

# EDEN NORTH CAROLINA COAL ASH SPILL SEDIMENT RESULTS

NOTE: The data below represents sediment samples that were collected on June 12, 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, arsenic, barium, chromium, copper, iron, manganese, selenium, and vanadium. 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 <sup>2</sup>		Schoolfield Dredge Area 6A 0-6 inches		Schoolfield Dredge Area 6B 0-6 inches		Schoolfield Dredge Area 6C 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-6A-0006-SD-20140612		EDEN-SFDA-6B-0006-SD-20140612		EDEN-SFDA-6C-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1559		1520		1535	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	26000	mg/Kg	28000	mg/Kg	8100	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	2.1U	mg/Kg	1.9U	mg/Kg	1.5U	mg/Kg
Arsenic	9.8	mg/kg	6.8	mg/Kg	6.8	mg/Kg	3	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	200	mg/Kg	200	mg/Kg	78	mg/Kg
Beryllium	-	-	1.4	mg/Kg	1.4	mg/Kg	0.47J	mg/Kg
Boron	-	-	21U	mg/Kg	19U	mg/Kg	15U	mg/Kg
Cadmium	0.99	mg/kg	0.19	mg/Kg	0.17	mg/Kg	0.059J	mg/Kg
Calcium	-	-	2,400J-	mg/Kg	2,100J-	mg/Kg	780J-	mg/Kg
Chromium	43.4	mg/kg	46J-	mg/Kg	47J-	mg/Kg	19J-	mg/Kg
Cobalt	50	mg/kg	17J-	mg/Kg	17J-	mg/Kg	6.4J-	mg/Kg
Copper	31.6	mg/kg	29J-	mg/Kg	31J-	mg/Kg	9.4J-	mg/Kg
Iron	6,800 (bkg)	mg/kg	39000	mg/Kg	40000	mg/Kg	13000	mg/Kg
Lead	35.8	mg/kg	19J-	mg/Kg	22J-	mg/Kg	5.9J-	mg/Kg
Magnesium	-	-	4,300J+	mg/Kg	4,300J+	mg/Kg	2,100J+	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	1200	mg/Kg	1100	mg/Kg	240	mg/Kg
Mercury	0.18	mg/kg	0.055	mg/Kg	0.056	mg/Kg	0.014J	mg/Kg
Molybdenum	-	-	2.1U	mg/Kg	0.69J	mg/Kg	1.5U	mg/Kg
Nickel	22.7	mg/kg	19	mg/Kg	19	mg/Kg	7.7	mg/Kg
Potassium	-	-	3,000J+	mg/Kg	3,000J+	mg/Kg	1,600J+	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	1.1	mg/Kg	1.1	mg/Kg	0.4J	mg/Kg
Silver	0.733	mg/kg	0.21U	mg/Kg	0.096J	mg/Kg	0.15U	mg/Kg
Sodium	-	-	430U	mg/Kg	380U	mg/Kg	300U	mg/Kg
Thallium	-	-	0.38	mg/Kg	0.41	mg/Kg	0.15	mg/Kg
Vanadium	57 <sup>e</sup>	mg/kg	73J-	mg/Kg	77J-	mg/Kg	25J-	mg/Kg
Zinc	121	mg/kg	89	mg/Kg	90	mg/Kg	33	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	-	-	-	-	-	-
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 5A 0-6 inches		Schoolfield Dredge Area 5A 6-12 inches		Schoolfield Dredge Area 5B 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-5A-0006-SD-20140612		EDEN-SFDA-5A-0612-SD-20140612		EDEN-SFDA-5B-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		800		800		830	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	15000	mg/Kg	15000	mg/Kg	22000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.5UJ	mg/Kg	1.5UJ	mg/Kg	2.9UJ	mg/Kg
Arsenic	9.8	mg/kg	2.6	mg/Kg	2.8	mg/Kg	4.9	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	170	mg/Kg	170	mg/Kg	230	mg/Kg
Beryllium	-	-	0.97	mg/Kg	0.99	mg/Kg	1.5	mg/Kg
Boron	-	-	15U	mg/Kg	15U	mg/Kg	29U	mg/Kg
Cadmium	0.99	mg/kg	0.1	mg/Kg	0.11	mg/Kg	0.14	mg/Kg
Calcium	-	-	1,400J-	mg/Kg	1,200J-	mg/Kg	1,800J-	mg/Kg
