

FINDING OF NO SIGNIFICANT IMPACT

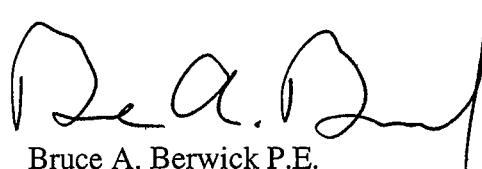
CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF THE CHESAPEAKE BAY OYSTER RECOVERY PROJECT PROJECT, MARYLAND

The Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources, is constructing approximately 18 acres of seed bars in Eastern Bay in Queen Anne's County. This supplemental environmental assessment (EA) identifies and assesses the potential environmental impacts associated with the construction of these seed bars in Eastern Bay as part of the Chesapeake Bay Oyster Recovery Project in Maryland which was begun in 1997. Project activities were planned in Oyster Recovery Areas (ORAs) established by the Maryland Oyster Roundtable Action Plan in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay.

The Chesapeake Bay Oyster Recovery Project in Maryland is authorized under Section 704(b) of the Water Resources Development Act of 1986, which provides authority for the Corps to conduct projects for fish and wildlife, including but not limited to man-made reefs for fish. The purpose of the project is to restore oyster habitat and to increase oyster populations in the Maryland portion of the Chesapeake Bay. Oyster populations have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and a loss of habitat. Oysters, which are filter feeders, improve water quality in the Chesapeake Bay, and oyster bars provide valuable habitat for fish, blue crabs, and other species.

An Environmental Assessment (EA) has been prepared which evaluates the potential environmental impacts associated with the proposed project. The EA was prepared in accordance with the provisions of the National Environmental Policy Act of 1969, as amended. Potential impacts were assessed with regard to the physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem, endangered and threatened species, hazardous and toxic materials, aesthetics and recreation, cultural resources, and the general needs and welfare of the public. In accordance with Section 404 of the Clean Water Act, a Section 404(b)(1) analysis was conducted for the proposed actions. The analysis determined that the project would result in beneficial impacts to the aquatic environment.

Upon reviewing the supplemental EA, I find that potential negative environmental impacts to benthic and open water habitat associated with implementation of the project will occur over a relatively small area and will be primarily short-term in nature. The project will produce a net beneficial impact to the environment through the creation of habitat for oysters and other species associated with oyster communities. Based upon this finding, preparation of an Environmental Impact Statement is not required.



Bruce A. Berwick P.E.
Colonel, Corps of Engineers
District Engineer



**US Army Corps
of Engineers**
Baltimore District

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

**FOR THE CONSTRUCTION OF SEED BARS IN EASTERN BAY AS
PART OF THE CHESAPEAKE BAY OYSTER RECOVERY
PROJECT, MARYLAND**

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July 1999

**SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT FOR
CONSTRUCTION OF SEED BARS IN EASTERN BAY AS PART OF
CHESAPEAKE BAY OYSTER RECOVERY PROJECT, MD
JULY 1999**

This supplemental environmental assessment (EA) identifies and assesses the potential environmental impacts associated with the construction of seed bars in Eastern Bay as part of the Chesapeake Bay Oyster Recovery Project in Maryland. (Figure 1) This additional construction would be performed by the Baltimore District, U.S. Army Corps of Engineers, in cooperation with the Maryland Department of Natural Resources (MDDNR). The Chesapeake Bay Oyster Recovery Project in Maryland is authorized under Section 704(b) of the Water Resources Development Act of 1986, which provides authority for the Corps to conduct projects of alternative or beneficially modified habitats for fish and wildlife, including but not limited to man-made reefs for fish.

This EA was prepared in accordance with the provisions of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations 40 CFR 1500-1508, U.S. Army Corps of Engineers Regulation 200-2-2, "Procedures for Implementing NEPA," and 33 CFR 230. It incorporates by reference the final environmental assessment and finding of no significant impact dated January 29, 1996, respectively, that was prepared by the Baltimore District, for the Chesapeake Bay Oyster Recovery Project in Maryland.

The project activities addressed in the January 1996 EA and proposed over a five-year period included the following: creation of new oyster bars and rehabilitation of existing non-productive bars; construction of seed bars for production and collection of seed oysters or "spat"; planting of hatchery produced and seed bar spat on new and rehabilitated bars; and monitoring of implemented projects. Areas considered were six oyster recovery areas (ORA's) designated by the State of Maryland in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers, and potentially in other Maryland waters of the Chesapeake Bay. The Eastern Bay area was not considered in detail as were the designated ORA's and the seed bars located near James Island in the Little Choptank River and Kedges Strait north of Smith Island. Project activities will be consistent with strategies identified on the Maryland Oyster Roundtable Action Plan for zones within the ORA's.

1.0 PURPOSE AND NEED OF THE PROPOSED ACTION

1.1 Purpose. The purpose of this proposed action in Eastern Bay is to plant shell to produce seed oysters for use by the MDDNR and the Corps of Engineers in oyster restoration. The purposes of the Chesapeake Bay Oyster Recovery Project in Maryland are to restore oyster habitat and to increase populations of the eastern or American oyster (*Crassostrea virginica*) in the Maryland portion of the

Chesapeake Bay. In addition to having economic value as a commercial fishery, oysters provide significant environmental benefits. Oysters, which are filter feeders, improve water quality in the Bay by removing plankton and nutrients from the water column. Oyster bars or reefs provide valuable habitat for many organisms, including crabs, clams, barnacles, mussels, and other invertebrates which are important food items for higher order prey. Oyster bars are frequented by blue crabs, striped bass (rockfish), white perch, weakfish, flounder, and many other species.

Oyster restoration is a significant component of current efforts to restore the Chesapeake Bay ecosystem. The proposed project supports objectives of the Chesapeake Bay Program and the Maryland Oyster Roundtable. The project is also consistent with the *Agreement of Federal Agencies on Ecosystem Management in the Chesapeake Bay* of 1994.

1.2 Need. Oyster populations in Maryland and Virginia have declined dramatically since the turn of the century, largely due to parasitic diseases, overharvesting, and the loss of habitat. Oyster harvests in Maryland have declined from 3.2 million bushels in 1973 to 79,617 bushels in 1994. The 1994 harvest represents a 35-percent decline from the 1993 harvest and a 95-percent decline from the 1986 harvest (MDDNR 1995). Increased mortalities of oysters in the Bay have followed the increased prevalence of two parasites: Dermo (*Perkinsus marinus*) and MSX (*Haplosporidium nelsoni*). These parasites are single-celled organisms that infect oysters and cause significant mortalities within the first two years of life.

Harvesting has contributed to the reduction of oyster habitat by the removal of shell, thereby flattening and fragmenting oyster bars. It is estimated that the current available oyster habitat is 50 percent or less of what it was a century ago (Rothschild 1994). Flattening of bars places oysters lower in the water column with a reduction in water current, food availability, and oxygen. Increased sediment loads in the Chesapeake Bay from agricultural and urban runoff and construction activities impact water quality and have adversely affected oyster habitat. Free-swimming oyster larvae attach to oyster shells or other hard substrate in a process known as "setting." Siltation of oyster bars reduces the amount of suitable habitat for larval setting and impairs the health of adult oysters.

In 1993, the State of Maryland convened the Oyster Roundtable to address the restoration of oyster populations in the Maryland portion of the Chesapeake Bay. The 40 members of the Roundtable included Federal and state agencies, research institutions, representatives of the environmental community, regulatory agencies, industry, aquaculture and public interests. The Roundtable developed the Maryland Oyster Roundtable Action Plan as a framework for oyster restoration efforts

2.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the planting of approximately 18 acres of seed bars in the Eastern Bay near the Eastern Shore of Maryland in Queen Anne's County. This 18-acre area of the proposed action is shown on Figure 2.

The construction activities that are proposed may occur in either or both areas of A or B. A is the

natural oyster bar, NOB 7-7, and B is another natural oyster bar, NOB 7-10. Activities include the placement of approximately 225,000 bushels of oyster shell to serve as a hard substrate for settlement of oyster larvae from nearby oyster bars. Shell would be evenly placed at the site with each acre receiving approximately 12,500 bushels of shell. Monitoring would be performed to assess performance. Aquatic activities are currently planned to occur within the limits of legal bars, also known as natural oyster bars. These sites are from 14 feet to 19 feet deep. The shallow water portion of the sites was probably planted with shells in the 1970's by MDDNR. No known plantings have been conducted by MDDNR since that time.

