

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT RESULTS

NOTE: The data below represents sediment samples that were collected on April 21, 2014 by EPA START Team 1. Sediment sample measurements are in milligrams per kilogram (mg/Kg). The data is being compared to ecological risk screening levels (ERSLs) to protect aquatic life in the sediments 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 are all below the ERSLs with the exception of aluminum, barium, iron, and manganese. There were no exceedances of human health screening criteria for sediment. 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 Standards for Sediment ²		Transect DUKE DRB Left Descending		Transect DUKE DRE Left Descending		Transect DUKE SBD Left Descending	
Sample Information								
Sample ID	-		EDEN-DUKEDRB-L-SD-20140421		EDEN-DUKEDRE-L-SD-20140421		EDEN-DUKESBD-L-SD-20140421	
Date	-		04/21/2014		04/21/2014		04/21/2014	
Time	-		1141		1305		1102	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	5,000	mg/kg	5,600	mg/kg	5,700	mg/kg
Antimony	2 ^a	mg/kg	1.3U	mg/kg	1.5U	mg/kg	1.4U	mg/kg
Arsenic	9.8	mg/kg	1.3J	mg/kg	1.2J	mg/kg	1.1J	mg/kg
Barium	60 ^b	mg/kg	52	mg/kg	62	mg/kg	57	mg/kg
Beryllium	-	-	0.32J	mg/kg	0.35J	mg/kg	0.3J	mg/kg
Boron	-	-	15U	mg/kg	15U	mg/kg	13U	mg/kg
Cadmium	0.99	mg/kg	0.065U	mg/kg	0.075U	mg/kg	0.072U	mg/kg
Calcium	-	-	640	mg/kg	800	mg/kg	1,000	mg/kg
Chromium	43.4	mg/kg	13	mg/kg	15	mg/kg	17	mg/kg
Cobalt	50	mg/kg	4.9	mg/kg	5	mg/kg	4.8	mg/kg
Copper	31.6	mg/kg	6.1	mg/kg	7	mg/kg	6.9	mg/kg
Iron	6,800 (bkg)	mg/kg	9,400	mg/kg	9,900	mg/kg	9,500	mg/kg
Lead	35.8	mg/kg	4.9	mg/kg	5.7	mg/kg	5.2	mg/kg
Magnesium	-	-	1,500	mg/kg	1,600	mg/kg	2,000	mg/kg
Manganese	460 ^c	mg/kg	200	mg/kg	210	mg/kg	250	mg/kg
Mercury	0.18	mg/kg	0.013J	mg/kg	0.011J	mg/kg	0.012J	mg/kg
Molybdenum	-	-	1.5U	mg/kg	1.5U	mg/kg	1.3U	mg/kg
Nickel	22.7	mg/kg	5.4J	mg/kg	6.2	mg/kg	6.9	mg/kg
Potassium	-	-	1,200	mg/kg	1,200	mg/kg	1,400	mg/kg
Selenium	2 ^d	mg/kg	0.65U	mg/kg	0.75U	mg/kg	0.72U	mg/kg
Silver	0.733	mg/kg	0.13U	mg/kg	0.15U	mg/kg	0.14U	mg/kg
Sodium	-	-	290U	mg/kg	300U	mg/kg	260U	mg/kg
Thallium	-	mg/kg	0.086J	mg/kg	0.08J	mg/kg	0.1J	mg/kg
Vanadium	57 ^e	mg/kg	18	mg/kg	21	mg/kg	21	mg/kg
Zinc	121	mg/kg	23	mg/kg	26	mg/kg	24	mg/kg
Physical Properties								
Percent Ash	-	-	3	%	ND	-	ND	-
Percent Moisture	-	-	-	-	-	-	-	-

Notes

¹ Values are based on ELCR=10⁻⁴ or HI = 1. Assumptions: EF=100 days/year. ET=2 hr/event

² MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindskoog, R.A.; Sloane, G; and T. Biernacki. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection, Tallahassee, FL. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters.

^a The screening value for antimony is from Long, Edward R., and Lee G. Morgan. 1991. The Potential for Biological Effects of Sediment-Sorbed Contaminants Tested in the National Status and Trends Program. NOAA Technical Memorandum NOS OMA 52.

