N00102.AR.000114
NSY PORTSMOUTH
5090.3a

MINUTES OF MEETING

SUBJECT: Technical Review Committee (TRC) Meeting
Portsmouth Naval Shipyard (PNS)
RCRA Facility Investigation/Corrective Measures Program

PURPOSE: The TRC meeting was called by the Navy to update the TRC members on the NCCOSC Off-Shore Investigation.

LOCATION: Portsmouth Naval Shipyard
Kittery, Maine

DATE: June 9, 1992

PREPARED BY: Stephen F. Urschel, Manager, Geoscience S.F. Urschel
Project Manager
McLaren/Hart Environmental Engineering Corporation
28 Madison Avenue Extension
Albany, New York 12203
(518) 869-6192

June 15, 1992

McLaren Hart

ATTENDEES:

Community/Public Representatives

Maria Barth, Town of Kittery
Jeffrey Clifford, Town of Kittery
John Nelson, New Hampshire Fish and Game
Chris Mitchell, Town of Kittery

USEPA Region I

Ernest Waterman, Project Manager

Maine DEP

Pamela Parker, Environmental Specialist
Mark Hyland, Federal Facilities Unit

US Navy- PNS

Paul Clark, Director, Environmental Affairs
Ken Plaisted, Environmental Affairs
Jim Tayon, Environmental Engineer
Martin Marsh, Environmental Affairs
Mike Pedersen, Environmental Affairs
Capt. J.T. Pessoney, Occupational Medical Physician, NEHC Detachment
Jim Braun, Super. Industrial Hygienist
Ralph Hickson, OSH
Len Sargent, OSH
Lt. Cecil Abels, Environmental Health Officer
Paul LaCroix, Audiologist, NEHC Detachment

US Navy- Compat/Wings Lant

Jennifer Parker, Regional Environmental Coordinator
Lt. Karen Zapp, REC
LCDR. Mike L'Abbé, REC

NCCOSC

Bob Johnston, Project Coordinator

US Navy- Northern Division, Philadelphia

Linda Dietz, Remedial Project Manager
Jim Szykman, Technical Manager
Kristen Wall, Biologist

McLaren/Hart Environmental Engineering Corporation

Stephen Urschel, Project Manager, Albany, NY

NUS

Karen Roof, Halliburton NUS

SAIC/ERLN

Wayne Munns
Cornelia Mueller, Biologist

University of New Hampshire

Frederick Short, Ecologist

BACKGROUND

The subject TRC meeting was held at Building 156 at the Portsmouth Naval Shipyard, Kittery, Maine to update committee members on the findings of the Phase I Off-Shore Investigation. Phase I began during the summer of 1991 in support of the RCRA Facility Investigation. In particular, the off-shore investigation was implemented to assess ecological conditions in the Piscataqua River and Great Bay Estuary in order to ascertain what impact, if any, there has been on the estuary as a result of contaminant releases from SWMUs at the PNS.

DISCUSSION

The meeting was opened by Linda Dietz followed by Jim Tayon who briefly discussed the shipyard's community relations plan.

The subject estuarine ecological risk assessment (Phase I) presentation was provided by Bob Johnston of Naval Command, Control, and Ocean Surveillance Center, San Diego, California, in conjunction with USEPA Research Laboratory in Narragansett, Rhode Island and the Jackson Estuarine Lab of the University of New Hampshire. All attendees were provided with a comprehensive written status report covering the information that was presented.

Since the status report provided the core information of the presentation, these minutes will not repeat the presented information but will summarize the presentation and supplement the status report by presenting comments and questions raised during discussions.

SUMMARY

Bob Johnston provided an introduction by summarizing the purpose and objectives of the study and discussing the cooperative agreement between the USEPA Research Laboratory (ERLN) in Narragansett and the Naval Command, Control, and Ocean Surveillance Center (NCCOSC).

After his introductory discussion, Bob Johnston (NCCOSC) turned the presentation over to Dr. Wayne Munns (SAIC/ERLN) who discussed the program design. Dr. Munns then introduced Dr. Frederick Short (UNH) who presented information pertaining to sample collection locations and sampling methodologies. After a 5-minute recess, a discussion of the chemical analyses was presented by Bob Johnston. Mr. Johnston followed this with a brief look at the activities proposed for Phase II which is scheduled for completion by October, 1993.

- Findings and conclusions included:

  - Bob Johnston indicated that Phase I was intended to gather information to determine if significant ecological impacts can be related to PNS. Because not all of the analytical data had been received from the subcontracted laboratory, comparisons could not be made between contaminant concentrations and ecosystem/ecological stress at the time of this presentation.

  - High population densities and wide variations in population density between samples was evident at Station 4 and Station 8 in Clarks Island Embayment, Station 19 in the back channel, and downriver at Station 2.

  - Fecal coliform concentrations were generally low for estuarine sediments.

  - Ammonium, nitrate and chlorophyll concentrations in sediment were all quite low and uniform throughout the sampling stations.

  - Fecal coliform concentrations in the water column showed some variability but were generally low, indicative of a "clean" water column.

  - Bivalve biomass measurements showed variability with respect to station location.

  - Eel grass biomass and density is relatively uniform with the exception of a few areas of high biomass and/or density. Variations show no correlation with proximity to PNS.

  - Blue Mussel population density showed moderate variability with no correlation with proximity to PNS. Blue Mussel lengths showed some correlation with populations density sometimes suggesting an organism size decreased with an increase in density.

  - Wet weight results for caged mussels indicated smaller mussels at Station 15. The reason for this is not known.

  - Caged mussels located near the shipyard did not show a statistically significant difference from other populations.

  - Scope for growth results for these mussels showed no evidence of contaminant stress.

  - Trawls for lobster and flounder revealed a high diversity of organisms in the estuary.

- A relatively high density of immature lobsters was recovered.

- Available analytical data showed low concentrations of PAHs and PCBs in sediment samples and much lower concentrations still in mussel tissue samples.

- Inorganic results for mussel tissue, flounder flesh from an unpolluted sources, lobster tails and lobster hepatopancreas showed fairly low metals concentrations on average with many metals below the MDL.

- Similarly low concentrations of PCBs, phenols, pesticides, and semi-volatile compounds were measured in lobster tail.

- Concentrations of these compounds were somewhat more elevated in the lobster hepatopancreas.

- Similar findings were made for these compounds in flounder filet versus flounder liver.

Questions were presented and answered during the presentation. A brief summary of the questions and responses follows.

- An attendee questioned whether any specific chemical markers had been identified which were unique to the shipyard.

  Response - Bob Johnston indicated that no unique marker had yet been identified for the PNS but that more work would be done in searching for such a marker in Phase II. Bob added that a chemical marker may turn out to be some combination of contaminants which is unique to PNS rather than an individual compound or containment.

- John Nelson, NH Fish and Game, asked what type of benthic infauna was sampled for the development of data for Figure 2 of the Status Report, especially with regard to Station 4 at Clark's Island Embayment.

  Response - Fred Short indicated that the organism is a polychete worm which was commonly found in sediment in the region.

- A question was raised with regard to interpretation of the variability of the mean density for the benthic organisms found at Station 4 Clark's Island Embayment.

  Response - Variability may be due to particular habitat of these organisms. High population density may be indicative of pollution or may be indicative of a natural healthy habitat. No determination can be made in this regard at this time.

- An attendee asked if the population density and organism size for the Blue Mussels were somehow interrelated.

  Response - Dr. Short indicated that there is likely to be a relationship between population density and size. Commonly, the size of individual organisms in a community will decrease with increasing population density.

- John Nelson (NH Fish and Game) asked why the data show that the concentration of Mercury was higher in lobster tails than lobster hepatopancreas since other studies commonly indicate the opposite.

  Response - Bob Johnston (NCOSSC) indicated that he believed that much of the mercury in the hepatopancreas may be metabolized to an organic form which is not detectable with the analytical method employed in this study.

- Linda Dietz closed the meeting thanking all attendees for attending the meeting. Linda scheduled the next TRC meeting for Tuesday, August 4, 1992. The topic of the next TRC was not yet defined. An announcement would be mailed to the TRC reminding them of the date and specifying the topic to be covered.

ESTUARINE ECOLOGICAL RISK ASSESSMENT FOR NAVAL SHIPYARD PORTSMOUTH

Status Report for the Technical Review Committee

June 9, 1992

INTRODUCTION
- What is Ecological Risk Assessment?
- Why Conduct Ecological Risk Assessments?

PARTICIPANTS

PURPOSE AND RATIONALE

TECHNICAL APPROACH
- Ecological Risk Assessment Framework
- PHASE I Activities and Status
- PRELIMINARY RESULTS & DISCUSSION
  - Biology & Toxicology
  - Chemistry
    - Methods & QA/QC
    - Analytical Screen Results
  - Hydrodynamics & Modeling
- PHASE II Approach
- Projected Schedule

SUMMARY

What is Ecological Risk Assessment?

Quantitatively estimating the likelihood of adverse ecological impact resulting from exposure to toxic substances.

Why Conduct Ecological Risk Assessments?

CERCLA 121(d)

"Degree of Cleanup. Remedial actions ... shall attain a degree of cleanup ... which assures protection of human health and the environment."

RCRA 1003(b)

"National Policy. Waste that is generated should be treated, stored, or disposed of so as to minimized the present and future threat to human health and the environment."

National Contingency Plan (55 FR 8741)

"Remedies must be protective of human health and the environment <u>and</u> attain ARARs"

PARTICIPANTS

Naval Command, Control, & Ocean Surveillance Center, San Diego, CA

EPA Environmental Research Laboratory, Narragansett, RI

UNH Jackson Estuarine Laboratory & Civil Engineering Dept., Durham, NH

URI Graduate School of Oceanography, Narragansett, RI

Woods Hole Institute of Oceanography, Woods Hole, MA

Normandeau Associates, Bedford, NH

McLaren/Hart Consultants, Albany, NY

Ceimic Corporation, Narragansett, RI

PURPOSE OF STUDY

Provide an Ecological Risk Assessment Framework to Assess the Potential Environmental Impact, If Any, of Hazardous Waste Storage, Treatment, and Disposal at NSY Portsmouth.

RATIONALE

DESIGN STUDY TO MEET:

- CONDITIONS OF RCRA PERMIT
- FUTURE REQUIREMENTS

ASSESSMENT ENDPOINTS

- SEDIMENT QUALITY
- CONTAMINANT SOURCES AND DISTRIBUTION
- BIOLOGICAL IMPACTS
- APPROPRIATE ANALYTICAL METHODS

APPLICATION OF ECOLOGICAL RISK ASSESSMENT TECHNOLOGY

FORMULA:

- Develop Cooperative Research Program
  - EPA Environmental Research Laboratory Narragansett
  - Universities
  - Local Experts
- Case Study Application of R&D
  - Site Specific
  - Ecologically Based Monitoring
- Involve Regulatory Agencies
  - Technical Review Committee
  - State Agencies
  - NOAA Trustee
  - Fish and Wildlife Trustee
  - EPA Region
- Satisfy Public Concern

NSY PORTSMOUTH CASE STUDY

PHASE I - INFORMATION GATHERING

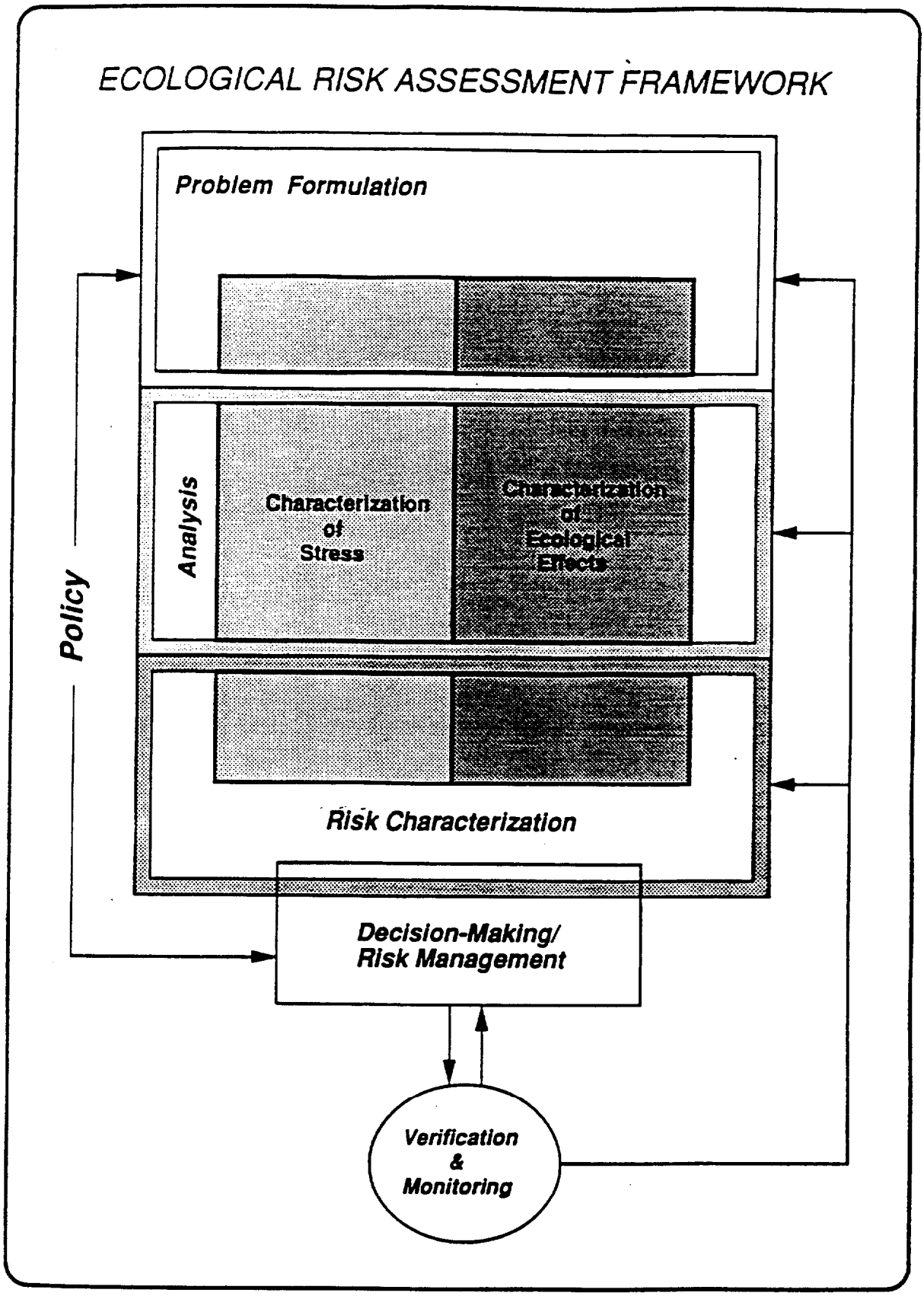
Determine if Significant Ecological Impacts Can be Related to NSY Portsmouth.

PHASE II - VERIFY AND QUANTIFY ECOLOGICAL RISK

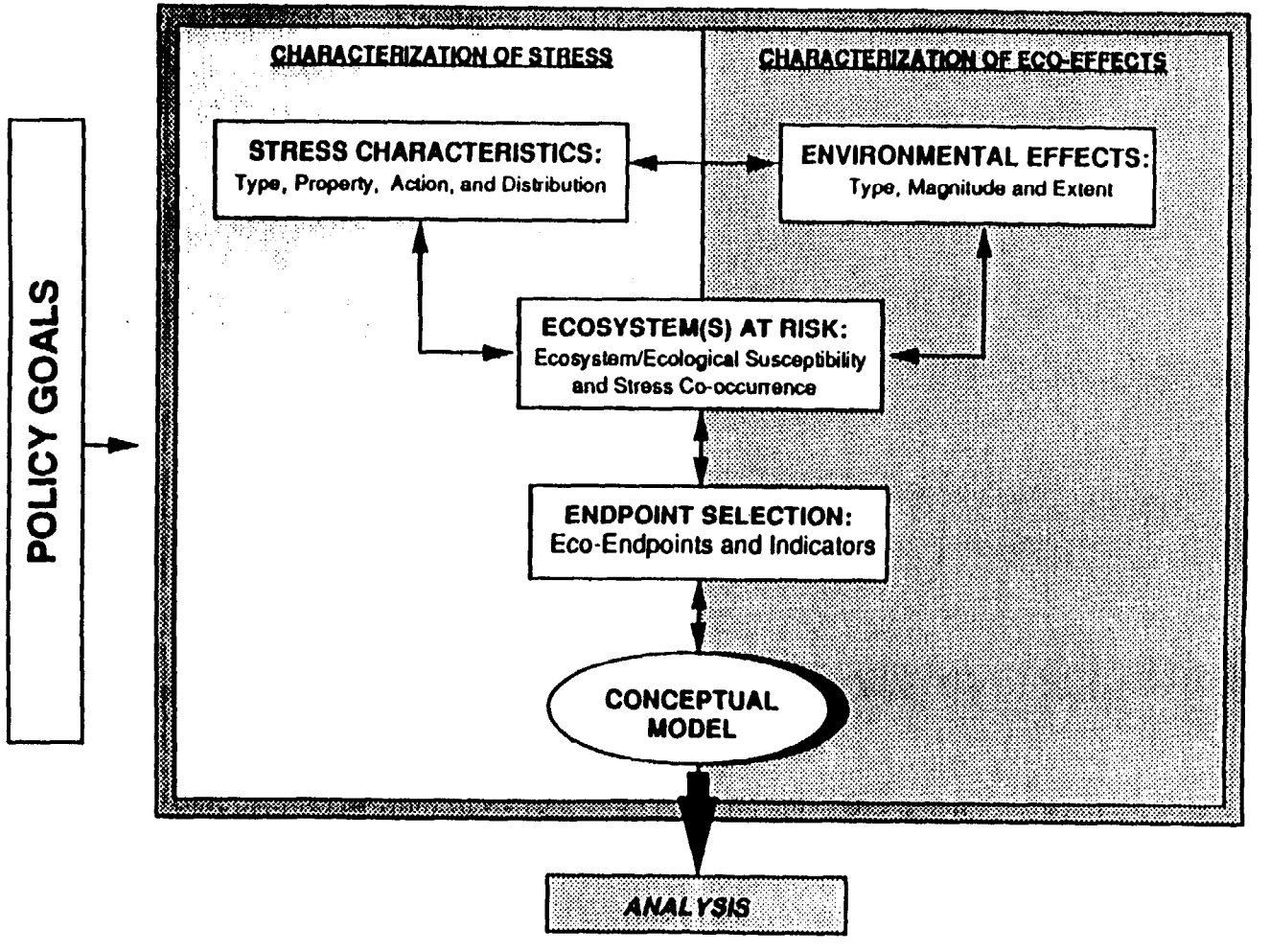
Quantify Exposure-Response of Ecological Risk From Shipyard Contaminants

