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Project Number 1703

Mr. Robert Krivinkas
Remedial Project Manager
Northern Division, Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-90-D-1298,
Contract Task Order No. 0173

Subject: Transmittal of Meeting Minutes, Ecorisk Advisory Board Meeting No. 5,
Ecological Risk Assessments, NETC Newport

Dear Mr. Krivinkas:

Attached are four copies of the minutes from the fifth Ecorisk Advisory Board (EAB) meeting held at the USEPA Region I office in Boston on October 5, 1995. These minutes have been distributed to the board members as appropriate.

If you have any questions regarding this material, please do not hesitate to contact me.

Very truly yours,

Stephen S. Parker
Project Manager

SSP/gmd

Enclosure

c: B. Wheeler, NETC Newport (w/enc.-4)
K. Keckler, USEPA (w/enc.-4)
P. Kulpa, RIDEM (w/enc.-4)
K. Finkelstein, NOAA (w/enc.)
T. Prior, USF&W (w/enc.)
J. Trepanowski/M. Turco, B&R Environmental (w/enc.)
File 1703-3.2 (w/enc.)

1346

bcc: J. Quinn/J. King, URIGSO (w/enc.)
G. Tracey, SAIC (w/enc.)
H. Laguette, B&RE (w/enc.)
File 1703-2.1 w/enc.

**MINUTES OF THE FIFTH ECORISK ADVISORY BOARD MEETING
NAVY INSTALLATION RESTORATION PROGRAM
NAVAL EDUCATION AND TRAINING CENTER (NETC)
NEWPORT, RHODE ISLAND**

October 5, 1995

**BROWN AND ROOT ENVIRONMENTAL
CONTRACT NO. N62472-90-D-1298
CONTRACT TASK ORDER NO. 0173**

**Prepared by:
Mr. Stephen S. Parker
Project Manager**

**Prepared for:
Mr. Bob Krivinskas
Remedial Project Manager
U.S. Navy, Northern Division**

MINUTES OF THE FIFTH ECORISK ADVISORY BOARD MEETING

OCTOBER 5, 1995

The fifth meeting of the Ecorisk Advisory Board for Naval Education and Training Center sites was held at the U.S. Environmental Protection Agency offices in Boston, Massachusetts, on October 5, 1995. The meeting was held to discuss the work plan for conducting the offshore ecological risk assessment for the Old Fire Fighting Training Area (OFFTA), and discuss the offshore field sampling and analysis plan for the site. The minutes of the meeting are presented below, followed by two attachments. Attachment A presents a list of meeting attendants, and Attachment B includes the meeting agenda and handouts.

I OPENING REMARKS - Stephen S. Parker, Brown and Root Environmental

The objectives of the meeting were stated. It was noted that Addendum C of the Master Work Plan is currently in Draft, and a Draft Final could be prepared and submitted if the group reached a consensus today. It was recognized that B&R/URI/SAIC should scope only one more iteration, be it referred to as a Final or a Draft Final.

II WORK PLAN FOR CONDUCTING THE OFFSHORE ECOLOGICAL RISK ASSESSMENT FOR OFFTA - Dr. Greg Tracey, SAIC

An overview of the Draft Work Plan for the OFFTA (Addendum C of the Master Work Plan) was presented. Dr. Tracey indicated that the overhead and handout materials used in the presentation corresponded to figures and tables from the draft Addendum C of the Master Work Plan. However, Dr. Tracey explained that revisions would be made to such materials during the presentation to reflect responses to earlier regulatory comments, and in accord with applicable up-to-date changes in approach previously agreed on for the offshore ecological risk assessments for the McAllister Point Landfill and Derektor Shipyard. The presentation of the work plan included a site overview addressing location and history, previous sampling and analytical work, and problem formulation for the ecological risk assessment. The contaminants, species and endpoints of concern for the site, as well as the site-specific conceptual model, were presented.

Brad Wheeler (NETC) indicated that all future maps of the site should not include the sign "CHILD CARE CENTER" when referring to the structure identified as Building #144.

Dr. Tracey agreed with Mr. Wheeler's comment and indicated that the necessary revisions would be made.

Dr. Tracey presented a summary of the offshore analytical results reported by TRC, and clarified that the units on the tables are "ppb". He indicated that PAHs appear to be the main contaminants of concern for the site. Dr. Tracey discussed the gaps that currently exist in the TRC analytical database, and indicated that the proposed offshore field sampling and analysis plan (FSAP) for the site will address such data gaps.

A general comment was made about the need for the proposed FSAP to be able to identify trends in contaminant concentrations from the nearshore stations towards the offshore stations. Ken Finkelstein (NOAA) expressed the need for better defining the areas of anaerobic sediments which have high organic deposition and low benthic diversity.

It was agreed to address these issues when discussing the proposed FSAP later during the meeting.

Susan Svirsky (USEPA) and Stephen Parker (B&RE) asked Brad Wheeler (NETC) about the use of Coasters Harbor.

Brad Wheeler indicated that the harbor has no industrial use but there is a recreational marina for Navy personnel to the south of the first bridge; he further indicated in response to a question from Dr. Tracey that there are no navigational restrictions from the Navy in proximity to the site. In addition, Chris Deacutis (RIDEM) responded to a question from Ms. Svirsky indicating that the area of Narragansett Bay where the site is located is open to lobster fishing but not for shellfishing.

Dr. Tracey identified the receptors of concern for the site, and indicated that the habitat for the osprey will be changed to read "avian aquatic". He also indicated that mummichogs (*Fundulus* spp.) are expected to exist in the area, and that soft shell clams (*Mya arenaria*) should also be present in association with soft sediments.

Susan Svirsky (USEPA) requested the use of another bird species that would be associated with a greater ingestion of shellfish.

Several species were discussed but eliminated from consideration because of the unavailability of appropriate toxicological databases. Dr. Tracey proposed the use of sea gull, for which he indicated there is an extensive database available; the use of the sea gull as the primary avian receptor of concern, in addition to osprey, was accepted.

Chris Deacutis (RIDEM) indicated that eelgrass beds represent a high quality habitat and requested their mapping as part of the studies for the ecological risk assessment for the site.

Dr. Tracey pointed out that eelgrass mapping was not originally planned as part of the project. However, Dr. Tracey indicated that he would seek the collaboration of the University of Rhode Island to identify, with navigational equipment, the location of the main eelgrass bed areas.

Dr. Tracey presented the assessment and measurement endpoints to be used in the ecological risk assessment. Dr. Tracey proposed the use of elutriate tests instead of porewater tests to assess the potential toxicity of sediment samples, and indicated that the recommended toxicity endpoint for elutriate tests based on USEPA guidance is the sea urchin larval development test.

Bob Richardson (RIDEM) questioned the use of the larval development test as opposed to the more widely used sea urchin sperm cell test.

Dr. Tracey reiterated that the larval development test is the one recommended in USEPA guidance for assessing potential toxicity in sediment elutriate, and explained that this test is more sensitive and better fitted to assess *chronic* toxicity because of the longer exposure period involved when compared to the sperm cell test. However, Dr. Tracey indicated that, in addition to the larval development toxicity test, the sperm cell toxicity test may also be conducted in split elutriate samples.

No consensus was reached on the selection of this test. This issue will be addressed at the next meeting following surface grab sample collections.

Dr. Tracey presented the exposure pathways for each of the receptors of concern as part of the conceptual model for the site.

Susan Svirsky (USEPA) indicated that contaminant tissue residue should also be included as a measurement endpoint in relation to benthic organisms and mummichog.

Dr. Tracey agreed and indicated that tissue contaminant loading would be determined for *in situ* organisms.

Susan Svirsky and Kymberlee Keckler (USEPA) commented that the issue of who will conduct the offshore human health risk assessment for the site should be resolved, given the concern for consumption of bivalves and lobster.

Robert Krivinskas (US Navy) indicated that this issue will be addressed at the next RPMs meeting. (Note that, according to the RIDEM, a shellfishing ban is in effect in the area).

Dr. Tracey presented the exposure point measurements to be used in the ecological risk assessment for the site.

A general discussion ensued on the need for better delineating and characterizing the areas of anaerobic sediments which reportedly have high organic deposition and low benthic diversity. Specific concerns included: what is the cause of the anaerobic conditions?; did anaerobic conditions precede the low benthic diversity or the opposite?; are there other sediment conditions in the harbor created by a current from the south?; should some preliminary sediment grab samples be collected and redox potential be determined to confirm whether anaerobic conditions really exist?; should both elutriate toxicity tests and porewater SEM/AVS measurements be conducted for the sediment samples?

Dr. John King (URI) indicated that, as part of the work currently being conducted for Derecktor Shipyard, he could make arrangements for collecting some sediment surface grab samples (0 to 18 cm) and perform redox potential determinations, in order to confirm if the "muck" sediment area is really anaerobic. There was general agreement on this phased screening approach based on the current need for more information to decide the proper strategy to assess the reportedly anaerobic sediment area. Steve Parker (B&RE) and Robert Krivinskas (US Navy) agreed on later discussing the logistics for conducting the proposed field screening work.

