Department of Environmental Conservation

FINAL
Generic Environmental Impact Statement and Plan for the Development and Management of Artificial Reefs

in New York's Marine and Coastal District

March 1993

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT

Title of Project:	**PLAN FOR THE DEVELOPMENT AND MANAGEMENT OF ARTIFICIAL REEFS IN NEW YORK'S MARINE AND COASTAL DISTRICT**
Location:	**Suffolk, Nassau and Westchester Counties (to Tappan Zee Bridge) and New York City**
Statutory Authority:	**Section 11-303 of the Environmental Conservation Law**
Prepared By:	**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION Division of Marine Resources Building #40, SUNY Stony Brook, New York 11790-2356**
Contact Person:	**Stephen W. Heins Marine Fishing Access (516) 751-5422**
Date of Acceptance:	**March 16, 1993**

Pursuant to the requirements of 6 NYCRR 617, the State Environmental Quality Review Act (SEQRA), a Generic Environmental Impact Statement has been prepared as part of this New York State Department of Environmental Conservation, Division of Marine Resources Plan for development and management of artificial reefs in New York's Marine and Coastal District for the purposes of recreational fishing. Implementation of this Plan is a direct agency action, the impacts of which have been determined to be significant.

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The state of the art in marine artificial reef technology has advanced rapidly in recent years. Increasingly, fishermen and resource managers alike are recognizing the value of properly designed, constructed and managed artificial reefs. The potential contribution to harvestable resources from artificial reefs is important, especially in light of declining fish stocks and habitat quality. Federal and state fishery management agencies are responding with policies and management strategies sensitive to user groups and resource management needs.

GOALS AND OBJECTIVES

The New York State Department of Environmental Conservation (DEC) has prepared this Plan utilizing the latest available technical information, as well as that gathered during its thirty-year history in marine artificial reef construction. This Plan establishes the goals and objectives for the Division of Marine Resources (DMR) Artificial Reef Program in accord with the guidelines set forth in the National Artificial Reef Plan. The DMR's Plan will act as a focus for policy regarding marine artificial reefs, and represents a long-term commitment on the part of the DEC to responsible resource stewardship.

The goals for DMR's artificial reef program:

1. provide fishing and diving opportunities for reef-associated fishery resources by selective placement of artificial habitat in State and adjacent Federal waters;

2. enhance or restore fishery resources and associated habitat, to the maximum extent practicable, utilizing artificial habitat; and

3. administer and manage artificial habitat to ensure its prudent use as part of an overall fisheries management program.

The objectives needed to accomplish our goals:

1. construct, repair and maintain the State's artificial reef system under a unified permit system;

2. conduct an evaluation of the effectiveness of existing artificial reefs in achieving program goals;

3. establish a fisheries survey program to monitor fish and crustacean populations associated with artificial reefs;

4. site, design and construct additional artificial reefs, as warranted, in a manner consistent with standards contained in this Plan;

5. maintain an artificial reef information system, coordinated with ASMFC Artificial Reef Committee, and provide a mechanism for public dissemination of this information; and

6. ensure that artificial reefs/habitat constructed in the Marine District comply with Federal and State rules and regulations and are consistent with State and regional management strategies for reef-associated stocks.

POLICY

The strategy necessary for the accomplishment of the goals and objectives of the artificial reef program is outlined below as policy statements in a number of program areas.

1. **Permits**.

A. Division of Marine Resources (DMR) is the sole entity to which permits for artificial reef construction should be issued by the US Army Corps of Engineers (COE) and NYS DEC Division of Regulatory Affairs (DRA).

B. A general permit(s) system will be used to more efficiently manage the State's artificial reefs.

2. **Materials Donations and Acquisitions**.

DMR will continue to accept scrap materials, or "materials of opportunity", as building material for artificial reefs.

3. **Citizen Participation**

DMR will solicit and facilitate citizen participation to the greatest possible extent. The establishment of a non-profit artificial reef foundation, through an entity such as "The Fisherman" magazine, should receive highest priority.

4. **Liability**

A. To minimize its liability, DMR will strictly adhere to all permit conditions.

B. DMR will follow this Plan's guidelines, including: requiring a performance bond or indemnification agreement of independent contractors involved; requiring proof of liability insurance of materials donors or contractors; and publishing warnings to mariners, fishermen and sport divers regarding the hazards of artificial reef use.

5. **Intra/Interagency Coordination**

A. DMR will continue its active participation in the ASMFC Artificial Reef Committee. This committee is comprised of Atlantic state artificial reef managers and representatives from federal and

other agencies with an interest in artificial reefs.

B. DMR will develop and expand formal relationships with NYS Department of Transportation and with other local public works agencies to facilitate movement of scrap materials to artificial reefs.

C. DMR will strengthen relationships with Federal and State agencies involved with permitting artificial reefs.

6. **Research**

A. DMR will utilize ASMFC Recreational Fisheries Report Number 7, "A Review of Artificial Reef Research Needs" (Steimle and Figley 1990), as the basis for identification of its research objectives.

B. DMR will interact closely with Sea Grant, SUNY and other research institutions in achieving its research objectives, possibly providing funds for an Artificial Reef Scholarship.

7. **Siting**

DMR will site artificial reefs: a) with public input and review; b) near major fishing centers, inlets and access points; and c) in compliance with all COE and Coast Guard requirements.

8. **Materials**

A. DMR will utilize the following materials of opportunity: 1) steel vessels; 2) rock and stone; and 3) surplus concrete materials and rubble. Other materials will be considered on a case-by-case basis, except the following materials which will not be used: 1) white goods; 2) auto and truck bodies; 3) construction and demolition (C&D) debris; 4) asphalt materials; and 5) automobile or truck tires except in areas with low wave energy, e.g. Long Island Sound.

B. DMR will continue to carefully monitor the development of

stabilized incineration ash as artificial reef substrate. This material will not be used on any DMR reef until such time as the questions surrounding its long-term stability and compatibility with the marine environment are resolved.

9. **Design**

A. DMR will design artificial reefs, utilizing the best available information, for the accomplishment of specific resource objectives.

B. DMR will use the "patch reef" concept in site design where and when feasible.

10. **Monitoring**

DMR will monitor all artificial reefs within its juridiction to ensure that permit requirements are complied with, and that program goals and objectives are being met.

11. **Maintenance**

DMR will perform maintenance on artificial reef sites under its control, based upon an evaluation of the information obtained in its monitoring program. In addition, the DMR will maintain accurate records of all artificial reef activities it conducts.

12. **Reefs in the Exclusive Economic Zone**

A. DMR will object to any proposed artificial reef development by another agency or entity whose goals and objectives for reef development are other than management and enhancement of fishery resources.

B. DMR will encourage any agency or entity that proposes artificial reef development in the EEZ to submit their proposal to the DMR for consideration. If the objectives of the proposed artificial reef project are not in accord with this Plan, DMR will

object to that project.

C. DMR wil coordinate the development and management of reefs in the EEZ with neighboring states through the Atlantic States Marine Fishery Commission and the Regional Fishery Management Councils (New England and Mid Atlantic).

13. **Mitigation**

DMR does not consider artificial reefs as acceptable mitigation for lost or degraded habitat unless: a) environmental impacts cannot be avoided. Reefs as mitigation should be used only as a last resort. The first priority for DEC is to avoid impacts; b) proposed habitat loss or degradation is on artificial or natural reef habitat; and c) artificial structures can be designed and constructed that provide proven biologically productive habitat. If the proposed habitat loss or degradation is other than artificial or natural reef habitat, artificial reefs could only be considered as mitigation if: a) impacts of proposed project are minor, as determined by technical review; and b) the value of productive habitat generated as a result of the mitigation project exceeds the value of the habitat lost. In all cases, the mitigation reef should be constructed, evaluated and its productivity demonstrated for a period of one year before work on the proposed project is begun.

14. **Fish Aggregating Devices (FADs)**

A. DMR will oppose the deployment of FADs by any agency or entity, pending the evaluation of FAD use in local waters by DMR or its agent.

B. DMR considers FADs as artificial reefs and, as such, will manage them in accord with fishery management objectives.

15. **User Conflicts**

A. DMR will increase the number of artificial reefs if such an increase can reduce conflict.

B. DMR will site artificial reefs to reduce encounters between different user groups, e.g. reefs placed in depths greater than 200 feet will effectively exclude sport divers.

C. DMR will select materials that may prove attractive to one group and not others, e.g. rubble piles may provide excellent bottom fishing but not be attractive to sport divers.

D. DMR will provide education on reef use ethics and courtesy to various user groups through public meetings and printed materials.

E. DMR will establish voluntary restrictions for specific reefs, (e.g. "no kill" sanctuaries; diver only). Should voluntary management fail, more formal measures will be considered, including: 1) legislation or regulation to manage all State artificial reefs (i.e. restrict or control fishing effort); 2) regulation allowing some reefs to be designated for certain user groups to the exclusion of others (e.g. diver only); 3) fisheries management measures, such as size and/or bag limits, gear restrictions or season closures; and 4) Special Management Zone (SMZ) designation for reefs in Federal waters. To achieve this the DMR would have to petition the appropriate Regional Fisheries Management Council for each reef site to be included under this designation. SMZ-type management could be considered for State waters as well.

16. **Illegal and Destructive Practices**

A. DMR will research the need for legislation that outlaws destructive fishing techniques and salvage operations on artificial reefs under its control. Destructive fishing techniques are defined as those that damage an artificial reef's capacity to sustain fish populations and fishing opportunities.

B. DMR will: 1) undertake an informational/educational campaign that exposes illegal reef building activity as a violation of the law and harmful to the resource; and 2) prosecute any violators to the fullest extent of the law.

