

Results and Management Implications of an Environmental Survey of the Norton Basin/Little Bay Borrow Pits, Jamaica Bay, NY

David J. Yozzo
Barry A. Vittor & Associates, Inc.

Steven Zahn
NYSDEC



Dredging Crisis in NY Harbor

1.7 million containers loaded annually. By 2010, 4 million containers per year expected if the Port can maintain and improve its existing channel system to meet anticipated needs

Dredged material placement options:

- Offshore placement
- Inshore placement
- Upland placement \$\$\$
- Decontamination \$\$\$



USACE and PANY/NJ's Dredged Material Management Plan includes "Beneficial uses of Dredged Material for Habitat Creation, Restoration and Enhancement" as a suite of alternatives

Bathymetric Recontouring of channels, dead-end basins and borrow pits is considered a beneficial use alternative

Up to 40 mcy placement capacity harbor-wide at a cost of \$5-10 per cy





Project Phases

Phase I - Baseline Environmental Characterization

Study Areas:

Norton Basin,
Little Bay

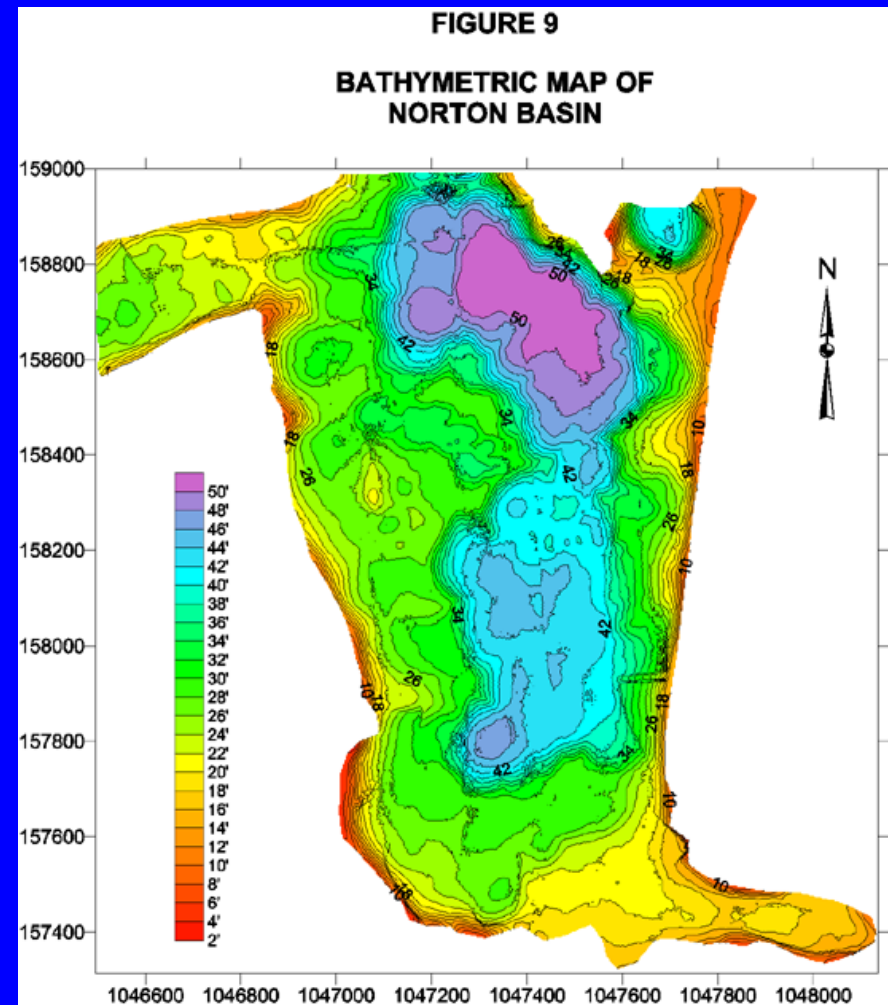
Reference Areas:

Grass Hassock Channel,
The Raunt

Phase II - Construction/Placement Monitoring

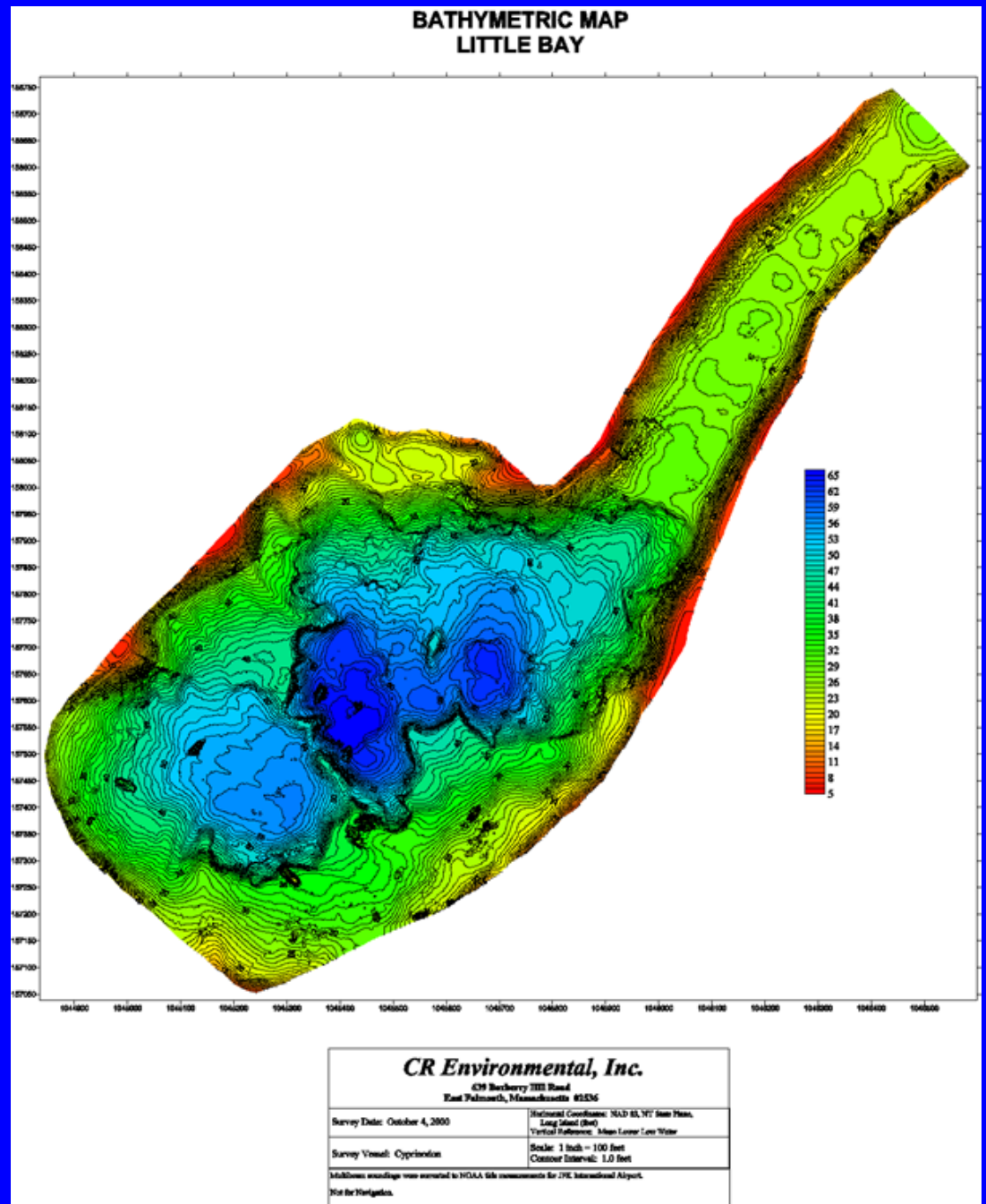
Phase III - Post-Construction/Placement Monitoring

Norton Basin Bathymetry



<i>CR Environmental, Inc.</i> 639 Boxberry Hill Road East Falmouth, Massachusetts 02536	
Survey Date: October 4, 2000	Horizontal Coordinates: NAD 83, NY State Plane, Long Island (feet) Vertical Reference: Mean Lower Low Water
Survey Vessel: Cyprinodon	Contour Interval: 2.0 feet 1 Inch = 300 feet
Multibeam soundings were corrected to NOAA tide measurements for Sandy Hook, corrected to Motts Basin. Not for Navigation.	

Little Bay Bathymetry



Water Quality Monitoring (2001-2002)

Depth Profiles (DO, Temp., Salinity)

Continuous *in situ* Sensor packages (DO, Temp., Salinity, TSS, Current Speed/Direction)