Dr. Tracey indicated that the issue of suspected low dissolved oxygen concentration in the water should be addressed when the lowest oxygen concentrations are expected to occur. Dr. Tracey mentioned that seasonality is an important factor because of changes on the kinetic energy of the system and on its freshwater runoff input. Dr. Tracey indicated that dissolved oxygen measurements should be conducted at the end of August; otherwise, he added, the available option is to first conduct the circulation and geophysical studies and then model the dissolved oxygen depletion in a manner similar to that used for Derecktor Shipyard (however, this task is not currently included in the work plan for OFFTA). Robert Krivinskas (US Navy) indicated that the time frame for the project will be contingent on the timing requirements of the studies involved.

It was agreed that these issues would be further discussed at a future meeting to be held when the results of the proposed preliminary surface grab sediment sampling become available.

Stephen Parker (B&RE) asked about the consideration of seasonality on sampling target species for tissue analyses.

Dr. Tracey indicated that July/August is, in general, the ideal time for tissue collection for uptake studies on target species, and mentioned that seasonality should not be much of an influencing factor when dealing with organic contaminants, particularly PAHs.

Ken Finkelstein (NOAA) asked when were the bivalve and sediment samples collected as part of the Battelle study, as he is concerned about modelling and seasonality and if whether the high concentrations of PAHs are contributing to the hypoxia.

Dr. Tracey said he would check on the sampling dates on the Battelle study, and would give further consideration to the seasonality issue.

Dr. Tracey presented the hydrographic survey lines, and indicated that a geophysical survey will also be conducted to determine the distribution of sediment grain sizes and the thickness of the sediment layers.

Susan Svirsky (USEPA) asked about the location of the CSO and sewage treatment plant outfalls, and commented they should be considered as alternative nutrient loading to the area.

Brad Wheeler (NETC) indicated that the locations of all CSOs is depicted in a "map" that has already been submitted to the USEPA and RIDEM. Dr. Tracey indicated that the locations of the outfalls will be presented in the appropriate figure of the revised Addendum C. In addition, after general discussion, it was agreed that an additional hydrographic survey line will be included in Coasters Harbor, in an area south of the bridge (at approximately where the "Coasters Harbor" arrow appears on Figure C4-2, which was used as the overhead during the presentation).

III OFFSHORE FIELD SAMPLING AND ANALYSIS PLAN FOR OFFTA - Dr. Greg Tracey, SAIC

Dr. Tracey presented the new proposed stations to be included in the field sampling and analysis plan (FSAP) for the offshore ecological risk assessment for OFFTA. A base map of sampling stations was presented, as well as the following maps of specific sampling stations: sediment cores for chemical evaluation; indigenous mussels, soft shell clams and mummichog fish; hard shell clams; and deployed mussels and lobsters. In addition, a table summarizing the proposed sampling and analysis plan was presented. Specific issues that were discussed during the presentation of the FSAP, and resolutions taken during the presentation, are described below.

Dr. Tracey indicated that the new proposed sampling stations represented an extended spatial coverage than previously proposed, since additional sample collections are now being considered at each station. For biota samples, Dr. Tracey explained that an overall collection success of approximately 65 to 75 percent is anticipated at the proposed sampling stations.

Dr. Tracey indicated that elutriate toxicity tests will be used for sediments considered to be anoxic, while porewater tests will be used for oxygenated sediments. General agreement was expressed over this approach.

Susan Svirsky (USEPA) requested to have station 16 considered for deep core samples for chemistry analysis given its proximity to previously detected high concentrations of contaminants.

Dr. Tracey agreed.

Bob Richardson (RIDEM) inquired if porewater tests would only be applied to the surface layer of sediments or to the whole 0-18 cm depth range.

Dr. Tracey indicated that, in general, porewater and elutriate tests will be done for the same 0-18 cm depth interval; however, depending on the field screening data yet to be generated, SEM/AVS determinations will probably only be made for the surface sediments. Dr. John King

(URI) pointed out that this could result in an approach different from that currently being followed for Derecktor Shipyard, and thus comparability between sites would be compromised. Susan Svirsky (USEPA) indicated that the proposed approach was appropriate for the OFFTA, and that the Superfund Program addresses sites in a case-by-case basis and does not seek the comparability between sites. In addition, Ms. Svirsky said, "for the record", that the Superfund Program does not normally endorse the use of elutriate tests but, as for the case of this site, special circumstances have been considered in the past.

Paul Kulpa (RIDEM) requested that TPH analysis be included for surface and core sediment samples at stations 4, 5, 6, 10, 11 and 16, since the Oil Pollution Control Program from the RIDEM has a regulatory cleanup standard for TPH.

Mr. Kulpa did not know the specific basis for the derivation of the RIDEM's TPH cleanup standard, but agreed on providing B&RE/SAIC with a copy of the appropriate official document containing such standard.

Ken Finkelstein (NOAA) expressed concern about the accuracy of measurement of mussels at 30 days only. In addition, Chris Deacutis (RIDEM) indicated that mussels should be deployed before the Spring bloom.

Dr. Tracey pointed out that small adult mussels will be used for deployment, which will occur in late May or early June; he indicated that such approach has been successful in the past. Dr. Tracey then explained that after 30 days of deployment he will collect some of the mussels for condition index and contaminant bioaccumulation determinations, while the remaining mussels will be redeployed for 30 additional days for condition index measurements after a total of 60 days of exposure. General consensus was reached regarding this approach.

Susan Svirsky (USEPA) suggested maintaining an up-to-date cumulative database of the information related to the reference locations selected for the NETC sites, and that such database should be included in each of the site reports as they are generated. Ms. Svirsky explained that such database may be useful to identify potential seasonal trends in some of the endpoints used in the ecological risk assessments.

Bob Richardson (RIDEM) inquired about the scope and design of the sewage pathogens studies to be conducted in relation to the OFFTA.

Dr. Tracey indicated that the approach of the sewage pathogens studies will be the same as that followed in the corresponding studies for Derecktor Shipyard and McAllister Point Landfill.

Susan Svirsky (USEPA) and Kymberlee Keckler (USEPA) indicated that neoplasia and P450 studies should be conducted since there is a concern of high concentrations of PAHs.

Dr. Tracey indicated that neoplasia determinations will be made on soft shell clams. However, regarding the P450 studies, Dr. Tracey explained that he wants to wait until the results from these studies conducted for Derecktor Shipyard are available before making a decision of whether to include such studies in the OFFTA ecological risk assessment. There was general acceptance to this approach.

Susan Svirsky (USEPA) commented that when sampling for mummichogs, indigenous bait should be used in the traps (substituting for cat food is not acceptable).

Dr. Tracey agreed.

Stephen Parker (B&RE) inquired if PCBs and TBT should be included in the analytical work for OFFTA.

Susan Svirsky (USEPA) and Kymberlee Keckler (USEPA) responded yes, that PCBs and TBT should be included in the analytical work for the site.

Dr. Tracey ended his presentation as no additional issues were raised by the audience.

IV MANAGERIAL ISSUES - Robert Krivinskas, U.S. Navy, and Stephen Parker, B&RE

Mr. Krivinskas and Mr. Parker indicated that the submittal date for the Draft Final version of Addendum C is contingent upon the following:

- submittal of, and agreement on, the minutes of the meeting;
- results of the redox potential determinations on a series of sediment surface grab samples to be collected from Coasters Harbor during the Fall of 1995; and
- agreement on pending issues to be reached at a future meeting based on the results of the redox potential determinations.

Mr. Krivinskas indicated that if all the necessary data is available, and consensus is reached in all pending issues, then the Navy would simply issue a Final version of Addendum C without first producing a Draft Final version. Mr. Krivinskas indicated that the Navy would follow this approach in accordance with agreements reached during the "partnering" sessions the Navy and the USEPA have held. General agreement was reached on this approach.

The meeting concluded at approximately 1:15 pm, after Mr. Krivinskas expressed the need for holding an RPMs meeting.

ATTACHMENT A
LIST OF MEETING ATTENDANTS

OCT. 5, 1995
 Attendance list — EAB meeting — Old Fire Fighting Training Area

<u>Name / Affiliation</u>	<u>Phone</u>
Theodor Laquette, HNUIS	508-658-7899
Stephen S. Parke — BTR	508-658-7899
Susan C. Swisky	(508) 573-9649
ROBERT x KRIVINSKAS	(610) 595-0567 x134
Zymlerke Yeckler — USEPA	(617) 573-5777
James King — URI	401-792-6182 or 6594
Ken Finkelstein — NOAA	617-223-5537
Chris Deacutis — FIDRAI NSP	401-277-3165 x7270
Paul Kulpr — R/PEM	401-277-3872 ext 7111
Bob Richardson — R/PEM	401-277-6519 ext 7240
"Bred" Whul — NAVY	841 6375
Patty Marjoh-Wlittenore — EPA	(617) 223-5582
Barbara Douglas — NAVY	610 595-0567 x188
GREG TRACEY — SAIC	401-782-1905

ATTACHMENT B
MEETING AGENDA AND HANDOUTS

**AGENDA FOR THE NETC ECORISK ADVISORY BOARD
MEETING ON OCTOBER 5, 1995, REGARDING THE
OLD FIRE FIGHTING TRAINING AREA (OFFTA)**

- I Opening remarks.
- II Discussion of the work plan for conducting the offshore ecological risk assessment for OFFTA:
- Brief overview of the general framework of the master Work Plan for NETC sites.
 - Brief presentation of the Work Plan for OFFTA (Addendum C of the master Work Plan), including a general overview of the problem formulation for the site (contaminants, species and endpoints of concern, and conceptual model).
- III Discussion of the field sampling and analysis plan to support the offshore ecological risk assessment for OFFTA:
- Overview of previous offshore sampling work.
 - Presentation and discussion of the proposed sampling and analysis plan to meet the data needs for the ecological risk assessment based on the problem formulation for the site. Reach consensus on the plan.
- IV Discuss and reach consensus on any pending issues for the preparation of the draft final version of Addendum C, and agree on a submittal date.