ACTIONS

A number of tasks should be undertaken in the implementation of this Plan. We believe the following actions will be necessary in achieving our goals and objectives:

1. seek a general permit(s) from the COE and DRA for all artificial reef sites previously developed in the Marine District;

2. include any future artificial reef sites developed in the Marine District under the general permit(s) obtained from COE and DRA;

3. seek a stable funding source for the purchase, preparation, transportation and deployment of artificial reef materials;

4. seek stable funding for the accomplishment of DMR's artificial reef research objectives;

5. conduct or contract for a survey to assess the demand for artificial reefs, user preferences, and potential conflicts;

6. assess the potential for reef development in conjunction with shoreline fishing and diving access points;

7. conduct pre-construction, site-specific evaluations of each potential new artificial reef site;

8. conduct a cost/benefit analysis for the use of specific prefabricated artificial reef structures (Appropriate design and deployment of these structures will be determined by technical review);

9. investigate the concept of a reef design that would provide sanctuary from harvest;

10. investigate the potential of prefabricated units for inclusion on DMR reefs;

11. work within the ASMFC Artificial Reef Committee towards the development of a policy for the management of artificial reefs in the EEZ, including the use of Special Management Zones (This policy will then be forwarded to the Regional Management Councils for consideration);

12. evaluate existing estuarine artificial reefs and de facto reefs for their effectiveness as juvenile fish habitat;

13. design, construct and evaluate a limited number (2-3) of new artificial reefs in estuarine waters;

14. investigate the potential of using hard substrate to establish vegetated areas for juvenile fish habitat;

15. conduct or contract for a cost/benefit analysis of the use of FADs in local waters;

16. determine the effectiveness of FADs for local waters and conditions by evaluating one or more experimental FAD projects;

17. research the jurisdiction and administration of FADs, including the State's ability to regulate the installation of such structures in Federal waters;

18. if the above mentioned research proves it to be necessary, pursue legislation that would enable DMR to regulate and control the use of FADs in State and adjacent Federal waters.

1. INTRODUCTION

Artificial reefs have been used for centuries in different parts of the world to attract marine organisms and make them available for harvest. Those who construct artificial reefs attempt to simulate the habitat of particular species of fish, crustaceans or molluscs, utilizing a variety of materials ranging from derelict ships and old tires to specially designed plastic, steel and concrete modules. According to Stone (1985) properly constructed artificial reefs can:

a) enhance fish habitat;

b) provide more accessible fishing grounds;

c) benefit anglers and the economies of shore communities;

d) increase total fish biomass within a given area; and

e) provide managers with another option for conserving and/or developing fishery resources.

However, improperly constructed artificial reefs can be ineffective, interfere with other activities or damage natural habitat.

Although artificial reefs have been in use in the United States for over a hundred years, lately interest in them has increased. Recent years have seen increasing demand for fishery products, increasing energy costs to the fishing industry, and a general decline in fishery resources and habitat quality. These factors prompted the US Congress in 1984 to pass the National

Fishing Enhancement Act (the Act) (Appendix A), which included a call for "responsible and effective efforts to establish artificial reefs" in US waters. According to the Act, artificial reefs should be constructed so as to provide: maximum enhancement of the fisheries; increased accessibility to US fishermen; minimum conflicts between user groups; minimum risks to the environment and to the health and safety of people; and no hazard to navigation or breach of international law. The Act also directed the Secretary of Commerce to formulate a long-term plan for artificial reef development. A year after passage of the Act, the National Artificial Reef Plan was published by the National Marine Fisheries Service (NMFS) as a guide for siting, design, construction, materials, monitoring and maintenance of artificial reefs. The Plan enjoined states and regional planners to develop their own plans sensitive to local environmental, economic and social conditions.

The State of New York, through its Department of Environmental Conservation, Division of Marine Resources (DMR) has produced this Marine Artificial Reef Development and Management Plan to fulfill its obligation under the National Fishing Enhancement Act, in accordance with the standards of the National Artificial Reef Plan. The DMR derives its authority to develop and manage marine artificial reefs from New York State's Environmental Conservation Law (ECL), Section 11-0303. The ECL empowers DMR to manage the fish and wildlife resources of the State, including the "maintenance and improvement of...natural resources and... administration of measures for making them accessible to the people of the state". Further, DMR is directed "to develop and carry out programs and procedures which will...promote natural propagation... of desirable species" and restore and improve important habitats. The DMR recognizes the value of artificial reef construction as a

sound management technique for the accomplishment of these directives. The DMR has had an artificial reef program since 1962 and continues to design, site and build reefs within its jurisdiction. This Plan is the first step toward the systematic development of a progressive reef program that is an integral part of marine fisheries management strategy for the State.

Artificial reefs have been used as fishery management tools, solid waste disposal options, or as mitigation for disruption or loss of various marine habitats. Outside of the general mandate contained in the ECL, there have been no established New York State policies regarding the use of artificial reefs in the Marine District for any purposes. The lack of a comprehensive theory or explanation of artificial reef function, coupled with the variety of motivations for reef construction, can create an atmosphere of confusion or inattention that could be exploited to the possible detriment of the resources and the public interest. This Plan will provide a focus for policy and establish the guidelines for artificial reef construction in the Marine District. However, as pointed out by Ditton and Burke (1985), "A plan will not substitute for effective leadership, organization and constituency support."

2. MANAGEMENT ENVIRONMENT

The management environment for artificial reefs in the Marine and Coastal District of New York (Marine District) is comprised of a suite of social, economic, political, and ecological factors that place increasing demands upon the fishery resources and the resource manager. Any artificial reef program operated within this environment will necessarily be as complex and varied as the environment itself. It is important that the critical components of the environment are considered in the planning process.

2.1. HISTORICAL PERSPECTIVE.

The first artificial reef on record in New York waters was built in the Great South Bay in the mid-1920's when a number of wooden butter tubs half-filled with concrete were sunk in several locations by the Boatmen's Association of Great South Bay. Wooden boxes, also half-filled with concrete, were sunk in the Bay in 1946 and 1947 in a program carried out by the Bay Shore Tuna Club. Artificial reef were created in the Atlantic Ocean as well, with the McAllister Grounds in 1949 and the Schaefer Grounds in 1953.

Since its inception in 1962, New York's marine artificial reef program has received twelve permits from the US Army Corps of Engineers and DEC, though most have expired. Materials were placed on ten sites, and eight are managed as the current reef system. All reefs were built based upon interest by specific sport fishing groups, with one exception (Shinnecock Bay Artificial Reef was built as a research project). The reefs were sited close to inlets to provide access by these groups. The early objectives for artificial reef construction were the enhancement of fishing opportunity and fishery habitat. Based on anecdotal information, New York's artificial reefs have provided increased fishing

opportunity. The perceived resource benefits, however, have been scientifically evaluated for reefs in the Marine District only rarely (Briggs & Zawacki 1974; Briggs 1975). In most cases, it is assumed that the reefs are meeting resource objectives.

Prior to DMR involvement in artificial reef construction, several de facto artificial reefs were created as a result of disposal operations; for example the dumping of "cellar dirt", building rubble, and excavated rock. Much of the material placed on artificial reefs today is some form of waste. This history may be responsible for the fostering of some misconceptions in the public mind: that any "junk" dumped in the ocean will make quality fishing grounds; or that the construction of artificial reefs is just ocean dumping in disguise. Indeed, some historically prime fishing areas have been created by disposal operations, for example the Tin Can Grounds (incinerated wastes) and the Subway Rocks (excavated rock). These successes may be overshadowed by high-visibility pollution events, such as the floatable waste wash-ups on Long Island beaches during the summer of 1988, allegedly caused by ocean dumping. Events like these have focused public attention on the negative environmental consequences of disposal practices and away from the positive benefits of a properly managed artificial reef program. Increasingly, the use of our coastal waters and oceans for disposal of any wastes is viewed less favorably by a growing number of people. Agencies and responsible environmental groups are working to make the public aware of the risks associated with this activity. Artificial reef managers need to educate the public about the potential positive benefits of an artificial reef program while emphasizing the distinction between such a program and ocean disposal.

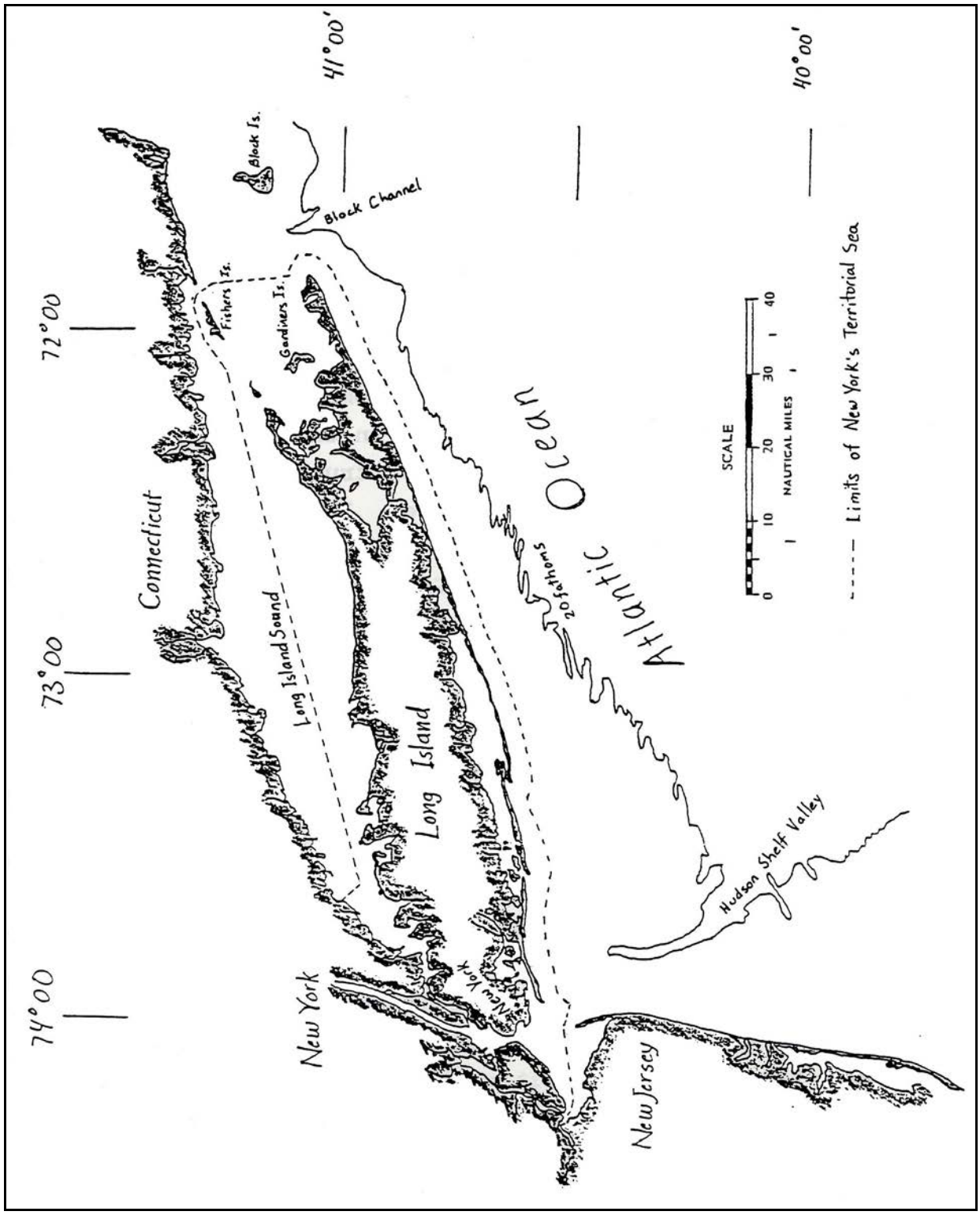


Figure 1. Locator map for the Marine and Coastal District of New York. Area covered by the Plan includes the Marine District and the ocean floor out to approximately the 20-fathom isobath.

