

EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT RESULTS

NOTE: The data below represents sediment samples that were collected on November 3, 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 ¹		Transect FWS 4B Left Descending		Transect FWS 4B Left Descending		Transect FWS SF14 Left Descending	
Sample Information								
Sample ID	-		EDEN-FWS4B-L-SD-20141103		EDEN-FWS4B-L-SD-20141103-DUP		EDEN-FWSSF14-L-20141103	
Date	-		11/03/2014		11/03/2014		11/03/2014	
Time	-		09:40		09:45		13:20	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	2,300	mg/kg	2,600	mg/kg	16,000	mg/kg
Antimony	2 ^a	mg/kg	1.3 UJ	mg/kg	1.3 UJ	mg/kg	1.4 UJ	mg/kg
Arsenic	9.8	mg/kg	2.5 U	mg/kg	2.6 U	mg/kg	2.5 J	mg/kg
Barium	60 ^b	mg/kg	23	mg/kg	30	mg/kg	130	mg/kg
Beryllium	-	-	0.15 J	mg/kg	0.17 J	mg/kg	0.83	mg/kg
Boron	-	-	13 U	mg/kg	13 U	mg/kg	15 U	mg/kg
Cadmium	0.99	mg/kg	0.022 J	mg/kg	0.022 J	mg/kg	0.1	mg/kg
Calcium	-	-	360 J+	mg/kg	280 J+	mg/kg	1,200 J+	mg/kg
Chromium	43.4	mg/kg	11 J+	mg/kg	12 J+	mg/kg	30 J+	mg/kg
Cobalt	50	mg/kg	2.9 J+	mg/kg	3.2 J+	mg/kg	11 J+	mg/kg
Copper	31.6	mg/kg	2.5 J+	mg/kg	3.1 J+	mg/kg	18 J+	mg/kg
Iron	6,800 (bkg)	mg/kg	6,200	mg/kg	6,400	mg/kg	24,000	mg/kg
Lead	35.8	mg/kg	2.9	mg/kg	2.8	mg/kg	12	mg/kg
Magnesium	-	-	600 J+	mg/kg	780 J+	mg/kg	3,400 J+	mg/kg
Manganese	460 ^c	mg/kg	99	mg/kg	110	mg/kg	510	mg/kg
Mercury	0.18	mg/kg	0.024 U	mg/kg	0.024 U	mg/kg	0.033	mg/kg
Molybdenum	-	-	1.3 U	mg/kg	1.3 U	mg/kg	0.52 J	mg/kg
Nickel	22.7	mg/kg	2.7 J	mg/kg	3 J	mg/kg	13	mg/kg
Potassium	-	-	470 J+	mg/kg	610 J+	mg/kg	2,600 J+	mg/kg
Selenium	2 ^d	mg/kg	0.63 U	mg/kg	0.64 U	mg/kg	0.65 J	mg/kg
Silver	0.733	mg/kg	0.13 U	mg/kg	0.13 U	mg/kg	0.14 U	mg/kg
Sodium	-	-	250 U	mg/kg	260 U	mg/kg	300 U	mg/kg
Thallium	-	-	0.055 J	mg/kg	0.13 U	mg/kg	0.32	mg/kg
Vanadium	57 ^e	mg/kg	14 J+	mg/kg	13 J+	mg/kg	42 J+	mg/kg
Zinc	121	mg/kg	11 J+	mg/kg	14 J+	mg/kg	56 J+	mg/kg
Physical Properties								
Percent Ash	-	-	1U	%	1U	%	1U	%