If Necessary, Provide Detailed Ecological Assessment of Impact

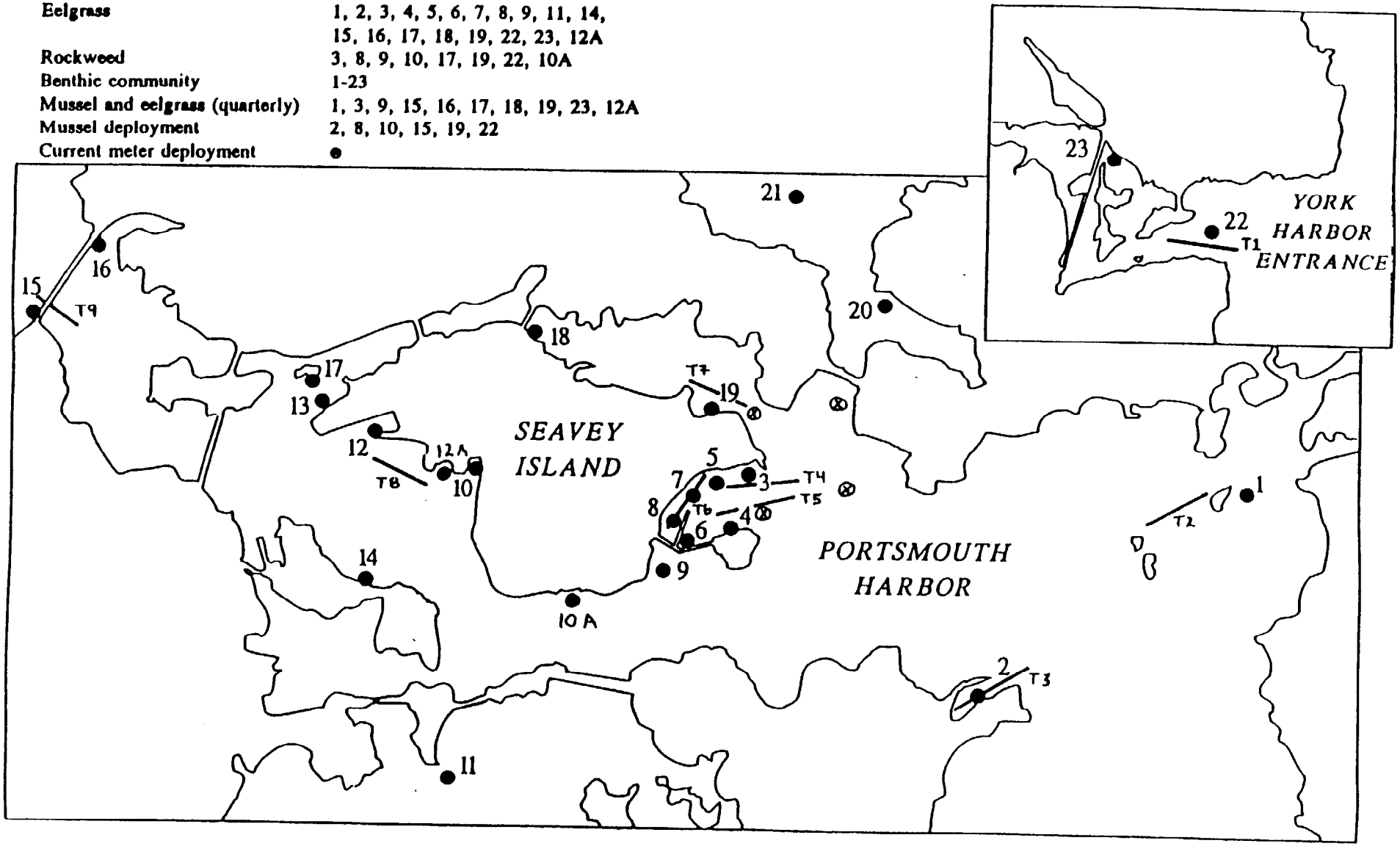
Develop Long-Term Monitoring Strategy

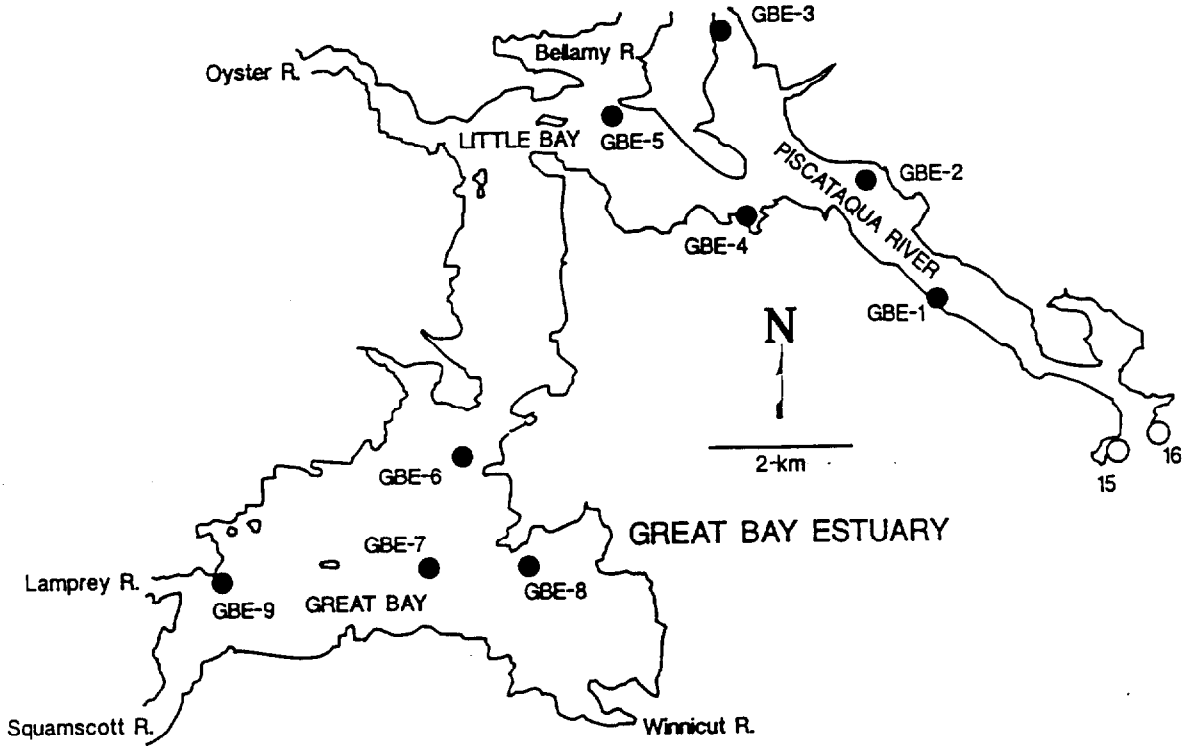

ECOLOGICAL RISK ASSESSMENT FRAMEWORK
Problem Formulation
Analysis
Characterization of Stress
Characterization of Ecological Effects
Risk Characterization
Policy
Decision-Making/ Risk Management
Verification & Monitoring

Problem Formulation



	Stations
Sediment	1-23
Water column (synoptic)	1-23
Water column (monthly)	1, 8, 10, 15, 16, 23
Mussel	1-23, 10A
Lobster and flounder trawls	T1-T9
Eelgrass	1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 14, 15, 16, 17, 18, 19, 22, 23, 12A
Rockweed	3, 8, 9, 10, 17, 19, 22, 10A
Benthic community	1-23
Mussel and eelgrass (quarterly)	1, 3, 9, 15, 16, 17, 18, 19, 23, 12A
Mussel deployment	2, 8, 10, 15, 19, 22
Current meter deployment	●




GBE-3
Bellamy R.
Oyster R.
LITTLE BAY
GBE-5
PISCATAQUA RIVER
GBE-2
GBE-4
GBE-1
N
2-km
16
15
GBE-6
GREAT BAY ESTUARY
GBE-7
Lamprey R.
GBE-9
GREAT BAY
GBE-8
Squamscott R.
Winnicut R.

FIELD WORK IN PROGRESS (PHASE I)

TASKS:

1. HISTORICAL OVERVIEW (completed)

2. CHARACTERIZE SEDIMENTS

   23 STATIONS
   - Seavy Island
   - Reference
   - Background

   FIELD SAMPLING (completed)
   CHEMICAL ANALYSIS (completed)
   TOXICITY ANALYSIS (completed)
   GEOPHYS. AND MICROBIAL ANALYSIS (completed)
   SEDIMENT DISTRIBUTION MAP

FIELD WORK IN PROGRESS (PHASE I)

TASKS (continued):

3. CHARACTERIZE WATER COLUMN

   23 STATIONS
   5 STATIONS FOR MONTHLY MONITORING

   FIELD SAMPLING (completed)
   WATER QUALITY (completed)
   WATER TOXICITY (completed)
   CAGED MUSSELS (completed)
   HYDRODYNAMIC MODELING
   SEEP SAMPLING

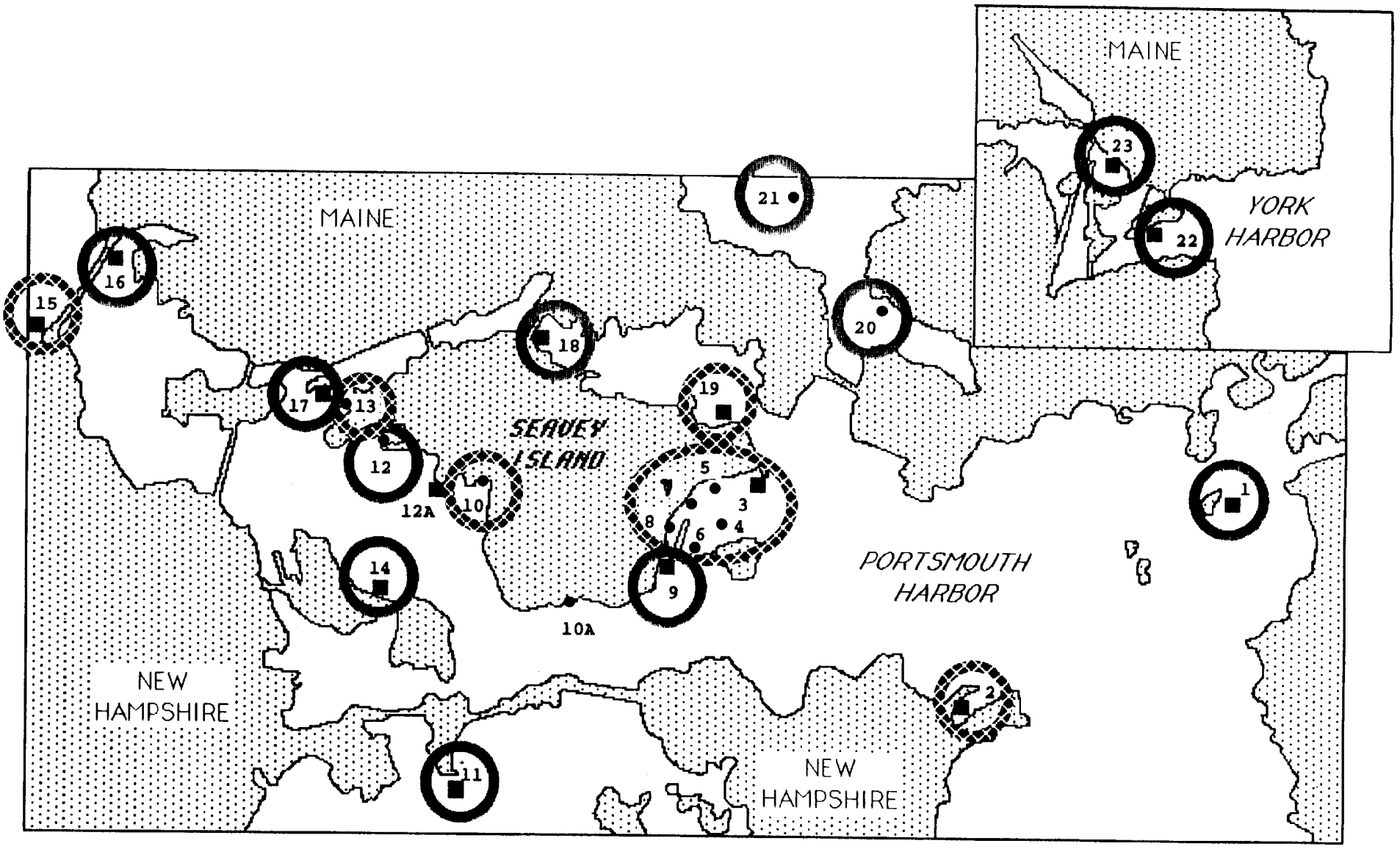
FIELD WORK IN PROGRESS (PHASE I)

TASKS (continued):

4. BIOLOGICAL RESOURCES

FIELD SAMPLING (completed)
ABUNDANCE AND TISSUE BURDENS IN:
- MUSSELS (completed)
- FLOUNDER (completed)
- LOBSTER (completed)
- EELGRASS (completed)
- MACROALGAE (completed)

BENTHIC COMMUNITY STRUCTURE (completed)
UP-ESTUARY TRANSECT (completed)
- MUSSELS, OYSTERS, AND EELGRASS



Location of Portsmouth Harbor and York River Sampling Stations

■ Denotes Eelgrass Station.

● Non-eelgrass Station.

Sand Sediment

Mud Sediment

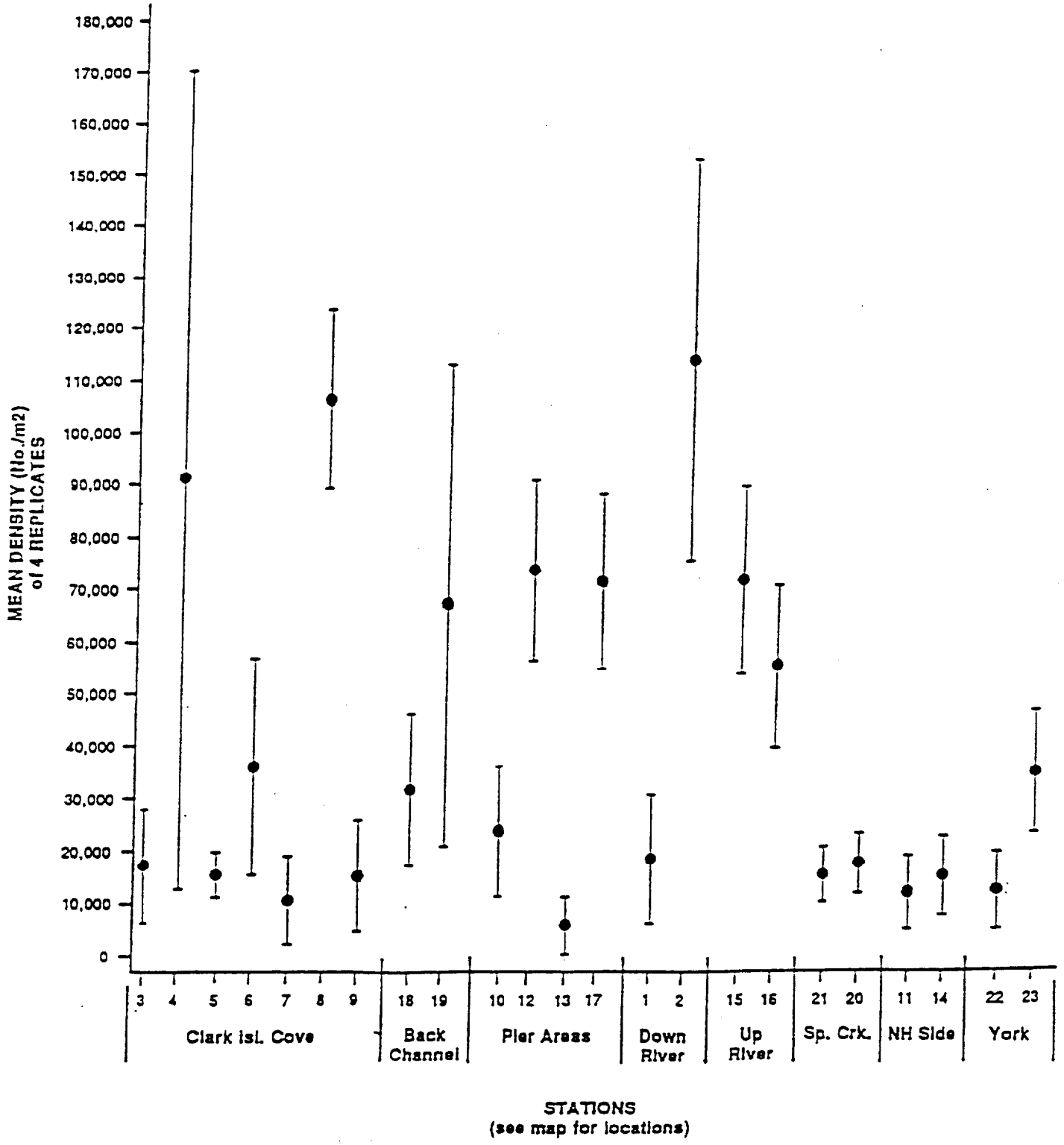
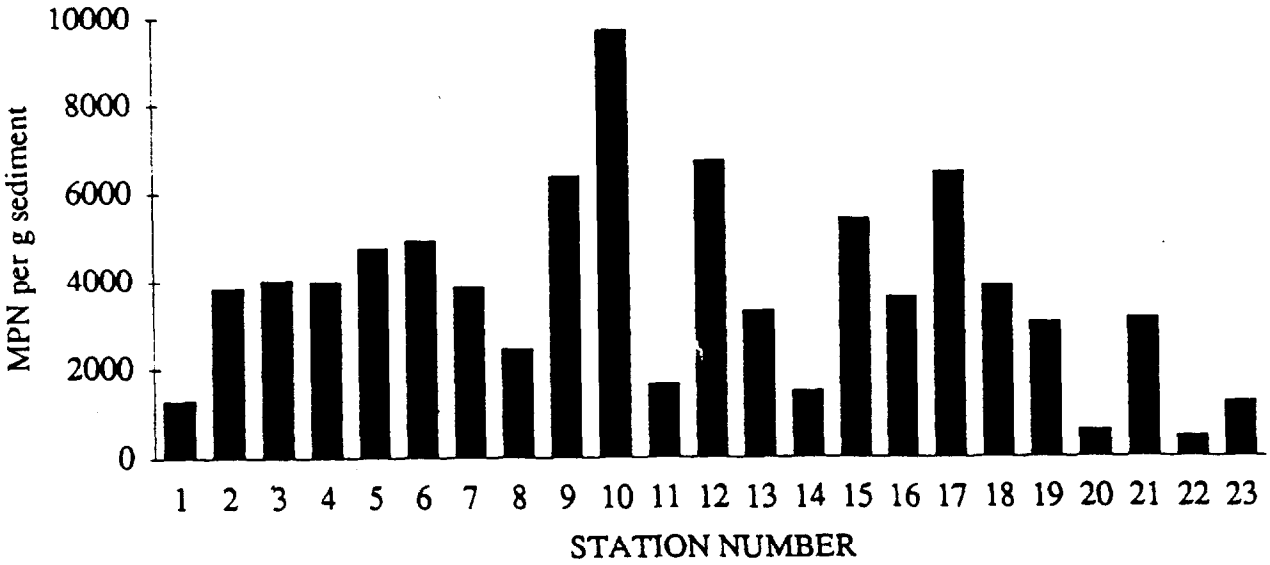


Figure 2. Mean density and ± 1 standard deviation of benthic infauna at each station, September 1991. Portsmouth Naval Shipyard Ecological Risk Assessment.

