
APPENDIX C

Grain Size Methods

GRAIN SIZE COMPARISONS ACROSS LABORATORIES

During development of the Pilot Study Quality Assurance Project Plan (QAPP), the original intent was to have the grain size sediment samples analyzed using Puget Sound Estuary Program (PSEP) methods. However, the laboratory performing the grain size analyses, black carbon and total organic carbon analyses, Alpha, was not certified to perform the analysis consistent with the PSEP method. Alpha was certified to perform grain size analysis using ASTM Method D422. In order to meet the requirements of the study¹, the ASTM Method D422 was modified to provide fines data equivalent to PSEP methods by using a #230 sieve. Alpha used this modified ASTM Method D422 for the baseline and Year 0 samples.

Because of changes in total organic carbon (TOC) analytical sample size and instrument, as well as the method used to measure activated carbon (AC) in bulk sediments, project work was discontinued at Alpha (see QAPP Addendum 3 for more information). Specifically, with analytical laboratory changes for TOC and AC analyses, it was decided to have a local laboratory conduct the grain size analysis starting with the Year 1 sampling. The bulk sediment samples were submitted to Materials Testing & Consulting (MTC) in Olympia, Washington. MTC performed the grain size analyses using the PSEP method, which resulted in a different set of sieves being used.

Table C-1 summarizes the sieve sizes used by Alpha during the Baseline and Year 0 sampling events compared to the sieve sizes used by MTC during the Year 1 sampling event. Due to the different sieve sizes used, the classifications provided by the different labs were not comparable. Within the sieve sets used by each method, there were two sieves in common (#10 and #230) that allowed comparison of the overall classifications of gravel, sand, and fines (Table C-2). Calculation of the general classification for each event are presented in Tables C-3 through C-5. The project does not require finer classifications to be comparable across sampling events.

Table C-1. Sieve sets used by Alpha and MTC

Alpha		MTC	
Classification	Sieve	Classification	Sieve
Cobbles	3"	--	--
Coarse Gravel	0.75"	Gravel	3/8"
Fine Gravel	#4		#4
Coarse Sand	#10		#10
Medium Sand	#40	Very Coarse Sand	#18
Fine Sand	#60	Coarse Sand	#35
	#140	Medium Sand	#60
	#200	Fine Sand	#120
Total Fines	<#200	Very Fine Sand	#230
	#230	Total Fines	<#230

1. Sieve sizes in common between the two methods are **bold/red**.
2. Shading indicates overall classification as cobbles, gravel, sand, or fines.

¹ <https://www.sfei.org/sites/default/files/project/SedimentEvaluationFrameworkForThePacificNorthwest.pdf>

Table C-2. Classification and Sieve Sizes Used in Year 1 Monitoring Report for Grain Size Comparisons Between Events

General Classification	Sieve Size
Cobbles	NA
Gravel	#10
Sand	#230
Total Fines	<#230

