

APPENDIX III

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Site:	NBH
Round:	42
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NEW BEDFORD HARBOR PILOT STUDY



PRE-OPERATIONAL MONITORING - PROGRESS REPORT:

SDMS DocID 000200376

Suspended Solids Measurements in New Bedford Harbor

K. John Scott

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## Introduction and Methods

Suspended solids measurements were made as part of the New Bedford Harbor Pilot Study. These data were collected during two pre-operational periods in early July and late September, 1987, representing dry and wet rainfall periods, respectively.

Four stations within the Harbor (Figure 1) were sampled on the following dates: 8, 9 July and 24, 28 September, 1987. Samples were also collected on 13 July at Station 2. At Stations NBH-1, 3 and 4, water samples were taken at the surface, middle and bottom water depths at five hourly intervals over each phase of the tide. Equal volumes were collected at each depth and composited into the hourly sample. Sampling times were set to begin one hour after slack high (H+1) and one hour after slack low tide (L+1). At Station NBH-2, hourly water samples were collected at two locations on the east and west side of the Harbor at three water depths and composited according to current flow at each of the six strata.

For each hourly composite, 500 mls of water were filtered through preweighed 0.45um glass fiber filters, followed by three successive 10 ml DI rinses to remove salt. Each sample was dried for at least three hours and reweighed to the nearest 0.01mg.

## Results

Suspended solids concentrations for the early July collections are shown in Tables 1, 2 and 3. On 8 July, concentrations ranged from 3.8 to 17.0 mg/l with a trend for Station NBH-3 to have higher concentrations than Stations NBH-1 and NBH-4. On 9 July suspended solids levels ranged from 4.4 to 21.8 mg/l with the same trend evident for station 3. On both days,

extremely high concentrations were observed three times: NBH-1 L+4, NBH-2 H+4 on 8 July and NBH-4 H+4 on 9 July. These data are not at all consistent with the remaining data set and are considered outliers representing a sampling contamination. There did not appear to be any consistent trend in the hourly samples (Figures 2, 3, 4) except that mean ebb concentrations were usually lower than mean flood concentrations (Table 4). These data may be interpreted to support the contention that there is net particle transport into the Harbor.

Suspended solids concentrations for the late September collections are shown in Tables 5 and 6. On 24 and 28 September, levels ranged from 4.4 to 15.9 and 3.3 to 9.4 mg/l, respectively. There were no consistent trends in suspended solids concentrations by station, hour (Figures 6 and 7) or tidal phase (Table 7). Two values that were considered to be outliers occurred on 24 September at NBH-1 L+3 and NBH-2 at L+2.

On 24 September the vertical and horizontal suspended solids distribution was measured at NBH-2. These data are presented in Table 8. There does not appear to be any spatial trend in the data. It is noteworthy that the hourly composite values of 6.6 and 5.8 mg/l (Table 5) for the H+3 and L+3 sample intervals are generally lower than these sample data. This discrepancy may reflect the smaller sample size for the samples reported in Table 8 (200-300 ml).

Table 1. New Bedford Harbor suspended solids concentrations - 8 July 1987.

TIDAL CONDITION	CONCENTRATION (mg/l)			
	STATION			
	NBH-1	NBH-2	NBH-3	NBH-4
H+ 2	6.3	10.6	11.1	3.8
H+ 3	4.0	6.9	6.7	5.4
H+ 4	4.5	36.6*	11.3	7.9
H+ 5	4.8	6.5	9.7	4.8
L+ 1	7.4	8.2	14.0	6.8
L+ 2	6.8	10.6	17.0	5.0
L+ 3	8.4	12.0	12.2	6.1
L+ 4	54.8*	11.4	7.1	5.4
L+ 5	11.2	8.6	6.7	9.9
H+ 1	8.5	7.5	11.6	4.8
Mean	6.9	9.1	10.7	6.0
(SD)	(2.3)	(2.0)	(3.3)	(1.8)

\* data are considered outliers and are not entered into Mean concentration calculations.

Table 2. New Bedford Harbor suspended solids concentrations - 9 July 1987.