2.2. LOCATION.

Section 13-0103 of the ECL defines New York's Marine and Coastal District as: "...the waters of the Atlantic Ocean within three nautical miles from the coast line and all other tidal waters within the state, including the Hudson River up to the Tappan Zee Bridge" (Figure 1). This area encompasses several bodies of water or parts thereof, including the Hudson River, Upper and Lower Bays, Raritan Bay, Long Island Sound, the Atlantic Ocean, and all of Long Islands bays, inlets, harbors, and tidal rivers. The underwater lands within the Marine District are under proprietary control of the state's Offices of General Services and Parks, Recreation and Historic Preservation, local townships, private individuals and other interests defined as "persons" by Section 11-0103 of the ECL (e.g., corporations).

DMR's artificial reef program will include placement of reefs in adjacent Federal waters in addition to those in the Marine District. Since accessibility to the reefs is a prime concern, reefs built within Federal jurisdiction will not usually be more than 15 miles from the coast of New York. For the purposes of this Plan, this area will be roughly described as those waters and underwater lands within the boundaries of the Hudson Shelf Valley in the west, Block Channel in the east, the 20-fathom curve in the south and New York's Territorial Sea in the north.

2.3. NATURAL RESOURCES.

2.3.1 Physical Characteristics. The area covered by the Plan can be roughly divided into estuarine and oceanic systems. The estuarine portion includes Long Island Sound and the contiguous harbors of Long Island's north shore, the Hudson River and New York Harbor area, Long Island's south shore bays, and the Peconics/

Gardiners Bay system. As a temperate estuarine system, the Marine District is a dynamic environment, subject to the variable interactions of tidal and wind forces, freshwater inputs, and basin geomorphology. Freshwater sources include surface runoff, river discharge and groundwater seepage. Hudson River discharge strongly influences circulation patterns in the New York Harbor, producing a partially mixed, stratified flow with surface flow down-estuary and bottom flow up-estuary. Long Island Sound exhibits stratified flow, with net surface flow to the east and net bottom flow to the west, though bottom circulation patterns are not well known. Bottom waters of eastern Long Island Sound, with maximum depths of over 300 feet, are cold, dense marine waters that do not mix with the surface waters of the Sound. The south shore bays are shallow, strongly influenced by wind energy and generally well-mixed. The Peconics/Gardiners system is well-mixed due to turbulent tidal flow through narrow channels to the north and south of Shelter Island (Hardy 1976). Tides are semidiurnal (twice daily) with mean spring tides range from 1-5 feet in the south shore bays to 8.5 feet in western Long Island Sound (Swanson 1976). Temperatures range from 0 to 27^{o} C seasonally. Salinity ranges from 0 to 30 ppt. Salinity and temperature distributions exhibit spatial and temporal variability based upon seasonal, climatological and geomorphological factors.

The oceanic area covered under this Plan includes that portion of the Atlantic Ocean that is within the following bounds: Hudson Shelf Valley in the west; Block Channel in the east; roughly the 20-fathom isobath in the south; and within 1/2 mile of Long Island's south shore in the north. The 20-fathom curve is as far as 26 miles south of Jones Inlet and as close as 6 miles south between Bridgehampton and Amagansett, NY. The bottom in this area slopes gently from about 25 feet to 120 feet MLW. Mean spring

tides range from 3 feet in the east to 6 feet in the west (Swanson 1976). General circulation patterns are variable and influenced by season, climate, and tides, with a net flow to the southwest except for the Hudson Shelf Valley where flow is to the northwest. Waves can be generated by wind, tides, and density gradients. Storm waves will reach heights of 12 feet or more in this area. Bottom temperatures range from 1 to 21° C, with salinities of 30 to 33 ppt.

New Jersey's Artificial Reef Plan (New Jersey Department of Environmental Protection 1987) described the ocean floor off New Jersey as "characterized by a sand or sand mud plain interrupted by submarine sand ridges separated by clay-bottomed depressions or swales." This description fairly describes the whole of the New York Bight area and off Long Island as well. This area is fairly flat and gently sloping. The only natural rock bottom in the Bight extends roughly from the Shrewsbury River in New Jersey to East Rockaway Inlet, New York. This reef is mostly covered with sand. Areas where the rock is exposed have become productive fishing grounds for reef species. The limited rocky habitat in the region is supplemented with areas of bottom where gravelly sediments will allow attachment of sessile organisms and with a scattering of vessels sunk by accident or as a result of war. These areas and wrecks have been utilized by fishermen and divers for decades. They are, however, continually being lost to storm damage, general deterioration, coverage by sand, and the activities of man. Major gravel deposits, such as the ones south of Jones Inlet (Figure 2) are counted among the inventory of sand and gravel mining resources and are therefore susceptible to degradation as marine habitat.

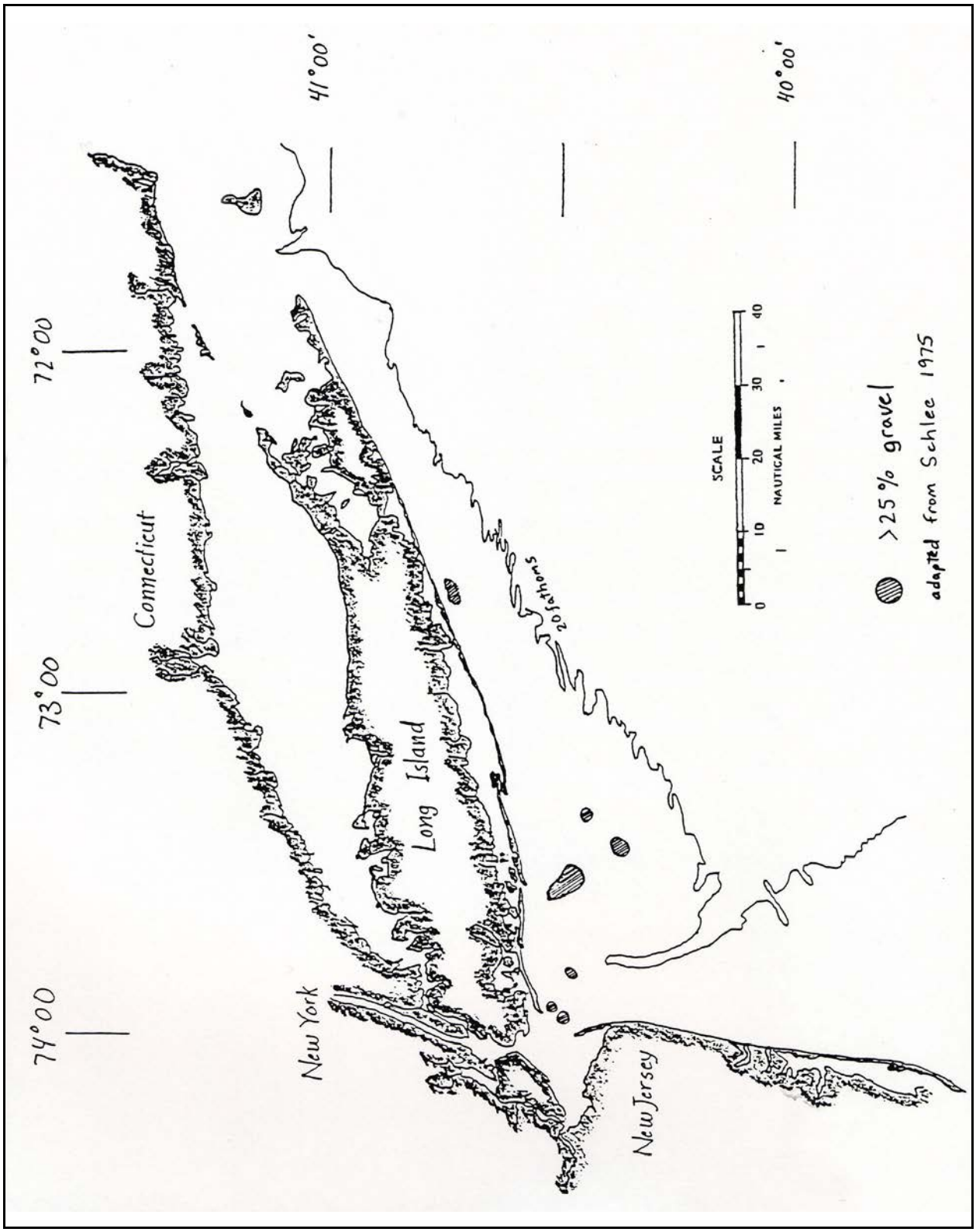


Figure 2. Gravel deposits with potential commercial value in the Plan area.

In contrast with the Atlantic Ocean, Long Island Sound contains a substantial amount of natural rocky or coarse-sediment habitat, particularly in the eastern portion. In addition, there are a number of wrecks that serve as reef fish habitat. The western and deeper portions of the Sound have a clay/silt bottom sediment composition, while near-shore areas offer sand/mud, sand, sandy gravel or cobble substrate. Areas protected from wave and strong current action are depositional environments with fine-grained sediments, while areas that are exposed to these forces are characterized by coarser sediments. In general, Long Island Sound is rich in hard-substrate habitat compared with the Atlantic off Long Island's South Shore, though the predominant substrates are sand and mud.

