US Army Corps of Engineers®

New York District
Albany Field Office
1 Bond Street
Troy, N.Y. 12180
ATTN: CENAN-OP-A

Public Notice

In replying refer to:
Public Notice No. HR-AFO-HR26

Published: October 1, 2025
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MAINTENANCE DREDGING
OF HAVERSTRAW BAY,
HUDSON RIVER
FEDERAL NAVIGATION PROJECT

TO WHOM IT MAY CONCERN:

The New York District, US Army Corps of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 (33 U.S.C. 1344) of the Federal Water Pollution Control Act (amended in 1977 and commonly referred to as the Clean Water Act), and Section 103 (U.S.C. 1413, 86 Statute 1052) or Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (commonly referred to as the Ocean Dumping Act), proposes to perform maintenance dredging of the Federal Navigation Project: HUDSON RIVER at Haverstraw Bay, NY (see Figure 1); with subsequent placement of the dredged material for environmental remediation purposes at the Historic Area Remediation Site (HARS, see Figure No. 2A and 2B).

ACTIVITY:	Maintenance dredging of the following Federal Navigation Project with subsequent placement of the dredged material at the HARS for the purpose of remediation.
WATERWAY/ PROJECT:	Haverstraw Bay Channel, Hudson River Federal Navigation Project
LOCATIONS:	Village of Haverstraw, Rockland County, New York.

The Hudson River federal navigation project was authorized by the Rivers and Harbors Acts of 1910 to 1930; and modified in 1934, 1935, 1938 and 1954, in accordance with the recommendations contained in the following Congressional Documents: House Document (HD) No. 719, 61st Congress, 2nd Session (Jun 1910) and modified by HD No.350, 68th Congress, 1st Session (Mar 1925); HD No. 210, 70th Congress, 1st Session (Jul1930); Senate Document No. 155, 72nd Congress, 2nd Session (Aug 1935); HD No. 572,75th Congress, 3rd Session (Jun 1938); and Public Law No. 780, 83rd Congress, 2nd Session (Sep 1954).

The existing navigation project authorizes a channel 600 ft. wide, New York City to Kingston, thence 400 ft. wide to 2,200 ft. wide south of the Mall Bridge (Dunn Memorial Bridge) at Albany with a turning basin at Albany and anchorages near Hudson and Stuyvesant, all with depths of 32 ft. in soft material and 34 ft. in rock; thence 27 ft. deep and 400 ft. wide to 900 ft. south of the Mall Bridge (Dunn Memorial Bridge); thence 14 ft. deep and generally 400 ft. wide, to the

Federal Lock at Troy; and thence 14 ft. deep and 200 ft. wide, to the southern limit of the State Barge Canal at Waterford; with widening at bends and widening in front of the cities of Troy and Albany to form harbors 12 ft. deep. The total length of the existing navigation project (NYC to Waterford) is about 155 miles.

This activity is being evaluated to determine that the proposed placement of dredged material will not unreasonably degrade or endanger human health, welfare or amenities, or the marine environment, ecological systems or economic potentialities. On September 26, 2000, the United States Environmental Protection Agency (USEPA) and Corps of Engineers signed a Memorandum of Agreement (MOA) outlining the steps to be taken to ensure that remediation of the HARS continues in a manner appropriately protective of human health and the aquatic environment. In making the determination, the criteria established by the Environmental Protection Agency (EPA) will be applied, including the interim change to one matrix value for PCB's as described in the MOA. In addition, based upon an evaluation of the potential effect which the failure to utilize this ocean site will have on navigation, economic and industrial development, and foreign and domestic commerce of the United States, an independent determination will be made of the need to place the dredged material in ocean waters, other possible methods of disposal, and other appropriate locations.

The U.S. Army Corps of Engineers, New York District, is soliciting comments from the public; federal, state and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Comments are used to assess impacts on navigation, water quality, endangered species, historic resources, wetlands, scenic and recreational values, and other public interest factors. Comments are used in the preparation of an Environmental Assessment pursuant to the National Environmental Policy Act and to determine the need for a public hearing.

ALL COMMENTS REGARDING THIS ACTIVITY MUST BE EMAILED TO DEVON.HINDS@USACE.ARMY.MIL, OR PREPARED IN WRITING AND MAILED TO REACH THE ALBANY FIELD OFFICE AT THE ADDRESS ON THE FRONT PAGE BEFORE THE EXPIRATION DATE OF THIS NOTICE, otherwise, it will be presumed that there are no objections to the activity.

Any person who has an interest which may be affected by the dredging and/or placement of this dredged material may request a public hearing. The request must be submitted in writing to the District Engineer within the comment period of this notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by the activity. It should be noted that information submitted by mail is considered just as carefully in the process and bears the same weight as that furnished at a public hearing.

No known archaeological, scientific, pre-historical or historical data are expected to be lost by work accomplished under the required dredging.

Pursuant to Section 307 of the Coastal Zone Management Act of 1972 as amended [16 USC 1456(c)], for activities conducted or supported by a federal agency in a state which has a federally approved Coastal Zone Management (CZM) program, the Corps will submit a determination that the proposed project is consistent with the State CZM program to the maximum extent practicable. This activity is subject to review by the New York State Department of State for its consistency with the enforceable policies of the New York State Coastal Management Program. The New York District of the US Army Corps of Engineers has determined that the proposed activities are consistent to the maximum extent practicable with the New York State CZM program. A copy of this determination will be provided to the New York State Department of State, Division of Coastal Resources, with a request for State's agreement with that determination. For activities within the coastal zone of the State of New York, project information is available from the Coastal Zone Management Program, New York State Department of State, Office of Coastal, Local Government, and Community Sustainability, One

Commerce Plaza, 99 Washington Avenue, Suite 1010, Albany, NY 11231, telephone (518) 474-3642.

The proposed project was reviewed based upon the "Biological Assessment for the Closure of the Mud Dump Site and Designation of the Historic Area Remediation Site (HARS) in the New York Bight and Apex", (USEPA, 1997). Based upon this review, and a review of the latest public listing of threatened and endangered species, it has been preliminarily determined that the proposed activity for which authorization is sought herein, is not likely to adversely affect any federally threatened or endangered species (humpback whales, finback whales, right whales, loggerhead turtles, leatherback turtles, green turtles, and Kemp's Ridley turtles) or their critical habitat pursuant to Section 7 of the Endangered Species Act (16 USC 1531).

The proposed HARS placements will not result in remediation material being placed within 0.27 nautical miles of any identified wrecks, as indicated in the National Register of Historic Places. Other than wrecks, there are no known sites eligible for or included in the Register within the project area. No known archaeological, scientific, prehistorical or historical data are expected to be lost by work accomplished under the required dredging.

Reviews of the activity pursuant to Section 404 of the Clean Water Act will include application of the guidelines announced by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act. The Corps will obtain a water quality certificate or waiver from the appropriate state agency in accordance with Section 401 of the Clean Water Act prior to commencement of any work.

In compliance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (1996 amendments), an Essential Fish Habitat Assessment will be prepared and submitted to the National Marine Fisheries Service for review and comment.

The proposed work is being coordinated with the following federal, state and local agencies:

- U.S. Environmental Protection Agency
- U.S. Department of the Interior, Fish and Wildlife Service
- U.S. Department of Commerce, National Marine Fisheries Service
- U.S. Coast Guard, First District
- New York State Department of Environmental Conservation
- New York State Department of State
- State of New Jersey Department of Environmental Protection

If you have any questions concerning this notice, you may contact the Albany Field Office at (518) 273-0870 and ask for Mr. Devon Hinds. Questions may be FAXED to (518) 273-3772 ATTN: Mr. Devon Hinds.

DESCRIPTION OF PLANNED FEDERAL ACTION:

The U.S. Army Corps of Engineers, New York District proposes to perform maintenance dredging of the Hudson River Federal Navigation Project, located at Haverstraw Bay, NY (River Mile 38, see Figure 1). The Hudson River channel was last dredged in 2022 with the removal of 56,795 CY of sediment. Based on surveys performed 25 March 2024, the proposed maintenance dredging would involve the removal of a combined estimated total of approximately 460,000 CY of material from the dredging areas with subsequent placement of dredged material at the Historic Area Remediation Site (HARS). The project will be dredged to its authorized depth of -32 feet plus 1 foot of allowable over depth. The project depth is referenced to the plane of MLLW. This datum is approximately 1.7-1.8 feet above NAVD88.

Maintenance dredging of the Hudson River Federal Navigation Project will be accomplished by a

mechanical dredge, or other similar plant, and is anticipated to occur in the summer/fall of 2026. The entire channel will generally not require maintenance dredging; only areas where shoaling has reduced the depth of the channel. No in-water work will occur during the following environmental windows for shortnose sturgeon (Ascipenser brevirostrum) and Atlantic sturgeon (Ascipenser oxyrinchus): November 1st to August 15th from RM 105 to RM 1.

The purpose of the proposed dredging is to alleviate the effects of shoaling in order to maintain the authorized project dimensions of the federal channel; thereby assuring safe and economical use of the Hudson River by commercial shipping interests. The material has been tested to meet the criteria for remediation material at the HARS. The dredged material would be used as such by placing it over degraded sediments within the HARS. The proposed dredged material would be transported by bottom dumping vessels to the HARS.

