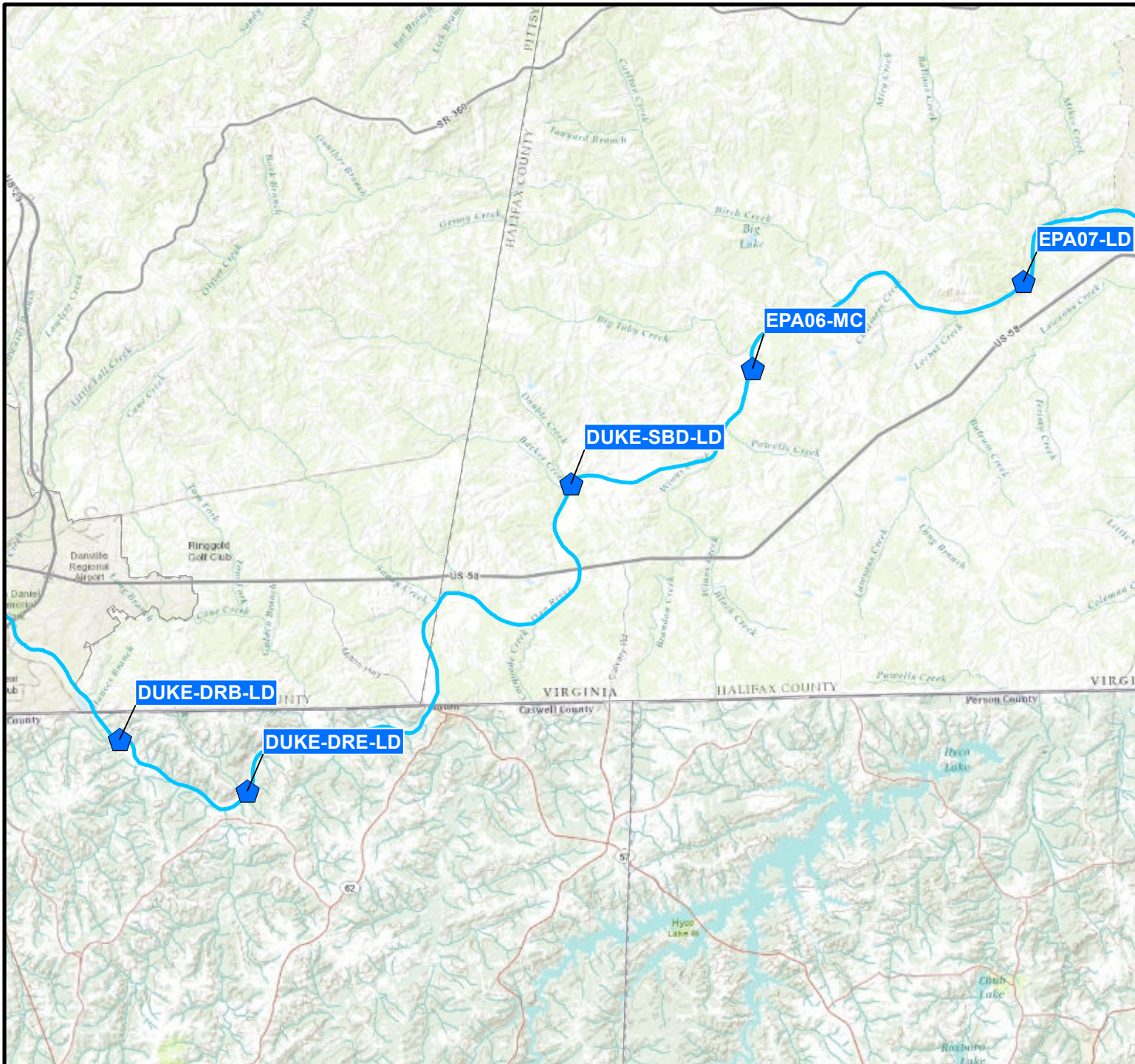
J- Value is estimated with a possible low bias

µg/L micrograms per liter

mg/L milligrams per liter

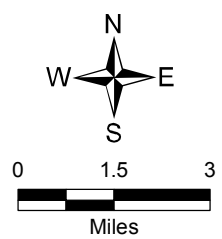
std standard

U Analyte was not detected at the listed reporting limit.



Legend

- ★ Approximate Spill Location
- ⬠ Sediment-Water Interface Sample Location
- Dan River



Map Source: ArcGIS Online World Map Topo, 2014

**Sediment-Water Interface
Sample Locations**

April 21, 2014

