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NORMANDEAU ASSOCIATES

December 5, 1997

Mr. Bob Herman
Bath Iron Works
700 Washington Street
Bath, ME 04530

RE: NAI Project #17566

Dear Bob:

Normandeau Associates conducted water quality monitoring of the US Army Corps of Engineers Kennebec River Maintenance Dredging Project. Maine Department of Environmental Protection's Federal Consistency Review and Water Quality Certification specified the following conditions:

- monitoring of bacterial levels just south of the Bluff Head disposal site immediately before and soon after disposal episodes
- monitoring of turbidity before and after disposal events at Bluff Head.

Results are to be delivered within 14 days of receipt.

A conversation with Doug Burdick, Maine Department of Environmental Protection on November 14, 1997 clarified that monitoring needed to take place on only three dates, before, during, and after dredging and disposal at Bluff Head.

This letter report provides methods and results of dredging and disposal monitoring activities.

METHODS

Normandeau collected three sets of samples. The first was collected on Friday, November 14th, prior to reported initiation of dredging at Bluff Head on November 23rd. The second set of samples was collected on November 24th, during the dredging operation. The third set of samples was collected on November 18th on the outgoing tide and November 25th on the incoming tide.

Bedford, NH, Corporate
Richmond, CA
Plymouth, MA

Yarmouth, ME
Ypsilanti, MI
Hampton, NH

Lakewood, NJ
Peekskill, NY
Drumore, PA

Spring City, PA
New Ellenton, SC
Brattleboro, VT



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We collected water samples at four locations as shown on Figure 1. Station 1 was located just north of the dredging area; Station 2 was located just south of the dredging area. Station 3 was located just north of the Bluff Head disposal area, with Station 4 located just south. Samples were collected on an incoming tide at Stations 1 and 3 and on an outgoing tide at Stations 2 and 4. Samples were collected at two depths, one meter off bottom and at mid-depth (river depth + 2). Using a Niskin sampler, water was analyzed for three parameters: turbidity (EPA method 180.1), total suspended solids (EPA method 160.1), and fecal coliform (method SM 9221A.3). Fecal coliform analysis was performed by Northeast Laboratory (11/14/97 samples only) and Maine Department of Marine Resources. Turbidity and total suspended solids were analyzed by Normandeau Associates' Analytical Laboratory.

RESULTS

All water samples were analyzed within EPA - designated holding times with one exception. The overnight courier failed to deliver water samples within 24 hours, causing an exceedance of the hold times for pre-dredge turbidity samples. These results should be considered approximate.

Turbidity results are summarized in Table 1; laboratory results are included in Appendix A. Turbidity levels were generally low and within the range of values collected during the Bath Iron Works modernization sampling program (Table 2). In general, turbidity increased slightly during dredging from pre-dredge levels, which should be considered approximate because of the exceeded hold-time. Levels following dredging decreased in three instances (Stations 1 mid-depth, 1 bottom, 2 bottom), increased at four (Station 2 mid-depth, 3 mid-depth, 4 mid-depth, 4 bottom) and remained the same at one (Station 3 bottom).

Total suspended solids (TSS) ranged from 9.6 mg/L to 54.0 mg/L (Table 3). In most cases, TSS levels were highest prior to dredging, likely a result of a large storm on the day of sampling. TSS levels decreased in all cases during the dredging, although at Station 4, south of the disposal area, these decreases were minor. Post-dredge TSS levels decreased from dredge levels in all bottom samples and at Station 4 mid-depth. TSS levels increased at mid-depth Stations 1, 2, and 3.

Fecal coliform levels were generally low before, during, and after dredging. Fecal coliform levels were less than 43 MPN/100 ml prior to dredging (Table 4) except at Station 2 bottom, which had 240 MPN/100 ml. Coliform levels were all <43 MPN/100 ml during the dredge event. Following dredging, fecal coliform ranged from 21-93 MPN/100 ml. Stations 1, 3, and 4 (both depths) showed a small increase after dredging; Station 2 levels remained approximately the same.

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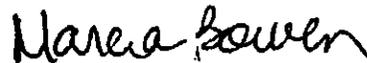
DISCUSSION

Turbidity levels near Bluff Head dredging and disposal areas in the Kennebec River were low before, during, and after the November 1997 dredging. Levels were consistent with other turbidity measurements in the Kennebec River. There was no apparent trend related to station, depth, or dredging/disposal. Total suspended solids levels showed varying trends with respect to station, depth, and timing with respect to dredging. Changes in TSS did not parallel trends in turbidity, probably because the latter measures water clarity, whereas the former measures suspended particulates. Neither parameter showed a consistent trend of increases during dredging. Fecal coliform levels were low with one exception, possibility related to the pre-dredging storm activity, which may have affected runoff or WWTP function. There was no evidence of an increase related to dredging.

If you have any questions, please do not hesitate to call.

Very truly yours,

NORMANDEAU ASSOCIATES, INC.



Marcia Bowen
Manager, Yarmouth Office

MB:js

Attachments

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Sampling locations for Kennebec River Dredge Monitoring
November 1997 Bath Iron Works

**DOUBLING POINT REACH
APPROXIMATE DREDGING &
DISPOSAL AREAS**

Table 1. Turbidity (NTU) before and during Kennebec River Dredging.

Station	Depth	Pre-dredge*	Dredge	Post-dredge
1	Mid	8.5	14.0	10.0
	Bottom	9.5	12.0	9.0
2	Mid	6.5	9.0	12.0
	Bottom	6.3	9.0	8.0
3	Mid	8.0	7.0	8.0
	Bottom	7.0	9.0	9.0
4	Mid	3.0	5.0	6.0
	Bottom	2.5	5.0	9.0

* Samples exceeded the allowable holding period.

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Table 2. Turbidity (NTU) Data Collected at Mid-Depth at Trawl Stations T1, T2, and T3 in the Kennebec River in the Vicinity of Bath Iron Works.

Station	DATE						
	17 April	20 May	4 June	24 July	7 August	10 September	9 October
T1	3.5	4.1	1.5	13.5	1.5	1.6	1.1
T2	3.5	4.0	1.0	13.8	1.7	1.1	1.5
T3	3.8	4.3	1.2	14.5	1.8	1.5	1.6

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Table 3. Total Suspended Solids (mg/L) before and during Kennebec River Dredging.

Station	Depth	Pre-dredge	Dredge	Post-dredge	Average
1	Mid	37.0	11.8	12.6	20.5
	Bottom	24.5	15.0	10.2	16.6
2	Mid	16.6	12.8	16.8	15.4
	Bottom	19.0	14.6	9.4	14.3
3	Mid	23.8	11.6	14.4	16.6
	Bottom	25.8	14.8	8.8	16.5
4	Mid	54.0	53.4	16.8	41.4
	Bottom	14.8	13.2	9.6	12.5

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Table 4. Fecal Coliform (MPN/100ml) before and during Kennebec River Dredging.

Station	Depth	Pre-dredge	Dredge	Post-dredge
1	Mid	15	9.1	43
	Bottom	9.1	9.1	20
2	Mid	<3	23	21
	Bottom	240	23	23
3	Mid	7.3	43	93
	Bottom	43	3.6	93
4	Mid	23	<3	23
	Bottom	<3	3.6	23

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