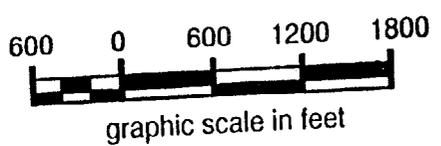
**DERECKTOR
SHIPYARD**

**CODDINGTON
COVE**

**COASTERS
HARBOR**

**CODDINGTON
POINT**

**OLD FIRE FIGHTING
TRAINING
AREA No. 9**



**FIGURE C1-1. LOCATION OF OLD FIRE FIGHTER TRAINING AREA AT THE NAVAL
EDUCATION AND TRAINING CENTER (NETC), NEWPORT, RI.**

Table C2-1. Organic contaminants in surface sediments of Coasters Harbor (TRC 1994).

Sample	Sediment		Mussels		Clam	
	Total PCB ^a	Σ Congeners ^b	Total PCB	Σ Congeners	Total PCB	Σ Congeners
Site 09 Old Fire Fighting Training Area						
S9-NS-1/2	48.6	28.4	251	128	26.9	31.8
S9-NS-3/4	18.7/26.4	13.2/17.3	305/289	146/144	22.5/25.6	26.4/26.0
S9-NS-5/6	7.83 J	8.69	310	150	—	—
S9-OS-7	54.2	29.7	—	—	—	—
S9-OS-8	27.9	17.3	—	—	38.3	45.4
S9-OS-9	4.51 J	4.67	—	—	30.0	33.6
S9-NS-10	—	—	—	—	66.2	37.1
S9-OS-11	21.4	13.8	—	—	85.5	54.0
Reference Sites						
R1-NS-1/2/3	1.26 J	0.92	358	184	23.0(H)/ 31.0(S)	27.5(H)/ 30.3(S)
R1-OS-4	14.4	18.5	—	—	46.6	56.0
R2-NS-1/2/3	1.26 J	0.81	331	167	27.4	26.2
R2-OS-4	2.41 J	2.64	—	—	100	105
R3-NS-1/2/3	6.39 J	3.59	407	221	46.7	23.2
R3-OS-4	33.9	26.9	—	—	168	111

^a Total PCB: Total PCB as Aroclor 1254, which was consistently the PCB formulation the PCB pattern most closely resembled.

^b ECongeners: Sum of the 20 individual PCB congeners determined.

^c Samples with two values reported show data for both field duplicates.

^d No sample collected.

^e Data for both hard (H) and soft (S) shell clam collected at the same station.

Table C2-1, con't.

Sample	Sediment		Mussels		Clam	
	ΣPAH ^a	ΣPAH ₁₆ ^b	ΣPAH	ΣPAH ₁₆	ΣPAH	ΣPAH ₁₆
Site 09 Old Fire Fighting Training Area						
S9-NS-1/2	57800	33600	2090	1020	2800	1790
S9-NS-3/4	16100/13500	10300/8350	1060/1010	450/450	3470/5770	2150/3970
S9-NS-5/6	9460	6000	876	370	—	—
S9-OS-7	13300	8170	—	—	—	—
S9-OS-8	4210	2350	—	—	526	194
S9-OS-9	955	572	—	—	417	205
S9-NS-10	—	—	—	—	2340	1110
S9-OS-11	3630	2060	—	—	904	393
Reference Sites						
R1-NS-1/2/3	535	260	465	188	396(H)/ 445(S)	176(H)/ 208(S)
R1-OS-4	1580	842	—	—	398	169
R2-NS-1/2/3	171	56.8	353	143	366	169
R2-OS-4	261	161	—	—	605	255
R3-NS-1/2/3	849	456	649	274	1040	466
R3-OS-4	2720	1590	—	—	962	394

^a EPAH: Sum of the 40 PAH analytes/parameters determined.

^b EPAH₁₆: Sum of the 16 Priority Pollutant PAHs.

^c Samples with two values reported show data for both field duplicates.

^d No sample collected

^e Data for both hard (H) and soft (S) shell clam collected at the same station.

Table C2-2. Target ecological systems/species/receptors of concern

Habitat	Ecological System/Species/Receptor of Concern
Pelagic	blue mussel (<i>Mytilus edulis</i>) ¹ mummichog (<i>Fundulus</i> spp.) winter flounder (<i>Pseudopleuronectes americanus</i>) ²
Epibenthic	blue mussel ³ lobster (<i>Homarus americanus</i>)
Benthic	hard shell clam (<i>Mercenaria mercenaria</i>) soft shell clam (<i>Mya arenaria</i>) benthic community
Terrestrial	osprey (<i>Pandion haliaetus</i>)

¹ surrogate for pelagic species when collected from mid-upper water column (e.g. mooring floats)

² present abundances of this species do not permit their collection for this study.

³ representative of epibenthic species when collected from bottom substrate.

Table C2-3. Assessment and measurement endpoints for Old Fire Fighting Training Area.

Assessment Endpoint	Receptor of Concern	Measurement Endpoint
Habitat Quality	Critical habitats	Spatial distribution of habitats
Sediment Quality	Infaunal receptors Epifaunal receptors	<ul style="list-style-type: none"> o Bulk sediment toxicity to amphipods (10-day mortality) o Pore water toxicity to sea urchin gametes (sperm cell test) o Benthic community structure (diversity, numbers) o Abundance and condition of target receptor species
Water Quality	Pelagic receptors Epifaunal receptors	<ul style="list-style-type: none"> o Abundance and condition of indigenous mussels o Water toxicity to sea urchin gametes (sperm cell test) o Abundance and condition of target receptor species
Status of Natural Resources	Resource species	<ul style="list-style-type: none"> o Abundance and condition of target receptor species o Abundance and condition potential prey species o Bioaccumulation and trophic transfer

PELAGIC RECEPTORS

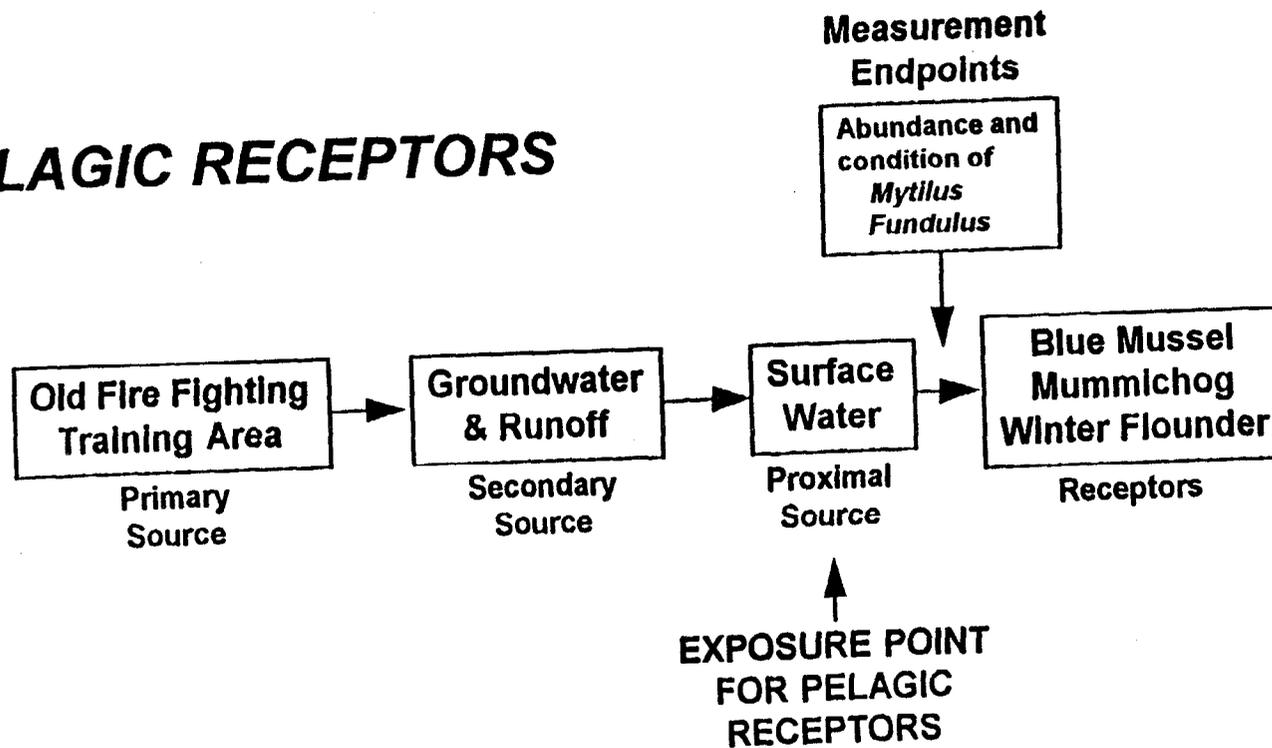


FIGURE C2-4. FOURTH TIER CONCEPTUAL MODEL FOR OLD FIRE FIGHTER TRAINING AREA - EXPOSURE PATHWAY TO PELAGIC ORGANISMS.