ENVIRONMENTAL IMPACT STATEMENT:

An Environmental Impact Statement (EIS) was prepared by the U.S. Army Engineer District, New York in January 1983. Environmental Assessments (EA) updating this EIS were prepared by the New York District for similar Hudson River (and Hudson River tributary) maintenance dredging projects performed between 1986 and 2022. It was determined then that maintenance dredging of the Hudson River Federal Navigation Project, has no significant adverse environmental impacts on water quality, marine resources, fish, wildlife, recreation, aesthetics and flood protection of the area.

An update of the EA and a 404 (b) evaluation as required by the Clean Water Act 40 CFR 230 will be finalized prior to the implementation of the proposed work. A copy of the draft EA will be available upon request by contacting the Albany Field Office.

PLACEMENT SITE:

The dredged material from this project is proposed to be placed at the HARS (see next section: Introduction to the HARS) using the bottom dumping process. Based upon review of the latest published version of the National Register of Historic Places, two wrecks, believed to be the HLW Lew and the ORMOND, were found in Remediation Area Number 1. As noted in the designation of the HARS, Remediation Material would not be allowed to be placed within 0.27 nautical miles of the identified wrecks or other wrecks that might be found.

INTRODUCTION TO THE HARS:

In 1972, the Congress of the United States enacted the Marine Protection Research and Sanctuaries ACT (MPRSA) to address and control the dumping of materials into the ocean waters. Title I of the Act authorizes the US Environmental Protection Agency (USEPA) and the US Army Corps of Engineers (USACE) to regulate dumping in ocean waters. USEPA and USACE share responsibility for MPRSA permitting and ocean disposal site management. USEPA regulations implementing MPRSA can be found in 40 CFR Sections 220 through 229. With few exceptions, MPRSA prohibits the transportation of material from the United States for the purpose of ocean dumping except as may be authorized by a permit issued MPRSA. The MPRSA divides permitting responsibility between USEPA and USACE. Under Section 102 of the MMPRSA, USEPA has responsibility for issuing permits for all materials other than dredged material. Under Section 103 of MPRSA, the Secretary of the Army has the responsibility for issuing permits for dredged material. Determination to issue MPRSA permits for dredged material are subject to USEPA concurrence.

In the fall of 1997, the USEPA de-designated and terminated the use of the New York Bight Dredged Material Disposal Site (commonly known as the Mud Dump Site or MDS). The MDS has been designated in 1984 for the disposal of up to 100 million cubic yards of dredged material from

navigation channels and other port facilities within the Port of New York and New Jersey. Simultaneous with the closure of the MDS, the site and surrounding areas that had been used historically as disposal sites for dredged material were redesigned as the HARS in 40 CFR Sections 228.15 (d)(6), (see 62 Fed. Reg. 46142 (August 29, 1997); 62 Fed. Reg. 26267 (May 13, 1997)). The HARS will be managed to reduce impacts of historical disposal activates at the site to acceptable levels in accordance with 40 CFR Sections 228.11 (c). The need to remediate the HARS is supported by the presence of toxic effects, dioxin bioaccumulation exceeding Category 1 levels (a definition of which appears in evaluation memoranda reviewing the results of the testing) in worm tissue, as well as TCDD/PCB contamination in area lobster stocks. Individual elements of those data do not establish sediments within the study as imminent hazards to the New York Bight Apex Ecosystem, living resources, or human health; however, the collective evidence presents cause for concern, and justifies the need to remediation. Further information on the condition the study area and surveys performed may be found in the Supplemental Environmental Impact Assessment (SEIS) [USEPA, 1997].

The HARS designation identifies an area in and around the MDS which has exhibited the potential for adverse ecological impacts (see Figure No. 2A: HARS Location Map A and Figure No. 2B: HARS Location Map B). The HARS will be remediated with dredged material that meets current Category 1 Standards and will not cause significant undesirable effects including through bioaccumulation. This dredged material is referred to as “Material for Remediation” or “Remediation Material.”

As of the end of August 2025, dredged materials from one hundred fifty-eight (158) different completed and ongoing Department of the Army (DA) permitted and federal dredging projects in the Port of New York and New Jersey have been dredged and placed as Remediation Material in the ocean at the Historic Area Remediation Site (HARS) since the closure of the Mud Dump Site and designation of the HARS in September 1997. This represents approximately 88.495 million cubic yards of Remediation Material.

The HARS, which includes the 2.2 square nautical mile area of the MDS, is approximately 15.7 nautical square mile area located approximately 3.5 nautical miles east of Highlands, New Jersey and 7.7 nautical miles south of Rockaway, New York. The MDS is located approximately 5.3 nautical miles east of Highlands, New Jersey and 9.6 nautical miles south of Rockaway, New York. When determined by bathymetry that capping is complete, the USEPA will take any necessary rulemaking to de-designate the HARS. The HARS includes the following three areas:

Priority Remediation Area (PRA): A 9.0 square nautical mile area to be remediated with at least 1 meter of Remediation Material. Then PRA encompasses the area of degraded sediments as described in greater detail in the SEIS.

Buffer Zone: An approximately 5.7 square nautical mile area (0.27 nautical mile wide band around the PRA) in which no placement of the Material for Remediation will be allowed, but which may receive Material for Remediation that incidentally spreads out of the PRA.

No Discharge Zone: An approximately 1.0 square nautical mile area in which no placement or incidental spread of Material for Remediation is allowed.

To improve management and monitoring of placement activities at the HARS, electronic monitoring equipment will be onboard any barges carrying Remediation Material to the HARS. This equipment records vessel positions throughout the duration of each trip to the HARS and during remediation operations. To improve communication reliability between tugs and scows, a prescribed formal communication procedure has been put in place (copies of the procedure are available upon request).

Additional information concerning the HARS can be obtained from Mr. Mark Reiss of the USEPA, Supervisor, Dredging, Sediments and Oceans Section, US Environmental Protection Agency,

Region 2, at (212) 637-3799.

HARS SUITABILITY TESTING:

In the past years, USEPA and USACE have been refining the approach to the technical review and scientific and regulatory analysis of dredging projects proposed for the HARS. A testing evaluation process was developed, which established a basic framework for assessing results of tissue analysis from bioaccumulation testing of dredged material proposed for ocean placement. The framework defines a standard approach for assessing each analyte (an item to be analyzed for as part of the testing), in relation to regulatory standards and human health and environmental risk factors, to facilitate decisions in accordance with the Marine Protection, Research, and Sanctuaries Act of 1972. USEPA and USACE utilize this testing evaluation process for identifying Category 1 dredged material in determining suitability of dredged sediments as remediation material at the HARS. The testing results for the proposed dredging sediments in the Hudson River Channel Federal Navigation Project has been submitted to USEPA for HARS suitability review. The Testing Evaluation Memoranda for this project may be obtained by contacting Mr. Mark Reiss, Supervisor, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799 or email at Reiss.Mark@epa.gov.

Sediment Grain Size Analysis

The proposed dredge material has been characterized by twenty-six (26) core sample sediment core samples taken to a depth of -32 feet (project depth) plus 1-foot allowable over-depth. The 5 samples in Reach 1, 3 samples in Reach 2, 8 samples in Reach 3 and 10 samples in Reach 4 were then combined into composite reach samples, which was subjected to chemical and biological testing. Based upon an analysis of the sediment samples, the grain size characteristics of the proposed dredged material are:

Reach 1: 0.0% Gravel, 4.6% Sand, 67.8% Silt, 27.6% Clay

Reach 2: 0.0% Gravel, 4.1% Sand, 65.4% Silt, 30.5% Clay

Reach 3: 0.0% Gravel, 4.5% Sand, 68.7% Silt, 26.8% Clay

Reach 4: 0.0% Gravel, 3.6% Sand, 65.9% Silt, 30.5% Clay

Results of the chemical and biological testing are summarized below.

Evaluation of the Liquid Phase: Chemistry

Under the requirements of 40 CFR Sections 227.6 (c) (1) and 227.27 (a), chemical analysis was conducted on project area site water and elutriate. Results of this evaluation are summarized in Table 1. Please note in reading Table 1 that detection limits have been listed for only those constituents which the laboratory reported as not- detected (ND) (this reporting convention was similarly applied in reporting the results of bioaccumulation potential testing discussed below). If the constituents were detected above the detection limit, the measured value would appear.

Expected concentrations of chemical constituents in the water column following ocean placement, after allowing for initial mixing, were calculated using the Automated Dredging and Disposal Alternatives Management System (ADDAMS). ADDAMS is a mixing model developed by USACE Waterways Experiment Station (WES) and described in the joint USEPA/USACE implementation manual entitled "Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Water" (commonly referred to as the National “Green Book”). The material can be considered suitable for ocean disposal only if the concentration of the Suspended Particulate Phase (SPP) of the dredged material, after allowance for initial mixing, will not exceed the Limiting Permissible Concentration (LPC) beyond the boundaries of the disposal site within the first four hours

following dumping or at any point in the marine environment after the first four hours. The ADDAMS Model predicted that applicable marine water quality criteria for listed constituents were not exceeded after allowance for initial mixing (40 CFR 227.29(a)). Results of the analyses indicate that the LPC will be met for the proposed dredged material from the project area.

