AD-A055 217 ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 13/2
AQUATIC DISPOSAL FIELD INVESTIGATIONS EATONS NECK DISPOSAL SITE--ETC(U)
MAY 78 S P COBB, J R REESE, M A GRANAT

UNCLASSIFIED WES-TR-D-77-6 NL

2 OF 2

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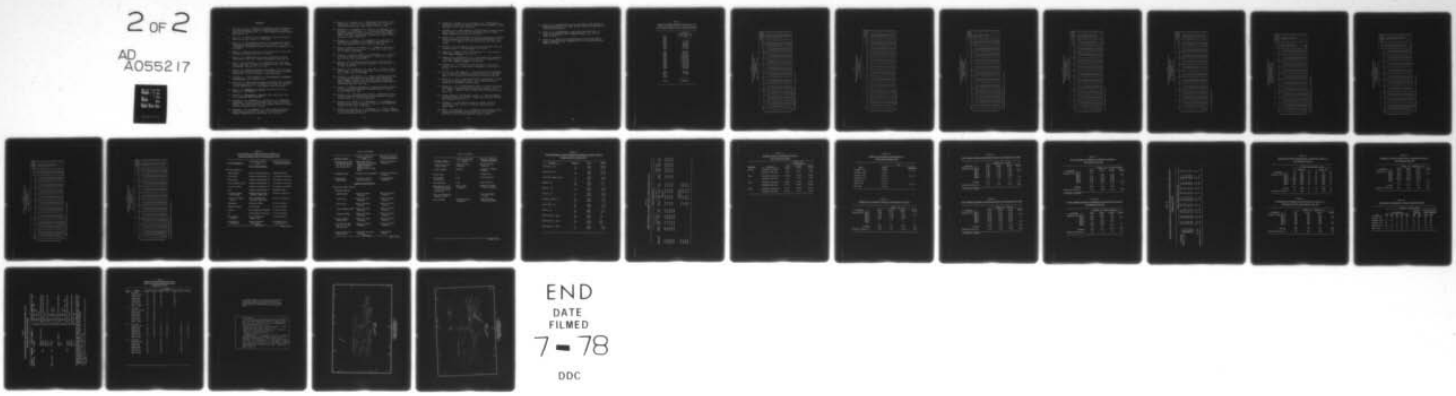

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Table 1

Volume of Dredged Material Disposed at the Eatons Neck Disposal Site, Long Island Sound

Year	Volume of Dredged Material m^3
1954	
1955	7,721
1956	85,433
1957	100,933
1958	99,374
1959	657,867
1960	269,677
1961	134,933
1962	194,339
1963	3,906,652
1964	2,121,799
1965	140,124
1966	1,011,120
1967	433,418
1968	451,651
1969	102,902
1970	38,072
1971	84,859
1972	
1973	
Total	9,840,874

Table 2

Frequency of Flow Velocity Occurrence at Station E N 1,

20-m Depth, Eatons Neck Disposal Site,

10-20 September 1974

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											1.46*	98.52
0 - 5	1.01	0.80	1.46	1.01	1.01	1.57	1.80	2.25	2.13	2.47	15.51	83.03
5 - 10	0.12	0.56	1.01	1.24	2.25	2.13	5.62	5.40	4.16	1.12	23.61	59.03
10 - 15	0.22	0.34	2.02	1.91	0.45	0.12	1.24	5.40	1.70	0.45	13.85	45.57
15 - 20	0.00	0.00	2.36	1.70	0.00	0.12	0.22	3.60	0.80	0.00	8.80	36.77
20 - 25	0.00	0.22	4.16	1.91	0.00	0.00	0.12	4.04	0.45	0.00	10.90	25.87
25 - 30	0.00	0.00	2.58	0.45	0.00	0.00	0.12	4.72	0.67	0.00	8.54	17.33
30 - 35	0.00	0.00	2.36	0.22	0.00	0.00	0.00	4.16	0.12	0.00	6.86	10.47
35 - 40	0.12	0.00	0.91	0.00	0.00	0.00	0.00	5.40	0.00	0.00	6.43	4.04
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.37	0.00	0.00	3.37	0.67
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.00	0.00	0.67	0.00
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.47	1.92	16.86	8.44	3.71	3.94	9.12	39.01	10.03	4.04	100.00	

Note: Total number of observations = 890

* No directions assigned to 0 speed (there were 13 zero-speed readings).