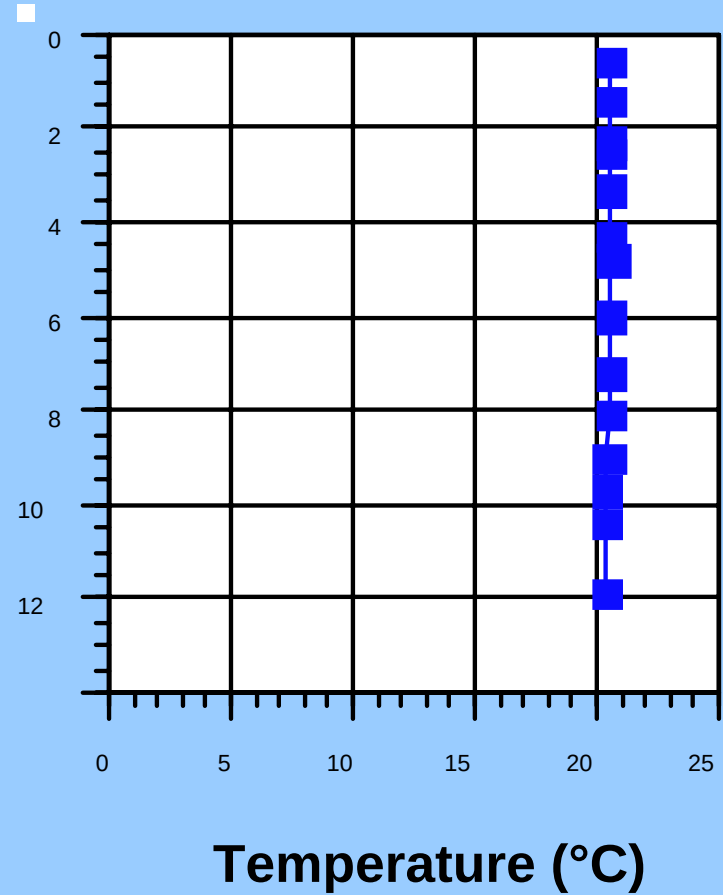
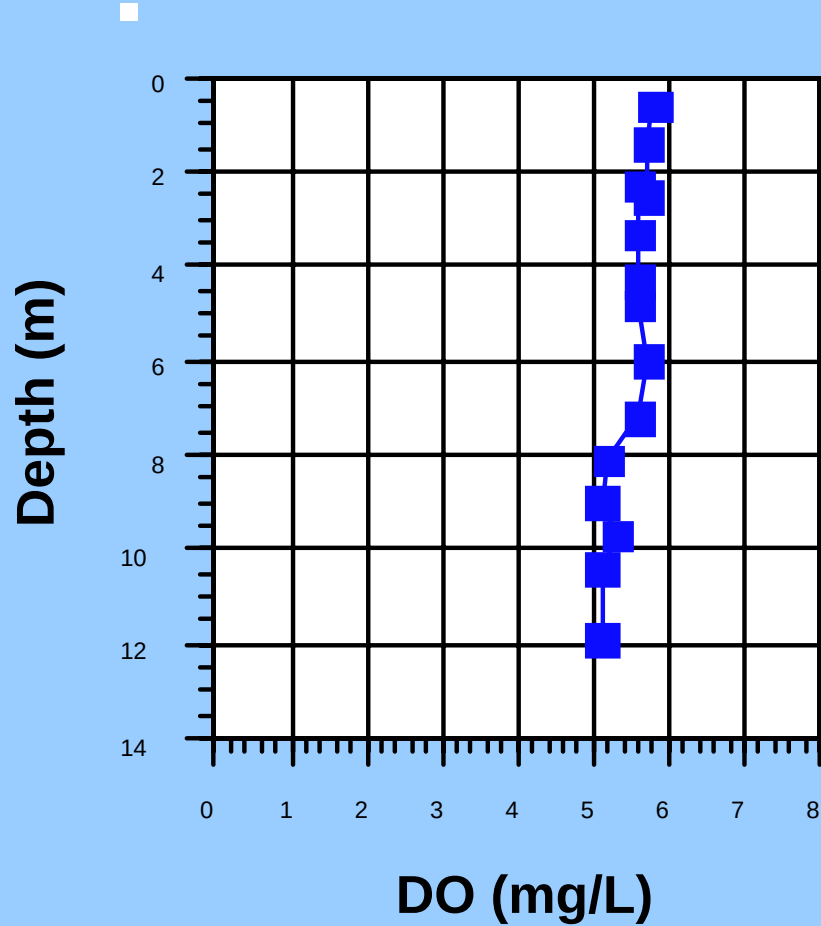
Nutrient Analyses:

Dissolved (N, NH₃, NO₂/NO₃, PO₄, TOC, Si)

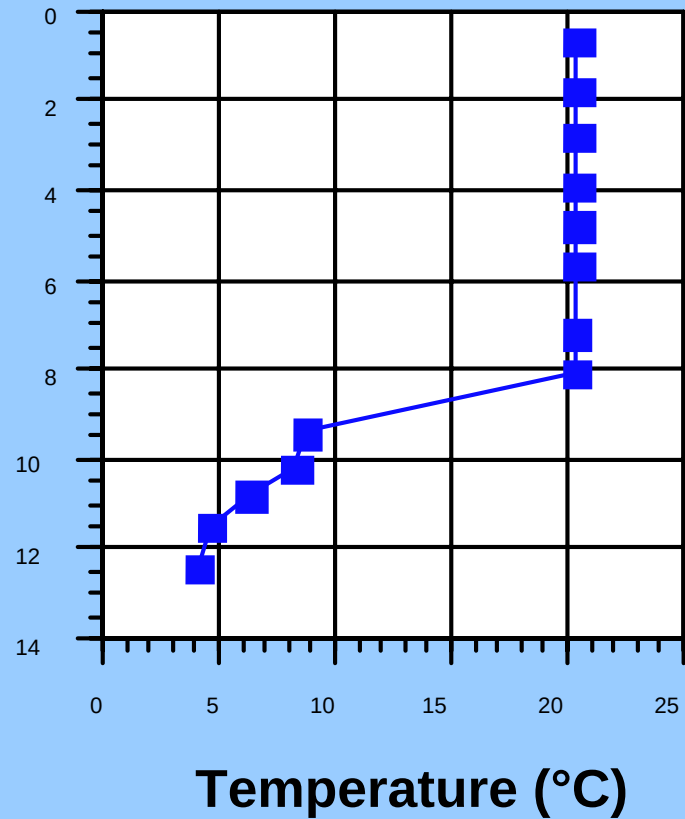
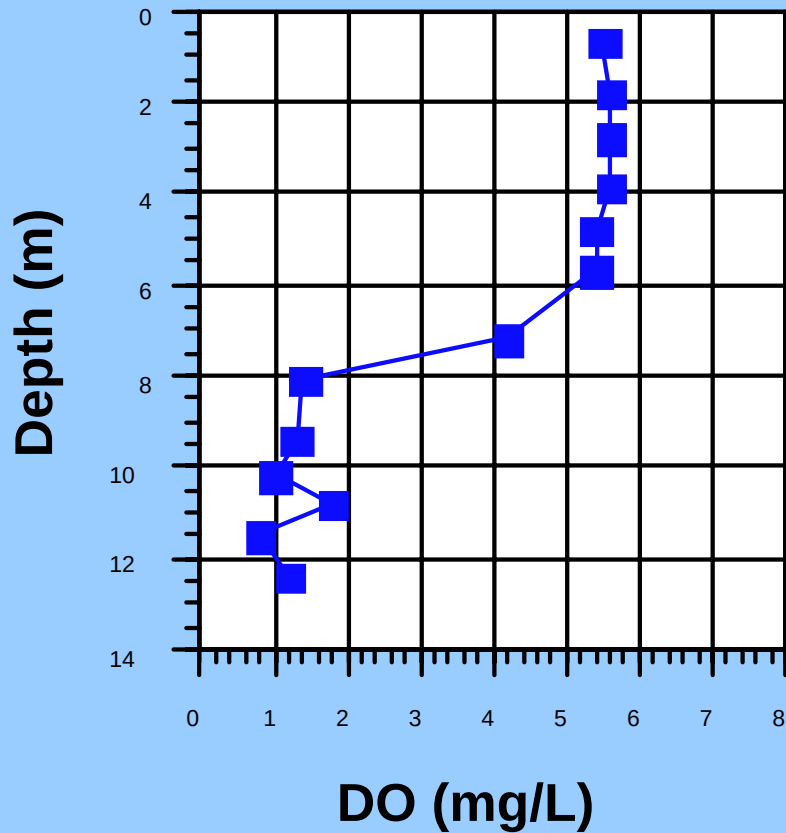
Particulate (C, N, P, Chl a, TSS)



