



**US Army Corps
of Engineers®**

New York District
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New York, N.Y. 10278
ATTN: CENAN-OP-ST

Public Notice

In replying refer to:
Public Notice: NY&NJ Channels-Seguine/Ward/Outerbridge
Published:
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NEW YORK AND NEW JERSEY CHANNELS – SEGUINE/WARD/OUTERBRIDGE FEDERAL NAVIGATION PROJECT MAINTENANCE DREDGING

TO WHOM IT MAY CONCERN:

The New York District, U.S. 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. 1463, 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 New York and New Jersey Channels – Seguine/Ward/Outerbridge Federal Navigation Channel (see Figure 1) with subsequent placement of the dredged material at the Historic Area Remediation Site (HARS, See Figure 2A and 2B).

ACTIVITY: Maintenance dredging of New York and New Jersey Channels – Seguine/Ward/Outerbridge Federal Navigation Channel, with placement of approximately 425,000 cubic yards (CY) of the dredged material at the HARS for the purpose of remediation

WATERWAY: NY & NJ Channels – Seguine/Ward/Outerbridge Reaches

LOCATION: Richmond County, New York.

The NY&NJ Channels Federal Navigation Project was adopted in 1933, modified in 1935, 1950, 1965 and 1985. The Seguine/Ward/Outerbridge reaches of the NY&NJ Channels have an authorized depth of 35 feet and are generally 600 to 800 feet wide, with widenings at the bends. The proposed activity is to dredge the critically shoaled areas located in the Seguine/Ward/Outerbridge reaches.

A detailed description of the proposed activities is enclosed to assist in your review. This activity is being evaluated to determine if 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 PCBs 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 Corps of Engineers 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 and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act and to determine the need for a public hearing.

DUE TO CURRENT LOCAL CONDITIONS, AND TO ENSURE ALL COMMENTS REGARDING THIS ACTIVITY ARE RECEIVED, ALL COMMENTS SHOULD BE EMAILED TO ALEXANDER.F.GREGORY@USACE.ARMY.MIL 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.

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 or Federal Consistency Determination (FCD) program, the Corps must submit a determination that the proposed project is consistent with the State CZM program and/or State FCD program to the maximum extent practicable. This activity is subject to review by the New York State Department of State for CZM consistency and by State of New Jersey Department of Environmental Protection for FCD consistency. The U.S. Army Corps of Engineers, New York District, has determined that the proposed activities are consistent to the maximum extent practicable and within the applicable policies of the CZM program and FCD program. A copy of the CZM determination will be provided to the New York State Department of State and a copy of the FCD determination will be

forwarded to the State of New Jersey, Department of Environmental Protection. Additional information regarding the Corps of Engineers' consistency determination may be obtained by contacting the New York State Department of State, Office of Coastal, Local Government and Community Sustainability, One Commerce Plaza, 99 Washington Avenue, Suite 1010, Albany, NY 12231 and the State of New Jersey Department of Environmental Protection, Bureau of Coastal Regulation, CN 401, 501 East State Street, Second Floor, Trenton, New Jersey 08625-0401.

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 Commerce, National Marine Fisheries Service
- U.S. Coast Guard, First District
- New York State Department of Environmental Conservation
- New York State Department of State
- New York City Department of Planning
- New Jersey Department of Environmental Protection

DESCRIPTION OF PLANNED FEDERAL ACTION:

The New York District, U.S. Army Corps of Engineers proposes to perform maintenance dredging of the New York and New Jersey Channels - Seguine/Ward/Outerbridge Federal Navigation Project. This channel was last dredged in 2018 by clamshell dredge, with the removal of approximately 163,405 cubic yards (CY) of sediment. The dredged material was used as remediation material at the Historic Area Remediation Site (HARS). This proposed maintenance dredging would involve the removal of approximately 425,000 CY of material to 35 feet MLLW plus 2 feet allowable overdepth. Maintenance dredging of the channel is usually accomplished by a clamshell dredge. The entire reach will generally not require maintenance dredging; only areas where shoaling has reduced the depth of the channel will require dredging.

The purpose of the proposed dredging is to maintain the authorized project dimensions, thereby assuring safe and economical use of Seguine/Ward/Outerbridge reaches by shipping interests. The material has been tested and meets 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 placement site.

This public notice serves to announce the government's intent and identifies the proposed location for placement of approximately 425,000 CY of material. The dredging and placement at the HARS for this project is anticipated to occur in the summer / fall of 2023.

ENVIRONMENTAL IMPACT STATEMENT:

The material to be placed at the HARS is dredged material that will be removed from New York and New Jersey Channels - Seguine/Ward/Outerbridge Federal Navigation Project. The material has been evaluated and found to meet the regulatory testing criteria of 40 CFR Sections 227.6 and 227.27, and the requirements of the rule establishing the HARS in Section 228.15 (d)(6). It has been determined that maintenance dredging of the project-area within the New York and New Jersey Channels - Seguine/Ward/Outerbridge Federal Navigation Channel, with placement of the dredged material at the HARS is not likely to have significant adverse environmental impact on water quality, marine resources, fish, wildlife, endangered species, recreation, aesthetics, or flood protection of the area.