**Table C-3
Baseline Grain Size Data**

Classification	Sieve Size	ENR		Subtidal		ENR+AC	
		LDW-BA-SU-ENR-CA-CORE	LDW-BA-SU-ENR-CB-CORE	LDW-BA-SU-ENR-CC-CORE	LDW-BA-SU-ENR+AC-CA-CORE	LDW-BA-SU-ENR+AC-CB-CORE	LDW-BA-SU-ENR+AC-CC-CORE
Weight Retained (g)							
Cobbles	3"	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0
Fine Gravel	#4	5.05	3.08	0.45	3.85	0.75	0.4
Coarse Sand	#10	2.16	1.83	2.25	3.02	1.07	0.39
Medium Sand	#40	9.51	7.3	7.43	10.6	5.74	2.65
Fine Sand	#60	6.17	4.17	4.16	5.03	4.33	2
	#140	5.63	4.21	4.53	7.69	6.65	3.76
	#200	9.16	3.14	2.77	1.9	5.33	2.47
Total Fines	#230	1.97	2.72	2.52	0.85	4.18	2.15
	<#230	62.35	53.32	72.86	11.1	55.95	65.66
	Total	102	79.77	96.97	44.04	84	79.48
Fractional Components (%)							
Cobbles	3"	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0
Fine Gravel	#4	4.95	3.86	0.46	8.74	0.89	0.50
Coarse Sand	#10	2.12	2.29	2.32	6.86	1.27	0.49
Medium Sand	#40	9.32	9.15	7.66	24.1	6.83	3.33
Fine Sand	#60	6.05	5.23	4.29	11.4	5.15	2.52
	#140	5.52	5.28	4.67	17.5	7.92	4.73
	#200	8.98	3.94	2.86	4.31	6.35	3.11
Total Fines	#230	1.93	3.41	2.60	1.93	4.98	2.71
	<#230	61.1	66.8	75.1	25.2	66.6	82.6
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction							
	Total Mass (g)	N/A	N/A	N/A	N/A	N/A	N/A
	Mass Passing #4	N/A	N/A	N/A	N/A	N/A	N/A
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving							
Cobbles	3"	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Gravel	0.75"	N/A	N/A	N/A	N/A	N/A	N/A
Fine Gravel	#4	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Sand	#10	N/A	N/A	N/A	N/A	N/A	N/A
Medium Sand	#40	N/A	N/A	N/A	N/A	N/A	N/A
Fine Sand	#60	N/A	N/A	N/A	N/A	N/A	N/A
	#140	N/A	N/A	N/A	N/A	N/A	N/A
	#200	N/A	N/A	N/A	N/A	N/A	N/A
Total Fines	#230	N/A	N/A	N/A	N/A	N/A	N/A
	<#230	N/A	N/A	N/A	N/A	N/A	N/A
New Fractional Components (%)							
Gravel	#10	7.1	6.2	2.8	15.6	2.2	1.0
Sand	230	31.8	27.0	22.1	59.2	31.2	16.4
Fines	<#230	61.1	66.8	75.1	25.2	66.6	82.6

**Table C-3
Baseline Grain Size Data**

Classification	Sieve Size	ENR			Scour			ENR+AC		
		LDW-BA-SC-ENR-CA-CORE	LDW-BA-SC-ENR-CA-CORE	LDW-BA-SC-ENR-CA-CORE	LDW-BA-SC-ENR-CB-CORE	LDW-BA-SC-ENR-CC-CORE	LDW-BA-SC-ENR+AC-CA-CORE	LDW-BA-SC-ENR+AC-CB-CORE	LDW-BA-SC-ENR+AC-CC-CORE	
Weight Retained (g)										
Cobbles	3"	0	0	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0	0	0
Fine Gravel	#4	0.05	0.03	0.25	0	0	6.6	0.06	0	0
Coarse Sand	#10	0.59	2.29	1.2	0.43	1.52	3.24	1	1.13	1.13
Medium Sand	#40	1.74	7.54	2.74	1.31	7.46	9.95	12.35	7.2	7.2
Fine Sand	#60	1	2.04	1.24	0.93	2.56	7.8	10.59	7.42	7.42
	#140	2.46	2.77	3.11	2.92	3.64	4.77	6.17	5.41	5.41
	#200	1.54	1.41	1.79	2.02	2	1.3	1.25	1.57	1.57
Total Fines	#230	0.96	1.08	1.25	1.3	1.23	0.84	0.85	0.99	0.99
	<#230	45.71	36.04	59.93	60.25	47.79	44.83	43.47	54.48	54.48
	Total	54.05	53.2	71.51	69.16	66.2	79.33	75.74	78.2	78.2
Fractional Components (%)										
Cobbles	3"	0	0	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0	0	0
Fine Gravel	#4	0.09	0.06	0.35	0	0	8.32	0.08	0	0
Coarse Sand	#10	1.09	4.30	1.68	0.62	2.30	4.08	1.32	1.45	1.45
Medium Sand	#40	3.22	14.2	3.83	1.89	11.3	12.5	16.3	9.21	9.21
Fine Sand	#60	1.85	3.83	1.73	1.34	3.87	9.83	14.0	9.49	9.49
	#140	4.55	5.21	4.35	4.22	5.50	6.01	8.15	6.92	6.92
	#200	2.85	2.65	2.50	2.92	3.02	1.64	1.65	2.01	2.01
Total Fines	#230	1.78	2.03	1.75	1.88	1.86	1.06	1.12	1.27	1.27
	<#230	84.6	67.7	83.8	87.1	72.2	56.5	57.4	69.7	69.7
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction										
	Total Mass (g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mass Passing #4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving										
Cobbles	3"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Gravel	0.75"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fine Gravel	#4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Sand	#10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medium Sand	#40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fine Sand	#60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	#140	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	#200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Fines	#230	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	<#230	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Fractional Components (%)										
Gravel	#10	1.2	4.4	2.0	0.6	2.3	12.4	1.4	1.5	1.5
Sand	230	14.3	27.9	14.2	12.3	25.6	31.0	41.2	28.9	28.9
Fines	<#230	84.6	67.7	83.8	87.1	72.2	56.5	57.4	69.7	69.7