Norton Basin Pit 9-25-00



Little Bay Pit 9-25-00



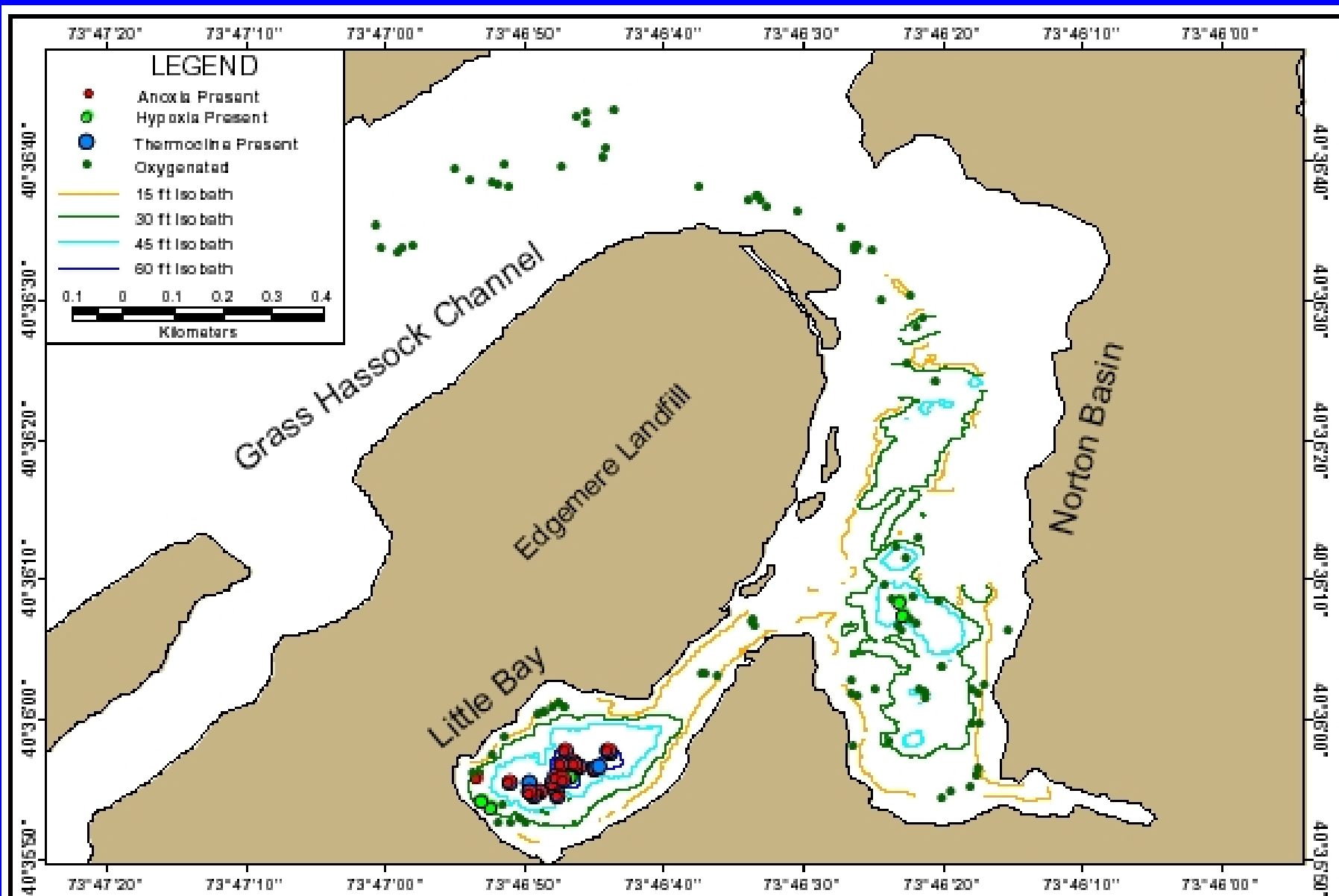


Figure 11. Summary of water column profile survey results from May to October 2002.