An update of the EA and a Section 404(b) evaluation, as required by the Clean Water Act 40 CFR 230, will be prepared prior to implementation of the proposed work.

PLACEMENT SITE:

The dredged material from this project is proposed to be placed at the HARS (see next section: Introduction to the HARS) using bottom dumping barges. As noted in the designation of the HARS, Remediation Material would not be allowed to be placed within 0.27 nautical miles of any wrecks identified in the National Register of Historic Places, 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 under MPRSA. The MPRSA divides permitting responsibility between USEPS and USACE. Under Section 102 of the MPRSA, 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 had 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 activities 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 an evaluation memorandum 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 area 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 in the study area and surveys performed may be found in the Supplemental Environmental Impact Assessment (SEIS) [USEPA, 1997].

The designation of the HARS identifies an area in and around the former Mud Dump Site (MDS) that has exhibited the potential for adverse ecological impacts (see Figure No. 2A: HARS Location Map 1 and 2B: HARS Location Map 2). The HARS will be remediated with dredged material that meets current Category 1 Standards and will not cause significant undesirable effects including through bioaccumulation or acceptable toxicity, in accordance with 40 CFR 227.6. This dredged material is referred to as "Material for Historic Area Remediation Site (HARS)" or "Remediation Material."

As of the end of November 2022, dredged materials from one hundred forty-four (144) 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 83,410,000 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 on-board 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, Chief, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799.

HARS SUITABILITY TESTING

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 factors, to facilitate decisions in accordance with 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 Evaluation Memorandum for this project may be obtained by contacting Mr. Mark Reiss, Chief, Dredging, Sediments and Oceans Section, US Environmental Protection Agency, Region 2, at (212) 637-3799.

Sediment Grain Size Analysis

As depicted on the attached drawing, the proposed maintenance dredging area has been characterized by twenty nine (29) sediment core samples taken down to -35 feet MLLW plus 2 feet allowable over-depth (green and orange shoaled areas in Figure 1). The 14 samples in Ward Point Bend reach and the 15 samples in Seguine Point Bend reach were then combined into composite reach samples, which were subjected to chemical and biological testing. Based on the analysis of the sediment samples from the Seguine/Ward/Outerbridge project area, the grain size characteristics of the proposed dredged material are:

Ward Point Bend:	3.6% gravel	20.6% sand	60.0% silt	15.8% clay
Seguine Point Bend:	0.9% gravel	35.8% sand	48.7% silt	14.6% 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 analyses were 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 the Corps Waterways Experiment Station (WES) and described in the joint USEPA/Corps 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 suspended particulate, liquid, and solid phases of the proposed dredged material from the 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*), a finfish (*Menidia beryllina*), and the planktonic larvae of a bivalve (the Mediterranean mussel, *Mytilus galloprovincialis*), 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: mysid shrimp (*Americamysis bahia*), inland silversides (*Menidia beryllina*), and the planktonic larvae of a bivalve (the Mediterranean mussel, *Mytilus galloprovincialis*). Median lethal concentrations (LC₅₀), 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 D-cell stage, was determined for the bivalve larvae. The Limiting Permissible Concentration (LPC) was then calculated as 0.01 of the LC₅₀ or EC₅₀ of the most sensitive organism. The LPC was calculated as 0.224% for Ward Point Bend and 0.224% for Seguine Point Bend based on the EC₅₀ of *Mytilus galloprovincialis*.

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, which indicates the suspended particulate phase of the project material would not cause significant undesirable effects, including the possibility of danger associated with bioaccumulation, since these impacts require long duration exposures (see USEPA, 1994). Accordingly, it is concluded that the suspended phase of the material from New York and New Jersey Channels – Seguine/Ward/Outerbridge reaches would be in compliance with 40 CFR Sections

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 predators 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: a burrowing, deposit-feeding polychaete *Alitta (Nereis) virens* and a filter-feeding bivalve *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 Memo 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.

Conclusion

Based upon the results of testing of the sediments proposed for dredging in the New York and New Jersey Channels – Seguine/Ward/Outerbridge Federal Navigation Project, USACE and USEPA have determined that the material is Category 1, meeting the criteria for ocean placement as described in 40 CFR parts 227.6, 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 memorandum as previously mentioned.

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, whereas project sediments used in laboratory acute toxicity tests with the same species were 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.