**Table C-3
Baseline Grain Size Data**

Plot		Intertidal					
Subplot		ENR			ENR+AC		
Sample ID	Sieve Size	LDW-BA-IN-ENR-CA-CORE	LDW-BA-IN-ENR-CB-CORE	LDW-BA-IN-ENR-CC-CORE	LDW-BA-IN-ENR+AC-CA-CORE	LDW-BA-IN-ENR+AC-CB-CORE	LDW-BA-IN-ENR+AC-CC-CORE
Classification	Sieve Size						
Weight Retained (g)							
Cobbles	3"	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0
Fine Gravel	#4	0.17	0	0.44	0.05	0.41	0.61
Coarse Sand	#10	0.63	0.55	1.61	0.71	0.74	0.8
Medium Sand	#40	11.49	10.3	12.73	4.4	8.66	9.58
Fine Sand	#60	14.14	11.72	10.62	5.26	9.59	11.05
	#140	13.37	9.52	8.54	11.39	15.53	15.62
	#200	4.62	4.28	4.07	6.43	5.79	5.85
Total Fines	#230	2.85	2.63	2.7	4.02	3.09	3.09
	<#230	48.67	50.52	41.03	51.84	46.29	40.83
	<i>Total</i>	<i>95.94</i>	<i>89.52</i>	<i>81.74</i>	<i>84.1</i>	<i>90.1</i>	<i>87.43</i>
Fractional Components (%)							
Cobbles	3"	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0
Fine Gravel	#4	0.18	0	0.54	0.06	0.46	0.70
Coarse Sand	#10	0.66	0.61	1.97	0.84	0.82	0.92
Medium Sand	#40	12.0	11.5	15.6	5.23	9.61	11.0
Fine Sand	#60	14.7	13.1	13.0	6.25	10.6	12.6
	#140	13.9	10.6	10.4	13.5	17.2	17.9
	#200	4.82	4.78	4.98	7.65	6.43	6.69
Total Fines	#230	2.97	2.94	3.30	4.78	3.43	3.53
	<#230	50.7	56.4	50.2	61.6	51.4	46.7
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction							
	<i>Total Mass (g)</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
	<i>Mass Passing #4</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving							
Cobbles	3"	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Gravel	0.75"	N/A	N/A	N/A	N/A	N/A	N/A
Fine Gravel	#4	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Sand	#10	N/A	N/A	N/A	N/A	N/A	N/A
Medium Sand	#40	N/A	N/A	N/A	N/A	N/A	N/A
Fine Sand	#60	N/A	N/A	N/A	N/A	N/A	N/A
	#140	N/A	N/A	N/A	N/A	N/A	N/A
	#200	N/A	N/A	N/A	N/A	N/A	N/A
Total Fines	#230	N/A	N/A	N/A	N/A	N/A	N/A
	<#230	N/A	N/A	N/A	N/A	N/A	N/A
New Fractional Components (%)							
Gravel	#10	0.8	0.6	2.5	0.9	1.3	1.6
Sand	230	48.4	42.9	47.3	37.4	47.3	51.7
Fines	<#230	50.7	56.4	50.2	61.6	51.4	46.7

- Notes:
1. Baseline grain size analysis was conducted by Alpha.
 2. In the new fractional components, gravel is defined as the fraction greater than the #10 sieve, sand is defined as the fraction greater than the #230 sieve, and fines are defined as the fraction less than the #230 sieve.