Table 3

Frequency of Flow Velocity Occurrence at Station E N 3,

26-m Depth, Eatons Neck Disposal Site,

9-20 September 1974

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0												
0 - 5	0.00	0.00	0.00	0.00	0.13	0.13	0.13	0.13	0.00	0.37	0.89	99.11
5 - 10	0.88	1.01	0.63	0.13	0.88	0.88	1.39	1.52	0.76	0.37	8.45	90.66
10 - 15	1.77	2.15	0.76	1.64	3.79	3.66	1.39	2.78	3.54	1.77	23.25	67.41
15 - 20	2.27	3.28	1.77	1.01	2.65	3.16	1.64	1.26	0.37	0.63	18.04	49.37
20 - 25	0.51	5.18	2.02	1.01	0.63	2.53	3.91	0.25	0.13	0.37	16.54	32.83
25 - 30	0.00	4.04	1.64	0.00	0.00	0.63	4.67	0.37	0.00	0.00	11.35	21.48
30 - 35	0.13	2.15	0.88	0.00	0.00	0.13	3.16	0.00	0.00	0.00	6.45	15.03
35 - 40	0.00	0.76	0.13	0.00	0.00	0.00	2.40	0.13	0.00	0.00	3.42	11.61
40 - 45	0.00	0.37	0.25	0.00	0.00	0.00	4.04	0.00	0.00	0.00	4.66	6.95
45 - 50	0.00	0.13	0.00	0.00	0.00	0.00	1.52	0.00	0.00	0.00	1.65	5.30
>50	0.00	0.00	0.00	0.00	0.00	0.00	5.30	0.00	0.00	0.00	5.30	0.00
Total	5.56	19.07	8.08	3.79	8.08	11.12	29.55	6.44	4.80	3.51	100.00	

Note. Total number of observations = 792

Table 4

Frequency of Flow Velocity Occurrence at Station E N A

21-m Depth, Eatons Neck Disposal Site,

31 October - 12 December 1974

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											5.60*	94.40
0 - 5	2.25	6.04	5.68	0.83	1.30	1.10	6.51	4.26	1.85	1.89	31.71	62.69
5 - 10	0.24	4.89	3.04	1.10	0.24	0.24	4.78	3.59	1.22	0.16	19.50	43.19
10 - 15	0.32	3.83	4.81	0.32	0.04	0.04	4.30	4.81	0.12	0.00	18.59	24.60
15 - 20	0.00	1.54	2.92	0.08	0.00	0.00	2.13	3.28	0.00	0.00	9.75	14.85
20 - 25	0.00	1.38	1.97	0.08	0.00	0.00	1.70	2.41	0.00	0.00	7.54	7.31
25 - 30	0.00	0.83	1.38	0.00	0.00	0.00	1.97	2.13	0.00	0.00	6.31	1.00
30 - 35	0.00	0.05	0.12	0.00	0.00	0.00	0.47	0.36	0.00	0.00	1.00	0.00
35 - 40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	2.81	18.56	19.92	2.41	1.68	1.38	21.86	20.84	3.19	2.05	100.00	

Note: Total number of observations = 2534

* No direction assigned to 0 speed (there were 142 zero-speed readings).

Table 5

Frequency of Flow Velocity Occurrence at Station E N C,

26-m Depth, Eatons Neck Disposal Site,

31 October - 25 November 1974

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0												
0 - 5	0.56	0.72	0.56	0.17	0.21	0.32	0.84	0.78	0.56	0.39	5.11	94.89
5 - 10	1.90	5.52	4.85	1.67	1.23	1.00	4.79	5.80	3.07	1.84	31.67	63.22
10 - 15	1.45	5.52	3.79	0.45	0.17	0.17	3.29	7.64	0.32	0.39	23.19	40.03
15 - 20	0.00	4.07	2.45	0.06	0.00	0.06	2.01	4.57	0.00	0.00	13.22	26.81
20 - 25	0.00	3.34	3.18	0.00	0.00	0.00	1.11	4.63	0.00	0.00	12.26	14.55
25 - 30	0.06	1.73	2.17	0.00	0.00	0.00	1.06	4.96	0.00	0.00	9.98	4.57
30 - 35	0.00	0.06	0.00	0.00	0.00	0.00	0.56	3.40	0.00	0.00	4.02	0.55
35 - 40	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.32	0.00	0.00	0.43	0.12
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.00	0.00	0.12	0.00
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Total	3.97	20.96	17.00	2.35	1.61	1.65	13.83	32.16	3.95	2.62	100.00	

Note: Total number of observations = 1794

Table 6

Frequency of Flow Velocity Occurrence at Station E N 5,

32-m Depth, Eatons Neck Disposal Site,

9-20 September 1974

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0												
0 - 5	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.25	0.00	0.38	99.62
5 - 10	0.50	0.75	0.88	1.51	0.25	0.38	0.25	0.13	0.88	0.25	5.78	93.84
10 - 15	1.13	3.40	3.02	1.26	1.89	2.01	0.88	2.14	3.14	1.13	20.00	73.84
15 - 20	1.13	4.53	5.28	1.38	1.13	2.52	1.26	4.28	3.14	1.51	26.16	47.68
20 - 25	0.00	4.65	7.17	0.50	0.00	3.40	2.89	4.03	1.13	0.25	24.02	23.66
25 - 30	0.00	2.01	4.65	0.00	0.00	1.01	1.89	4.15	0.00	0.00	13.71	9.95
30 - 35	0.00	0.38	0.25	0.00	0.00	0.38	2.39	1.76	0.00	0.00	5.16	4.79
35 - 40	0.00	0.00	0.00	0.00	0.00	0.00	1.38	1.13	0.00	0.00	2.51	2.28
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	1.64	0.38	0.00	0.00	2.02	0.26
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.00	0.00	0.36	0.00
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.76	15.72	21.25	4.78	3.37	9.70	12.71	18.13	8.54	3.14	100.00	

