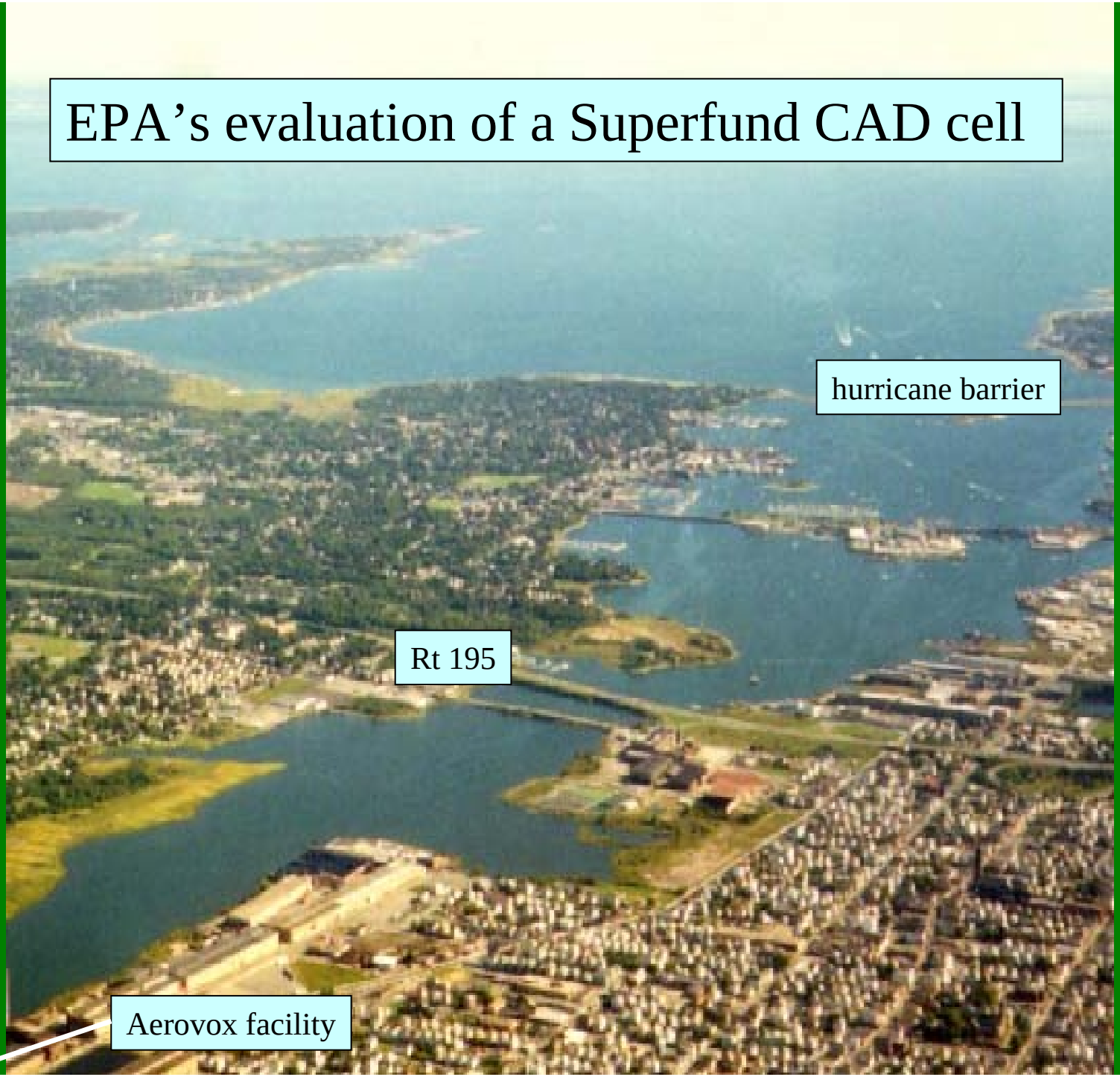
Return to SER AR Index

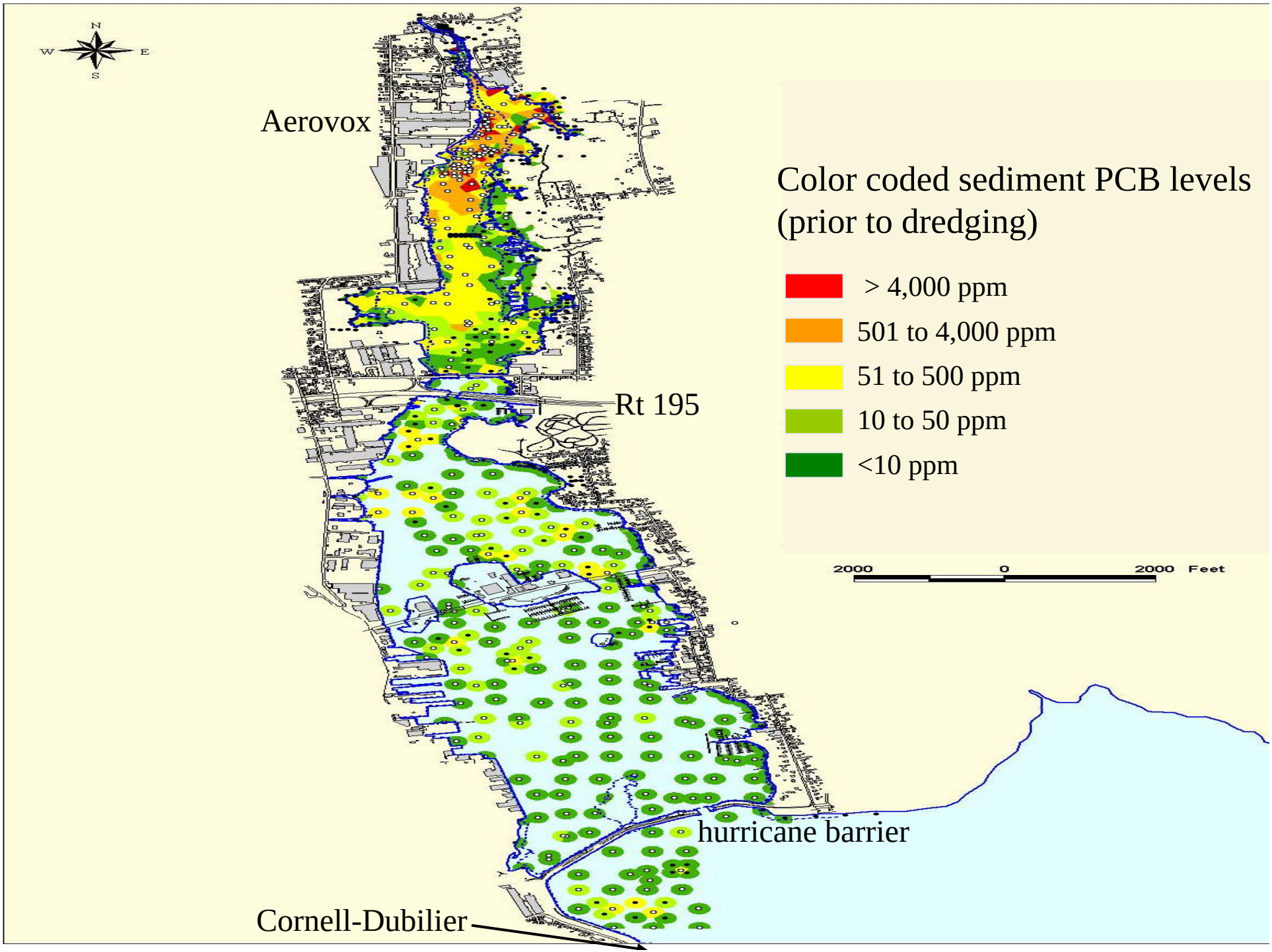
EPA's evaluation of a Superfund CAD cell

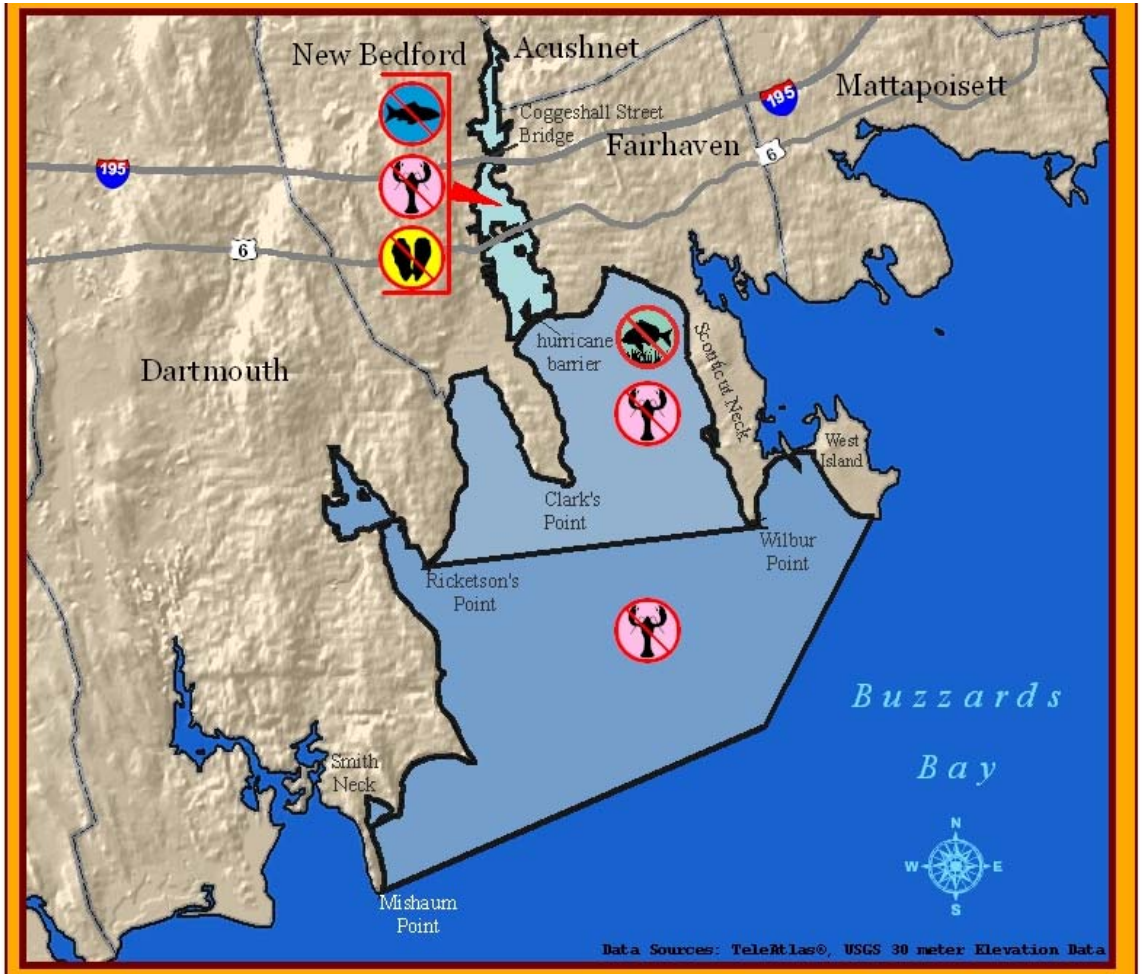


6/24/10


the upper harbor, looking north
Aerovox
11/10/2003

The lower harbor and hurricane barrier


N
W
E
S
Aerovox
Rt 195
hurricane barrier
Cornell-Dubilier
Color coded sediment PCB levels
(prior to dredging)
> 4,000 ppm
501 to 4,000 ppm
51 to 500 ppm
10 to 50 ppm
<10 ppm
2000
0
2000 Feet



Do NOT eat any fish
No coma pescado
Não coma peixe

Do NOT eat any lobster
No coma langosta
Não coma lagosta

Do NOT eat bottom feeding fish
No coma pescado de fondo:
Não coma peixe de fundo:

- flounder
- lenguado
- solha
- tautog
- tautoga
- bodião da ostra
- scup
- sargo
- sargo
- eel
- anguila
- anguila