Chromium	43.4	mg/kg	35J+	mg/Kg	34J+	mg/Kg	49J+	mg/Kg
Cobalt	50	mg/kg	13	mg/Kg	14	mg/Kg	18	mg/Kg
Copper	31.6	mg/kg	20J+	mg/Kg	20J+	mg/Kg	30J+	mg/Kg
Iron	6,800 (bkg)	mg/kg	23000	mg/Kg	23000	mg/Kg	36000	mg/Kg
Lead	35.8	mg/kg	13	mg/Kg	14	mg/Kg	19	mg/Kg
Magnesium	-	-	3200	mg/Kg	2700	mg/Kg	4200	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	560	mg/Kg	630	mg/Kg	750	mg/Kg
Mercury	0.18	mg/kg	0.15U	mg/Kg	0.15U	mg/Kg	0.29U	mg/Kg
Molybdenum	-	-	1.5U	mg/Kg	0.63J	mg/Kg	2.9U	mg/Kg
Nickel	22.7	mg/kg	16J+	mg/Kg	15J+	mg/Kg	22J+	mg/Kg
Potassium	-	-	2,700J+	mg/Kg	2,200J+	mg/Kg	3,300J+	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.67J	mg/Kg	0.66J	mg/Kg	1.3J	mg/Kg
Silver	0.733	mg/kg	0.15U	mg/Kg	0.12J	mg/Kg	0.29U	mg/Kg
Sodium	-	-	34J-	mg/Kg	30J-	mg/Kg	47J-	mg/Kg
Thallium	-	mg/kg	0.28	mg/Kg	0.27	mg/Kg	0.39	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	49J+	mg/Kg	50J+	mg/Kg	72J+	mg/Kg
Zinc	121	mg/kg	65	mg/Kg	67	mg/Kg	90	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.028J	mg/Kg	0.035	mg/Kg	0.044J	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 5B 6-12 inches		Schoolfield Dredge Area 5B 12-16 inches		Schoolfield Dredge Area 5C 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-5B-0612-SD-20140612		EDEN-SFDA-5B-1216-SD-20140612		EDEN-SFDA-5C-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		830		830		910	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	14000	mg/Kg	16000	mg/Kg	4900	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.7UJ	mg/Kg	1.7UJ	mg/Kg	1.3UJ	mg/Kg
Arsenic	9.8	mg/kg	10	mg/Kg	2.6	mg/Kg	0.96	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	220	mg/Kg	160	mg/Kg	50	mg/Kg
Beryllium	-	-	1.5	mg/Kg	0.92	mg/Kg	0.33	mg/Kg
Boron	-	-	17U	mg/Kg	17U	mg/Kg	13U	mg/Kg
Cadmium	0.99	mg/kg	0.11	mg/Kg	0.087	mg/Kg	0.034J	mg/Kg
Calcium	-	-	1,400J-	mg/Kg	1,400J-	mg/Kg	520J-	mg/Kg
Chromium	43.4	mg/kg	32J+	mg/Kg	37J+	mg/Kg	15J+	mg/Kg
Cobalt	50	mg/kg	12	mg/Kg	13	mg/Kg	4.4	mg/Kg
Copper	31.6	mg/kg	27J+	mg/Kg	21J+	mg/Kg	6J+	mg/Kg
Iron	6,800 (bkg)	mg/kg	22000	mg/Kg	27000	mg/Kg	8900	mg/Kg
Lead	35.8	mg/kg	12	mg/Kg	13	mg/Kg	5.1	mg/Kg
Magnesium	-	-	2700	mg/Kg	3300	mg/Kg	1100	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	450	mg/Kg	700	mg/Kg	140	mg/Kg
Mercury	0.18	mg/kg	0.089J	mg/Kg	0.17U	mg/Kg	0.13U	mg/Kg
Molybdenum	-	-	0.89J	mg/Kg	1.7U	mg/Kg	1.3U	mg/Kg
Nickel	22.7	mg/kg	17J+	mg/Kg	16J+	mg/Kg	5.1J+	mg/Kg
Potassium	-	-	2,200J+	mg/Kg	2,500J+	mg/Kg	860J+	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	3	mg/Kg	0.69J	mg/Kg	0.65U	mg/Kg
Silver	0.733	mg/kg	0.17U	mg/Kg	0.17U	mg/Kg	0.13U	mg/Kg
Sodium	-	-	56J-	mg/Kg	37J-	mg/Kg	32UJ	mg/Kg
Thallium	-	mg/kg	0.42	mg/Kg	0.26	mg/Kg	0.087J	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	49J+	mg/Kg	53J+	mg/Kg	18J+	mg/Kg
Zinc	121	mg/kg	55	mg/Kg	65	mg/Kg	21	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.068	mg/Kg	0.032J	mg/Kg	0.025U	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	22	%	-	-	-	-