2.3.2 Living Resources. Though many of the same plant and animal species are found throughout the Marine District, their distributions and abundances normally vary dependent upon the habitat characteristics, season, water temperature, distance from shore, water depth, location and population status. In general, artificial reef construction will occur in a limited habitat range, specifically on subtidal (>15 feet deep) firm sand or sand/gravel substrate devoid of vegetation and existing concentrations of commercially important shellfish species. The reef sites may be adjacent to a variety of habitats, including sand/mud bottom, rocky reef or patches of vegetation. Invertebrate organisms, including deposit and filter feeders (polychaete worms, crustaceans, molluscs) and their predators (crabs, lobster and snails), are abundant in these habitats though the species composition will be different among the habitats. Rock and other hard substrate serves as point of attachment for sessile invertebrates such as tube-dwelling polychaetes, mussels and barnacles, while fine-grained

sediments are manipulated to create burrows and tubes by worms, amphipods and lobsters. In addition, sand and mud are habitat for commercially important bivalve molluscs such as the quahog (Mercenaria mercenaria), surf clam (Spisula solidissima), and ocean quahog (Arctica islandica). Vegetated areas, including eelgrass (Zostera marina) beds and areas of attached macroalgae, harbor sessile and motile invertebrates as well as many juvenile fish species.

Most fish species of the New York Bight and Long Island Sound areas are migratory with seasonal variation in distributions and abundances. Even species that are considered residents undergo limited inshore/offshore seasonal migrations and seasonal changes in behavior patterns. Smaller individuals of cunner (Tautogalabris adspersus) and tautog (Tautoga onitis) appear to remain inshore in the winter, when larger members of the species move off to deeper waters. This pattern varies, as well, with location.

Table I lists many important fish and crustacean species of the region. These species can be classified based upon their relationship with structured habitat as reef-associated or reef-frequenting. Reef-associated species are those that spend at least a portion of their life cycle in close association with hard-substrate habitat and derive from it some needed benefit, such as food or shelter. Reef-frequenting species are commonly found on or in proximity to this habitat, though they are found in non-reef habitat as well. The benefits derived from this relationship are often unclear. These classifications are general, since many species not commonly found on structured habitat may be found on or near it at some time or point. Some of the reef-frequenting species, such as the tunas, may be found only over deep-water wrecks and only for brief periods during the year. Cod, red hake

Table I. Important recreational and commercial species associated with structured habitat, including wrecks, in New York's Marine District.

Reef-associated species	
Black sea bass	Centropristis striata
Tautog	Tautoga onitis
Cunner	Tautogalabris adspersus
Atlantic cod	Gadus morhua
American lobster	Homarus americanus
Rock crab	Cancer irroratus
Reef-frequenting species	
Scup	Stenotomus chrysops
Pollock	Pollachius virens
Red hake	Urophysis chuss
Summer flounder	Paralichthys dentatus
Winter flounder	Pseudopleuronectes americanus
Striped bass	Morone saxatilis
Bluefish	Pomatomus saltatrix
Weakfish	Cynoscion regalis
Yellowfin tuna	Thunnus albacares
Bluefin tuna	Thunnus thynnus
Goosefish	Lophius americanus
Grey triggerfish	Balistes capriscus
Spiny dogfish	Squalus acanthius
Blue shark	Prionace glauca
Atlantic mackerel	Scomber scombrus

and pollock appear seasonally on deeper structure as well. The inshore hard-substrate areas are used by tautog, scup, black sea bass, cunner and red hake, with scup and tautog dominant in Long Island Sound and black sea bass, red hake and tautog predominant along the South Shore. Cunner are rarely targeted as a fishery, yet are one of the most numerous and frequently caught species.

The ecology and biology of the species listed play an important role in their utilization of artificial reefs. Some species are dependent upon the reefs for food and shelter while others are simply aggregated by structure. For those fish that are merely aggregated, artificial reefs may intensify and accelerate the effects of overfishing. Artificial reefs may not be important for highly migratory species, or they may briefly interrupt migration patterns. Certain reef-associated species, such as tautog, are slow-growing and long-lived, making them especially susceptible to overfishing.

Reef-associated fish species present a management challenge for the present and future. If artificial reefs are to play a role in a comprehensive management scheme, their relationship with the fish species that utilize them must be more clearly understood. For example, estuarine nursery grounds are more important than coastal reef habitat for juveniles of many reef species. The management of reef species must be sensitive to the essential habitat requirements of all life stages of these valuable resources.

2.4. HUMAN RESOURCES.

2.4.1 Fisheries. The Marine District and adjacent Federal waters support an important commercial fishing industry in New York, though landings have declined since the 1960s. The main gear types employed include: trawls for finfish and squid; pots for lobster and finfish; gill nets, trap nets, and hook and line for finfish; and rakes, tongs, and dredges for shellfish. Table II lists estimated New York 1989 recreational catch and commercial landings and values for many important species. The value of the commercial catch is given as the ex-vessel value of the landings without multipliers. The true economic impact of the commercial

fishing industry can only be understood when one considers the value of related service and supply industries, seafood wholesale, retail, packing and shipping. The commercial fishing and related industries employ thousands of people and pump millions of dollars into local economies.

If the commercial fishing industry is of vital importance to the regional economy, the sport fishing industry is probably even more valuable. A recent study by Kahn (1989) of the economic value of the regional sport fishing industry estimates that nearly 1.2 million anglers participate annually in recreational fishing in the New York City/Long Island area. These anglers spend an estimated 1.1 billion dollars (1987 dollars) to go fishing. Total economic effect including multipliers could range from 1.5 to 4.7 billion dollars annually. Kahn's conclusion was that "the deterioration of recreational fishing" in the region "would have serious economic consequences". Preliminary data from the National Marine Fisheries Service's 1987 Marine Recreational Fisheries Statistics Survey give an estimate of 25% less than Kahn for numbers of anglers, yet when Kahn's analysis is applied to these data, the total economic effect is still 1.1 to 3.5 billion dollars. The full economic potential of sport fishing in New York may not be realized, however, as the growth in the number of saltwater anglers has failed to keep pace with regional population expansion.

Traditionally, artificial reefs have been considered favorably by only the recreational fishermen able to locate and utilize the reefs, a few commercial pot fishermen, and SCUBA divers. Most recreational fishermen in the Marine District fish the bays or Long Island Sound (Kahn 1989) and have little experience with artificial reefs. Commercial activity on artificial reefs is limited by the acreage developed. The non-fishing public is largely unaware of

Table II. 1989 New York fishery catch and landings for selected species (preliminary data).

	RECREATIONAL CATCH (number of fish)	COMMERCIAL LANDINGS (pounds)	COMMERCIAL VALUE (dollars)
Tautog	1,156,300	285,400	175,932
Cunner	1,664,700	-	-
Scup	3,939,200	1,328,600	1,606,676
Black sea bass	906,700	77,300	122,255
Atlantic cod	333,300	778,400	636,757
Pollock	63,000	3,100	775
Red hake	232,700	527,000	165,334
Summer flounder	449,900	1,463,700	2,589,441
Winter flounder	3,570,200	1,041,000	1,054,573
Bluefish	5,041,100	564,600	191,253
Striped bass	381,800	**	**
Weakfish	7,800	103,500	121,596
Butterfish	-	674,900	492,000
Tilefish	-	549,000	1,174,013
Goosefish	-	427,500	254,380
Whiting	-	9,059,300	2,859,449
Yellowtail flounder	-	848,600	1,238,671
American lobster	26,400*	2,345,100	7,750,958
Longfin squid	-	6,726,000	3,255,238
Hard clam (quahog)	-	2,854,300	21,712,011
Surf clam	-	6,324,300	2,352,892

Data from National Marine Fisheries Service Statistics Branch

* - data collected by NYDEC; value is given in pounds
** - commercial fishery closed

the existence or utility of the reefs. This situation is changing as fishermen and non-fishermen alike recognize the need for resource management, habitat enhancement and environmental quality control.

Although artificial reefs account for a very small part of

local fisheries, a number of factors contribute to an increase in demand for their construction. Included among these is the demand for reefs from the sport fishing public with more leisure time and financial resources to devote to their sport. Artificial reefs are known fishable locations that hold the promise of successful fishing trips for anglers who are able to exploit them. In addition, electronic navigation and fish locating equipment is less expensive, more reliable, easier to use and more widely available than in the past. This equipment gives anglers the capability to locate structure that holds fish and return to that structure time and again, increasing exploitation rates and competition for fishing spots. Artificial reefs can be used to reduce conflicts.

In addition, lower fish stock levels plus increased demand drive up prices and commercial exploitation rates of targeted species and shift fishing effort onto previously under-utilized stocks, such as tautog. The angling public see artificial reefs, if properly designed and sited, as providing a management option to offset this increased fishing effort.

2.4.2 Archaeological Resources. The remains of many shipwrecks and other potential archaeological resources can be found on the underwater lands of the Marine District and adjacent Federal zone. Many of these sites have been discovered and visited by recreational and salvage divers (Berg 1990). Anglers as well exploit the fish that are attracted by these wrecks. Section 223 of the State Education Law protects archaeological sites and objects of historic interest on State lands. No artifacts may be removed without written permission from the Education Department through the New York State Museum. Under current Federal law, the responsibility for management of all existing historic shipwrecks on Federal underwater land is transferred to the states.

Therefore, within the area covered under this plan, all existing wrecks are potentially under the control of New York State through the Education Department.

2.4.3 Sand and Gravel Mining. Sand and gravel have been removed from the New York Harbor area for beach maintenance and building and roadway aggregate. These resources have not been utilized extensively from the remaining portion of the area covered by this Plan, though this potential does exist. The surficial sediments of this area consist of a sheet of sand up to ten meters thick in places, with patches of gravel and muddy sand (Freeland and Swift 1978). This resource is controlled by the NY Office of General Services (OGS) and the US Minerals Management Service (MMS).

2.4.4 Marine Disposal of Waste. Waste disposal operations continue in this area, though this activity has been and continues to be curtailed through legislation. There are still a number of waste outfalls and some dumping activity in the New York Bight, which contribute to major water quality degradation.

2.4.5 Navigation. The ports of the New York/New Jersey harbor area are host to heavy commercial sea traffic from around the world. Three sets of navigation lanes have been established to help separate and control this heavy traffic (Figure 3). Although many other uses of marine resources are not precluded from these lanes, the constant ship traffic necessarily limits certain activities, including fishing.

