

Case Study – The New Bedford Harbor Superfund Site Remediation

Norm Farris, USACE Regulatory
Charles.N.Farris@usace.army.mil
Superfund, PCB, monitoring, New Bedford, water treatment

Thanks to:
Jay Mackay, USCAE-EP-VE
Gary Morin, USACE-PP-E
Paul L'Heureux, USACE New Bedford Field Office
Ken Hickey, ENSR, Westford, MA
Alex Mansfield, Battelle, Duxbury, MA

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



1

New Bedford Harbor Superfund Site Remediation

- Norm Farris - TDY from Regulatory Division
- Providing Technical Assistance to the Long-Term Monitoring Activities
- Participating in the Design Components Stage

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



2

New Bedford Harbor Superfund Site



- Heavily contaminated w/ PCB's from electrical manufacturing in Upper Harbor
- EPA designated NBH as Superfund Site in 1982
- EPA requested USACE assistance

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



3

New Bedford Harbor Harbor Characteristics

- Upper, Lower and Outer Harbor
- North-South Contamination gradient
- PCB hotspots removed in 1994/5 (>**100,000 ppm**)
- Balance of sediments have PCB's up to 4,000 ppm

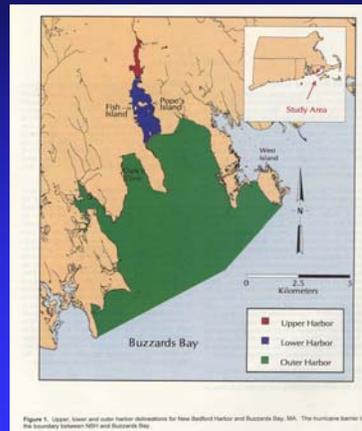


Figure 1. Upper, lower and outer harbor delineations for New Bedford Harbor and Buzzards Bay, MA. The horizontal line is the boundary between NBH and Buzzards Bay.

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



4

New Bedford Harbor Superfund Site Remediation

- Multi-year remediation of New Bedford Harbor
- Initial pilot dredging study
- Evaluate dredging and sediment disposal approach
- Removal of PCB sediments
- Wetland remediation
- Water quality monitoring
- Long-term Monitoring Program

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



5

New Bedford Harbor Superfund Site Remediation

- **Pilot Dredging Study (1989) – EVALUATE sediment removal effectiveness; sediment resuspension; CAD option; operational costs; contaminant release. Determine project feasibility**
- **Hot Spot Dredging (1995) – Remove most contaminated PCB sediments; 45% of PCB (by mass) removed. Assoc. impacts**

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



6

New Bedford Harbor Superfund Site Remediation

- **Pre-Design Field Test PDFT (2000) – select optimum dredge technologies. ASSESS air/water quality impacts; production rates**
- **PDFT Design Parameters developed**
- **Design Components (2002 – Present) – Implement PDFT design; PCB removal - worse first; monitor recovery**

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



7

New Bedford Harbor Design Components Stage

- **Z* - Dredging Depth (estimated depth horizon)**
- **Dredge Management Units (DMU)**
- **Dredge Performance Specifications**
- **Dredging Sequence & Schedule**

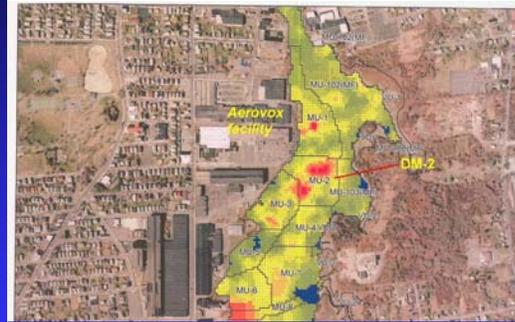
5/21/2005

Dredged Material Assessment and
Management Seminar 2005



8

New Bedford Harbor Design Components - DMU's



- Dredge Management Unit 2 dredged in 2004

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



9

New Bedford Harbor - Design Specifications

Four Phase Removal Effort

- Hydraulic Dredging
- De-sanding
- Dewatering; T+D to TSCA landfill
- Water treatment