Due to changing environmental conditions and prevalence of disease and in order to utilize new knowledge and technology, the Chesapeake Bay Oyster Recovery Project, MD, implemented by the Baltimore District and MDDNR, has been designed to be flexible in its actions and locations. In 1997, portions of Eastern Bay received exceptionally natural dense spat sets. At the same time, seed areas in the Kedges Straits region produced relatively low densities of seed oysters, though historically the area has been more productive. Oyster management for the past several years has directed special attention to areas of the Bay where oyster populations show signs of natural recovery, i.e. increased recruitment and survival. With very large populations of young oysters, Eastern Bay appears to be recovering from the high mortality and poor recruitment observed in the 1980's and early 1990's. The region now has the potential to produce large quantities of seed oysters as it historically did. Although there are no reliable methods for predicting oyster spat set, Eastern Bay is a strategic choice for creation of a new seed area.

2.1 Aquatic Activities. The planting of approximately 18 acres of shell in Eastern Bay is currently planned to occur within the limits of legal bars, also known as natural oyster bars, as shown in Figure 1. Specific locations for bar creation will be determined based on surveys of bottom composition and benthic communities, salinity, water depth, water currents, dissolved oxygen levels, and disease prevalence.

Aquatic activities will involve the placement of oyster shell obtained by dredging fossil oyster shell or other means. Oyster shell will be transported to project sites by barge and placed overboard by front-end loaders and/or high-pressure water "cannons."

Seed from the proposed activities in the Eastern Bay would be planted within the oyster recovery areas. In April, after the previous June and July planting, large workboats harvest the seed-bearing shell from the bottom, load the seed oysters on deck, and transport them to restoration sites in the ORA's to enhance oyster production at those sites.

2.1.1 Seed Bars. The area will have a solid bottom so the shell will not subside into the sediment and will be in an area historically noted for high oyster spat production. The bar will encompass 18 acres and may be expanded in subsequent years. Seed bars will be constructed between June and July, prior to the mid-summer oyster spawn. Shell will be placed at a quantity of 12,500 bushels per acre. Surveys during the fall will assess the level of spat set and the density of seed on the bar.

The seed bar is normally harvested in the spring, at which time the seed oysters are transported to

other oyster growing areas. Spat is usually moved in the spring when the oysters have grown to a larger size and loss due to transportation is lower.

Seed bars will be harvested by dredging the entire site and evaluating the amount of spat on the shell. The normal amount of yield using this method is 25 percent of the shell planted (i.e. 100,000 bushels of cultch produces 25,000 bushels of spat). The spat harvested will be used to "seed" (plant) new or rehabilitated oyster bars created under this project. Spat harvested from seed bars will be planted in Zone C unless it can be "certified" as disease-free. If it can be certified, the spat can be planted in Zones A or B. Seed bars will be monitored in part for disease, growth, and abundance. Siting of subsequent seed bars will be based on the harvest success of the initial bar.

2.2 Monitoring. The project relies on observations of created or rehabilitated bars to allow management decisions for subsequent activities. Seed bars will be monitored for spat attachment, size, growth, mortality, density, and disease acquisition.

3.0 ALTERNATIVES CONSIDERED

3.1 The "No-Action" Alternative. CEQ regulations on implementing NEPA require a no-action alternative as a benchmark against which proposed actions are evaluated. The no-action alternative would consist of not implementing the proposed project. This alternative does not support the project goals of restoring oyster habitat and increasing oyster populations in the Maryland portion of the Chesapeake Bay. If no action is taken, oyster habitat would not be created through the construction of new seed bars and this potential increase in the production of oyster seed for use in oyster restoration activities would not occur. Environmental benefits associated with increased oyster populations would not be realized. In addition, the no-action alternative does not support the goals and objectives of the Maryland Oyster Roundtable and the Chesapeake Bay Program.

3.2 Alternative Project Activities

Alternative 2. Seed Bar Construction in Other Areas - As part of the 1996 EA, seed bar areas in Kedges Strait and James Island were considered. These areas are still being considered and are practicable. However, because the spat set in 1997 in the Kedges Straits area was lower than expected, this alternative is not considered to be as practicable as seed bar construction in Eastern Bay. The proposed seed bar areas in Eastern Bay are currently used by MDDNR, and are known to be areas of high spat set and oyster productivity.

Alternative 3. Alternative Materials for Bar Construction - Due to the limited availability of oyster shell for oyster restoration efforts, alternative materials have been used to provide substrate for the placement of shell or oyster seed. Clean dredged material from Baltimore District maintenance dredging could be placed in geotextile tubes and covered with a layer of oyster shell for bar creation. Dredging projects typically occur within a short timeframe, and funding availability is often uncertain. Hence, this alternative is not considered practicable.

Alternative 4 Planting of Hatchery-Produced Seed - Oyster seed produced at the Piney Point and Horn Point hatcheries will be planted on new and rehabilitated bars as part of the Corps/ DNR project. It has been speculated that the prevalence of disease can be reduced through the planting of disease-free oysters in currently infected areas. Hatchery seed that has been certified as disease-free can be planted in Zones A and B of ORA's. However, at this time there is a limited availability of hatchery seed and its use is more expensive than the proposed action in Eastern Bay. Hence, this alternative is not considered practicable.

4.0 AFFECTED ENVIRONMENT

4.1 Project Area Description. The project area is east of Kent Island on Maryland's Eastern Shore as shown on Figure 1. The nearest point of land to the seed bar area is Parson Island which is approximately one mile away.

4.1.1 Land Use. Land use in the Eastern Bay area is primarily agricultural and residential.

4.1.2 Geology. The Chesapeake Bay lies within the Atlantic Coastal Plain Physiographic Province. Young, poorly consolidated sediments, covered in areas by unconsolidated terrace and alluvial deposits underlie the Coastal Plain.

4.1.3 Soils. The aquatic substrate is firm sand, firm silt and shells.

4.1.4 Topography and Drainage. Coastal Plain topography is characterized by rolling hills and broad open valleys with streams that have flat slopes and shallow channels.

4.1.5 Climate. The climate of the Chesapeake Bay area is temperate and humid. Temperatures vary moderately in four well-defined seasons. Winters are mild with the coldest months being January and February with temperatures averaging about 30 degrees Fahrenheit (F). The warmest month is July with temperatures averaging in the upper 80's.

4.2 Air Quality. The project area is located within the Northeast Ozone Transport Region attainment area as defined by guidance published pursuant to the Clean Air Act Amendments. The Baltimore region, including Baltimore City, Baltimore County, Harford County, Anne Arundel County, Carroll County and Howard County, is classified as a serious non-attainment area for ozone. The Washington metropolitan area, including Washington, D.C., Montgomery County, Prince George's County, and Charles County, is classified as a severe non-attainment area for ozone. Queen Anne's County and Kent County, located on the Eastern Shore of Maryland, are classified as marginally non-attainment for ozone.

4.3 Water Quality. Salinity varies from 8 to 16 parts per thousand (ppt) in Eastern Bay depending on rainfall. Climate and subsequent changes in salinity affect the distribution and intensity of MSX and Dermo. Due to the inflow of freshwater to the Bay and decreased salinity, disease is generally less virulent in years of high rainfall. The prevalence of disease ranges from low prevalences of

approximately 10 percent to up to 80 percent or higher in some years depending on salinity and the dynamics of disease at the time.

4.4 Aquatic Resources

Eastern Oyster - The eastern oyster lives subtidally in the Chesapeake Bay, at water depths ranging from 6 to 30 feet from mean low water (MLW). In Maryland, oysters spawn from June through September depending upon water temperature (Figure 3). Larvae are free-swimming and experience heavy mortality due to predation, low salinity, and low levels of dissolved oxygen. Larvae prefer a hard substrate for attachment, and the newly attached oysters are called spat. Spatfall varies widely in the Bay, with the highest rates occurring in more saline areas. Spat mortality is also high. Oysters tolerate a wide range of salinity from 5 to 30 ppt. However, salinity must remain at or above 9 ppt for successful reproduction. In Maryland, oysters reach the legal harvest size of three inches in approximately three years.

Eastern Bay was once very productive and has declined due to disease mortality. In the 1970's the area produced an average of 400,000 bushels of oysters annually. Through most of the 1990's the harvest has been under 5,000 bushels annually.

The 1997 spatset in Eastern Bay was spectacular, yielding 1,000 to 5,000 spat per bushel, both on shells placed by MDDNR, and on some natural bars. This level of spat set has not been observed for many decades. These new oysters are providing abundant brood oysters starting in 1999. As they grow, harvest should increase.