**Notes**

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 5C	Schoolfield Dredge Area 4A	Schoolfield Dredge Area 4A			
			6-12 inches	0-6 inches	6-12 inches			
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-5C-0612-SD-20140612	EDEN-SFDA-4A-0006-SD-20140612	EDEN-SFDA-4A-0612-SD-20140612			
Date	-		6/12/2014	6/12/2014	6/12/2014			
Time	-		910	930	930			
Status	-		Validation Complete	Validation Complete	Validation Complete			
Type	-		Sediment	Sediment	Sediment			
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	1900	mg/Kg	19000	mg/Kg	15000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.3UJ	mg/Kg	2UJ	mg/Kg	1.4UJ	mg/Kg
Arsenic	9.8	mg/kg	0.44	mg/Kg	3.5	mg/Kg	2.6	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	21	mg/Kg	210	mg/Kg	170	mg/Kg
Beryllium	-	-	0.15	mg/Kg	1.3	mg/Kg	0.95	mg/Kg
Boron	-	-	13U	mg/Kg	20U	mg/Kg	14U	mg/Kg
Cadmium	0.99	mg/kg	0.065U	mg/Kg	0.14	mg/Kg	0.11	mg/Kg
Calcium	-	-	370J-	mg/Kg	1,800J-	mg/Kg	1,200J-	mg/Kg
Chromium	43.4	mg/kg	10J+	mg/Kg	43	mg/Kg	35J+	mg/Kg
Cobalt	50	mg/kg	2.2	mg/Kg	17	mg/Kg	14	mg/Kg
Copper	31.6	mg/kg	2.5J+	mg/Kg	26	mg/Kg	20J+	mg/Kg
Iron	6,800 (bkg)	mg/kg	4500	mg/Kg	31000	mg/Kg	24000	mg/Kg
Lead	35.8	mg/kg	2.4	mg/Kg	19	mg/Kg	13	mg/Kg
Magnesium	-	-	550	mg/Kg	3400	mg/Kg	3000	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	59	mg/Kg	930	mg/Kg	670	mg/Kg
Mercury	0.18	mg/kg	0.13U	mg/Kg	0.2U	mg/Kg	0.14U	mg/Kg
Molybdenum	-	-	1.3U	mg/Kg	0.88J	mg/Kg	0.58J	mg/Kg
Nickel	22.7	mg/kg	2.6J+	mg/Kg	19	mg/Kg	15J+	mg/Kg
Potassium	-	-	410J+	mg/Kg	2700	mg/Kg	2,600J+	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.65U	mg/Kg	0.93J	mg/Kg	0.64J	mg/Kg
Silver	0.733	mg/kg	0.13U	mg/Kg	0.2U	mg/Kg	0.14U	mg/Kg
Sodium	-	-	32UJ	mg/Kg	36J-	mg/Kg	31J-	mg/Kg
Thallium	-	mg/kg	0.035J	mg/Kg	0.34	mg/Kg	0.29	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	8.8J+	mg/Kg	66J-	mg/Kg	49J+	mg/Kg
Zinc	121	mg/kg	10	mg/Kg	83	mg/Kg	69	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.024U	mg/Kg	0.047	mg/Kg	0.029	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 4B 0-6 inches		Schoolfield Dredge Area 4B 6-12 inches		Schoolfield Dredge Area 4C 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-4B-0006-SD-20140612		EDEN-SFDA-4B-0612-SD-20140612		EDEN-SFDA-4C-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1015		1015		1040	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	16000	mg/Kg	14000	mg/Kg	4200	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	2UJ	mg/Kg	1.8UJ	mg/Kg	1.4UJ	mg/Kg
Arsenic	9.8	mg/kg	3.9	mg/Kg	2.2	mg/Kg	2.9	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	170	mg/Kg	130	mg/Kg	58	mg/Kg
Beryllium	-	-	1.1	mg/Kg	0.82	mg/Kg	0.44	mg/Kg
Boron	-	-	20U	mg/Kg	18U	mg/Kg	14U	mg/Kg
Cadmium	0.99	mg/kg	0.1	mg/Kg	0.085J	mg/Kg	0.032J	mg/Kg
Calcium	-	-	1,200J-	mg/Kg	1,000J-	mg/Kg	530J-	mg/Kg
Chromium	43.4	mg/kg	40J+	mg/Kg	31J+	mg/Kg	12J+	mg/Kg
Cobalt	50	mg/kg	14	mg/Kg	11	mg/Kg	4.1	mg/Kg
Copper	31.6	mg/kg	23J+	mg/Kg	17J+	mg/Kg	7.4J+	mg/Kg
Iron	6,800 (bkg)	mg/kg	26000	mg/Kg	21000	mg/Kg	7600	mg/Kg
Lead	35.8	mg/kg	14	mg/Kg	11	mg/Kg	4.2	mg/Kg
Magnesium	-	-	3200	mg/Kg	2600	mg/Kg	900	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	580	mg/Kg	490	mg/Kg	120	mg/Kg
Mercury	0.18	mg/kg	0.2U	mg/Kg	0.18U	mg/Kg	0.14U	mg/Kg
Molybdenum	-	-	2U	mg/Kg	1.8U	mg/Kg	1.4U	mg/Kg
Nickel	22.7	mg/kg	18J+	mg/Kg	14J+	mg/Kg	5.1J+	mg/Kg
Potassium	-	-	2,700J+	mg/Kg	2,000J+	mg/Kg	720J+	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.9J	mg/Kg	0.62J	mg/Kg	0.63J	mg/Kg
Silver	0.733	mg/kg	0.2U	mg/Kg	0.18U	mg/Kg	0.14U	mg/Kg
Sodium	-	-	39J-	mg/Kg	33J-	mg/Kg	27J-	mg/Kg
Thallium	-	mg/kg	0.3	mg/Kg	0.23	mg/Kg	0.12J	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	57J+	mg/Kg	43J+	mg/Kg	16J+	mg/Kg
Zinc	121	mg/kg	69	mg/Kg	56	mg/Kg	19	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.044	mg/Kg	0.018J	mg/Kg	0.015J	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 4C 6-12 inches		Schoolfield Dredge Area 3A 0-6 inches		Schoolfield Dredge Area 3A 6-12 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-4C-0612-SD-20140612		EDEN-SFDA-3A-0006-SD-20140612		EDEN-SFDA-3A-0612-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1040		1100		1100	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	1600	mg/Kg	19000	mg/Kg	16000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.2UJ	mg/Kg	1.7UJ	mg/Kg	1.7UJ	mg/Kg
Arsenic	9.8	mg/kg	0.35	mg/Kg	3.8	mg/Kg	2.9	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	17	mg/Kg	200	mg/Kg	160	mg/Kg
Beryllium	-	-	0.12	mg/Kg	1.3	mg/Kg	0.98	mg/Kg
Boron	-	-	12U	mg/Kg	17U	mg/Kg	17U	mg/Kg
Cadmium	0.99	mg/kg	0.061U	mg/Kg	0.11	mg/Kg	0.12	mg/Kg
Calcium	-	-	240J-	mg/Kg	1,500J-	mg/Kg	1,200J-	mg/Kg
Chromium	43.4	mg/kg	8J+	mg/Kg	40J+	mg/Kg	36	mg/Kg
Cobalt	50	mg/kg	2.1	mg/Kg	15	mg/Kg	13	mg/Kg
Copper	31.6	mg/kg	2J+	mg/Kg	23J+	mg/Kg	21	mg/Kg
Iron	6,800 (bkg)	mg/kg	3500	mg/Kg	29000	mg/Kg	25000	mg/Kg
Lead	35.8	mg/kg	1.8	mg/Kg	15	mg/Kg	14	mg/Kg
Magnesium	-	-	410	mg/Kg	3800	mg/Kg	3000	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	45	mg/Kg	610	mg/Kg	570	mg/Kg
Mercury	0.18	mg/kg	0.12U	mg/Kg	0.08J	mg/Kg	0.17U	mg/Kg
Molybdenum	-	-	1.2U	mg/Kg	0.69J	mg/Kg	1.7U	mg/Kg
Nickel	22.7	mg/kg	2J+	mg/Kg	18J+	mg/Kg	16	mg/Kg
Potassium	-	-	300J+	mg/Kg	2,800J+	mg/Kg	2400	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.61U	mg/Kg	1.1	mg/Kg	0.7J	mg/Kg
Silver	0.733	mg/kg	0.12U	mg/Kg	0.17U	mg/Kg	0.17U	mg/Kg
Sodium	-	-	31UJ	mg/Kg	55J-	mg/Kg	53J-	mg/Kg
Thallium	-	mg/kg	0.12U	mg/Kg	0.35	mg/Kg	0.29	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	6.7J+	mg/Kg	56J+	mg/Kg	52J-	mg/Kg
Zinc	121	mg/kg	8.6	mg/Kg	77	mg/Kg	67	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.023U	mg/Kg	0.037	mg/Kg	0.034	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

