EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT RESULTS

NOTE: The data below represents sediment samples that were collected on May 6, 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, 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[2]**		**Transect FWS 4A Right Descending**		**Transect FWS 4A Right Descending**		**Transect FWS 4B Left Descending**	
Sample Information								
Sample ID	-		EDEN-FWS4A-R-SD-20140506		EDEN-FWS4A-R-SD-20140506-DUP		EDEN-FWS4B-L-SD-20140506	
Date	-		05/06/2014		05/06/2014		05/06/2014	
Time	-		1120		1125		1245	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	3,400	mg/Kg	4,000	mg/Kg	5,700	mg/Kg
Antimony	2[a]	mg/kg	1.3U	mg/Kg	1.2U	mg/Kg	1.2U	mg/Kg
Arsenic	9.8	mg/kg	2.8U	mg/Kg	0.91J	mg/Kg	1.4J	mg/Kg
Barium	60[b]	mg/kg	34	mg/Kg	39	mg/Kg	57	mg/Kg
Beryllium	-	-	0.21J	mg/Kg	0.24J	mg/Kg	0.35J	mg/Kg
Boron	-	-	14U	mg/Kg	12U	mg/Kg	14U	mg/Kg
Cadmium	0.99	mg/kg	0.067U	mg/Kg	0.019J	mg/Kg	0.043J	mg/Kg
Calcium	-	-	440	mg/Kg	430	mg/Kg	670	mg/Kg
Chromium	43.4	mg/kg	11	mg/Kg	13	mg/Kg	16	mg/Kg
Cobalt	50	mg/kg	3.9	mg/Kg	4.3	mg/Kg	5.7	mg/Kg
Copper	31.6	mg/kg	3.4J	mg/Kg	3.7	mg/Kg	6.3	mg/Kg
Iron	6,800 (bkg)	mg/kg	6,700	mg/Kg	7,700	mg/Kg	11,000	mg/Kg
Lead	35.8	mg/kg	3.1J+	mg/Kg	3.3J+	mg/Kg	4.9J+	mg/Kg
Magnesium	-	-	1,100	mg/Kg	1,400	mg/Kg	1,800	mg/Kg
Manganese	460[c]	mg/kg	160J+	mg/Kg	180J+	mg/Kg	260J+	mg/Kg
Mercury	0.18	mg/kg	0.024U	mg/Kg	0.025U	mg/Kg	0.026U	mg/Kg
Molybdenum	-	-	1.4U	mg/Kg	1.2U	mg/Kg	1.4U	mg/Kg
Nickel	22.7	mg/kg	3.9J	mg/Kg	4.6	mg/Kg	6.3	mg/Kg
Potassium	-	-	860	mg/Kg	1,100	mg/Kg	1,400	mg/Kg
Selenium	2[d]	mg/kg	0.67U	mg/Kg	0.61U	mg/Kg	0.31J	mg/Kg
Silver	0.733	mg/kg	0.13U	mg/Kg	0.12U	mg/Kg	0.12U	mg/Kg
Sodium	-	-	280U	mg/Kg	230U	mg/Kg	270U	mg/Kg
Thallium	-	mg/kg	0.045J	mg/Kg	0.087J	mg/Kg	0.12	mg/Kg
Vanadium	57[c]	mg/kg	13J+	mg/Kg	14J+	mg/Kg	20J+	mg/Kg
Zinc	121	mg/kg	16J+	mg/Kg	18J+	mg/Kg	27J+	mg/Kg
Physical Properties								
Percent Ash	-	-	ND	%	ND	%	2	%