Notes

- ¹ 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
- % Percent
- EPA U.S. Environmental Protection Agency
- J Value is estimated
- J+ Value is estimated with a possible high bias
- mg/kg milligrams per kilogram
- 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 ¹		Transect FWS SF15 Left Descending		Transect Milton Left Descending		Transect EPA 13 Mid-Channel	
Sample Information								
Sample ID	-		EDEN-FWSSF15-L-20141103		EDEN-MILTON-L-SD-20141103		EDEN-EPA13-C-SD-20141103	
Date	-		11/03/2014		11/03/2014		11/03/2014	
Time	-		14:20		12:45		10:00	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	15,000	mg/kg	12,000	mg/kg	17,000	mg/kg
Antimony	2 ^g	mg/kg	1.8 UJ	mg/kg	1.7 UJ	mg/kg	1.9 UJ	mg/kg
Arsenic	9.8	mg/kg	3.3 J	mg/kg	2.7 J	mg/kg	3.9 J	mg/kg
Barium	60 ^h	mg/kg	130	mg/kg	110	mg/kg	140	mg/kg
Beryllium	-	-	0.87	mg/kg	0.69	mg/kg	0.96	mg/kg
Boron	-	-	18 U	mg/kg	17 U	mg/kg	20 U	mg/kg
Cadmium	0.99	mg/kg	0.09 J	mg/kg	0.074 J	mg/kg	0.12	mg/kg
Calcium	-	-	930 J+	mg/kg	1,000 J+	mg/kg	1,100 J+	mg/kg
Chromium	43.4	mg/kg	29 J+	mg/kg	27 J+	mg/kg	35 J+	mg/kg
Cobalt	50	mg/kg	10 J+	mg/kg	9.1 J+	mg/kg	12 J+	mg/kg
Copper	31.6	mg/kg	18 J+	mg/kg	15 J+	mg/kg	20 J+	mg/kg
Iron	6,800 (bkg)	mg/kg	23,000	mg/kg	19,000	mg/kg	25,000	mg/kg
Lead	35.8	mg/kg	12	mg/kg	10	mg/kg	14	mg/kg
Magnesium	-	-	3,100 J+	mg/kg	3,000 J+	mg/kg	3,400 J+	mg/kg
Manganese	460 ^e	mg/kg	360	mg/kg	570	mg/kg	450	mg/kg
Mercury	0.18	mg/kg	0.031 J	mg/kg	0.022 J	mg/kg	0.049	mg/kg
Molybdenum	-	-	0.65 J	mg/kg	1.7 U	mg/kg	0.66 J	mg/kg
Nickel	22.7	mg/kg	12	mg/kg	11	mg/kg	14	mg/kg
Potassium	-	-	2,400 J+	mg/kg	2,100 J+	mg/kg	2,400 J+	mg/kg
Selenium	2 ^d	mg/kg	0.71 J	mg/kg	0.45 J	mg/kg	0.82 J	mg/kg
Silver	0.733	mg/kg	0.18 U	mg/kg	0.17 U	mg/kg	0.19 U	mg/kg
Sodium	-	-	350 U	mg/kg	340 U	mg/kg	400 U	mg/kg
Thallium	-	mg/kg	0.25	mg/kg	0.18	mg/kg	0.33	mg/kg
Vanadium	57 ^f	mg/kg	42 J+	mg/kg	36 J+	mg/kg	48 J+	mg/kg
Zinc	121	mg/kg	54 J+	mg/kg	48 J+	mg/kg	59 J+	mg/kg
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Percent Ash	-	-	1U	%	1U	%	1U	%

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^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