EPIBENTHIC RECEPTORS

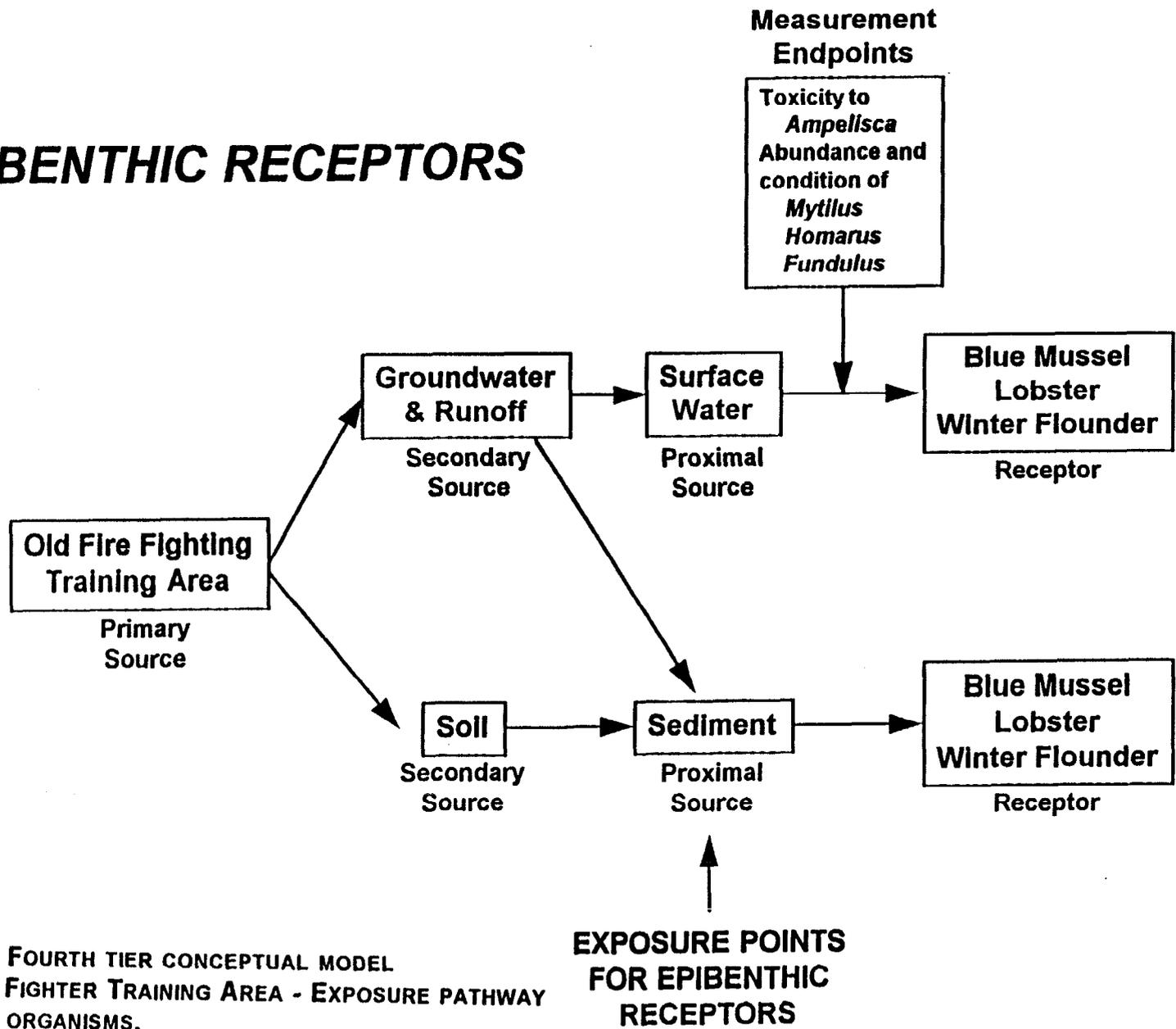


FIGURE C2-5. FOURTH TIER CONCEPTUAL MODEL FOR OLD FIRE FIGHTER TRAINING AREA - EXPOSURE PATHWAY TO EPIBENTHIC ORGANISMS.

EXPOSURE POINTS FOR EPIBENTHIC RECEPTORS

INFAUNAL RECEPTORS

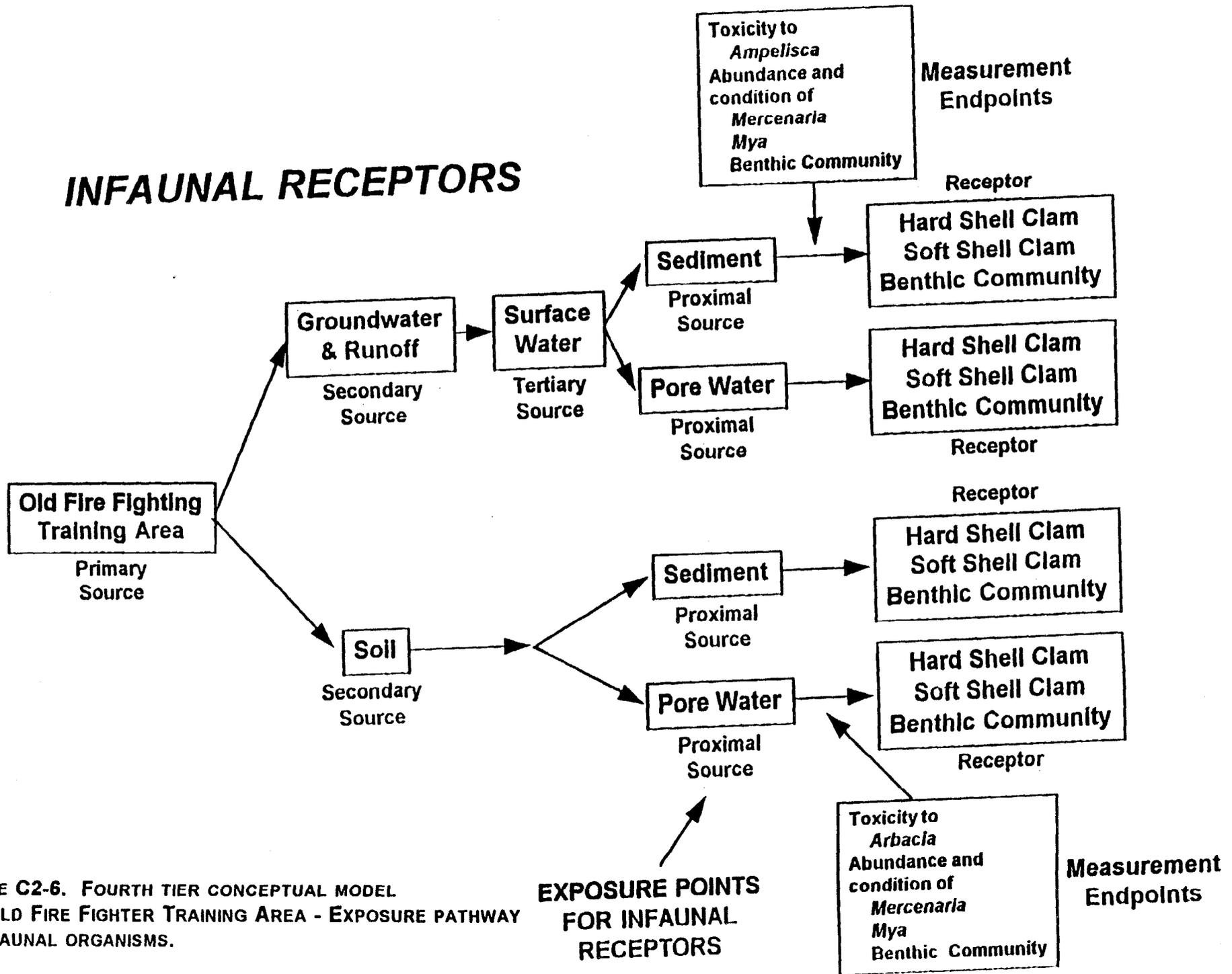


FIGURE C2-6. FOURTH TIER CONCEPTUAL MODEL FOR OLD FIRE FIGHTER TRAINING AREA - EXPOSURE PATHWAY TO INFAUNAL ORGANISMS.