Other Aquatic Resources - Commercially important species within the project area include the soft-shell clam (*Mya arenaria*) and the blue crab (*Callinectes sapidus*). The soft-shell clam is a bivalve mollusc found over a wide range of bottom types, but prefers substrates with mixes of fine sand and silt. Clams are harvested in subtidal areas ranging in depth from 6 to 20 feet (MLW). Clam dredging is restricted within 150 feet of legal oyster bars. There are no restrictions for crabbing or trotline placement regarding legal bars.

The area likely provides habitat for a variety of finfish, including freshwater resident, anadromous/catadromous, and ocean-spawning and/or estuarine species including spot (*Leiostomus xanthurus*), striped killifish (*Fundulus majalis*), Atlantic silverside (*Menidia menidia*), striped bass (*Morone saxatilis*), white perch (*Morone americana*), sea trout (*Cynoscion nebulosus*) and Atlantic croaker (*Micropogonias undulatus*) and bluefish (*Pomatomus saltarix*). Spawning of anadromous fish has been documented in the mainstem and tributaries of the ORA rivers, including striped bass (*Morone saxatilis*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), hickory shad (*Alosa mediocris*), alewife (*Alosa pseudoharengus*), and blueback herring (*Alosa aestivalis*). Spawning activity has been observed in Zone A of ORA's and upstream into nontidal reaches. Spawning anadromous species utilize ORA's for nursery areas and juvenile foraging ground.

4.4.1 Essential Fish Habitat. The Magnuson- Stevenson Fishery Conservation and Management

Act recently required that essential fish habitat areas be identified for each fishery management plan and that all Federal agencies consult with NMFS on all Federal actions that may adversely affect EFH. The EFH areas have been designated by the Fishery Management Councils and were published in March 1999 by NOAA/NMFS as the "Guide to Essential Fish Habitat in the Northeastern United States, Volume V: Maryland and Virginia."

A Federal agency must identify the species of concern and prepare an analysis of the effects of the proposed action. The agency must also give its views regarding the effects of the proposed action and propose mitigation if applicable. The NMFS has suggested that the EFH analysis and determination be incorporated as part of the NEPA process rather than in a separate document such as a biological assessment, as is prepared for endangered species.

The Baltimore District, after reviewing fisheries information, has determined that the proposed action is not likely to significantly affect EFH or species covered under the Magnuson-Stevenson Act and is more likely to benefit these protected species than to have an adverse effect on them.

In the mid and northern portions of the Bay, NMFS is concerned about the populations of winter flounder (*Pseudopleuronectes americanus*) and summer flounder (*Paralichthys dentatus*). In "The Chesapeake Bay in Maryland, An Atlas of Natural Resources" by Lipson, one of the spawning areas for winter flounder is the eastern side of Eastern Bay, near but not in the area proposed for the creation of seed bars. Spawning occurs in the winter (mid-February to mid-March) when no shell placement for this project would occur. The eggs sink to the bottom, cling together, and do not relocate outside the spawning grounds. The planting area and the spawning area do not overlap. Shell placement would occur in July well after the February and March spawning time. Winter flounder larvae which occurs only in the winter would not be in the project area during the time of shell placement.

Juvenile winter flounder are known to use the upper and mid-Bay. Juveniles remain in the Bay and the lower reach of tributaries in inshore waters in usually shallower and less exposed than the 14- to 19-foot depths at the project area.

Older fish and adults are mostly present in the mid and upper bay from November until May, being almost absent from June until October. They prefer deeper channel waters in the summer but move into shallow water in winter to spawn. Winter flounder are mobile and have the ability to leave the project area as shell is being placed should they be in the area. No mitigation is proposed because negative impacts are not clearly demonstrated, and benefits accrue to winter flounder and their habitat by the creation of seedbars.

Winter flounder are predominantly found between Kent Island and Hoopers Island, though they exist throughout Maryland. Shell plantings improve the winter flounder habitat and food supply

Summer Flounder is the only other large flatfish common to Maryland waters. Unlike the winter flounder its migration pattern is similar to many other migrating fish species which enter the bay in the spring and summer and leave with the onset of winter. It differs from the winter flounder in that its eyes and color on the left hand side of its body.

It is believed that the summer flounder is a winter spawner and probably seeks deep water. Since the summer flounder is not usually found in the project area during the winter there is no reason to believe that this area is used for spawning.

The summer flounder is a valuable food fish in the bay and is caught from March until November.

Summer flounder feed mainly on fish, squids, shrimp, crabs and Mysis. The summer flounder prefers sandy substrate and is frequently seen near sandy shores, partly buried in the sand. Color adaptation is developed to a very high degree.

The proposed seed bar creation in Eastern Bay is not expected to have an affect on the summer flounder. Unlike the winter flounder the summer flounder is not known to utilize oyster bars. It is likely that the creation of oyster bars would serve as an attractant and provide habitat for the small creatures that the summer flounder preys upon. Thus, the summer flounder would likely take advantage of soft bottom, if any is available near the seed bars, for concealment as it would stalk prey at the edges of the shell planting. Oyster bar areas are typically created in areas of hard bottom that have some shell as part of the substrate, or in firm areas with some clay. The project area is mostly, firm, not shifting, sand and firm silt that has oyster shell in some area. There are many hundreds of acres of sand in Eastern Bay that could provide suitable summer flounder habitat in Eastern Bay.

4.5 Vegetation

4.5.1 Submerged Aquatic Vegetation (SAV) - The Virginia Institute of Marine Science (VIMS) conducts annual aerial surveys of submerged aquatic vegetation (SAV) in the Chesapeake Bay. No SAV were indicated or would be expected to occur because the project depths are 14 to 19 feet, which is below the photic zone. Usually SAV is not found in areas greater than 6 feet deep depending on water clarity.

4.5.2 Terrestrial Vegetation – None in the project area.

4.5.3 Wetlands – None in the project area.

4.6 Wildlife Resources. Wildlife species at the site include waterfowl and osprey.

4.7 Threatened and Endangered Species. The National Marine Fisheries Service (NMFS) has determined that Federally listed species of marine turtles may occur within the proposed project areas. Several species of turtles, including the threatened loggerhead turtle (*Caretta caretta*), the endangered Kemp's ridley turtle (*Lepidochelys kempii*), and the endangered leatherback turtle (*Dermochelys coriacea*), occasionally move into the central and upper Chesapeake Bay during warm weather .

According to the USFWS there are no endangered or threatened species within its jurisdiction within the project area.

Until the fall of 1997, the coordination review of the National Environmental Policy Act (NEPA) planned dredging placement actions by the U.S. Fish and Wildlife Service (USFWS), NMFS, and the Maryland Department of Natural Resources (MDDNR), has resulted in a finding of no significant impact (FONSI) or a favorable record of decision (ROD) for Baltimore and Philadelphia District Chesapeake Bay dredging actions due to the lack of any rare, threatened or endangered (RTE) aquatic species which were known to occur in the project areas, other than occasional transient shortnose sturgeon individuals.

This finding of no significant habitat and no resident populations of shortnose sturgeon in the Chesapeake Bay is now under review by NMFS due to the results of a bounty program administered by the USFWS since 1996. This program has resulted in the reporting and documentation of 19 shortnose sturgeon as incidental bycatch in the pound nets, hoop nets and gill nets of watermen in areas of the Bay from the Susquehanna Flats to south of Poplar Island (see Figure 4). Another outcome of the recent captures has been the listing of these fish as a distinct population segment in the draft Shortnose Sturgeon Recovery Plan. The draft recovery plan recommends that genetic characterization of shortnose sturgeon found in the Chesapeake Bay be performed and that NMFS should review the results of these genetic studies.

4.7.1 USFWS Atlantic and Shortnose Sturgeon Bounty Program. The USFWS is currently conducting a field study of Atlantic and shortnose sturgeon (*Acipenser brevirostrum*) populations in the Chesapeake Bay through a bounty program. This program is offering a reward of \$25 for each live Atlantic sturgeon and \$100 for each live shortnose sturgeon reported and documented as incidental bycatch by commercial or recreational watermen. Most of the fish were caught in relatively shallow water, using pound nets (8 fish), gill nets (9 fish), a hoop net (1 fish) and a catfish trap (1 fish).

The locations of the shortnose sturgeon reported in the bounty program are shown on Figure 3. As can be seen, no fish have been caught in Eastern Bay. As of June 16, 1999, a shortnose sturgeon was caught in the Honga River south of Eastern Bay. No information is presently available on that fish. Shortnose sturgeon usually prefer less saline water as can be seen on Figure 3. The Eastern Bay is not considered a suitable spawning area because these fish prefer freshwater rivers with a gravel substrate.