Do NOT eat any shellfish
No coma mariscos
Não coma mariscos

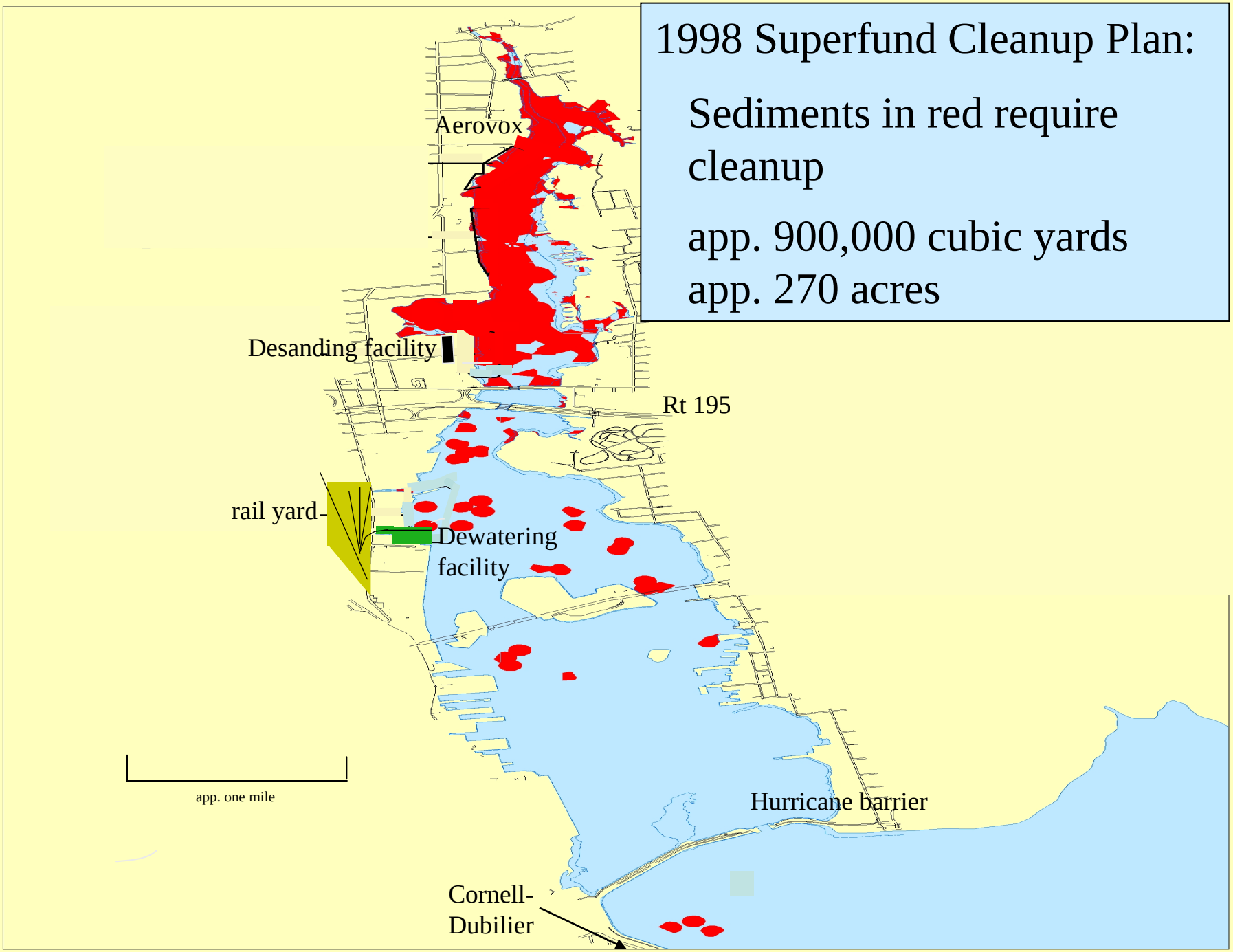
The 1979 state fishing ban - due to PCBs

(covers 18,000 acres)

1998 Superfund Cleanup Plan:

Sediments in red require cleanup

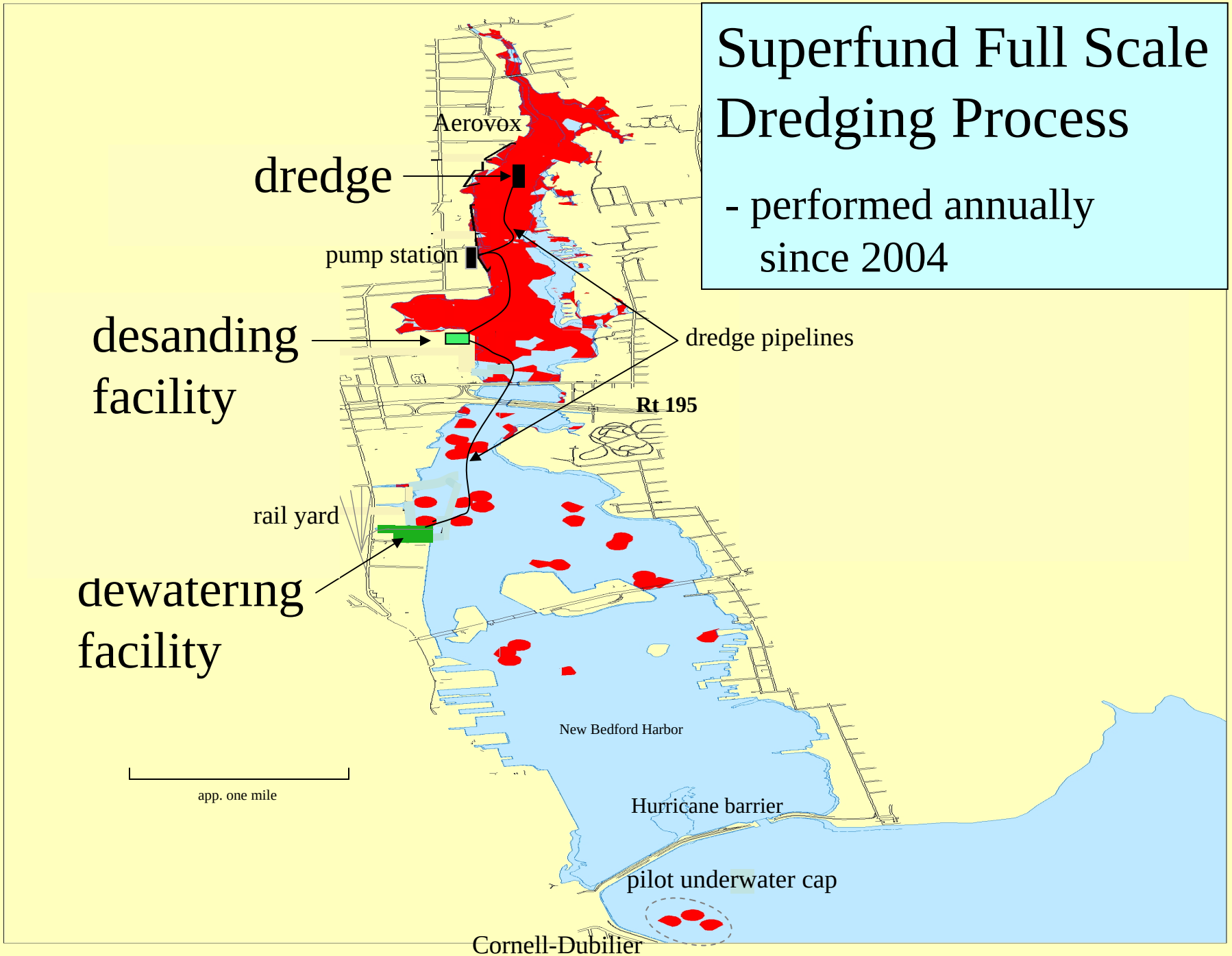
app. 900,000 cubic yards
app. 270 acres




River banks also need cleanup and
restoration in addition to sediments

Superfund Full Scale Dredging Process

- performed annually since 2004



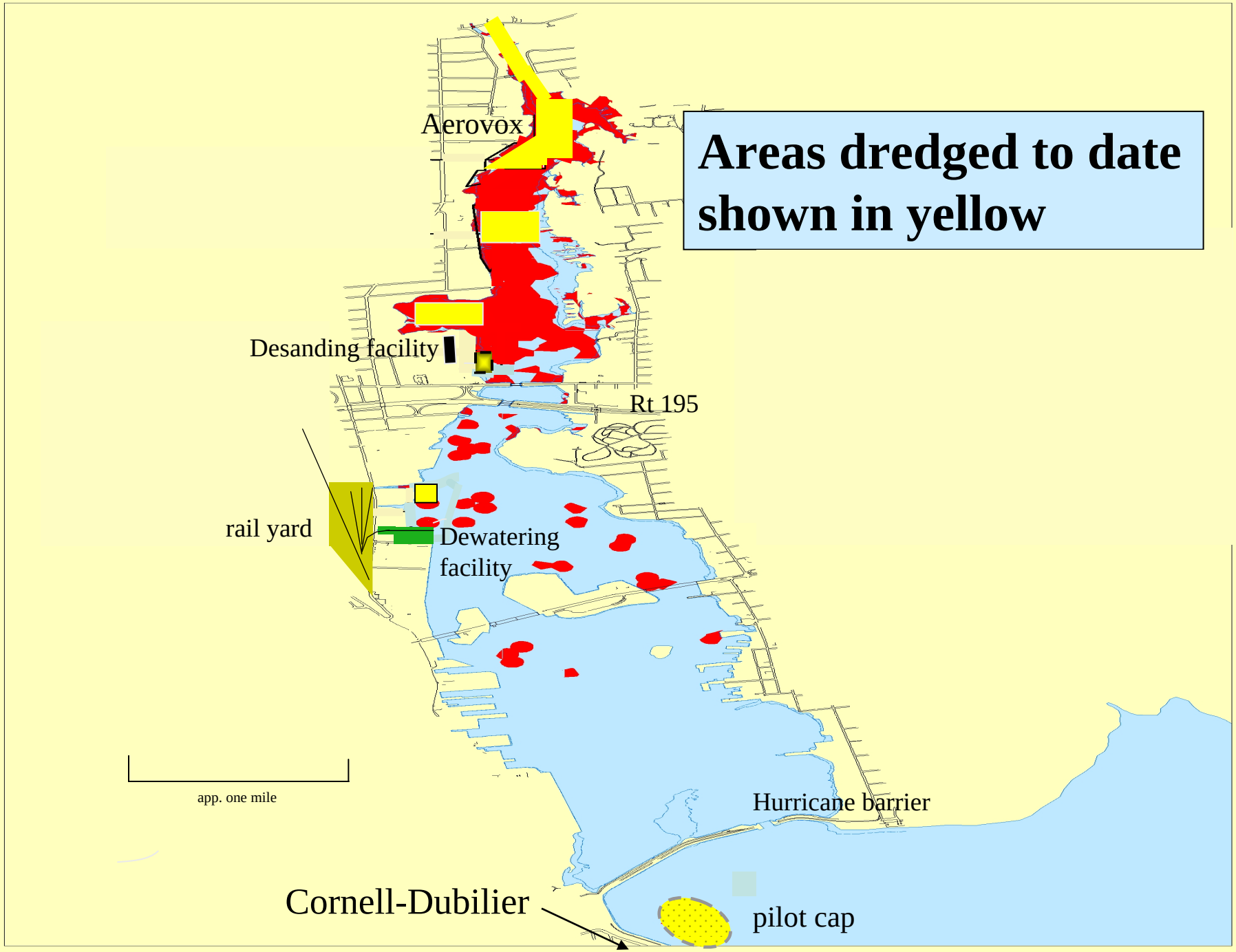
Superfund dredging and disposal operations