TIDAL CONDITION	CONCENTRATION (mg/l)			
	STATION			
	NBH-1	NBH-2	NBH-3	NBH-4
H+ 1	6.8	7.8	7.4	4.4
H+ 2	5.9	8.3	8.2	6.2
H+ 3	4.3	6.3	7.8	5.6
H+ 4	7.9	8.5	8.8	49.6*
H+ 5	5.5	7.9	10.2	5.9
L+ 1	5.5	7.6	9.8	6.6
L+ 2	7.5	10.2	11.3	8.8
L+ 3	7.4	9.4	22.0	6.6
L+ 4	9.9	10.3	9.6	6.2
L+ 5	9.4	9.6	21.8	7.2
Mean	7.0	8.6	11.7	6.4
(SD)	(1.8)	(1.3)	(5.5)	(1.2)

\* data are considered outliers and are not entered into Mean concentration calculations.

Table 3. New Bedford Harbor suspended solids concentrations - 13 July 1987.

TIDAL CONDITION	CONCENTRATION (mg/l)
	STATION NBH-2
L+ 2	7.1
L+ 3	7.0
L+ 4	6.4
L+ 5	9.0
H+ 1	9.8
H+ 2	9.3
H+ 3	8.4
H+ 4	7.7
H+ 5	6.5
L+ 1	7.4
Mean	7.9
(SD)	(1.2)

Table 4. New Bedford Harbor suspended solids concentrations (Mean  $\pm$  SD) - 8, 9, 13 July 1987.

STATION	CONCENTRATION (mg/l)	
	EBB	FLOOD
<u>8 JULY 87</u>		
NBH-1	5.6 $\pm$ 1.8	8.4 $\pm$ 1.9 (n=4)
NBH-2	7.9 $\pm$ 1.9 (n=4)	10.2 $\pm$ 1.7
NBH-3	10.1 $\pm$ 2.0	11.4 $\pm$ 4.5
NBH-4	5.4 $\pm$ 1.6	6.6 $\pm$ 1.9
<u>9 JULY 87</u>		
NBH-1	6.1 $\pm$ 1.3	7.9 $\pm$ 1.8
NBH-2	7.8 $\pm$ 0.8	9.4 $\pm$ 1.1
NBH-3	8.5 $\pm$ 1.1	15.0 $\pm$ 6.4
NBH-4	5.5 $\pm$ 0.8 (n=4)	7.1 $\pm$ 1.0
<u>13 July 87</u>		
NBH-2	8.3 $\pm$ 1.3	7.4 $\pm$ 1.0

Table 5. New Bedford Harbor suspended solids concentrations - 24 Sept 1987.

TIDAL CONDITION	CONCENTRATION (mg/l)			
	STATION			
	NBH-1	NBH-2	NBH-3	NBH-4
L+ 4	8.1	6.7	9.4	6.8
L+ 5	8.7	8.4	8.0	6.9
H+ 1	7.9	9.2	7.8	7.3
H+ 2	8.9	7.7	7.1	8.5
H+ 3	7.6	6.6	8.0	10.0
H+ 4	9.2	6.9	9.2	5.9
H+ 5	9.3	6.9	8.9	7.8
L+ 1	8.2	6.3	10.9	5.5
L+ 2	6.2	43.8*	15.9	13.9
L+ 3	2.0*	5.8	7.8	6.0
Mean	8.2	7.2	9.3	7.9
(SD)	(1.0)	(1.1)	(2.6)	(2.5)

\* data are considered outliers and are not entered into Mean concentration calculations.

Table 6. New Bedford Harbor suspended solids concentrations - 28 Sept 1987.

TIDAL CONDITION	CONCENTRATION (mg/l)			
	STATION			
	NBH-1	NBH-2	NBH-3	NBH-4
L+ 1	9.9	6.0	7.9	6.3
L+ 2	6.4	6.4	6.9	9.4
L+ 3	4.5	8.1	5.3	7.3
L+ 4	5.7	6.1	6.0	6.6
L+ 5	6.2	8.2	6.4	6.1
H+ 1	7.0	6.6	5.5	5.7
H+ 2	7.5	6.4	7.7	3.9
H+ 3	6.5	6.5	6.0	5.6
H+ 4	5.6	6.7	6.1	3.4
H+ 5	6.0	5.8	5.0	3.3
Mean	6.5	6.7	6.3	5.8
(SD)	(1.4)	(0.8)	(1.0)	(4.9)

Table 7. New Bedford Harbor suspended solids concentrations (Mean  $\pm$  SD) -  
24, 28 Sept 1987.