C. perfringens concentrations in surface sediments from Portsmouth (#1-21) and York (#22-23) Harbors: September, 1991.



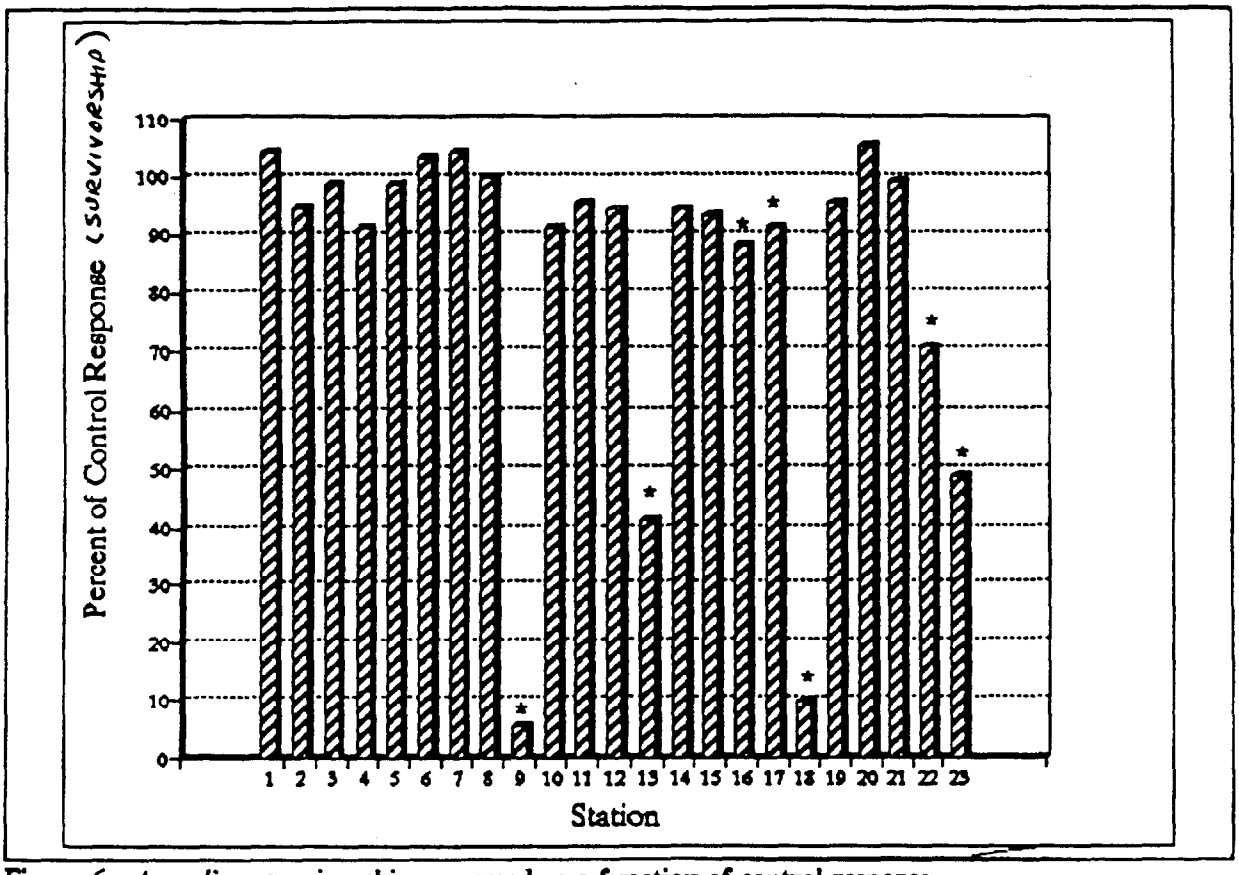
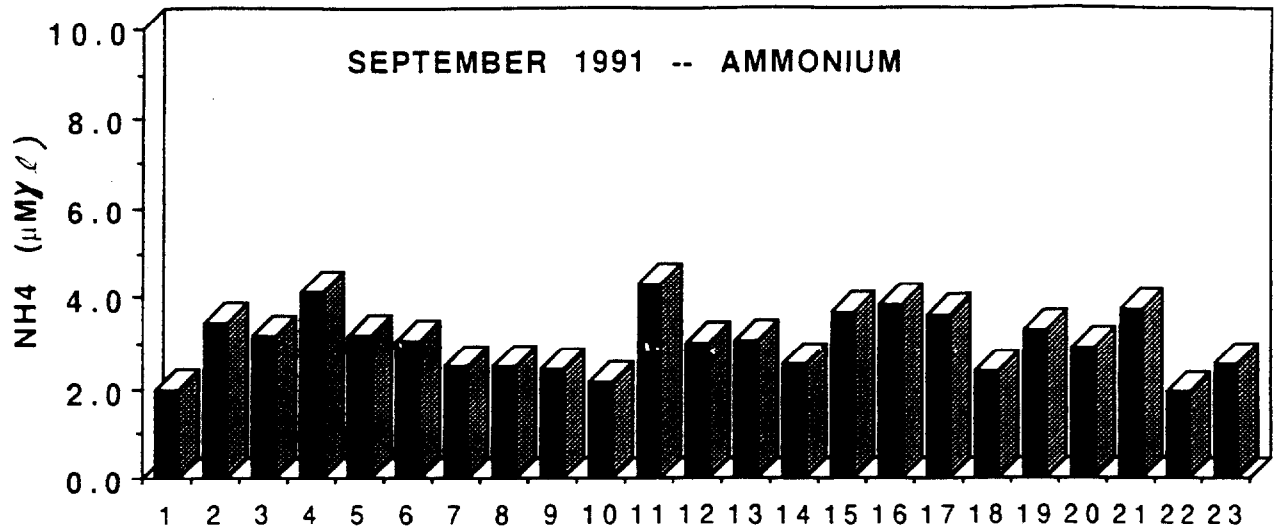
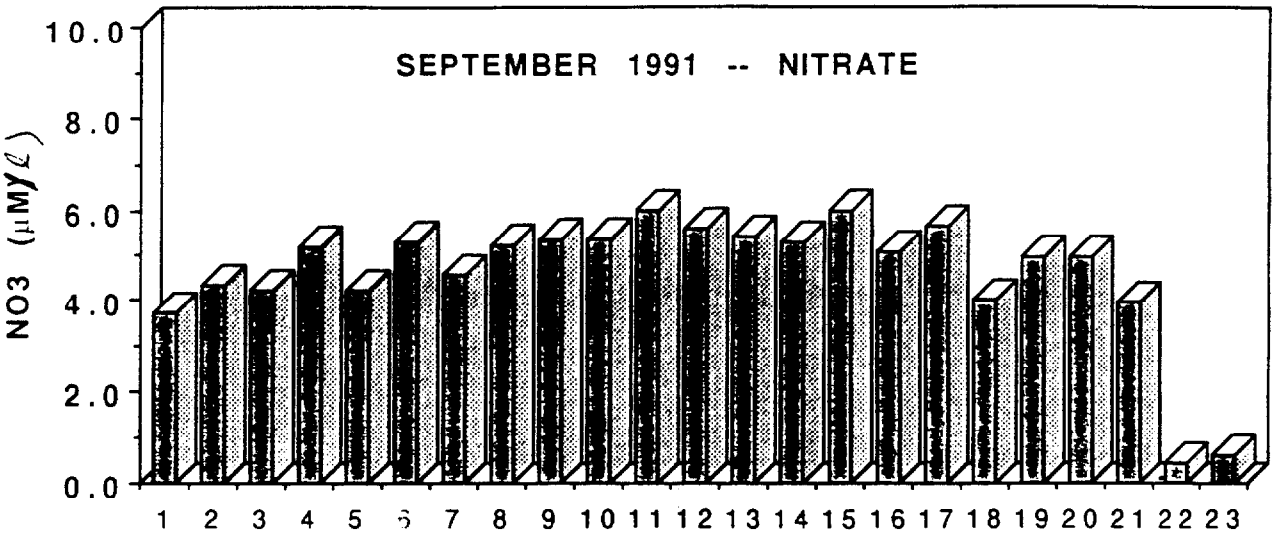
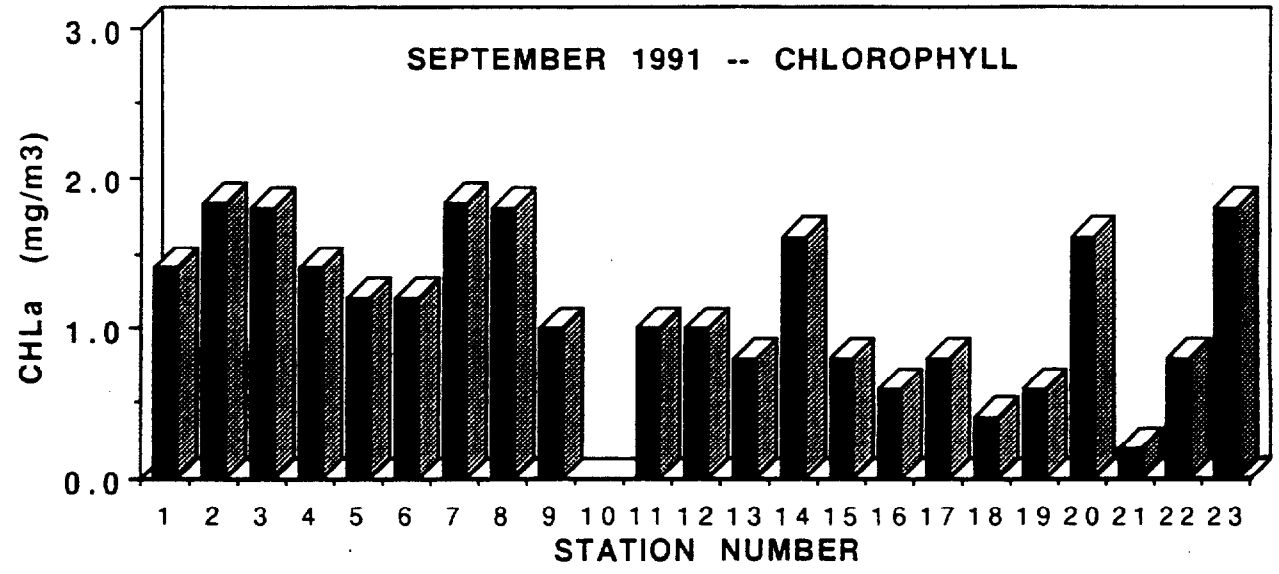
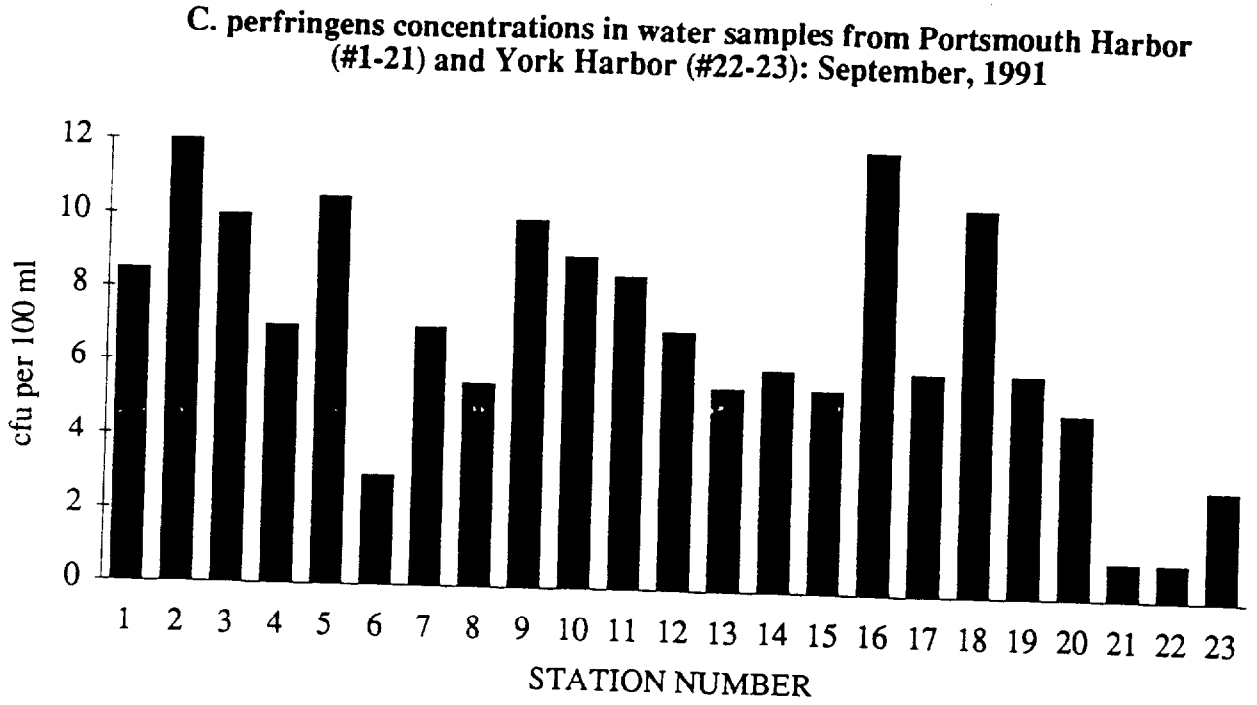


Figure 6. *Ampelisca* survivorship expressed as a function of control response.


SEPTEMBER 1991 -- AMMONIUM
NH4 (µMγℓ)
10.0
8.0
6.0
4.0
2.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23


SEPTEMBER 1991 -- NITRATE
NO3 (µMγℓ)
10.0
8.0
6.0
4.0
2.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23


SEPTEMBER 1991 -- CHLOROPHYLL
CHLa (mg/m3)
3.0
2.0
1.0
0.0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
STATION NUMBER