EXPOSURE POINTS FOR INFAUNAL RECEPTORS

AVIAN PREDATOR RECEPTOR

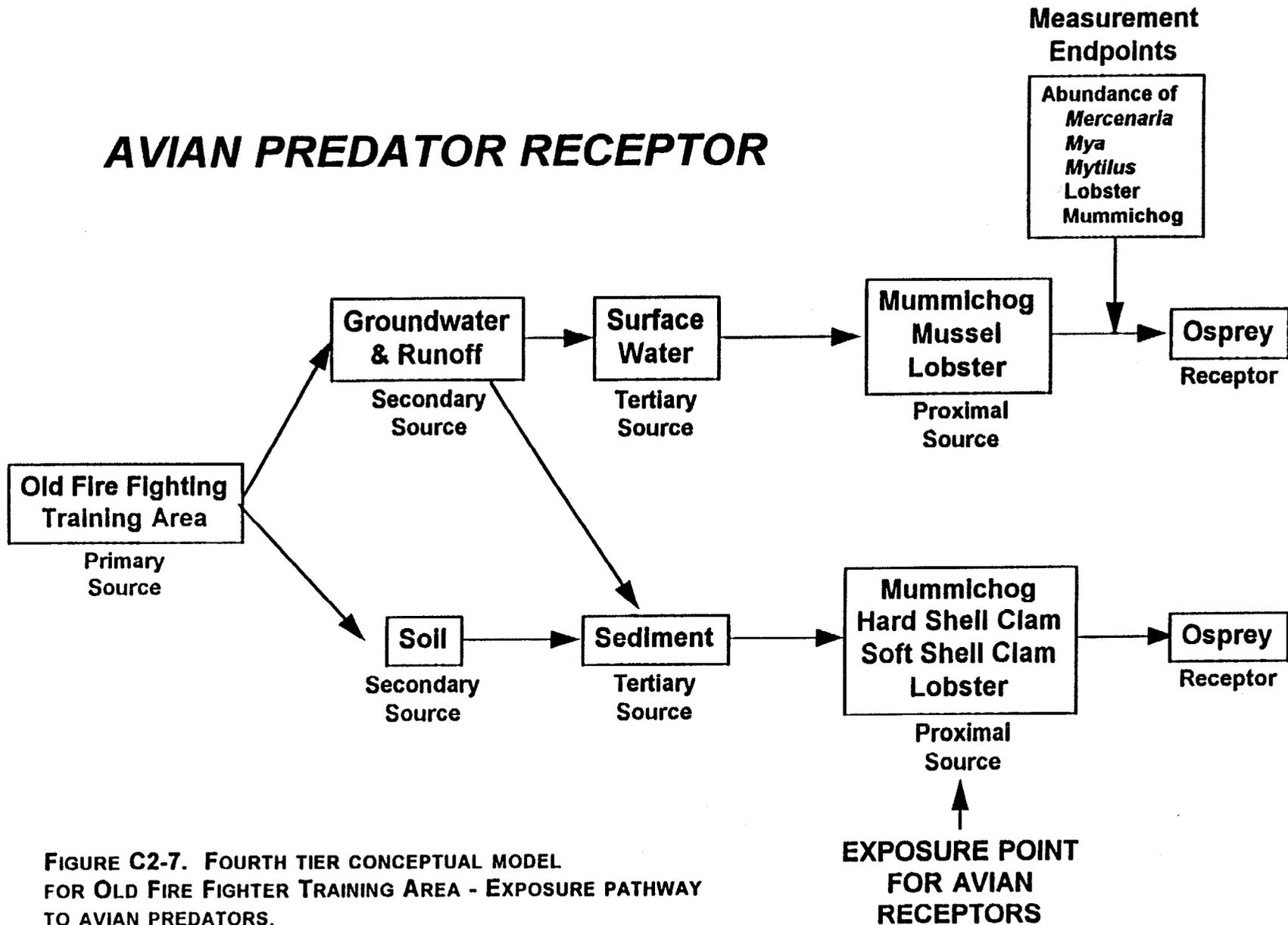


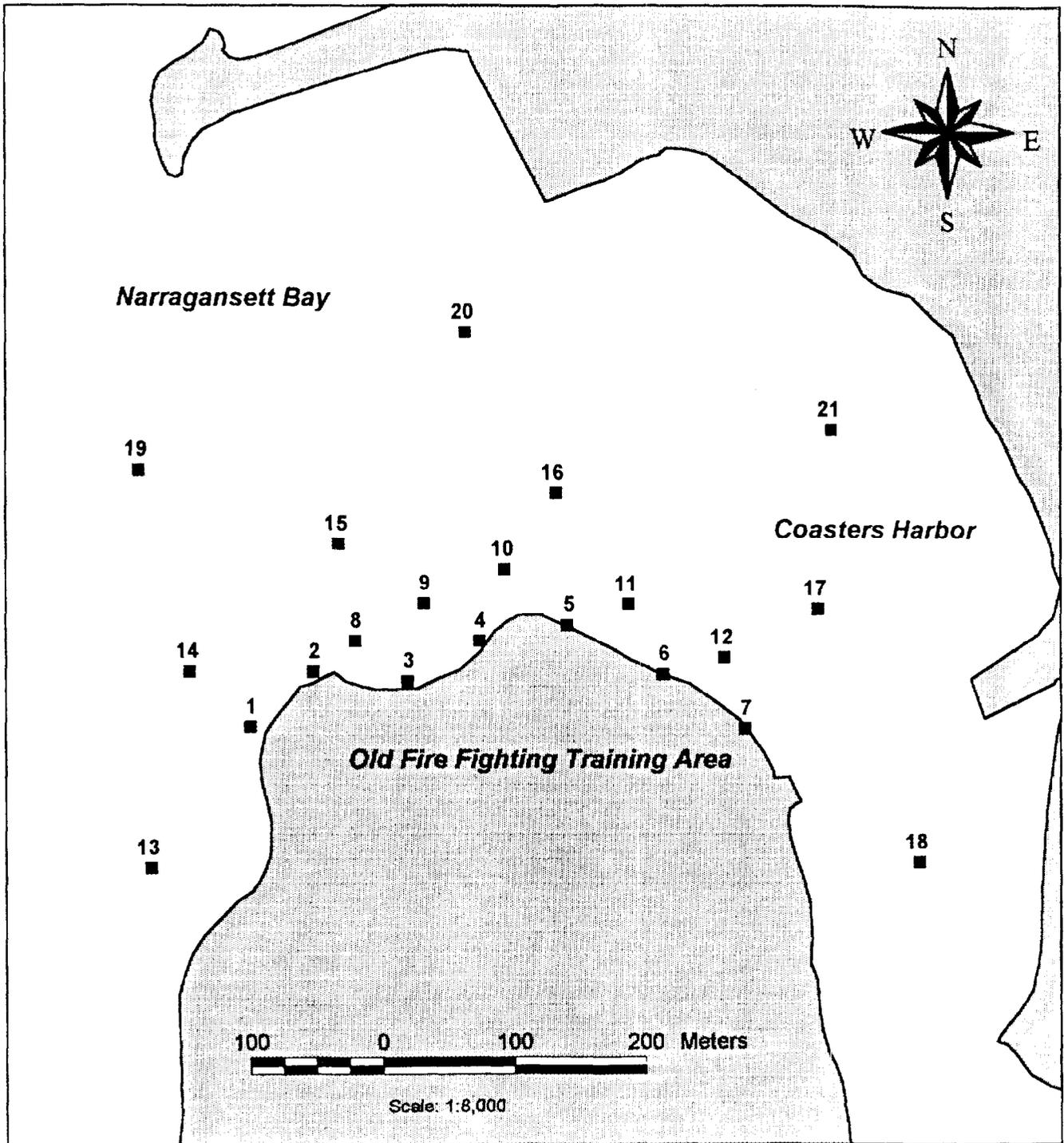
FIGURE C2-7. FOURTH TIER CONCEPTUAL MODEL FOR OLD FIRE FIGHTER TRAINING AREA - EXPOSURE PATHWAY TO AVIAN PREDATORS.