STATION	CONCENTRATION (mg/l)	
	EBB	FLOOD
<u>24 SEPT 87</u>		
NBH-1	8.6 $\pm$ 0.8	7.8 $\pm$ 1.1 (n=4)
NBH-2	7.5 $\pm$ 1.1	6.8 $\pm$ 1.1 (n=4)
NBH-3	8.2 $\pm$ 0.9	10.4 $\pm$ 3.3
NBH-4	7.9 $\pm$ 1.5	7.8 $\pm$ 3.4
<u>28 SEPT 87</u>		
NBH-1	6.5 $\pm$ 0.8	6.5 $\pm$ 2.0
NBH-2	6.4 $\pm$ 0.4	7.0 $\pm$ 1.0
NBH-3	6.1 $\pm$ 1.0	6.5 $\pm$ 1.0
NBH-4	4.4 $\pm$ 1.2	7.1 $\pm$ 1.3

Table 8. New Bedford Harbor suspended solids concentration at NBH-2 at each of six sampling strata on mid-ebb and mid-flood hourly intervals - 24 Sept 1987.

		CONCENTRATION (mg/l)		
DEPTH		EAST	WEST	X $\pm$ SD
EBB (H+3)	Surface	7.4	5.9	
	Mid	8.9	7.4	7.2 $\pm$ 1.0
	Bottom	6.9	6.9	
FLOOD (L+3)	Surface	8.7	7.0	
	Mid	7.7	6.9	8.0 $\pm$ 1.3
	Bottom	7.2	10.3	