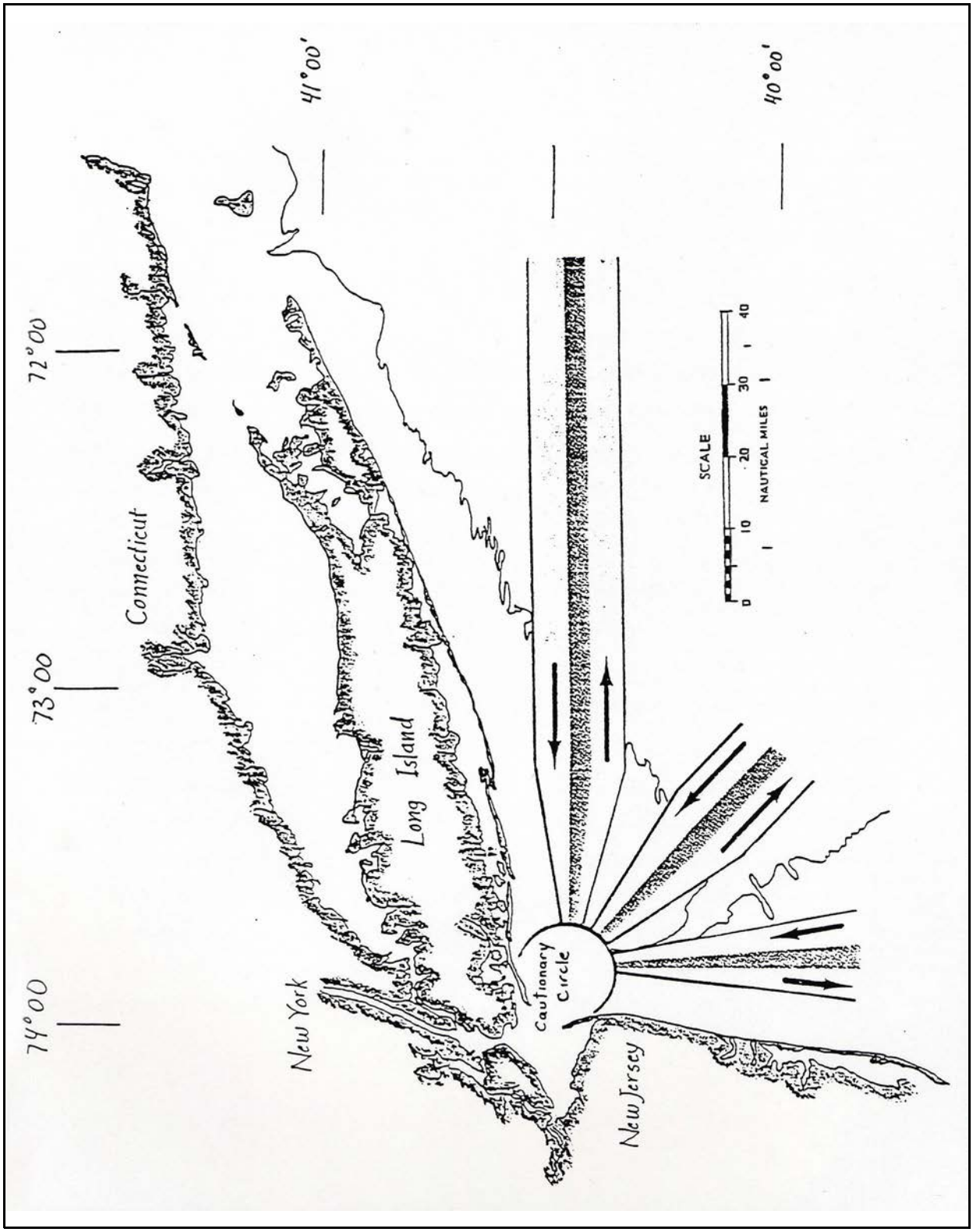


Figure 3. Major shipping routes into the ports of New York and New Jersey.

2.5. ARTIFICIAL REEF RESOURCES.

DMR currently manages eight artificial reefs in the Marine District (Figure 4). This system has developed primarily due to interest within local sport fishing communities. All the reefs are located within a few miles of major inlets and fishing centers. Nearly all materials placed on these reefs were locally available materials of opportunity (see Appendix D). In siting and developing these reefs, the goals and objectives for each were similar--increase local fishing opportunities.

The following is an evaluation of the status of the existing artificial reefs in the Marine District:

INSHORE REEFS

(1) ROCKAWAY BEACH

Type: benthic.
Dimensions: 2000 yards by 1000 yards.
Permit expiration: June 1990.
Hydrographic survey: June/July 1988 - I.U.C., Inc..
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter & private boat; commercial pot.
Diving activity: unknown.
Monitoring: none.
Status: more than 50% developed; anecdotal information indicates that large portion of reef is difficult or impossible to fish due to anchor and gear fouling; MOU with NY DOT Region 11 commits remaining undeveloped area to rubble generated from specific DOT projects.

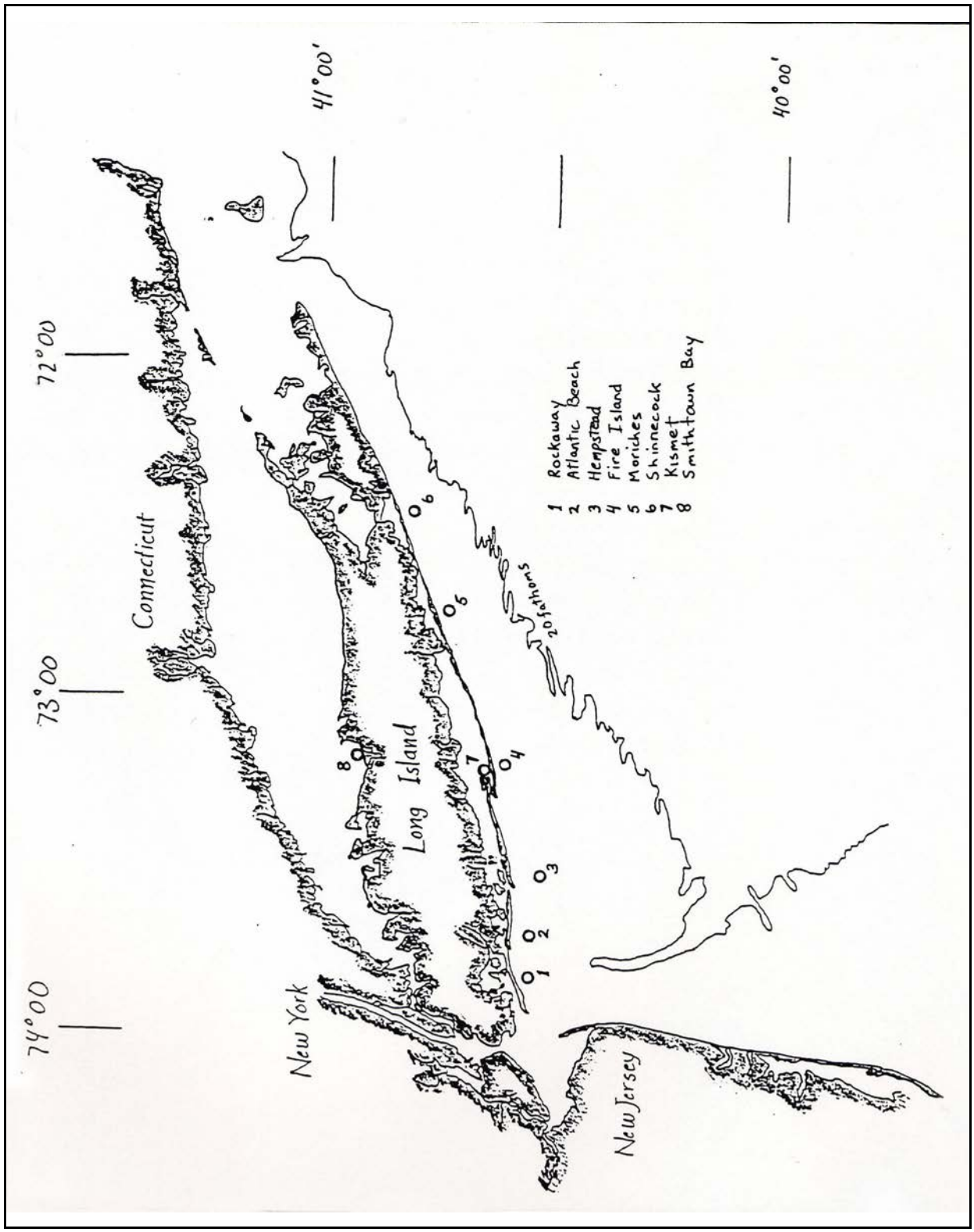


Figure 4. Existing artificial fishing reefs in New York's Marine and Coastal District and contiguous Federal zone.

(2) ATLANTIC BEACH

Type: benthic.
Dimensions: 2000 yards by 1000 yards.
Permit expiration: September 1988.
Hydrographic survey: June/July 1988 - I.U.C., Inc.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter & private boat; commercial pot.
Diving activity: yes, on tug 'Fran S'; rest unknown.
Monitoring: none.
Status: approximately 50% developed; anecdotal information indicates that large portion of reef is difficult or impossible to fish due to anchor and gear fouling; MOU with NY DOT Region 11 commits remaining undeveloped area to rubble generated from specific DOT projects.

(3) HEMPSTEAD TOWN

Type: benthic.
Dimensions: 3000 yards by 1200 yards.
Permit expiration: February 1999.
Hydrographic survey: July 1988.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter and private boat.
Diving activity: unknown.
Monitoring: none.
Status: permit renewed February 1989; original permit expired

in 1970; very small amount of material in relation to reef site area; ROV survey in December, 1988 showed substantial biological activity on sandy bottom over site.

(4) FIRE ISLAND

Type: benthic.
Dimensions: 1760 yards by 176 yards.
Permit expiration: December 1989.
Hydrographic survey: May 1989 - DMR.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter and private boat; commercial pot and gill net.
Diving activity: recreational charter and private boat.
Monitoring: none.
Status: reef is approximately 20% developed; many materials close to, but not on site; CWARP reported buried in 1989; wing walls of wood drydock reported collapsed in 1988.

(5) MORICHES

Type: benthic.
Dimensions: 450 yards by 150 yards.
Permit expiration: May 1985.
Hydrographic survey: none.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party and private boat; commercial pot.

Diving activity: unknown.
Monitoring: none.
Status: unknown.

(6) SHINNECOCK

Type: benthic.
Dimensions: 450 yards by 150 yards.
Permit expiration: October 1995.
Hydrographic survey: none.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational charter and private boat; commercial pot.
Diving activity: recreational private boat.
Monitoring: none.
Status: unknown.