1. Dredging in upper harbor

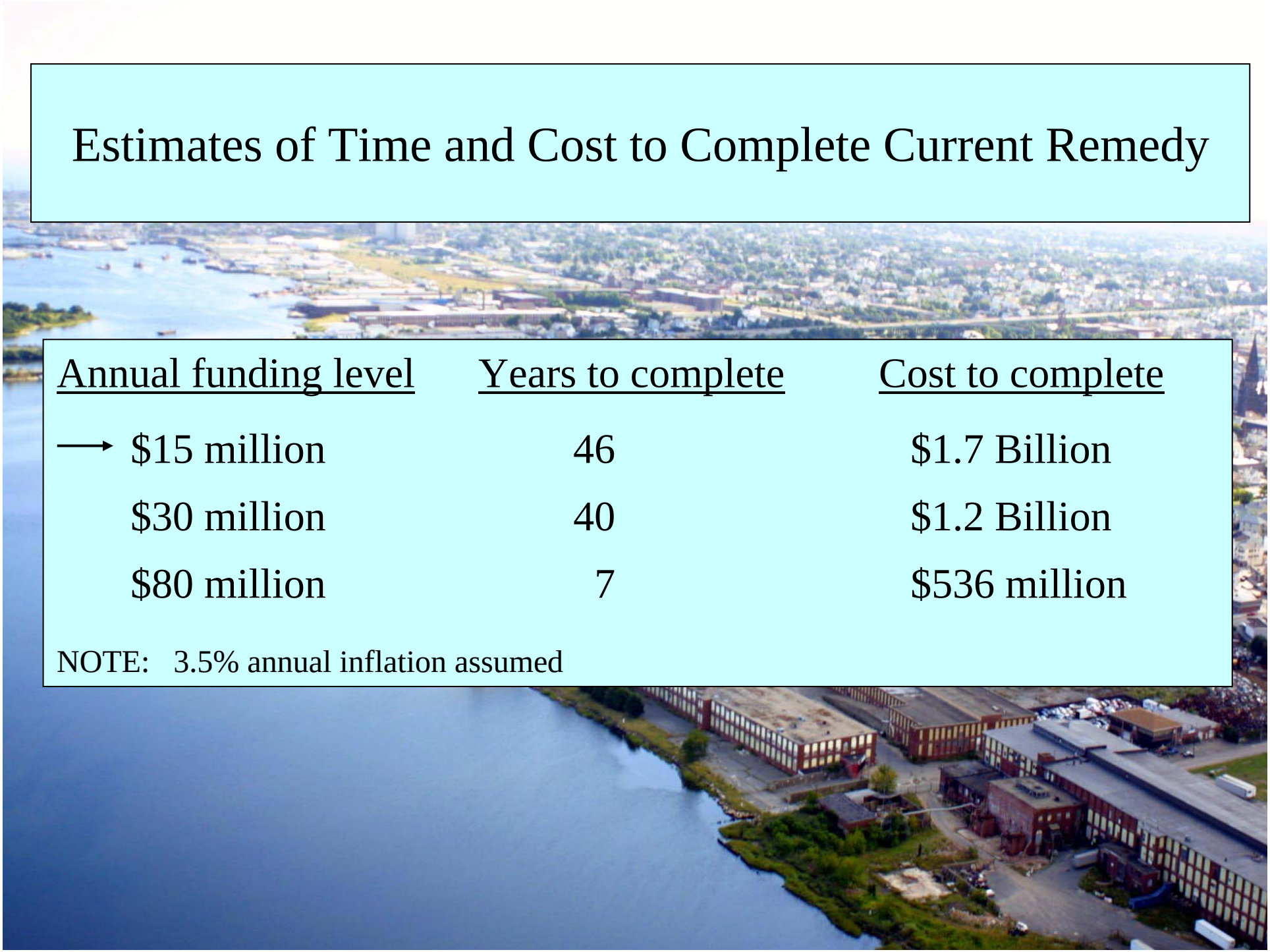
2. Desanding

3. Dewatering

4. Loading to rail for offsite disposal


Areas dredged to date shown in yellow
Aerovox
Desanding facility
Rt 195
rail yard
Dewatering facility
app. one mile
Hurricane barrier
Cornell-Dubilier
pilot cap

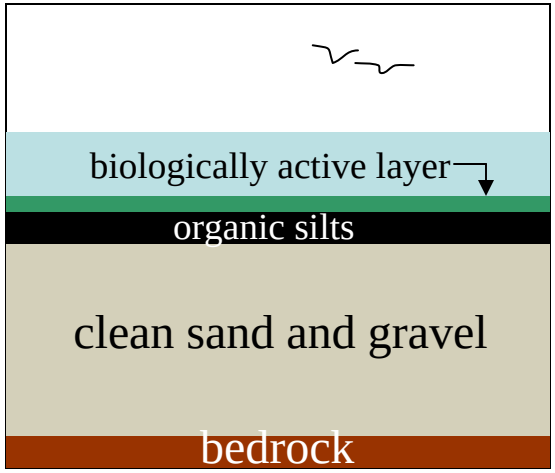
Estimates of Time and Cost to Complete Current Remedy



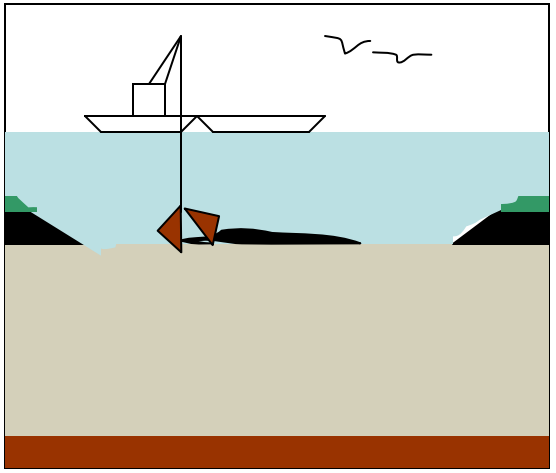
Annual funding level	Years to complete	Cost to complete
→ $15 million	46	$1.7 Billion
$30 million	40	$1.2 Billion
$80 million	7	$536 million

NOTE: 3.5% annual inflation assumed

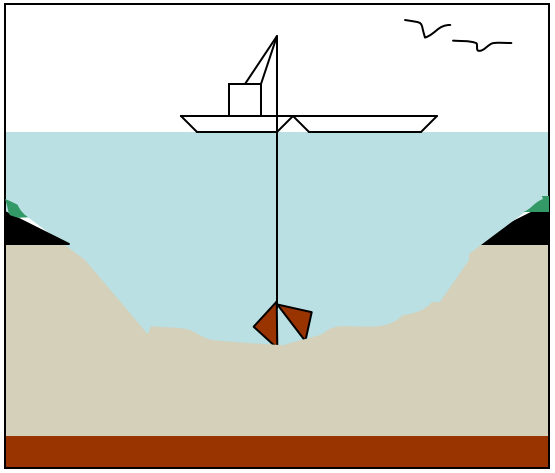
One alternative to speed the harbor cleanup:
a lower harbor CAD cell for Superfund material



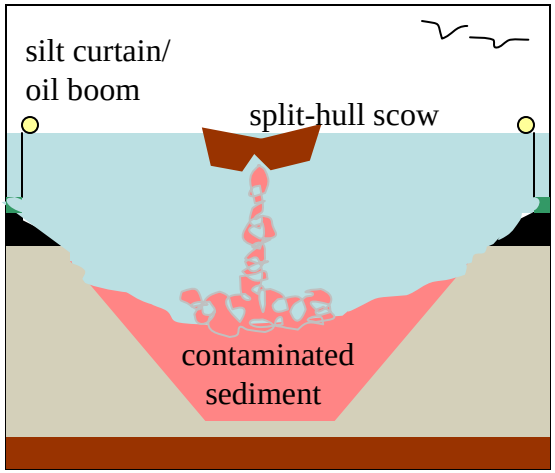
1. Harbor bottom as is



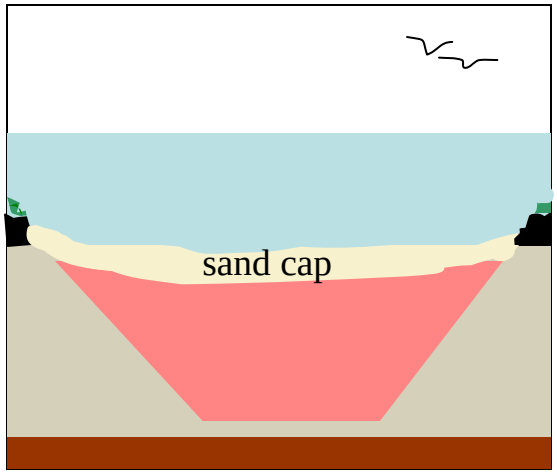
2. Excavation of top silts



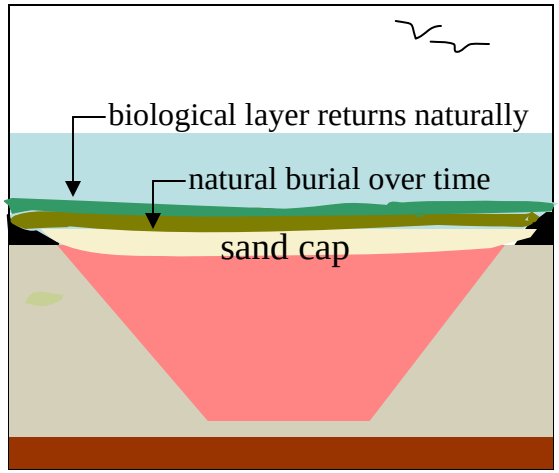
3. Excavation of clean sand



4. Placement of sediments



5. Placement of initial cap



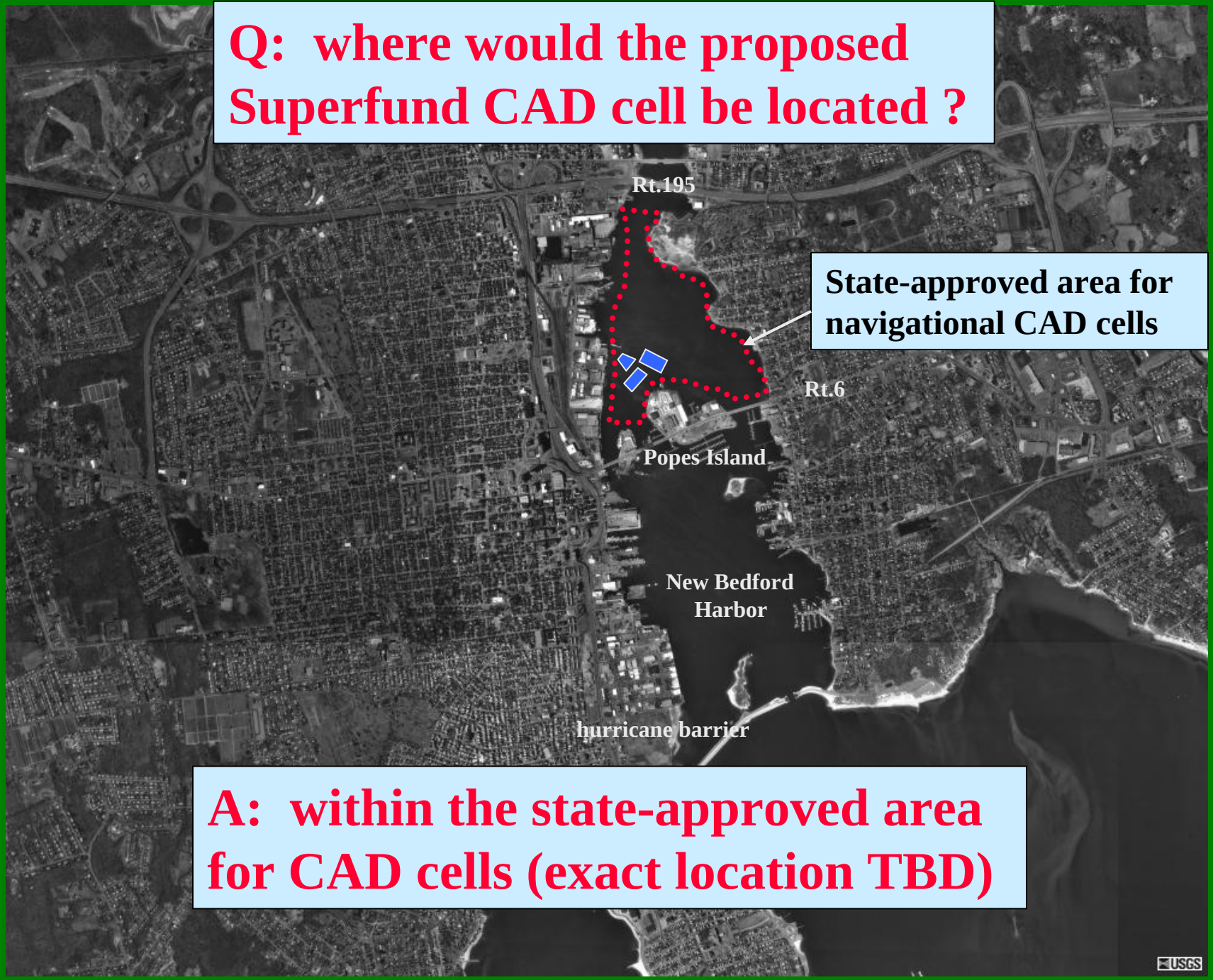
6. Surface fills in over time

What is a confined aquatic disposal cell?