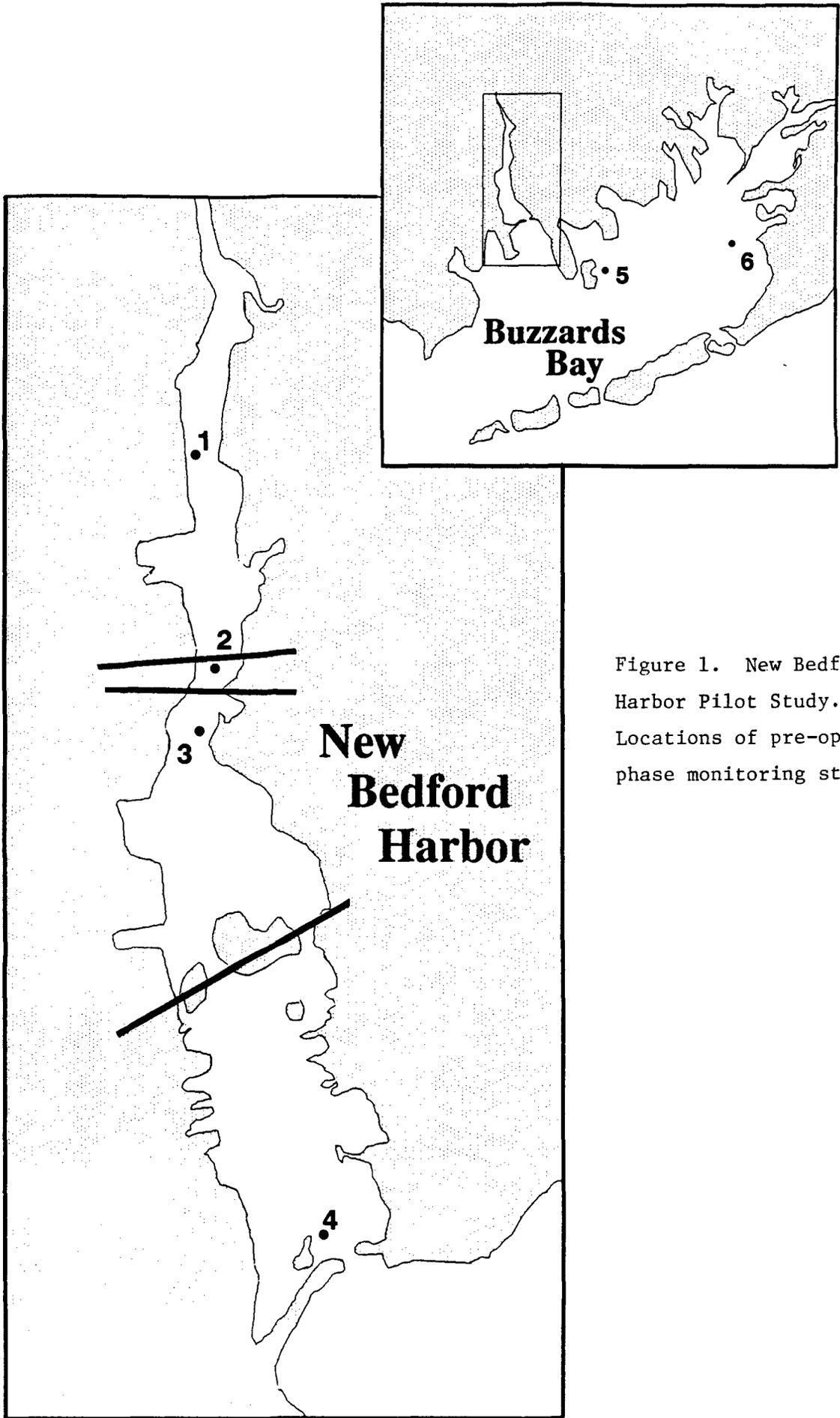


Figure 1. New Bedford Harbor Pilot Study. Locations of pre-operational phase monitoring stations.

Figure 2.