BIOASSAYS:

In accordance with 40 CFR Part 227 of the Ocean Dumping Regulations, bioassays were performed to assess the toxicities of the solid phase, liquid phase, and suspended particulate phase of the proposed dredged material from the proposed project area.

Evaluation of the Liquid Phase

Liquid phase bioassays, run as part of the suspended particulate phase on three appropriate sensitive marine organisms: a crustacean (mysid shrimp, Americamysis bahia), finfish (Menidia beryllina), and the planktonic larvae of a bivalve (blue mussel, *Mytilus edulis*), show that after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)) the liquid phase of the material would not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic to appropriate sensitive marine organisms. Accordingly, it is concluded that the liquid phase of the material would be in compliance with 40 CFR Sections 227.6(c)(1) and 227.27(a). The specific test results and technical analysis of the data underlying this conclusion are described and evaluated in a joint USACE New York District / U.S. Environmental Protection Agency Region 2 memorandum (copies available upon request).

Evaluation of the Suspended Particulate Phase

The suspended particulate phase of the material was evaluated for compliance with 40 CFR Sections 227.6(c)(2) and 227.27(b). Bioassay testing of the suspended particulate phase of the material has been conducted using three appropriate sensitive marine organisms: inland silversides (*Menidia beryllina*), mysid shrimp (*Americamysis bahia,* formerly *Mysidopsis bahia),* and the planktonic larvae of the blue mussel (*Mytilus edulis)*. Median lethal concentrations (LC_{50}), which are concentrations of suspended particulate phase resulting in 50% mortality, were determined for all three test species. In addition, the median effective concentration (EC50), based on normal larval development to the Dcell stage, was determined for the bivalve larvae. The Limiting Permissible Concentration (LPC) was then calculated as 0.01 of the LC_{50} or EC_{50} of the most sensitive organism. The LPC was calculated as 0.90% for Reach 1, 0.84% for Reach 2, 0.41% for Reach 3 and 0.44% for Reach 4 based on the EC_{50} of *Mytilus edulis*.

The information shows that when placed at the HARS and after initial mixing (as determined under 40 CFR Sections 227.29(a)(2)), the suspended particulate phase of this material would not exceed a toxicity threshold of 0.01 of a concentration shown to be acutely toxic in the laboratory bioassays and, thus, would not result in significant mortality. Moreover, the fact that after placement, the suspended particulate phase would only exist in the environment for a short time, means the suspended particulate phase would not cause significant undesirable effects, including the possibility of danger associated with bioaccumulation, since these impacts require longer exposure durations (see EPA, 1994). Accordingly, it is concluded that the suspended phase of the material complies with 40 CFR 227.6(c)(2) and 227.27(b). The results of bioassay tests conducted on proposed dredged sediments from the project area are presented in Table 2 of this public notice.

Evaluation of the Solid Phase

The solid phase tests the whole test sediment before it has undergone processing that might alter its chemical or toxicological properties. The solid phase was evaluated for compliance with 40 CFR Sections 227.6(c)(3) and 227.27(b). This evaluation was made using the results of two specific types of evaluations on the solid phase of the material – one focusing on the acute (10-day) toxicity of the material, and the other focusing on the potential for the material to cause significant adverse effects due to bioaccumulation. Both types of tests used appropriate sensitive benthic marine organisms according to procedures approved by USEPA and the USACE. The following sections address the results of those tests and further analyze compliance with the regulatory criteria of 40 CFR Sections 227.6(c)(3) and 227.27(b) and 228.15 and with USEPA Region 2/USACE New York District guidance

1. Toxicity:

Ten-day toxicity tests were conducted on proposed project dredged material using a filter feeding mysid shrimp (*Americamysis bahia*) and a deposit feeding, burrowing amphipod (*Ampelisca abdita*), which are appropriate sensitive benthic marine organisms. The results from the proposed project material are then compared to results for the same organisms that are exposed to reference sediments. The reference sediment represents existing background conditions in the vicinity of the HARS, removed from the influence of any placement operations. These organisms are good predictors of adverse effects to benthic marine communities (see USEPA, 1996). The toxicity of project sediments was not statistically greater than reference sediments for either mysids or for amphipods, and the difference between percent survivals in test and reference sediments was less than 10% for mysid shrimp and less than 20% for amphipods.

These results show that the solid phase of the material would not cause significant mortality and meets the solid phase toxicity criteria of Sections 227.6 and 227.27. The results of the 10-day toxicity test are summarized in Table 2.

2. Bioaccumulation:

Bioaccumulation tests for sediments from the project area were conducted on the solid phase of the project material for contaminants of concern using two appropriate sensitive benthic marine organisms: sand worm (*Alitta virens,* formerly *Nereis virens*) and bent-nose clam (*Macoma nasuta)*. These species are considered to be good representatives of the phylogenetically diverse base of the marine food chain. Contaminants of concern were identified for the regional testing manual from the NY/NJ Harbor Estuary Program Toxics Characterization report (Squibb, et al. 1991).

Table 3 of this notice addresses the bioaccumulation of contaminants of concern. Additional information on more rigorous evaluations conducted on individual contaminants may be found in the Testing Evaluation Memos for this project. Table 3 indicates that some contaminants bioaccumulated above reference in the clam and/or worm. All constituents identified in worm and clam tissue were compared to existing Food and Drug Administration (FDA) actions levels for poisonous or deleterious substance in fish and shellfish for human food, regional disposal criteria, background concentrations and risk-based criteria provided by USEPA Region 2. The testing memo further evaluates these contaminants and concludes that any contaminant that exceeded reference did not exceed any existing regional matrix or dioxin values. Several contaminants which did not have matrix values did exceed background levels, but in no case did any contaminant accumulate to toxicologically important concentrations even when very conservative assumptions were used in the analysis. Any contaminants that exhibited bioaccumulation test results above referenced were all below the acceptable human health risk range and acceptable aquatic effects range, again using conservative approaches and analyses. A discussion of this determination is available in the Testing Evaluation Memo for this project. The bioaccumulation

tests results were used in evaluating the potential impacts of the material. The determination is that the combined results of the toxicity and bioaccumulation tests indicate that the material meets the criteria of 40 CFR Sections 227.6(c)(3) and 227.27(b) and 228.15(d)(6)(v)(A) of the Regulations, and that the material is suitable for placement at the HARS.

CONCLUSIONS:

The testing results for the proposed dredging sediments in the Hudson River Federal Navigation Channel Project has been submitted to USEPA for HARS suitability review. Based on the analysis for the proposed dredging sediments found in the Hudson River Federal Navigation Channel Project, it has been determined that the material is Category 1, meeting the criteria for ocean placement as described in 40 CFR parts 27.6, 227.27, and 228.15, and is Remediation Material as defined under the USEPA, Region 2/USACE, New York District, guidance. The specific test results and technical analysis of the data underlying this conclusion are described in the joint USACE, New York District/USEPA, Region 2 memoranda.

Placement of this material at the HARS will serve to reduce impacts at the HARS to acceptable levels and improve benthic conditions. Sediments in the HARS have been found to be acutely toxic to sensitive benthic marine organisms in laboratory tests. Project dredged material used in laboratory acute toxicity tests with the same species was determined not to be toxic. Placement of project material over existing toxic sediments would serve to remediate those areas for toxicity. In addition, by covering the existing sediments in the site with this project material, surface dwelling organisms will be exposed to sediments exhibiting Category 1 qualities, whereas the existing sediments exceed these levels.

ALTERNATIVES TO HARS PLACEMENT:

Regarding ocean placement of dredged material, the Ocean Dumping Regulations [Title 40 CFR Sections 227.16 (b)] states that "…alternative methods of disposal are practicable when they are available at reasonable incremental cost and energy expenditures which need not to be competitive with the costs of ocean dumping, taking into account the environmental impacts associated with the use of alternatives to ocean dumping…". The Corps has investigated the use of alternative placement sites for the dredged material that include beach placement, upland placement, and open water placement. Beneficial uses such as beach nourishment were found not to be practicable, as the dredged material is silty, fine-grained material that is not suitable for beach nourishment. Processing the dredged material for use in brownfields restoration projects has been considered, but the costs for handling and amending the material would be excessive. The Corps has also investigated the use of upland placement of the dredged material. However, based on historical bid prices of similar projects in the area, there is a significant increase in cost for upland placement as compared to placement at the HARS, thereby making upland placement not a practicable alternative. Other options are not available at reasonable incremental costs, which leave the HARS placement as the preferred alternative.

For more information on the New York District Corps of Engineers programs, visit our website at http://www.nan.usace.army.mil.

It is requested that you communicate the foregoing information concerning the proposed work to any persons known by you to be interested and who did not receive a copy of this notice.

If you have any questions concerning this notice, you may contact Mr. Devon Hinds, the Project Manager at (518) 273 0870 ext. 6706 or email at Devon.Hinds@usace.army.mil.

Questions about the HARS can be addressed to Mr. Mark Reiss, Supervisor, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799 or email at Reiss.Mark@epa.gov.