ESTUARINE REEFS

(7) GREAT SOUTH BAY (KISMET)

Type: benthic.
Dimensions: 1000 yards by 50 yards.
Permit expiration: August 1977.
Hydrographic survey: none.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter and private boat.
Diving activity: recreational private boat.

Monitoring: none.
Status: site considered fully developed by mid 70's; receives heavy fishing pressure, very popular.

(8) SMITHTOWN BAY

Type: benthic.
Dimensions: 150 yards by 100 yards.
Permit expiration: June 1989.
Hydrographic survey: none.
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Fishing activity: recreational party, charter and private boat; commercial and recreational pot.
Diving activity: recreational private boat.
Monitoring: Town of Smithtown SCUBA surveys.
Status: anecdotal information indicates site is near capacity; condition of materials unknown.

3. GOALS AND OBJECTIVES

3.1 GOALS

The goals of New York's Artificial Reef Program are:

(a) to provide fishing and diving opportunities for reef-associated fishery resources by selective placement of artificial habitat in State and adjacent Federal waters;

(b) to enhance or restore fishery resources and associated habitat, to the maximum extent practicable, utilizing artificial habitat; and

(c) to administer and manage artificial habitat to ensure its prudent use as part of an overall fisheries management program.

3.2 OBJECTIVES

In order to achieve these goals, the Division of Marine Resources (DMR) needs to accomplish the following objectives:

(a) construct, repair and maintain its artificial reefs under a unified permit system;

(b) conduct an evaluation of the effectiveness of existing artificial reefs in achieving program goals;

(c) establish a fisheries survey program to monitor fish and crustacean populations associated with artificial reefs;

(d) site, design and construct additional artificial reefs, as warranted, in a manner consistent with standards contained in this Plan;

(e) maintain an artificial reef information system, coordinated with the ASMFC Artificial Reef Committee, and provide a mechanism for public dissemination of this information; and

(f) ensure that all artificial reefs/habitat constructed in the Marine District comply with all Federal and State rules and regulations and are consistent with State and regional management strategies for reef-associated stocks.

4. POLICY

4.1 PROGRAM ADMINISTRATION

Artificial reefs constructed in State and contiguous Federal waters should be designed and built for the purposes outlined in this Plan. DMR is best suited to ensure that reefs built in waters within its jurisdiction are in accord with the plan. In addition, DMR has authority over and responsibility for the marine resources of the State and should therefore direct and coordinate all reef building activities in State waters and be the primary agent for these activities in contiguous Federal waters.

As coordinator for artificial reef construction in the Marine District, DMR will undertake all administrative responsibilities, including:

a) obtaining necessary permits and authorizations;

b) acting as point of contact for potential donors of reef materials;

c) coordinating public involvement and volunteer efforts;

d) maintaining and disseminating information about reefs for the public;

e) coordinating all legal aspects of and assuming pertinent liability (see Appendix C);

f) participating in regional and national artificial reef planning and management activities; and

g) directing research efforts.

4.1.1 Permits. Artificial reef construction requires permits from several agencies at the State and Federal levels. At the beginning of the permit process, DMR will coordinate the siting of all potential reefs with New York's Office of General Services, Division of Land Utilization. For all artificial reefs constructed, a permit is required from the US Army Corps of Engineers (COE) under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and, in association with the US Environmental Protection Agency (EPA), Section 404(b) of the Clean Waters Act of 1972 (33 USC 1344). The COE has final authority over the permit process, and coordinates the review of artificial reef applications with the following: the EPA, the Coast Guard, Fish and Wildlife Service, National Marine Fisheries Service and others. Also, the COE must comply with sections of the Coastal Zone Management Act of 1972, Marine Protection, Research, and Sanctuaries Act of 1972, Federal Water Pollution Control Act of 1972, and the Consolidated National Pollutant Discharge Elimination System regulations for any permits they issue. For more detailed information on the COE permit policy, the reader is referred to Appendix D.

In addition to the COE permit, the DEC needs to comply with the State's Environmental Quality Review (SEQR) regulations. The SEQR requirement is mandatory for any operation by a State agency. This process ensures compliance with Section 102 of the National Environmental Policy Act of 1969 (NEPA). This, in the case of reefs for fisheries enhancement, is accomplished by completing an environmental assessment and determining whether the proposed action will have a significant adverse impact on the environment. If so, an Environmental Impact Statement must be prepared; if not, a Negative Declaration will be prepared and filed. For reefs built

within the State's Territorial Sea and Internal Waters, the DEC will need to apply to its Division of Regulatory Affairs for certification under Section 401 of the Clean Water Act, and to determine the project to be consistent with the policies set forth in the Department of States's Coastal Management Program.

DMR constructed artificial reefs in the past under the assumption that they would have only positive impacts on the local environment. The COE has never required DMR to prepare a full environmental impact statement (EIS) for any artificial reef project. The Federal view has been that artificial reefs, when properly constructed and managed, are beneficial to fisheries and other resources. In order to address any concerns regarding the cumulative impacts of all current and future reef construction, DMR has prepared a Generic EIS (GEIS) as part of this Plan. This GEIS outlines the potential positive and negative impacts for the Artificial Reef Program. As noted above, each potential reef site will require a site-specific environmental assessment as part of the permitting process. Any reef built in accordance with the guidelines in this Plan and consistent with the GEIS should receive a Negative Declaration (a written determination that the implementation of the action as proposed will not result in any significant environmental effects) from DEC.

As DMR has traditionally held all artificial reef permits in the Territorial Sea and Internal Waters, and as they exercise authority over the marine resources in the region (ECL Section 11-0303 par.1), every artificial reef in the region should be planned, designed, sited and built under the auspices of the State alone. This would ensure that all reefs constructed in State waters would be consistent with goals, objectives and guidelines of the State's reef program as outlined in this Plan. DMR is the sole entity,

public or private, that may legally receive a permit for the construction of an artificial reef in the marine waters of the State (see Appendix E).

The General Permit. DMR currently manages eight planned and permitted artificial reefs, though the permits have expired for six of these. In order to properly maintain and manage its artificial reefs, DMR will need to renew the permits for these sites. In addition, the number of reef sites under DMR control could double in the next five years. The administrative demands of obtaining and renewing 16 or more individual permits would tax the resources of the reef program.

A more efficient means of maintaining permits for DMR's reefs is the general permit. A general permit would allow DMR to construct, enhance and maintain all artificial reefs and fish aggregating devices (FADs) under its control, with a single permit process and public review necessary for renewal. North Carolina's Division of Marine Fisheries, in cooperation with the Wilmington district COE, developed a general permit that covers several of their 42 reef sites. As other sites come due for permit renewal they are included under the general permit. This general permit has substantially improved the efficiency of their artificial reef operations and management (Steve Murphey, personal communication).

4.1.2 Materials Donations and Acquisitions. DMR will continue to act as point of contact for the donation of materials to the artificial reef program. These materials must meet the standards established in this plan. For materials to be considered for use in the artificial reef program, the following procedure is required:

a) The donor must complete a DONOR'S REQUEST FORM available from DMR's office in Stony Brook. The completed form must contain a detailed description of the materials, including type, approximate quantities, and drawings or photos. In addition, the donor must describe their plan for placement of the material on the reef site.

b) The donor must provide a Certificate of Insurance that indicates that they have liability insurance for the operation. In the case of a vessel, proof of ownership is required.

c) DMR will arrange for an inspection of the materials, including a representative of the US Coast Guard's Vessels Compliance Section if the material is a vessel.

d) When all requirements are met, DMR will provide a LETTER OF PERMISSION to the donor. If materials are conditionally acceptable, DMR will withhold the letter, provide instructions on how to properly prepare the materials for deployment, and arrange for a reinspection. DMR will provide the donor with the name and location of the artificial reef and a statement of the donor's responsibility and liability (see Appendix B).

e) DMR will coordinate with the donor and any contractor providing services, arrange date of deployment, and provide oversight on the deployment operations.

Acquisition of quality reef materials is essential for the effective operation of an artificial reef program. The history of DMR's program has been one of feast or famine. This was due to the absence of a full-time program coordinator and lack of dedicated

funding. A priority has been placed by this Plan on the acquisition of steel vessels for artificial reefs. New Jersey, with dedicated funding, has been able to place nearly 30 steel vessels on their reefs in the four years prior to this writing (Figley 1989). New York has placed only nine vessels--seven of these wood--on its reefs in this period. Most of New Jersey's vessels were acquired from within the Port of New York. The completion of this Plan and addition of full-time staff (as of May 1988) will help DMR in its competition with New Jersey for vessels, but a dedicated, stable budget for construction of reefs is essential to this task.

4.1.3 Citizen Participation. In its role as coordinator for artificial reef development in the Marine District, DMR will work with all interested groups and encourage them to take an active role in construction of artificial reefs under State-held permits. Ways for these groups to become involved include:

a) contributions of labor and/or loan of equipment for reef construction;

b) organizing fishing tournaments, the proceeds of which could be used for reef construction;

c) volunteer of diver services for biological survey of potential reef sites or existing reefs, and for cleanup of reefs, including removal of entangled fishing gear;

d) contributions of money to a dedicated, non-profit artificial reef foundation;

e) participation in a reef user survey, possibly in the form of

a log book, which would provide DMR with information about reef usage, catch, catch per unit of effort, fishing methods and effectiveness of reefs;

f) participation in reef resource conservation programs that go beyond enforcing regulations, e.g., size and catch limits, tagging programs, etc.; and

g) provide suggestions and information about potential locations for artificial reefs.

DMR, in turn, should maintain accurate information about its artificial reefs and be certain that this information is available to the public in a convenient and understandable form. This could be accomplished in the following ways:

a) publish an artificial reef guide that would include reef maps, coordinates, materials inventories, and dates of deployments as well as information on fish species, how to catch them on the reefs, and good fishing conservation practices, i.e., the "ethical angling" concept;

b) provide periodic press releases to keep the public abreast of artificial reef activities;

c) produce an instructional videotape that describes the artificial reef program, its goals and objectives, and what the public can do to help;

d) provide staff for lectures and talks on artificial reefs to clubs and organizations.

Policy: DMR will solicit and facilitate citizen participation to the greatest possible extent. The establishment of a non-profit artificial reef foundation, through an entity such as "The Fisherman" magazine, should receive highest priority.