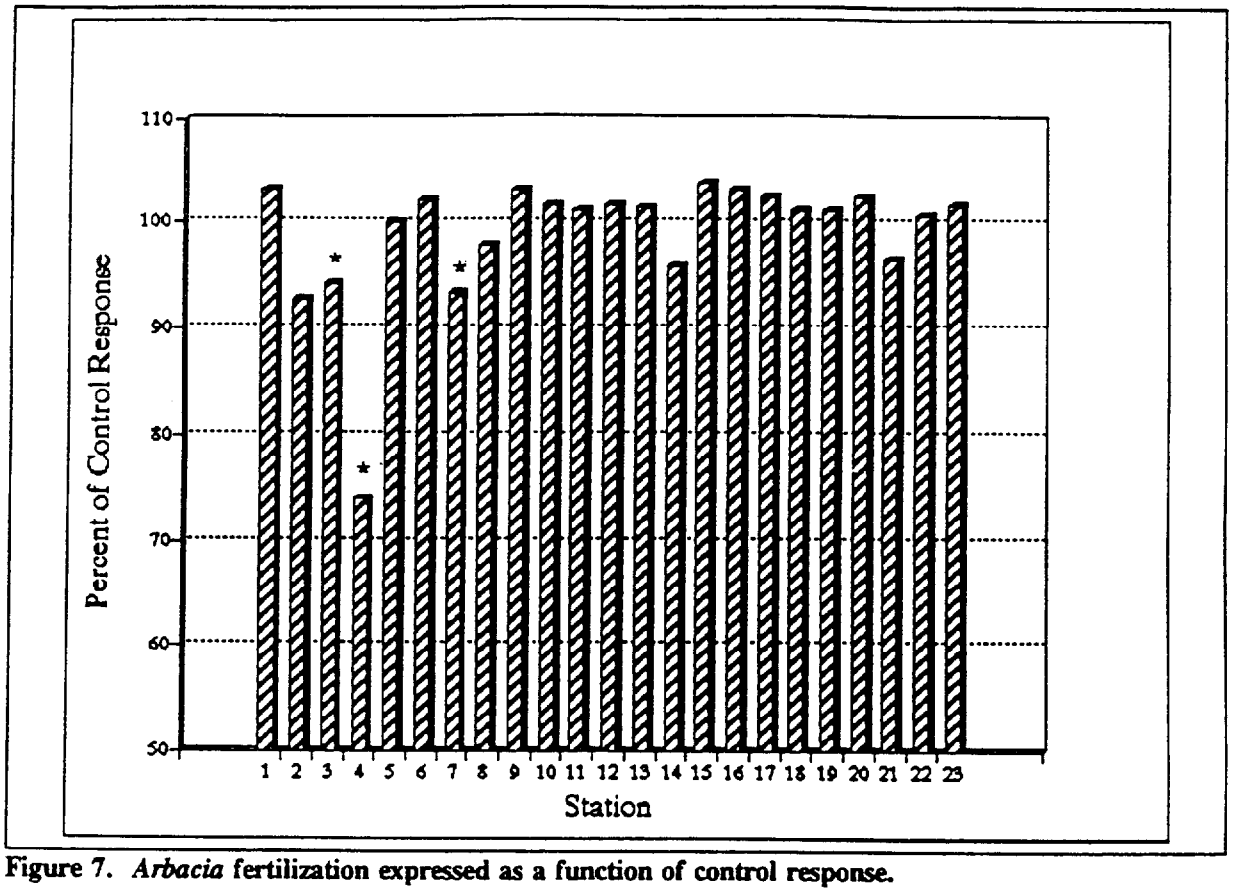
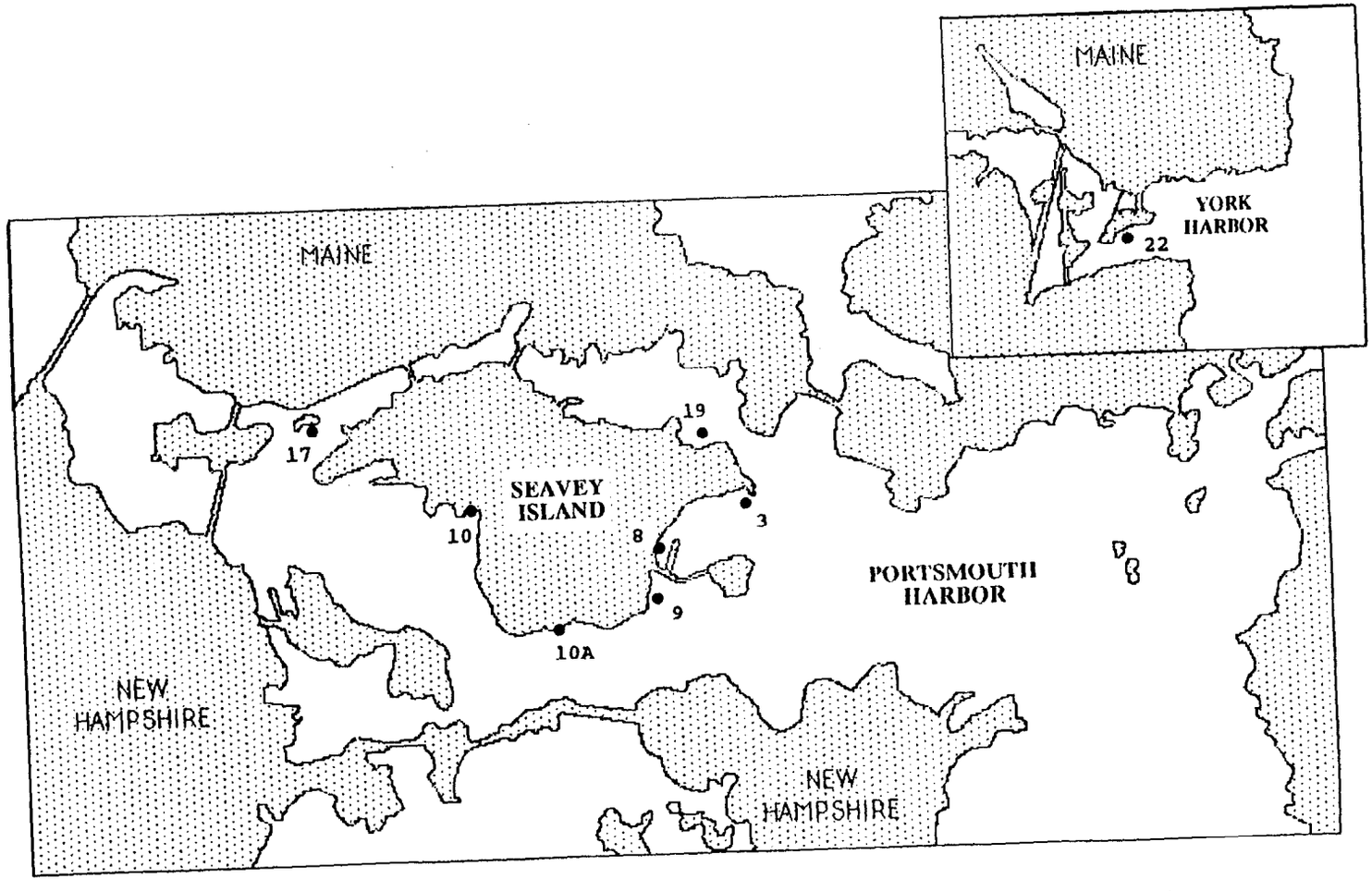
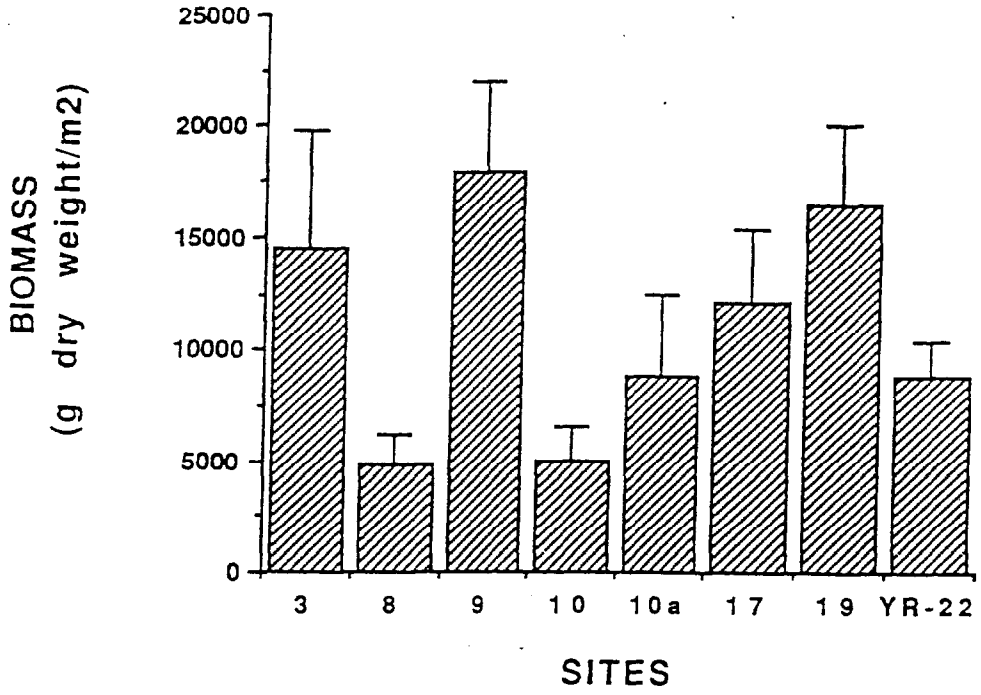


Figure 7. ***Arbacia*** **fertilization expressed as a function of control response.**

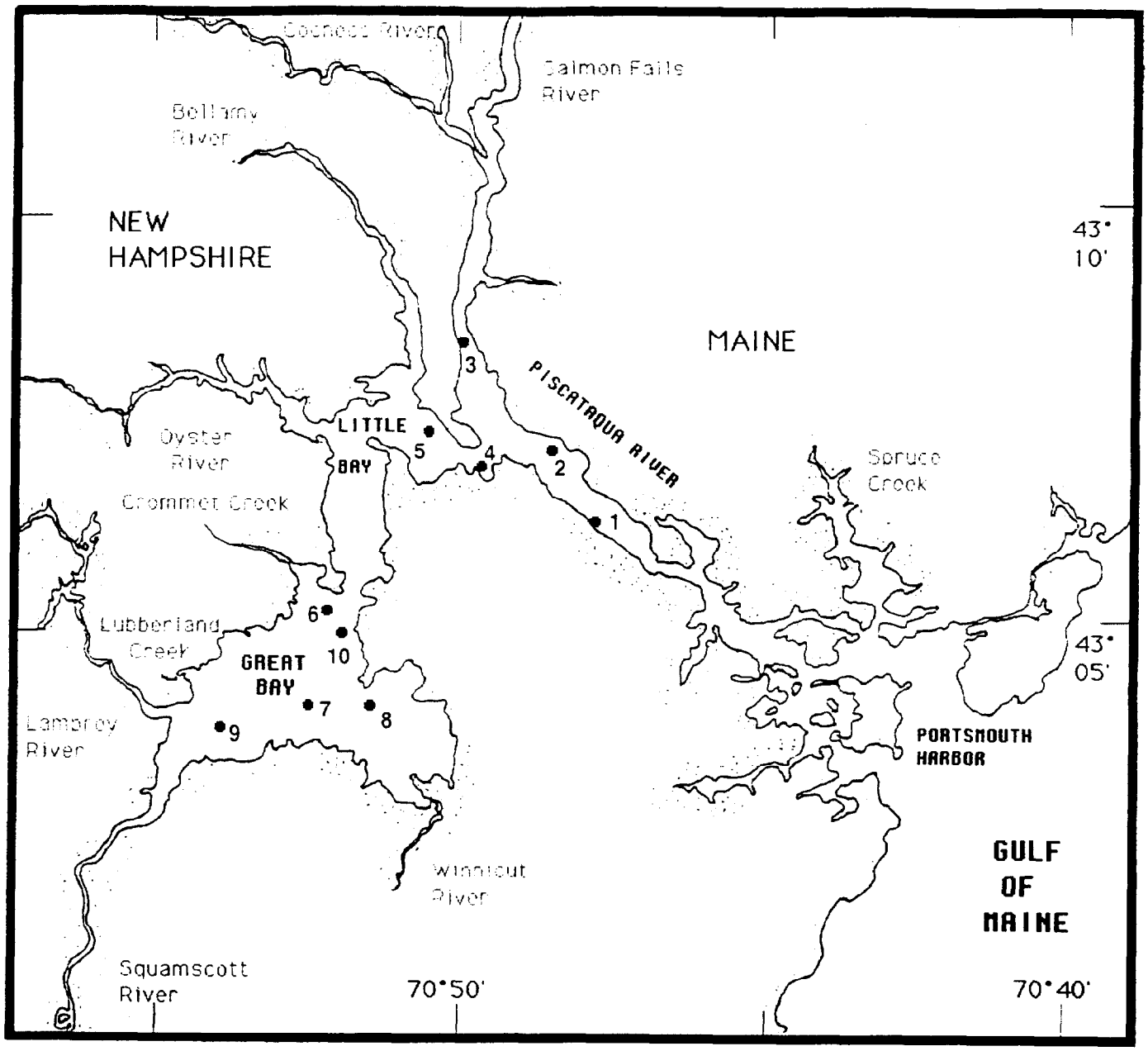


Portsmouth Harbor (PH) and York River (YR) Ascophyllum sampling locations.



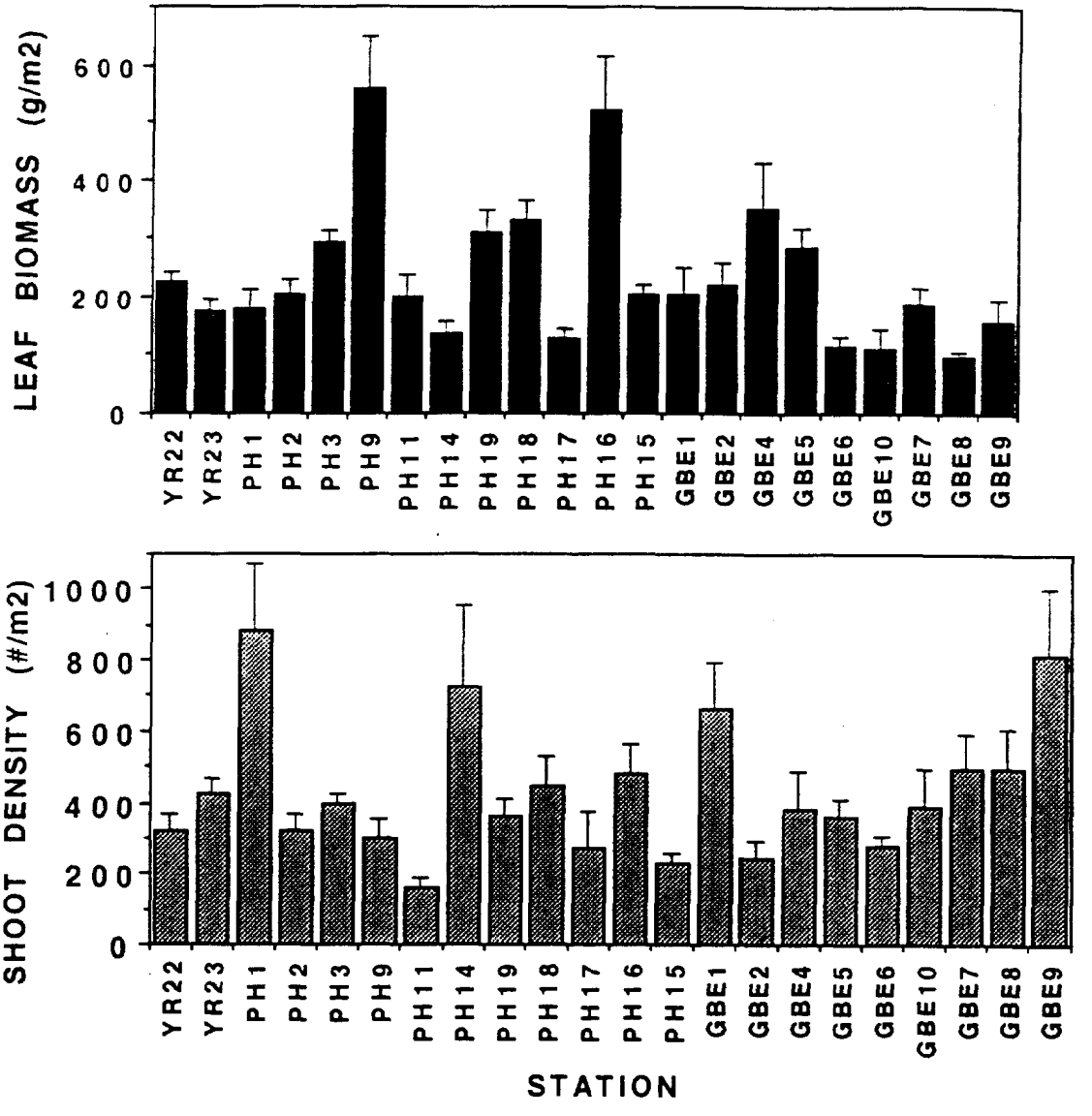
(Sea weed)

Figure 2. *Ascophyllum nodosum* biomass at seven Portsmouth Harbor (PH) stations and one York River (YR) station.

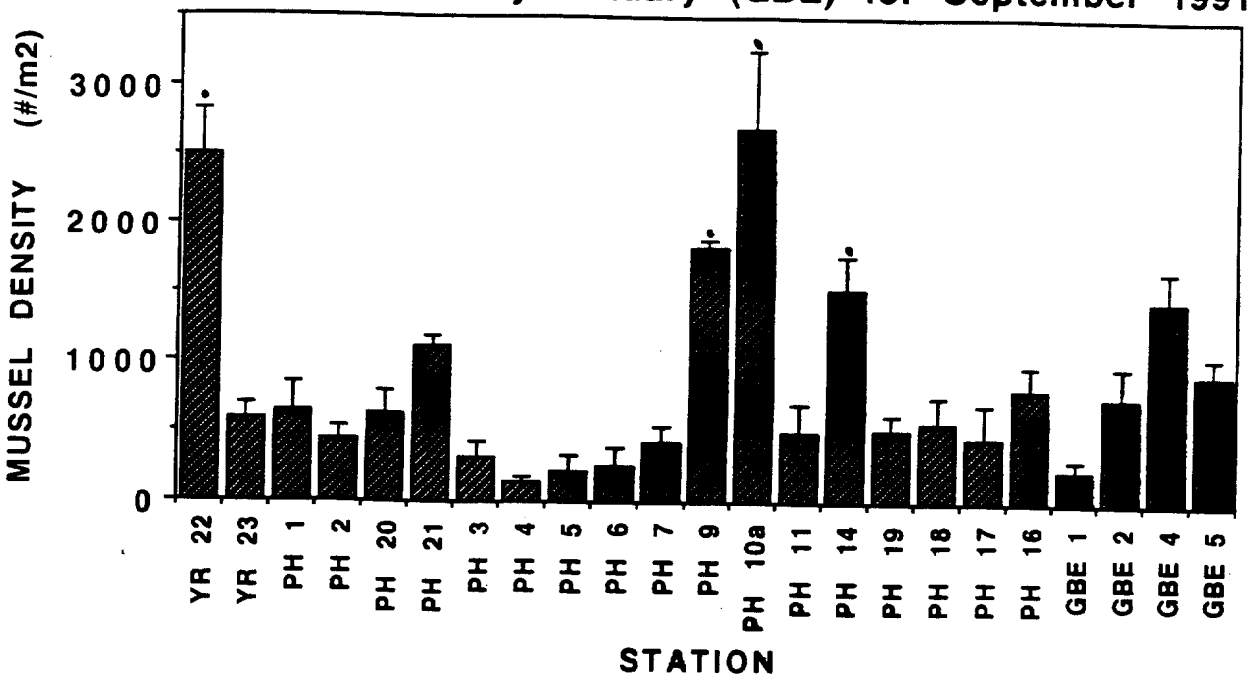


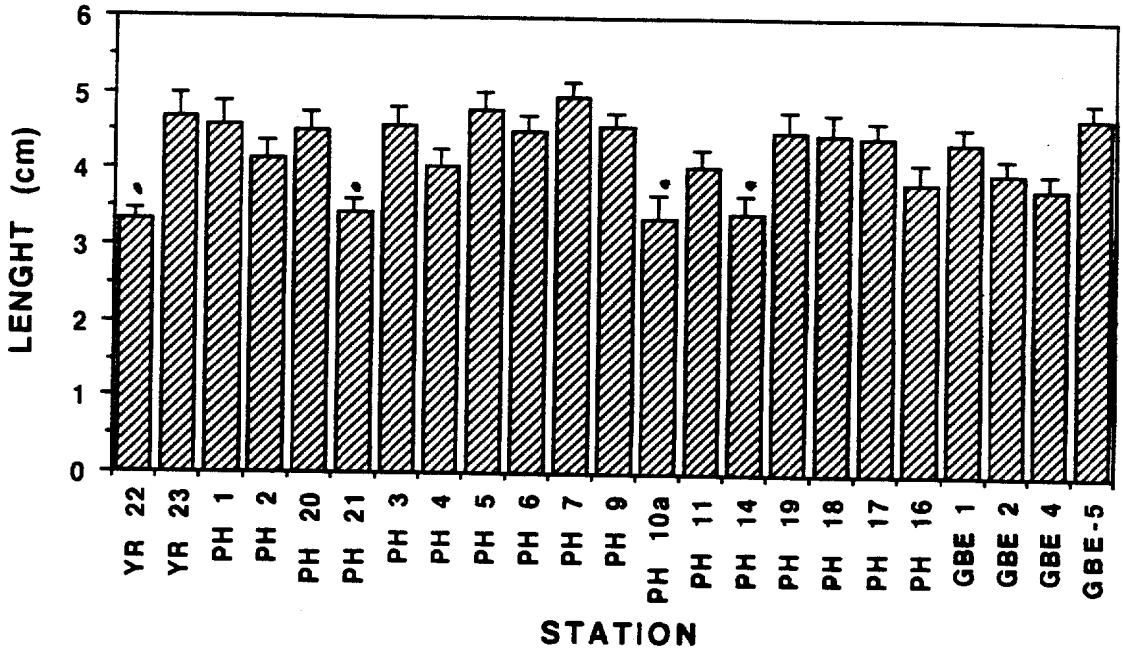
Map of the Great Bay Estuary showing the location of stations for the eelgrass and bivalve up bay transect (GBE1 through GBE10).