For more information on the New York District Corps of Engineers programs, visit our website at http://www.nan.usace.army.mil

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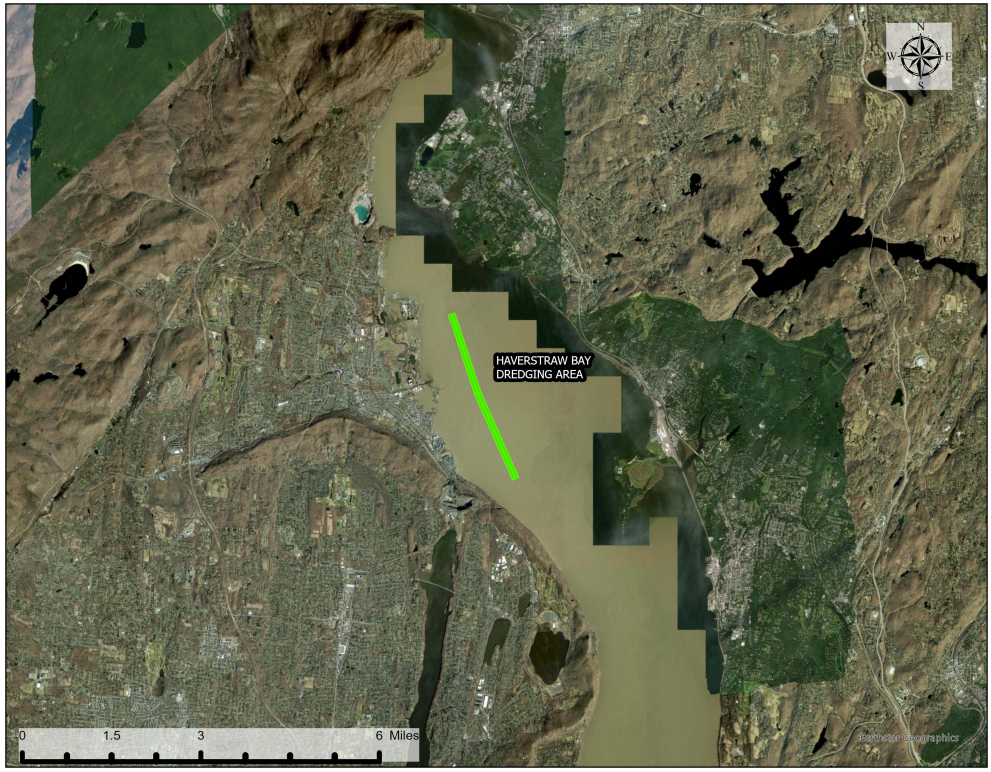
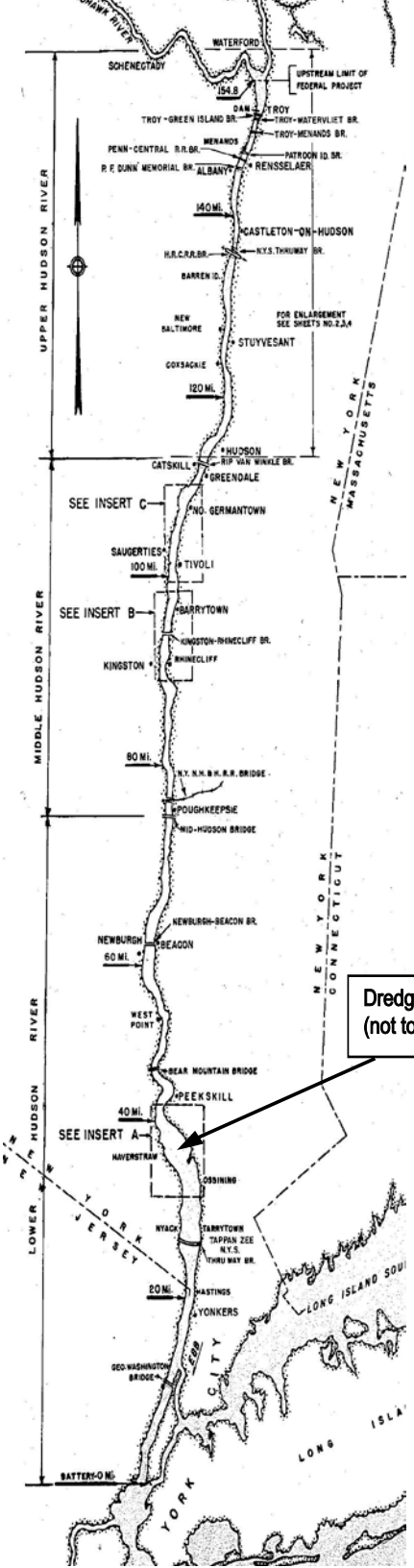
Michael T. Wright
Branch Chief, Albany Field Office