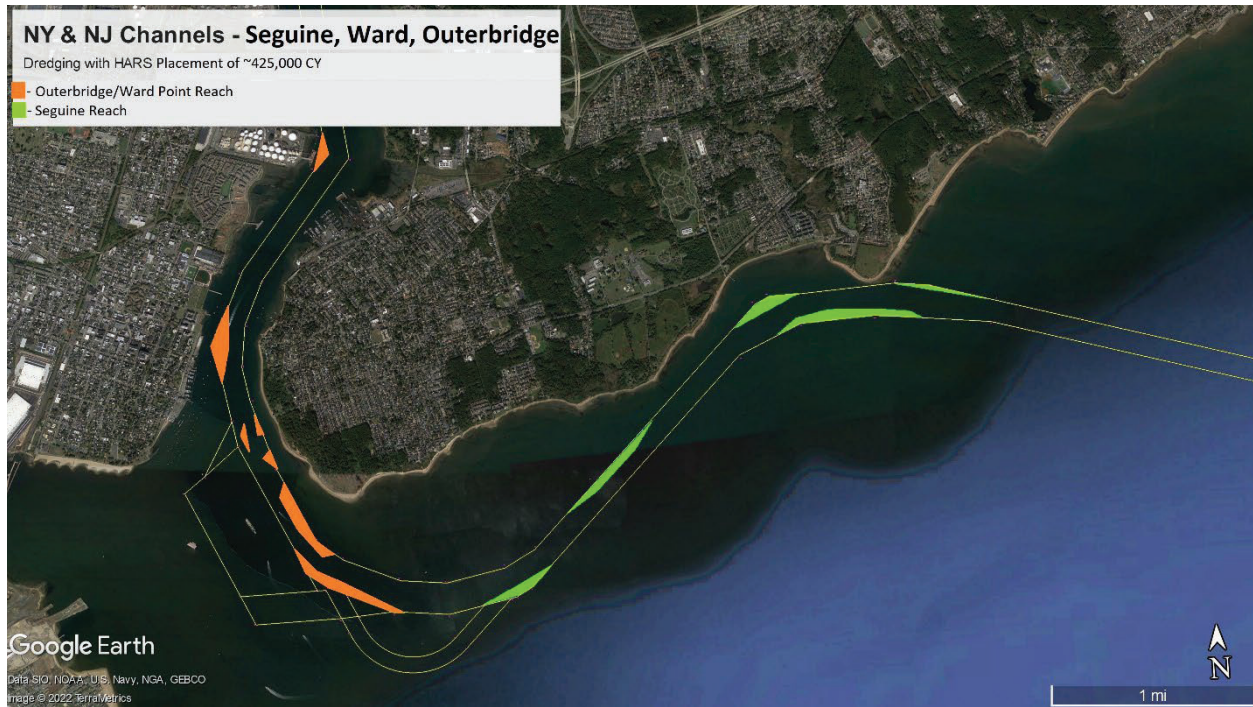
If you have any questions concerning this notice, you may contact Mr. Alexander Gregory by phone at (917) 790-8427 or email at Alexander.F.Gregory@usace.army.mil.

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

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Gerlyn T. Perlas
Acting Chief, Operations Support Branch