Eelgrass Leaf Biomass and Density in the York River (YR), Portsmouth Harbors (PH), and Great Bay Estuary (GBE) for September 1991

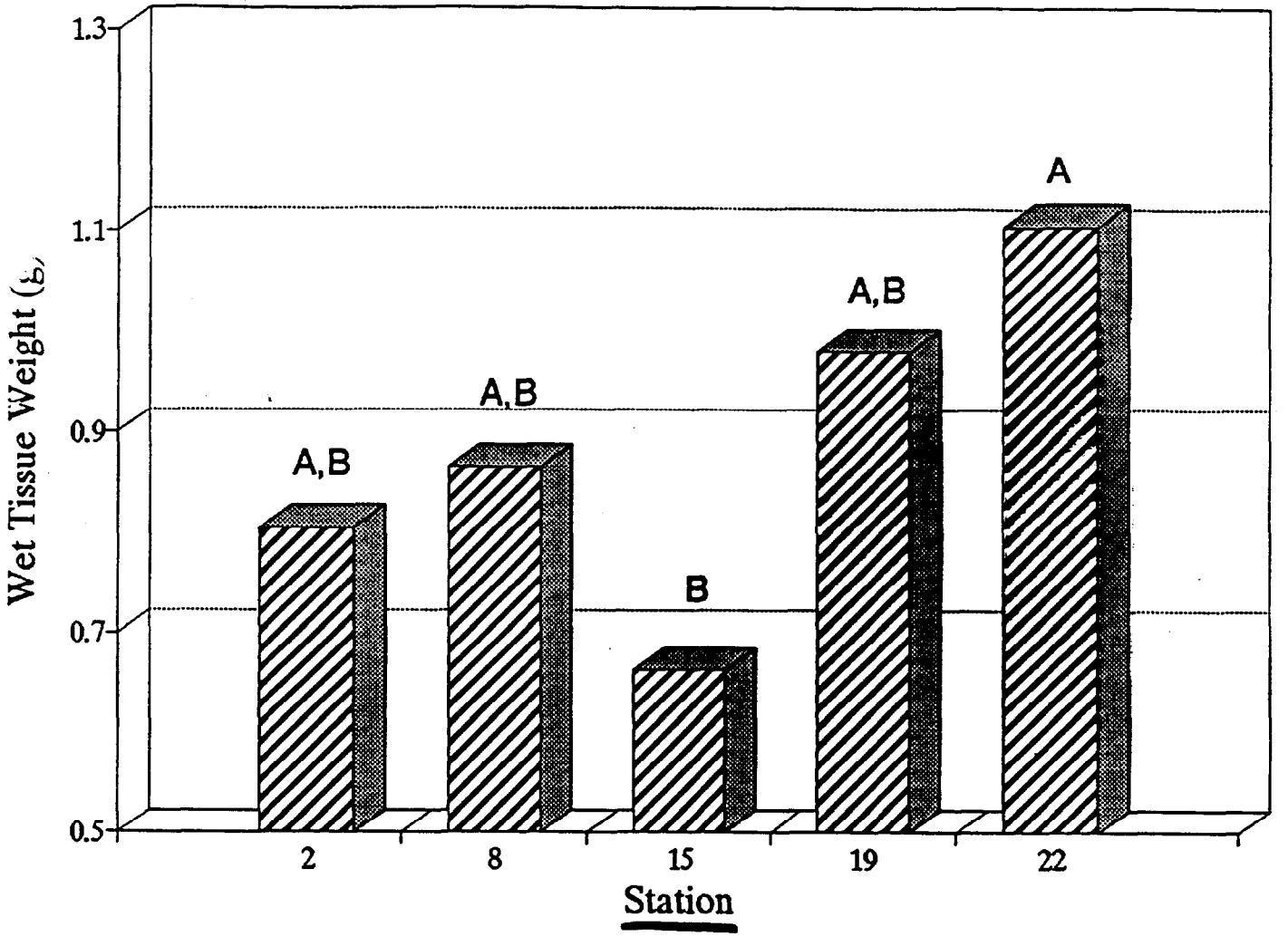


Blue Mussel Density and Length in York River (YR), Portsmouth Harbor (PH), and Great Bay Estuary (GBE) for September 1991

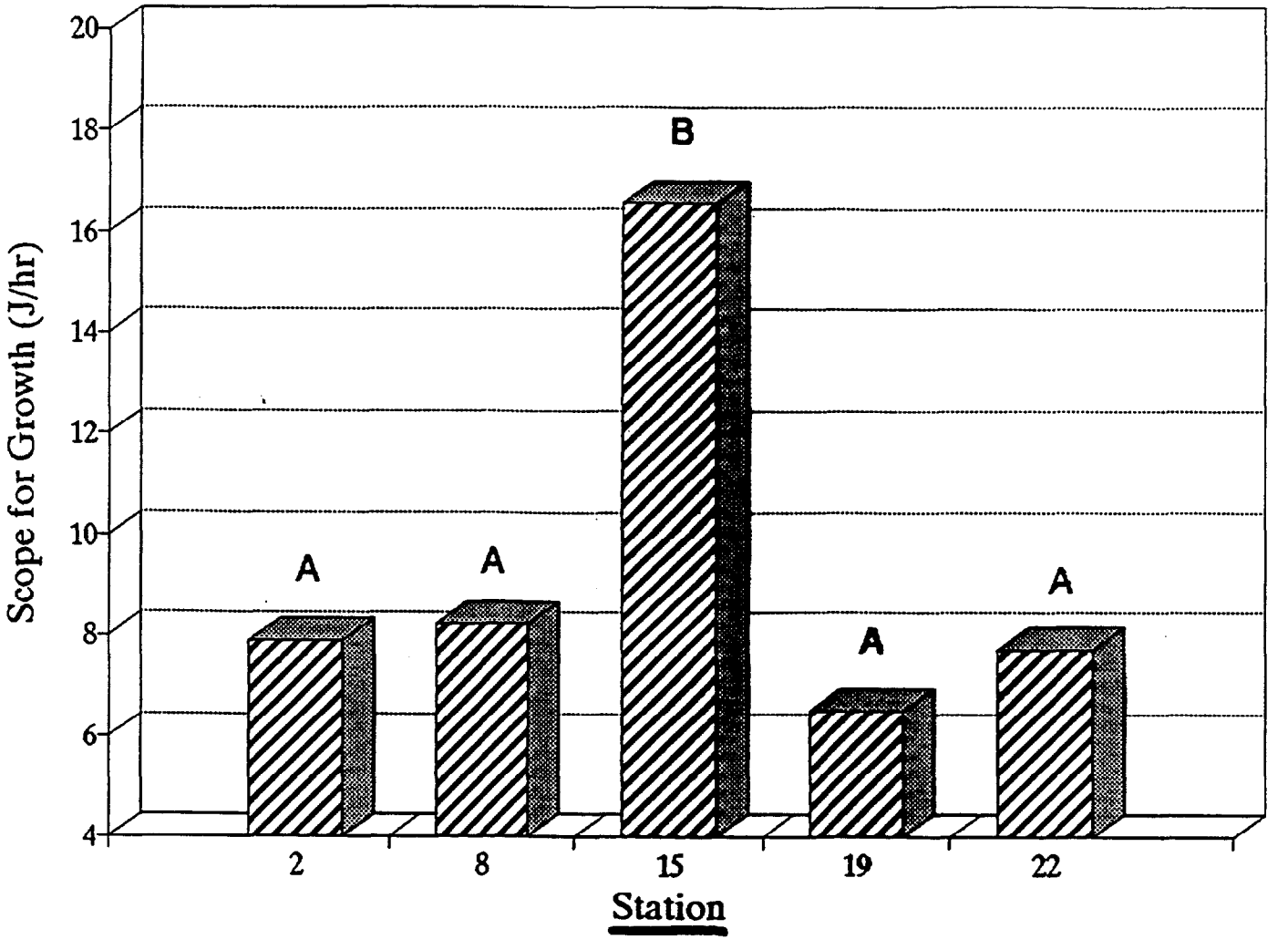




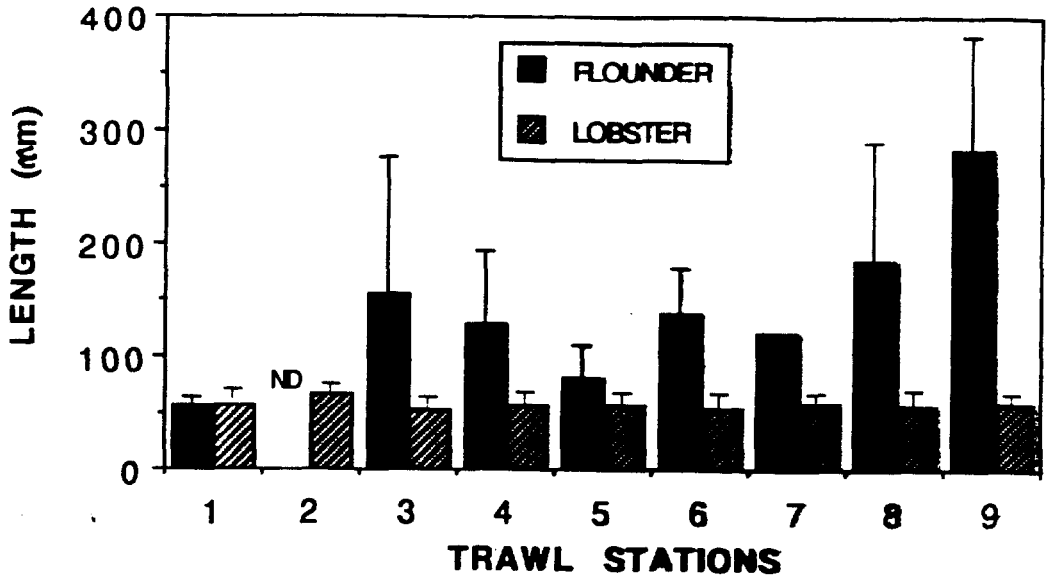
Caged Mussel Wet Weight Results



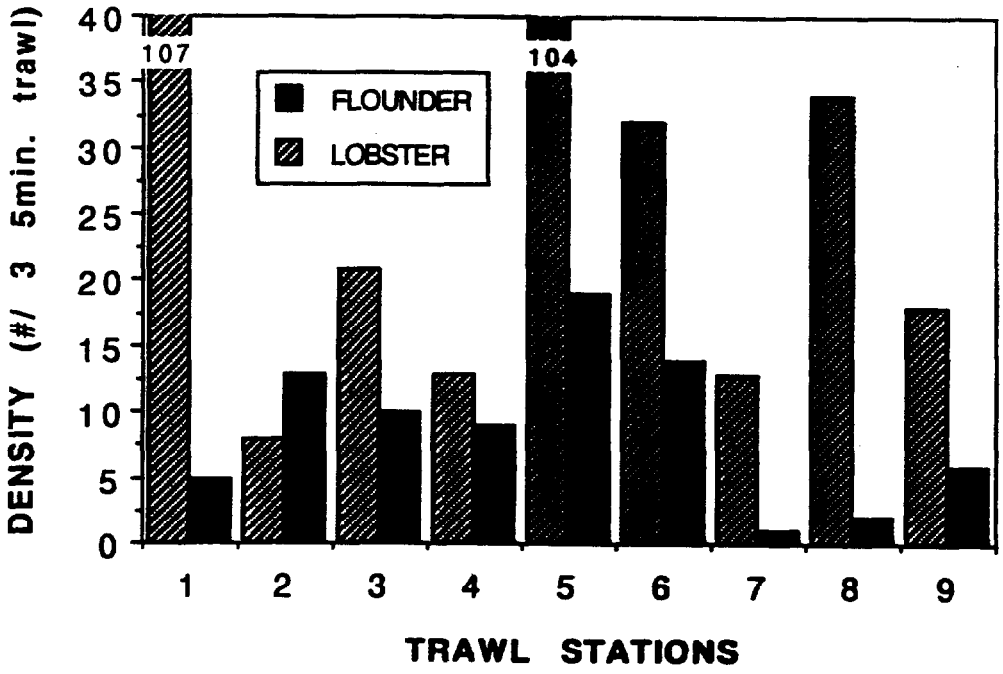
Caged Mussel Scope for Growth Results



York (1) and Portsmouth (2-9) Harbors September 1991



York (1) and Portsmouth (2-9) Harbors September 1991



ANALYTICAL CHEMISTRY

QUALITY ASSURANCE AND QUALITY CONTROL

PROTOCOLS, CRITERIA, AND CORRECTIVE ACTION

FOR THE

ESTUARINE ECOLOGICAL RISK ASSESSMENT

AT NAVAL SHIPYARD PORTSMOUTH, KITTERY, ME

Prepared by:

Marine Environmental Support Office
Naval Ocean Systems Center
San Diego, CA 92152-5000

and

Environmental Research Laboratory Narragansett
United States Environmental Protection Agency
27 Tarzwell Drive
Narragansett, RI 02882

March 31, 1992

TABLE 2. Target analytes for chemical analysis.

A. Organic compounds.		(Dry weight for sediment and biota)
Analyte	Sample Matrix	Target Detection Limit
VOCs	seep water	0.1 ug/L
PAHS	**seep water**	**1-5 ug/L**
	sediment	**1-5 ng/g**
	biota	**10-20 ng/g**
Pest.	**seep water**	**0.6 ng/L**
	sediment	**0.6 ng/g**
	biota	**0.6 ng/g**
PCBs	**seep water**	**1 ug/L**
	sediment	**0.5 ng/g**
	biota	**0.5 ng/g**

B. Target MDLs for inorganic compounds.

Analyte	Matrix Sediment (ug/g)	Matrix Tissue (ug/g)
As	**1.1**	**4.3**
Cd	**0.4**	**0.06**
Cr	**3.2**	**0.3**
Cu	**1.3**	**5.0**
Pb	**1.2**	**0.6**
Hg	**0.01**	**0.04**
Ni	**1.1**	**0.7**
Ag	**0.04**	**0.04**
Sn	**1.8**	**NS**
Zn	**2.2**	**11.65**

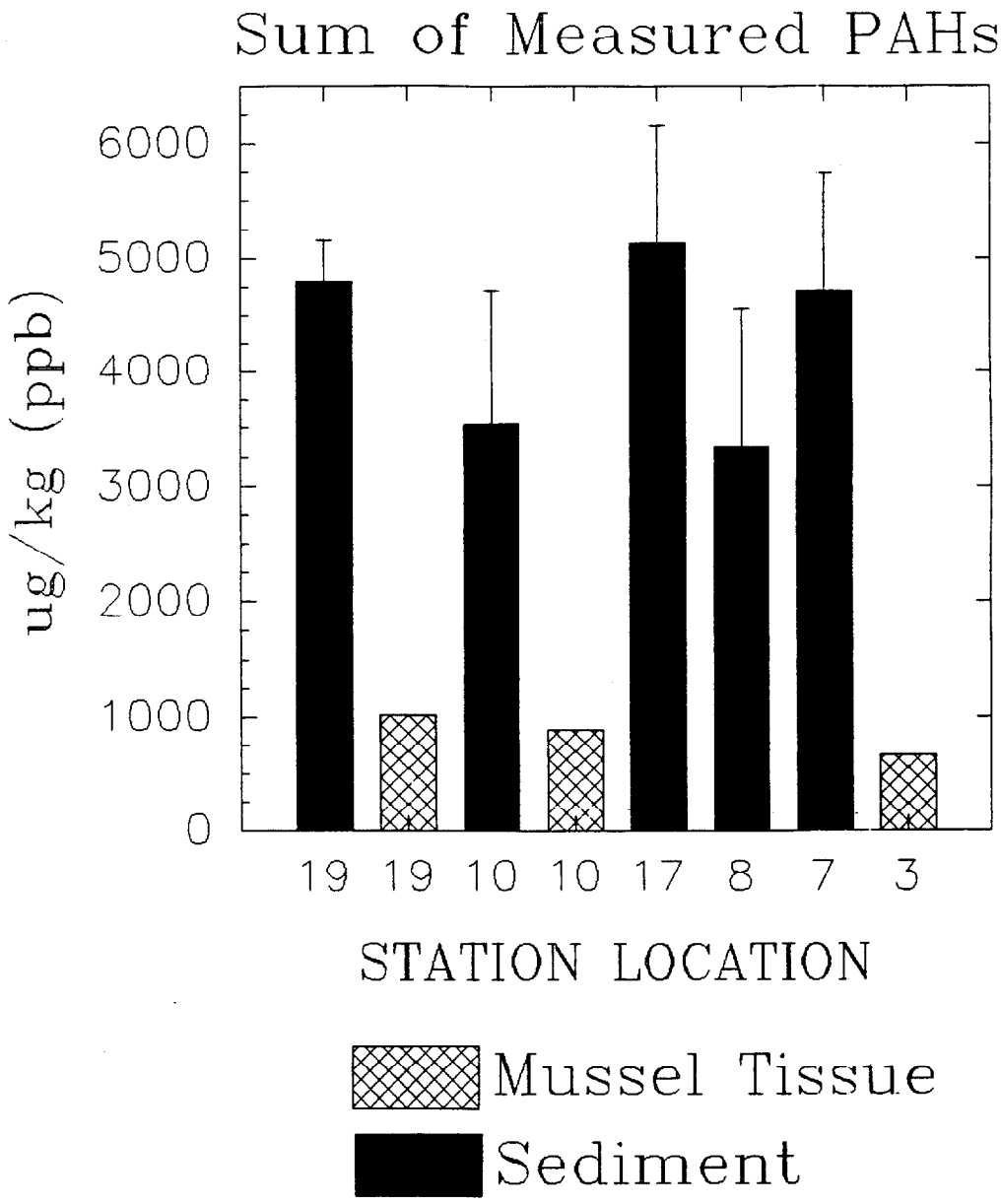
Abbreviations Used :