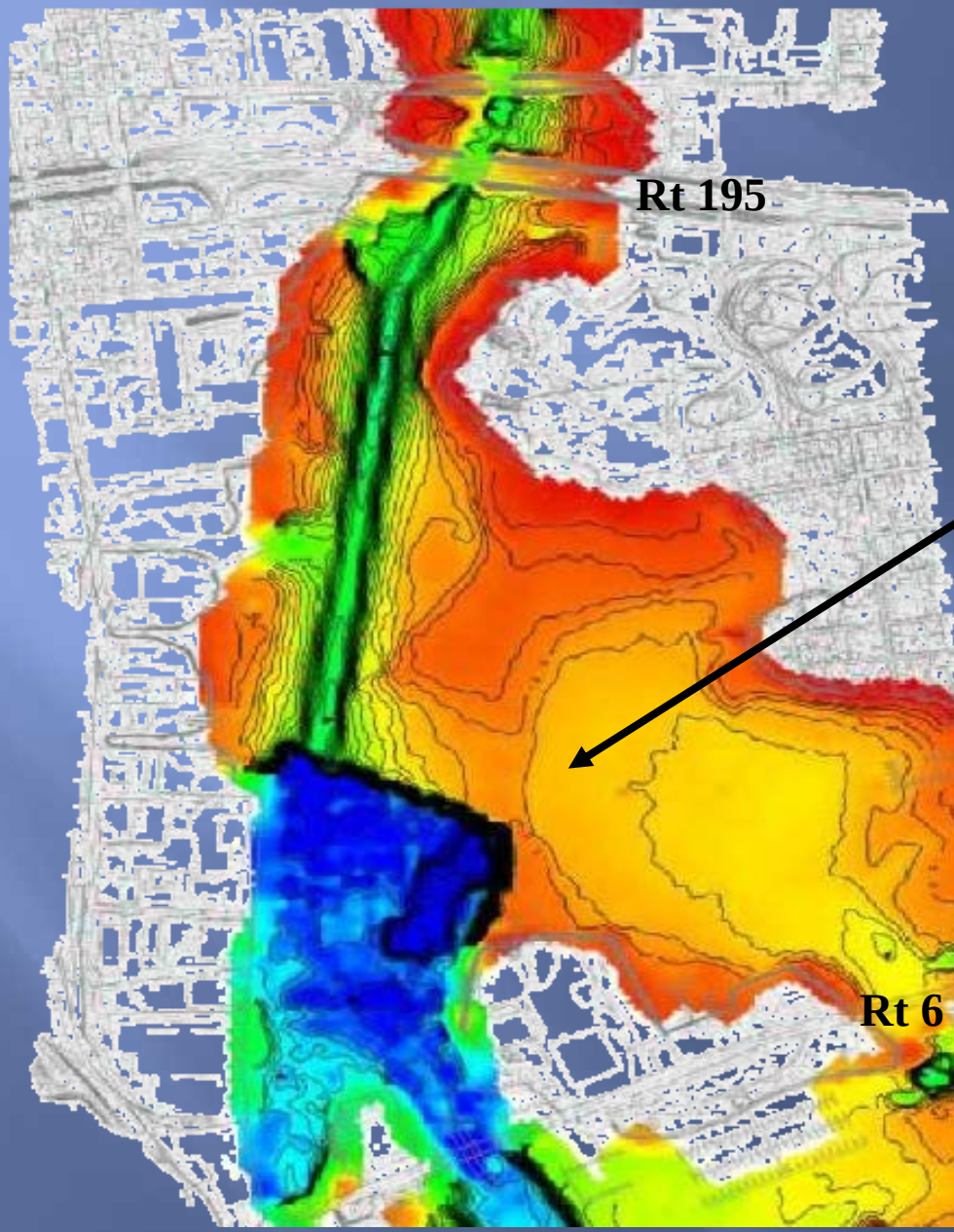
For illustrative purposes only – NOT TO SCALE

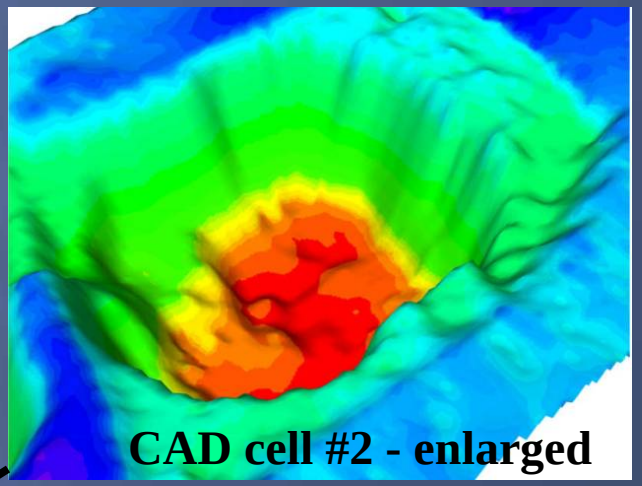
USEPA Region 1 - 2009

Q: where would the proposed Superfund CAD cell be located ?

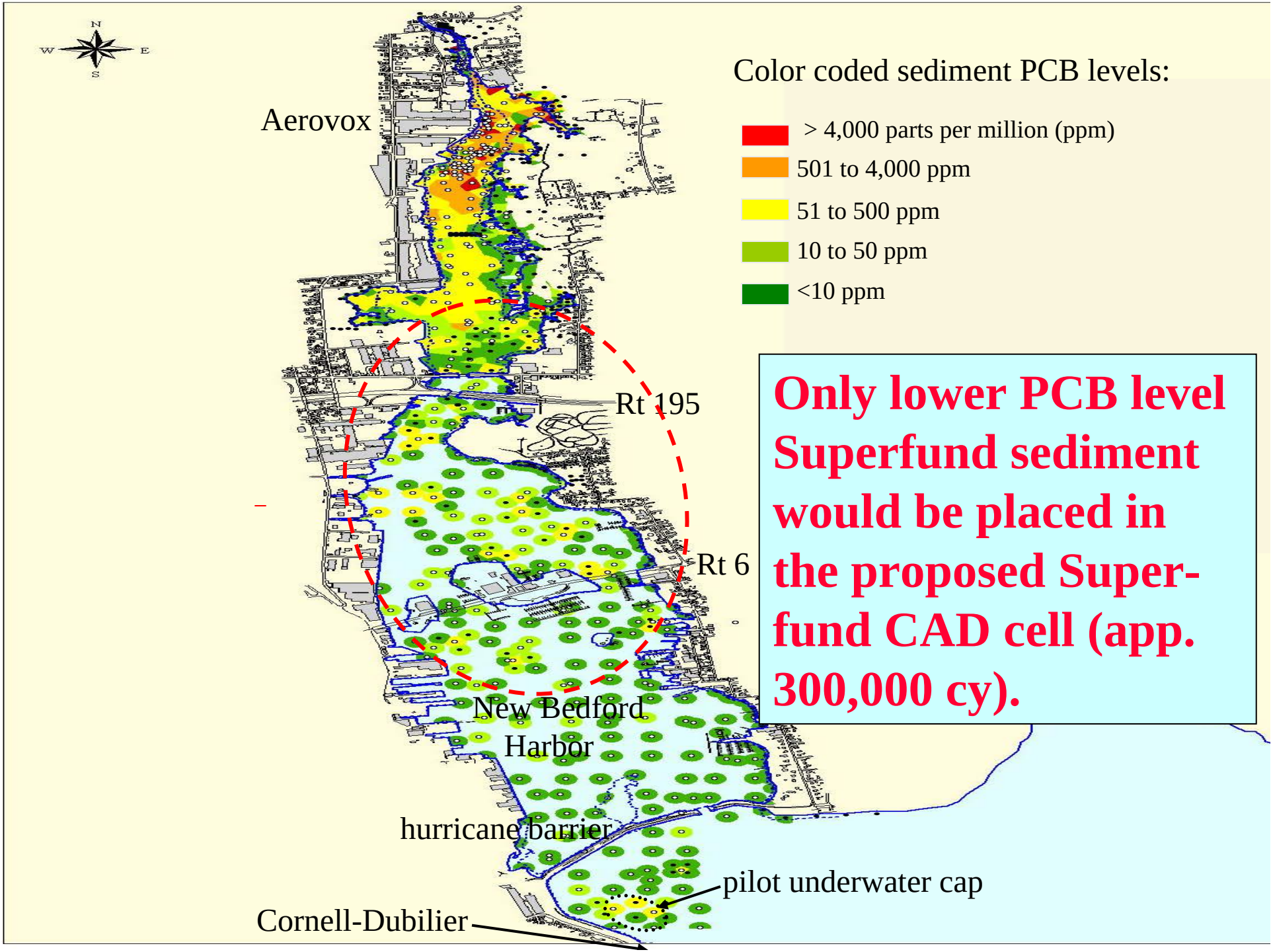


A: within the state-approved area for CAD cells (exact location TBD)





"Bathymetry" of harbor bottom and navigational CAD cell #2


Color coded sediment PCB levels:
> 4,000 parts per million (ppm)
501 to 4,000 ppm
51 to 500 ppm
10 to 50 ppm
<10 ppm
Aerovox
Rt 195
Rt 6
New Bedford
Harbor
hurricane barrier
pilot underwater cap
Cornell-Dubilier
Only lower PCB level Superfund sediment would be placed in the proposed Super-fund CAD cell (app. 300,000 cy).

Q: why do we believe that a CAD cell will safely contain the sediment placed into it?