Notes

[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

[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.pd
f

[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
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 02 Right Descending		Transect FWS SFI1 Left Descending		Transect FWS SFI2 Right Descending	
Sample Information								
Sample ID	-		EDEN-EPA02-R-SD-20140506		EDEN-FWSSFI1-L-SD-20140506		EDEN-FWSSFI2-R-SD-20140506	
Date	-		05/06/2014		05/06/2014		05/06/2014	
Time	-		1420		1040		1135	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	7,100	mg/Kg	13,000	mg/Kg	7,800	mg/Kg
Antimony	2[a]	mg/kg	1.4U	mg/Kg	1.6U	mg/Kg	1.4U	mg/Kg
Arsenic	9.8	mg/kg	1.8J	mg/Kg	2.6J	mg/Kg	3.1	mg/Kg
Barium	60[b]	mg/kg	71	mg/Kg	120	mg/Kg	82	mg/Kg
Beryllium	-	-	0.42J	mg/Kg	0.69	mg/Kg	0.58J	mg/Kg
Boron	-	-	15U	mg/Kg	16U	mg/Kg	15U	mg/Kg
Cadmium	0.99	mg/kg	0.031J	mg/Kg	0.072J	mg/Kg	0.047J	mg/Kg
Calcium	-	-	770	mg/Kg	820	mg/Kg	690	mg/Kg
Chromium	43.4	mg/kg	17	mg/Kg	28	mg/Kg	18	mg/Kg
Cobalt	50	mg/kg	6.1	mg/Kg	10	mg/Kg	6.1	mg/Kg
Copper	31.6	mg/kg	7.5	mg/Kg	15	mg/Kg	9.9	mg/Kg
Iron	6,800 (bkg)	mg/kg	12,000	mg/Kg	15,000	mg/Kg	13,000	mg/Kg
Lead	35.8	mg/kg	6.9J+	mg/Kg	10J+	mg/Kg	6.7J+	mg/Kg
Magnesium	-	-	2,200	mg/Kg	3,300	mg/Kg	1,900	mg/Kg
Manganese	460[c]	mg/kg	250J+	mg/Kg	140J+	mg/Kg	230J+	mg/Kg
Mercury	0.18	mg/kg	0.026U	mg/Kg	0.031	mg/Kg	0.025J	mg/Kg
Molybdenum	-	-	1.5U	mg/Kg	0.51J	mg/Kg	1.5U	mg/Kg
Nickel	22.7	mg/kg	7.4	mg/Kg	12	mg/Kg	7.8	mg/Kg
Potassium	-	-	1,700	mg/Kg	2,500	mg/Kg	1,500	mg/Kg
Selenium	2[d]	mg/kg	0.7U	mg/Kg	0.6J	mg/Kg	0.8	mg/Kg
Silver	0.733	mg/kg	0.14U	mg/Kg	0.089J	mg/Kg	0.14U	mg/Kg
Sodium	-	-	290U	mg/Kg	330U	mg/Kg	300U	mg/Kg
Thallium	-	mg/kg	0.12J	mg/Kg	0.21	mg/Kg	0.17	mg/Kg
Vanadium	57[c]	mg/kg	22J+	mg/Kg	39J+	mg/Kg	25J+	mg/Kg
Zinc	121	mg/kg	29J+	mg/Kg	47J+	mg/Kg	29J+	mg/Kg
Physical Properties								
Percent Ash	-	-	ND	%	2	%	11	%

Notes

[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

[a] The screening value for antimony is from Long, Edward R., and L Biological Effects of Sediment-Sorbed Contaminants Tested in the N 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.pd

[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
ND	No fly ash detected at a PLM reporting limit of 1
PLM	Polarized light microscopy
U	Analyte was not detected at the listed reporting li
UJ	Analyte was not detected at the listed reporting li which is an estimated quantitation.

EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT RESULTS

Analyte	Ecological Screening Standards for Sediment[2]		Transect FWS SFI3 Left Descending		Transect FWS SFI4 Left Descending		Transect EPA 03 Left Descending	
Sample Information								
Sample ID	-		EDEN-FWSSFI3-L-SD-20140506		EDEN-FWSSFI4-L-SD-20140506		EDEN-EPA03-L-SD-20140506	
Date	-		05/06/2014		05/06/2014		05/06/2014	
Time	-		1220		1300		1335	
Status	-		Validation Complete		Validation Complete		Validation Complete	
Type	-		Sediment		Sediment		Sediment	
Total Metals								
Aluminum	3,200 (bkg)	mg/kg	17,000	mg/Kg	19,000	mg/Kg	21,000	mg/Kg
Antimony	2[a]	mg/kg	1.7U	mg/Kg	1.9U	mg/Kg	2U	mg/Kg
Arsenic	9.8	mg/kg	5.5	mg/Kg	7.4	mg/Kg	4.6	mg/Kg
Barium	60[b]	mg/kg	140	mg/Kg	180	mg/Kg	170	mg/Kg
Beryllium	-	-	1.1	mg/Kg	1.3	mg/Kg	1.2	mg/Kg
Boron	-	-	19U	mg/Kg	17U	mg/Kg	21U	mg/Kg
Cadmium	0.99	mg/kg	0.095	mg/Kg	0.11	mg/Kg	0.17	mg/Kg
Calcium	-	-	1,600	mg/Kg	2,100	mg/Kg	2,000	mg/Kg
Chromium	43.4	mg/kg	34	mg/Kg	36	mg/Kg	39	mg/Kg
Cobalt	50	mg/kg	12	mg/Kg	13	mg/Kg	14	mg/Kg
Copper	31.6	mg/kg	19	mg/Kg	24	mg/Kg	24	mg/Kg
Iron	6,800 (bkg)	mg/kg	27,000	mg/Kg	29,000	mg/Kg	31,000	mg/Kg
Lead	35.8	mg/kg	14J+	mg/Kg	15J+	mg/Kg	16J+	mg/Kg
Magnesium	-	-	3,300	mg/Kg	3,800	mg/Kg	3,900	mg/Kg
Manganese	460[c]	mg/kg	620J+	mg/Kg	650J+	mg/Kg	730J+	mg/Kg
Mercury	0.18	mg/kg	0.038	mg/Kg	0.055	mg/Kg	0.047	mg/Kg
Molybdenum	-	-	0.73J	mg/Kg	0.81J	mg/Kg	0.75J	mg/Kg
Nickel	22.7	mg/kg	14	mg/Kg	16	mg/Kg	17	mg/Kg
Potassium	-	-	2,400	mg/Kg	2,600	mg/Kg	2,800	mg/Kg
Selenium	2[d]	mg/kg	0.89	mg/Kg	2.9	mg/Kg	1.2	mg/Kg
Silver	0.733	mg/kg	0.17U	mg/Kg	0.19U	mg/Kg	0.2U	mg/Kg
Sodium	-	-	390U	mg/Kg	330U	mg/Kg	430U	mg/Kg
Thallium	-	mg/kg	0.24	mg/Kg	0.38	mg/Kg	0.33	mg/Kg
Vanadium	57[c]	mg/kg	55J+	mg/Kg	56J+	mg/Kg	60J+	mg/Kg
Zinc	121	mg/kg	58J+	mg/Kg	64J+	mg/Kg	72J+	mg/Kg
Physical Properties								
Percent Ash	-	-	9	%	17	%	5	%

Notes

[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

[a] The screening value for antimony is from Long, Edward R., and L Biological Effects of Sediment-Sorbed Contaminants Tested in the N 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.pd

[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
ND	No fly ash detected at a PLM reporting limit of 1
PLM	Polarized light microscopy
U	Analyte was not detected at the listed reporting li
UJ	Analyte was not detected at the listed reporting li which is an estimated quantitation.

EDEN NORTH CAROLINA COAL ASH SPILL
SEDIMENT RESULTS

Analyte	Ecological Screening Standards for Sediment[2]		Transect FWS SFI5 Left Descending	
Sample Information				
Sample ID	-		EDEN-FWSSFI5-L-SD-20140506	
Date	-		05/06/2014	
Time	-		1410	
Status	-		Validation Complete	
Type	-		Sediment	
Total Metals				
Aluminum	3,200 (bkg)	mg/kg	14,000	mg/kg
Antimony	2[a]	mg/kg	1.8U	mg/kg
Arsenic	9.8	mg/kg	5.1	mg/kg
Barium	60[b]	mg/kg	130	mg/kg
Beryllium	-	-	0.98	mg/kg
Boron	-	-	16U	mg/kg
Cadmium	0.99	mg/kg	0.093	mg/kg
Calcium	-	-	1,500	mg/kg
Chromium	43.4	mg/kg	28	mg/kg
Cobalt	50	mg/kg	10	mg/kg
Copper	31.6	mg/kg	18	mg/kg
Iron	6,800 (bkg)	mg/kg	22,000	mg/kg
Lead	35.8	mg/kg	12J+	mg/kg
Magnesium	-	-	3,100	mg/kg
Manganese	460[c]	mg/kg	460J+	mg/kg
Mercury	0.18	mg/kg	0.042	mg/kg
Molybdenum	-	-	0.67J	mg/kg
Nickel	22.7	mg/kg	12	mg/kg
Potassium	-	-	2,200	mg/kg
Selenium	2[d]	mg/kg	1	mg/kg
Silver	0.733	mg/kg	0.18U	mg/kg
Sodium	-	-	320U	mg/kg
Thallium	-	mg/kg	0.25	mg/kg
Vanadium	57[c]	mg/kg	42J+	mg/kg
Zinc	121	mg/kg	50J+	mg/kg
Physical Properties				
Percent Ash	-	-	14	%