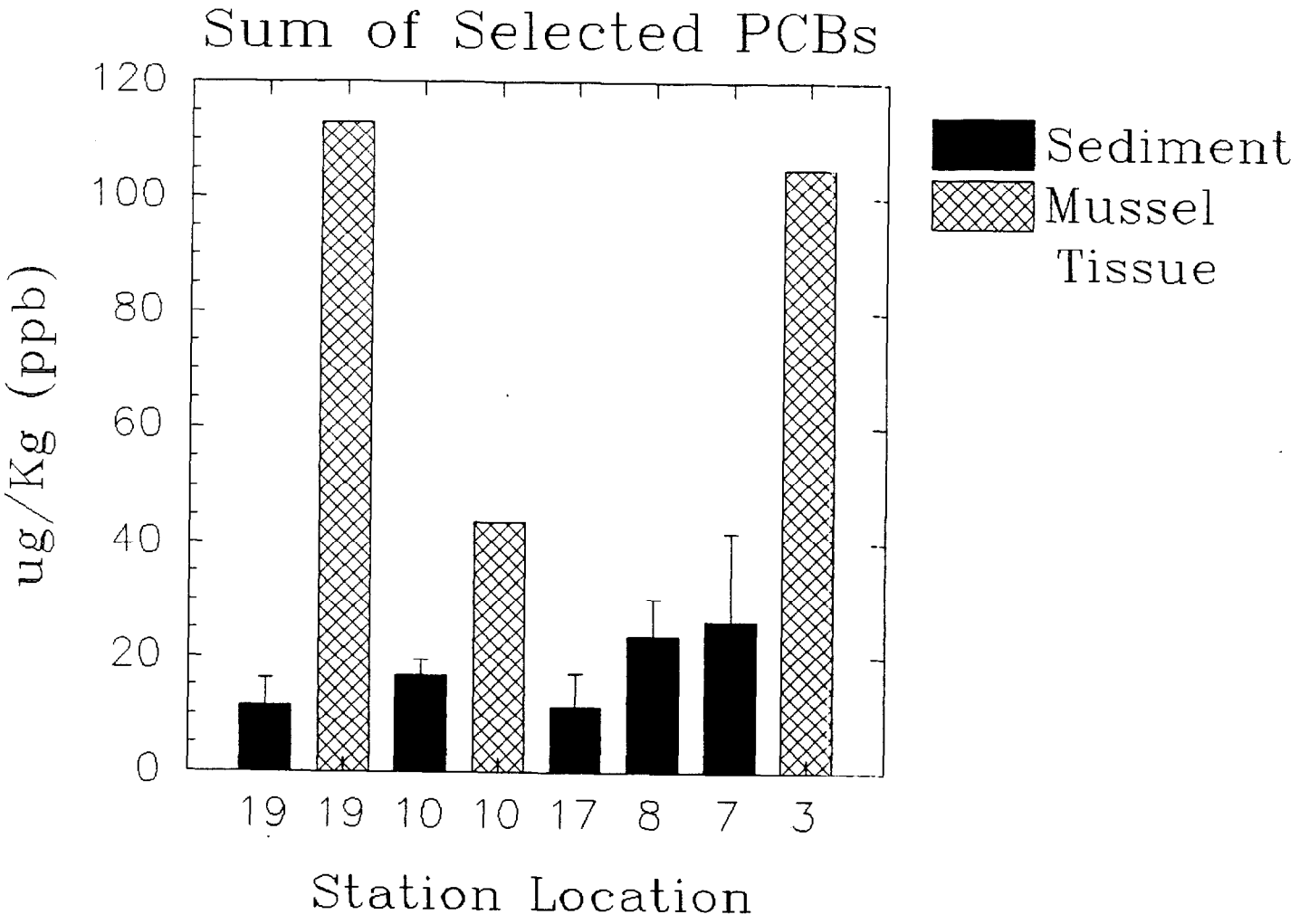
Organics

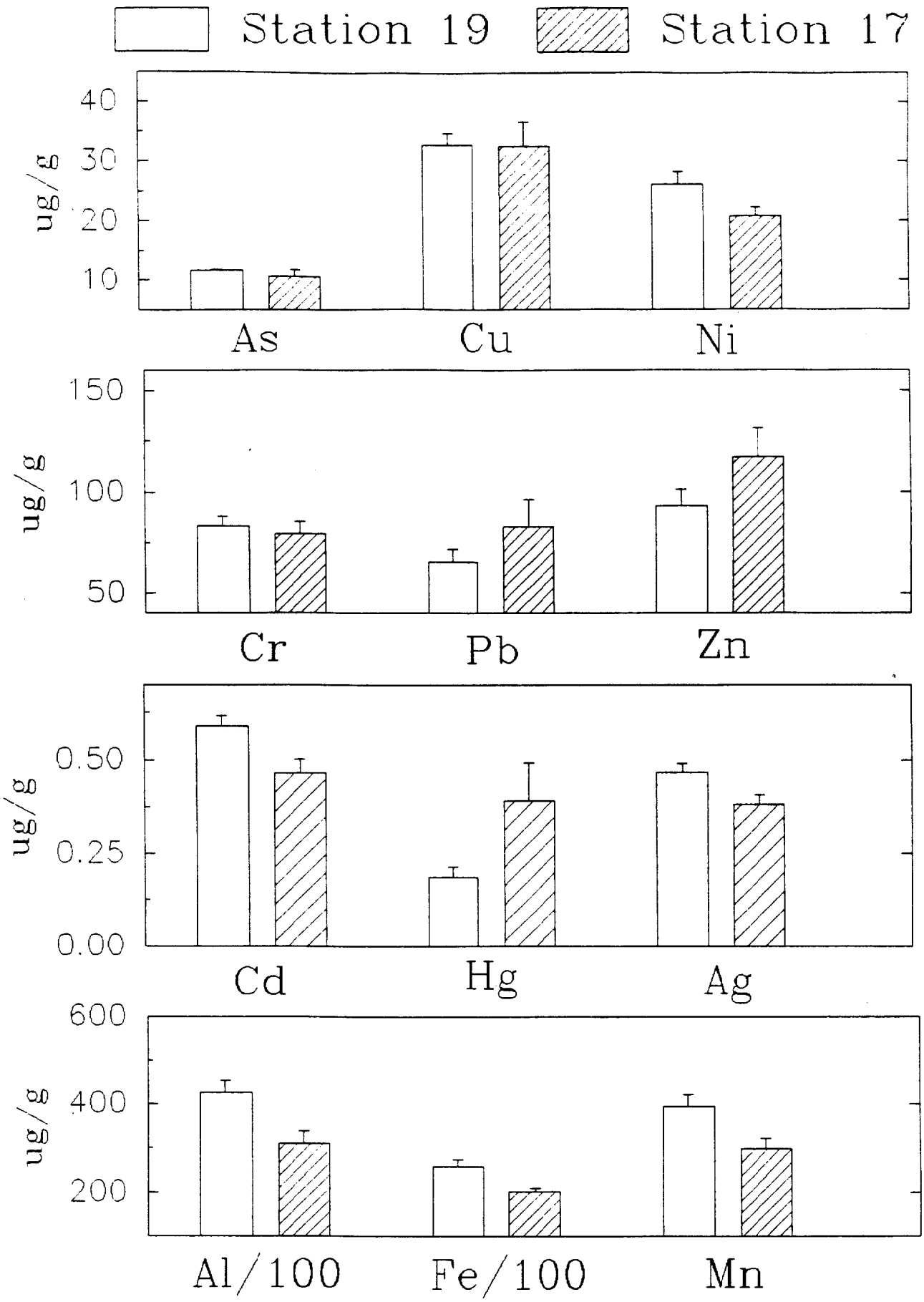
PCB	- Polychlorinated Biphenyls	PAH	-Polycyclic Aromatic Hydrocarbons
BaP	- Benzo[a]pyrene	BAA	-Benzo[a]anthracene
Phen	- Phenanthrene	DDD	-Dichlorodiphenyldichlorine
DDE	- Dichlorodiphenyl-dichloroethene		
HBC	- Hexachlorobenzene		
TBT	- Tributyltin		

METALS

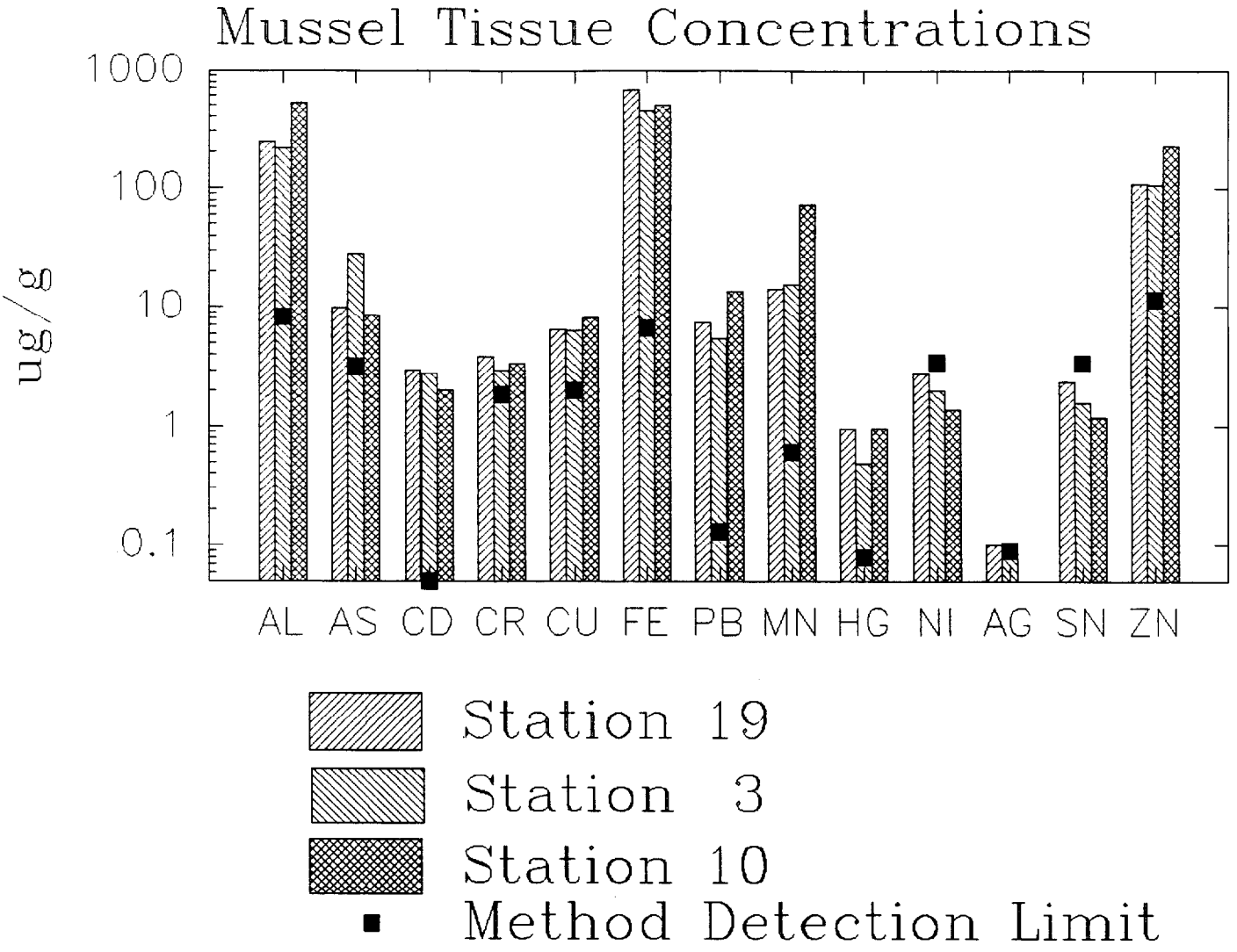
Cu	- Copper	Al	-Aluminium
Zn	- Zinc	Fe	-Iron
Cr	- Chromium	Mn	-Manganese
Pb	- Lead	Hg	-Mercury
Ni	- Nickel	Cd	-Cadmium
As	- Arsenic		

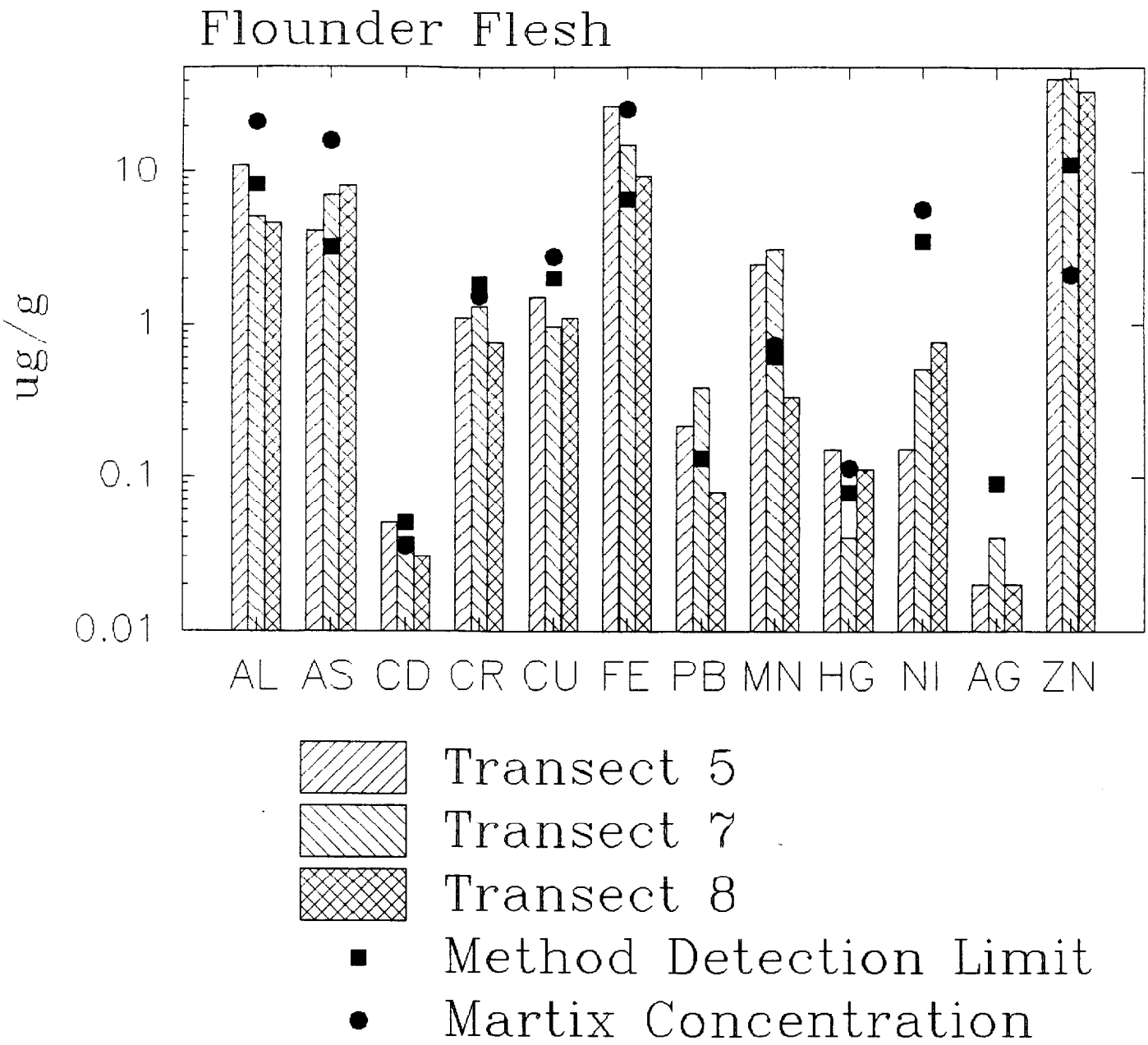

Sum of Measured PAHs
ug/kg (ppb)
6000
5000
4000
3000
2000
1000
0
19 19 10 10 17 8 7 3
STATION LOCATION
Mussel Tissue
Sediment