4.1.4 Liability. Certain risks are involved during and after construction of artificial reefs. According to Stone (1985), these include:

a) injuries or damage to personnel or equipment during handling and transportation of reef materials;

b) placing materials off site, creating a hazard to fishing gear and navigation;

c) damage to vessels in transit over reefs;

d) injury to sport divers;

e) movement of materials off site; and

f) environmental hazards due to improper cleaning or toxic materials.

The National Fishing Enhancement Act of 1984 states that no liability exists on the part of the United States, unless through negligence of the COE in issuing the permit. Therefore, liability should be addressed pertaining to the materials donor and the permit holder; in this case the State. Certain liability is incurred during each phase of reef construction. For a complete review of all aspects of these considerations, the reader is referred to Appendix C.

Policy: In order to minimize liability problems, the following policies and procedures are recommended:

a) DMR will strictly adhere to all conditions of any permit it is issued by the COE.

b) Materials donors must demonstrate proof of liability insurance if they are to prepare, transport and place the materials on site. DMR should consider requiring a performance bond or indemnification agreement of any independent contractor involved in these stages.

c) DMR will publish warnings to mariners, fishermen and sport divers regarding the hazards of artificial reef use.

d) DMR will not take title to any reef materials from a donor until such time as the material is demonstrated, using depth soundings, to be resting in a stable configuration on the bottom on the designated reef site. Should the donor not meet these conditions, they will be responsible for the movement or removal of the materials.

4.1.5 Intra/Interagency Coordination. To ensure that DMR's reef program continues to improve and accommodates the needs of the people of the State, DMR will to persist in developing formal and/or informal relationships with appropriate agencies, and continue to participate in artificial reef management on a regional and national scale. The State's program has greatly benefitted from its direct involvement with the Atlantic States Marine Fisheries Commission's (ASMFC) Artificial Reef Committee. Working with the Committee enables the Division to interact with ASMFC member states' reef personnel, as well as the NMFS, the EPA, Sea

Grant, the International Association of Fish and Wildlife Agencies (IAFWA), and the Sport Fishing Institute's Artificial Reef Development Center.

DMR has also begun developing a formal relationship with the NYS Department of Transportation (DOT). Recently, a Memorandum of Understanding (Appendix B) was drafted that would enable the DOT to offer DMR's artificial reef sites to State contractors for disposal of select concrete and steel rubble from specific projects. Bridge reconstruction in the region can be a vital source of the materials needed in DMR's reef program. DMR's ties to DOT should be strengthened and formalized in order that the greatest possible benefit is produced for the people of the State.

In addition, DMR should seek more open dialogue with the COE, EPA and Coast Guard in order to strengthen understanding and facilitate interactions regarding permits and other areas of concern. This is particularly important when dealing with experimental reef materials or designs.

Policy:

a) DMR will continue to actively participate in the ASMFC Artificial Reef Committee and in cooperative regional projects.

b) DMR will seek to expand the current formal relationship with NYS Department of Transportation Region 11 to other regions, and explore similar relationships with other local public works agencies as well.

c) DMR will strengthen channels of communication with Federal agencies involved with permitting artificial reefs.

4.1.6 Program Costs and Funding. In order to fully implement an effective artificial reef program according to the guidelines established in this Plan, stable funding is essential. Current funding consists of Federal Aid to Sport Fish Restoration funds and State matching funds. These funds pay for a full-time reef construction coordinator, the administration of the program, and some seasonal labor. This amount of funding allows DMR to run a limited program based entirely upon materials of opportunity, with little capability for monitoring, maintenance, and research. Reef construction under these conditions is subject to the sporadic availability of materials. DMR needs to secure the funding necessary to provide a basic artificial reef program that includes planning, construction, monitoring, maintenance and research without such heavy reliance upon donated materials and labor.

Burke (1986) provides a good general description of program costs for a basic reef program, with suggested funding options. Costs are incurred in each of several phases, as follows:

Program administration costs include the acquisition and maintenance of permits, inspection of materials, program coordination, staffing and maintenance of records. These costs are borne by DMR. In order to fully implement the recommendations in this Plan, approximately four permanent staff and seasonal help would be required.

Materials acquisition costs include purchase of materials. Traditionally, the majority of materials placed on DMR's reefs are donated at no cost to the State. Some preparation and

transportation costs were financed by the State, through General Fund appropriations and DEC capital construction funds, during the period of 1970-75. If the program is to use prefabricated units as recommended herein, additional funding will be necessary. Often, the cost of acquiring these materials is part of a contracted "package deal" that also includes all preparation, transportation and deployment.

Preparation and cleaning costs are often incurred when utilizing materials of opportunity. Vessels usually require modifications, such as breaching of watertight bulkheads or addition of ballast, as well as removal of pollutants and floatables. Some modifications, such as cutting of additional holes, may be desirable to increase the effectiveness of the reef. These costs are generally borne by the materials donor. Occasionally, these costs may be sufficiently high as to discourage the donation. Funding is needed to pay such costs to encourage the donation of materials with high preparation costs that might otherwise be lost to the program. Some preparation and cleaning could be accomplished by volunteers. In this case, costs could be minimal.

Transportation and deployment phases are often the most costly, depending upon the equipment required and the distances travelled. The most common equipment used are a tug and barge, with a crane sometimes necessary. In the current program, these costs are borne by the materials donor, though some limited funding was available in the past for specific projects. DMR needs to secure a stable source of funds to supplement the donations of equipment and labor. If DMR is to rely upon contracted labor and equipment, costs will be substantial. The alternative is for DMR to provide its own equipment and staff, such as North Carolina and Virginia have done. Initial costs of such an operation would be high, but long-term

savings would be realized over the contractual option. In addition, a waterfront staging area for loading operations will need to be leased or purchased.

Buoying and buoy maintenance are not part of DMR's reef program, mainly because of the enormous costs involved. Should adequate funding become available, marking the reefs should be considered. Buoys provide a much greater number of potential reef users with a means of locating the reefs. In addition, temporary buoys are helpful during deployment operations, especially in areas subject to interference of LORAN C signals.

Monitoring and maintenance are essential parts of a basic reef program, and are required for issuance of a COE permit. The costs associated with monitoring the performance of a reef system, including fishery dependent and independent studies, will be substantial. These costs will include contractual services for research as well as DMR assessment programs.

4.1.7 Research. Artificial reefs have been constructed in the Marine District based mainly upon interest by the sport fishing community. A limited amount of research has been done to quantify the benefits that these reefs are providing to the users and the resource. Though anecdotal information indicates that reefs improve fishing opportunities, DMR needs to collect the type of information necessary to ensure that the management goals of the program are being met. Basic research should be conducted that will accomplish the following objectives:

Determine reef effectiveness. For the reef user, the most easily recognized benefit of artificial reef construction is an apparent increase in fish catches on the reef site. This "obvious"

indication that a reef is successful has not been adequately evaluated or quantified for regional artificial reefs. DMR needs to assess the effectiveness of reefs in achieving program goals and objectives. This assessment needs to be comprehensive and cumulative so that it accurately represents a true picture of the status of the reef-associated fish populations.

Provide baseline ecological data to guide management. There is a basic need for information about the biology of reef-associated fishes and their relationships with artificial reefs. Data needs include age structure, growth rates, fecundity, habitat requirements, and population characteristics for key species. An important question is whether artificial reefs actually increase production (survival and growth) or simply aggregate fish so that they are more easily caught. If reefs do increase production, the mechanisms for and limits to production should be investigated. In order for a reef to be effective, any increased production should equal or exceed the increase in fishing mortality on the reef. Therefore, quantification of production will need to be coupled with monitoring of catch rates, including total catch, catch per unit of effort, and distribution of effort. Research in this area will aid in determining the need for sanctuaries and if artificial reefs can be effective sanctuaries.

Provide socioeconomic data. DMR needs to determine the cost/benefit for artificial reefs in the Marine District. Public input is essential to this process. Surveys of reef users are effective research methods for obtaining the necessary information on user participation and satisfaction. DMR could develop or contract for a reef user survey. DMR has added questions to the NMFS Marine Recreational Fisheries Statistics Survey, and could refine these questions or add more.

Evaluate designs, materials and techniques. Materials evaluation studies will enable DMR to make decisions regarding the continued use of materials used currently. New materials should be evaluated prior to their incorporation into the reef program, especially those with uncertain environmental impacts. Other studies could include: effects of materials placement or orientation on reef effectiveness; comparisons of various designs; cost/benefit analysis of different materials; and fish attractiveness/design relationships, In addition, research in these areas can help determine how to manage artificial reefs effectively with a minimum investment in enforcement.

Identify problem areas. Basic studies will allow DMR to identify major problems and prioritize them for allocation of limited resources. For example, the use of certain materials may be damaging the environment. An analysis of reef materials may determine that the use of a certain material should be discontinued, or even that the materials in place should be removed by DMR, if possible. Other potential problems could include a negative effect of a reef on local non-reef fish populations or on adjacent biological communities.

Many of these research projects are beyond the scope of any individual state reef program, yet the information gained from such studies would be very important to a successful program. Other agencies and institutions, such as universities or environmental consultants, are better suited for some studies. Basic monitoring and some evaluations can and should be accomplished by DMR. DMR needs to coordinate its research with Sea Grant, ASMFC, and research institutions. This can be accomplished by:

a) providing a list of research needs to the scientific community

(such a list has been published by the ASMFC Artificial Reef Committee);

b) reviewing all research proposals for artificial reef-related studies in the Marine District;

c) providing funding for independent research by universities or other contractors; and

d) monitoring the scientific literature on artificial reef studies to eliminate redundant research, propose cooperative research programs with other states or agencies, plan more effective studies, and fund new approaches or methods for assessment.

Policy: DMR will interact closely with Sea Grant, SUNY and other research institutions in achieving its research objectives, possibly providing funds for an Artificial Reef Scholarship.

4.2 DEVELOPMENT GUIDELINES

4.2.1 Siting. The principal concern when deciding where to place an artificial reef is the objective for that specific reef. Reefs constructed in New York will have one or more of the following objectives:

a) enhancement of habitat for reef-associated species;

b) increasing recreational fishing opportunities;

c) increasing commercial fishing opportunities;

d) providing a nursery/sanctuary for juvenile fishes dependent upon structured habitat (primarily in estuaries); and

e) restoration of or mitigation for development-related habitat loss.