**Table C-4
Year 0 Grain Size Data**

Plot		Subtidal						
Subplot		ENR				ENR+AC		
Sample ID		LDW-Y0-SU-ENR-CA-CORE	LDW-Y0-SU-ENR-CA-CORE	LDW-Y0-SU-ENR-CB-CORE	LDW-Y0-SU-ENR-CC-CORE	LDW-Y0-SU-ENR+AC-CA-CORE	LDW-Y0-SU-ENR+AC-CB-CORE	LDW-Y0-SU-ENR+AC-CC-CORE
Classification	Sieve Size							
Weight Retained (g)								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	0.74	0.6	1.44	0.69	0.17	0.85	1.56
Coarse Sand	#10	25.1	26.66	30.38	33.93	23.68	33.65	33.52
Medium Sand	#40	54.21	62.07	72.82	68.75	58.85	73.62	76.75
Fine Sand	#60	18.95	22.15	22.99	23.18	19.55	23.36	25.73
	#140	14.35	16.05	13.27	12.99	9.53	12.14	13.44
	#200	1.2	1.31	0.81	0.82	0.42	0.66	0.78
Total Fines	#230	0.24	0.27	0.15	0.19	0.07	0.12	0.14
	<#230	1.23	2.26	1.36	2.84	1.02	2.43	2.28
	Total	116.02	131.37	143.22	143.39	113.29	146.83	154.2
Fractional Components (%) - Measured								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	0.6	0.5	1.0	0.5	0.2	0.6	1.0
Coarse Sand	#10	21.6	20.3	21.2	23.7	20.9	22.9	21.7
Medium Sand	#40	46.7	47.2	50.8	47.9	51.9	50.1	49.8
Fine Sand	#60	16.3	16.9	16.1	16.2	17.3	15.9	16.7
	#140	12.4	12.2	9.3	9.1	8.4	8.3	8.7
	#200	1.0	1.0	0.6	0.6	0.4	0.4	0.5
Total Fines	#230	0.2	0.2	0.1	0.1	0.1	0.1	0.1
	<#230	1.1	1.7	0.9	2.0	0.9	1.7	1.5
Fractional Components (%) - Reported								
Total Gravel	#4	0.6	0.5	1	0.5	0.2	0.6	1
Total Sand	#200	98.0	97.6	98.0	97.5	98.9	97.6	97.4
Coarse Sand	#10	21.6	20.3	21.2	23.7	20.9	22.9	21.7
Medium Sand	#40	46.7	47.2	50.8	47.9	51.9	50.1	49.8
Fine Sand	#200	29.7	30.1	26.0	25.9	26.1	24.6	25.9
Total Fines	<#200	1.3	1.9	1.1	2.1	1.0	1.7	1.6
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction								
	Total Mass (g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mass Passing #4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fractional Components (%), Corrected for Pre-Analytical Laboratory Submission Sieving - Reported								
Total Gravel	#4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Sand	#200	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Sand	#10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medium Sand	#40	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fine Sand	#200	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Fines	<#200	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	0.60	0.50	1.00	0.50	0.20	0.60	1.00
Coarse Sand	#10	21.6	20.3	21.2	23.7	20.9	22.9	21.7
Medium Sand	#40	46.7	47.2	50.8	47.9	51.9	50.1	49.8
Fine Sand	#60	16.3	16.9	16.1	16.2	17.3	15.9	16.7
	#140	12.4	12.2	9.30	9.10	8.40	8.30	8.70
	#200	1.00	1.00	0.60	0.60	0.40	0.40	0.50
Total Fines	#230	0.20	0.20	0.10	0.10	0.10	0.10	0.10
	<#230	1.10	1.70	0.90	2.00	0.90	1.70	1.50
New Fractional Components (%)								
Gravel	#10	22.2	20.8	22.2	24.2	21.1	23.5	22.7
Sand	230	76.6	77.5	76.9	73.9	78.1	74.8	75.8
Fines	<#230	1.1	1.7	0.9	2.0	0.9	1.7	1.5