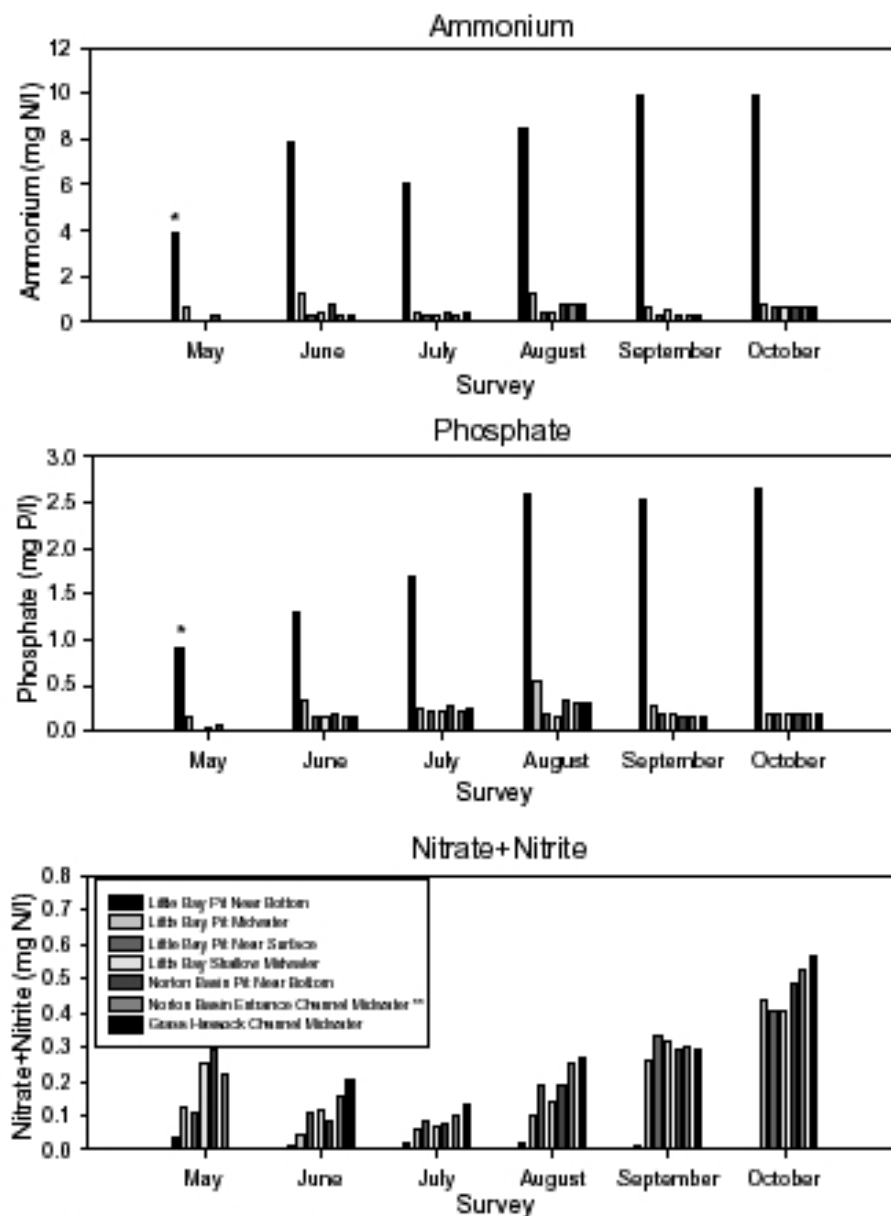


Figure 13. Ammonium, phosphate, and nitrate+nitrite in Little Bay pit near bottom, midwater, and near surface, Little Bay shallow midwater, Norton Basin pit near bottom, and Grass Hassock Channel midwater samples.

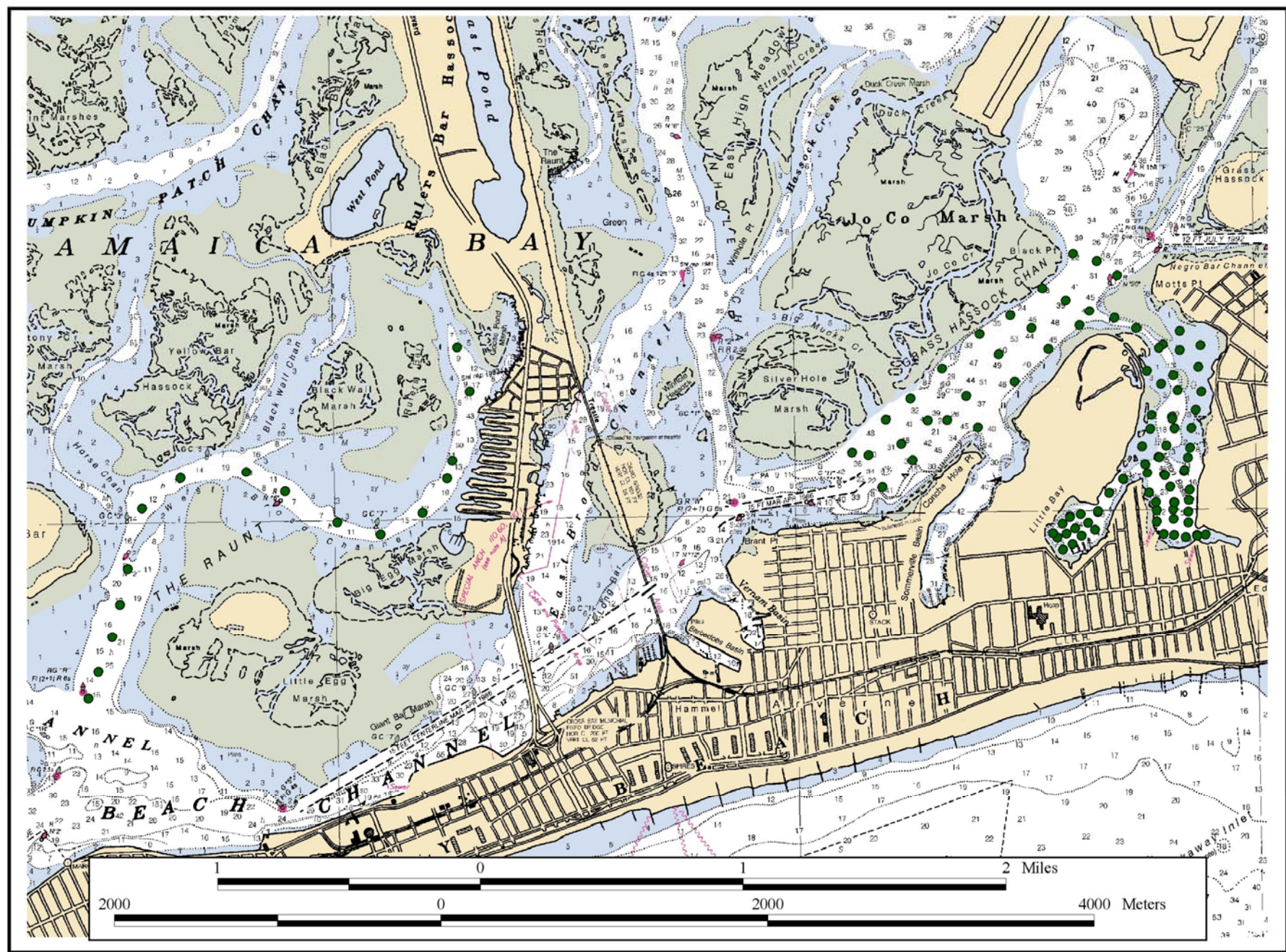
Sediment Characterization/Contaminant Analysis