**Figure 1: Proposed Dredging Area in the
New York and New Jersey Channels – Seguine/Ward/Outerbridge**

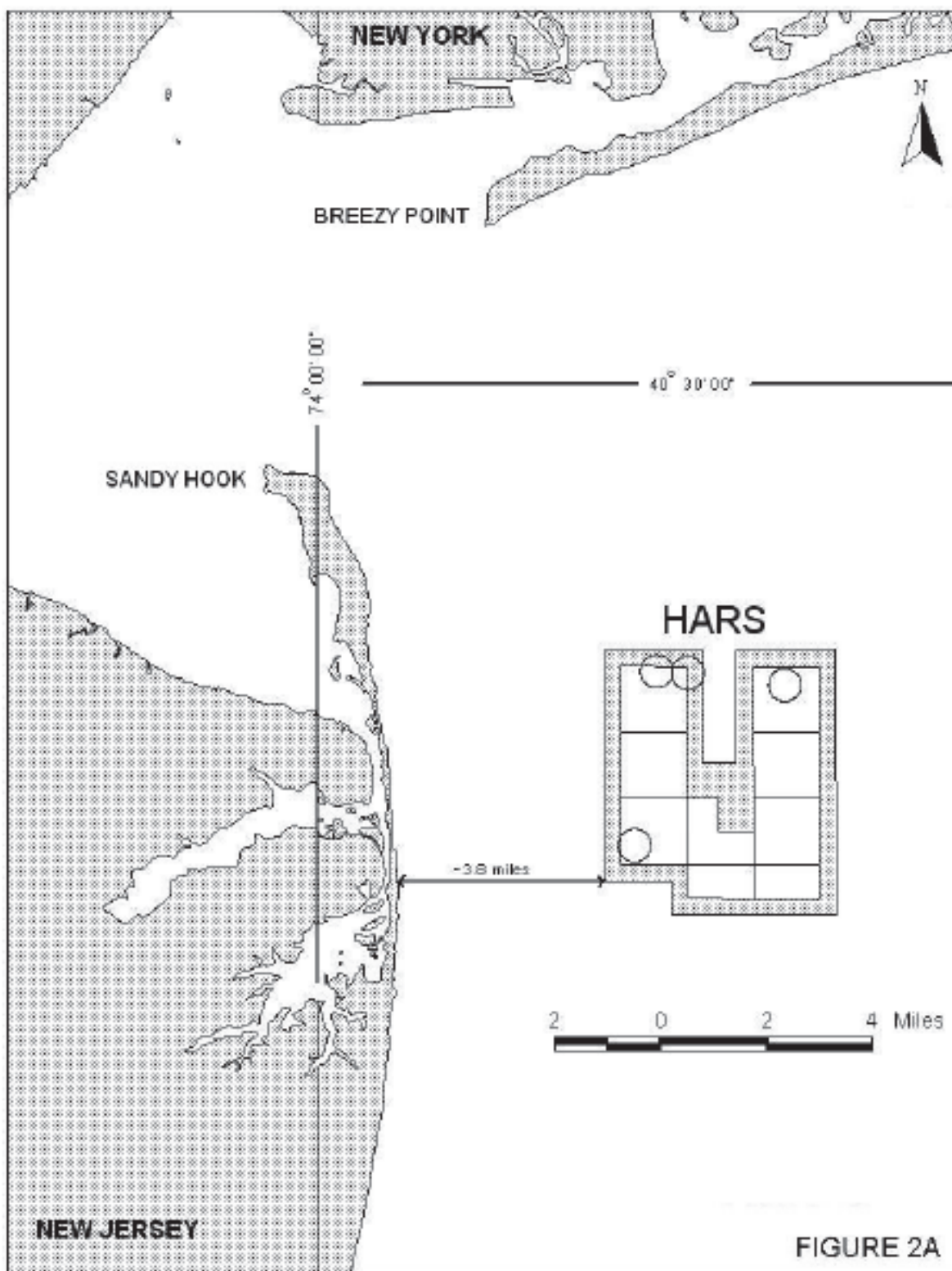


Figure 2A: HARS Location Map 1

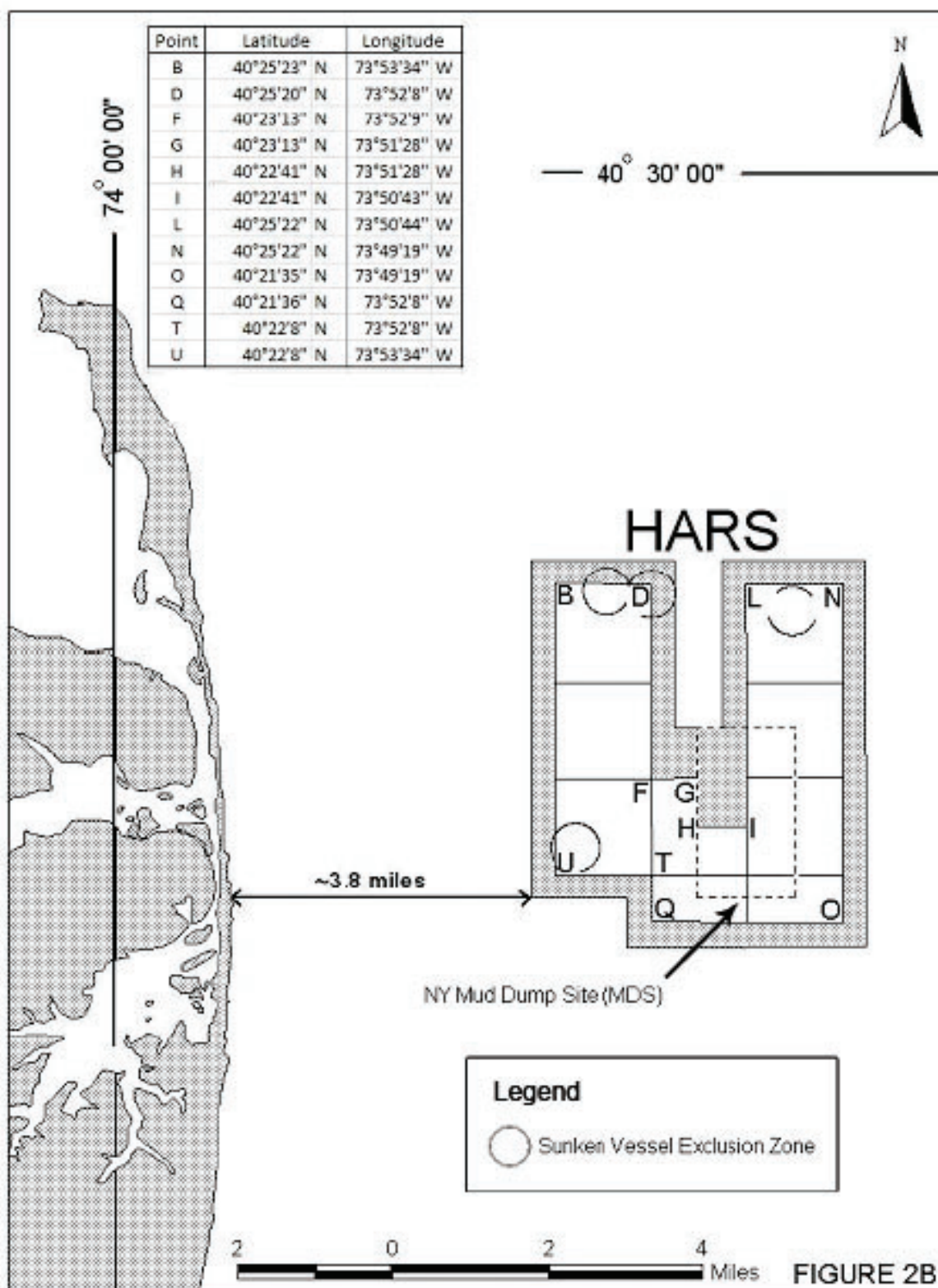


Figure 2B: HARS Location Map 2

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE
Seguine Point Bend

CONSTITUENTS	SITE WATER		ELUTRIATE	
	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		3.86
Cu		1.77		3.14
Hg	0.200	ND	0.200	ND
Ni	5.00	ND	5.00	ND
Pb	5.00	ND	5.00	ND
Zn		15.2	12.5	ND
Pesticides	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
Aldrin	0.531	ND	0.526	ND
α -Chlordane	0.442	ND	0.438	ND
trans Nonachlor	0.436	ND	0.432	ND
Dieldrin	0.544	ND	0.539	ND
4,4'-DDT	0.633	ND	0.627	ND
2,4'-DDT	0.795	ND	0.787	ND
4,4'-DDD	0.531	ND	0.526	ND
2,4'-DDD	0.582	ND	0.576	ND
4,4'-DDE	0.445	ND		0.990
2,4'-DDE	0.557	ND	0.552	ND
Total DDT		ND		2.52
Endosulfan I	0.531	ND	0.526	ND
Endosulfan II	0.525	ND	0.520	ND
Endosulfan sulfate	0.439	ND	0.435	ND
Heptachlor	0.534	ND	0.529	ND
Heptachlor epoxide	0.442	ND	0.438	ND
Industrial Chemicals	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
PCB 8	0.572	ND	0.566	ND
PCB 18	0.366	ND	0.362	ND
PCB 28	0.423	ND	0.419	ND
PCB 44	0.534	ND	0.529	ND
PCB 49	0.391	ND	0.387	ND
PCB 52	0.499	ND	0.494	ND
PCB 66	0.601	ND	0.595	ND
PCB 87	0.461	ND	0.456	ND
PCB 101	0.388	ND	0.384	ND
PCB 105	0.598	ND		0.597
PCB 118	0.576	ND		0.563
PCB 128	0.417	ND	0.413	ND
PCB 138	0.493	ND		4.32
PCB 153	0.493	ND		2.16
PCB 170	0.452	ND		0.270
PCB 180	0.458	ND		0.142
PCB 183	0.410	ND		0.539
PCB 184	0.576	ND	0.570	ND