Note: Total number of observations = 795

Table 7

Frequency of Flow Velocity Occurrence at Station E N A,

22-m Depth, Eatons Neck Disposal Site,

18 December 1974 - 10 January 1975

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											4.55*	95.45
0 - 5	2.06	5.70	10.25	2.79	1.94	3.34	7.83	7.34	2.25	1.27	44.79	95.45
5 - 10	0.43	3.28	4.79	1.03	0.43	1.64	6.49	3.88	1.46	0.36	23.79	50.66
10 - 15	0.00	2.18	3.28	0.12	0.00	0.06	3.28	2.85	0.24	0.00	12.01	14.86
15 - 20	0.00	1.15	1.46	0.00	0.00	0.00	3.09	1.15	0.00	0.00	6.85	8.01
20 - 25	0.00	0.67	1.64	0.00	0.00	0.00	1.58	1.15	0.00	0.00	5.04	2.97
25 - 30	0.00	0.12	0.55	0.00	0.00	0.00	1.27	0.18	0.00	0.00	2.12	0.85
30 - 35	0.00	0.06	0.06	0.00	0.00	0.00	0.43	0.30	0.00	0.00	0.85	0.00
35 - 40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Total	2.49	13.16	22.03	3.94	2.47	5.04	23.97	16.85	3.95	1.63	100.00	

Note: *Total number of observations* = 1648

* No directions assigned to 0 speed (there were 75 zero-speed readings).

Table 8

Frequency of Flow Velocity Occurrence at Station E N A,

22-m Depth, Eatons Neck Disposal Site,

3 March - 10 April 1975

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											0.81*	99.19
0 - 5	0.32	1.62	3.34	0.41	0.27	0.72	2.34	3.20	0.41	0.27	12.90	86.29
5 - 10	2.07	3.92	3.02	2.07	2.12	1.58	4.55	2.34	2.34	1.85	25.86	60.43
10 - 15	0.50	3.61	4.82	0.99	0.23	0.23	3.38	4.37	1.80	0.46	20.39	40.04
15 - 20	0.00	3.16	4.96	0.09	0.00	0.00	1.94	5.05	0.23	0.00	15.43	24.61
20 - 25	0.00	1.35	4.51	0.00	0.00	0.00	3.07	5.37	0.00	0.00	14.30	10.31
25 - 30	0.00	0.81	2.25	0.00	0.00	0.00	0.99	2.89	0.05	0.00	6.97	3.34
30 - 35	0.00	0.05	0.54	0.00	0.00	0.00	0.54	0.72	0.00	0.00	1.85	1.49
35 - 40	0.00	0.00	0.23	0.00	0.00	0.00	0.54	0.63	0.00	0.00	1.40	0.09
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Total	2.89	14.52	23.67	3.56	2.62	2.53	17.44	24.57	4.83	2.58	100.00	

Note: Total number of observations = 2218

* No directions assigned to 0 speed (there were 18 zero-speed readings).

Table 9

Frequency of Flow Velocity Occurrence at Station E N N,

20-m Depth, Eatons Neck Disposal Site,

15 April - 7 May 1975

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											2.63*	97.37
0 - 5	0.06	0.00	0.5[illegible]	1.07	0.25	0.19	0.25	1.82	0.25	0.14	4.97	92.40
5 - 10	1.44	0.75	3.01	4.08	3.14	2.38	1.19	4.96	3.58	2.13	26.66	65.74
10 - 15	1.32	2.82	4.83	2.70	2.20	1.19	3.76	6.46	1.51	0.82	27.61	38.13
15 - 20	0.00	1.69	4.20	0.63	0.06	0.19	3.58	4.96	0.50	0.00	15.81	22.32
20 - 25	0.00	1.25	5.83	0.06	0.00	0.00	1.25	5.14	0.00	0.00	13.53	8.79
25 - 30	0.00	0.82	2.51	0.00	0.00	0.00	0.00	2.45	0.00	0.00	5.84	2.95
30 - 35	0.00	0.38	0.94	0.00	0.00	0.00	0.00	0.25	0.00	0.00	1.57	1.38
35 - 40	0.00	0.06	1.19	0.00	0.00	0.00	0.00	0.13	0.00	0.00	1.38	0.00
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total	2.82	7.77	23.45	8.60	5.65	3.95	10.03	26.17	5.84	3.09	100.00	

Note: Total number of observations = 1594

* No directions assigned to 0 speed (there were 42 zero-speed readings).

Table 10

Frequency of Flow Velocity Occurrence at Station E N N,

20-m Depth, Eatons Neck Disposal Site,

9-19 May 1975

Magnetic Compass Direction, deg - Frequency

Speed cm/sec	0 - 36	36 - 72	72 - 108	108 - 144	144 - 180	180 - 216	216 - 252	252 - 288	288 - 324	324 - 360	% Occurence (A)	% Greater than Indicated Speed Interval (100-A)
0											0.21*	99.79
0 - 5	0.14	0.83	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.59	98.20
5 - 10	2.35	5.39	1.11	0.41	1.45	0.76	0.07	0.21	0.48	0.69	12.92	85.28
10 - 15	2.70	4.84	2.63	2.84	4.98	5.33	1.04	0.83	1.73	1.18	28.10	57.18
15 - 20	0.14	3.18	4.77	1.24	1.73	4.84	1.94	1.80	0.41	0.00	20.05	37.13
20 - 25	0.00	4.77	3.53	0.07	0.48	1.52	6.02	3.18	0.07	0.00	19.64	17.49
25 - 30	0.00	3.04	0.62	0.14	0.00	0.48	6.22	1.73	0.00	0.00	12.23	5.26
30 - 35	0.00	0.35	0.14	0.00	0.00	0.14	1.87	0.41	0.00	0.00	2.91	2.35
35 - 40	0.00	0.41	0.07	0.07	0.00	0.00	1.31	0.07	0.00	0.07	2.00	0.35
40 - 45	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.21	0.14
45 - 50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14
>50	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.14	0.00
Total	4.33	22.81	13.42	4.84	8.64	13.07	18.82	8.23	2.69	1.94	100.00	

Note: Total number of observations = 1446

* No directions assigned to 0 speed (there were 3 zero-speed readings).