A1: Water quality monitoring of navigational CAD Cell #2 in 2009 found no plume outside of the CAD cell

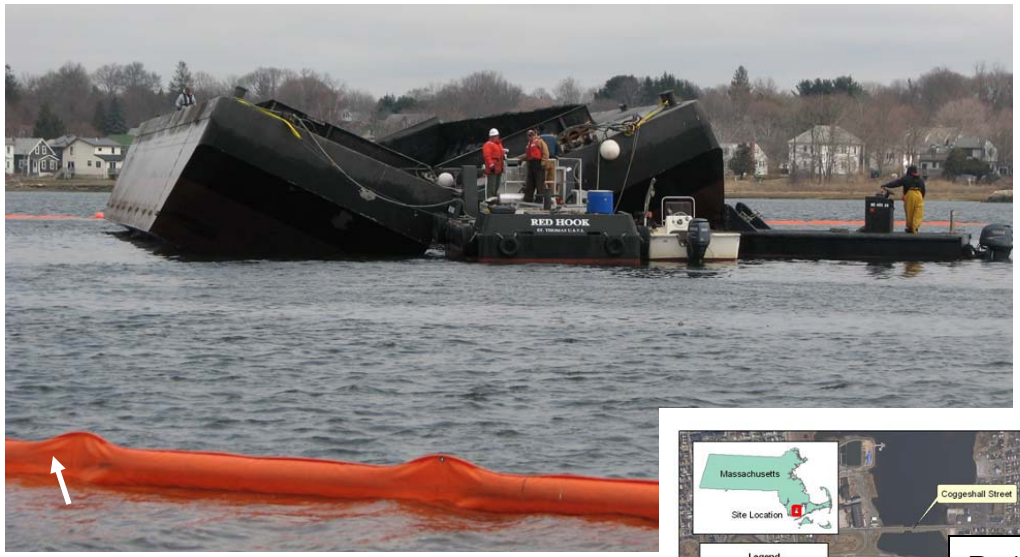
A2: the same monitoring found NO toxicity

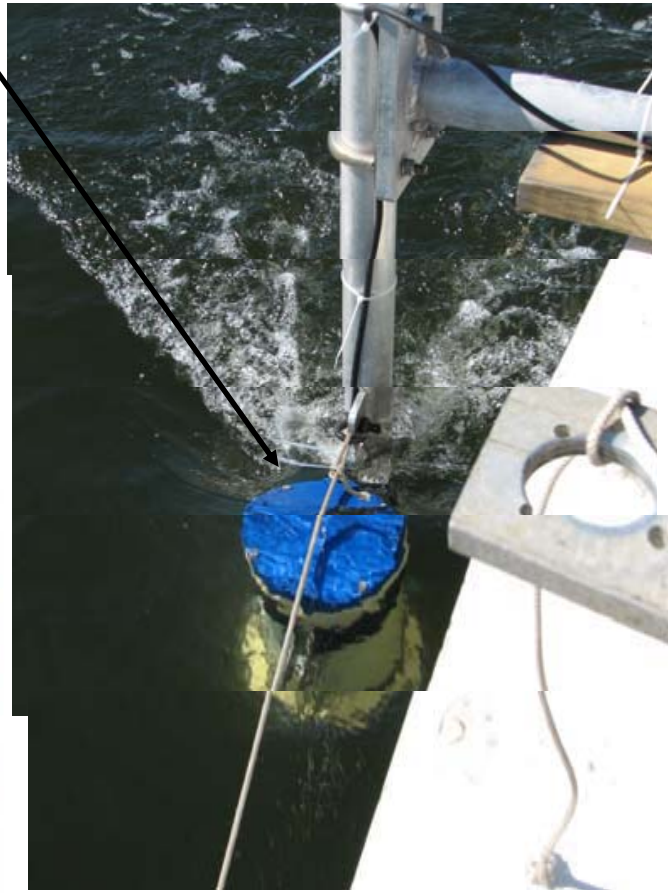
A3: short and long term computer modeling

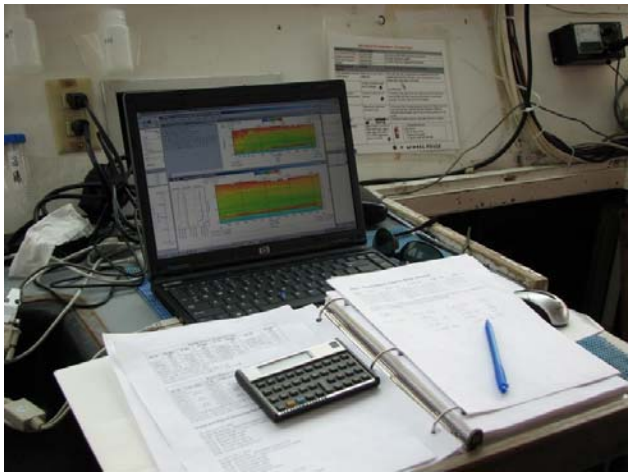
A4: performance standards would be used

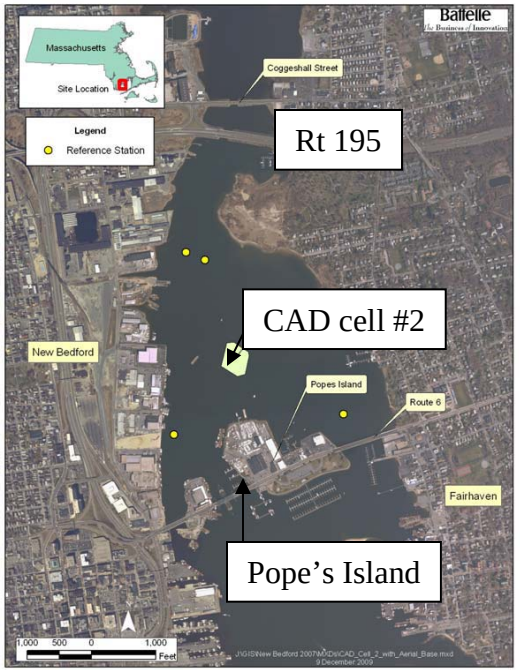
Water Quality Monitoring of Navigational CAD Cell #2

Acoustic Doppler Current Profiler

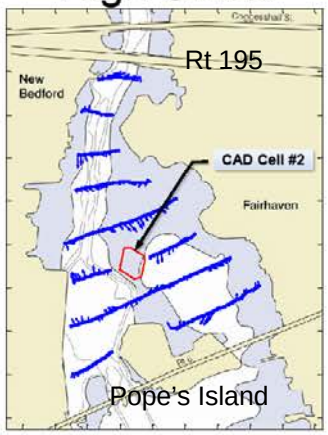




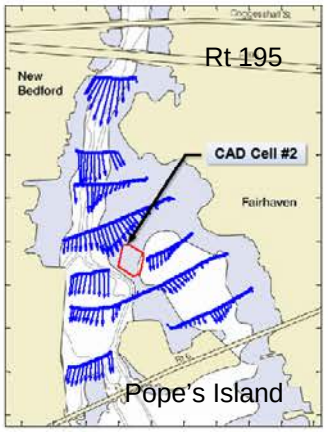




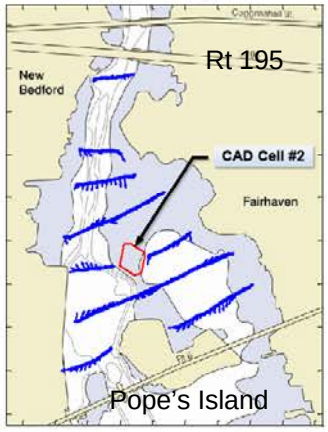
High Slack



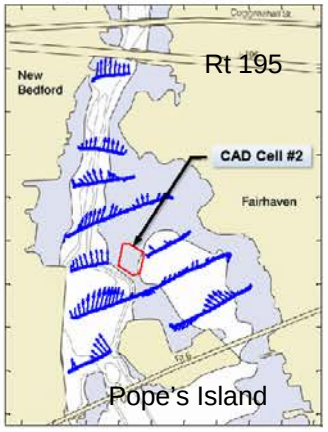
Max Ebb



Low Slack

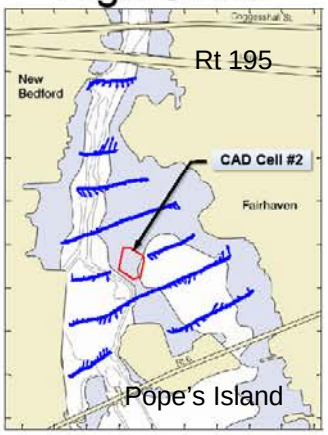


Max Flood

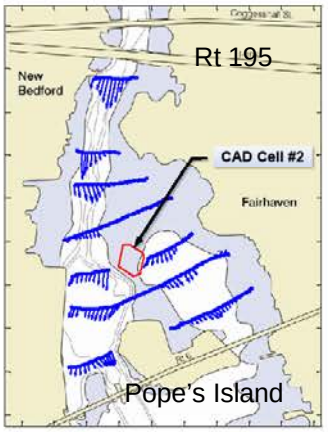


Surface Currents

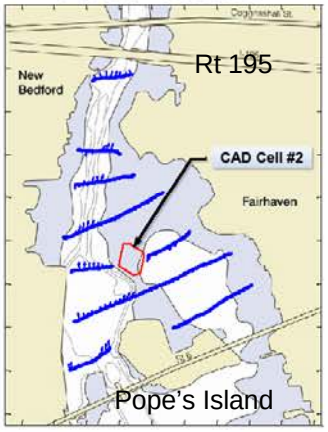
High Slack



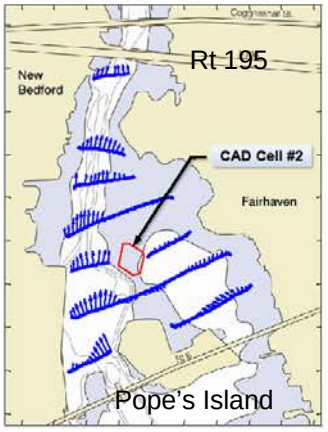
Max Ebb



Low Slack



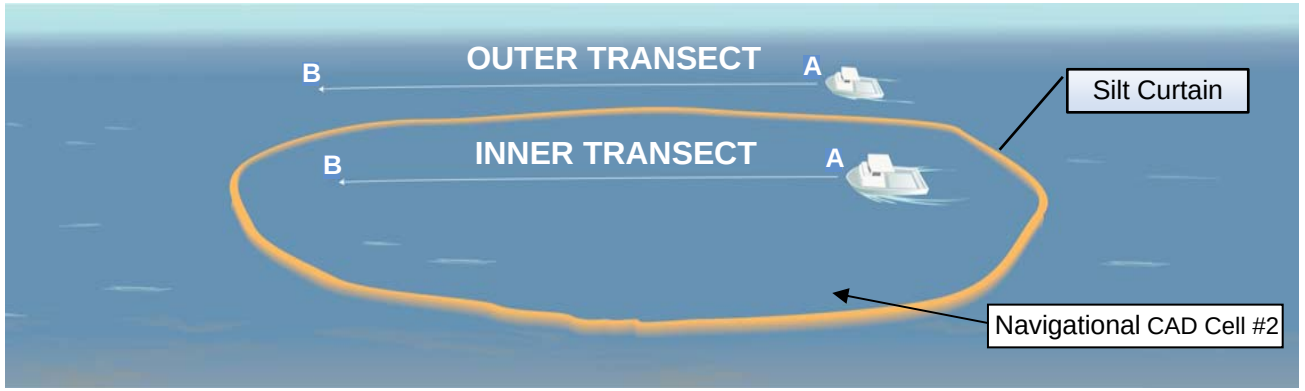
Max Flood

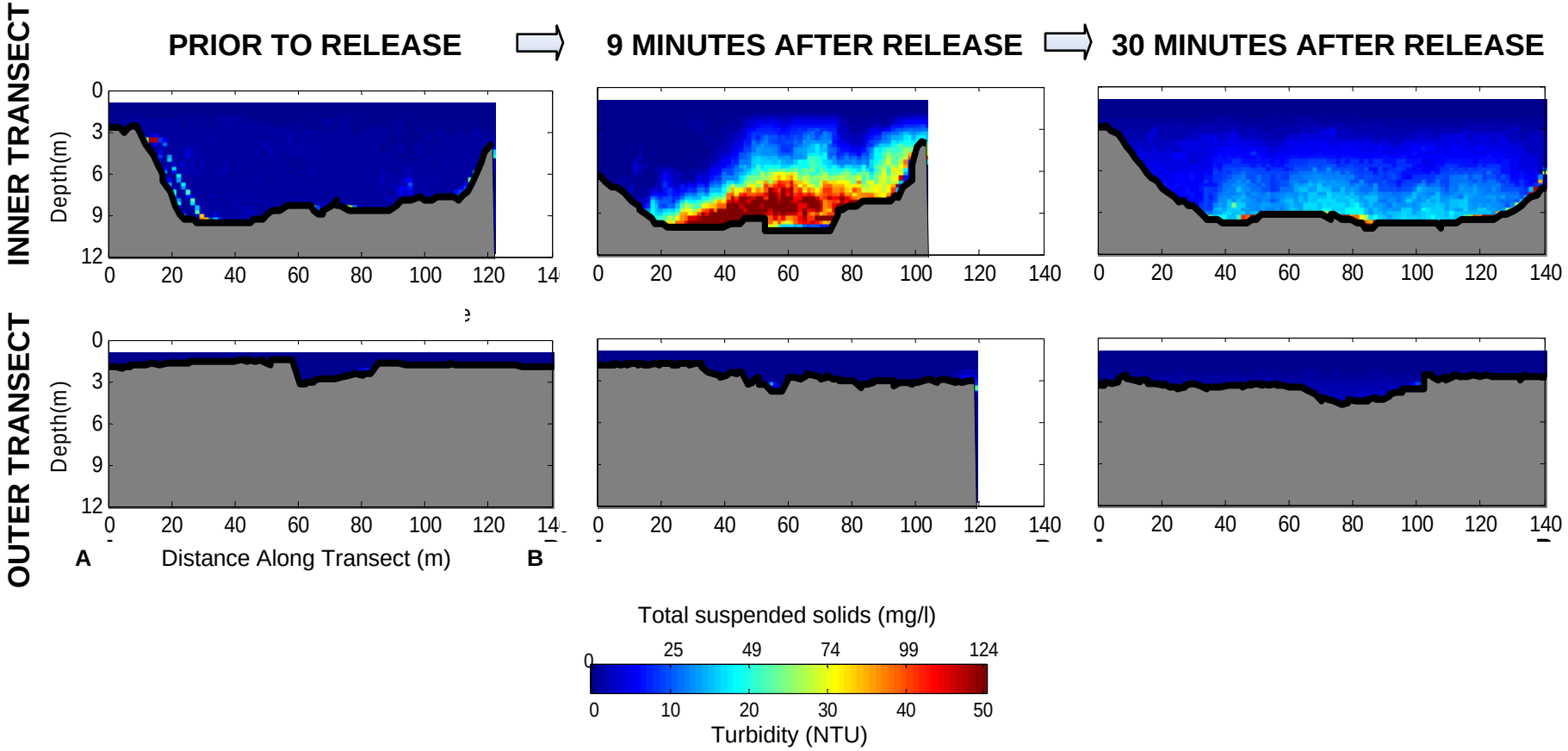


Bottom Currents

Note: Arrows show current directions with arrow length proportional to speed.