FIGURE 1
LOCATION MAPS OF PROPOSED DREDGING AREA





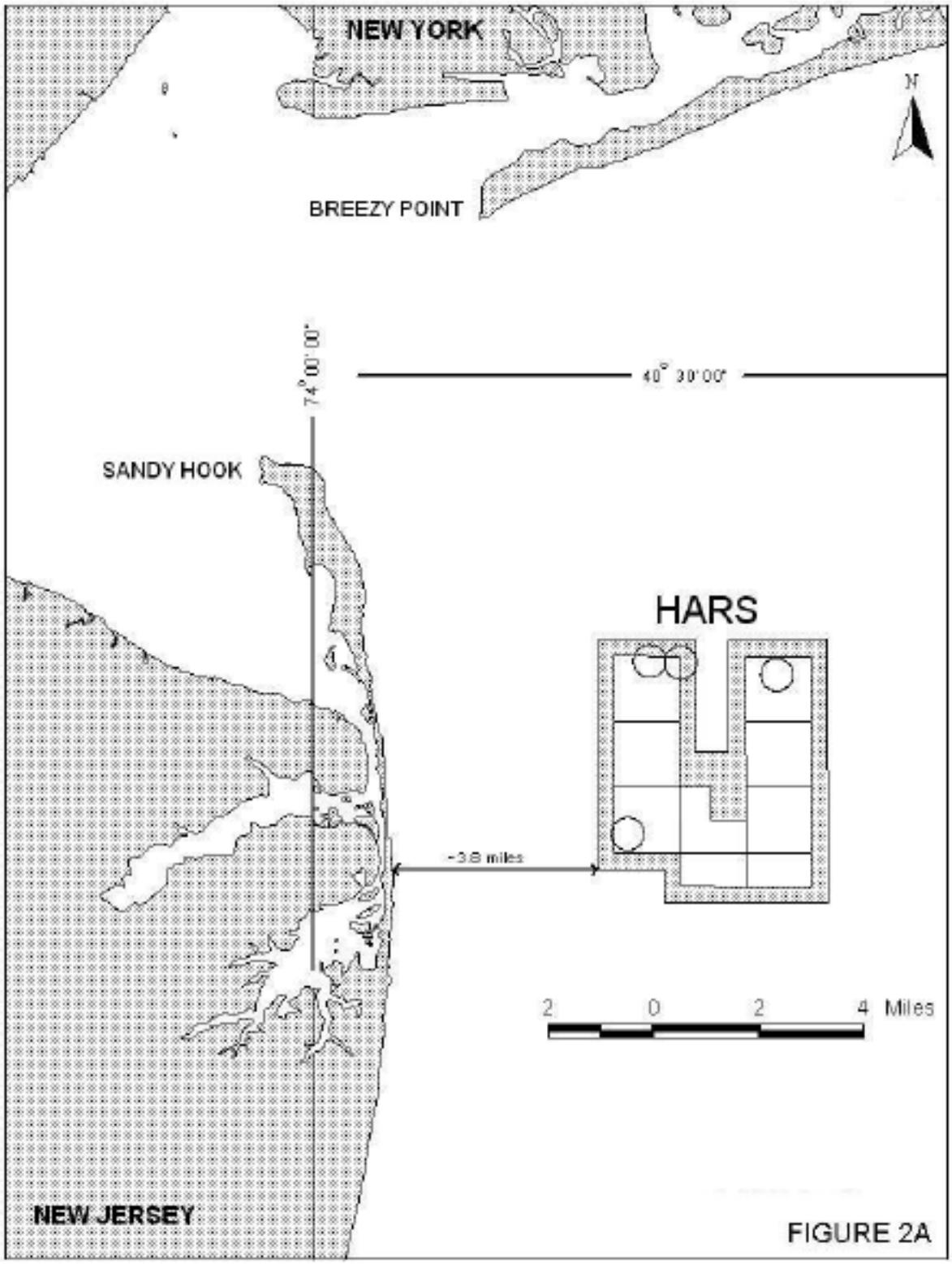


Figure 2A: HARS Location Map 1

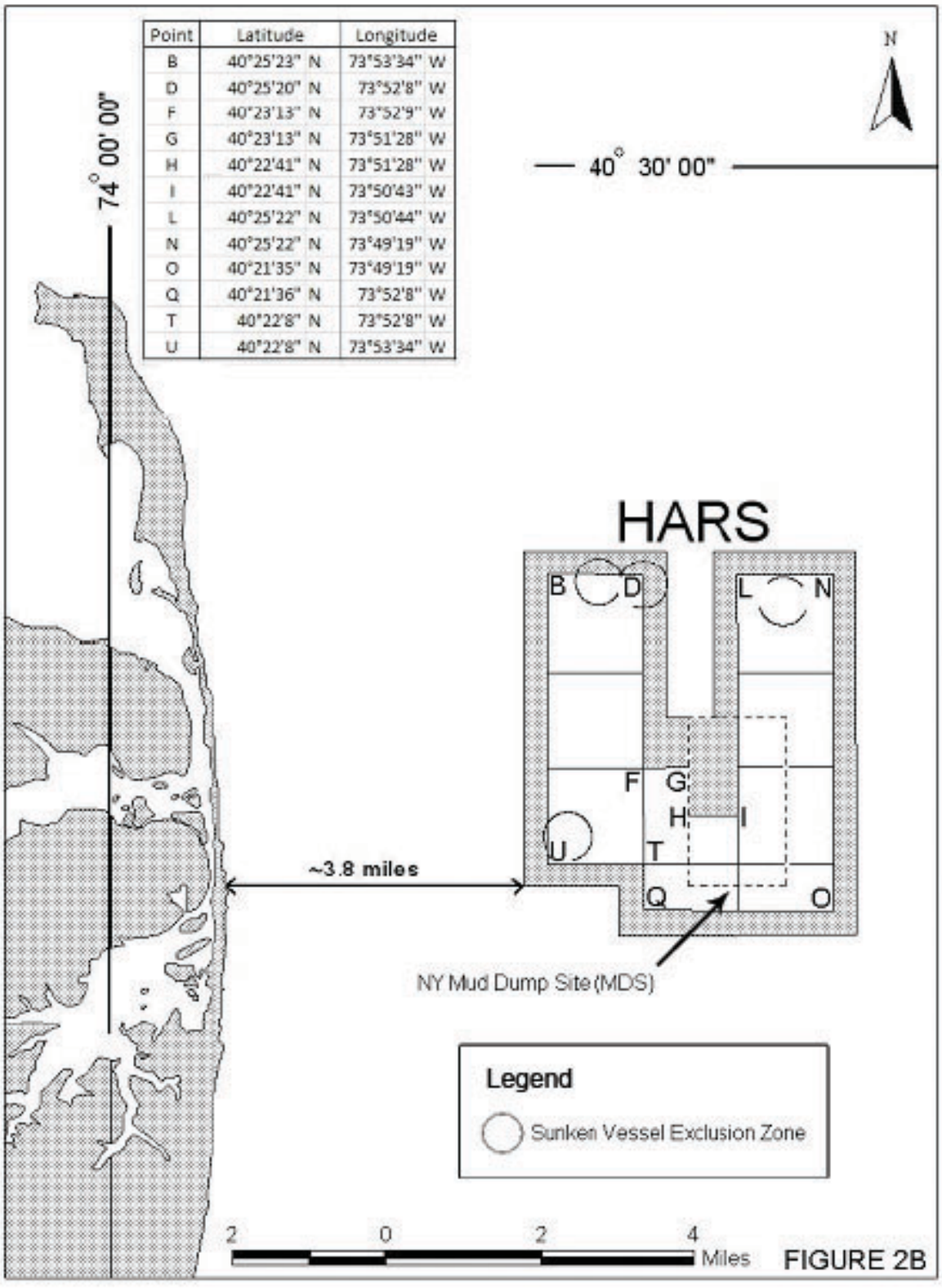


Figure 2B: HARS Location Map 2

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Haverstraw Bay - Reach 1

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.060	ND	0.060	ND
Cd	0.100	ND	0.100	ND
Cr		1.69		3.80
Cu		2.04		2.26
Hg	0.200	ND	0.200	ND
Ni	1.00	ND		1.03
Pb		1.30		3.00
Zn		6.07		6.50
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND	0.442	ND
trans Nonachlor	0.436	ND	0.436	ND
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND	0.531	ND
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		0.472
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**2.02**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND		1.78
PCB 18	0.366	ND		3.04
PCB 28		2.15		2.25
PCB 44	0.534	ND		2.71
PCB 49	0.391	ND		2.06
PCB 52		3.86		3.63
PCB 66	0.601	ND		2.29
PCB 87	0.461	ND	0.461	ND
PCB 101	0.388	ND		1.02
PCB 105	0.598	ND	0.598	ND
PCB 118	0.576	ND		0.368
PCB 128	0.417	ND		0.256
PCB 138	0.493	ND		0.625
PCB 153	0.493	ND		0.974
PCB 170	0.452	ND		0.239
PCB 180	0.458	ND		0.233
PCB 183	0.410	ND		0.244
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.232
PCB 195	0.429	ND		0.062
PCB 206	0.464	ND		0.107
PCB 209	0.445	ND		0.129
Total PCB		**21.6**		**46.1**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Haverstraw Bay - Reach 2

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.300	ND	0.300	ND
Cd	0.500	ND	0.500	ND
Cr	2.00	ND		15.9
Cu		1.87		10.2
Hg	1.00	ND	1.00	ND
Ni	5.00	ND		8.56
Pb	5.00	ND		11.0
Zn	12.5	ND		48.1
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND	0.442	ND
trans Nonachlor	0.436	ND		0.590
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND		0.658
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		2.03
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**3.97**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND		51.8
PCB 18	0.366	ND		7.03
PCB 28	0.423	ND		9.78
PCB 44	0.534	ND		4.42
PCB 49	0.391	ND		6.28
PCB 52		1.91		8.50
PCB 66	0.601	ND		5.36
PCB 87	0.461	ND		0.824
PCB 101	0.388	ND		3.34
PCB 105	0.598	ND		1.34
PCB 118	0.576	ND		3.99
PCB 128	0.417	ND		0.424
PCB 138	0.493	ND		3.10
PCB 153	0.493	ND		3.57
PCB 170	0.452	ND		1.70
PCB 180	0.458	ND		1.36
PCB 183	0.410	ND		1.24
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.983
PCB 195	0.429	ND		0.445
PCB 206	0.464	ND		0.595
PCB 209	0.445	ND		0.706
Total PCB		**13.8**		**234**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Haverstraw Bay - Reach 3

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.300	ND	0.300	ND
Cd	0.500	ND	0.500	ND
Cr	2.00	ND		8.44
Cu		1.82		5.88
Hg	1.00	ND	1.00	ND
Ni	5.00	ND	5.00	ND
Pb	5.00	ND		6.90
Zn	12.5	ND		25.1
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND	0.442	ND
trans Nonachlor	0.436	ND	0.436	ND
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND		0.401
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		1.18
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**2.86**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND		10.9
PCB 18	0.366	ND		4.33
PCB 28	0.423	ND		5.25
PCB 44	0.534	ND		4.34
PCB 49	0.391	ND		5.24
PCB 52	0.499	ND		6.72
PCB 66	0.601	ND		2.92
PCB 87	0.461	ND		0.543
PCB 101	0.388	ND		2.42
PCB 105	0.598	ND		0.814
PCB 118	0.576	ND		2.14
PCB 128	0.417	ND		0.393
PCB 138	0.493	ND		2.04
PCB 153	0.493	ND		2.31
PCB 170	0.452	ND		0.809
PCB 180	0.458	ND		0.804
PCB 183	0.410	ND		0.688
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.645
PCB 195	0.429	ND		0.241
PCB 206	0.464	ND		0.385
PCB 209	0.445	ND		0.447
Total PCB		**ND**		**109**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

Haverstraw Bay - Reach 4

	SITE WATER		ELUTRIATE	
CONSTITUENTS	**DETECTION LIMITS**	**CONCENTRATION**	**DETECTION LIMITS**	**CONCENTRATION**
Metals	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**	**ppb (ug/L)**
Ag	0.060	ND		0.086
Cd		0.501	0.100	ND
Cr		2.05		3.75
Cu		1.86		2.65
Hg	0.200	ND	0.200	ND
Ni	1.00	ND		1.10
Pb	1.00	ND		4.10
Zn		4.69		7.49
Pesticides	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
Aldrin	0.531	ND	0.531	ND
a-Chlordane	0.442	ND	0.442	ND
trans Nonachlor	0.436	ND	0.436	ND
Dieldrin	0.544	ND	0.544	ND
4,4'-DDT	0.633	ND	0.633	ND
2,4'-DDT	0.795	ND	0.795	ND
4,4'-DDD	0.531	ND	0.531	ND
2,4'-DDD	0.582	ND	0.582	ND
4,4'-DDE	0.445	ND		0.852
2,4'-DDE	0.557	ND	0.557	ND
Total DDT		**ND**		**2.40**
Endosulfan I	0.531	ND	0.531	ND
Endosulfan II	0.525	ND	0.525	ND
Endosulfan sulfate	0.439	ND	0.439	ND
Heptachlor	0.534	ND	0.534	ND
Heptachlor epoxide	0.442	ND	0.442	ND
Industrial Chemicals	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**	**pptr (ng/L)**
PCB 8	0.572	ND		2.55
PCB 18	0.366	ND		7.52
PCB 28	0.423	ND		5.54
PCB 44	0.534	ND		4.97
PCB 49	0.391	ND		5.12
PCB 52	0.499	ND		7.91
PCB 66	0.601	ND		1.91
PCB 87	0.461	ND		0.325
PCB 101	0.388	ND		1.48
PCB 105	0.598	ND	0.598	ND
PCB 118	0.576	ND		0.833
PCB 128	0.417	ND		0.203
PCB 138	0.493	ND		1.30
PCB 153	0.493	ND		1.47
PCB 170	0.452	ND		0.400
PCB 180	0.458	ND		0.390
PCB 183	0.410	ND		0.361
PCB 184	0.576	ND	0.576	ND
PCB 187	0.423	ND		0.451
PCB 195	0.429	ND		0.124
PCB 206	0.464	ND		0.199
PCB 209	0.445	ND		0.213
Total PCB		**ND**		**87.7**