^b The screening value for barium was the probable effect level (PEL) instead of the threshold effect level (TEL) because the TEL was below background

^c Sediment screening values for manganese and vanadium come from the NOAA SQuIRT. <http://response.restoration.noaa.gov/sites/default/files/SQuIRTs.pdf>

^d The screening value for selenium is from Region 3 after Lemley, A.D. 2002. Selenium assessment in aquatic ecosystems. US Forest Service, Blacksburg, VA.

^e Cadmium from diet

^f Chromium (VI)

^g Methyl Mercury

^h Thallium Chloride

% Precent

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

ND No fly ash detected at a PLM reporting limit of 1 percent

PLM Polarized light microscopy

U Analyte was not detected at the listed reporting limit.

UJ Analyte was not detected at the listed reporting limit, which is an estimated quantitation.

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT RESULTS

Analyte	Ecological Screening Standards for Sediment ²		Transect EPA 06 Mid-Channel		Transect EPA 07 Left Descending	
Sample Information						
Sample ID	-		EDEN-EPA06-C-SD-20140421		EDEN-EPA07-L-SD-20140421	
Date	-		04/21/2014		04/21/2014	
Time	-		1315		1440	
Status	-		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment	
Total Metals						
Aluminum	3,200 (bkg)	mg/kg	1,900	mg/kg	11,000	mg/kg
Antimony	2 ^a	mg/kg	1.2U	mg/kg	1.4U	mg/kg
Arsenic	9.8	mg/kg	1.2J	mg/kg	2.1J	mg/kg
Barium	60 ^b	mg/kg	26	mg/kg	110	mg/kg
Beryllium	-	-	0.21J	mg/kg	0.62J	mg/kg
Boron	-	-	13U	mg/kg	16U	mg/kg
Cadmium	0.99	mg/kg	0.059U	mg/kg	0.039J	mg/kg
Calcium	-	-	350	mg/kg	1,400	mg/kg
Chromium	43.4	mg/kg	13	mg/kg	28	mg/kg
Cobalt	50	mg/kg	4.4	mg/kg	9	mg/kg
Copper	31.6	mg/kg	1.8J	mg/kg	13	mg/kg
Iron	6,800 (bkg)	mg/kg	6,600	mg/kg	18,000	mg/kg
Lead	35.8	mg/kg	4.8	mg/kg	9.3	mg/kg
Magnesium	-	-	430	mg/kg	3,200	mg/kg
Manganese	460 ^c	mg/kg	340	mg/kg	480	mg/kg
Mercury	0.18	mg/kg	0.033	mg/kg	0.029J	mg/kg
Molybdenum	-	-	1.3U	mg/kg	1.6U	mg/kg
Nickel	22.7	mg/kg	2.6J	mg/kg	11	mg/kg
Potassium	-	-	340	mg/kg	2,400	mg/kg
Selenium	2 ^d	mg/kg	0.59U	mg/kg	0.72U	mg/kg
Silver	0.733	mg/kg	0.12U	mg/kg	0.14U	mg/kg
Sodium	-	-	250U	mg/kg	320U	mg/kg
Thallium	-	mg/kg	0.036J	mg/kg	0.17	mg/kg
Vanadium	57 ^c	mg/kg	12	mg/kg	36	mg/kg
Zinc	121	mg/kg	13	mg/kg	43	mg/kg
Physical Properties						
Percent Ash	-	-	1	%	ND	-
Percent Moisture	-	-	-	-	-	-

Notes

¹ Values are based on ELCR=10-4 or HI = 1. Assumptions: EF=100 days/year. ET=2 hr/event

² MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindskoog, R.A.; Sloane, G; and T. Biernacki. 2003. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters. Florida Department of Environmental Protection, Tallahassee, FL. Development and Evaluation of Numerical Sediment Quality Assessment Guidelines for Florida Inland Waters.

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^e Cadmium from diet

^f Chromium (VI)