Tidal Currents Were Measured to Predict Location of any Turbidity Plume





Turbidity Measured Inside and Outside of CAD Cell #2 - 2009

Laboratory Sampling Showed NO Aquatic Toxicity Inside or Outside of CAD Cell #2 - 2009

Sample	Time After Release (min)	Turbidity from ADCP (NTU)	Toxicity Results					
			Sea Urchin (*A. punctulata*)	Mysid Shrimp (*A. bahia*)			Red alga (*C. parvula*)	
			mean fertilization (%)	48-hr mean survival (%)	7-day mean survival (%)	7-day mean biomass (mg/mysid)	48-hr mean survival (%)	7-day mean reproduction (cystocarp/ plant)
Lab Control	na	na	97.1	100	84.4	0.431	100	34.0
Site Reference	na	< 2	93.5[1]	100	82.5	0.462	100	34.0
Outside silt curtain	49	~12	95.0[1]	100	97.5	0.519	100	34.1
Inside silt curtain	20	~70	94.1[1]	97.5	87.5	0.435	100	34.7
Acceptance Criteria (for Lab Control)			> 70	≥ 90	≥ 80	>0.2	no necrosis	≥ 10

Results of computer modeling of CAD cell

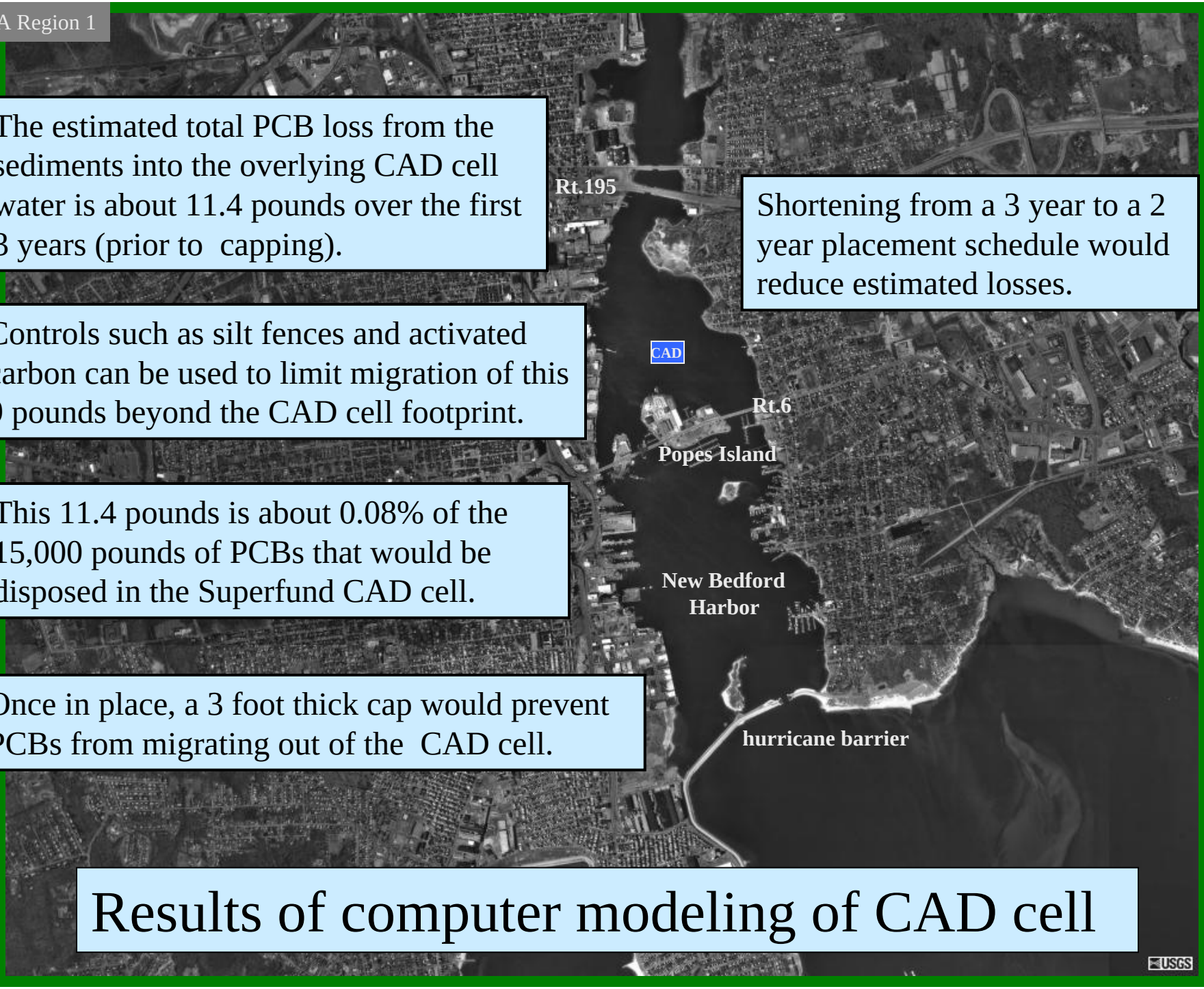
The estimated total PCB loss from the sediments into the overlying CAD cell water is about 11.4 pounds over the first 3 years (prior to capping).

Controls such as silt fences and activated carbon can be used to limit migration of this 9 pounds beyond the CAD cell footprint.

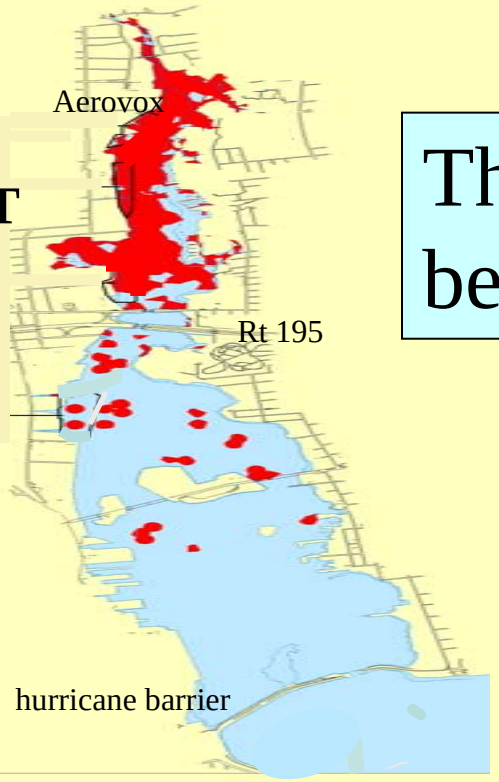
This 11.4 pounds is about 0.08% of the 15,000 pounds of PCBs that would be disposed in the Superfund CAD cell.

Once in place, a 3 foot thick cap would prevent PCBs from migrating out of the CAD cell.

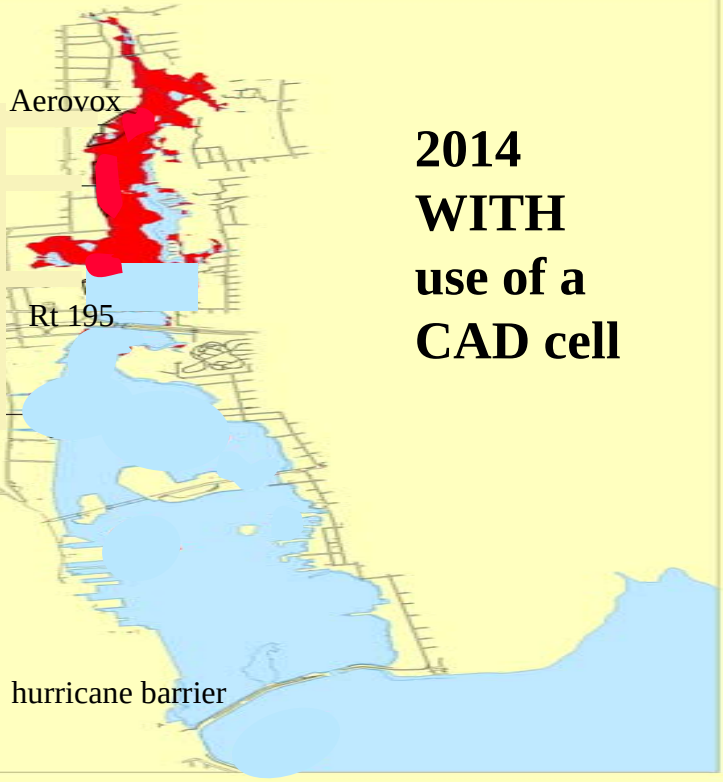
Shortening from a 3 year to a 2 year placement schedule would reduce estimated losses.



2014 WITHOUT use of a CAD cell



The lower harbor cleanup would be accelerated with a CAD cell



2014 WITH use of a CAD cell

Red areas are sediments requiring Superfund dredging. Assumes a typical $15 million annual funding rate.