**Table C-4
Year 0 Grain Size Data**

Classification	Sieve Size	ENR			Scour			ENR+AC	
		LDW-Y0-SC-ENR-CA-CORE	LDW-Y0-SC-ENR-CB-CORE	LDW-Y0-SC-ENR-CC-CORE	LDW-Y0-SC-ENR+AC-CA-CORE	LDW-Y0-SC-ENR+AC-CB-CORE	LDW-Y0-SC-ENR+AC-CC-CORE	LDW-Y0-SC-ENR+AC-CA-CORE	LDW-Y0-SC-ENR+AC-CC-CORE
Weight Retained (g)									
Cobbles	3"	0	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0	0
Fine Gravel	#4	1.77	1.63	4.75	2.88	3.19	3.09	4.06	
Coarse Sand	#10	55.8	58.93	68.44	61.98	65.73	69.83	60.2	
Medium Sand	#40	75.23	97.74	103.98	75.91	87.48	69.91	83.39	
Fine Sand	#60	10.42	18.65	15.13	12.98	10.51	22.12		
	#140	2.29	4.67	4.08	4.53	2.89	2.34	8.04	
	#200	0.07	0.12	0.13	0.24	0.11	0.06	0.41	
Total Fines	#230	0.03	0.03	0.04	0.08	0.03	0.03	0.11	
	<#230	0.91	0.85	1.06	1.32	1.17	0.82	1.66	
	<i>Total</i>	<i>146.52</i>	<i>182.62</i>	<i>199.45</i>	<i>162.07</i>	<i>173.58</i>	<i>156.59</i>	<i>179.99</i>	
Fractional Components (%) - Measured									
Cobbles	3"	0	0	0	0	0	0	0	
Coarse Gravel	0.75"	0	0	0	0	0	0	0	
Fine Gravel	#4	1.2	0.9	2.4	1.8	1.8	2.0	2.3	
Coarse Sand	#10	38.1	32.3	34.3	38.2	37.9	44.6	33.4	
Medium Sand	#40	51.3	53.5	52.1	46.8	50.4	44.6	46.3	
Fine Sand	#60	7.1	10.2	8.5	9.3	7.5	6.7	12.3	
	#140	1.6	2.6	2.0	2.8	1.7	1.5	4.5	
	#200	0.0	0.1	0.1	0.1	0.1	0.0	0.2	
Total Fines	#230	0.0	0.0	0.0	0.0	0.0	0.0	0.1	
	<#230	0.6	0.5	0.5	0.8	0.7	0.5	0.9	
Fractional Components (%) - Reported									
Total Gravel	#4	1.2	0.9	2.4	1.8	1.8	2	2.3	
Total Sand	#200	98.1	98.7	97.0	97.2	97.6	97.4	96.7	
Coarse Sand	#10	38.1	32.3	34.3	38.2	37.9	44.6	33.4	
Medium Sand	#40	51.3	53.5	52.1	46.8	50.4	44.6	46.3	
Fine Sand	#200	8.7	12.9	10.6	12.2	9.3	8.2	17.0	
Total Fines	<#200	0.6	0.5	0.6	0.9	0.7	0.5	1.0	
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction									
	<i>Total Mass (g)</i>	<i>10,609</i>	<i>9,986</i>	<i>10,579</i>	<i>11,211</i>	<i>11,060</i>	<i>11,060</i>	<i>10,878</i>	
	<i>Mass Passing #4</i>	<i>5,867</i>	<i>5,306</i>	<i>5,547</i>	<i>6,357</i>	<i>5,971</i>	<i>5,970.833333</i>	<i>6,148</i>	
Fractional Components (%), Corrected for Pre-Analytical Laboratory Submission Sieving - Reported									
Total Gravel	#4	45.36548582	47.34459651	48.82823159	44.31951238	46.98591019	47.09388186	44.7808641	
Total Sand	#200	54.24742754	52.44286906	50.85718787	55.11347655	52.6901748	52.58220313	54.65394515	
Coarse Sand	#10	21.06857278	17.16215472	17.98352107	21.65982309	20.4606314	24.07768234	18.87737092	
Medium Sand	#40	28.36792082	28.42647918	27.3160772	26.53611834	27.20886076	24.07768234	26.16833155	
Fine Sand	#200	4.810933941	6.854235166	5.557589602	6.917535122	5.02068264	4.426838457	9.608242684	
Total Fines	<#200	0.331788548	0.26566803	0.314580544	0.510309968	0.377900844	0.269929174	0.565190746	
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving									
Cobbles	3"	0	0	0	0	0	0	0	
Coarse Gravel	0.75"	0	0	0	0	0	0	0	
Fine Gravel	#4	45.4	47.3	48.8	44.3	47.0	47.1	44.8	
Coarse Sand	#10	21.1	17.2	18.0	21.7	20.5	24.1	18.9	
Medium Sand	#40	28.4	28.4	27.3	26.5	27.2	24.1	26.2	
Fine Sand	#60	3.93	5.42	4.46	5.27	4.05	3.62	6.95	
	#140	0.89	1.38	1.05	1.59	0.92	0.81	2.54	
	#200	0	0.05	0.05	0.06	0.05	0	0.11	
Total Fines	#230	0	0	0	0	0	0	0.06	
	<#230	0.33	0.27	0.26	0.45	0.38	0.27	0.51	
New Fractional Components (%)									
Gravel	#10	66.5	64.5	66.8	66.0	67.5	71.2	63.7	
Sand	230	33.2	35.3	32.9	33.4	32.2	28.5	35.9	
Fines	<#230	0.3	0.3	0.3	0.5	0.4	0.3	0.5	