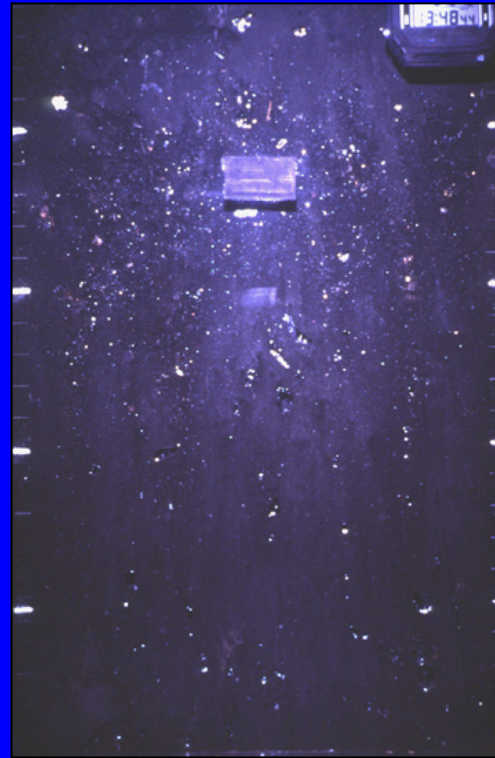
Norton Basin, Little Bay, the Raunt, and Grass Hassock Channel

VOC's
SVOC's
TAL metals
Pesticides
PCB's
Dioxins
Furans
Nitrate/nitrite
Cyanide
Fecal coliform
Grain size
Acid-volatile sulfide
Atterberg limits
Bulk density
Porosity
TOC
% Solids