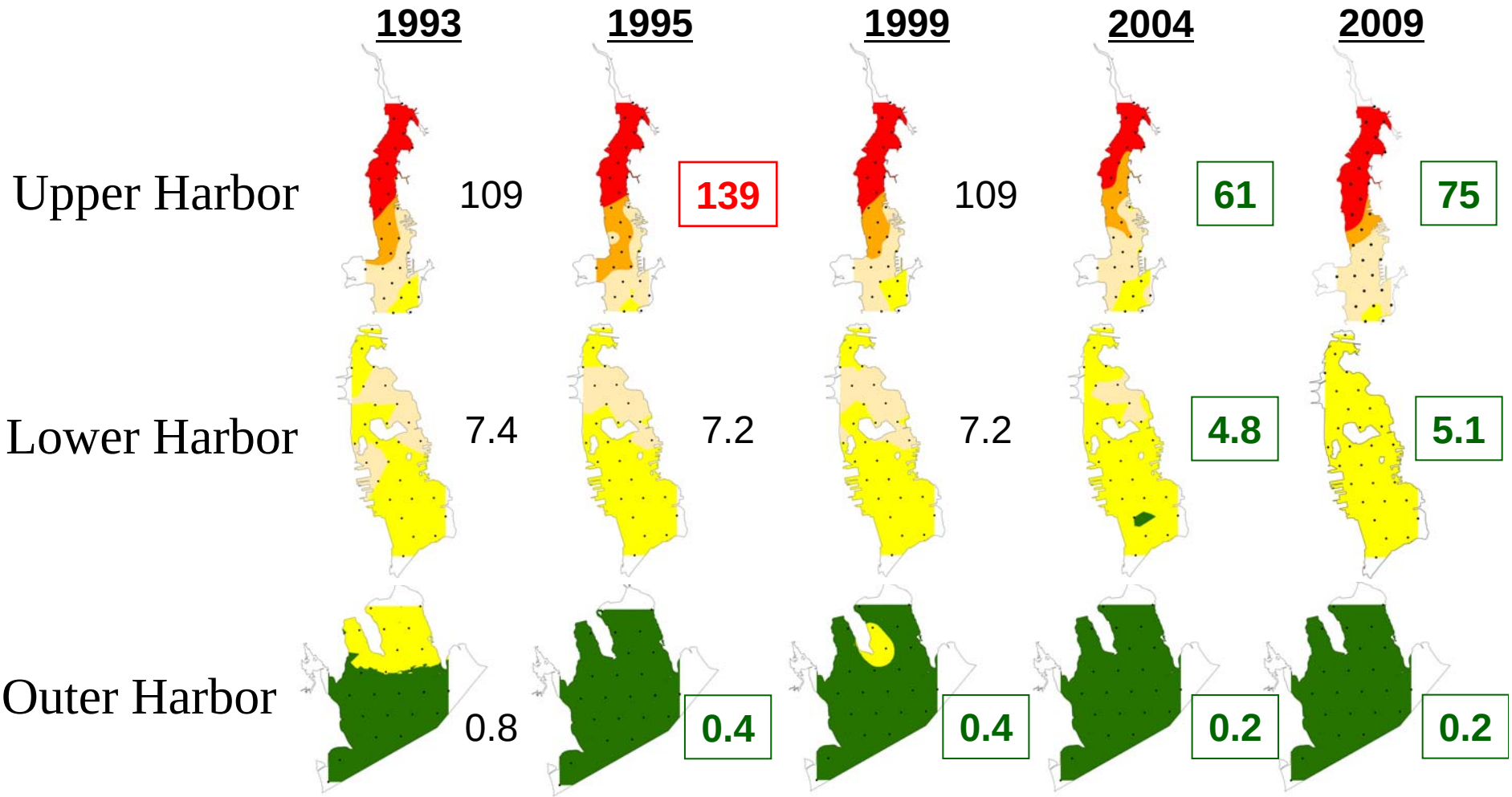
A CAD cell would be faster and less costly

	Time to Complete		Cost to Complete*	
Funding Level	Current Remedy	ESD Remedy	Current Remedy	ESD Remedy
$15 m/yr	46 yrs	40 yrs	$1.7B	$1.2B
$30 m/yr	40 yrs	26 yrs	$1.2B	$767m
$80 m/yr	7 yrs	6 yrs	$536m	$422m

*assuming 3.5% annual inflation

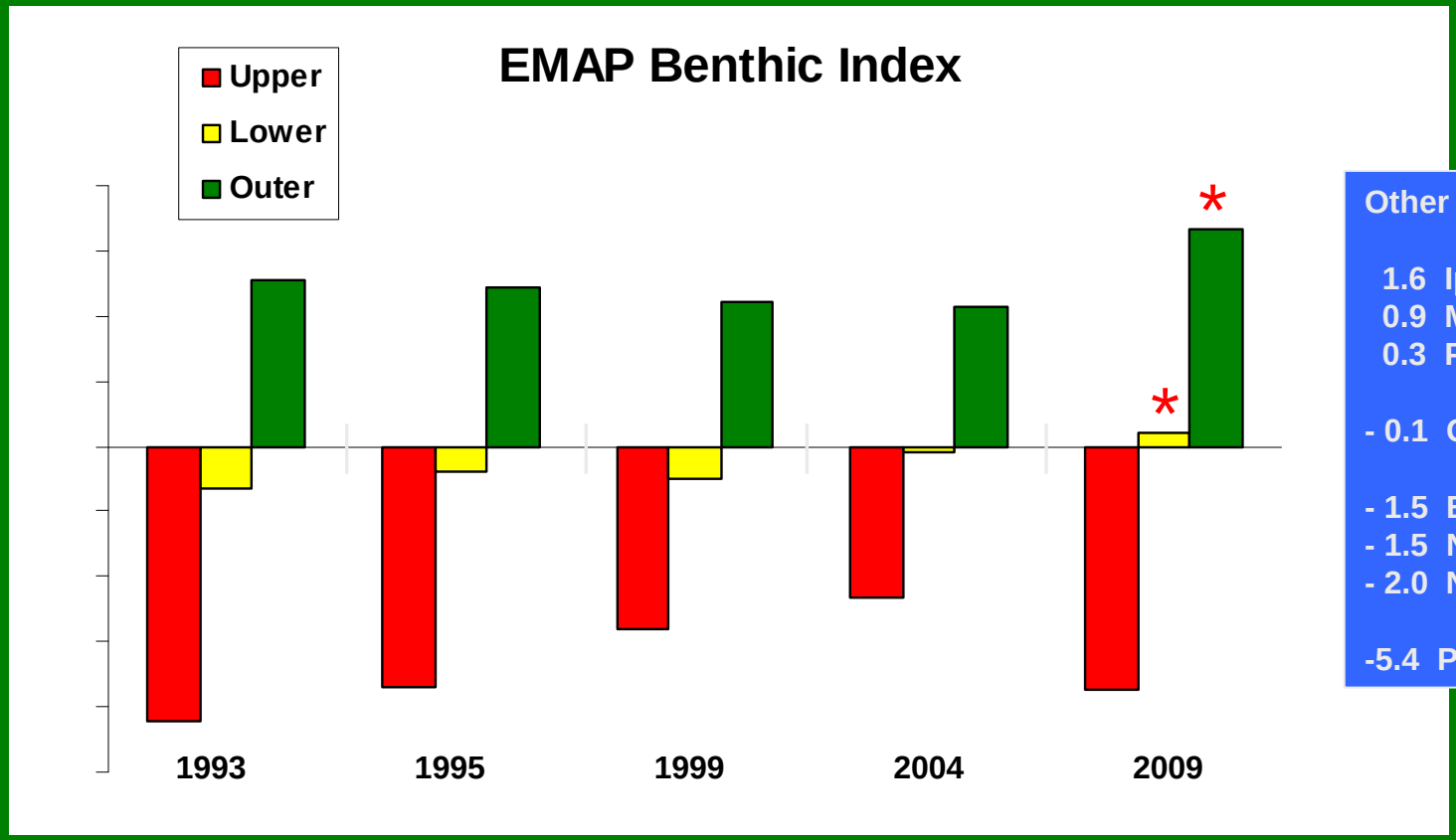
If the lower harbor is cleaned up before the upper harbor, won't it become recontaminated during upper harbor dredging?

Contamination of lower harbor from upper harbor dredging has NOT been observed to date



PCB levels in top 2 cm of sediment over time - ppm

Benthic quality index: lower harbor quality improving since 1993



Other Harbors:

1.6 Ipswich Bay, MA
0.9 Menemsha, MA
0.3 Pt Judith, RI

- 0.1 Gloucester, MA

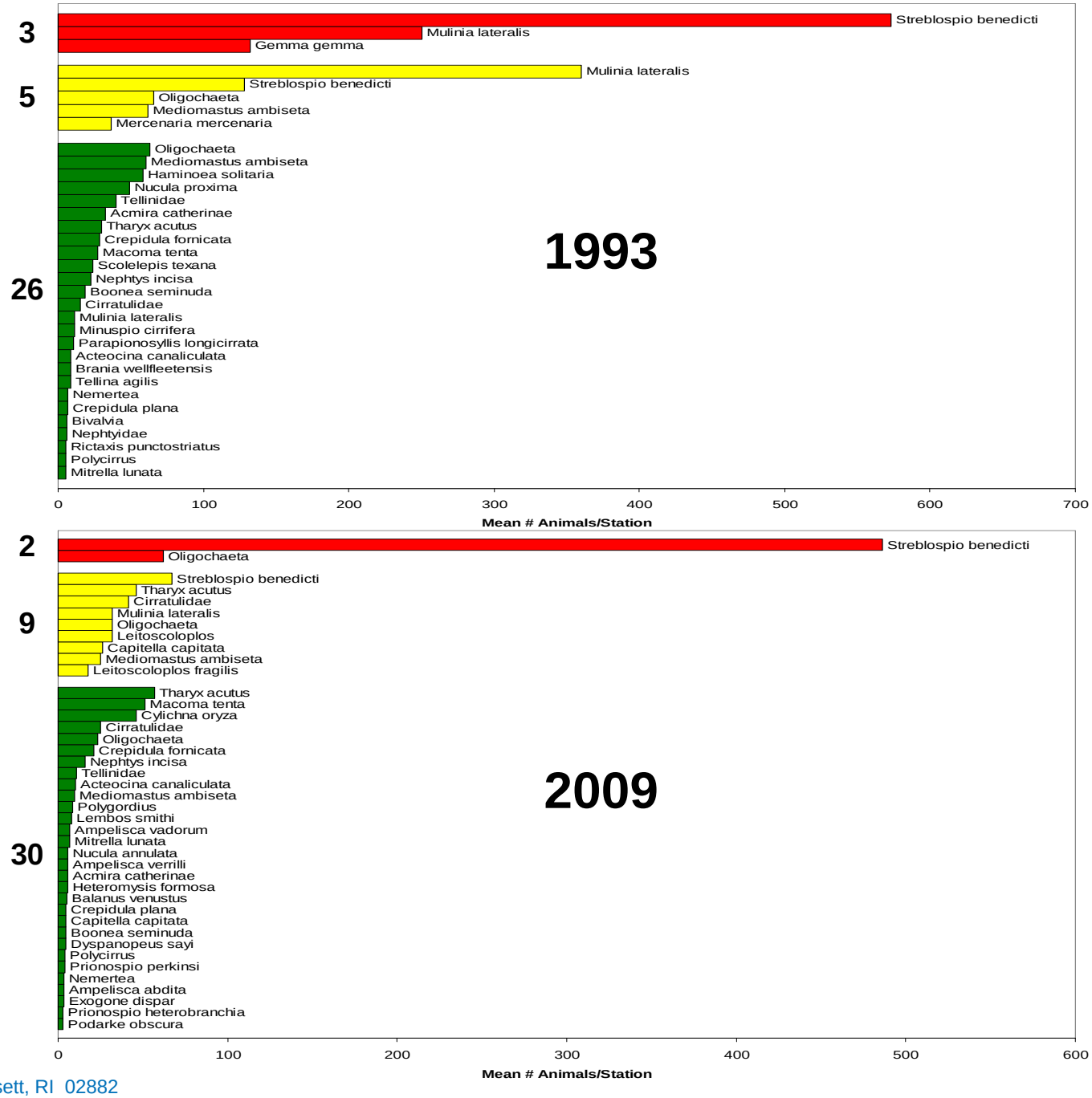
- 1.5 Boston Harbor
- 1.5 NY/NJ Harbor
- 2.0 New Haven, CT