Notes

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 3B 0-6 inches		Schoolfield Dredge Area 3B 6-12 inches		Schoolfield Dredge Area 3C 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-3B-0006-SD-20140612		EDEN-SFDA-3B-0612-SD-20140612		EDEN-SFDA-3C-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1130		1130		1150	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	18000	mg/Kg	14000	mg/Kg	3200	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	2UJ	mg/Kg	1.8UJ	mg/Kg	1.3UJ	mg/Kg
Arsenic	9.8	mg/kg	5.5	mg/Kg	2.2	mg/Kg	0.71	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	220	mg/Kg	130	mg/Kg	30	mg/Kg
Beryllium	-	-	1.4	mg/Kg	0.87	mg/Kg	0.2	mg/Kg
Boron	-	-	20U	mg/Kg	18U	mg/Kg	13U	mg/Kg
Cadmium	0.99	mg/kg	0.12	mg/Kg	0.094	mg/Kg	0.02J	mg/Kg
Calcium	-	-	1,400J-	mg/Kg	960J-	mg/Kg	410J-	mg/Kg
Chromium	43.4	mg/kg	41	mg/Kg	32	mg/Kg	10	mg/Kg
Cobalt	50	mg/kg	15	mg/Kg	11	mg/Kg	3.2	mg/Kg
Copper	31.6	mg/kg	26	mg/Kg	18	mg/Kg	3.5	mg/Kg
Iron	6,800 (bkg)	mg/kg	28000	mg/Kg	23000	mg/Kg	6700	mg/Kg
Lead	35.8	mg/kg	16	mg/Kg	12	mg/Kg	3	mg/Kg
Magnesium	-	-	3500	mg/Kg	2700	mg/Kg	780	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	620	mg/Kg	430	mg/Kg	91	mg/Kg
Mercury	0.18	mg/kg	0.2U	mg/Kg	0.18U	mg/Kg	0.13U	mg/Kg
Molybdenum	-	-	0.79J	mg/Kg	1.8U	mg/Kg	1.3U	mg/Kg
Nickel	22.7	mg/kg	19	mg/Kg	14	mg/Kg	3.3	mg/Kg
Potassium	-	-	2900	mg/Kg	2100	mg/Kg	540	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	1.4	mg/Kg	0.59J	mg/Kg	0.64U	mg/Kg
Silver	0.733	mg/kg	0.2U	mg/Kg	0.18U	mg/Kg	0.13U	mg/Kg
Sodium	-	-	52J-	mg/Kg	38J-	mg/Kg	22J-	mg/Kg
Thallium	-	mg/kg	0.38	mg/Kg	0.24	mg/Kg	0.05J	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	60J-	mg/Kg	47J-	mg/Kg	12J-	mg/Kg
Zinc	121	mg/kg	76	mg/Kg	59	mg/Kg	14	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.043	mg/Kg	0.026J	mg/Kg	0.029U	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 3C 6-12 inches		Schoolfield Dredge Area 2A 0-6 inches		Schoolfield Dredge Area 2A 6-12 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-3C-0612-SD-20140612		EDEN-SFDA-2A-0006-SD-20140612		EDEN-SFDA-2A-0612-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1150		1210		1210	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	8600	mg/Kg	19000	mg/Kg	20000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.5UJ	mg/Kg	1.6UJ	mg/Kg	1.9UJ	mg/Kg
Arsenic	9.8	mg/kg	1.6	mg/Kg	3	mg/Kg	4.2	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	80	mg/Kg	200	mg/Kg	230	mg/Kg
Beryllium	-	-	0.53	mg/Kg	1.2	mg/Kg	1.4	mg/Kg
Boron	-	-	15U	mg/Kg	16U	mg/Kg	19U	mg/Kg
Cadmium	0.99	mg/kg	0.054J	mg/Kg	0.14	mg/Kg	0.16	mg/Kg
Calcium	-	-	560J-	mg/Kg	1,600J-	mg/Kg	1,600J-	mg/Kg
Chromium	43.4	mg/kg	23	mg/Kg	43	mg/Kg	50	mg/Kg
Cobalt	50	mg/kg	7.8	mg/Kg	16	mg/Kg	18	mg/Kg
Copper	31.6	mg/kg	11	mg/Kg	26	mg/Kg	33	mg/Kg
Iron	6,800 (bkg)	mg/kg	15000	mg/Kg	29000	mg/Kg	32000	mg/Kg
Lead	35.8	mg/kg	8.9	mg/Kg	16	mg/Kg	20	mg/Kg
Magnesium	-	-	1800	mg/Kg	3500	mg/Kg	3400	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	260	mg/Kg	860	mg/Kg	1100	mg/Kg
Mercury	0.18	mg/kg	0.15U	mg/Kg	0.064J	mg/Kg	0.19U	mg/Kg