% Percent

EPA U.S. Environmental Protection Agency

J Value is estimated

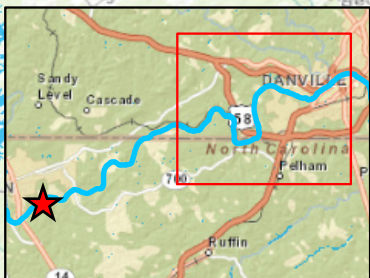
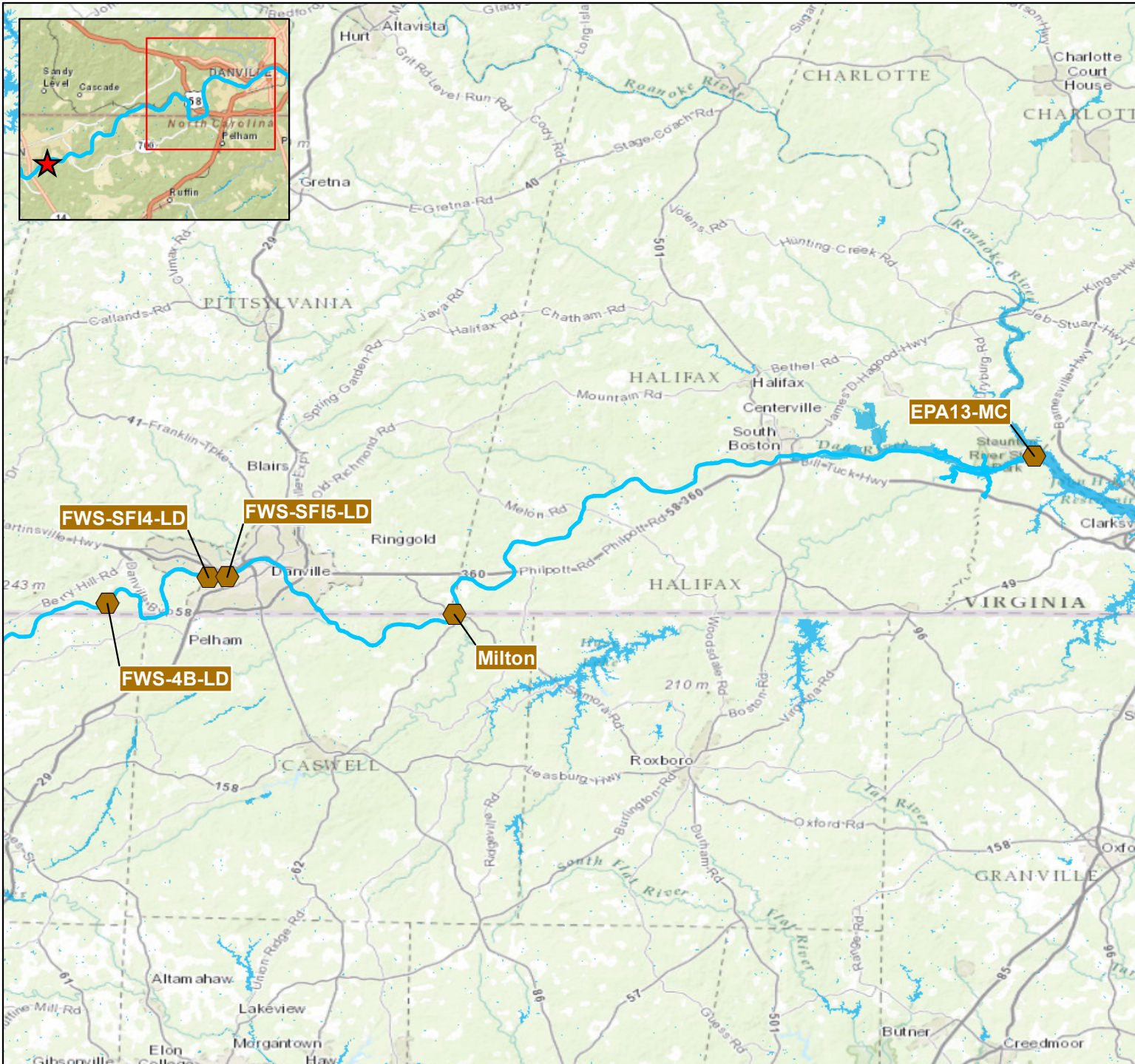
J+ Value is estimated with a possible high bias

mg/kg milligrams per kilogram



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

Imagery Source:
ESRI, USGS Mapping Service, 2013



31,000 15,500 0 31,000 Feet

Eden Coal Ash Spill
Eden, North Carolina

Sediment
Sample Locations
November 03, 2014