4.7.2 Shortnose and Atlantic Sturgeon Studies. Due to their believed extirpation from the Chesapeake Bay, few studies have been conducted of the shortnose and Atlantic sturgeon in the area until very recently. The following paragraphs list and discuss aquatic sampling in and around dredged material placement sites conducted in the Chesapeake Bay.

Fish Population Characterization Conducted in and Around Site 104

As part of the preparation of the environmental impact statement prepared by the Baltimore District and released in 1999, fish abundances and distributions were evaluated in Site 104 near Kent Island and two reference areas. This evaluation was part of a four-season sampling program conducted

during the day and night, during different seasons of the year (July 1996 to April 1997), and at varying depths. The fisheries cruises were conducted during the months of June/July, October, December 1996, and April 1997. A total of 28 deployments of multi-panel anchor-set gill nets and 128 bottom trawls were performed to determine the composition of the fish community within and around Site 104. The gill nets were generally set in the daytime tide, and consisted of 150-foot length with a 3, 4, 5, 6, 7, and 8-inch mesh. Bottom trawls consisted of a 7.9-meter headrope, 3.8-centimeter stretch mesh netting, and a 13-millimeter stretch mesh liner to retain small samples. No shortnose or Atlantic sturgeon were captured during the study by either method in Site 104 or in reference areas A and B during July 1996 to April 1997.

4.8 Prime and Unique Farmlands. No prime and unique farmlands are located within the project area.

4.9 Wild and Scenic Rivers. No national wild and scenic rivers or river segments are located within the project area.

4.10 Cultural Resources. The project, as a Federal undertaking, falls within the review requirements of the National Historic Preservation Act of 1966, as amended, and its implementing regulations 36 CFR, Part 800. These regulations require the agency to identify, evaluate and mitigate impacts to National Register eligible or listed cultural resources prior to project initiation, in consultation with the appropriate State Historic Preservation Officer (SHPO), and at times, the Advisory Council on Historic Preservation (ACHP). In 1999 the SHPO undertook cultural investigations in Eastern Bay. The SHPO has indicated that there are no cultural resources of concern in the project area.

4.11 Hazardous, Toxic, and Radioactive Substances. In order to plan specific sites for project activities, a listing of Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and Resource Conservation Recovery Information System (RCRIS) sites within the project area has been generated by the Baltimore District. The project will avoid known CERCLIS and RCRIS sites.

4.12 Infrastructure. Transportation routes in the project area include primary and secondary roads located on lands adjacent to Eastern Bay.

4.13 Socioeconomic Conditions

4.13.1 Demographics. According to U.S. Department of Commerce census data, the 1990 population of the State of Maryland was 4,781,468. The population estimates for the Maryland counties near Eastern Bay are as follows: Anne Arundel County, 427,239; Queen Anne's County, 33,953; and Talbot County, 30,549.

There are approximately 15 million people living in the Chesapeake Bay watershed (Chesapeake Bay Program, 1995). Between 1950 and 1990, population in the watershed increased from 8.4 million to 14.7 million and, by 2020, there will be an estimated 17.4 million people living in the watershed (Chesapeake Bay Program, 1995). Most of this growth is expected to take place in Maryland and

Virginia.

The number of oystermen in Maryland can be estimated by the number of oyster surcharges paid by tidal fish licensees. In 1992 the number of oyster surcharges paid totaled 1,578. This figure dropped to 874 in 1993. In 1994 the number of surcharges decreased again to 545, nearly 34% of the total surcharges paid in 1992. In 1995, oyster licenses demonstrated a modest increase to 875. In 1999 there are approximately 1,300 surcharges.

4.13.2 Economics. According to the Maryland Department of Economic and Employment Development (MDDEED), incomes generated from commercial fishing, activities for the ports, ship and boat building, ship repair, and tourism totaled an estimated \$678 billion in 1987. This figure combines the present values of the annual incomes generated by the major annual economic activities which could not take place without the Bay as well as the land value premiums which people are willing to pay for waterfront, waterview, or water access residence.

An estimated 500 million pounds of seafood are harvested from the Chesapeake Bay annually (Smithsonian Environmental Research Center). The harvest includes menhaden, striped bass, bluefish, flounder, shad, white perch, blue crabs, hard and soft clam meats, and oysters. The dockside value of the annual oyster harvest has declined dramatically, affecting the economies of many small, water-oriented communities around the Bay. Whereas the dockside value for 1986 was \$16.6 million, in 1994 the dockside value was only \$1.3 million, 92 percent less. The dockside value for 1995 was approximately \$3 million. The 1998-1999 season value was \$7.4 million.

Table 4-4 summarizes the bushels and dockside value in the Maryland oyster industry since 1986.

Table 4-4 Oyster Harvests in Maryland

<i>SEASON</i>	<i>BUSHELS</i>	<i>DOCKSIDE VALUE</i>
1986	1,557,091	\$16,653,862
1987	976,025	\$16,516,182
1988	363,259	\$7,341,501
1989	398,508	\$7,443,487
1990	413,592	\$9,910,448
1991	418,393	\$9,451,855
1992	323,189	\$6,449,539
1993	123,618	\$2,686,777
1994	79,617	\$1,375,465
1995	164,317	\$2,382,838
1996	98,000	\$3,218,329
1997	177,600	\$3,769,923
1998	284,980	\$5,742,280
1999	400,000	\$7,400,000 est.

4.13.3 Recreation. The Chesapeake Bay region is heavily utilized for recreational activities. Hunting, camping, swimming, boating and other water-related activities are major attractions. Sportfishing is a major recreational activity. In 1987, the total economic impact associated with these activities in Maryland and Virginia was approximately \$8 million (MDDEED 1989).

4.13.4 Public Health and Safety. Contamination of oysters and other shellfish with bacteria and viruses has been associated with sewage discharges, septic leaching, and stormwater runoff. Oyster

harvest is restricted in various areas by MDE for public health reasons, including areas with excessive coliform bacteria counts, and setbacks from marinas and municipal discharges. Consumption of oysters infected with MSX or Dermo does not affect humans.

4.13.5 Noise. The major sources of anthropogenic noise in the project area are power boats and vehicular traffic along adjacent roads.

4.13.6 Visual and Aesthetic Values. The Chesapeake Bay region is noted for its abundance of natural resources and scenic areas.

4.14 Environmental Justice. Due to the large geographic area encompassed by the proposed project, low income and/or minority communities may exist in the project area.

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 Project Area Description

5.1.1 Land Use. Specific sites for creation of the new seed bars will be determined based on appropriate substrate (shell or firm bottom) within legal oyster bars. Historically, oyster reef communities covered large portions of the bottom of the Bay mainstem and its tributaries. Proposed activities will restore a small portion of their historic range. No impacts to land use are expected.

5.1.2 Geology. Shell placement activities will only superficially cover the 18-acre area. No geological impacts are expected.

5.1.3 Soils. To minimize the potential for siltation and burial of shell, shell will be placed on firm bottoms of sand, shell, gravel. No impacts to soils are expected.

5.1.4 Topography and Drainage. Bar creation and seed planting activities will increase the elevation of the existing substrate, but will not impact existing drainage patterns. Due to the limited size and extent of underwater activities, they are not expected to have any hydraulic impacts.

5.2 Air Quality. The project was evaluated to determine if the Clean Air Act Conformity Requirements apply (58 Fed. Reg. 63214, November 30, 1994). This project is exempt from this regulation as stated in 40 C.F.R. Section 93.153(c)(1). Impacts to air quality will be temporary. A temporary increase in emissions of volatile organic compounds, nitrogen oxides, sulfur dioxide, and carbon monoxide from construction vehicles (mobile sources) will occur. Emissions produced during construction are not expected to exceed ambient air quality standards. Temporary construction activities are generally accounted for in the Maryland State Implementation Plan.

5.3 Water Quality. Shell placement is not expected to impact water quality. However, shell recovery activities involving dredging and redepositing shell may cause temporary turbidity. The selection of sites for shell recovery will include an evaluation of bottom composition, and appropriate measures to minimize turbidity will be implemented. Long-term impacts to water

quality as a result of the creation and restoration of oyster habitat are expected to be positive. Oysters filter nutrients and plankton from the water column, thereby improving water quality.