### New Bedford Harbor Suspended Solids July 8, 1987

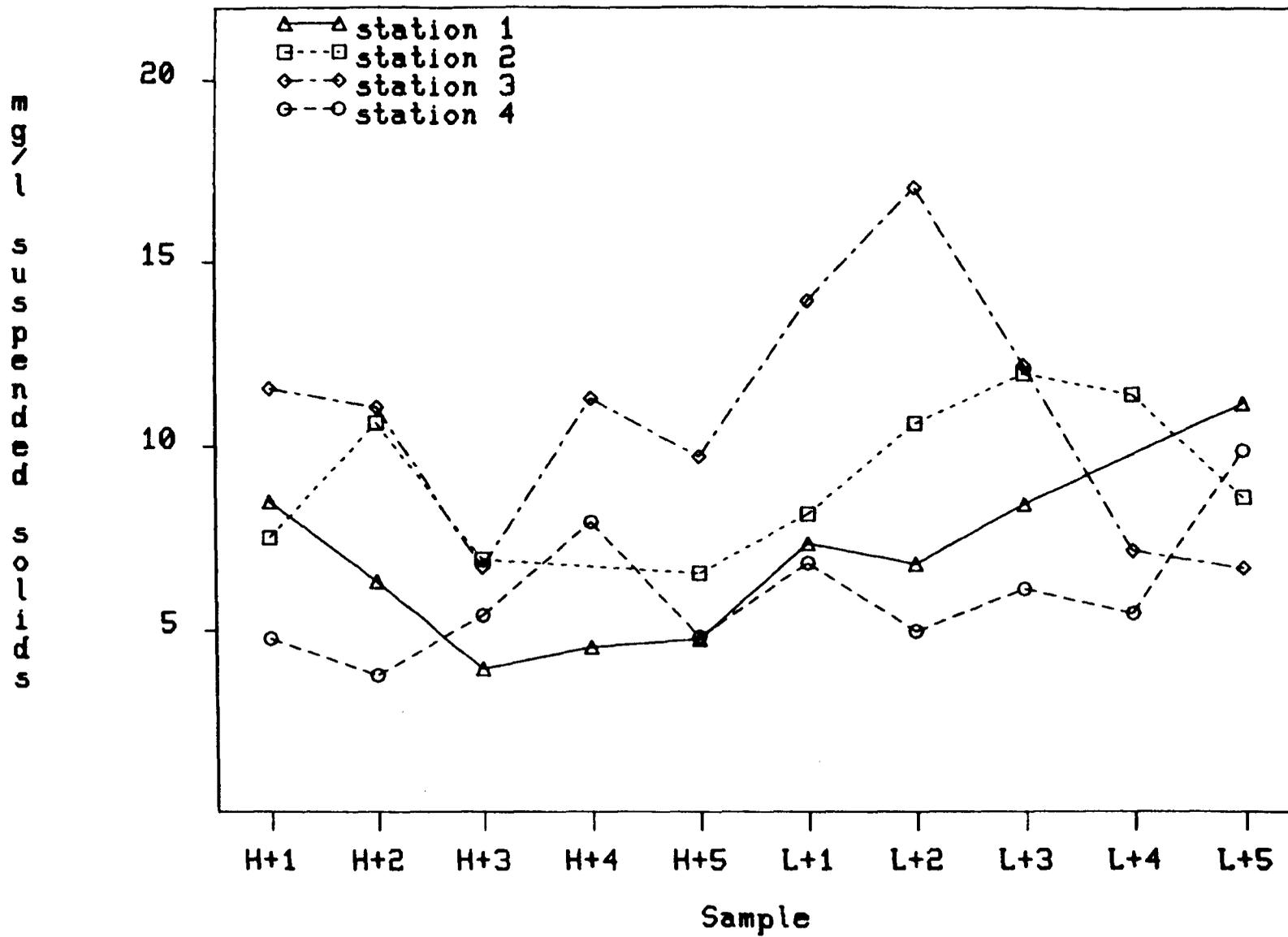


Figure 3.

### New Bedford Harbor Suspended Solids July 9, 1987

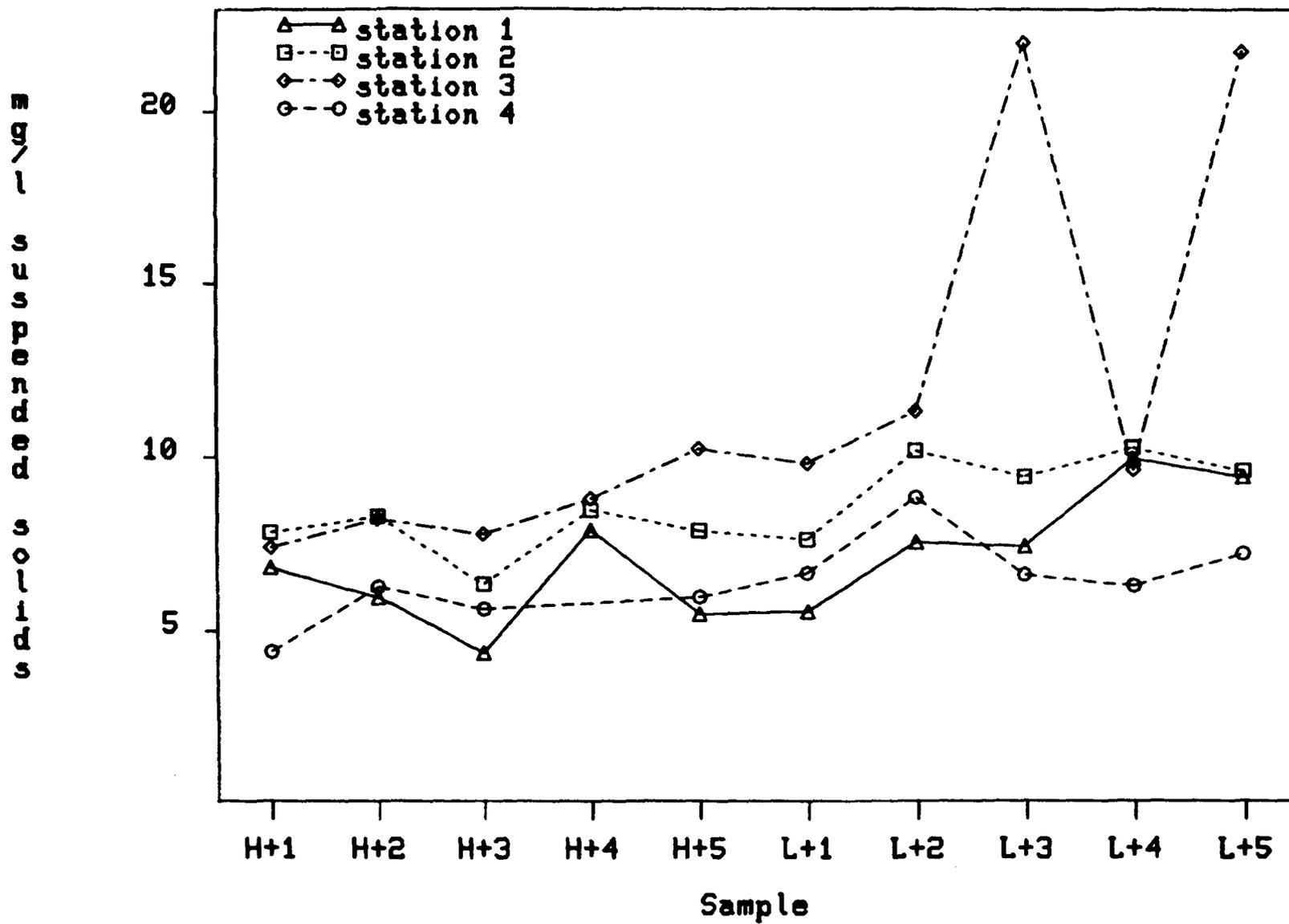


Figure 4.