ND = Not detected
For values reported as ND, one-half of the detection limit is used in the calculation of Total DDT and Total PCB

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = sum of congeners reported x 2
(If all PCB congeners are ND, the total is reported as ND)

ppb = parts per billion
ug/L = micrograms per liter
pptr = parts per trillion
ng/L = nanograms per liter

TABLE 2 **TOXICITY TEST RESULTS** **ASI Job No. 44-020**

Haverstraw Bay- Reach 1

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** >100%	>1.00
Americamysis bahia	96 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval survival)**	48 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval normal develop.)**	48 hours	**(c)** 90.7%	0.907

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	97%	95%	2%	No
Americamysis bahia	97%	90%	7%	Yes

TABLE 2 **TOXICITY TEST RESULTS** **ASI Job No. 44-020**
Haverstraw Bay- Reach 2

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** >100%	>1.00
Americamysis bahia	96 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval survival)**	48 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval normal develop.)**	48 hours	**(c)** 84.8%	0.848

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	97%	95%	2%	No
Americamysis bahia	97%	93%	4%	No

TABLE 2 **TOXICITY TEST RESULTS** **ASI Job No. 44-020**

Haverstraw Bay- Reach 3

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** >100%	>1.00
Americamysis bahia	96 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval survival)**	48 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval normal develop.)**	48 hours	**(c)** 41.4%	0.414

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	97%	95%	2%	No
Americamysis bahia	97%	96%	1%	No

TABLE 2 **TOXICITY TEST RESULTS** **ASI Job No. 44-020**
Haverstraw Bay- Reach 4

Suspended Particulate Phase

Test Species	Test Duration	LC_{50}/EC_{50}	LPC (a)
Menidia beryllina	96 hours	**(b)** >100%	>1.00
Americamysis bahia	96 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval survival)**	48 hours	**(b)** >100%	>1.00
Mytilus edulis **(larval normal develop.)**	48 hours	**(c)** 44.8%	0.448

(a) Limiting Permissible Concentration (LPC) is the LC_{50} or EC_{50} multiplied by 0.01

(b) Median Lethal Concentration (LC_{50}) resulting in 50% mortatlity at test termination

(c) Median Effective Concentration (EC_{50}) based on normal development to the D-cell, prodissoconch 1 stage

Whole Sediment (10 days)

Test Species	% Survival Reference	% Survival Test	% Difference Reference - Test	Is difference statistically significant? (a=0.05)
Ampelisca abdita	97%	92%	5%	Yes
Americamysis bahia	97%	91%	6%	Yes

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Haverstraw Bay- Reach 1

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.022		0.023		0.039		0.025
As		2.89		2.91		3.53		2.88
Cd	0.024	ND	0.024	ND	0.024	ND		0.034
Cr		0.257		* 0.401		0.294		0.171
Cu		1.48		1.68		1.00		1.01
Hg	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Ni		0.418		* 0.535		0.309		0.352
Pb		0.217		* 0.321		0.105		0.144
Zn		13.0		12.7		13.5		14.4
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND	0.014	ND	0.014	ND
a-Chlordane		0.047	0.011	ND		0.047		0.037
trans Nonachlor		0.033	0.014	ND		0.110		0.079
Dieldrin		0.045	0.009	ND		0.099		0.088
4,4'-DDT		0.018	0.012	ND	0.012	ND	0.012	ND
2,4'-DDT	0.017	ND	0.017	ND	0.017	ND		0.024
4,4'-DDD		0.117		* 0.783		0.079		* 0.564
2,4'-DDD		0.049		0.079		0.061		* 0.128
4,4'-DDE		0.186		* 0.608		0.030		* 0.115
2,4'-DDE	0.009	ND	0.009	ND		0.009	0.009	ND
Total DDT		**0.396**		* **1.51**		**0.208**		* **0.852**
Endosulfan I	0.015	ND	0.015	ND		0.015	0.015	ND
Endosulfan II		0.029		* 0.103		0.033		* 0.106
Endosulfan sulfate		0.019		0.030	0.012	ND	0.012	ND
Heptachlor	0.011	ND	0.011	ND	0.011	ND	0.011	ND
Heptachlor epoxide	0.017	ND	0.017	ND	0.017	ND	0.017	ND
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND	0.030	ND	0.030	ND	0.030	ND
PCB 18	0.014	ND	0.014	ND		0.060		* 1.10
PCB 28		0.088		* 1.38		0.051		* 0.693
PCB 44		0.209		* 0.793		0.105		* 0.510
PCB 49		0.172		* 1.85		0.106		* 1.30
PCB 52		0.392		* 1.95		0.263		* 2.25
PCB 66		0.141		* 1.54		0.215		* 1.24
PCB 87		0.058		0.084		0.020		* 0.035
PCB 101		0.243		* 1.05		0.197		* 0.805
PCB 105		0.032		0.045		0.037		0.043
PCB 118		0.177		0.258		0.084		* 0.129
PCB 128		0.048		* 0.190		0.051		* 0.102
PCB 138		0.209		* 0.509		0.271		* 0.513
PCB 153		0.283		* 0.800		0.358		* 0.770
PCB 170		0.086		* 0.144		0.055		* 0.127
PCB 180		0.091		* 0.179		0.113		* 0.248
PCB 183		0.038		* 0.074		0.063		* 0.102
PCB 184	0.024	ND	0.024	ND	0.024	ND	0.024	ND
PCB 187		0.095		* 0.171		0.135		* 0.260
PCB 195		0.040		0.053		0.036		* 0.074
PCB 206		0.024		* 0.065		0.050		* 0.117
PCB 209		0.087		0.058		0.071		* 0.103
Total PCB		**5.16**		* **22.5**		**4.79**		* **21.2**
1,4-Dichlorobenzene		0.088		* 0.146		0.091		0.085

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.885		0.953		0.874		0.926
Acenaphthylene		0.159		0.229		0.049		* 0.098
Acenaphthene		0.262		* 0.426		0.228		* 0.349
Fluorene		0.317		* 0.443		0.129		0.168
Phenanthrene		1.92		* 2.44		0.326		* 0.448
Anthracene		0.388		0.445		0.040		* 0.094
Fluoranthene		6.47		7.48		0.400		* 1.73
Pyrene		4.81		* 8.80		0.364		* 2.17
Benzo(a)anthracene		1.42		* 2.33		0.038		* 0.182
Chrysene		2.59		* 4.76		0.273		0.892
Benzo(b)fluoranthene		1.42		* 2.89		0.076		* 0.264
Benzo(k)fluoranthene		1.66		* 4.10		0.111		* 0.432
Benzo(a)pyrene		1.38		* 2.71		0.095		* 0.258
Indeno(1,2,3-cd)pyrene		0.567		* 1.42	0.053	ND		* 0.104
Dibenzo(a,h)antracene		0.147		* 0.334	0.047	ND		0.043
Benzo(g,h,i)perylene		0.810		* 1.48		0.068		* 0.146
Total PAH's		**25.2**		* **41.2**		**3.17**		* **8.30**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.056	ND	0.065	ND	0.093	ND	0.050	ND
12378 PeCDD	0.051	ND	0.087	ND	0.068	ND	0.048	ND
123478 HxCDD	0.048	ND	0.069	ND	0.105	ND	0.051	ND
123678 HxCDD	0.050	ND	0.071	ND	0.106	ND	0.054	ND
123789 HxCDD	0.049	ND	0.070	ND	0.107	ND	0.053	ND
1234678 HpCDD		0.193		0.429		0.250		0.315
1234789 OCDD		2.16		* 4.38		1.48		3.25
2378 TCDF	0.101	ND	0.103	ND		0.273		0.299
12378 PeCDF	0.041	ND	0.068	ND	0.108	ND	0.047	ND
23478 PeCDF	0.040	ND	0.066	ND	0.083	ND	0.052	ND
123478 HxCDF	0.030	ND	0.042	ND	0.055	ND	0.039	ND
123678 HxCDF	0.031	ND	0.045	ND	0.055	ND	0.038	ND
234678 HxCDF	0.032	ND	0.044	ND	0.054	ND	0.040	ND
123789 HxCDF	0.048	ND	0.063	ND	0.092	ND	0.057	ND
1234678 HpCDF		0.106	0.103	ND		0.102		0.078
1234789 HpCDF	0.056	ND	0.105	ND	0.088	ND	0.059	ND
12346789 OCDF		0.226	0.328	ND	0.172	ND		0.197