5.4 Aquatic Resources. The proposed project is expected to result in beneficial impacts to aquatic resources. Through the creation of new seed bars a portion of historic oyster habitat will be restored. Placement of shell and seeding activities will form an elevated reef structure with greatly increased surface area for the attachment of sessile organisms (e.g. algae, barnacles, sponges, bryozoans, and tube-building worms). In addition, this reef structure will provide shelter and cover for mobile invertebrates and finfish. The three-dimensional habitat of an oyster bar results in a higher level of primary and secondary production than is produced in most other benthic substrates. Planting of hatchery-produced oyster seed and spat harvested from seed bars is expected to increase oyster populations. Shell recovery activities may cause resuspension of sediments and generate turbidity which could potentially impact fish eggs, larvae, and juvenile stages. However, this impact would be temporary, minor, and confined to a limited area. Most project activities will occur in June and July, which is after the spawning season for most anadromous fish. In addition, most spawning occurs in shallow, low salinity areas, which would not be used as a part of this project.

5.5 Vegetation.

Submerged Aquatic Vegetation (SAV) - Since oysters are generally restricted to water depths between 6 and 30 feet (MLW), shell placement and seeding activities will occur within this range. Therefore, these activities are not expected to impact SAV in the project area. Increased turbidity due to shell recovery activities could result in sediment deposition and reduced productivity in adjacent SAV beds. To minimize this potential impact, NMFS usually indicates that time-of-year restrictions may be necessary to protect SAV from elevated turbidity within 500 yards of the activity.

Terrestrial Vegetation and Wetlands - Since the project is not in shallow water or on land, no impacts are expected.

5.6 Wildlife Resources. Proposed activities are not expected to significantly impact wildlife resources. Any waterfowl in the project areas would be temporarily displaced but would return soon afterwards.

5.7 Threatened and Endangered Species. Based upon a review of the proposed project by NMFS, the central and upper Bay and its tributaries are not essential habitat for threatened and endangered marine turtles which may occur in project areas, and it is not anticipated that any of the proposed activities will adversely impact these species.

The National Marine Fisheries Service has indicated that the seed bar construction activities will not effect the short nose sturgeon.

5.8 Prime and Unique Farmlands. Since no prime and unique farmlands are located within the project area, there will be no impacts to this resource.

5.9 Wild and Scenic Rivers. The project is expected to benefit the aquatic environment, and will

not result in adverse impacts to state-designated wild and scenic rivers.

5.10 Cultural Resources. The Maryland SHPO concurred that the proposed shell placement would not affect cultural resources (see letter in Appendix I).

5.11 Hazardous, Toxic, and Radioactive Substances. The proposed project is not expected to result in the use or production of, or impacts to hazardous materials.

5.12 Infrastructure. The proposed project will require the use of transport vehicles and excavation equipment. Shell placement and seeding activities will involve the use of barges, tugboats, and heavy equipment, such as front-end loaders. Project activities will be short-term and are not expected to significantly impact existing transportation routes.

5.13 Socioeconomic Conditions

5.13.1 Demographics. The proposed project will not impact demographics.

5.13.2 Economics. The proposed project is expected to result in increased oyster populations, which, as filter feeders, may improve water quality in the Bay, and the restoration of oyster habitat. This may result in economic benefits through a minor increase in commercial and sportfishing opportunities. No significant adverse impacts to other fisheries are expected to occur as a result of this project.

5.13.3 Recreation. It is expected that oyster habitat restored as a result of the proposed project will support blue crabs and various species of finfish. This will have a minor positive impact to blue crab and finfish populations, and therefore to recreational fisheries.

5.13.4 Public Health and Safety. The proposed project is not expected to impact public health or safety. Project locations will not include known pollution sources and areas where shellfish harvest is restricted, as determined by MDE.

5.13.5 Noise. The proposed project will generate noise through the use of barges and tugboats to transport shell to project sites and the use of dredges for shell recovery activities. In addition, no residences are expected to be located in close proximity to project sites.

5.13.6 Visual and Aesthetic Values. Transport vehicles, boats and heavy equipment associated with the proposed project will be a temporary negative impact. Project activities, will occur under water, and therefore will not impact visual and aesthetic values.

5.14 Environmental Justice. The project is expected to comply with Executive Order 12989, dated February 11, 1994 (*Environmental Justice in Minority Populations and Low-Income Populations*). The project is not expected to adversely impact any minority or low-income communities.

5.15 Cumulative Impacts. The proposed project will provide valuable habitat development for

future aquatic restoration activities. Potential negative impacts associated with the project, including increased turbidity, are not expected to be significant and will not contribute to adverse impacts to the Chesapeake Bay ecosystem. Restoration of oyster habitat associated with the proposed project, in conjunction with other aquatic restoration efforts, is expected to result in increased oyster populations and habitat area in the Chesapeake Bay and a long-term positive impact to the estuarine ecosystem. Oyster restoration activities are currently being conducted by MDDNR, the Oyster Recovery Partnership, the Chesapeake Bay Foundation, and local conservation groups. Increased oyster populations would result in improved water quality in the Bay, and restoration of oyster bars would increase available habitat for communities associated with oyster bars, including benthic organisms, blue crabs, and finfish. In addition, oyster restoration is of economic importance to the commercial oyster fishery.

The Maryland Port Administration has proposed the placement of 18 million cubic yards of dredged material from the approach channels to Baltimore Harbor at Site 104 north of the Bay Bridge near the eastern shore of Maryland. The Baltimore District is in the process of preparing a final environmental impact statement that evaluates the possible use of Site 104. This document is expected to be completed in late 1999. Concerns have been raised by citizens about the potential impacts of this activity on water quality, sediment movement, and the effects on fish and oysters. Studies to date indicate that the transport of material from Site 104 would be toward the north which is away from the Eastern Bay area. Studies to date indicate that potential nutrient releases at Site 104 would not likely cause a significant impact to water quality in the area or in the Chesapeake Bay. It is not expected that placement at Site 104, should it occur, would have an impact on the oyster population in Eastern Bay.

5.16 Environmental Permits and Regulatory Compliance. Project activities that occur within navigable waters are subject to authorization pursuant to Section 10 of the River and Harbors Act of 1899. The determination of specific locations for restoration activities will avoid potential impacts to navigation. Dredging of oyster shell, redeposition of sediment from dredging activities, and the deposition of shell within the Chesapeake Bay and its tributaries is subject to authorization pursuant to Section 404 of the Clean Water Act. In accordance with Section 404 of the Clean Water Act, an evaluation of the impacts of proposed project to waters of the United States was conducted (Appendix V). The MDE has indicated that the water quality certificate received from the State of Maryland for the existing USACE/DNR oyster project will serve for the Eastern Bay seed bar proposed project (Appendix I). This project is consistent with the Coastal Zone Management Act. A summary of compliance of the project with applicable environmental statutes is given in Appendix VI.

6.0 COORDINATION

The proposed project has been coordinated with the USFWS, NMFS, EPA, the U.S. Natural Resources Conservation Service, MDDNR, MDE, and Maryland Historical Trust. Copies of environmental coordination correspondence are included in Appendix I. Included is an e-mail indicating that USFWS supports this project.

A Public Notice concerning the proposed Eastern Bay project was distributed to interested persons

and organizations on May 19, 1999.

7.0 CONCLUSIONS

This supplemental environmental assessment has evaluated the proposed additional site in Eastern Bay for the Chesapeake Bay Oyster Recovery Project in the Maryland portion of the Chesapeake Bay. No significant adverse environmental impacts are expected as a result of the proposed project addition. The findings herein have been prepared in accordance with the National Environmental Policy Act of 1969, as amended.

APPENDIX I

ENVIRONMENTAL COORDINATION

MEMORANDUM FOR THE RECORD

10 May, 1999

SUBJECT: Consultation for Oyster Planting Area in Eastern Bay

1. On the weekend of 8-9 May 1999, the Maryland Historic Trust surveyed the potential site locations for 1999 oyster planting in the Eastern Bay, Chesapeake Bay, with magnetometer to determine the potential for the oyster bed formation to effect submarine cultural resources.
2. Mr. Steve Biliki of the Maryland Historic Trust contacted Mr. Kenneth Baumgardt on 10 May 1999 to report that no resources were identified within the Baltimore District's area of potential effect, and that no further investigations were required. Therefore, based upon these findings, Section 106 consultation is completed.

Kenneth Baumgardt
CENAB-PL

Copy Furnished:
Claire O'Neal, PPMD
Mark Mendelsohn, PL



MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway • Baltimore Maryland 21224
(410) 631-3000 • 1-800-633-6101 • <http://www.mde.state.md.us>

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 8, 1999

Mr. Mark Mendelsohn
Planning Division
Corps of Engineers, Baltimore District
P.O. Box 1715
Baltimore, Maryland 21203

RE: Chesapeake Bay Oyster Recovery Project

Dear Mr. Mendelsohn:

The referenced project involves numerous restoration and remediation activities to increase oyster habitat and populations in the Chesapeake Bay. The section 401 Water Quality Certification (WQC) for the project was issued by the Department of the Environment in 1995, and expires January 1, 2001.