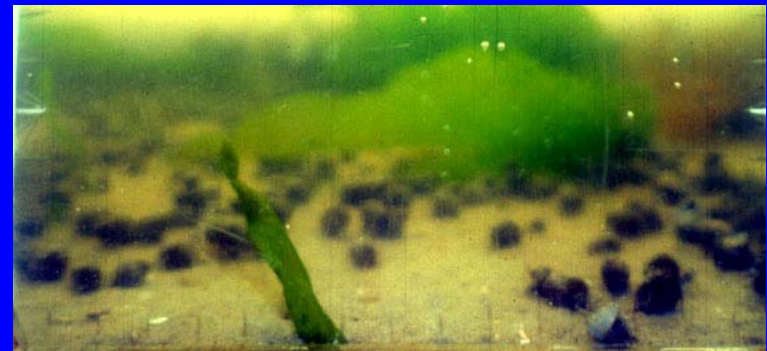




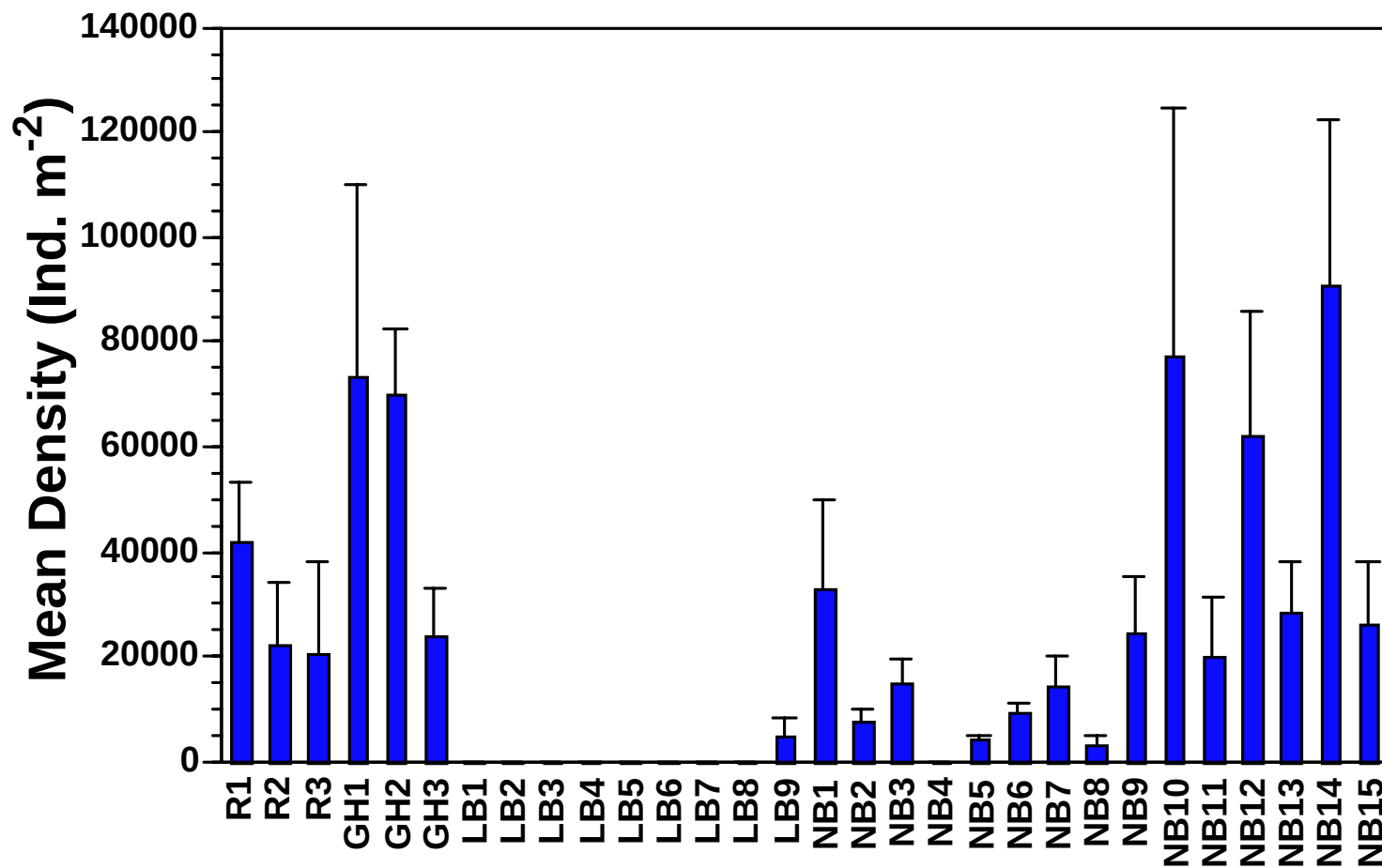


Gas voids

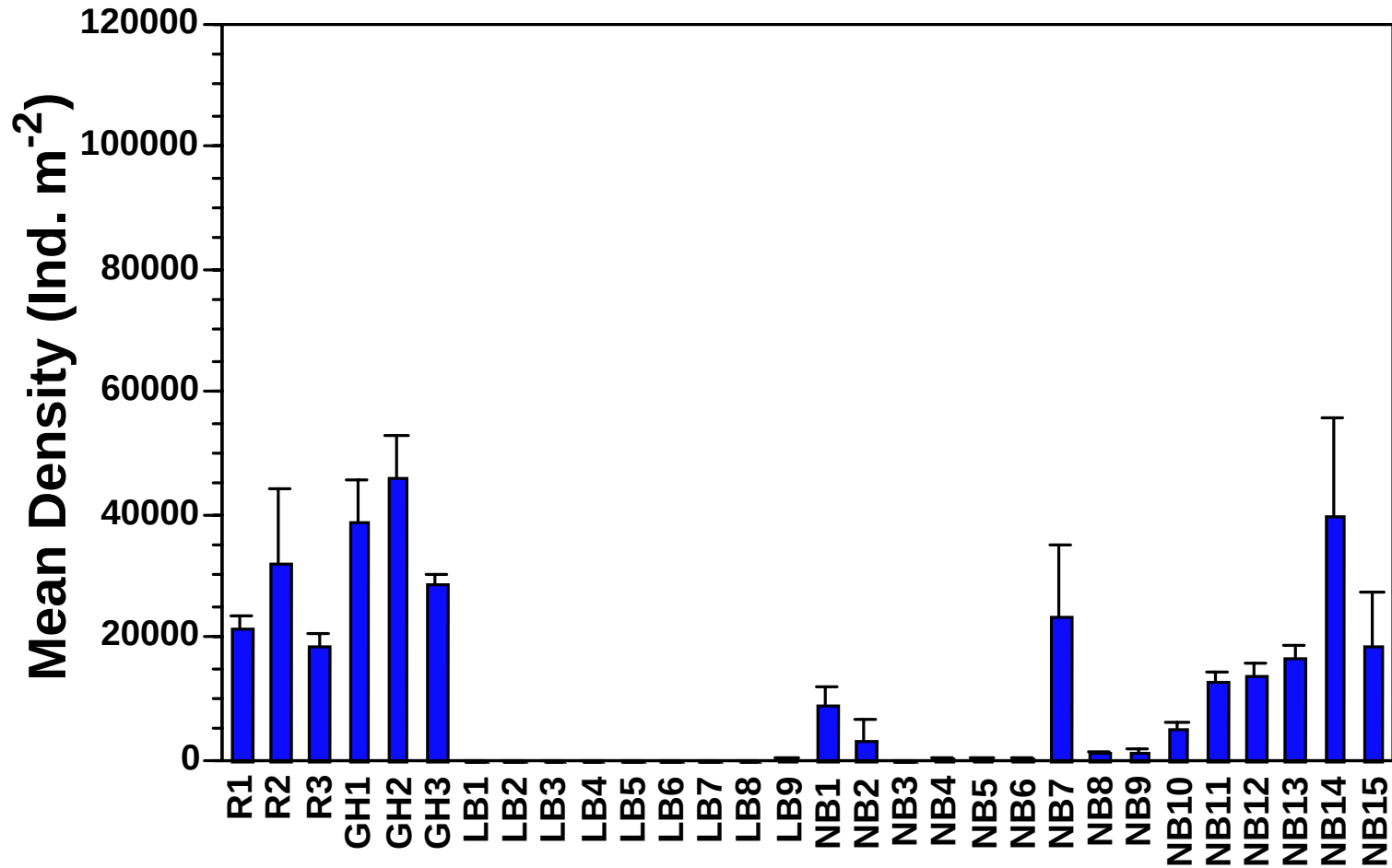
Sulfur bacteria



June, 2002



October, 2002



Cluster analysis of benthic assemblage composition

The Raunt:

dominated by tubicolous amphipods (*Ampelisca vadorum*, *Monocorophium tuberculatum*, *Microdeutopus gryllotalpa*)

Grass Hassock Channel:

dominated by tubicolous amphipods (*A. vadorum*, *M. tuberculatum*)

Norton Basin deep:

dominated by polychaetes (*Capitella capitata*, *Polydora cornuta*, *Sabellaria vulgaris*, *Mediomastis* spp.)

Norton Basin shallow:

diverse assemblage of amphipods polychaetes and molluscs).
No one group dominated

Figure 16. Station dendrogram from the cluster analysis for the Norton Basin stations, June 2002.

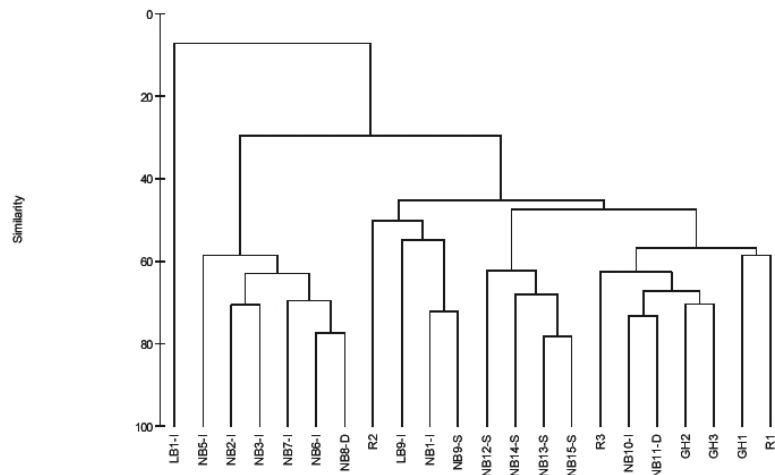