**Table C-4
Year 0 Grain Size Data**

Classification	Sieve Size	Intertidal						
		ENR			ENR+AC			
Plot Subplot	Sample ID	LDW-Y0-IN-ENR-CA-CORE	LDW-Y0-IN-ENR-CA-CORE	LDW-Y0-IN-ENR-CB-CORE	LDW-Y0-IN-ENR-CC-CORE	LDW-Y0-IN-ENR+AC-CA-CORE	LDW-Y0-IN-ENR+AC-CB-CORE	LDW-Y0-IN-ENR+AC-CC-CORE
Weight Retained (g)								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	2.52	1.7	1.18	3.53	2.51	1.7	2.77
Coarse Sand	#10	51.4	53.54	35.27	82.41	74.49	69.45	65.41
Medium Sand	#40	72.49	70.08	55.34	77.3	82.7	78.24	75.76
Fine Sand	#60	13.71	17.13	13.95	16.3	12.5	12.72	14.88
	#140	4.07	4.98	4.36	5.21	2.99	3.45	4.96
	#200	0.24	0.29	0.25	0.3	0.16	0.28	0.47
Total Fines	#230	0.08	0.1	0.1	0.1	0.06	0.11	0.19
	<#230	0.81	0.93	0.42	1.07	1.02	1.11	1.51
	Total	145.32	148.75	110.87	186.22	176.43	167.06	165.95
Fractional Components (%) - Measured								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	1.7	1.1	1.1	1.9	1.4	1.0	1.7
Coarse Sand	#10	35.4	36.0	31.8	44.3	42.2	41.6	39.4
Medium Sand	#40	49.9	47.1	49.9	41.5	46.9	46.8	45.7
Fine Sand	#60	9.4	11.5	12.6	8.8	7.1	7.6	9.0
	#140	2.8	3.3	3.9	2.8	1.7	2.1	3.0
	#200	0.2	0.2	0.2	0.2	0.1	0.2	0.3
Total Fines	#230	0.1	0.1	0.1	0.1	0.0	0.1	0.1
	<#230	0.6	0.6	0.4	0.6	0.6	0.7	0.9
Fractional Components (%) - Reported								
Total Gravel	#4	1.7	1.1	1.1	1.9	1.4	1	1.7
Total Sand	#200	97.7	98.1	98.4	97.6	98.0	98.3	97.4
Coarse Sand	#10	35.4	36	31.8	44.3	42.2	41.6	39.4
Medium Sand	#40	49.9	47.1	49.9	41.5	46.9	46.8	45.7
Fine Sand	#200	12.4	15.0	16.7	11.8	8.9	9.9	12.3
Total Fines	<#200	0.6	0.7	0.5	0.6	0.6	0.7	1.0
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction								
	Total Mass (g)	13,702	13701.66667	13,655	14,669	13,292	13,294	13,214
	Mass Passing #4	7,821	7820.833333	7,628	7,920	7,547	7,405	7,406
Fractional Components (%), Corrected for Pre-Analytical Laboratory Submission Sieving - Reported								
Total Gravel	#4	43.8909196	43.54844301	44.75578543	47.03502812	44.01745455	44.85588917	44.90726521
Total Sand	#200	55.76660382	55.99492154	54.96492127	52.69501789	55.64188088	54.75420297	54.58832522
Coarse Sand	#10	20.20611848	20.54859506	17.76305383	23.91792308	23.96007524	23.17166677	22.08193032
Medium Sand	#40	28.48263593	26.88441187	27.87347126	22.40618076	26.62861442	26.06812512	25.61279736
Fine Sand	#200	7.07784941	8.561914609	9.328396192	6.370914049	5.053191223	5.514411083	6.893597538
Total Fines	<#200	0.342476584	0.399556015	0.279293299	0.323944782	0.340664577	0.389907854	0.560455084
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving								
Cobbles	3"	0	0	0	0	0	0	0
Coarse Gravel	0.75"	0	0	0	0	0	0	0
Fine Gravel	#4	43.9	43.5	44.8	47.0	44.0	44.9	44.9
Coarse Sand	#10	20.2	20.5	17.8	23.9	24.0	23.2	22.1
Medium Sand	#40	28.5	26.9	27.9	22.4	26.6	26.1	25.6
Fine Sand	#60	5.37	6.56	7.04	4.75	4.03	4.23	5.04
	#140	1.60	1.88	2.18	1.51	0.97	1.17	1.68
	#200	0.11	0.11	0.11	0.11	0.06	0.11	0.17
Total Fines	#230	0.06	0.06	0.06	0.05	0	0.06	0.06
	<#230	0.34	0.34	0.22	0.32	0.34	0.39	0.50
New Fractional Components (%)								
Gravel	#10	64.1	64.0	62.6	70.9	68.0	68.1	67.0
Sand	#230	35.6	35.5	37.3	28.8	31.7	31.7	32.5
Fines	<#230	0.3	0.3	0.2	0.3	0.3	0.4	0.5