^g Methyl Mercury

^h Thallium Chloride

% Percent

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

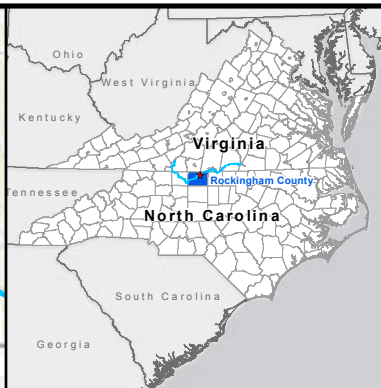
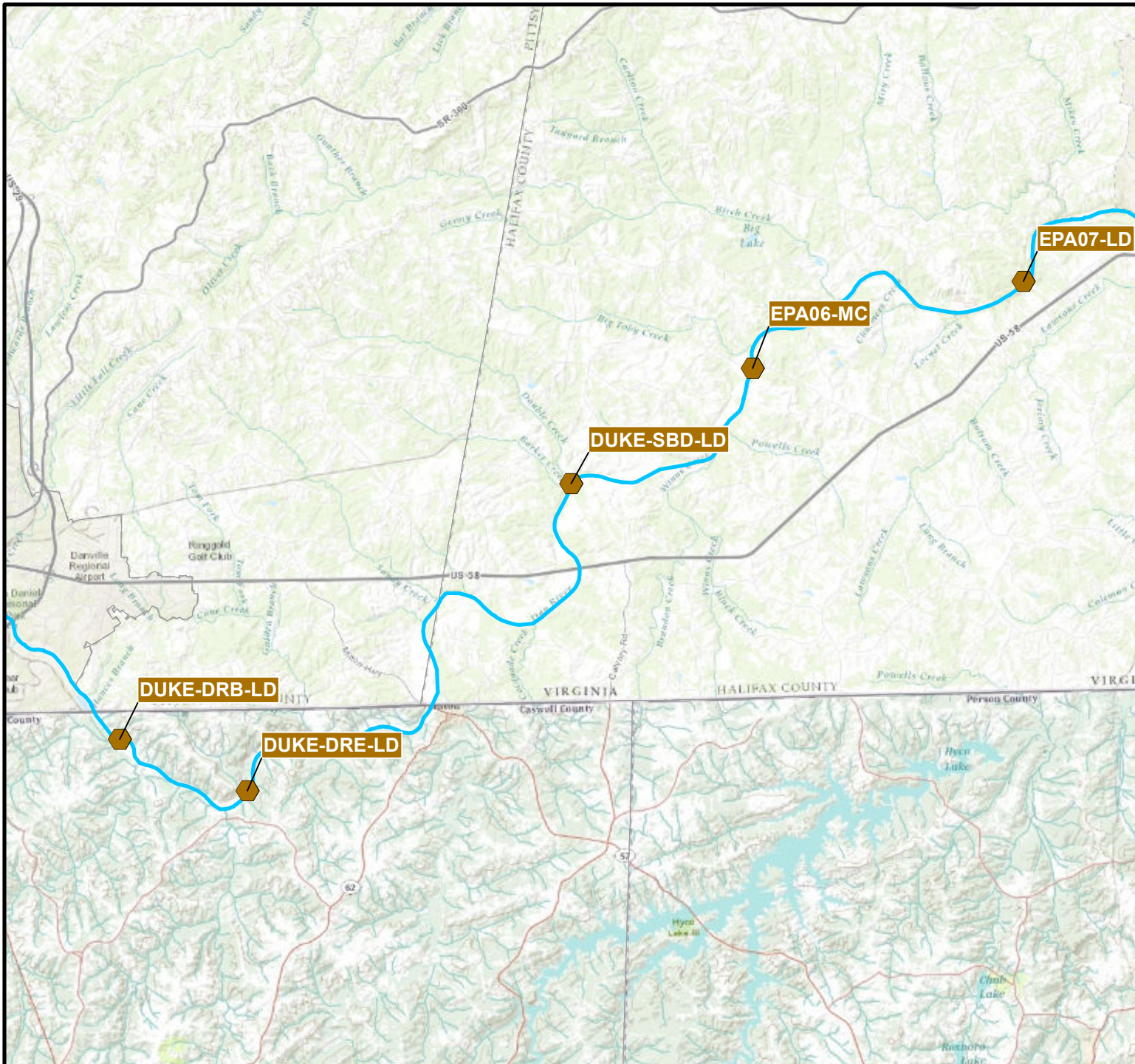
mg/L milligrams per liter

ND No fly ash detected at a PLM reporting limit of 1 percent




PLM Polarized light microscopy

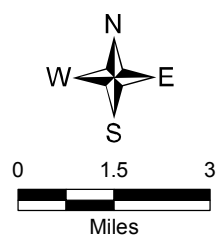
U Analyte was not detected at the listed reporting limit.

UJ Analyte was not detected at the listed reporting limit, which is an estimated quantitation.



Legend

-  Approximate Spill Location
-  Sediment Sample Location
-  Dan River



Map Source: ArcGIS Online World Map Topo, 2014

**Sediment
Sample Locations
April 21, 2014**