As we recently discussed, the WQC does not reference specific sites or activities, but rather certifies the project as a whole, including areas and activities by reference. Thus, any new areas that are added to the project, such as the site in Eastern Bay, are automatically certified in the existing WQC. The initial public notice issued by the Corps of Engineers on August 24, 1995 included six Oyster Recovery Areas (ORAs) located in the Severn, Nanticoke, Chester, Choptank, Patuxent, and Magothy Rivers. The Eastern Bay area was not considered in detail as were the ORAs and seed bars. Accordingly, the new area in Eastern Bay is hereby certified under the conditions outlined in the existing WQC for the Chesapeake Bay Oyster Recovery Project.

If you have any questions, please contact me at (410) 631-8093.

Sincerely,

Elder A. Ghigiarelli, Jr.
Chief, Coastal Zone Consistency

EAGJr:cma

Mendelsohn, Mark NAB02

From: John_Gill@fws.gov
Sent: Wednesday, July 07, 1999 3:51 PM
To: mark.mendelsohn@usace.army.mil
Subject: Oyster Seed Bar Creation - Eastern Bay

Mark,

We have reviewed the Public Notice, support the project, and have no recommendations to add to the EA.

John Gill
Chesapeake Bay Field Office
U.S. Fish and Wildlife Service

To: John Nichnols
From: Mark Mendelsohn
Subject: Creation of oyster seed bars in Eastern Bay, Maryland
Date: July 7, 1999

Dear John:

The purpose of this memo is to confirm our phone conversation of June 21, 1999, regarding the placement of shell on approximately 18 acres of Eastern Bay over a 1-2 week period in July 1999.

During that conversation you stated that an Essential Fish Habitat Assessment should be performed for summer flounder in addition to winter flounder.

We also talked about potential impacts to the shortnose sturgeon.

As a result of that discussion you indicated that the determination for the above species would be a no effect determination.

Regards

Mark



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If you have any questions, please contact me at (410) 631-8093.

Sincerely,

Elder A. Ghigiarelli, Jr.
Chief, Coastal Zone Consistency

EAGJr:cma



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Northeast Region
One Blackburn Drive
Gloucester, Massachusetts 01930-2298

July 9, 1999

Colonel Bruce A. Berwick
District Engineer
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Attn: Mark Mendelsohn, Planning Division

Dear Colonel Berwick:

This pertains to a request by your staff during a June 21, 1999 telephone conversation for a determination of the effects on protected species (relative to Section 7 of the Endangered Species Act) and Essential Fish Habitat (relative to recent amendments to the Magnuson-Stevens Fishery Conservation & Management Act) of a proposal by your agency to enhance an American oyster habitat near Parsons Island in Eastern Bay, Queen Annes County, Maryland. The project will involve placement of oyster shell on approximately 18 acres of charted oyster bar over a one to two week period during July, 1999.

There are four species of protected sea turtles whose juvenile stages occur the mid-Chesapeake Bay region, and which could be encountered at the project site from April through November. These include the threatened loggerhead sea turtle (*Caretta caretta*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempi*), the endangered green sea turtle (*Chelonia mydas*), and the endangered leatherback sea turtle (*Dermochelys coriacea*). Additionally, the endangered shortnose sturgeon could also be encountered in the project area, especially during summer months. No critical habitats associated with these species have been identified in the Chesapeake Bay.

The proposed activity should not affect any of the protected species listed above. Therefore, we have determined that this proposal will have no effect on sea turtles and the shortnose sturgeon, and further consultation on this matter is not required.

The proposed cultching activity will also affect Essential Fish Habitat (EFH) for winter flounder (*Pseudopleuronectes americanus*), egg, larvae, juvenile and adult life stages, as well as summer flounder (*Paralichthys dentatus*), juvenile and adults life stages. Your agency is required to prepare an EFH Assessment on this project, pursuant to procedures provided under Section 305(b)(2) of the Magnuson-Stevens Act. An EFH Assessment must include a description of the proposed action, analysis of the effects of the action on EFH and associated species, the federal



agencies' views regarding the effects of the action, and mitigation as is appropriate. Furthermore, the EFH Assessment can be incorporated as a separate section of the Environmental Assessment you are preparing for this project.

Winter flounder spawning activity has been documented within the eastern half of Eastern Bay, including areas immediately south of Parsons Island. Because winter flounder spawns during late winter, and is absent from the Chesapeake Bay from June to October, the proposed activities should not adversely affect the spawning activities of this species. Furthermore, cultched areas resulting from this project may enhance forage opportunities for both flounder species present. Therefore, as indicated during our previous phone conversations with your staff, this project should not adversely affect EFH for these species.

If there are any questions concerning these comments, you may call John S. Nichols at (410) 226-5771, at our Oxford, Maryland Habitat Office.

Sincerely,

Patricia A. Kurkul
Regional Administrator

APPENDIX II

404(b)(1) EVALUATION

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
CONSTRUCTION OF SEED BARS IN EASTERN BAY
AS PART OF CHESAPEAKE BAY OYSTER RECOVERY PROJECT
MARYLAND

JULY 1999

I. PROJECT DESCRIPTION

- a. Location - The proposed project will occur within the Maryland portion of the Chesapeake Bay. Project activities will occur in an 18 acre area in Eastern Bay near the eastern shore of Maryland in Queen Anne's County.
- b. General Description - Project construction will occur over a 7 to 14 day period in the summer and includes the following activities construction of seed bars for production of seed oysters. and monitoring of implemented activities.
- c. Purpose - The purpose of the proposed project is to restore oyster habitat and increase oyster populations in the Maryland portion of the Chesapeake Bay.
- d. General Description of Discharge Material - Project activities will involve the placement of oyster shell obtained by dredging fossil oyster shell or other means. Seed bars, totaling approximately 18 acres in size will be constructed during the project. Shell will be placed at a rate of 12,500 bushels per acre to create seed bars.
- e. Description of the Proposed Discharge Sites - Specific locations for project activities were determined based on bottom composition, salinity, water depth, water currents, levels of dissolved oxygen, and disease prevalence. The area has been previously used as seed bars by MD DNR. Project depths are between 14 feet to 19 feet deep.
- f. Description of Discharge Method - Dredged oyster shell will be transported to project sites by barge and placed overboard by front-end loader and/or high pressure water "cannons".

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

- (1) Substrate Elevation and Slope - Project activities will occur in water depths of 14 to 19 feet MLLW. The elevation of the existing substrate will be raised 2 to 6 inches by the creation of seed bars.
- (2) Sediment Type - Seed bars will be constructed on firm bottoms.

(3) Dredged/Fill Material Movement - Minimal movement of material placed during this project is expected.

(4) Physical Effects on Benthos - The placement of shell and other fill material will cover the existing substrate and benthos, but will provide enhanced habitat for recolonization by benthic epifauna including oyster larvae.

(5) Other Effects - N/A.

(6) Actions Taken to Minimize Impacts - The fill material will be discharged in a manner to minimize the disruption of bottom sediments. Environmental protection measures will be employed at project sites to avoid and minimize impacts to the aquatic environment. Construction specifications will state that compliance is mandatory for all applicable environmental protection regulations for pollution control and abatement.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water

- (a) Salinity - No change expected.
- (b) Chemistry - No change expected.
- (c) Clarity - Minor and temporary change expected during construction due to turbidity.
- (d) Color - Minor and temporary change expected expected during construction due to turbidity.
- (e) Odor - No change expected.
- (f) Taste - N/A.
- (g) Dissolved Gas Levels - No change expected.
- (h) Nutrients - No change expected.
- (i) Eutrophication - Not expected to occur.
- (j) Others as Appropriate - None.

(2) Current Patterns and Circulation

- (a) Current Patterns and Flow - Minimal effects are expected. Elevation of oyster bars may increase flow and turbulence in the vicinity of the bar, resulting in enhanced mixing and food delivery downstream.
- (b) Velocity - No significant change in velocity is anticipated.
- (c) Stratification - No change expected.
- (d) Hydrologic Regime - No change expected.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - N/A.

(5) Actions to Minimize Impacts - N/A.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Project Sites - Minor and short term impacts are expected to occur during construction. Turbidity levels are expected to rapidly return to background levels once construction is completed.