- Notes:
- Year 0 grain size analysis was conducted by Alpha.
 - In the new fractional components, gravel is defined as the fraction greater than the #10 sieve, sand is defined as the fraction greater than the #230 sieve, and fines are defined as the fraction less than the #230 sieve.

**Table C-5
Year 1 Grain Size Data**

Plot		Subtidal							
Subplot		ENR				ENR+AC			
Sample ID		LDW-Y1-SU-ENR-CA-CORE	LDW-Y1-SU-ENR-CA-CORE	LDW-Y1-SU-ENR-CA-CORE	LDW-Y1-SU-ENR-CB-CORE	LDW-Y1-SU-ENR-CC-CORE	LDW-Y1-SU-ENR+AC-CA-CORE	LDW-Y1-SU-ENR+AC-CB-CORE	LDW-Y1-SU-ENR+AC-CC-CORE
Classification	Sieve Size								
Fractional Components (%)									
Gravel	#10	22.0	23.2	21.9	22.1	19.9	24.2	20.2	15.2
Very Coarse Sand	#18	19.9	20.3	20.1	20.3	18.6	14.8	17.8	15.4
Coarse Sand	#35	20.5	19.3	20.1	21.2	21.6	18.8	19.9	18.5
Medium Sand	#60	20.3	20.2	19.9	21.5	23.2	20.2	17.2	20.4
Fine Sand	#120	7.80	7.84	7.74	8.20	9.50	7.90	6.20	8.10
Very Fine Sand	#230	1.90	1.99	1.89	1.80	1.90	2.20	1.90	2.20
Total Fines	<#230	7.70	7.19	8.35	5.00	5.30	11.9	16.8	20.2
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction									
	Total Mass (g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Mass Passing #4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving									
Gravel	#10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Very Coarse Sand	#18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Coarse Sand	#35	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medium Sand	#60	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fine Sand	#120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Very Fine Sand	#230	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Fines	<#230	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Fractional Components (%)									
Gravel	#10	22.0	23.2	21.9	22.1	19.9	24.2	20.2	15.2
Sand	230	70.4	69.6	69.7	73.0	74.8	63.9	63.0	64.6
Fines	<#230	7.7	7.2	8.4	5.0	5.3	11.9	16.8	20.2