Table 11

Water Quality and Sediment Chemistry Variables and Analytical Methods Used for the Eatons Neck Study

Variable Sampled	Laboratory Equipment Used	Laboratory Analytical Procedure Followed
	Water Column Chemistry	
Nutrient Analyzed:		
Ammonium NH_4^+	Technicon Autoanalyzer II	Indophenol method
Nitrate NO_3^-	Technicon Autoanalyzer II	Colorimetric procedure
Nitrate NO_2^-	Technicon Autoanalyzer II	Colorimetric procedure
Total phosphate PO_4^{3-}	Technicon Autoanalyzer II	Colorimetric procedure
Silicate $Si(OH)_4$	Technicon Autoanalyzer II	Colorimetric procedure
Urea	Technicon Autoanalyzer II	McCarthy method
Dissolved organic carbon (DOC)	Bechman Organic Carbon Analyzer (Model 915)	Catalytic combustion
Particulate organic carbon	Hewlett-Packard CHN Analyzer (Model 185)	Catalytic combustion
Temperature	Thermistor Sensor	In situ procedure
Dissolved oxygen	YSI Electrode	In situ procedure
Salinity	Bisset-Berman Salinograph	In situ procedure
pH	Corning Model 12 pH meter	In situ procedure
Chlorophyll *a* (in vivo)	Turner Flourometer (Model 110)	In situ procedure
Chlorophyll *a* (extraction)	Turner Fluorometer (Model 110)	Trichromatical and fluorometrical

(Continued)

Table 11 (Continued)

Variable Sampled	Laboratory Equipment Used	Laboratory Analytical Procedure Followed
Dissolved and particulate metals (Ag, Cd, Co, Cr, Cu, Hg, Ni, Pb) (Fe, Mn, Zn)	Perkin Elmer Atomic absorption spectrometer (Model 403) heated graphite atomic directly into air-C_2H_2 flame	Details of methods in Appendix B
Suspended matter	Nuclepore filter apparatus	Filtration drying and weighing
Particle-size distribution	Zeiss Particle Size Analyzer (TG2-3)	Photomicrographic techniques
	Sediment Physicochemistry	
Interstitial water analysis		
Nutrients analyzed:		
Ammonium NH_4^+	Same as for water chemistry	Same as for water chemistry
Nitrate NO_3^-	Same as for water chemistry	Same as for water chemistry
Nitrite NO_2^-	Same as for water chemistry	Same as for water chemistry
Total phosphate PO_4^{3-}	Same as for water chemistry	Same as for water chemistry
Silicate $Si(OH)_4$	Same as for water chemistry	Same as for water chemistry
Dissolved Organic Carbon (DOC)	Same as for water chemistry	Same as for water chemistry
Interstitial metals (Cd, Cu, Ni, Pb) (Fe, Mn, Zn)	Same as for water chemistry	Same as for water chemistry
Sediment grain-size distribution	Grain-size sieves and pipettes	Sieve-pipette method

(Continued)

Table 11 (Concluded)

Variable Sampled	Laboratory Equipment Used	Laboratory Analytical Procedure Followed
Particulate carbon and nitrogen	Same as for water chemistry	Same as for water chemistry
Total sulfides	Titration	Titrimetric (iodine) methods
Percent water	--	Gravimetrical
Clay-fraction mineralogy	X-ray	X-ray defraction
Bulk mineralogy	X-ray	X-ray defraction
Heavy metals of bulk samples (Ag, Cd, Co, Ci, Cu, Fe, Hg, Mn, Ni, Pb, Zn)	Same as water chemistry	Digestion the same as water chemistry
Total cation exchange capacity (TCEC)	--	Cations exchanged for NH_4-
Oil and grease	Separatory filter apparatus	Simplified ether extraction method

Table 12

Selected Ranges for Water Chemistry Variables, Diurnal Study at Disposal Site D, October 1974

Variable	Depth, m	Time	Value
Salinity, o/oo	1	1056	28.10
	29	2236	28.55
Temperature, ^{o}C	1	1056	13.83
	10	1620	14.42
Dissolved Oxygen, mg/ℓ	1	1408	8.51
	10	0837	7.61
Ammonia, µM	20	1408	12.7
	29	2236	0.2
Nitrite, µM	1	1620	2.14
	29	2236	3.25
Nitrate, µM	1	1620	9.26
	20	0837	6.16
Dissolved PO_4^{3-}, µM	10	1620	3.45
	20	0350	3.13
Total PO_4^{3-}, µM	20	1408	2.75
	20	2032	4.50
Silica, µM	20	1408	6.0
	20	2032	16.1
Particulate N, µg/ℓ	10	1056	24
	29	1620	74
Particulate C, µg/ℓ	10	2236	120
	29	1620	768
Chlorophyll *a*, µg/ℓ	1	1620	6.32
	10	0837	1.32