5/21/2005

Dredged Material Assessment and
Management Seminar 2005



10

New Bedford Harbor - Hydraulic Dredging



- Cutterhead section dredge – 6” dredge depth

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



11

New Bedford Harbor - De-sanding



5/21/2005

Dredged Material Assessment and
Management Seminar 2005



12

New Bedford Harbor Superfund Site Remediation

Four Phase Remediation Effort

- Hydraulic Dredging
- De-sanding
- Dewatering => fines
T+D to TSCA landfill
- Water treatment



5/21/2005

Dredged Material Assessment and
Management Seminar 2005



13

New Bedford Harbor - Dewatering

- Slurry is pressed into filter cake
- Filter cakes are shipped to TSCA landfill
- Filtrate water is treated to bring effluent
to standards established in ambient water
quality conditions (AWQC)
- Effluent goes into Harbor

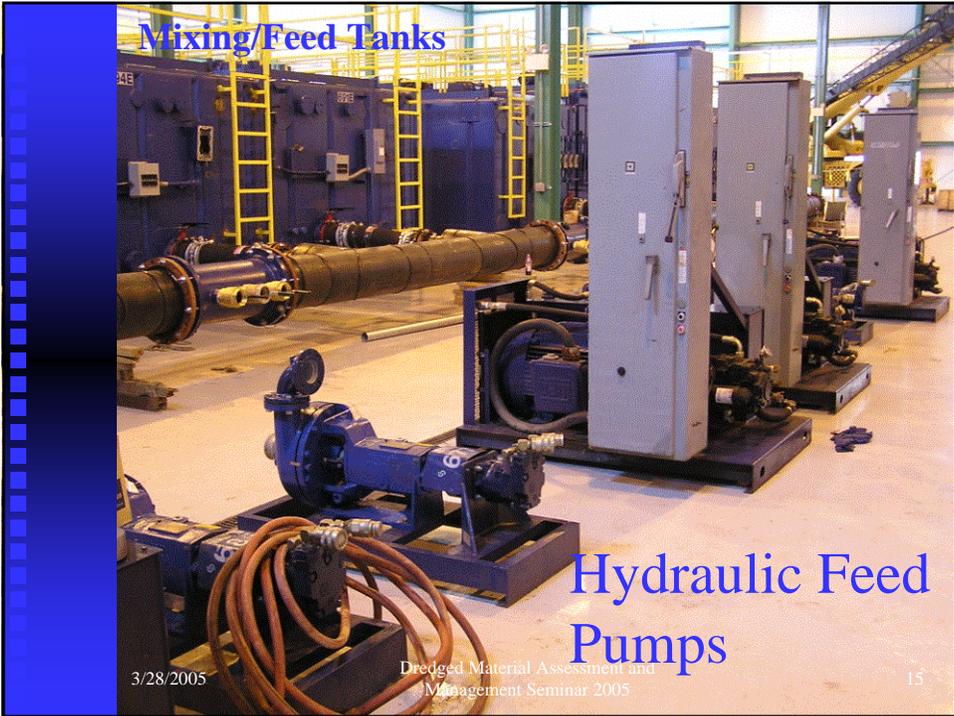
Thanks to Paul L'Heureux from USACE New
Bedford Field Office for these photos

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



14





Filter Press

3/28/2005

Dredged Material Assessment and
Management Seminar 2005

17



Filter Press Plates

3/28/2005

Dredged Material Assessment and
Management Seminar 2005

18



Bag & Sand Filters



3/28/2005

Dredged Material Assessment and Management Seminar 2005

21

Carbon Filters



3/28/2005

Dredged Material Assessment and Management Seminar 2005

22

New Bedford Harbor - Environmental Monitoring

Monitoring Components

- Water Quality monitoring – ENSR
- Long-Term monitoring (LTM) - Battelle
- Parameters chosen to address specific questions/goals

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



23

New Bedford Harbor - Water Quality Monitoring

Monitoring Objectives

- Ensure minimal impacts from dredging activities
- Minimize water quality impacts
- Minimize contaminant transports



5/21/2005

Dredged Material Assessment and
Management Seminar 2005

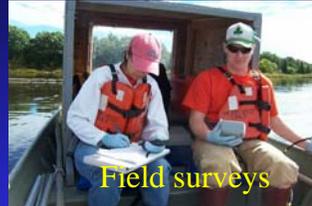


24

New Bedford Harbor - Water Quality Monitoring

Monitoring Components

- Compliance monitoring – wastewater
- Concurrent monitoring – turbidity, toxicity