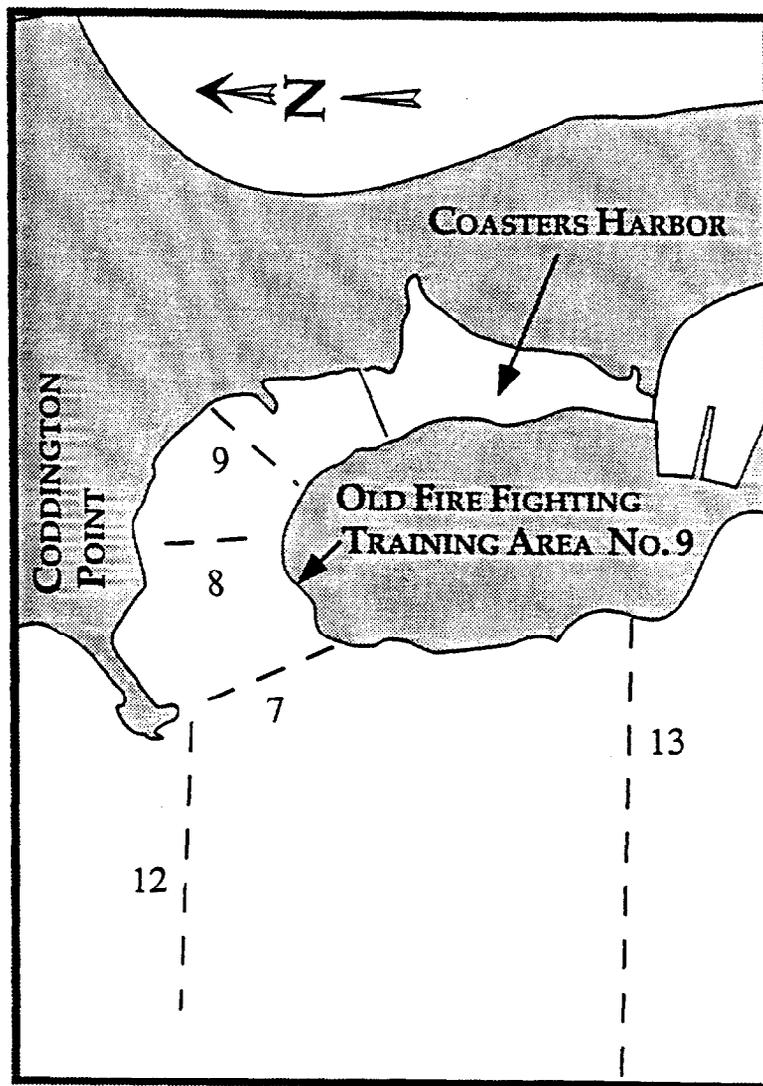
Table C2-4. Exposure point measurements for Old Fire Fighter Training Area.

Exposure Medium/ Receptor	Exposure Point Measurement
Sediment	<ul style="list-style-type: none"> o Bulk sediment and pore water chemistry o Redox potential discontinuity o Geotechnical characteristics (e.g., grain size, water content) o Ammonia o Organic carbon o SEM/AVS o Pathogen abundance
Water	<ul style="list-style-type: none"> o Water column chemistry (deployed mussel tissue residues) o Dissolved oxygen, ammonia concentration o Hydrographic parameters (temperature, salinity) o Pathogen abundance
Biota	<ul style="list-style-type: none"> o Tissue chemistry o Pathogen abundance

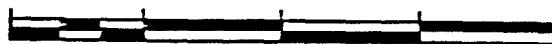
Proposed Sampling Stations for the
Old Fire Fighting Training Area
Marine Ecological Risk Assessment

Base Map





600 0 600 1200 1800

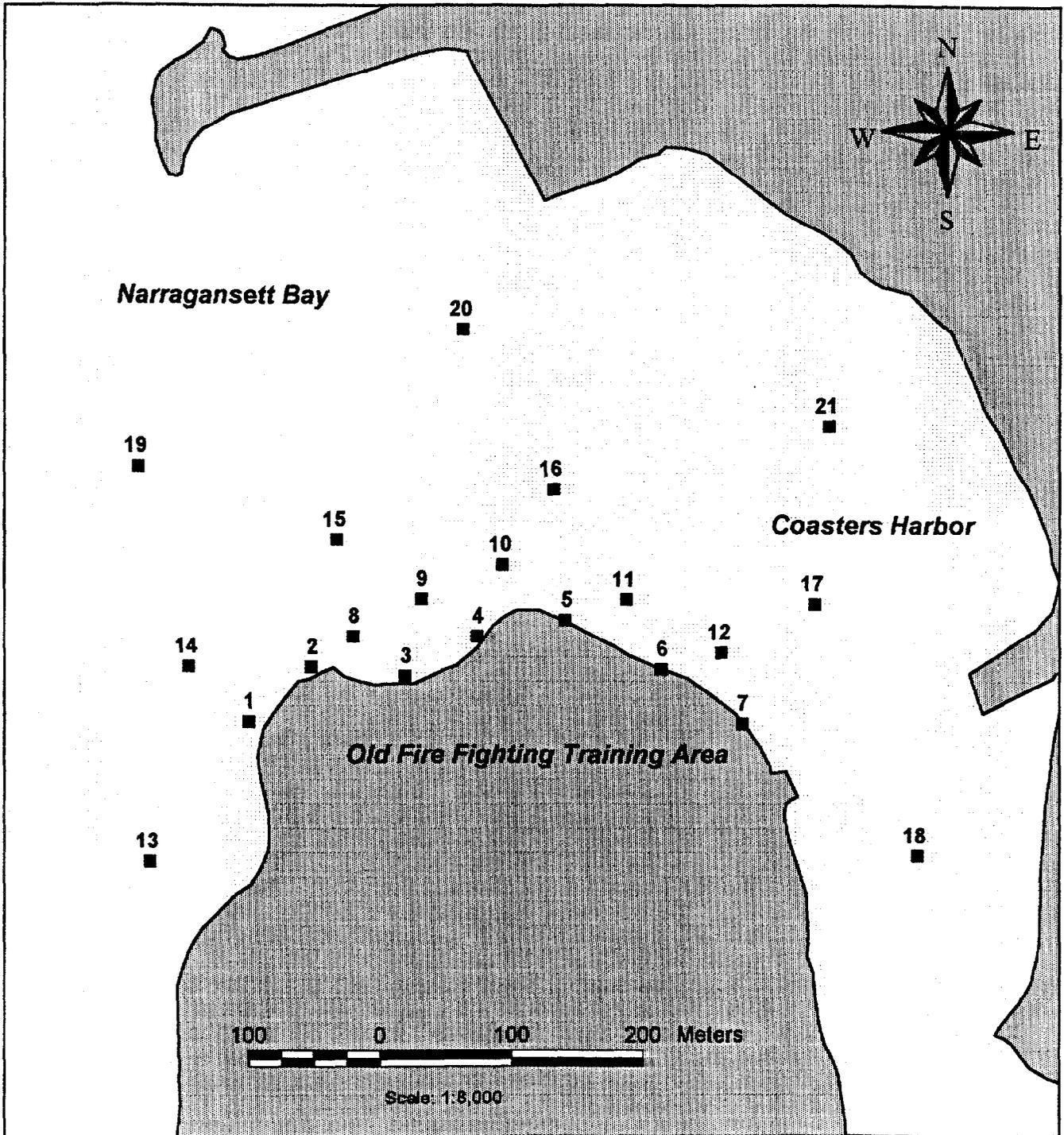


feet

FIGURE C4-2. OLD FIRE FIGHTER TRAINING AREA ERA HYDROGRAPHIC SURVEY LINES.

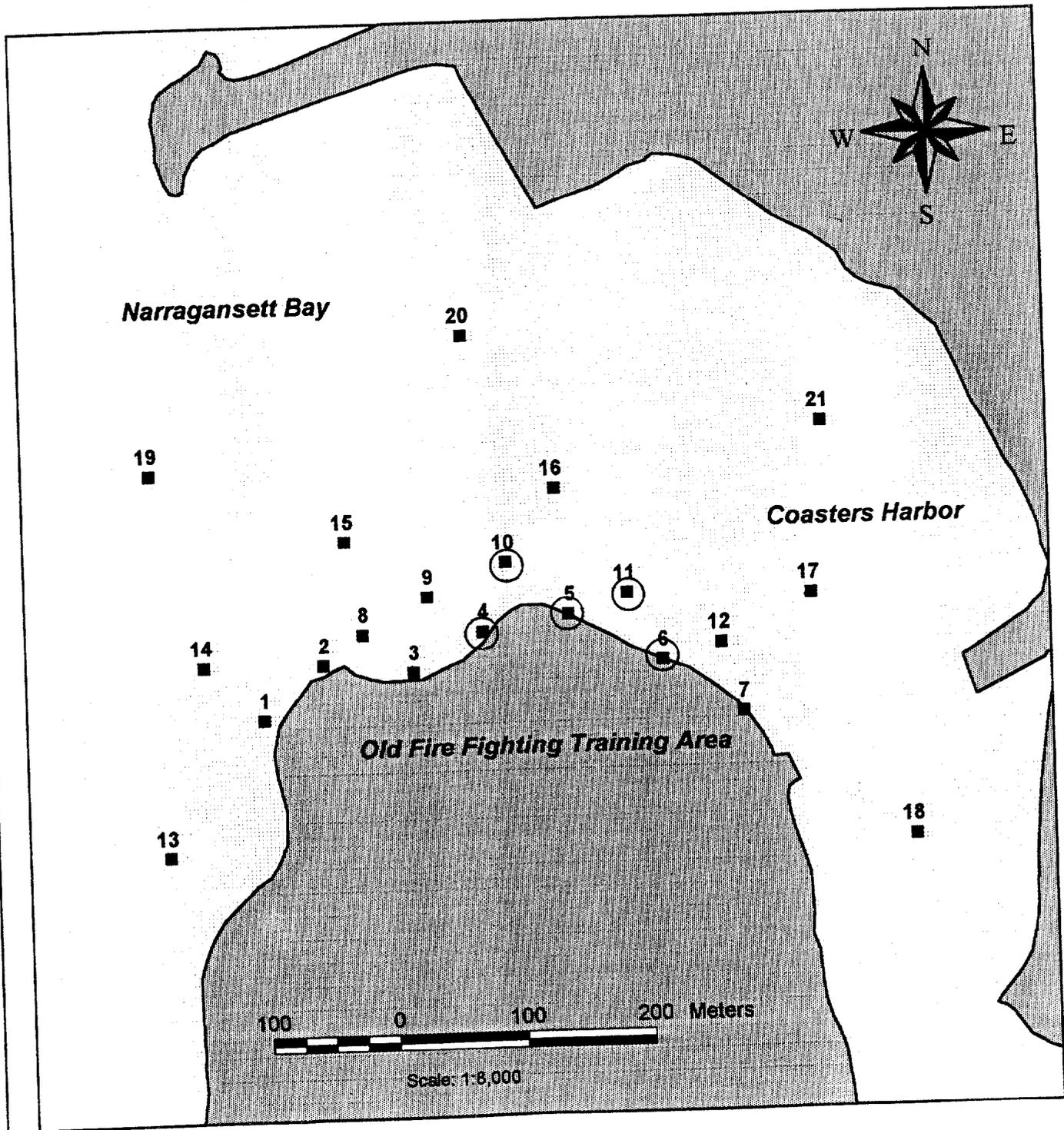
Proposed Sampling Stations for the
Old Fire Fighting Training Area
Marine Ecological Risk Assessment