(2) Effects on Chemical and Physical Properties of the Water Column

(a) Light Penetration - A minor, temporary decrease may occur during construction. No change expected after construction.

(b) Dissolved Oxygen - Minor, temporary, and localized reduction in dissolved oxygen due to turbidity may occur during construction. No change is expected after construction.

(c) Toxic Metals and Organics - No toxic metals or organics are expected to be released into the water column. No change expected after construction.

(d) Pathogens - No pathogens are expected to be released into the water column.

(e) Aesthetics - No adverse impacts are anticipated.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - Clean fill material (oyster shell.) will be used for construction. No significant levels of contaminants will be released into the water column.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - No effect expected.

(2) Effects on Benthos - Benthic organisms will be covered by the placement of shell and displaced by bar cleaning. However, new oyster bars will be created. Oyster bars are three-dimensional structures which provide more surface area for the attachment of oysters and other sessile organisms (mussels, barnacles, hydroids, algae, etc.) than that provided by relatively flat bottom.

(3) Effects on Nekton - Nekton are expected to be temporarily disturbed during construction, but to return after project completion. New and rehabilitated bars will increase available habitat for organisms associated with oyster bars, including fishes, amphipods, shrimp, worms, and crabs.

(4) Effects on Food Web - Organisms associated with oyster bars recycle nutrients and organic matter, and are prey for commercially and recreationally important finfish species.

(5) Effects on Special Aquatic Sites

(a) Sanctuaries and Refuges - N/A.

(b) Wetlands - N/A.

(c) Tidal flats - N/A.

(d) Vegetated Shallows - Oysters are generally restricted to subtidal areas from 6 to 30 feet in depth. Therefore, project activities are not expected to displace or adversely impact submerged aquatic vegetation (SAV). However, appropriate measures will be implemented during shell recovery activities as necessary to protect SAV in adjacent areas from elevated turbidity.

(6) Threatened and Endangered Species - No effects to threatened and endangered species are expected as a result of this project. Any endangered species would avoid the falling shell.

(7) Other Wildlife - No change expected.

(8) Actions to Minimize Impacts - Construction activities will be limited to the immediate project areas. Impacts to the environment will be minimized through the employment of environmental protection measures such as best management techniques to control discharge and reduce turbidity.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A.

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance and create habitat for oysters and other organisms, including finfish and blue crabs.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - No effect expected.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The project is expected to increase the acreage of available oyster habitat. The cumulative impact of this project and other restoration projects is expected to be positive, with the creation of more diverse and productive habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem - Secondary effects are expected to be positive, resulting in increased habitat for finfish, blue crabs, and other species.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. The planned placement of material will be in compliance with State water quality standards.

c. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

d. The proposed project will not negatively affect any endangered species.

e. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

f. The proposed project will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity and productivity are expected as a result of the proposed project.

g. Appropriate steps to minimize potential impacts of the placement of fill material in aquatic systems will be followed. Impacts to the environment will be minimized through the employment of environmental protection measures such as best management techniques to control discharge and reduce turbidity.

h. On the basis of the guidelines, the proposed discharge sites are specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem.