5/21/2005

Dredged Material Assessment and Management Seminar 2005



25

New Bedford Harbor - Water Quality Monitoring

- Critical turbidity level (50 NTU above background) at downstream transects
- Turbidity-dependent toxicity testing
- Regular operation-based monitoring

ENSR Daily Field Summary for Water Quality Monitoring at DMU #2

Date: 7 October 2004

Weather: Sunny 80°F

Tide: Low

Monitoring Period: From 10:00 To 14:00

Tide Stage: FHS Ebb LWS Flood

Monitoring Measurement Summary:

Location	Turbidity (NTU)	Season/Water Depth (ft)
Station 1	15	10
Station 2	20	15
Station 3	25	20
Station 4	30	25
Station 5	35	30
Station 6	40	35
Station 7	45	40
Station 8	50	45
Station 9	55	50
Station 10	60	55
Station 11	65	60
Station 12	70	65
Station 13	75	70
Station 14	80	75
Station 15	85	80
Station 16	90	85
Station 17	95	90
Station 18	100	95
Station 19	105	100
Station 20	110	105
Station 21	115	110
Station 22	120	115
Station 23	125	120
Station 24	130	125
Station 25	135	130
Station 26	140	135
Station 27	145	140
Station 28	150	145
Station 29	155	150
Station 30	160	155
Station 31	165	160
Station 32	170	165
Station 33	175	170
Station 34	180	175
Station 35	185	180
Station 36	190	185
Station 37	195	190
Station 38	200	195
Station 39	205	200
Station 40	210	205
Station 41	215	210
Station 42	220	215
Station 43	225	220
Station 44	230	225
Station 45	235	230
Station 46	240	235
Station 47	245	240
Station 48	250	245
Station 49	255	250
Station 50	260	255
Station 51	265	260
Station 52	270	265
Station 53	275	270
Station 54	280	275
Station 55	285	280
Station 56	290	285
Station 57	295	290
Station 58	300	295
Station 59	305	300
Station 60	310	305
Station 61	315	310
Station 62	320	315
Station 63	325	320
Station 64	330	325
Station 65	335	330
Station 66	340	335
Station 67	345	340
Station 68	350	345
Station 69	355	350
Station 70	360	355
Station 71	365	360
Station 72	370	365
Station 73	375	370
Station 74	380	375
Station 75	385	380
Station 76	390	385
Station 77	395	390
Station 78	400	395
Station 79	405	400
Station 80	410	405
Station 81	415	410
Station 82	420	415
Station 83	425	420
Station 84	430	425
Station 85	435	430
Station 86	440	435
Station 87	445	440
Station 88	450	445
Station 89	455	450
Station 90	460	455
Station 91	465	460
Station 92	470	465
Station 93	475	470
Station 94	480	475
Station 95	485	480
Station 96	490	485
Station 97	495	490
Station 98	500	495
Station 99	505	500
Station 100	510	505

Observations: One dredge cut was performed to clear debris. No other significant observations.

Station Draw: None. Station: None. Station: None. Station: None.

Completed by: [Signature]

5/21/2005

Dredged Material Assessment and Management Seminar 2005



26

New Bedford Harbor - LTM Monitoring

LTM Objective

- Establish/populate environmental database
- Database documents ecosystem recovery of harbor over time following removal of contaminated sediments

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



27

New Bedford Harbor - Monitoring

LTM Components

- Physical – grain size, TOC
- Chemical – bulk sediment (including PCB's); toxicity
- Biological – benthic community



A. Mansfield - Battelle

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



28

New Bedford Harbor - Final thoughts

Adaptive management approach

- Evaluation of results from previous stage establishes goals for next stage
- Monitoring process designed to address specific questions

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



29

New Bedford Harbor - Final thoughts

Three zones of potential remediation

- Shoreline, intertidal,
subtidal

Subtidal first

- Limited resources
- Greatest production
efficiencies remediation

Shoreline environments during final stage



Wetland restoration project
in the Upper Harbor

5/21/2005

Dredged Material Assessment and
Management Seminar 2005



30