-5.4 Providence, RI

United States Environmental Protection Agency

Benthic Community Comparison

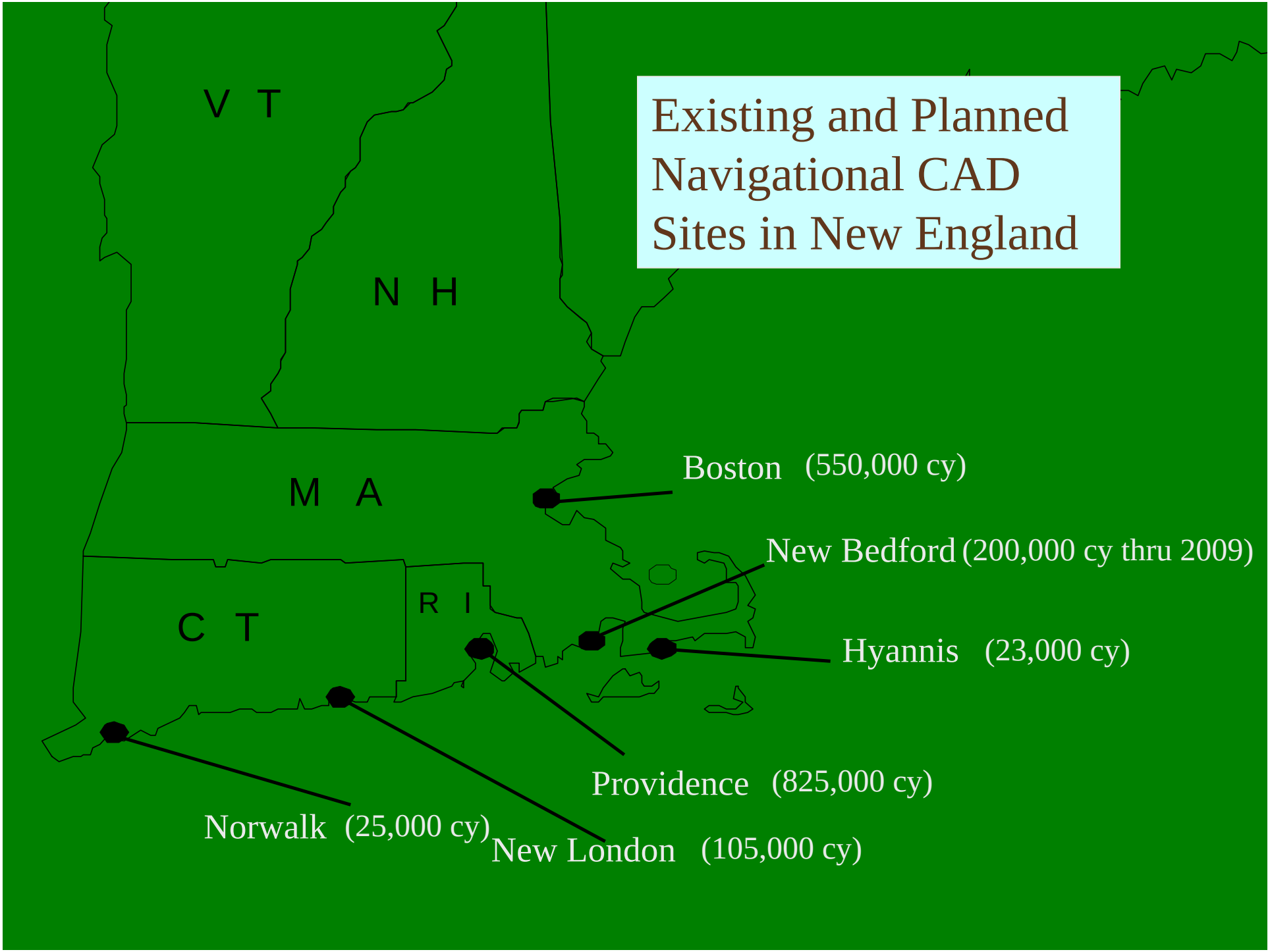
Another indication that the lower harbor quality is improving even as the upper harbor is dredged

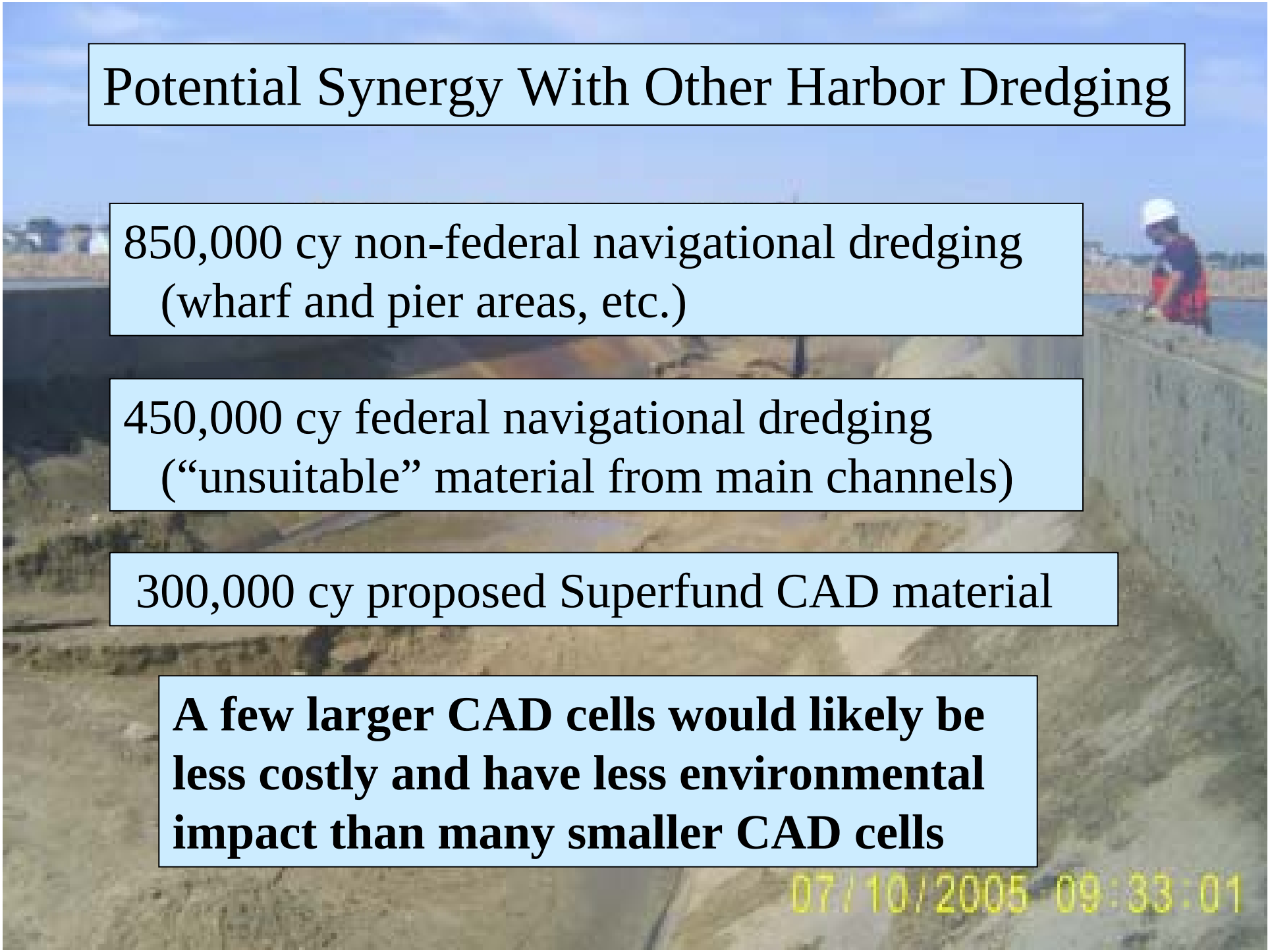


Office of Research and Development
NHEERL. Atlantic Ecology Division, Narragansett, RI 02882

Other Superfund Sites that have selected CAD cells:

- Puget Sound Naval Shipyard, WA
- Callahan Mine, ME
- St. Paul Waterway, Commencement Bay Site, WA
- St. Louis Rive Site, MN


Existing and Planned Navigational CAD Sites in New England
V T
N H
M A
C T
R I
Boston (550,000 cy)
New Bedford (200,000 cy thru 2009)
Hyannis (23,000 cy)
Providence (825,000 cy)
Norwalk (25,000 cy)
New London (105,000 cy)



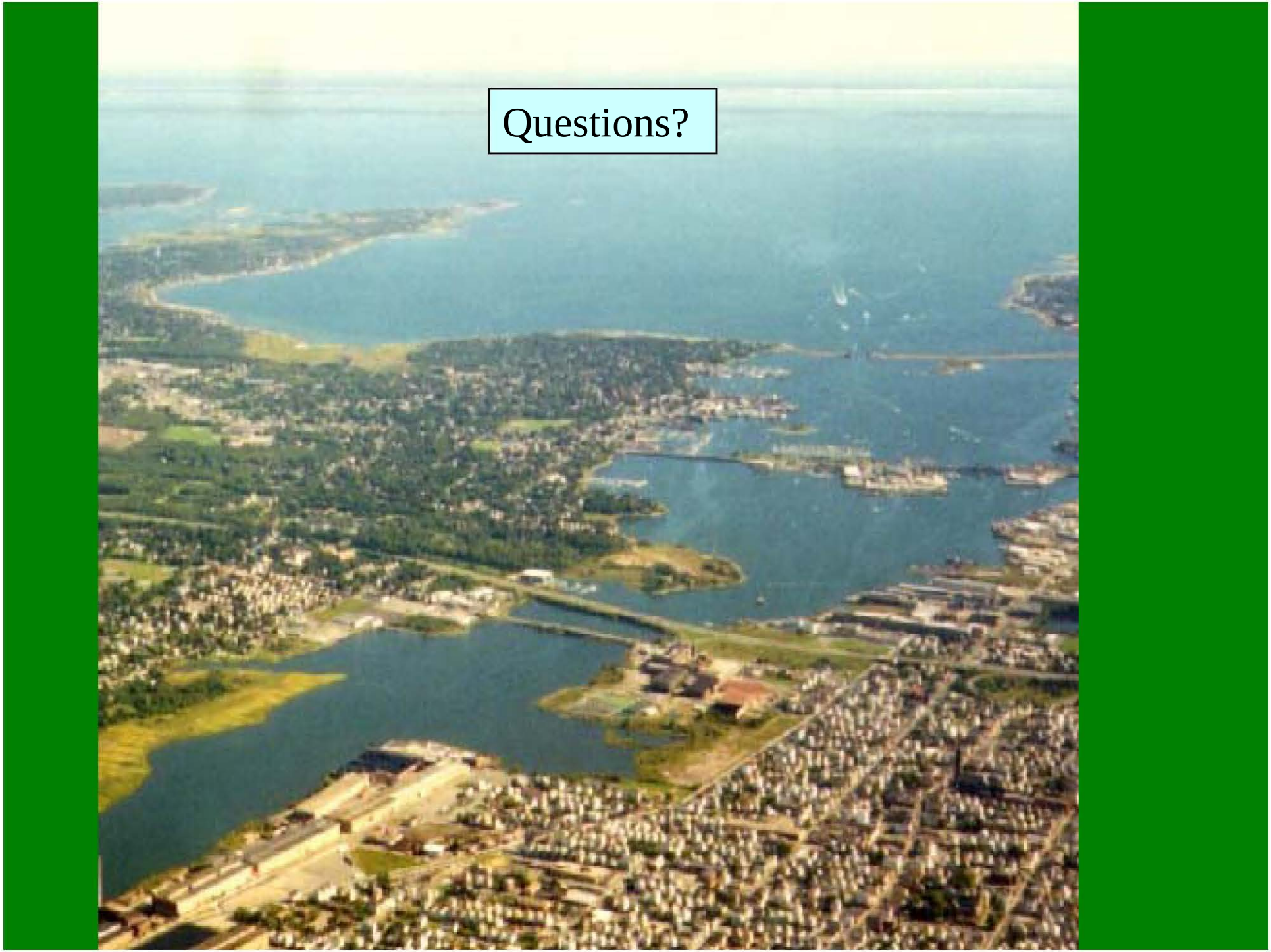
Potential Synergy With Other Harbor Dredging

850,000 cy non-federal navigational dredging (wharf and pier areas, etc.)

450,000 cy federal navigational dredging ("unsuitable" material from main channels)

300,000 cy proposed Superfund CAD material

A few larger CAD cells would likely be less costly and have less environmental impact than many smaller CAD cells


Questions?

REPOSITORY TARGET SHEET

US EPA New England
Superfund Document Management System /
RCRA Document Management System
Native Files Target Sheet

SDMS / RDMS Document ID #: 299754

Site Name: NEW BEDFORD

File Break: 13.04

File Type(s) Attached Specify below (Example: Excel file or .jpg):

Powerpoint file (.ppt)

Document Type this Target Sheet Represents:

☐ Map ☐ Photograph ☐ Graph/Chart

☐ Video ☐ Compact Disc ☑ Other (Specify below)

Public Meeting Presentation Slides

Description or Comments:
Native file format for June 2010 Public Meeting Presentation. File name: 2010.june.pub.mtg.ppt

To view the attached files, click on the "Attachment Panel"

** Please note to view attachments the software corresponding with the specified file type is necessary. **

For any additional assistance please contact the EPA New England Office of Site Remediation and Restoration Records and Information Center-
Telephone (617) 918 1440