Molybdenum	-	-	1.5U	mg/Kg	0.78J	mg/Kg	0.98J	mg/Kg
Nickel	22.7	mg/kg	8.7	mg/Kg	19	mg/Kg	21	mg/Kg
Potassium	-	-	1400	mg/Kg	2800	mg/Kg	2800	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.74U	mg/Kg	0.85	mg/Kg	1	mg/Kg
Silver	0.733	mg/kg	0.15U	mg/Kg	0.16U	mg/Kg	0.11J	mg/Kg
Sodium	-	-	38J-	mg/Kg	38J-	mg/Kg	41J-	mg/Kg
Thallium	-	mg/kg	0.14J	mg/Kg	0.34	mg/Kg	0.36	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	28J-	mg/Kg	63J-	mg/Kg	72J-	mg/Kg
Zinc	121	mg/kg	36	mg/Kg	81	mg/Kg	93	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.029U	mg/Kg	0.041	mg/Kg	0.051	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 2B 0-6 inches		Schoolfield Dredge Area 2B 0-6 inches		Schoolfield Dredge Area 2B 6-12 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-2B-0006-SD-20140612		EDEN-SFDA-2B-0006-SD-20140612-DUP		EDEN-SFDA-2B-0612-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1225		1230		1225	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	12000	mg/Kg	18000	mg/Kg	12000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.9UJ	mg/Kg	2.1UJ	mg/Kg	1.5UJ	mg/Kg
Arsenic	9.8	mg/kg	4.2	mg/Kg	6	mg/Kg	4.1	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	130	mg/Kg	210	mg/Kg	150	mg/Kg
Beryllium	-	-	0.93	mg/Kg	1.5	mg/Kg	0.93	mg/Kg
Boron	-	-	19U	mg/Kg	21U	mg/Kg	15U	mg/Kg
Cadmium	0.99	mg/kg	0.071J	mg/Kg	0.12	mg/Kg	0.086	mg/Kg
Calcium	-	-	870J-	mg/Kg	1,300J-	mg/Kg	1,000J-	mg/Kg
Chromium	43.4	mg/kg	28	mg/Kg	40	mg/Kg	31	mg/Kg
Cobalt	50	mg/kg	9.7	mg/Kg	15	mg/Kg	11	mg/Kg
Copper	31.6	mg/kg	18	mg/Kg	26	mg/Kg	19	mg/Kg
Iron	6,800 (bkg)	mg/kg	19000	mg/Kg	28000	mg/Kg	21000	mg/Kg
Lead	35.8	mg/kg	11	mg/Kg	17	mg/Kg	11	mg/Kg
Magnesium	-	-	2300	mg/Kg	3400	mg/Kg	2600	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	380	mg/Kg	600	mg/Kg	370	mg/Kg
Mercury	0.18	mg/kg	0.19U	mg/Kg	0.21U	mg/Kg	0.15U	mg/Kg
Molybdenum	-	-	1.9U	mg/Kg	2.1U	mg/Kg	1.5U	mg/Kg
Nickel	22.7	mg/kg	13	mg/Kg	19	mg/Kg	14	mg/Kg
Potassium	-	-	1900	mg/Kg	2800	mg/Kg	2100	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	1	mg/Kg	1.6	mg/Kg	1.1	mg/Kg
Silver	0.733	mg/kg	0.19U	mg/Kg	0.21U	mg/Kg	0.15U	mg/Kg
Sodium	-	-	39J-	mg/Kg	52J-	mg/Kg	43J-	mg/Kg
Thallium	-	mg/kg	0.25	mg/Kg	0.39	mg/Kg	0.27	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	41J-	mg/Kg	60J-	mg/Kg	46J-	mg/Kg
Zinc	121	mg/kg	49	mg/Kg	75	mg/Kg	52	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.047	mg/Kg	0.052	mg/Kg	0.036	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 2B 6-12 inches		Schoolfield Dredge Area 2C 0-6 inches		Schoolfield Dredge Area 2C 6-12 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-2B-0612-SD-20140612-DUP		EDEN-SFDA-2C-0006-SD-20140612		EDEN-SFDA-2C-0612-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1230		1250		1250	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	11000	mg/Kg	5100	mg/Kg	14000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.6UJ	mg/Kg	1.3UJ	mg/Kg	1.6UJ	mg/Kg
Arsenic	9.8	mg/kg	3.7	mg/Kg	2.8	mg/Kg	2.2	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	130	mg/Kg	64	mg/Kg	120	mg/Kg