PCB 187	0.423	ND		0.502
PCB 195	0.429	ND	0.425	ND
PCB 206	0.464	ND	0.459	ND
PCB 209	0.445	ND	0.441	ND
Total PCB		ND		24.7

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 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE Ward Point Bend				
CONSTITUENTS	SITE WATER		ELUTRIATE	
	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		3.53
Cu		2.68		4.27
Hg	0.200	ND	0.200	ND
Ni	5.00	ND	5.00	ND
Pb	5.00	ND	5.00	ND
Zn	12.5	ND	12.5	ND
Pesticides	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
Aldrin	0.531	ND	0.521	ND
a-Chlordane	0.442	ND	0.433	ND
trans Nonachlor	0.436	ND	0.428	ND
Dieldrin	0.544	ND		0.684
4,4'-DDT	0.633	ND		0.714
2,4'-DDT	0.795	ND	0.779	ND
4,4'-DDD	0.531	ND		1.74
2,4'-DDD	0.582	ND	0.571	ND
4,4'-DDE	0.445	ND		2.11
2,4'-DDE	0.557	ND	0.546	ND
Total DDT		ND		5.51
Endosulfan I	0.531	ND	0.521	ND
Endosulfan II	0.525	ND	0.515	ND
Endosulfan sulfate	0.439	ND	0.430	ND
Heptachlor	0.534	ND	0.524	ND
Heptachlor epoxide	0.442	ND	0.433	ND
Industrial Chemicals	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)	pptr (ng/L)
PCB 8	0.572	ND	0.561	ND
PCB 18	0.366	ND	0.359	ND
PCB 28	0.423	ND		5.10
PCB 44	0.534	ND		2.92
PCB 49	0.391	ND		5.89
PCB 52	0.499	ND		14.5
PCB 66	0.601	ND		1.89
PCB 87	0.461	ND		2.47
PCB 101	0.388	ND		3.18
PCB 105	0.598	ND		0.791
PCB 118	0.576	ND		1.13
PCB 128	0.417	ND	0.409	ND
PCB 138	0.493	ND		5.63
PCB 153	0.493	ND		1.92
PCB 170	0.452	ND		1.51
PCB 180	0.458	ND		0.400
PCB 183	0.410	ND		2.79
PCB 184	0.576	ND	0.565	ND
PCB 187	0.423	ND		0.596
PCB 195	0.429	ND		0.369
PCB 206	0.464	ND		0.244
PCB 209	0.445	ND		0.713
Total PCB		ND		106