Table 13

Temporal Variation of the Sediment Texture at Reference Stations A and Al

Depth (cm)	Time - Type Material, %											
	4 Nov. 1974				5 Jan. 1975				22 May 1975			
	Gravel	Sand	Silt	Clay	Gravel	Sand	Silt	Clay	Gravel	Sand	Silt	Clay
					Station A							
0-10	0.00	3.51	66.71	29.71	2.48	26.82	48.94	21.76	0.00	25.88	46.82	27.30
10-30	0.00	2.79	63.90	33.31	0.79	42.99	31.53	24.69	9.35	22.02	39.00	29.58
30-50	0.00	3.21	66.00	30.46	0.26	48.19	29.11	22.44	0.00	47.89	25.04	27.07
50-70	0.00	11.26	64.99	23.82	0.26	30.93	36.23	32.22	0.08	50.51	26.28	23.13
70-90	0.00	11.26	64.99	23.82								
					Station Al							
0-10					3.05	26.08	38.62	32.25				
10-30					1.91	31.62	35.51	30.96				
30-50					0.68	39.16	31.02	29.14				
50-60					0.35	45.92	31.99	21.74				

Table 14

Sediment Texture at Reference Station A and Disposal Site DSA

Material	Location	Depth, cm - % of Material 0-10	10-30	30-50
Gravel	Reference Station A	0.00	9.35	0.00
	Disposal Site DSA	1.02	0.11	0.12
Sand	Reference Station A	25.88	22.02	47.89
	Disposal Site DSA	7.78	5.87	6.20
Silt	Reference Station A	48.82	39.00	25.04
	Disposal Site DSA	77.55	66.66	62.56
Clay	Reference Station A	27.30	29.58	27.07
	Disposal Site DSA	13.65	27.37	31.12

Table 15

Ranges of pH in Water and Sediments at Eatons Neck Disposal Site

Date	pH	
	Water	Sediments
November 1974	7.8-8.1	7.4-7.9
December 1974	7.8-8.3	-
January 1975	8.0-8.1	6.1-7.8
February 1975	7.8-7.9	-
March 1975	7.7-8.3	-
April 1975	8.1-8.4	7.2-7.9
May 1975	7.8-8.4	-

Table 16

Sediment pH at Reference Station A and Disposal Site DSA

Location	Depth, cm - pH			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	7.80	7.72	7.36	-
DSA-2	7.90	7.76	7.70	7.61
DSA-3	7.83	7.70	7.62	-
DSA-4	7.89	7.80	7.53	-
DSA-B	-	-	-	-
DSA-C	-	-	-	-
Average	7.86	7.74	7.55	7.61
Reference Station A	7.58	7.52	7.40	7.18

Table 17

Total Organic Carbon at Reference Station A and Disposal Site DSA

Location	Depth, cm - % TOC*			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	2.07	1.58	0.69	-
DSA-2	1.87	1.13	1.00	0.88
DSA-3	2.13	1.39	1.24	-
DSA-4	1.96	1.33	1.24	-
DSA-B	1.62	1.79	1.18	-
DSA-C	2.35	2.00	1.42	1.23
Average	2.0	1.5	1.1	1.0
Reference Station A	1.30	0.54	0.60	0.82

* Percent by weight.

Table 18

Total Organic Nitrogen at Reference Station A and Disposal Site DSA

Location	Depth, cm - TON, %*			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	0.24	0.19	0.10	-
DSA-2	0.24	0.14	0.13	0.12
DSA-3	0.20	0.17	0.15	-
DSA-4	0.21	0.16	0.15	-
DSA-B	0.20	0.22	0.16	-
DSA-C	0.26	0.14	0.17	0.15
Average	0.22	0.17	0.14	0.14
Reference Station A	0.17	0.10	0.08	0.10

* Percent by weight.

Table 19

Oil and Grease in Sediments at Reference Station A and Disposal Site DSA

Location	Depth, cm - Oil and Grease*			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	0.11	-	-	-
DSA-2	-	0.08	0.16	0.12
DSA-3	0.16	0.15	0.09	-
DSA-4	0.14	0.21	0.09	-
DSA-B	0.16	0.08	0.19	-
DSA-C	0.29	0.05	0.08	0.03
Average	0.17	0.11	0.12	-
Reference Station A	0.13	0.04	0.03	0.03

* Percent by weight.