Beryllium	-	-	0.87	mg/Kg	0.47	mg/Kg	0.77	mg/Kg
Boron	-	-	16U	mg/Kg	13U	mg/Kg	16U	mg/Kg
Cadmium	0.99	mg/kg	0.073J	mg/Kg	0.034J	mg/Kg	0.075J	mg/Kg
Calcium	-	-	880J-	mg/Kg	510J-	mg/Kg	980J-	mg/Kg
Chromium	43.4	mg/kg	29	mg/Kg	13	mg/Kg	31	mg/Kg
Cobalt	50	mg/kg	9.8	mg/Kg	4.5	mg/Kg	10	mg/Kg
Copper	31.6	mg/kg	17	mg/Kg	8.1	mg/Kg	17	mg/Kg
Iron	6,800 (bkg)	mg/kg	19000	mg/Kg	8500	mg/Kg	21000	mg/Kg
Lead	35.8	mg/kg	10	mg/Kg	4.7	mg/Kg	11	mg/Kg
Magnesium	-	-	2300	mg/Kg	1100	mg/Kg	2400	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	340	mg/Kg	140	mg/Kg	430	mg/Kg
Mercury	0.18	mg/kg	0.16U	mg/Kg	0.13U	mg/Kg	0.16U	mg/Kg
Molybdenum	-	-	1.6U	mg/Kg	1.3U	mg/Kg	1.6U	mg/Kg
Nickel	22.7	mg/kg	12	mg/Kg	5.8	mg/Kg	13	mg/Kg
Potassium	-	-	1900	mg/Kg	830	mg/Kg	1800	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	1	mg/Kg	0.69	mg/Kg	0.59J	mg/Kg
Silver	0.733	mg/kg	0.16U	mg/Kg	0.13U	mg/Kg	0.16U	mg/Kg
Sodium	-	-	40J-	mg/Kg	26J-	mg/Kg	28J-	mg/Kg
Thallium	-	mg/kg	0.25	mg/Kg	0.13	mg/Kg	0.21	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	41J-	mg/Kg	18J-	mg/Kg	43J-	mg/Kg
Zinc	121	mg/kg	47	mg/Kg	21	mg/Kg	54	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.045	mg/Kg	0.012J	mg/Kg	0.023J	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 1A 0-6 inches		Schoolfield Dredge Area 1A 6-12 inches		Schoolfield Dredge Area 1B 0-6 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-1A-0006-SD-20140612		EDEN-SFDA-1A-0612-SD-20140612		EDEN-SFDA-1B-0006-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1310		1310		1330	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	12000	mg/Kg	12000	mg/Kg	21000	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.6UJ	mg/Kg	1.3UJ	mg/Kg	2.4UJ	mg/Kg
Arsenic	9.8	mg/kg	2.1	mg/Kg	2.2	mg/Kg	7.5	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	120	mg/Kg	120	mg/Kg	260	mg/Kg
Beryllium	-	-	0.7	mg/Kg	0.76	mg/Kg	1.7	mg/Kg
Boron	-	-	16U	mg/Kg	13U	mg/Kg	24U	mg/Kg
Cadmium	0.99	mg/kg	0.075J	mg/Kg	0.084	mg/Kg	0.13	mg/Kg
Calcium	-	-	760J-	mg/Kg	670J-	mg/Kg	1,600J-	mg/Kg
Chromium	43.4	mg/kg	26	mg/Kg	27	mg/Kg	47	mg/Kg
Cobalt	50	mg/kg	9.6	mg/Kg	10	mg/Kg	18	mg/Kg
Copper	31.6	mg/kg	15	mg/Kg	17	mg/Kg	31	mg/Kg
Iron	6,800 (bkg)	mg/kg	18000	mg/Kg	18000	mg/Kg	33000	mg/Kg
Lead	35.8	mg/kg	10	mg/Kg	12	mg/Kg	19	mg/Kg
Magnesium	-	-	2500	mg/Kg	2300	mg/Kg	4000	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	300	mg/Kg	300	mg/Kg	740	mg/Kg
Mercury	0.18	mg/kg	0.16U	mg/Kg	0.13U	mg/Kg	0.24U	mg/Kg
Molybdenum	-	-	1.6U	mg/Kg	0.53J	mg/Kg	0.98J	mg/Kg
Nickel	22.7	mg/kg	11	mg/Kg	12	mg/Kg	22	mg/Kg
Potassium	-	-	2000	mg/Kg	1900	mg/Kg	3200	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	0.54J	mg/Kg	0.54J	mg/Kg	2	mg/Kg
Silver	0.733	mg/kg	0.16U	mg/Kg	0.076J	mg/Kg	0.24U	mg/Kg
Sodium	-	-	39J-	mg/Kg	44J-	mg/Kg	57J-	mg/Kg
Thallium	-	mg/kg	0.23	mg/Kg	0.23	mg/Kg	0.45	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	36J-	mg/Kg	39J-	mg/Kg	70J-	mg/Kg
Zinc	121	mg/kg	51	mg/Kg	52	mg/Kg	88	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.027J	mg/Kg	0.023J	mg/Kg	0.06	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	-	-	-	-