New Bedford Harbor Suspended Solids  
Station 2, July 13, 1987

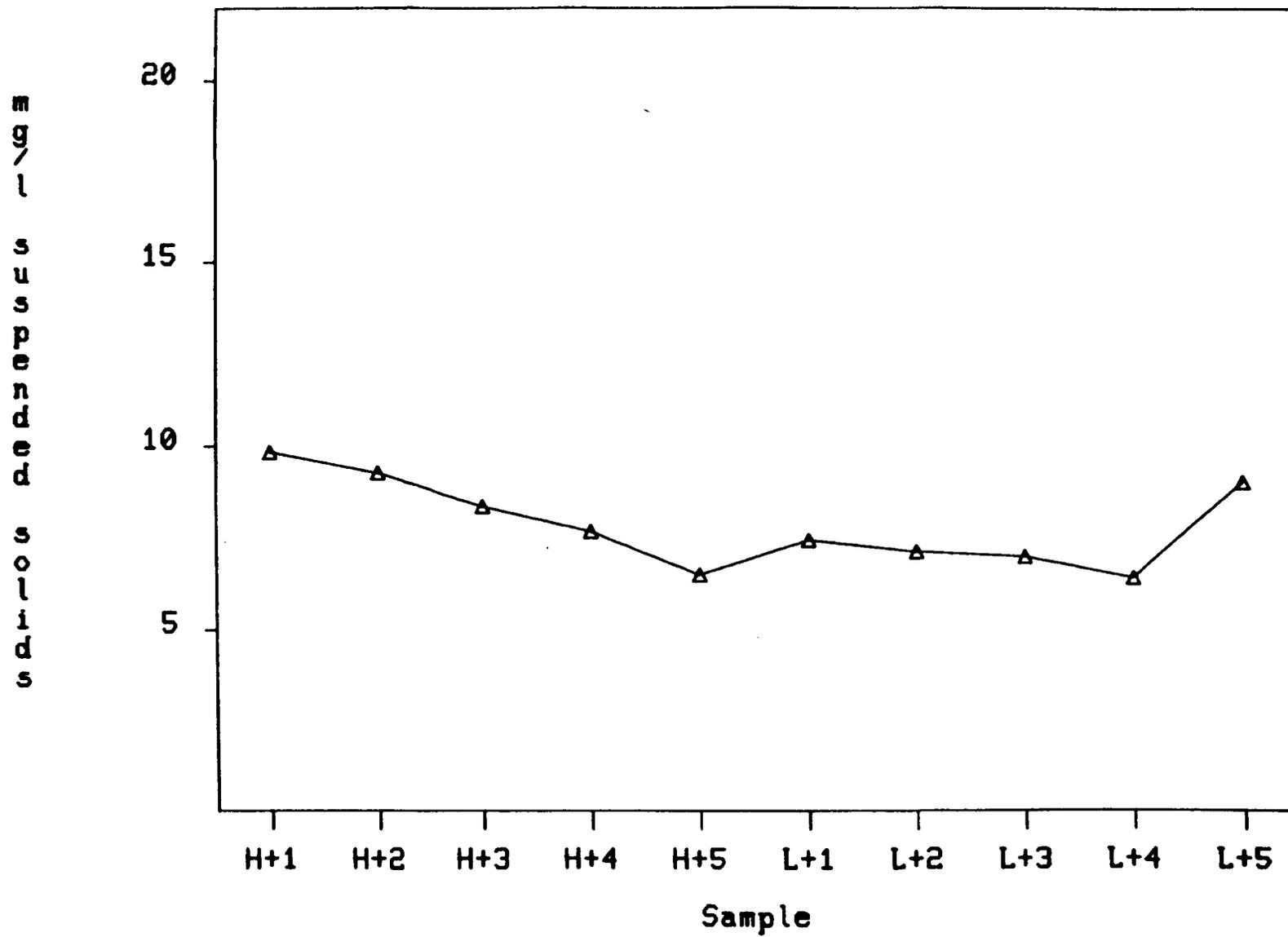


Figure 5.