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Haverstraw Bay- Reach 2

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.022		0.021		0.039		0.022
As		2.89		3.08		3.53		2.79
Cd	0.024	ND	0.024	ND	0.024	ND	0.024	ND
Cr		0.257		* 0.377		0.294		0.192
Cu		1.48		1.66		1.00		0.944
Hg	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Ni		0.418		* 0.526		0.309		0.317
Pb		0.217		* 0.355		0.105		0.092
Zn		13.0		12.4		13.5		12.2
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND	0.014	ND	0.014	ND
a-Chlordane		0.047	0.011	ND		0.047		0.049
trans Nonachlor		0.033	0.014	ND		0.110		0.086
Dieldrin		0.045	0.009	ND		0.099		0.095
4,4'-DDT		0.018	0.012	ND	0.012	ND	0.012	ND
2,4'-DDT	0.017	ND	0.017	ND	0.017	ND	0.017	ND
4,4'-DDD		0.117		* 0.433		0.079		* 0.453
2,4'-DDD		0.049		0.074		0.061		* 0.116
4,4'-DDE		0.186		* 0.511		0.030		* 0.093
2,4'-DDE	0.009	ND	0.009	ND		0.009	0.009	ND
Total DDT		**0.396**		* **1.06**		**0.208**		* **0.700**
Endosulfan I	0.015	ND	0.015	ND		0.015	0.015	ND
Endosulfan II		0.029		* 0.100		0.033		* 0.093
Endosulfan sulfate		0.019		* 0.066	0.012	ND	0.012	ND
Heptachlor	0.011	ND	0.011	ND	0.011	ND	0.011	ND
Heptachlor epoxide	0.017	ND	0.017	ND	0.017	ND	0.017	ND
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND	0.030	ND	0.030	ND	0.030	ND
PCB 18	0.014	ND	0.014	ND		0.060		* 0.851
PCB 28		0.088		* 0.982		0.051		* 0.411
PCB 44		0.209		* 0.557		0.105		* 0.387
PCB 49		0.172		* 1.33		0.106		* 0.919
PCB 52		0.392		* 1.55		0.263		* 1.66
PCB 66		0.141		* 1.16		0.215		* 0.958
PCB 87		0.058		* 0.096		0.020		* 0.032
PCB 101		0.243		* 0.817		0.197		* 0.654
PCB 105		0.032		0.038		0.037		0.046
PCB 118		0.177		0.199		0.084		0.101
PCB 128		0.048		* 0.140		0.051		* 0.100
PCB 138		0.209		* 0.435		0.271		* 0.475
PCB 153		0.283		* 0.685		0.358		* 0.666
PCB 170		0.086		* 0.133		0.055		* 0.113
PCB 180		0.091		* 0.157		0.113		* 0.228
PCB 183		0.038		* 0.066		0.063		* 0.097
PCB 184	0.024	ND	0.024	ND	0.024	ND	0.024	ND
PCB 187		0.095		* 0.157		0.135		* 0.237
PCB 195		0.040		0.050		0.036		* 0.065
PCB 206		0.024		* 0.060		0.050		* 0.105
PCB 209		0.087		0.043		0.071		* 0.097
Total PCB		**5.16**		* **17.5**		**4.79**		* **16.5**
1,4-Dichlorobenzene		0.088		* 0.153		0.091		0.071

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.885		* 0.959		0.874		0.877
Acenaphthylene		0.159		0.210		0.049		* 0.071
Acenaphthene		0.262		* 0.430		0.228		0.282
Fluorene		0.317		* 0.406		0.129		0.147
Phenanthrene		1.92		2.27		0.326		0.369
Anthracene		0.388		0.428		0.040		* 0.066
Fluoranthene		6.47		6.88		0.400		* 1.45
Pyrene		4.81		* 7.71		0.364		* 1.70
Benzo(a)anthracene		1.42		2.31		0.038		* 0.089
Chrysene		2.59		* 4.48		0.273		* 0.680
Benzo(b)fluoranthene		1.42		* 2.68		0.076		* 0.144
Benzo(k)fluoranthene		1.66		* 3.91		0.111		* 0.258
Benzo(a)pyrene		1.38		* 2.58		0.095		* 0.134
Indeno(1,2,3-cd)pyrene		0.567		* 1.20	0.053	ND		0.041
Dibenzo(a,h)antracene		0.147		* 0.297	0.047	ND		0.039
Benzo(g,h,i)perylene		0.810		* 1.42		0.068		0.062
Total PAH's		**25.2**		* **38.2**		**3.17**		* **6.41**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.056	ND	0.086	ND	0.093	ND	0.050	ND
12378 PeCDD	0.051	ND	0.113	ND	0.068	ND	0.052	ND
123478 HxCDD	0.048	ND	0.083	ND	0.105	ND	0.052	ND
123678 HxCDD	0.050	ND	0.084	ND	0.106	ND	0.052	ND
123789 HxCDD	0.049	ND	0.084	ND	0.107	ND	0.053	ND
1234678 HpCDD		0.193		* 0.413		0.250		0.142
1234789 OCDD		2.16		2.79		1.48		1.49
2378 TCDF	0.101	ND	0.113	ND		0.273		0.167
12378 PeCDF	0.041	ND	0.078	ND	0.108	ND	0.048	ND
23478 PeCDF	0.040	ND	0.076	ND	0.083	ND	0.051	ND
123478 HxCDF	0.030	ND	0.054	ND	0.055	ND	0.034	ND
123678 HxCDF	0.031	ND	0.058	ND	0.055	ND	0.032	ND
234678 HxCDF	0.032	ND	0.055	ND	0.054	ND	0.033	ND
123789 HxCDF	0.048	ND	0.082	ND	0.092	ND	0.049	ND
1234678 HpCDF		0.106	0.111	ND		0.102	0.049	ND
1234789 HpCDF	0.056	ND	0.116	ND	0.088	ND	0.059	ND
12346789 OCDF		0.226	0.363	ND	0.172	ND	0.154	ND

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Haverstraw Bay- Reach 3

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.022		0.026		0.039		0.025
As		2.89		2.91		3.53		2.67
Cd	0.024	ND	0.025	ND	0.024	ND	0.024	ND
Cr		0.257		0.427		0.294		0.150
Cu		1.48		1.63		1.00		0.893
Hg	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Ni		0.418		* 0.520		0.309		0.312
Pb		0.217		* 0.378		0.105		0.095
Zn		13.0		12.0		13.5		11.1
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND	0.014	ND	0.014	ND
a-Chlordane		0.047	0.011	ND		0.047		0.040
trans Nonachlor		0.033	0.014	ND		0.110		0.087
Dieldrin		0.045	0.009	ND		0.099		0.110
4,4'-DDT		0.018	0.012	ND	0.012	ND	0.012	ND
2,4'-DDT	0.017	ND	0.017	ND	0.017	ND	0.017	ND
4,4'-DDD		0.117		* 0.715		0.079		* 0.752
2,4'-DDD		0.049		* 0.186		0.061		* 0.195
4,4'-DDE		0.186		* 0.730		0.030		* 0.198
2,4'-DDE	0.009	ND	0.009	ND		0.009	0.009	ND
Total DDT		**0.396**		* **1.67**		**0.208**		* **1.18**
Endosulfan I	0.015	ND	0.015	ND		0.015	0.015	ND
Endosulfan II		0.029		* 0.174		0.033		* 0.147
Endosulfan sulfate		0.019	0.012	ND	0.012	ND	0.012	ND
Heptachlor	0.011	ND	0.011	ND	0.011	ND		0.139
Heptachlor epoxide	0.017	ND	0.017	ND	0.017	ND	0.017	ND
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND	0.030	ND	0.030	ND	0.030	ND
PCB 18	0.014	ND	0.014	ND		0.060		* 2.15
PCB 28		0.088		* 2.44		0.051		* 1.26
PCB 44		0.209		* 1.06		0.105		* 0.924
PCB 49		0.172		* 3.09		0.106		* 2.322
PCB 52		0.392		* 3.20		0.263		* 3.80
PCB 66		0.141		* 2.25		0.215		* 2.11
PCB 87		0.058		* 0.127		0.020		* 0.050
PCB 101		0.243		* 1.50		0.197		* 1.36
PCB 105		0.032		* 0.047		0.037		* 0.065
PCB 118		0.177		* 0.382		0.084		* 0.253
PCB 128		0.048		* 0.152		0.051		* 0.154
PCB 138		0.209		* 0.592		0.271		* 0.759
PCB 153		0.283		* 1.05		0.358		* 1.19
PCB 170		0.086		* 0.173		0.055		* 0.207
PCB 180		0.091		* 0.222		0.113		* 0.395
PCB 183		0.038		* 0.086		0.063		* 0.151
PCB 184	0.024	ND	0.024	ND	0.024	ND	0.024	ND
PCB 187		0.095		* 0.215		0.135		* 0.386
PCB 195		0.040		* 0.062		0.036		* 0.106
PCB 206		0.024		* 0.064		0.050		* 0.172
PCB 209		0.087		0.094		0.071		* 0.137
Total PCB		**5.16**		* **33.8**		**4.79**		* **36.0**
1,4-Dichlorobenzene		0.088		* 0.171		0.091		0.077