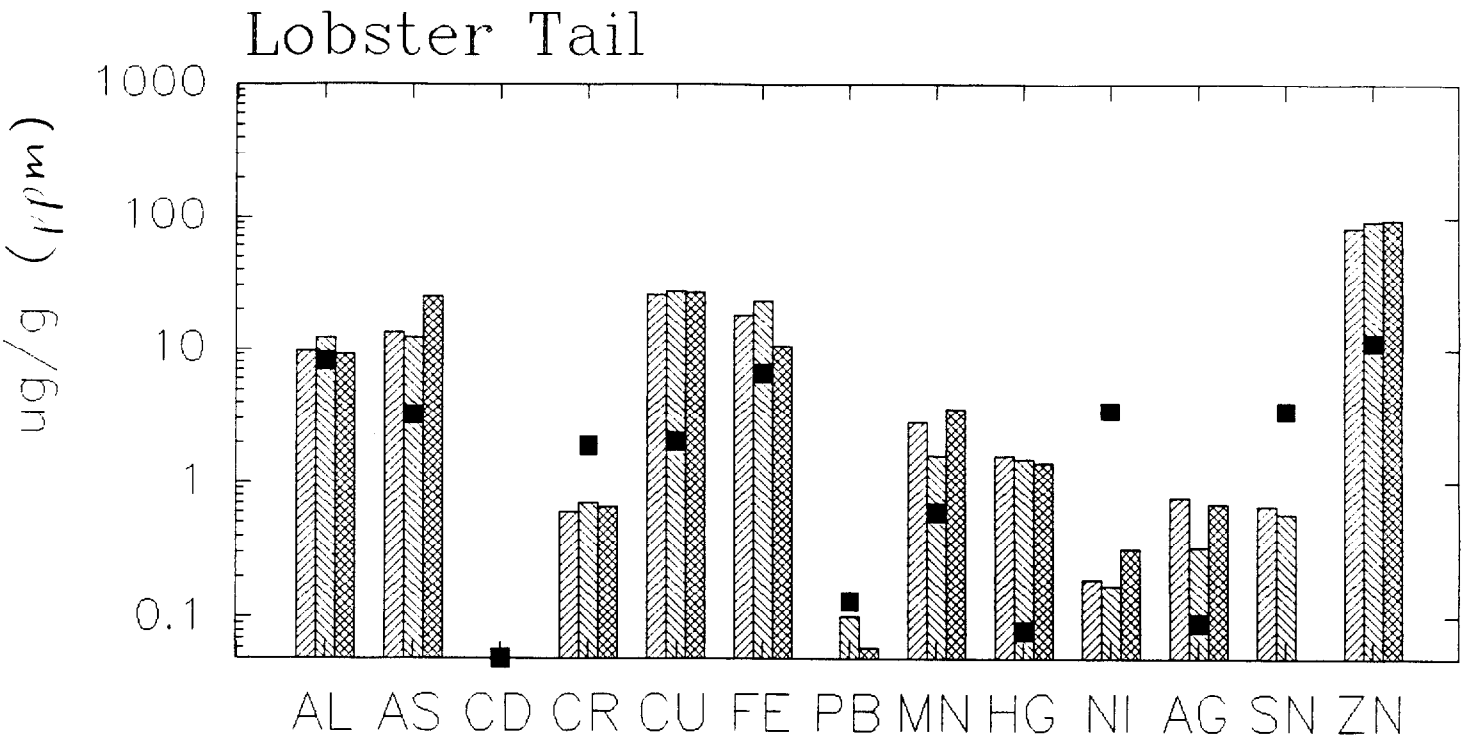

Sum of Selected PCBs
120
100
80
60
40
20
0
ug/Kg (ppb)
19 19 10 10 17 8 7 3
Station Location
Sediment
Mussel Tissue

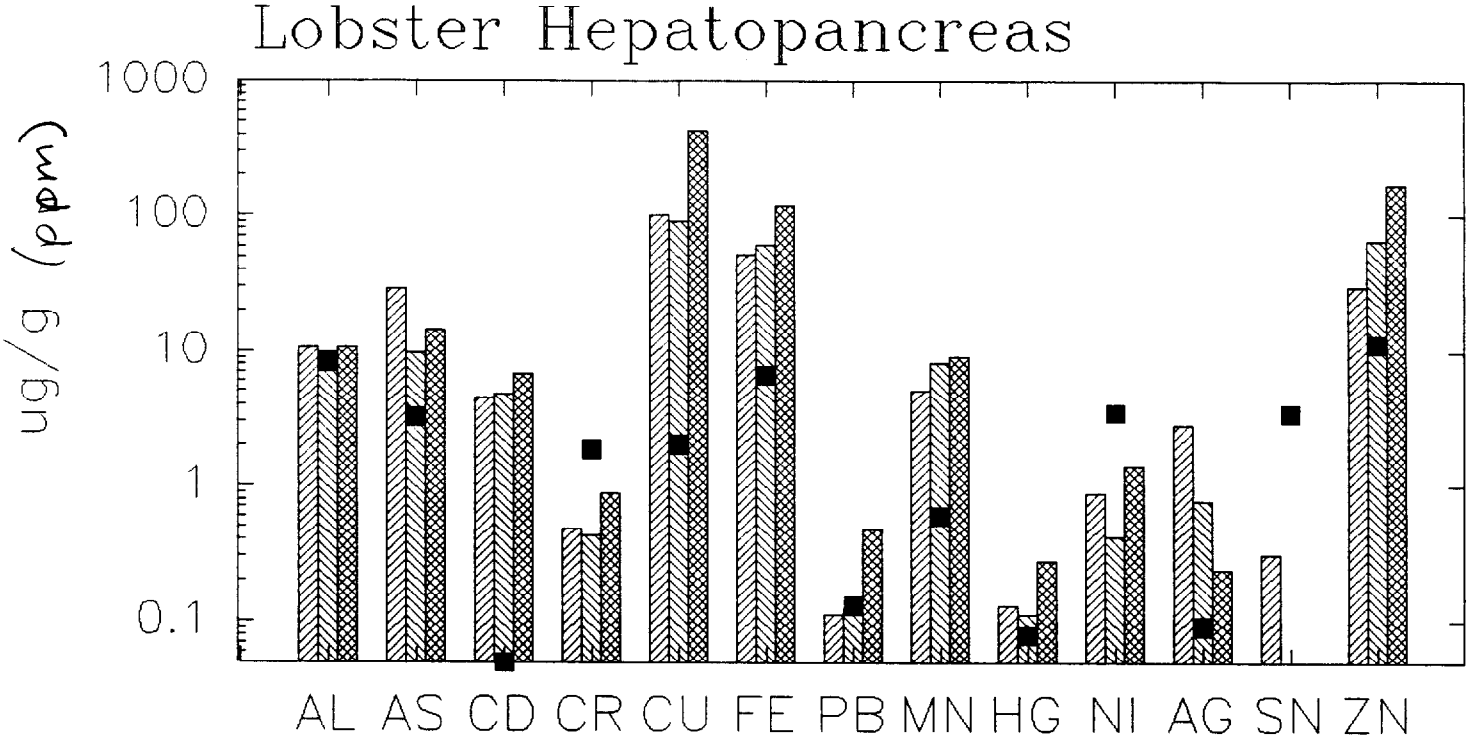


Concentration of inorganic compounds measured in sediment samples from stations 19 and 17.


Mussel Tissue Concentrations
1000
100
10
1
0.1
ug/g
AL AS CD CR CU FE PB MN HG NI AG SN ZN
Station 19
Station 3
Station 10
Method Detection Limit


Flounder Flesh
ug/g
10
1
0.1
0.01
AL AS CD CR CU FE PB MN HG NI AG ZN
Transect 5
Transect 7
Transect 8
Method Detection Limit
Martix Concentration



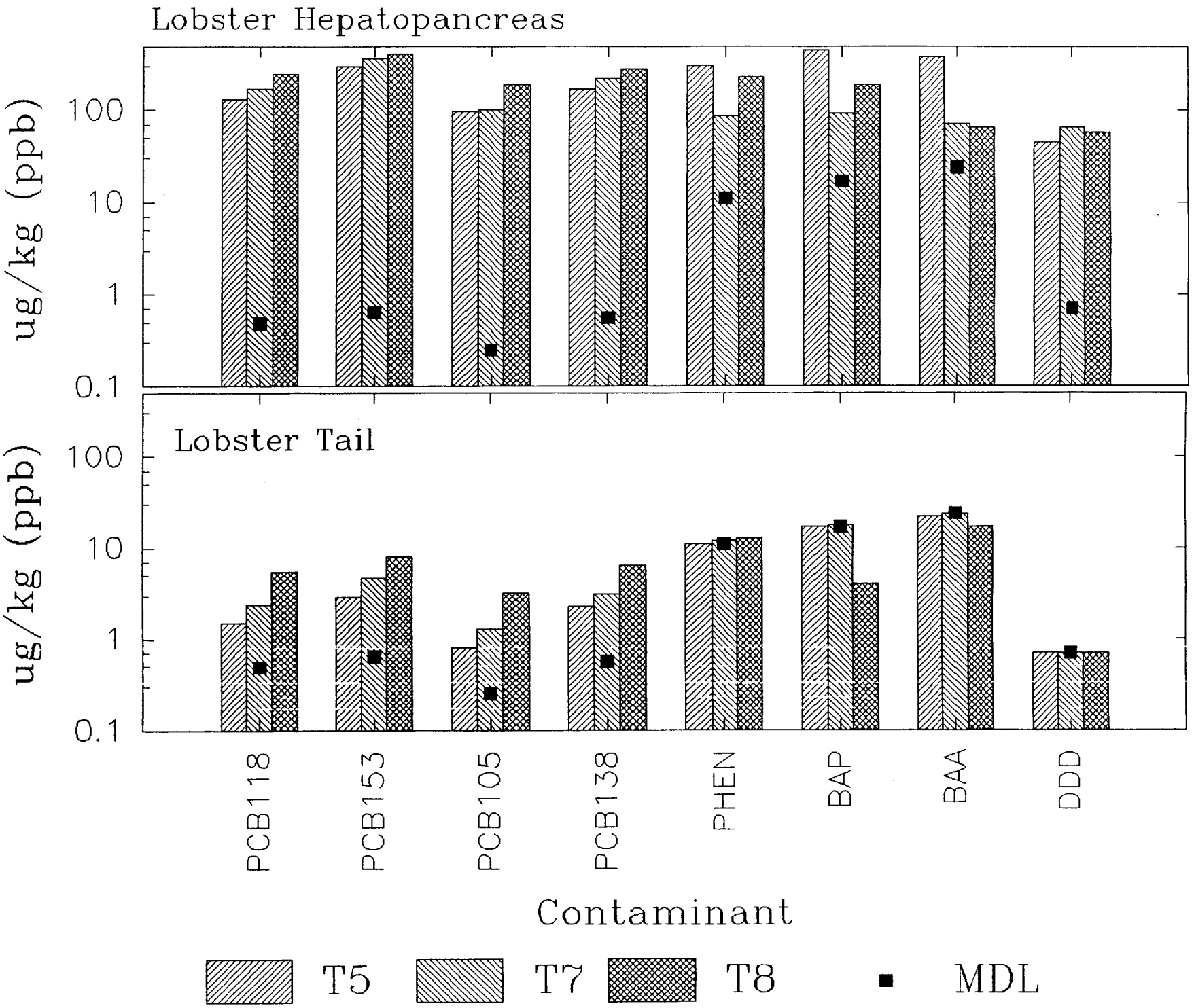


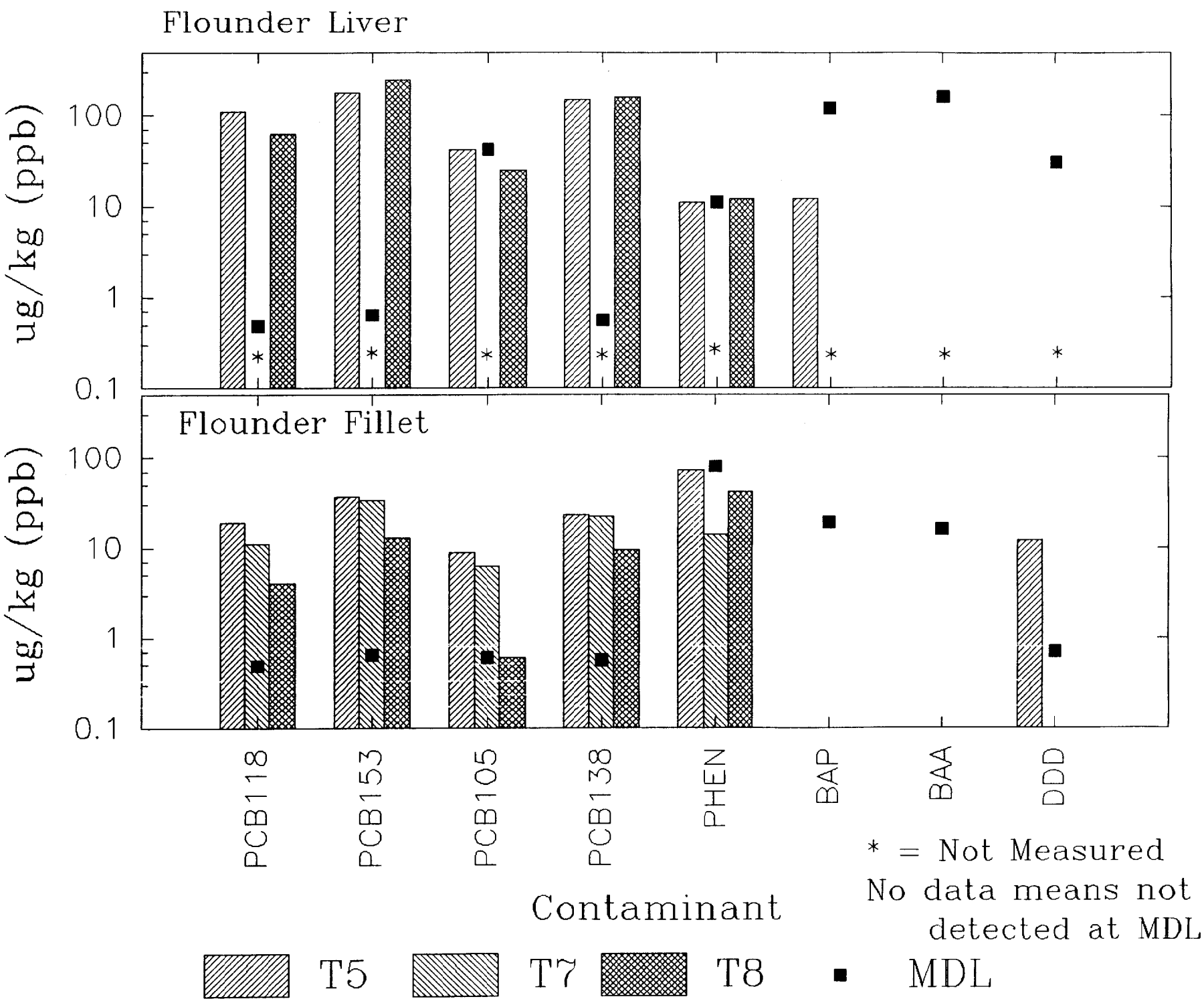
Transect 5

Transect 7

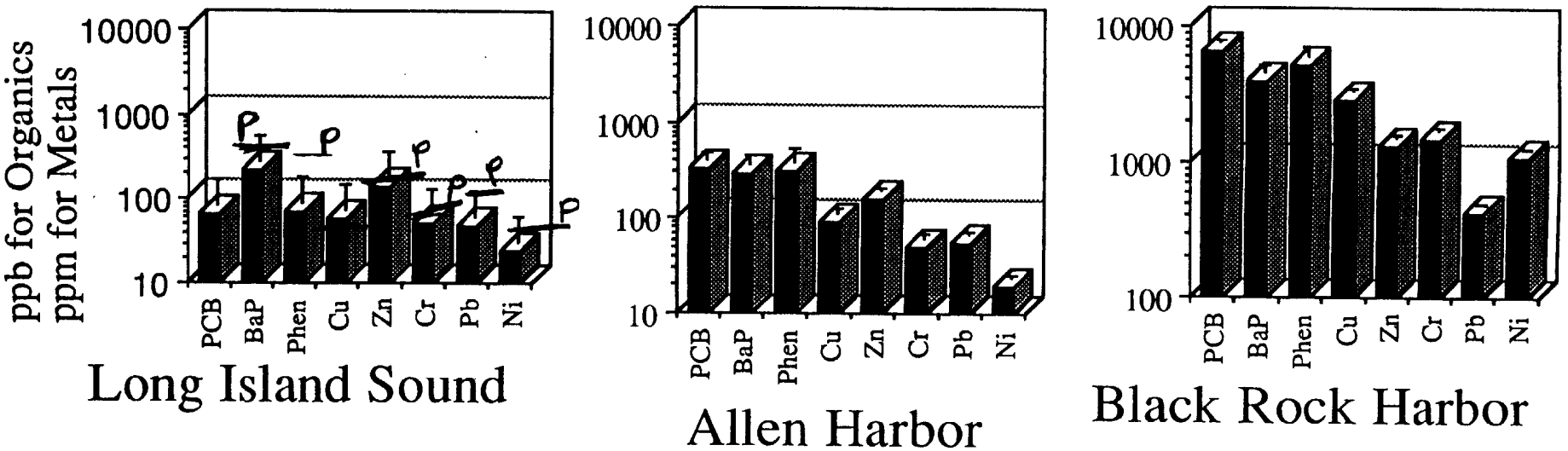
Transect 8

■ Method Detection Limit

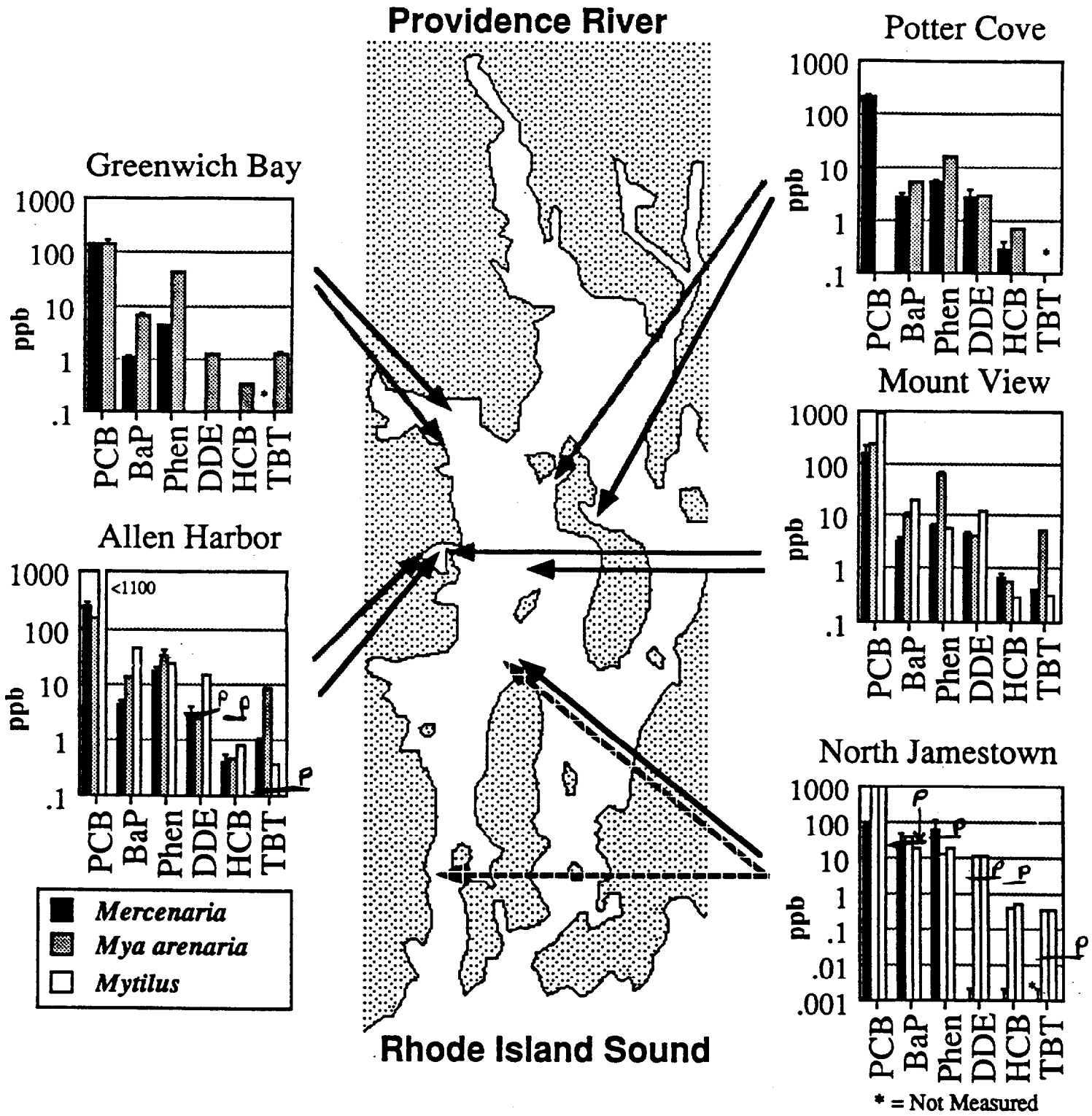

Lobster Hepatopancreas
Lobster Tail
ug/kg (ppb)
100
10
1
0.1
PCB118
PCB153
PCB105
PCB138
PHEN
BAP
BAA
DDD
Contaminant
T5
T7
T8
MDL