Table 20

Cation Exchange Capacity of Sediments from Reference Station A and Disposal Site DSA

Location	Depth, cm - CEC, meq/100 g			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	27.6	18.0	15.5	-
DSA-2	10.3	16.9	8.7	10.6
DSA-3	99.6	4.3	5.6	-
DSA-4	-	10.0	14.1	-
DSA-B	31.5	18.0	-	-
DSA-C	38.5	17.6	10.6	8.5
Average	41.5	14.1	10.9	9.5
Reference Station A	13.4	4.2	6.4	4.2

Table 21

Total Metal Concentrations in the 0 to 10-cm Layer at Reference Station A and Disposal Site DSA

Location	Metal Concentrations, µg/g									
	Fe	Mn	Hg	Cd	Cu	Ni	Pb	Zn	Cr	Co
Disposal Site DSA-1	1.87	514	0.50	0.9	155.8	23	63	278	100.0	9
DSA-2	2.04	684	0.49	1.0	141.9	26	71	277	98.2	11
DSA-3	1.83	748	0.36	0.4	123.0	21	57	239	52.4	9
DSA-4	1.78	554	0.42	0.4	112.0	21	45	193	78.8	9
DSA-B	2.03	623	0.46	0.6	135.6	24	65	259	102.9	10
DSA-C	1.99	596	0.33	0.8	127.4	23	62	273	89.5	9
Average	1.92	620	0.44	0.7	133	23	60	253	87	10
Reference Station A	1.52	485	0.33	0.6	96.1	17	51	185	62.4	9

Table 22

Interstitial Metal Concentrations at Reference Station A and Disposal Site DSA

Location	Metal Concentration, µg/l					
	0-10 cm			10-30 cm		
	Fe	Mn	Zn	Fe	Mn	Zn
Disposal Site DSA-1	53	2930	11	56	2450	15
DSA-2	70	3950	15	35	3100	27
DSA-3	2970	4930	30	140	2970	38
DSA-4	218	2950	11	32	3110	0
DSA-B	84	5570	11	67	4930	15
DSA-C	968	2530	48	21	2390	17
Average	727	3810	21	59	3158	19
Reference Station A	25	3680	22	20	1500	20

Table 23

Concentration of Ammonia in the Interstitial Waters at Reference Station A and Disposal Site DSA

Location	Depth, cm - Ammonia, µM			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	670	890	700	-
DSA-2	750	750	830	650
DSA-3	520	510	480	-
DSA-4	520	630	690	-
DSA-B	870	680	650	660
DSA-C	760	700	550	-
Average	680	690	650	660
Reference Station A	360	400	280	300

Table 24

Phosphate in Interstitial Water at Reference Station A and Disposal Site DSA

Location	Depth, cm - Phosphate, µM			
	0-10	10-30	30-50	50-60
Disposal Site DSA-1	72.8	129.8	137.5	-
DSA-2	94.8	78.8	102.5	135.5
DSA-3	65.8	87.8	85.3	-
DSA-4	49.5	172.0	128.5	-
DSA-B	212.5	126.3	57.8	-
DSA-C	25.8	87.5	100.3	103.3
Average	87	114	102	119
Reference Station A	45.8	63.8	45.8	46.3

Table 25

Percent Sand in Sediment at Benthic Sampling Stations

Date	Station - Percent Sand								
	Mud Stations					Budd Reef Stations		Cable and Anchor Reef Stations	
	EB1	EB2	EB3	EB4	EB5	EB6	EB9	EB7	EB8
October 1974	4	7	8	36	14	47	84	90	79
December 1974	11	30	9	27	11	70	74	87	90
January 1975	21	2	8	65	19	19	19	61	95
February 1975	18	15	15	21	54	37	92	71	93
April 1975	14	10	8	13	5	72	42	75	53

Table 26

Statistical Comparisons of Macrofaunal Total Density and Number of Taxa at Disposal Site and Reference Stations*

Variable	Assemblage	Time of Sampling	Statistical Comparisons (P < 0.05)**
Total Density	Mud	December	EB1 ≡ EB2 ≡ EB4 ≡ EB11 ≡ EB12
			EB3 ≡ EB2 ≡ EB1 ≡ EB4
			EB3 > EB11 ≡ EB12†
		January, February, April	No significant difference among stations
	Sand	December	No significant difference among stations
		January	EB8 ≡ EB10 > EB7
		February	No significant difference among stations
		April	EB7 ≡ EB8 < EB10
Number of Taxa	Mud	December	EB3 > EB1 ≡ EB11 ≡ EB12
			EB1 ≡ EB2 ≡ EB4 ≡ EB11 ≡
			EB3 ≡ EB2 ≡ EB4
		January, February	No significant difference among stations
		April	EB1 > EB3 ≡ EB12
			EB1 ≡ EB2 ≡ EB4 ≡ EB11
			EB2 ≡ EB3 ≡ EB2 ≡ EB4 ≡ EB11 ≡ EB12
	Sand	December	No significant difference among stations
		January	EB8 > EB7 ≡ EB10
		February	No significant difference among stations
		April	EB10 > EB7 ≡ EB8

* Disposal site stations were EB1, EB2, and EB4 for the mud assemblage and EB7 and EB8 for the Cable and Anchor Reef sand assemblage. Reference stations were EB3, EB11, and EB12 for the mud assemblages and EB10 for the Cable and Anchor Reef sand assemblage.

** Scheffé's method of linear contrast used.

† The > sign indicates a statistically significant greater value at the 5-percent level of probability.