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
Seguine Point Bend

Suspended Particulate Phase

Test Species	Test Duration	LC ₅₀ /EC ₅₀	LPC (a)
<i>Menidia beryllina</i>	96 hours	(b) 48.6%	0.486
<i>Americamysis bahia</i>	96 hours	(b) 76.2%	0.762
<i>Mytilus galloprovincialis</i> (larval survival)	48 hours	(b) >100%	>1.00
<i>Mytilus galloprovincialis</i> (larval normal develop.)	48 hours	(c) 22.4%	0.224

(a) Limiting Permissible Concentration (LPC) is the LC₅₀ or EC₅₀ multiplied by 0.01(b) Median Lethal Concentration (LC₅₀) resulting in 50% mortality at test termination(c) Median Effective Concentration (EC₅₀) 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? (α=0.05)
<i>Ampelisca abdita</i>	99%	98%	1%	No
<i>Americamysis bahia</i>	100%	99%	1%	No

TABLE 2

TOXICITY TEST RESULTS
Ward Point Bend

Suspended Particulate Phase

Test Species	Test Duration	LC ₅₀ /EC ₅₀	LPC (a)
<i>Menidia beryllina</i>	96 hours	(b) 43.2%	0.432
<i>Americamysis bahia</i>	96 hours	(b) 71.0%	0.710
<i>Mytilus galloprovincialis</i> (larval survival)	48 hours	(b) 71.6%	0.716
<i>Mytilus galloprovincialis</i> (larval normal develop.)	48 hours	(c) 22.4%	0.224

(a) Limiting Permissible Concentration (LPC) is the LC₅₀ or EC₅₀ multiplied by 0.01(b) Median Lethal Concentration (LC₅₀) resulting in 50% mortality at test termination(c) Median Effective Concentration (EC₅₀) 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? (α=0.05)
<i>Ampelisca abdita</i>	99%	91%	8%	No
<i>Americamysis bahia</i>	100%	100%	0%	No

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations
Sequine Point Bend

CONSTITUENTS	<i>Macoma nasuta</i>				<i>Alitta (nereis) virens</i>			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Metals								
Ag		0.030	*	0.055		0.014		0.018
As		4.94		5.05		2.82		2.45
Cd	0.118	ND	0.118	ND	0.121	ND	0.146	ND
Cr		0.148	*	0.566		0.181	0.146	ND
Cu		1.55	*	1.98		1.56		1.40
Hg		0.020	*	0.022		0.020		0.019
Ni	0.236	ND	*	0.664	0.241	ND	0.245	ND
Pb	0.118	ND	*	0.887	0.121	ND	0.122	ND
Zn		20.2		19.9		8.63		9.50
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		0.057		0.107	0.013	ND	0.014	ND
a-Chlordane		0.038	*	0.227		0.033	*	0.088
trans Nonachlor	0.020	ND	0.017	ND		0.100		0.122
Dieldrin		0.024	*	0.140		0.051	*	0.119
4,4'-DDT	0.018	ND	0.015	ND		0.013	0.012	ND
2,4'-DDT	0.024	ND	0.021	ND		0.018	0.017	ND
4,4'-DDD		0.324		0.487		0.061	*	0.153
2,4'-DDD	0.024	ND		0.101		0.061	*	0.138
4,4'-DDE		0.349	*	1.98		0.039	*	0.148
2,4'-DDE	0.014	ND	0.012	ND	0.009	ND		0.009
Total DDT		0.753	*	2.62		0.201	*	0.477
Endosulfan I	0.022	ND	0.019	ND	0.015	ND		0.013
Endosulfan II	0.024	ND	0.021	ND		0.022	0.017	ND
Endosulfan sulfate		0.051		0.078		0.032	*	0.088
Heptachlor		0.102	0.013	ND	0.011	ND	0.011	ND
Heptachlor epoxide		0.040	0.021	ND	0.016	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		0.257		0.266	0.029	ND	*	0.040
PCB 18	0.020	ND	*	0.182	0.013	ND	*	0.216
PCB 28		0.103	*	1.35		0.091	*	0.323
PCB 44		0.079	*	0.439		0.096	*	0.222
PCB 49		0.088	*	0.82		0.062	*	0.391
PCB 52		0.372	*	1.25		0.115	*	0.684
PCB 66		0.203	*	1.36		0.158	*	0.283
PCB 87	0.020	ND	*	0.124		0.020	*	0.036
PCB 101		0.065	*	1.04		0.234	*	0.633
PCB 105	0.018	ND	*	0.273		0.044	*	0.083
PCB 118	0.020	ND	*	0.714		0.101	*	0.243
PCB 128	0.022	ND	*	0.131		0.080	*	0.115
PCB 138		0.152	*	0.720		0.537	*	0.735
PCB 153		0.034	*	0.596		0.944	*	1.258
PCB 170	0.020	ND	*	0.117		0.147		0.173
PCB 180		0.063	*	0.243		0.322		0.367
PCB 183		0.035	*	0.115		0.150	*	0.175
PCB 184		0.039	*	0.483	0.024	ND	0.025	ND
PCB 187		0.064	*	0.321		0.369	*	0.477
PCB 195	0.014	ND	0.012	ND		0.089	*	0.122
PCB 206	0.014	ND	0.012	ND		0.146	*	0.175
PCB 209	0.024	ND	0.021	ND		0.159	*	0.179
Total PCB		3.45	*	21.2		7.86	*	13.9
1,4-Dichlorobenzene		0.091	*	0.226		0.152		0.148