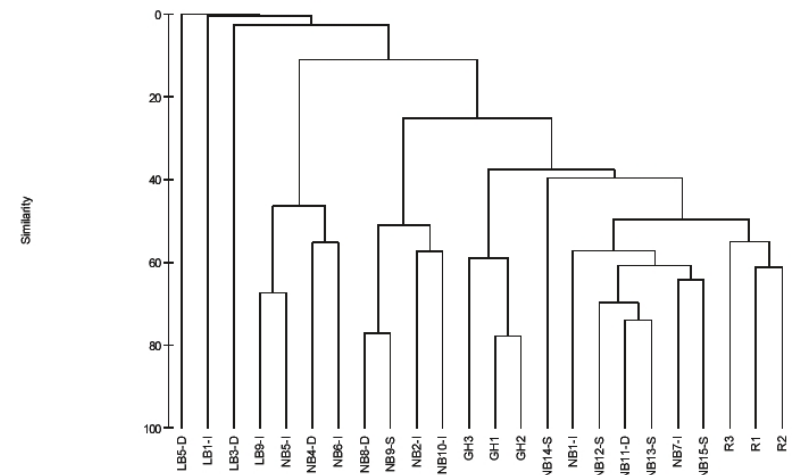


Figure 26. Station dendrogram from the cluster analysis for the Norton Basin stations, October 2002.



Bioassay and Bioaccumulation Testing Norton Basin, Little Bay, and Grass Haddock Channel June/July 2002

10-day whole sediment tests

M. bahia

E. estuarius

A. abdita

96 hr elutriate tests

M. bahia

M. beryllina

48 hr elutriate test

bivalve (*M. californicus*) larvae

28 day bioaccumulation test

N. virens





Fish Sampling (Gill Nets)

Norton Basin, Little Bay, and Grass Hassock Channel

May/June 2002



	<u>May</u>	<u>June</u>
<u>CPUE (g/hr):</u>		
R	1676.7	2800.6
GH bottom	1609.0	2524.2
GH mid	4037.6	227.6
GH surface	1597.8	562.5
NB bottom	3115.4	1913.2
NB mid	898.5	635.7
NB surface	900.6	185.7
NB shallow	1767.6	1522.8
LB bottom	0	0
LB mid	140.5	0
LB surface	768.7	0
LB shallow	1669.7	325.2