**Surface Sediment and Sediment
Elutriate Chemistry/Toxicity,
and Community Structure**



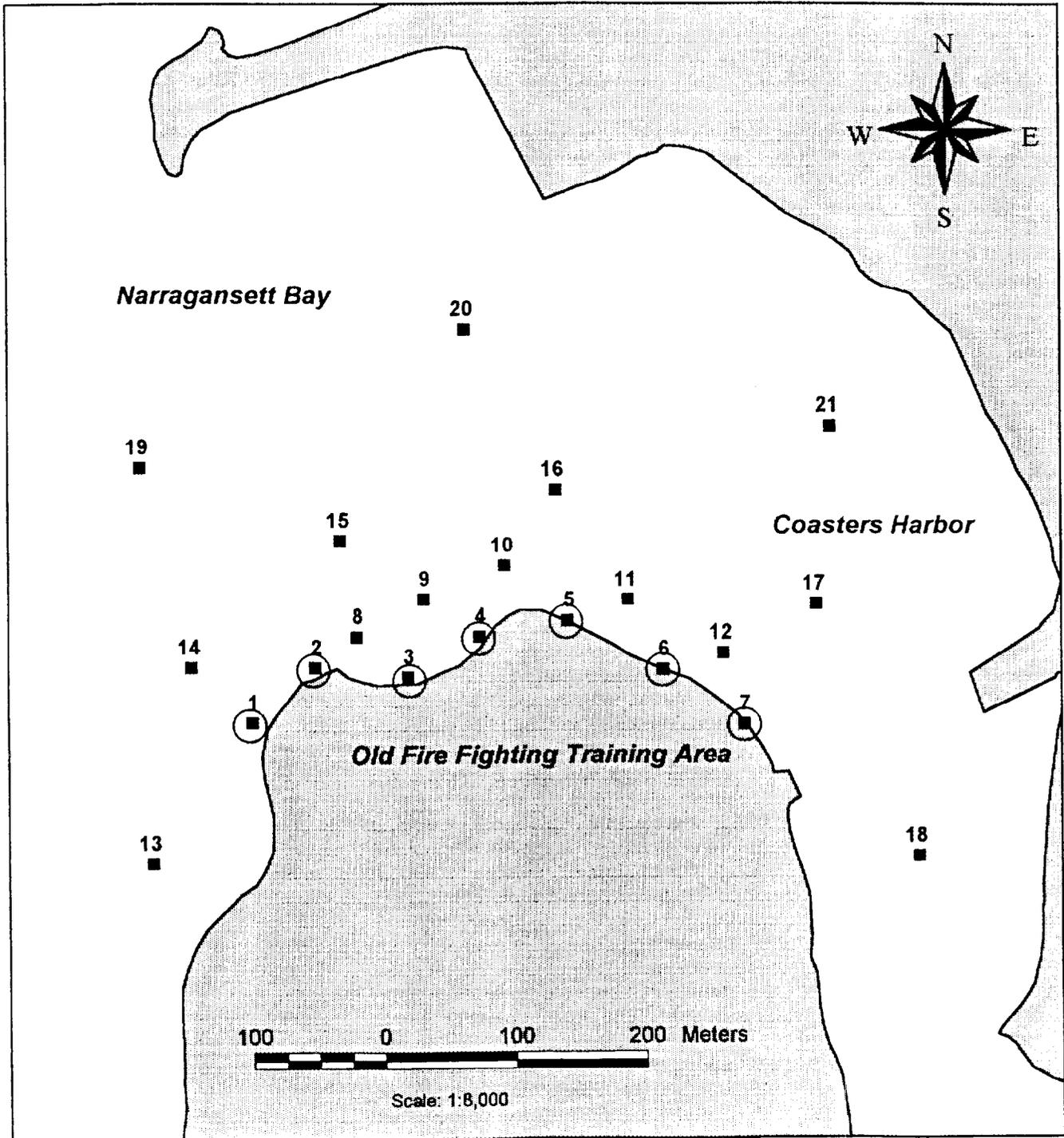
Proposed Sampling Stations for the Old Fire Fighting Training Area Marine Ecological Risk Assessment

Sediment Cores for Chemical Evaluation

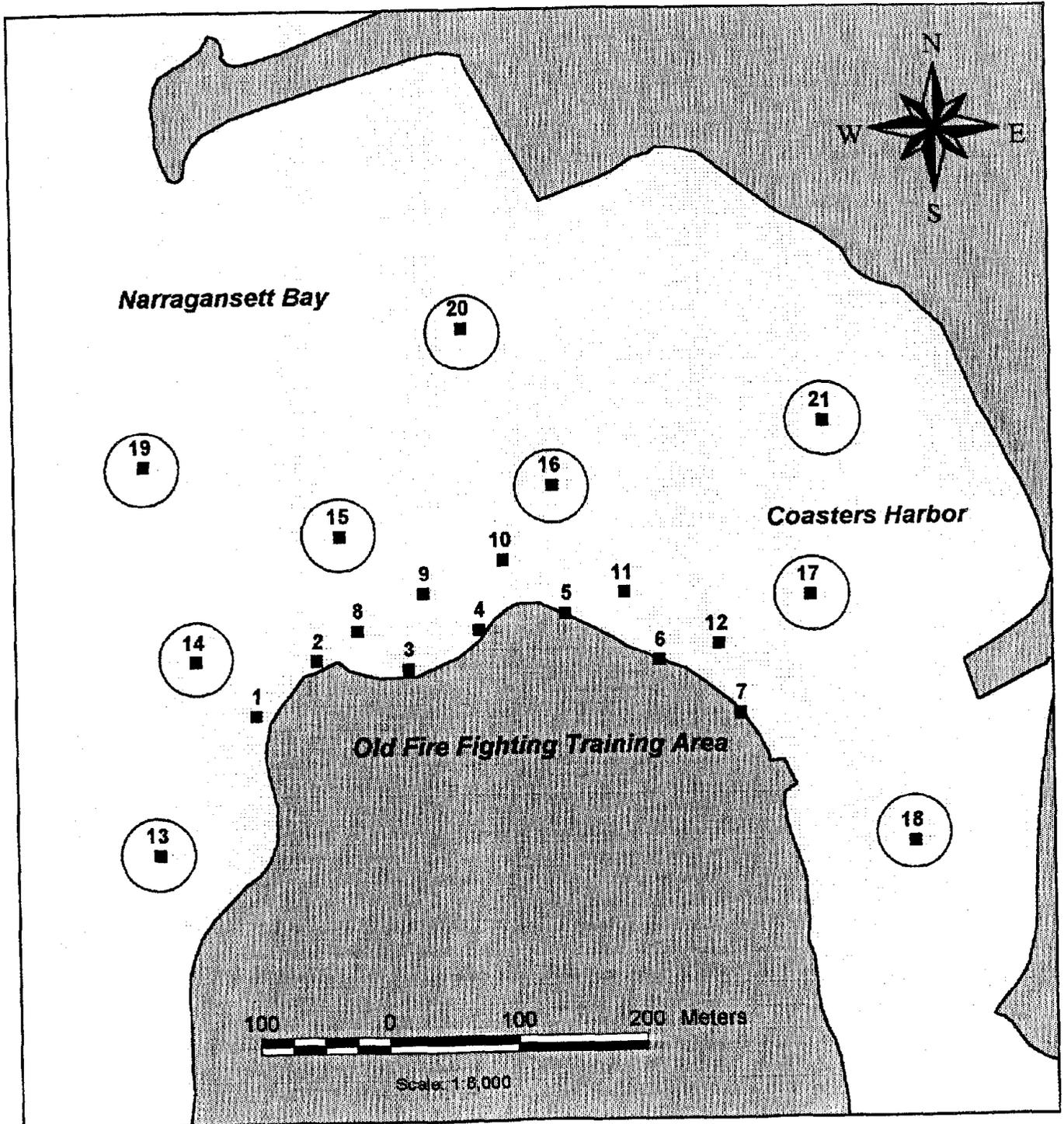


Proposed Sampling Stations for the
Old Fire Fighting Training Area
Marine Ecological Risk Assessment