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.885		* 1.03		0.874		0.733
Acenaphthylene		0.159		0.232		0.049		* 0.092
Acenaphthene		0.262		* 0.442		0.228		* 0.316
Fluorene		0.317		* 0.461		0.129		0.137
Phenanthrene		1.92		* 2.67		0.326		0.336
Anthracene		0.388		0.480		0.040		* 0.083
Fluoranthene		6.47		8.79		0.400		* 2.04
Pyrene		4.81		* 10.2		0.364		* 2.53
Benzo(a)anthracene		1.42		* 2.76		0.038		* 0.145
Chrysene		2.59		* 5.49		0.273		* 1.00
Benzo(b)fluoranthene		1.42		* 3.19		0.076		* 0.204
Benzo(k)fluoranthene		1.66		* 4.77		0.111		* 0.383
Benzo(a)pyrene		1.38		* 3.05		0.095		* 0.162
Indeno(1,2,3-cd)pyrene		0.567		* 1.41	0.053	ND		* 0.072
Dibenzo(a,h)antracene		0.147		* 0.328	0.047	ND		0.035
Benzo(g,h,i)perylene		0.810		* 1.51		0.068		* 0.092
Total PAH's		**25.2**		* **46.8**		**3.17**		* **8.37**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.056	ND	0.057	ND	0.093	ND	0.109	ND
12378 PeCDD	0.051	ND	0.083	ND	0.068	ND	0.082	ND
123478 HxCDD	0.048	ND	0.070	ND	0.105	ND	0.122	ND
123678 HxCDD	0.050	ND	0.073	ND	0.106	ND	0.125	ND
123789 HxCDD	0.049	ND	0.072	ND	0.107	ND	0.125	ND
1234678 HpCDD		0.193	0.356	ND		0.250		* 0.496
1234789 OCDD		2.16		* 5.82		1.48		6.94
2378 TCDF	0.101	ND	0.106	ND		0.273		0.395
12378 PeCDF	0.041	ND	0.059	ND	0.108	ND	0.102	ND
23478 PeCDF	0.040	ND	0.058	ND	0.083	ND	0.103	ND
123478 HxCDF	0.030	ND	0.038	ND	0.055	ND	0.069	ND
123678 HxCDF	0.031	ND	0.039	ND	0.055	ND	0.069	ND
234678 HxCDF	0.032	ND	0.040	ND	0.054	ND		* 0.088
123789 HxCDF	0.048	ND	0.055	ND	0.092	ND	0.116	ND
1234678 HpCDF		0.106		0.111		0.102		0.155
1234789 HpCDF	0.056	ND	0.110	ND	0.088	ND	0.139	ND
12346789 OCDF		0.226	0.217	ND	0.172	ND	0.449	ND

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Haverstraw Bay- Reach 4

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION
Metals	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Ag		0.022		0.047		0.039		0.022
As		2.89		* 3.25		3.53		2.64
Cd	0.024	ND		0.037	0.024	ND		0.035
Cr		0.257		* 0.430		0.294		0.144
Cu		1.48		1.93		1.00		1.12
Hg	0.010	ND	0.010	ND	0.010	ND	0.010	ND
Ni		0.418		* 0.543		0.309		0.339
Pb		0.217		* 0.445		0.105		0.118
Zn		13.0		11.9		13.5		16.4
Pesticides	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Aldrin	0.014	ND	0.014	ND	0.014	ND	0.014	ND
a-Chlordane		0.047	0.011	ND		0.047		0.042
trans Nonachlor		0.033		0.031		0.110		0.100
Dieldrin		0.045		0.094		0.099		* 0.140
4,4'-DDT		0.018	0.012	ND	0.012	ND	0.012	ND
2,4'-DDT	0.017	ND	0.017	ND	0.017	ND		0.053
4,4'-DDD		0.117		* 0.823		0.079		* 0.862
2,4'-DDD		0.049		* 0.188		0.061		* 0.211
4,4'-DDE		0.186		* 0.799		0.030		* 0.200
2,4'-DDE	0.009	ND	0.009	ND		0.009	0.009	ND
Total DDT		**0.396**		* **1.85**		**0.208**		* **1.35**
Endosulfan I	0.015	ND	0.015	ND		0.015		0.280
Endosulfan II		0.029		* 0.226		0.033		* 0.180
Endosulfan sulfate		0.019		0.069	0.012	ND	0.012	ND
Heptachlor	0.011	ND	0.011	ND	0.011	ND	0.011	ND
Heptachlor epoxide	0.017	ND	0.017	ND	0.017	ND	0.017	ND
Industrial Chemicals	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
PCB 8	0.030	ND		* 1.60	0.030	ND		0.043
PCB 18	0.014	ND		* 4.85		0.060		* 5.28
PCB 28		0.088		* 7.80		0.051		* 2.80
PCB 44		0.209		* 2.49		0.105		* 1.41
PCB 49		0.172		* 8.48		0.106		* 3.67
PCB 52		0.392		* 8.99		0.263		* 6.43
PCB 66		0.141		* 2.48		0.215		* 2.07
PCB 87		0.058		* 0.171		0.020		* 0.048
PCB 101		0.243		* 2.30		0.197		* 1.72
PCB 105		0.032		* 0.081		0.037		0.074
PCB 118		0.177		* 0.708		0.084		* 0.323
PCB 128		0.048		* 0.163		0.051		* 0.171
PCB 138		0.209		* 0.783		0.271		* 0.844
PCB 153		0.283		* 1.31		0.358		* 1.32
PCB 170		0.086		* 0.210		0.055		* 0.232
PCB 180		0.091		* 0.266		0.113		* 0.434
PCB 183		0.038		* 0.107		0.063		* 0.161
PCB 184	0.024	ND	0.024	ND	0.024	ND	0.024	ND
PCB 187		0.095		* 0.271		0.135		* 0.408
PCB 195		0.040		* 0.075		0.036		* 0.123
PCB 206		0.024		* 0.087		0.050		* 0.185
PCB 209		0.087		0.072		0.071		* 0.148
Total PCB		**5.16**		* **86.6**		**4.79**		* **55.8**
1,4-Dichlorobenzene		0.088		* 0.135		0.091		0.091

TABLE 3. (Continued)

CONSTITUENTS	*Macoma nasuta*				*Alitta (nereis) virens*			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
PAH's	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)	ppb (ug/kg)
Naphthalene		0.885		0.936		0.874		0.962
Acenaphthylene		0.159		0.209		0.049		* 0.101
Acenaphthene		0.262		* 0.467		0.228		0.269
Fluorene		0.317		* 0.426		0.129		0.150
Phenanthrene		1.92		* 2.32		0.326		* 0.468
Anthracene		0.388		0.472		0.040		* 0.109
Fluoranthene		6.47		9.18		0.400		* 1.57
Pyrene		4.81		* 10.4		0.364		* 1.93
Benzo(a)anthracene		1.42		* 2.28		0.038		* 0.164
Chrysene		2.59		* 5.23		0.273		* 0.965
Benzo(b)fluoranthene		1.42		* 2.79		0.076		* 0.217
Benzo(k)fluoranthene		1.66		* 3.55		0.111		* 0.326
Benzo(a)pyrene		1.38		* 2.44		0.095		* 0.178
Indeno(1,2,3-cd)pyrene		0.567		* 1.29	0.053	ND		0.095
Dibenzo(a,h)antracene		0.147		* 0.260	0.047	ND		0.058
Benzo(g,h,i)perylene		0.810		* 1.35		0.068		* 0.172
Total PAH's		**25.2**		* **43.6**		**3.17**		* **7.73**
Dioxins	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)	pptr(ng/kg)
2378 TCDD	0.056	ND	0.081	ND	0.093	ND	0.094	ND
12378 PeCDD	0.051	ND		0.083	0.068	ND	0.071	ND
123478 HxCDD	0.048	ND	0.079	ND	0.105	ND	0.101	ND
123678 HxCDD	0.050	ND	0.081	ND	0.106	ND	0.104	ND
123789 HxCDD	0.049	ND	0.080	ND	0.107	ND	0.104	ND
1234678 HpCDD		0.193		* 1.17		0.250		0.423
1234789 OCDD		2.16		* 8.66		1.48		* 3.71
2378 TCDF	0.101	ND	0.169	ND		0.273		* 0.517
12378 PeCDF	0.041	ND	0.067	ND	0.108	ND	0.084	ND
23478 PeCDF	0.040	ND	0.066	ND	0.083	ND	0.077	ND
123478 HxCDF	0.030	ND	0.050	ND	0.055	ND	0.051	ND
123678 HxCDF	0.031	ND	0.051	ND	0.055	ND	0.051	ND
234678 HxCDF	0.032	ND	0.053	ND	0.054	ND	0.061	ND
123789 HxCDF	0.048	ND	0.083	ND	0.092	ND	0.092	ND
1234678 HpCDF		0.106		0.136		0.102		0.157
1234789 HpCDF	0.056	ND	0.092	ND	0.088	ND	0.120	ND
12346789 OCDF		0.226		* 0.368	0.172	ND		0.315

ND = Not detected
Concentrations shown are the mean of 5 replicate analyses in wet weight.
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.
* = Statistically significant at the 95% confidence level.

Total PAH = Sum of all PAH's.
(If all PAHs are ND, the total is reported as ND)

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
(If all DDT metabolites are ND, the total is reported as ND)

Total PCB = 2(x), where x = sum of PCB congeners
(If all PCB congeners are ND, the total is reported as ND)