### New Bedford Harbor Suspended Solids September 24, 1987

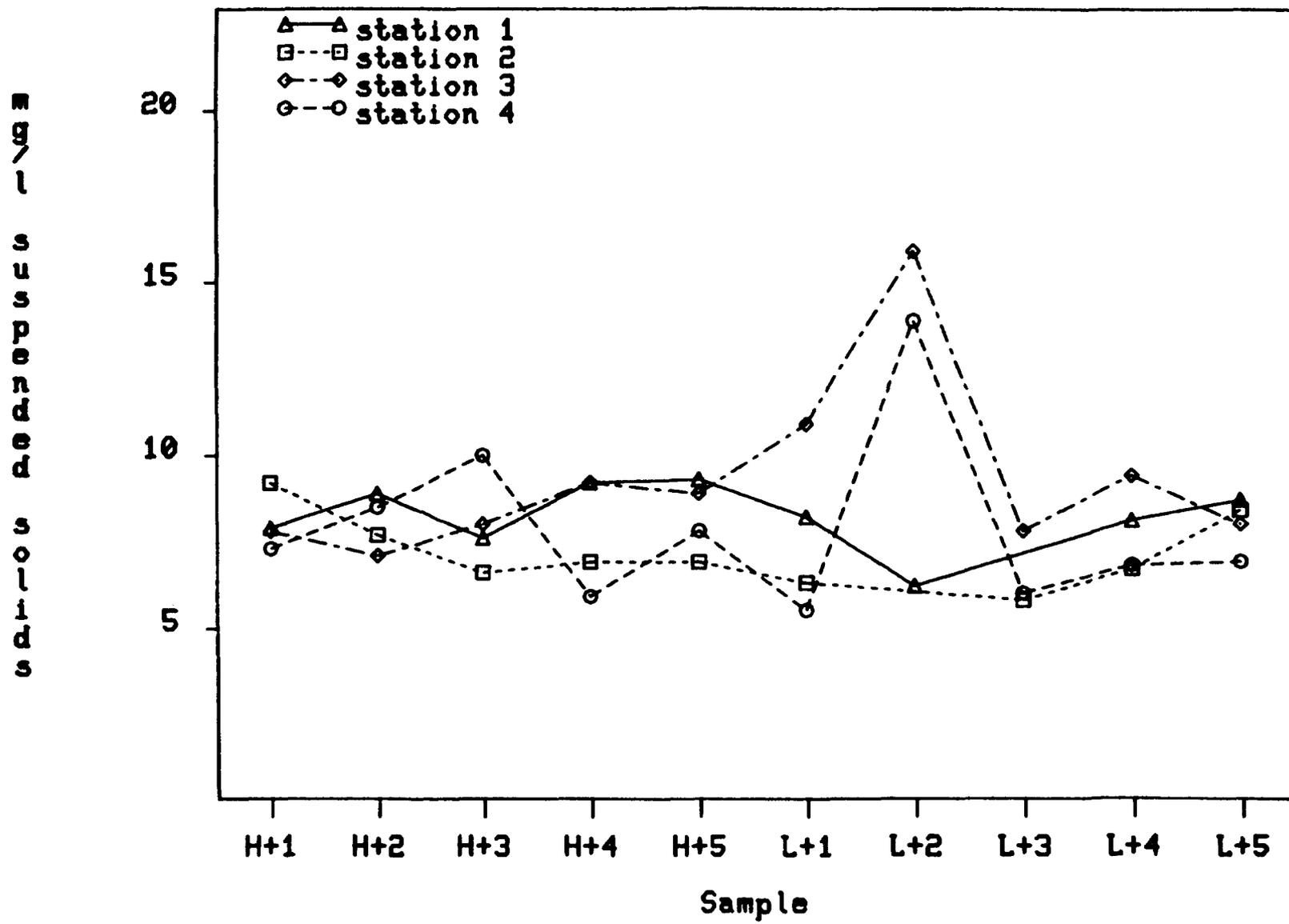


Figure 6. New Bedford Harbor Suspended Solids  
September 28, 1987