**Notes**

<sup>2</sup> 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

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 <sup>2</sup>		Schoolfield Dredge Area 1B 6-12 inches		Schoolfield Dredge Area 1C 0-6 inches		Schoolfield Dredge Area 1C 6-12 inches	
<b>Sample Information</b>								
Sample ID	-		EDEN-SFDA-1B-0612-SD-20140612		EDEN-SFDA-1C-0006-SD-20140612		EDEN-SFDA-1C-0612-SD-20140612	
Date	-		6/12/2014		6/12/2014		6/12/2014	
Time	-		1330		1400		1400	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
<b>Total Metals</b>								
Aluminum	3,200 (bkg)	mg/kg	8300	mg/Kg	16000	mg/Kg	3400	mg/Kg
Antimony	2 <sup>a</sup>	mg/kg	1.6UJ	mg/Kg	1.9UJ	mg/Kg	1.1UJ	mg/Kg
Arsenic	9.8	mg/kg	3.9	mg/Kg	7.8	mg/Kg	1.5	mg/Kg
Barium	60 <sup>b</sup>	mg/kg	99	mg/Kg	220	mg/Kg	39	mg/Kg
Beryllium	-	-	0.7	mg/Kg	1.5	mg/Kg	0.27	mg/Kg
Boron	-	-	16U	mg/Kg	19U	mg/Kg	11U	mg/Kg
Cadmium	0.99	mg/kg	0.06J	mg/Kg	0.12	mg/Kg	0.023J	mg/Kg
Calcium	-	-	870J-	mg/Kg	1,600J-	mg/Kg	390J-	mg/Kg
Chromium	43.4	mg/kg	19	mg/Kg	36	mg/Kg	12	mg/Kg
Cobalt	50	mg/kg	7	mg/Kg	14	mg/Kg	3.7	mg/Kg
Copper	31.6	mg/kg	12	mg/Kg	27	mg/Kg	4.8	mg/Kg
Iron	6,800 (bkg)	mg/kg	14000	mg/Kg	25000	mg/Kg	6300	mg/Kg
Lead	35.8	mg/kg	6.9	mg/Kg	14	mg/Kg	3.2	mg/Kg
Magnesium	-	-	1800	mg/Kg	3300	mg/Kg	860	mg/Kg
Manganese	460 <sup>c</sup>	mg/kg	260	mg/Kg	600	mg/Kg	99	mg/Kg
Mercury	0.18	mg/kg	0.16U	mg/Kg	0.095J	mg/Kg	0.11U	mg/Kg
Molybdenum	-	-	1.6U	mg/Kg	0.83J	mg/Kg	1.1U	mg/Kg
Nickel	22.7	mg/kg	9	mg/Kg	18	mg/Kg	4.1	mg/Kg
Potassium	-	-	1,400J-	mg/Kg	2800	mg/Kg	660	mg/Kg
Selenium	2 <sup>d</sup>	mg/kg	1.1	mg/Kg	2.4	mg/Kg	0.31J	mg/Kg
Silver	0.733	mg/kg	0.16U	mg/Kg	0.19U	mg/Kg	0.11U	mg/Kg
Sodium	-	-	39J	mg/Kg	56J-	mg/Kg	24J-	mg/Kg
Thallium	-	mg/kg	0.2	mg/Kg	0.43	mg/Kg	0.081J	mg/Kg
Vanadium	57 <sup>c</sup>	mg/kg	28J-	mg/Kg	54J-	mg/Kg	13J-	mg/Kg
Zinc	121	mg/kg	33	mg/Kg	68	mg/Kg	16	mg/Kg
<b>Total Metals CVAA</b>								
Mercury	0.18	mg/kg	0.026J	mg/Kg	0.073	mg/Kg	0.024U	mg/Kg
<b>Physical Properties</b>								
Percent Ash	-	-	-	-	9	%	-	-

**Notes**

<sup>2</sup> MacDonald, D.D.; Ingersoll, C.G.; Smorong, D.E.; Lindscoog, 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.