Table 27

Statistical Analysis for Length of Winter Flounder
Collected for the Eatons Neck Aquatic Disposal Site
November 1974 - June 1975

Station	Parameter	Date Sampled						
		23 Dec 74	22 Jan 75	21 Feb 75	2 Apr 75	15 Apr 75	28 Apr 75	14 May 75
EF1	Mean length	163	117	119	-	165		
	Standard deviation	34	45	42	-	41		
	Median length	167	100	108	-	182		
	Maximum length	264	254	251	-	217		
	Minimum length	90	60	63	-	89 > 1		
	Upper 95% limit	170	126	127	-	188		
	Lower 95% limit	155	108	110	-	142		
	Number in sample	90	105	95	-	15		
EF2	Mean length	148	122	-	-	-		
	Standard deviations	47	40	-	-	-		
	Median length	153	115	-	-	-		
	Maximum length	207	230	-	-	-		
	Minimum length	75	50	-	-	-		
	Upper 95% limit	174	129	-	-	-		
	Lower 95% limit	122	115	-	-	-		
	Number in sample	15	115	-	-			
EF3	Mean length	182	159	132	172	-	185	169
	Standard deviation	53	52	48	40	-	22	44
	Median length	178	150	117	170	-	188	169
	Maximum length	380	275	244	290	-	215	230
	Minimum length	71	80	80	80	-	135	95
	Upper 95% limit	193	171	151	181	-	197	197
	Lower 95% limit	170	147	112	162	-	173	141
	Number in sample	79	72	26	72	-	15	12
EF4	Mean length	171	-	143	-	-	143	-
	Standard deviation	38	-	37	-	-	33	-
	Median length	176	-	150	-	-	145	-
	Maximum length	231	-	219	-	-	191	-
	Minimum length	97	-	64	-	-	89	-
	Upper 95% limit	186	-	154	-	-	162	-
	Lower 95% limit	156	-	133	-	-	125	-
	Number in sample	28	-	53	-	-	15	-