Flounder Liver
Flounder Fillet
ug/kg (ppb)
100
10
1
0.1
PCB118
PCB153
PCB105
PCB138
PHEN
BAP
BAA
DDD
Contaminant
* = Not Measured
No data means not detected at MDL
T5
T7
T8
MDL

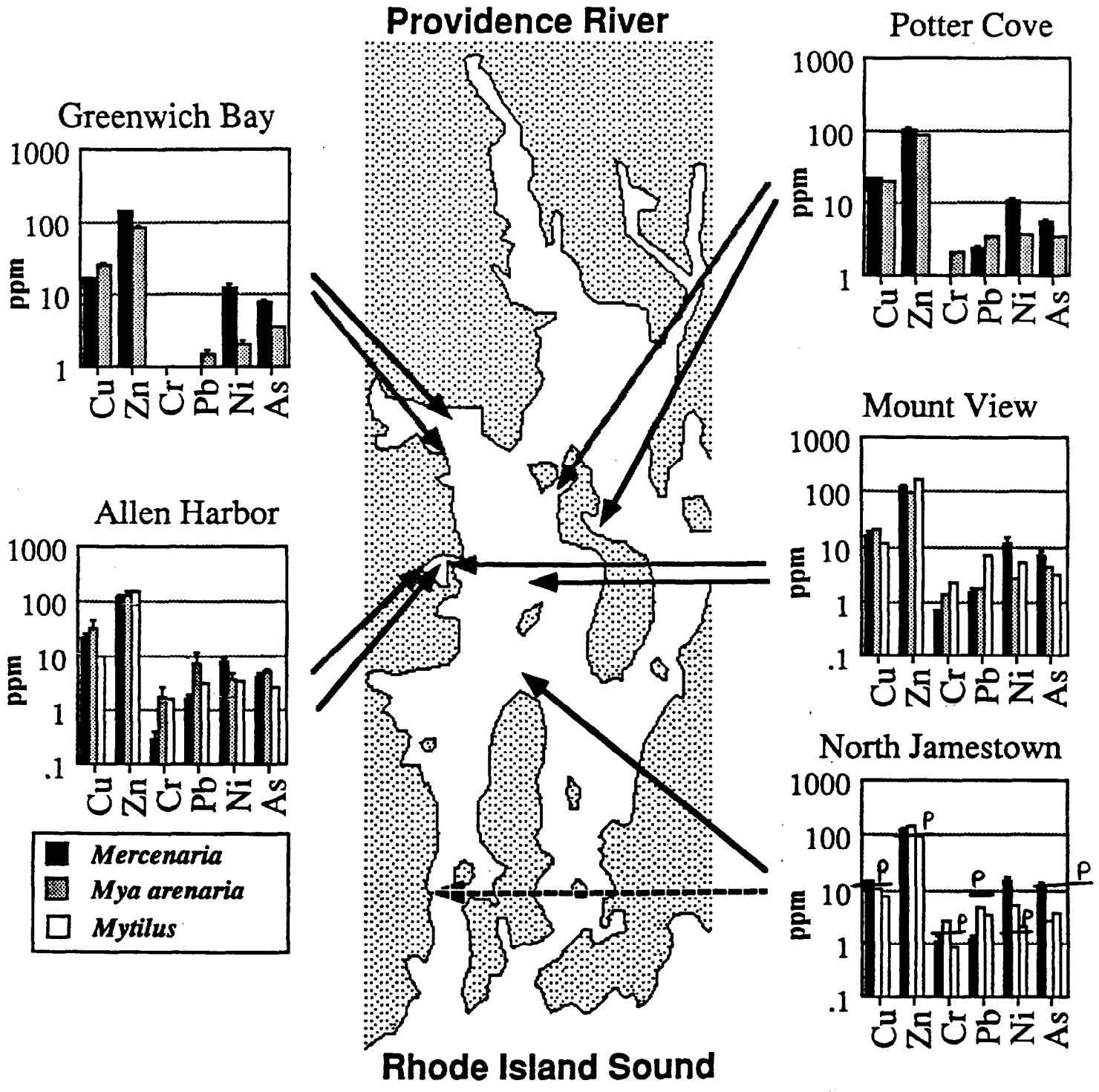
COMPARISON WITH OTHER NORTH EASTERN SITES



Tissue residues of selected organic contaminants in indigenous *Mercenaria mercenaria*, *Mya arenaria*, and deployed *Mytilus edulis*.



Tissue residues of selected toxic metals in indigenous *Mercenaria mercenaria*, *Mya arenaria*, and deployed *Mytilus edulis*.



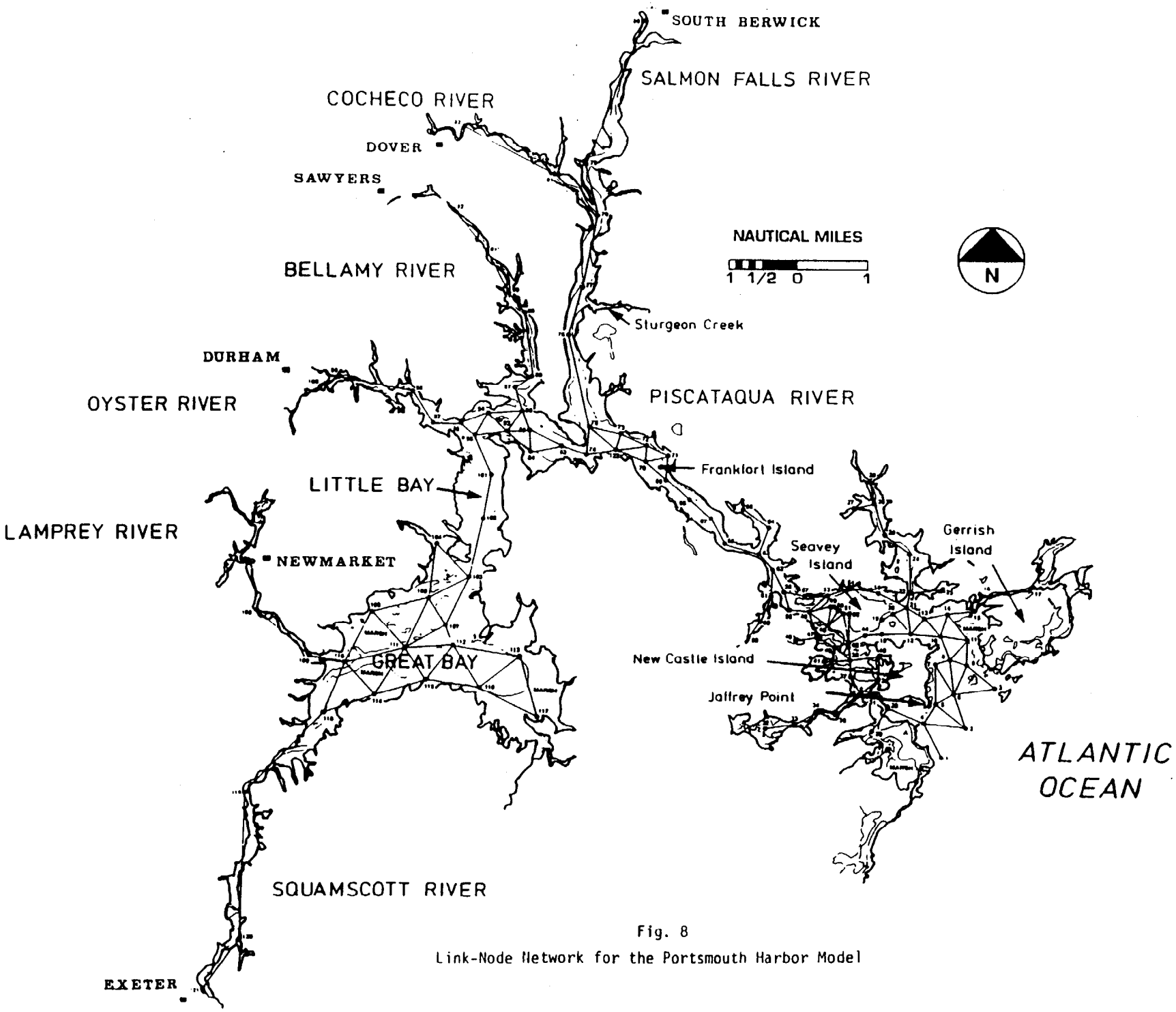


Fig. 8
Link-Node Network for the Portsmouth Harbor Model

PHASE II TECHNICAL APPROACH

1. Quantify Ecological Risk From Exposure

    a. Exposure-Response Bioassays
    b. Salt Marsh and Benthic Ecology
    c. Bioaccumulation Potential
        (1) Lobsters
        (2) Flounder
        (3) Food Chain

2. Conduct Detailed Ecological Assessment of Impact or Lack Thereof

    a. Sedimentation and Accumulation
        (1) sediment transport
        (2) suspended sediment dynamics
        (3) geochemical assimilation capacity
    b. Dispersion Dynamics
        (1) track water masses
        (2) measure dispersion coefficients
        (3) quantify current regimes
        (4) modelling
    c. Chemical and Microbial Markers

3. Long Term Monitoring

4. Ecological Risk Synthesis & Analysis

SUMMARY

STUDIES ARE DESIGNED TO MEET AND EXCEED REGULATORY REQUIREMENTS

STUDIES FOCUSED ON ECOLOGY OF THE SYSTEM

CASE STUDIES ARE APPLICATIONS OF R&D

CASE STUDIES ARE AN EFFECTIVE MEANS FOR TECHNOLOGY TRANSFER

GENERIC APPROACH TO ECOLOGICAL RISK ASSESSMENT

Cold nights, hot entertain

Portsmouth Hera

L. 102, NO. 14

WEDNESDAY, JANUARY 15, 1992

l Sites

broccoli

corn bread

hool budget

ommittee will discuss
ght.
rease over last year's
cing on reductions to
r state funding cuts.
ary freeze for the third
administrative staff.
lent Robert Hausman
of to the school for the

s to eliminate staffing
/ previous cuts will re-

nclude delaying build-

ne outcome of teacher
be finished within the

Wells High School on

architect

resident Robert Acker-
retainer fee to the ar-
entary School.

Public happy with EPA, Yard waste update

By Jack Spillane
Herald York Bureau

KITTERY — Kittery residents and environmental activists reacted positively Tuesday evening to an open forum held by the Environmental Protection Agency and the Navy to discuss the status of hazardous waste sites at the Portsmouth Naval Shipyard.

An audience of approximately 50 people listened for an hour and a half at Shapleigh School in Kittery to the EPA, the Maine Department of Environmental Protection and their consultants describe what they are doing to investigate 13 waste sites at the yard.

After the meeting, environmentally concerned citizens, who say they have been frustrated with the quality of information supplied by the EPA and the Navy in the past, said they were impressed.

"I still have a lot of questions, but I'm basically pleased with the meeting," said John Burns, chairman of the Southern Maine Toxics Campaign, an area environmental activist group.

EPA SPOKESPERSONS outlined in step-by-step detail how they have conducted the investigation of each of 13 sites that the Navy and the federal agency have agreed could be potentially hazardous.

Officials also provided specific information about the kinds of toxic substances that are located at the sites, and how the process will be developed to control them. They estimated that cleanup measures or other actions aimed at controlling the dangerous substances would be developed by March, 1994.

The program dealt only with materials on site at the shipyard, and the possible effects of those materials on waters adjacent to the yard.

Environmentally dangerous materials were stored at the Portsmouth Naval Shipyard for many years before environmental consciousness developed. The hazardous materials primarily consist of heavy metals such as chromium, lead, mercury, waste oils, potentially hazardous-exposed water, and PCBs (polychlorinebyphenyls — chemical products found in the oils of the electrical transfer process).

OFFICIALS SAID there are no nuclear waste materials stored at the shipyard because such matter has always been disposed of off-site.

Roger Cole, a Kittery resident who said he has attended the EPA and shipyard public meetings on hazardous waste sites for years, said last night's gathering was more "candid and complete" than past meetings have been.

"I think it's sort of our glasnost," he said. According to the concerned citizen, the openness of the meeting represented a victory for area residents, who have demanded more information from the EPA and Navy.

Although residents were pleased with the approach taken by the government organizations last night, areas of contention remained.

Conrad Quimby, chairman of the Kittery Conservation Commission, asked for information about the amount of toxics stored at the Jamaica Island Landfill, an estuary area of the shipyard that was filled with a variety of waste materials for many years.

The EPA consultants, however, said quantitative data on the amount of hazardous materials is not yet available because the scientific process of taking sediment samples and extrapolating level of hazardous concentrations has not been completed.

HOWEVER, MR. COLE said such data does exist. He cited an Initial Assessment Study conducted by environmental consultant Ray Weston in 1983 that stated data seemed to indicate the landfill was the source of contamination in mussels and algae in the estuaries that surround the shipyard.

Mr. Cole said that study indicated tidal fluctuations are causing inundation of the landfill that could result in contamination of the Piscataqua River.

"I'd be concerned about eating anything near the Navy Yard," he said.

Shipyard commander Capt. Lewis Felton ordered an interim study of the possible effects on a shipyard child-care center located near the landfill, and Steve Urschel, a consultant with McLaren Hart Corporation, a national environmental consultant group, reported the health risks were "very low."

The EPA seemed to give little encouragement to requests that waste material assessments of Spruce Creek, Chauncey Creek, or private wells that are located in Kittery along the Piscataqua River, will be conducted at this time.

Robert Johnston, project coordinator for the offshore effects of the waste site investigation, said the sites being examined have been selected to provide information of the overall contamination of the estuaries. Adding more sites would be limited by time and funding. However, he said if flow data indicates contamination was headed for a particular area, further studies would be requested.

POINTS OF CONTACT :

Mr. Robert K. Johnston
Naval Command, Control, and Ocean Surveillance Center
c/o University of Rhode Island Graduate School of Oceanography
Narragansett, RI 02874
(401) 295 - 5462 FAX 401 - 295 - 5462

Dr. Wayne R. Munns, Jr.
SAIC
c/o EPA Environmental Research Laboratory Narragansett
27 Tarzwell Dr.
Narragansett, RI 02882
(401) 782 - 3017 FAX 401 - 782 - 3030

Dr. Fred T. Short
Jackson Estuarine Laboratory
University of New Hampshire
Durham, NH 03824
(603) 862 - 2175 FAX 603 - 862 - 1101

Abstract submitted for presentation at the Annual Meeting of the Society of Environmental Toxicology and Chemistry (November 1992)

AN ESTUARINE ECOLOGICAL RISK ASSESSMENT FOR THE PISCATAQUA AND GREAT BAY ESTUARY, NH. R.K. Johnston, NCCOSC, San Diego, CA USA; W.R. Munns, Jr., SAIC, Narragansett, RI USA; F.T. Short, JEL-UNH, Durham, NH USA; and W.G. Nelson, EPA-ERLN, Narragansett, RI USA.

An ecological risk assessment framework is being applied to assess the ecological risk of past hazardous waste disposal operations at Naval Shipyard Portsmouth on the Piscataqua and Great Bay Estuary. The framework was developed to meet conditions of the Shipyard's environmental compliance requirements. The initial phase consists of evaluating existing environmental data and comparing measures of contamination and biological impact made at sites in the immediate vicinity of the shipyard with similar measures made at reference and background sites. Appropriate analytical methods, implemented using a performanced-based quality control program, were used to assess the distribution of contaminants in sediments and biota. The second phase will quantify the ecological risks of future impacts with data from exposure-response assays, bioaccumulation experiments, and measurements of sedimentation rates, assimilation potential, and dispersion dynamics. Sources of contamination will be determined with chemical and microbial markers. A long-term monitoring plan will provide data for effective risk management.