**Table C-5
Year 1 Grain Size Data**

Plot		Scour					
Subplot		ENR			ENR+AC		
Sample ID		LDW-Y1-SC-ENR-CA-CORE	LDW-Y1-SC-ENR-CB-CORE	LDW-Y1-SC-ENR-CC-CORE	LDW-Y1-SC-ENR+AC-CA-CORE	LDW-Y1-SC-ENR+AC-CB-CORE	LDW-Y1-SC-ENR+AC-CC-CORE
Classification	Sieve Size						
Fractional Components (%)							
Gravel	#10	28.7	41.7	33.0	26.4	34.6	35.5
Very Coarse Sand	#18	20.2	19.3	20.2	18.6	19.1	17.9
Coarse Sand	#35	21.0	18.0	18.8	25.7	20.5	21.7
Medium Sand	#60	15.3	10.3	12.9	18.2	15.4	15.5
Fine Sand	#120	4.20	2.60	3.70	4.10	3.80	4.10
Very Fine Sand	#230	2.00	1.30	2.30	1.10	1.30	1.10
Total Fines	<#230	8.80	6.70	9.30	5.80	5.30	4.20
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction							
	Total Mass (g)	4195	3948	4008	4434	4929	4979
	Mass Passing #4	2061	1961	2079	2698	2515	2331
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving							
Gravel	#10	65.0	71.0	65.2	55.2	66.6	69.8
Very Coarse Sand	#18	9.92	9.59	10.5	11.3	9.75	8.38
Coarse Sand	#35	10.3	8.94	9.75	15.6	10.5	10.2
Medium Sand	#60	7.52	5.12	6.69	11.1	7.86	7.26
Fine Sand	#120	2.06	1.29	1.92	2.49	1.94	1.92
Very Fine Sand	#230	0.98	0.65	1.19	0.67	0.66	0.52
Total Fines	<#230	4.32	3.33	4.82	3.53	2.70	1.97
New Fractional Components (%)							
Gravel	#10	65.0	71.0	65.2	55.2	66.6	69.8
Sand	230	30.8	25.6	30.1	41.2	30.7	28.3
Fines	<#230	4.3	3.3	4.8	3.5	2.7	2.0

**Table C-5
Year 1 Grain Size Data**

Plot		Intertidal								
Subplot		ENR				ENR+AC				
Classification	Sample ID	LDW-Y1-IN-ENR-CA-CORE	LDW-Y1-IN-ENR-CA-CORE	LDW-Y1-IN-ENR-CA-CORE	LDW-Y1-IN-ENR-CB-CORE	LDW-Y1-IN-ENR-CC-CORE	LDW-Y1-IN-ENR+AC-CA-CORE	LDW-Y1-IN-ENR+AC-CB-CORE	LDW-Y1-IN-ENR+AC-CC-CORE	
Fractional Components (%)										
Gravel	#10	22.1	20.6	21.4	29.4	28.5	35.5	34.6	30.7	
Very Coarse Sand	#18	19.0	18.1	19.2	17.7	19.6	18.4	20.9	18.5	
Coarse Sand	#35	24.3	25.5	25.2	22.2	21.8	22.0	22.2	25.5	
Medium Sand	#60	21.6	22.3	21.8	18.1	16.3	14.4	14.6	16.1	
Fine Sand	#120	6.50	6.75	6.36	4.90	4.90	4.40	3.10	3.60	
Very Fine Sand	#230	2.20	2.11	2.06	1.80	2.60	2.50	1.40	2.10	
Total Fines	<#230	4.30	4.61	3.92	5.90	6.30	2.90	3.30	3.50	
Pre-Analytical Laboratory Submission Sieving to Remove Gravel Fraction										
	Total Mass (g)	4938	4938	4938	4968	4174	5103	5123	4721	
	Mass Passing #4	3136	3136	3136	2754	2712	3262	2837	2947	
Fractional Components (%) - Corrected for Pre-Analytical Laboratory Submission Sieving										
Gravel	#10	50.5	49.6	50.1	60.9	53.5	58.8	63.8	56.7	
Very Coarse Sand	#18	12.1	11.5	12.2	9.81	12.7	11.8	11.6	11.5	
Coarse Sand	#35	15.4	16.2	16.0	12.3	14.2	14.1	12.3	15.9	
Medium Sand	#60	13.7	14.2	13.8	10.0	10.6	9.20	8.09	10.1	
Fine Sand	#120	4.13	4.29	4.04	2.72	3.18	2.81	1.72	2.25	
Very Fine Sand	#230	1.40	1.34	1.31	1.00	1.69	1.60	0.78	1.31	
Total Fines	<#230	2.73	2.93	2.49	3.27	4.09	1.85	1.83	2.18	
New Fractional Components (%)										
Gravel	#10	50.5	49.6	50.1	60.9	53.5	58.8	63.8	56.7	
Sand	230	46.7	47.5	47.4	35.8	42.4	39.5	34.5	41.1	
Fines	<#230	2.7	2.9	2.5	3.3	4.1	1.9	1.8	2.2	

Notes:

- Year 1 grain size analysis was conducted by MTC
- In the new fractional components, gravel is defined as the fraction greater than the #10 sieve, sand is defined as the fraction greater than the #230 sieve, and fines are defined as the fraction less than the #230 sieve.