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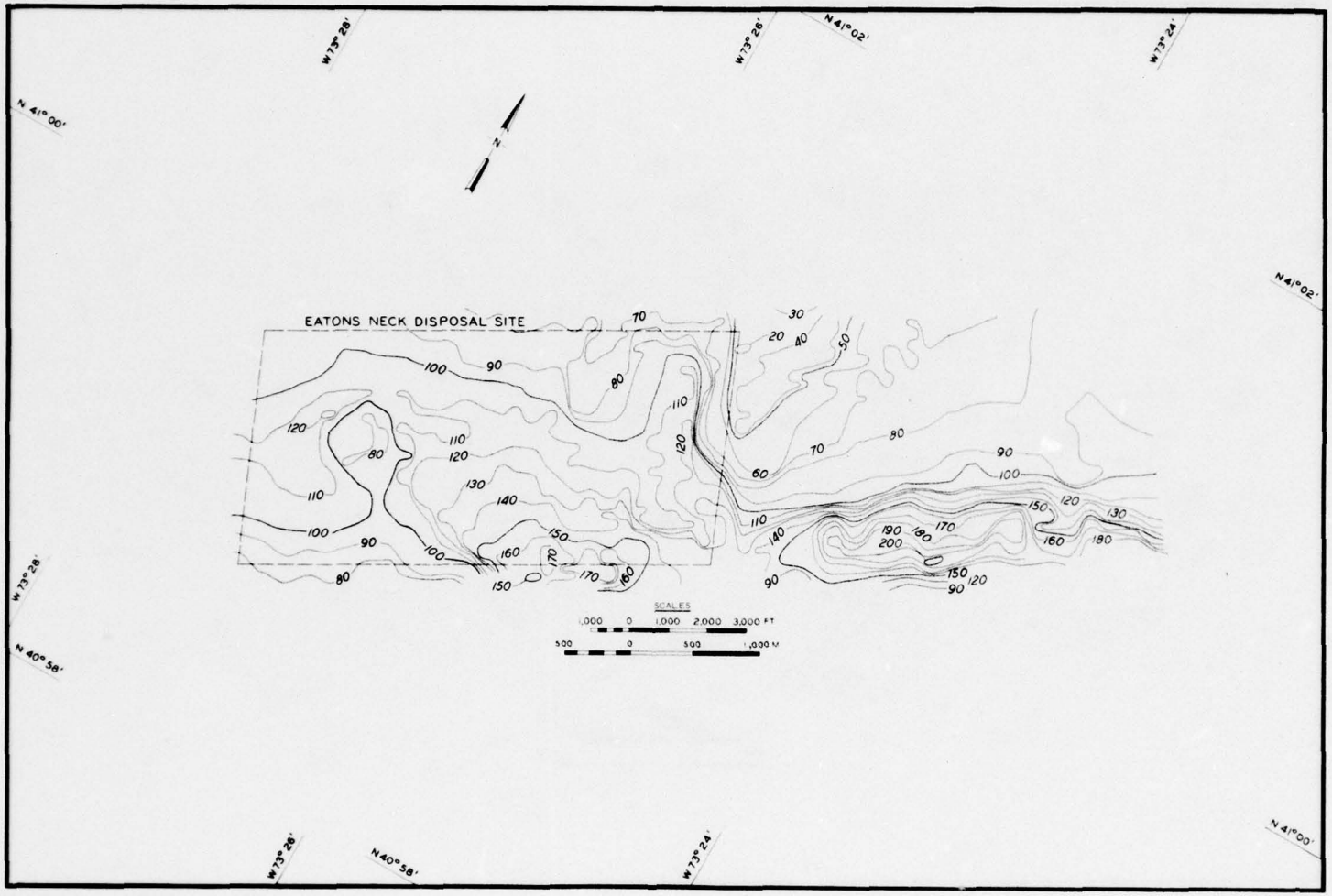
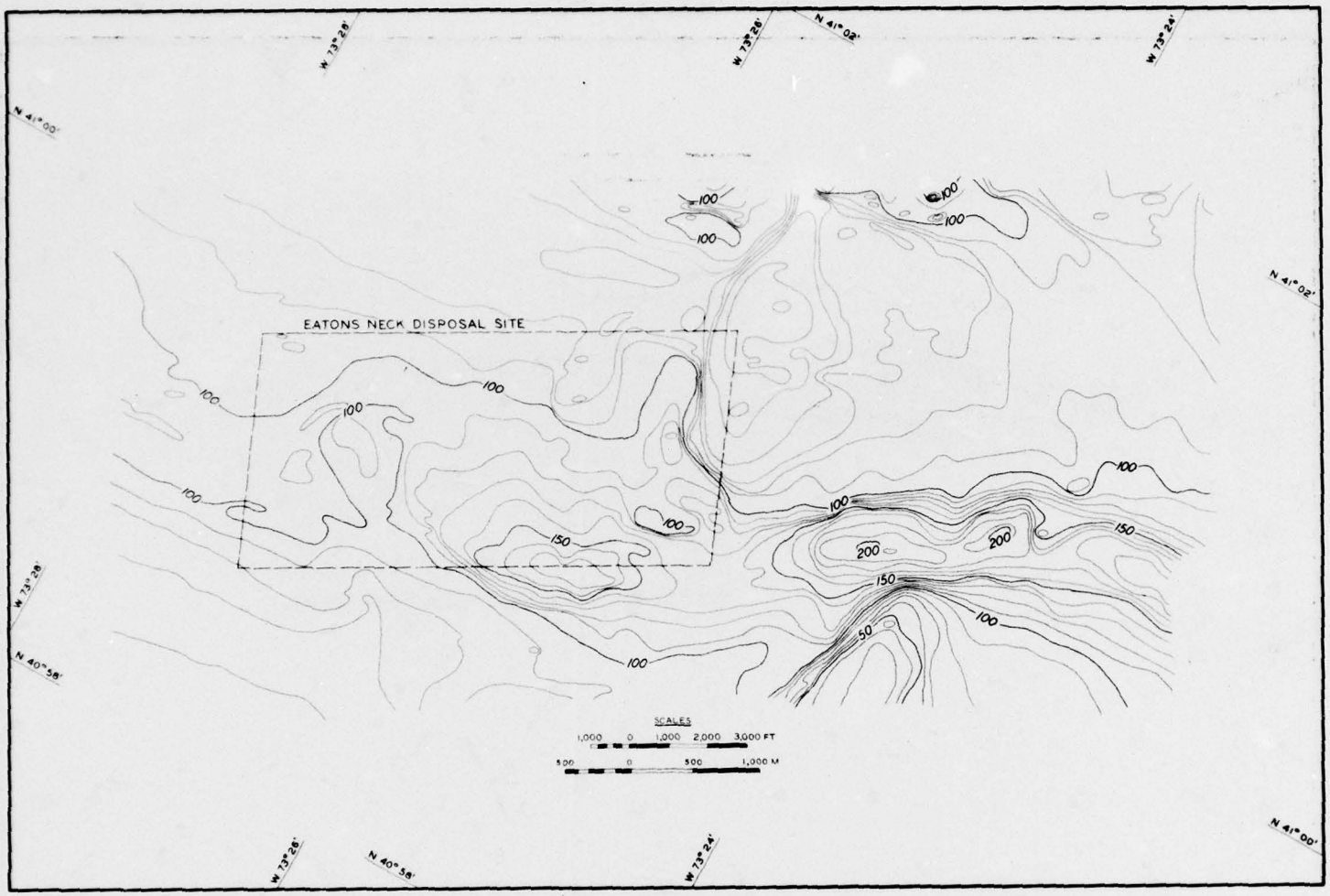
Aquatic disposal field investigations, Eatons Neck Disposal Site, Long Island Sound; an environmental inventory / by S. P. Cobb ... [et al.]. Vicksburg, Miss. : U. S. Waterways Experiment Station ; Springfield, Va. : available from National Technical Information Service, 1978.
94, [24] p. : ill. ; 27 cm. (Technical report - U. S. Army Engineer Waterways Experiment Station ; D-77-6)
Prepared for Office, Chief of Engineers, U. S. Army, Washington, D. C., under DMRP Work Unit No. 1A06.
Appendices A-F published separately.
References: p. 91-94.
1. Dredged material. 2. Dredged material disposal. 3. Eatons Neck disposal site. 4. Environmental effects. 5. Field investigations. 6. Sedimentation. 7. Waste disposal sites. I. Carroll, Joe H., joint author. II. Granat, Mitchell Allen, joint author. III. Holliday, Barry W., joint author. IV. Klehr, E. H., joint author. V. Reese, J. R., joint author. VI. United States. Army. Corps of Engineers. VII. Series: United States. Waterways Experiment Station, Vicksburg, Miss. Technical report ; D-77-6.
TA7.W34 no.D-77-6



OVERLAY 1. BATHYMETRY OF
THE EATONS NECK DISPOSAL SITE
BASED ON A 1961 SURVEY



OVERLAY 2. BATHYMETRY OF
THE EATONS NECK DISPOSAL SITE
BASED ON A 1976 SURVEY