<sup>a</sup> 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.

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

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

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

<sup>e</sup> Cadmium from diet

<sup>f</sup> Chromium (VI)

<sup>g</sup> Methyl Mercury

<sup>h</sup> 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

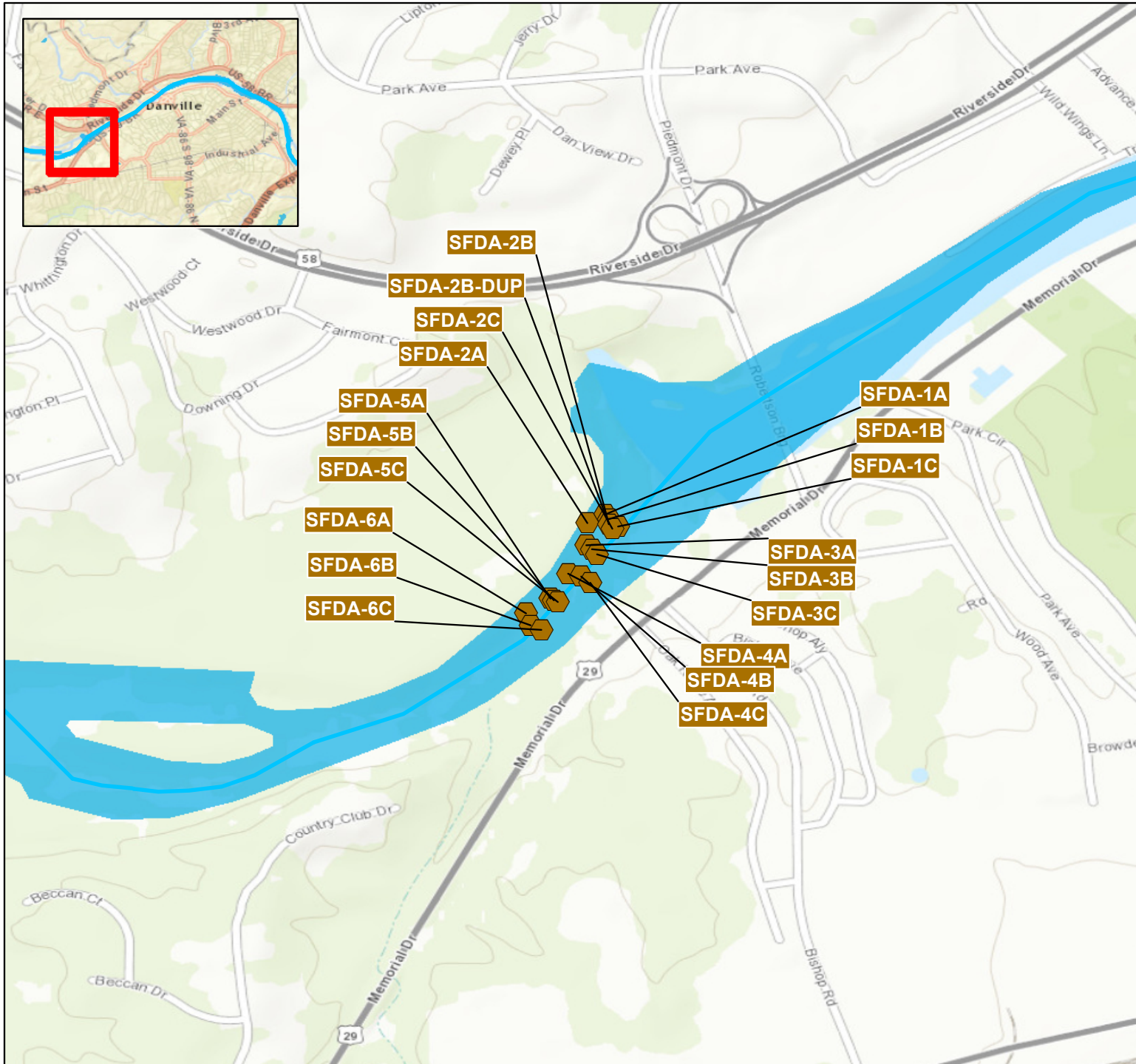
ND No fly ash detected at a PLM reporting limit of 1 percent

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.

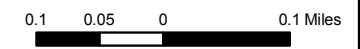




Legend

- ★ Approximate Spill Location
- ⬡ Sediment Sample Location

Imagery Source:  
ESRI, USGS Mapping Service, 2013



Eden Coal Ash Spill  
Eden, North Carolina

Sediment  
Sample Locations  
June 12, 2014