TABLE 3. (Continued)								
CONSTITUENTS	<i>Macoma nasuta</i>				<i>Alitta (nereis) virens</i>			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION	DETECTION LIMITS	CONCEN TRATION
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		0.424	*	1.11		0.343	*	0.410
Acenaphthylene		0.063	*	0.658		0.108	*	0.249
Acenaphthene		0.123	*	0.439		0.109	*	0.399
Fluorene		0.139	*	0.597		0.094	*	0.213
Phenanthrene		0.89	*	4.34		0.329	*	0.639
Anthracene	0.058	ND	*	1.57	0.057	ND	*	0.162
Fluoranthene		1.57	*	18.5		0.321	*	5.37
Pyrene		1.62	*	24.7		0.255	*	8.62
Benzo(a)anthracene		0.393	*	8.68		0.146	*	0.423
Chrysene		0.798	*	11.8		0.217	*	2.79
Benzo(b)fluoranthene		0.547	*	8.52		0.153	*	0.660
Benzo(k)fluoranthene		0.764	*	13.0		0.238	*	0.915
Benzo(a)pyrene		0.514	*	8.80		0.182	*	0.628
Indeno(1,2,3-cd)pyrene		0.150	*	4.67		0.228	*	0.136
Dibenzo(a,h)anthracene		0.046	*	0.979		0.195	0.046	ND
Benzo(g,h,i)perylene		0.340	*	6.36		0.343		0.296
Total PAH's		8.43	*	115		3.32	*	22.0
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	0.172	ND		0.198	0.110	ND	*	0.214
12378 PeCDD	0.120	ND	0.125	ND	0.094	ND	*	0.210
123478 HxCDD	0.148	ND	0.161	ND	0.106	ND	0.132	ND
123678 HxCDD	0.142	ND	*	0.313	0.107	ND	*	0.233
123789 HxCDD	0.158	ND	0.172	ND	0.104	ND	0.130	ND
1234678 HpCDD		0.404	*	3.59		0.643		0.912
1234789 OCDD		1.51	*	45.7		4.47	*	6.79
2378 TCDF	0.195	ND	*	0.734		0.752	*	1.85
12378 PeCDF	0.098	ND	0.165	ND	0.082	ND	*	0.360
23478 PeCDF	0.093	ND		0.248		0.216	*	0.482
123478 HxCDF	0.080	ND		0.226	0.072	ND		0.128
123678 HxCDF	0.082	ND	0.106	*	0.070	ND	0.081	*
234678 HxCDF	0.087	ND	0.117	*	0.076	ND	0.087	*
123789 HxCDF	0.123	ND	0.154	ND	0.093	ND	0.106	*
1234678 HpCDF		0.135	*	1.15		0.402		0.530
1234789 HpCDF	0.108	ND	0.122	ND	0.093	ND	0.107	ND
12346789 OCDF	0.334	ND	*	1.52		0.431		0.399