Notes

[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

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[f] Chromium (VI)

[g] Methyl Mercury

[h] Thallium Chloride

%	Percent
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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
PLM	Polarized light microscopy
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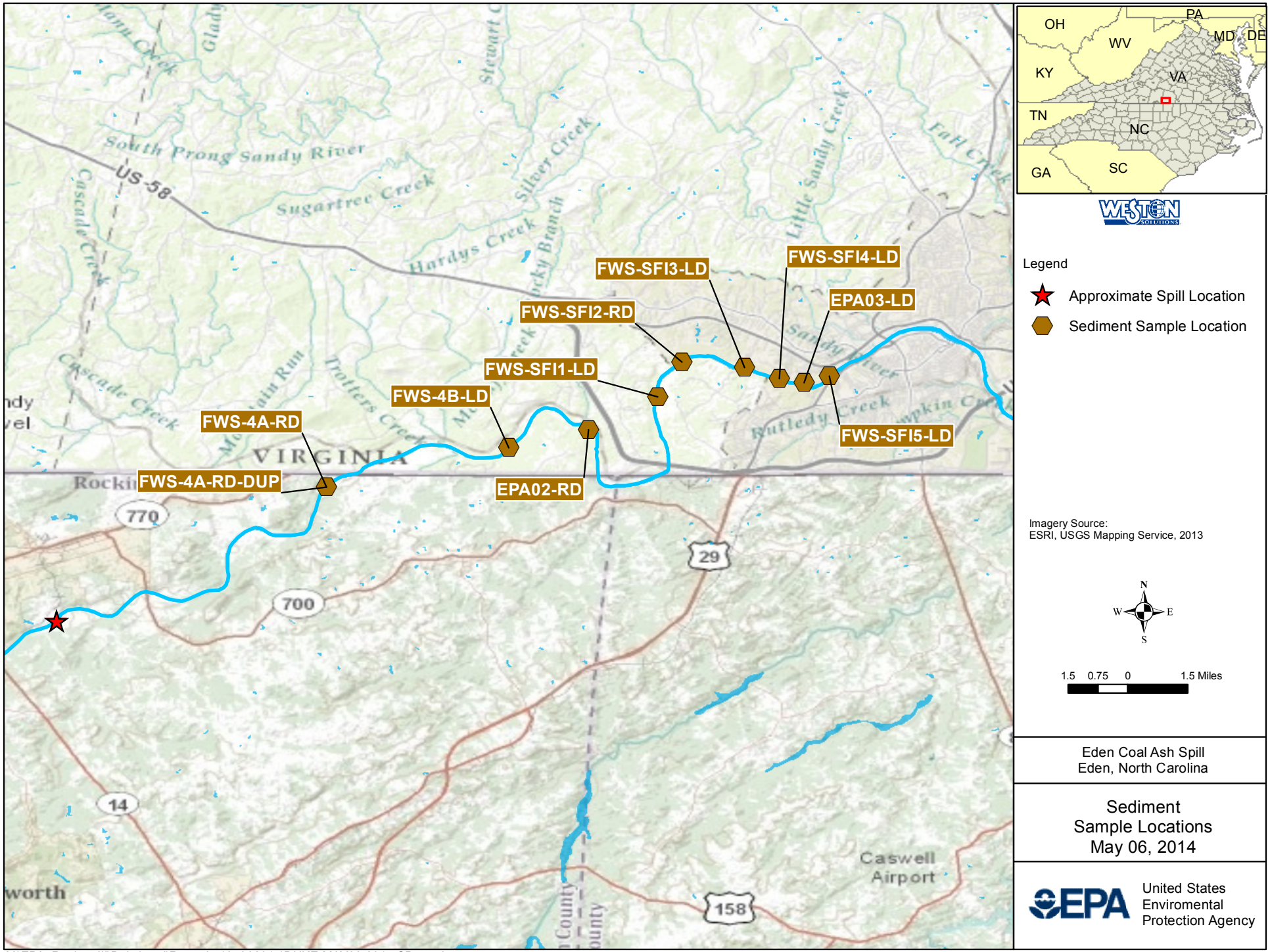

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