APPENDIX III

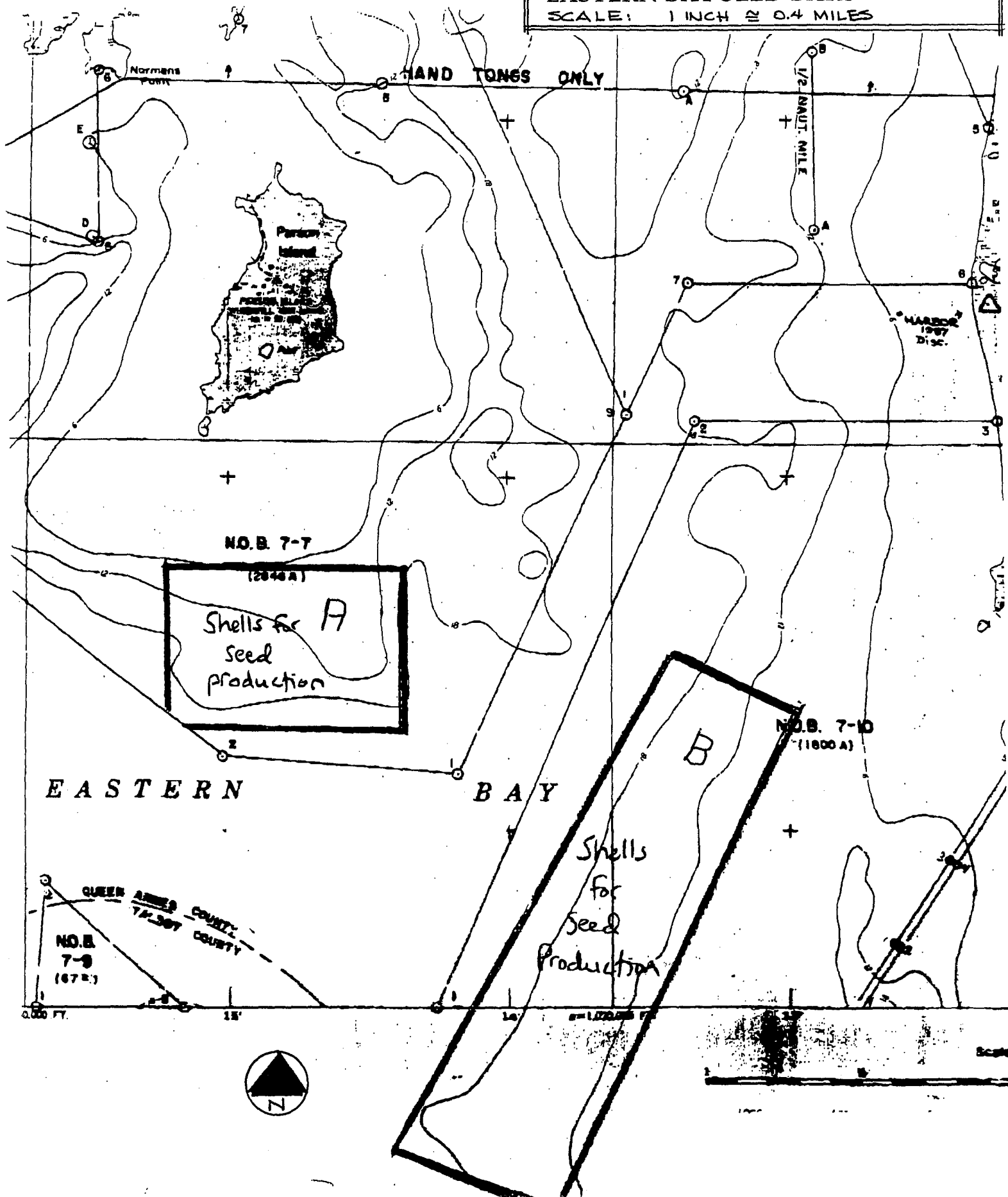
FIGURES

COE/DNR Oyster Project 1999

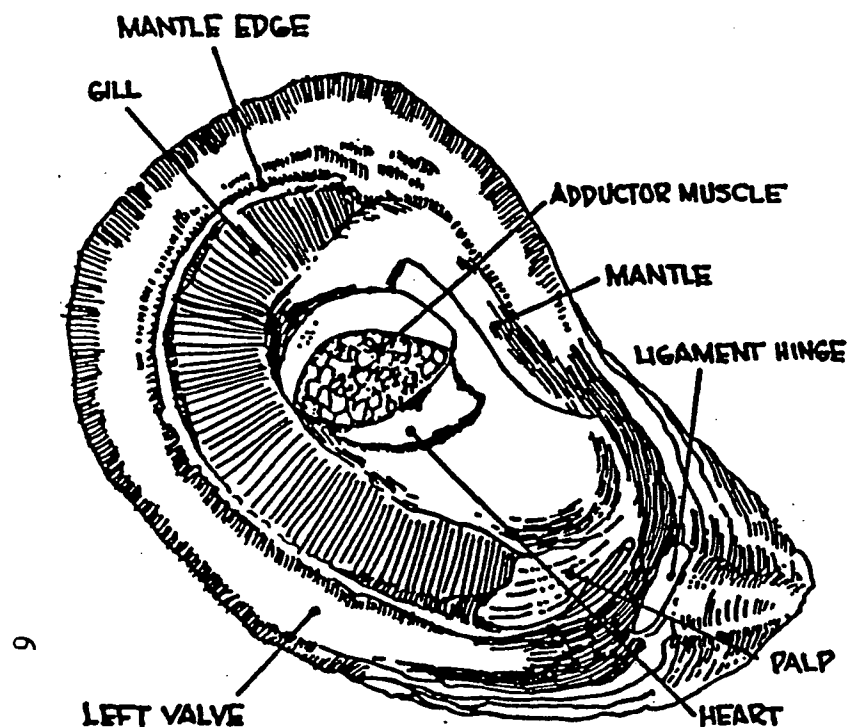
FIGURE 2

DETAILED MAP EASTERN BAY SEED BARS

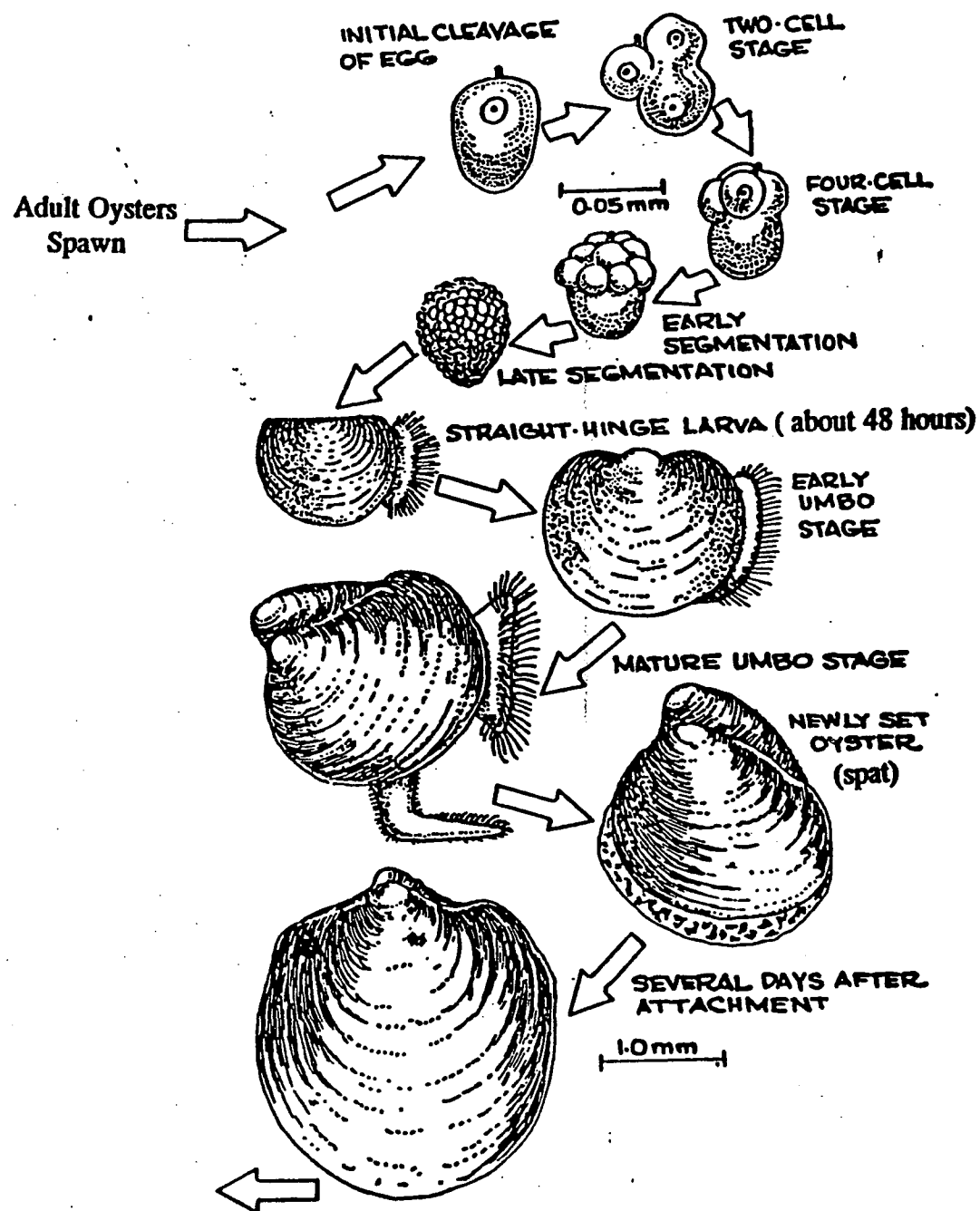
SCALE: 1 INCH \approx 0.4 MILES



Anatomy



Early Life Stages



Source: The Maryland Oyster (Fred W. Sieling, MDDNR)

FIGURE 3

LIFE STAGES OF THE OYSTER

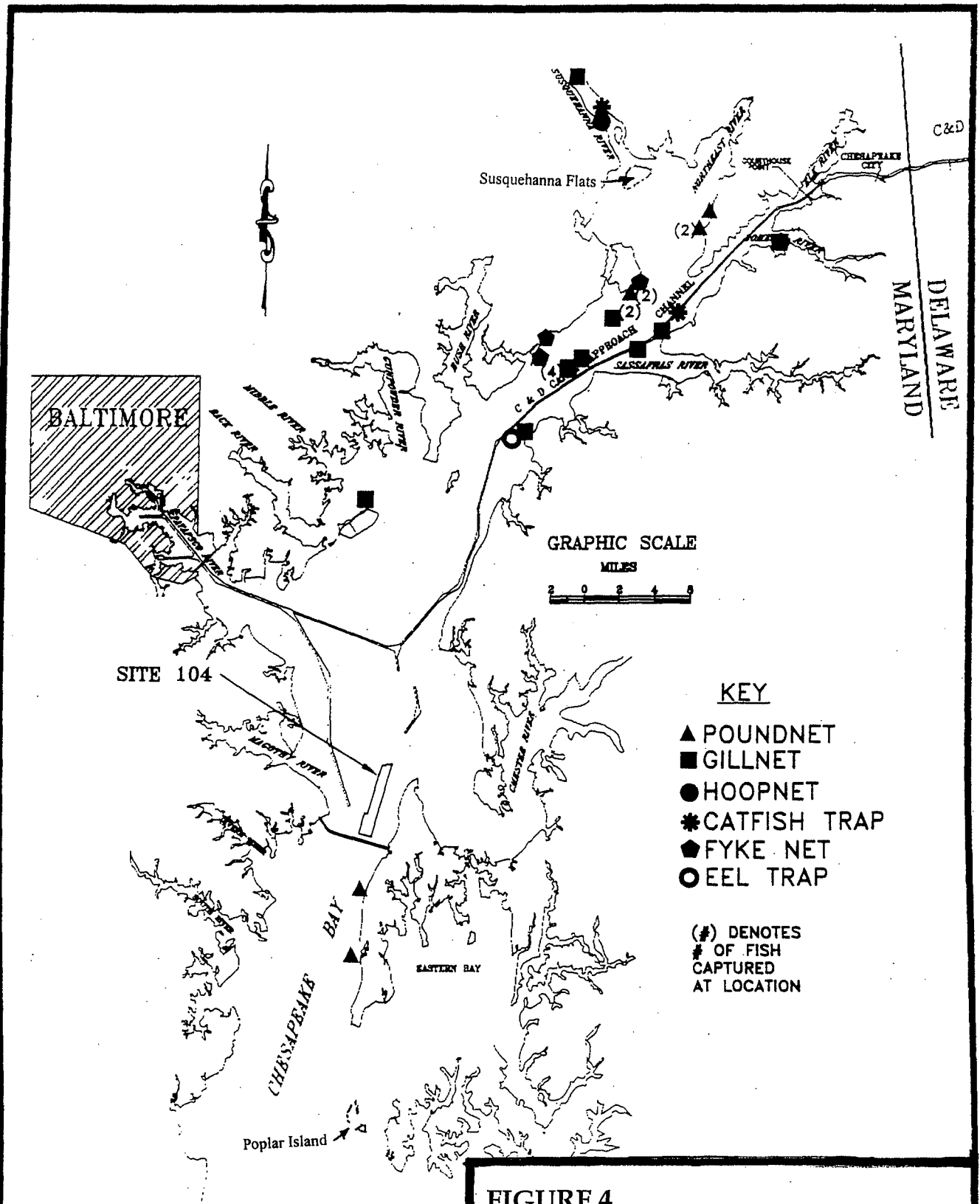


FIGURE 4

**SHORTNOSE STURGEON BOUNTY
PROGRAM CATCHES
APRIL 1996-FEBRUARY 1999**



**MARYLAND
ENVIRONMENTAL
SERVICE**



**MARYLAND
PORT
ADMINISTRATION**



**US Army Corps
of Engineers**