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
Ward Point Bend

CONSTITUENTS	<i>Macoma nasuta</i>				<i>Alitta (nereis) virens</i>			
	REFERENCE		TEST		REFERENCE		TEST	
	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION	DETECTION LIMITS	CONCENTRATION
	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)	ppm (mg/kg)
Metals								
Ag		0.030	*	0.046		0.014	*	0.020
As		4.94		5.26		2.82		2.60
Cd	0.118	ND	0.120	ND	0.121	ND	0.121	ND
Cr		0.148	*	0.518		0.181		ND
Cu		1.55	*	2.28		1.56		1.28
Hg		0.020	*	0.024		0.020		0.011
Ni	0.236	ND	*	0.583	0.241	ND	0.242	ND
Pb	0.118	ND	*	0.843	0.121	ND		0.185
Zn		20.2		21.6		8.63	*	9.68
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		0.057	*	0.856	0.013	ND		ND
α-Chlordane		0.038		0.040		0.033	*	0.171
trans Nonachlor	0.020	ND	0.018	ND		0.100		0.199
Dieldrin		0.024	*	0.158		0.051	*	0.237
4,4'-DDT	0.018	ND		0.046		0.013	0.012	ND
2,4'-DDT	0.024	ND	0.022	ND		0.018	0.016	ND
4,4'-DDD		0.324	*	1.18		0.061	*	0.95
2,4'-DDD	0.024	ND	*	0.358		0.061	*	0.347
4,4'-DDE		0.349	*	3.98		0.039	*	0.930
2,4'-DDE	0.014	ND	*	0.312	0.009	ND	*	0.052
Total DDT		0.753	*	5.90		0.201	*	2.30
Endosulfan I	0.022	ND	*	0.264	0.015	ND	*	0.062
Endosulfan II	0.024	ND	0.022	ND		0.022	0.016	ND
Endosulfan sulfate		0.051		0.063		0.032	*	0.168
Heptachlor		0.102	0.014	ND	0.011	ND	0.011	ND
Heptachlor epoxide		0.040	0.022	ND	0.016	ND	0.016	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		0.257		2.03	0.029	ND	*	0.704
PCB 18	0.020	ND	*	0.534	0.013	ND	*	1.09
PCB 28		0.103	*	3.08		0.091	*	1.46
PCB 44		0.079	*	0.652		0.086	*	1.01
PCB 49		0.088	*	1.79		0.062	*	1.49
PCB 52		0.372	*	2.27		0.115	*	2.17
PCB 66		0.203	*	2.78		0.158	*	1.14
PCB 87	0.020	ND	*	0.290		0.020	*	0.215
PCB 101		0.065	*	1.96		0.234	*	1.58
PCB 105	0.018	ND	*	0.564		0.044	*	0.205
PCB 118	0.020	ND	*	1.24		0.101	*	0.708
PCB 128	0.022	ND	*	0.210		0.080	*	0.202
PCB 138		0.152	*	1.09		0.537	*	1.32
PCB 153		0.034	*	0.873		0.944	*	1.96
PCB 170	0.020	ND	*	0.240		0.147	*	0.297
PCB 180		0.063	*	0.309		0.322	*	0.649
PCB 183		0.035	*	0.153		0.150	*	0.242
PCB 184		0.039	*	0.809	0.024	ND	0.024	ND
PCB 187		0.064	*	0.399		0.369	*	0.666
PCB 195	0.014	ND	0.012	ND		0.089	*	0.166
PCB 206	0.014	ND		0.022		0.146	*	0.219
PCB 209	0.024	ND	0.022	ND		0.159	*	0.193
Total PCB		3.45	*	42.7		7.86	*	35.4
1,4-Dichlorobenzene		0.091	*	0.324		0.152		0.168

TABLE 3. (Continued)

CONSTITUENTS	<i>Macoma nasuta</i>				<i>Alitta (nereis) virens</i>			
	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		0.424	*	1.13		0.343		0.300
Acenaphthylene		0.063	*	0.769		0.108		0.136
Acenaphthene		0.123	*	0.430		0.109	*	0.182
Fluorene		0.139	*	0.640		0.094		0.067
Phenanthrene		0.886	*	4.38		0.329		0.229
Anthracene	0.058	ND	*	1.49	0.057	ND	0.057	ND
Fluoranthene		1.57	*	14.1		0.321	*	1.07
Pyrene		1.62	*	17.7		0.255	*	1.47
Benzo(a)anthracene		0.393	*	6.98		0.146	*	0.179
Chrysene		0.798	*	8.64		0.217	*	0.720
Benzo(b)fluoranthene		0.547	*	5.92		0.153		0.196
Benzo(k)fluoranthene		0.764	*	11.6		0.238		0.308
Benzo(a)pyrene		0.514	*	8.06		0.182		0.259
Indeno(1,2,3-cd)pyrene		0.150	*	4.76		0.228	0.051	ND
Dibenzo(a,h)anthracene		0.046	*	0.885		0.195	0.046	ND
Benzo(g,h,i)perylene		0.340	*	5.73		0.343		0.094
Total PAH's		8.43	*	93.2		3.32	*	5.36
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	0.172	ND		0.189	0.110	ND	0.118	ND
12378 PeCDD	0.120	ND		0.199	0.094	ND	0.114	ND
123478 HxCDD	0.148	ND	0.164	ND	0.106	ND	0.108	ND
123678 HxCDD	0.142	ND	0.186	ND	0.107	ND	0.111	ND
123789 HxCDD	0.158	ND	0.195	ND	0.104	ND	0.105	ND
1234678 HpCDD		0.404	*	2.83		0.643		0.768
1234789 OCDD		1.51	*	33.3		4.47		5.43
2378 TCDF	0.195	ND	*	0.619		0.752		0.809
12378 PeCDF	0.098	ND		0.253	0.082	ND	0.111	ND
23478 PeCDF	0.093	ND	0.159	*	ND	0.216		0.136
123478 HxCDF	0.080	ND		0.227	0.072	ND	0.084	ND
123678 HxCDF	0.082	ND		0.173	0.070	ND	0.083	ND
234678 HxCDF	0.087	ND		0.155	0.076	ND	0.089	ND
123789 HxCDF	0.123	ND	0.144	*	0.093	ND	0.107	ND
1234678 HpCDF		0.135	*	0.884		0.402		0.323
1234789 HpCDF	0.108	ND	0.140	*	0.093	ND	0.103	ND
12346789 OCDF	0.334	ND	*	1.53		0.431		0.264

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)