**Indigenous Mussels, Soft Shell Clams
and Mummichog Fish**

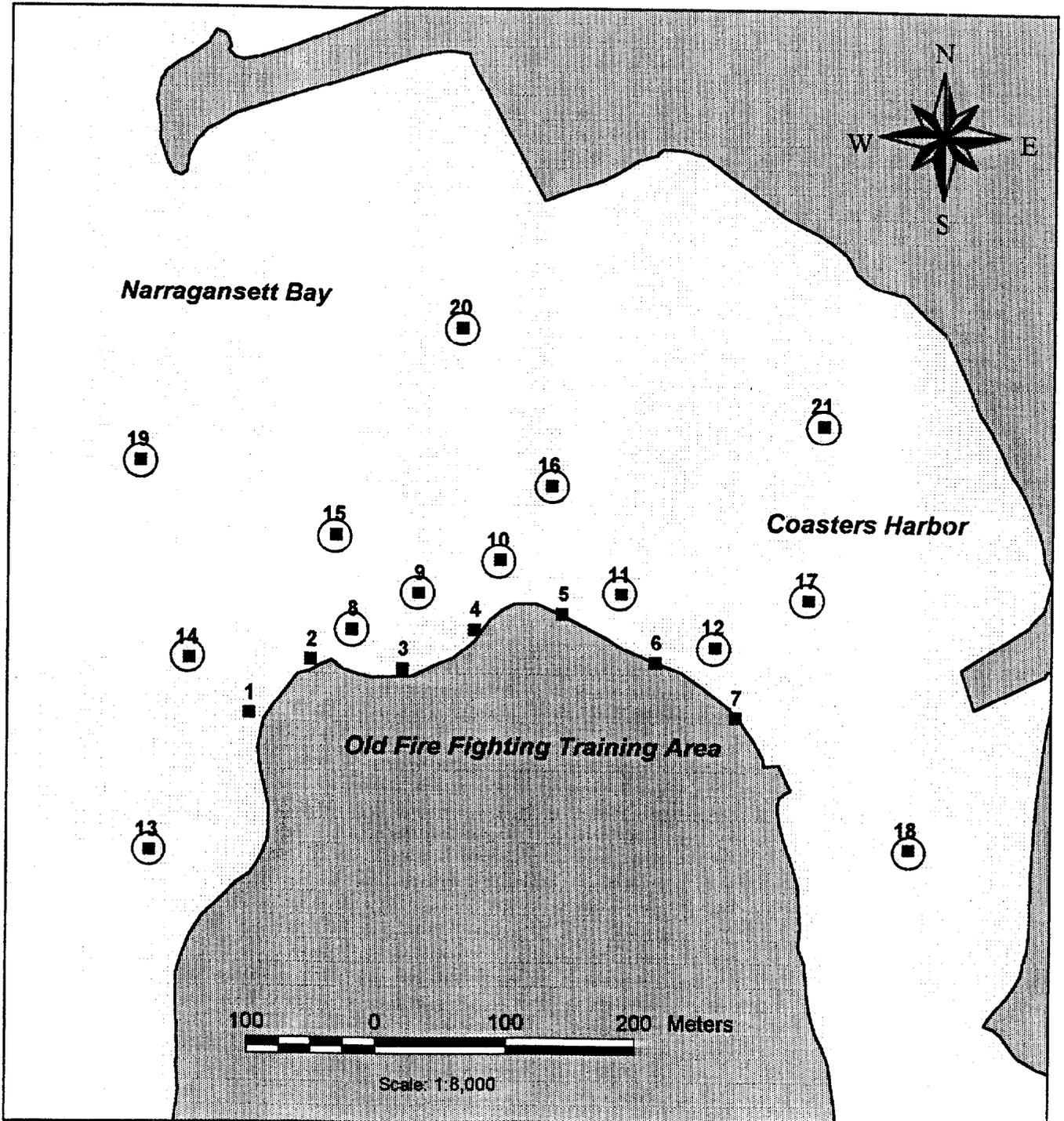


Proposed Sampling Stations for the
Old Fire Fighting Training Area
Marine Ecological Risk Assessment
Deployed Mussels and Lobsters



Proposed Sampling Stations for the
Old Fire Fighting Training Area
Marine Ecological Risk Assessment

Hard Shell Clams



NETC Old Fire Fighting Training Area sample collection and analysis summary (revised).

MATRIX	LOC	STA	Chemistry	Geo-technical	Bioassay		Community Indices
					BIOMARKERS	TOXICITY	
SEDIMENT	OF	1	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	2	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	3	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	4	ORG, TBT, MET x 3	GS & TOC x 3, MS	MICRO	AMP, ARB	
	OF	5	ORG, TBT, MET x 3	GS & TOC x 3, MS	MICRO	AMP, ARB	
	OF	6	ORG, TBT, MET x 3	GS & TOC x 3, MS	MICRO	AMP, ARB	
	OF	7	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	8	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	9	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	10	ORG, TBT, MET x 3	GS & TOC x 3, MS	MICRO	AMP, ARB	
	OF	11	ORG, TBT, MET x 3	GS & TOC x 3, MS	MICRO	AMP, ARB	
	OF	12	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	13	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	14	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	15	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	16	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	17	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	18	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	19	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	20	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	OF	21	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	CHC	1	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	CIIC	2	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	JPC	1	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
	JPC	2	ORG, TBT, MET	GS, TOC	MICRO	AMP, ARB	
TISSUE (a)	OF	1	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	2	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	3	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	4	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	5	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	6	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	7	BM, MYA, MF		MICRO, Hn		DIV, CI
	OF	8	HC, DM, LOB		MICRO		DIV, CI
	OF	9	HC, DM, LOB		MICRO		DIV, CI
	OF	10	HC, DM, LOB		MICRO		DIV, CI
	OF	11	HC, DM, LOB		MICRO		DIV, CI
	OF	12	HC, DM, LOB		MICRO		DIV, CI
	OF	13	DM, LOB		MICRO		DIV, CI, DMG
	OF	14	DM, LOB		MICRO		DIV, CI, DMG
	OF	15	DM, LOB		MICRO		DIV, CI, DMG
	OF	16	DM, LOB		MICRO		DIV, CI, DMG
	OF	17	DM, LOB		MICRO		DIV, CI, DMG
	OF	18	DM, LOB		MICRO		DIV, CI, DMG
	OF	19	DM, LOB		MICRO		DIV, CI, DMG
	OF	20	DM, LOB		MICRO		DIV, CI, DMG
	OF	21	DM, LOB		MICRO		DIV, CI, DMG
	CHC	1	BM, MYA, MF		MICRO, Hn		DIV, CI
	CHC	2	HC, DM, LOB		MICRO		DIV, CI, DMG
	JPC	1	BM, MYA, MF		MICRO, Hn		DIV, CI
	JPC	2	HC, DM, LOB		MICRO		DIV, CI, DMG

CODES:
PC = Potter Cove, Jamestown
CH = Castle Hill Cove Reference Station
GS = Grain Size
TOC = Total Organic Carbon
MS = Magnetic Susceptibility

AMP = Amphipod Test
ARB = Arbacia Elutriate Test
DM = Deployed Mussel
BM = Blue Mussel
HC = Hard Clam
LOB = Lobster
MF = Mummichog Fish/Cunner

MYA = Soft Shell Clam
HN = Hematopoietic neoplasia
Micro = Sewage Pathogens
OF = Old Fire Fighting Training Area
DIV = Community Diversity Analysis
CI = Bivalve Condition Index
DMG = Deployed Mussel Growth

* Biota samples for chemistry and biology dependent on availability; 75% Completeness anticipated

ATTACHMENT C

TENTATIVE SCHEDULE FOR FINALIZATION OF WORK PLAN ADDENDUM C

**CTO 173: TENTATIVE SCHEDULE
FINALIZATION OF WORK PLAN ADDENDUM C
Off Shore Ecological Risk Assessment, NETC Newport**

ID	Task Name	Start	Finish	October							November						
				10/1	10/8	10/15	10/22	10/29	11/5	11/12	11/19	11/26	12/3	12/10	12/17	12/24	
1	EAB Meeting No. 5	10/5/95	10/5/95														
2	Meeting Minutes Prep/Dist	10/6/95	10/12/95														
3	Minutes Reveiw/Concurrence	10/20/95	10/27/95														
4	Surface Sediment Grab Samples	10/30/95	11/3/95														
5	EAB Meeting No. 6	11/9/95	11/9/95														
6	Prepare Final Addendum C	11/10/95	12/28/95														

Project:
Date: 10/17/95

Task



Summary



Rolled Up Progress



Progress



Rolled Up Task



Milestone



Rolled Up Milestone