In order to meet these objectives, consideration will be given to important socioeconomic, ecological, and regulatory factors, after which a site-specific evaluation will be conducted.

Four main interests need to be considered at this phase of planning: recreational fishermen; commercial fishermen; divers; and interested non-users, e.g., cable-laying companies. Each of these groups can be further subdivided into gear types, fishing methods, consumptive versus non-consumptive, etc. In general, however, we can expect that: a) most recreational fishermen and divers will favor reef construction of any type; b) fishermen using mobile gear will not consider reefs favorably; and c) some environmental advocates may consider some types of artificial reef construction as ocean dumping while, on the other hand, applauding

efforts at habitat enhancement. Therefore, reef construction in New York will most likely favor the recreational fishermen and divers, though it will certainly increase opportunities for some types of commercial fishing. In addition, a properly planned and executed reef program, coupled with a strong public education program, will serve to build support among non-user groups concerned about the environment.

Artificial reefs constructed mainly for the enhancement of recreational fishing need to be sited with accessibility as a prime consideration, except when used as refuges. The reefs should be located close to major population centers, where demand and interest is greatest, and where facilities exist conducive to that type of fishing. On Long Island, this translates to areas adjacent to major inlets and fishing centers (Table III). In addition, artificial reefs can be used to stimulate fishing interest in areas where facilities and circumstances are not already conducive to fishing. Thus artificial reefs can be sited to the benefit of local communities as well as fishermen.

In order to properly assess the demand for artificial reef construction among recreational fishermen and divers, a substantial data base should be developed (Gordon & Ditton, 1986) which includes:

a) numbers and distribution of fishermen and divers;

b) growth trends in the fishing and fishing-support industries;

c) distances travelled by boat to fish;

d) fish species sought;

Table III. Major fishing centers in New York's Marine District and nearby artificial reefs.

FISHING CENTER/INLET	ARTIFICIAL REEF
Great Kills Harbor	none
Rockaway Inlet	Rockaway Beach Atlantic Beach
East Rockaway Inlet	Atlantic Beach
Jones Inlet	Hempstead Town
Fire Island Inlet	Great South Bay Fire Island
Moriches Inlet	Moriches
Shinnecock Inlet	Shinnecock
Montauk	none
Greenport/Orient	none
Mattituck Inlet	none
Port Jefferson/Mt. Sinai	none
Stony Brook/Smithtown	Smithtown
Huntington/Oyster Bay	none
Flushing/North Hempstead/City Island	none

e) general access points and their frequency of use; and

f) shore-based facilities and services.

In addition, management will need to consider the different fishing methods and potential conflicts between methods or groups. For example, reefs sited in 210 feet of water or deeper will exclude divers, while reefs in 30 to 90 feet will favor them (Stone 1985). Therefore, managers should anticipate conflicts between divers and recreational fishermen on the shallower reefs. All of New York's current reefs are well within sport diving range. Also, bottom fishing while anchored is not necessarily compatible with either drift fishing or trolling.

When considering accessibility, the subject of marking the reef needs careful scrutiny. Artificial reefs in the Marine District are not currently marked, though they were in the past. The history of buoying reefs in New York indicates that the buoys themselves, unless scrupulously maintained, may be more of a hazard than benefit. Due to the perceived problems and expense of the program, buoying of artificial reefs was discontinued. DMR should conduct a formal cost/benefit analysis of buoying to determine if the policy of not marking the reefs should be continued. In the interim, reefs should be sited so as to allow simple visual location using shoreline features, channel markers and other extant aids to navigation. Reefs should be easy for fishermen to locate using simple compass headings and known distances from reliable reference points.

If the objective of the artificial reef is to provide a fishing sanctuary, then the reef should be sited and constructed so as to be difficult to locate and/or fish effectively. With modern electronic navigation aids, true sanctuaries are unlikely to exist. Sanctuary reefs will require strong public cooperation, and probably regulation, to be effective.

The needs of the sport diving community should be considered when siting reefs in New York. DMR should site and design reefs primarily for fishermen, mindful of the fact that divers will be attracted to the reefs. For instance, if a site is to be developed for a sport fishing reef using surplus vessels in 90 feet of water or less, chances are excellent that divers will utilize the reef. Therefore, water clarity and current velocities at the proposed site as well as reef materials and their preparation and design should be evaluated for their effects on diver safety.

The shore-based angler need not be left out of the equation. Artificial reefs can be sited near areas where the shorebound angler has traditionally fished. Better still, artificial reef development can occur in concert with development of access points for fishing from shore. Any public fishing pier or bridge with fishing access facilities should be examined for associated artificial reef development. Buckley and Walton (1982) documented the generation of a broad base of public support for an artificial reef program due to a series of highly popular fishing pier/habitat enhancement projects. Exclusion of boat fishing on reefs sited near shore access may prove necessary.

Though DMR's artificial reef program will focus mainly upon recreational interests, present management does not exclude commercial fishing on artificial reefs. Hook and line commercial fishermen ("pinhookers") target scup, black sea bass and tautog. Pot fishermen target American lobster, black sea bass and tautog on south shore reefs, as they do on natural hard bottom. Briggs and Zawacki (1974) documented the existence of both legal-sized lobsters and a commercial fishery for them on at least one of these reefs, and speculated on the feasibility of establishing artificial reefs especially for the commercial harvest of lobsters. Indeed, any artificial reef constructed off the south shore should attract lobsters due to the lack of suitable habitat in the area. Despite this, relatively few numbers of lobster fishermen could efficiently work on a single reef as they currently exist. The amount of new artificial habitat necessary to support a significant expansion in the commercial pot fishery would be so great as to be economically unfeasible. In addition, annual fishing mortality on lobsters is currently over 90% (Phil Briggs, personal communication). Consequently, encouraging commercial use of artificial habitat would only be acceptable if it can be shown that the reefs actually

increase production of lobsters, and that such activity would not significantly increase mortality in lobster and other fisheries.

Some commercial potential exists for developing fisheries based upon underutilized species, such as cunner and eel pout. This objective is not currently under consideration, though existing reefs and those built for recreational use could potentially be utilized for this purpose. In addition, some potential exists for combining mariculture projects with artificial reefs. For example, blue mussel culture is currently under development in Long Island Sound. The culture systems now in use may function as fish attractors. If a benthic artificial reef were developed in close proximity to the culture system, perhaps the finfish fishery in the area could be enhanced without negatively affecting the mussel culture operation. In fact, support structures for a culture system could be designed that would function more effectively as fish habitat while improving the durability and efficiency of the system.

While examining the needs of user groups that will utilize artificial reefs it is essential to consider other uses of ocean resources. These include trawl and dredge fishing, sand and mineral mining, navigation, cable-crossing ares, military, and waste disposal, for example. In most instances, artificial reef construction is incompatible with these uses.

Traditional trawling and dredging grounds will be avoided when possible. Potential conflicts with trawlers and dredgers can be preempted by siting reefs around existing obstructions. Meetings with representatives of the trawling and dredging industries will establish the open communications necessary to avoid conflicts. In addition, a well-supervised and coordinated artificial reef program

will reduce possibilities of "amateur" reef building interfering with these activities.

Bottom composed of sand and/or gravel is desirable substrate for placement of artificial reefs. Unfortunately, these materials are also valuable as building aggregate. As such, they represent part of the inventory counted by State and Federal agencies concerned with these and other mineral resources. Any artificial reef sited within New York's territorial sea will need to be approved by the State's Office of General Services (OGS), Division of Land Utilization, Bureau of Underwater Lands. Likewise, applications for artificial reefs from 3 to 200 miles offshore will be reviewed by the U.S. Minerals Management Service (MMS). Any reef sited on potentially valuable mineral resources will limit the potential use and development of such resources. Therefore, DMR should avoid these areas where possible, and work with OGS and MMS to locate sites which minimize potential limitations on mineral resource development.

Military areas, such as practice bombing zones or submarine testing areas, have to be avoided. These areas are clearly delineated on nautical charts.

Artificial reefs should be sited so as to pose no hazard to navigation. Compliance with U.S. Coast Guard requirements will generally avoid this problem. In addition, the busy approaches to the ports of New York and New Jersey should be dropped from consideration. The potential for development of the area in the separation zones between shipping lanes should be investigated.

Cable areas for communication and electrical supply have to be avoided. Such areas need to be kept clear so that maintenance and

repair may be easily accomplished.

Given the variety of areas unsuitable for reef development, a systematic means of identifying potential sites for artificial reefs is exclusion mapping (Ditton and Myatt, 1986). This technique delineates areas that are off limits to reef construction, based on previously described incompatible uses of the ocean resources. Once areas where reefs should not be placed are mapped, then the environmental characteristics of the remaining area can be considered. It is necessary to examine the geology, hydrography, ecology and water quality of any area under consideration.

As mentioned previously, hard-packed sand and/or gravel bottoms are desirable to provide the support necessary for artificial reefs. Also, hard rock or shell bottoms make appropriate substrate, though these areas often do not need enhancement. Areas to avoid include soft sand, silt or mud that is unsupported by a hardpan base. Any soft sediment will allow the reef materials to settle in and become covered, thereby destroying the reef. In addition, soft silt or loose sand that is resuspended by wave or current action will damage encrusting organisms and reduce a reef's effectiveness.

Hydrographic features to be considered include water depth and wave and current energies. Adequate vertical clearance over the reef site is necessary to reduce hazards to navigation. The local US Coast Guard District has established a standard of no less than 50 feet of depth clearance at mean low water for all ocean reefs. New York has been granted permits for less clearance in the past although areas with existing obstructions can potentially be developed at the depth of the obstruction, even if that depth is

shallower than would be normally allowed. Bay reefs are judged separately, since the sizes of vessels potentially utilizing these areas are much smaller. The least depth permit clearance granted to New York in a bay site is 16 feet MLW.

The biology of the reefs is affected by the water depth. Shallow reefs (30-50 feet of water) are frequently characterized by populations of smaller fish in greater diversity and numbers than deeper reefs (Stone 1985). Water temperature and light penetration are affected by depth which will influence overall species diversity and abundances of organisms.

Shallow reefs in open water, such as off Long Island's South Shore, are more susceptible to wave action than those in more sheltered areas, and some consideration should be given to typical storm wave energies over a possible site. In general, reef materials should be placed below depths at which storm waves will sound. Off the South Shore of Long Island, this will require depths greater than 60 feet MLW.

Currents and tidal energies are important considerations. Areas with exceptionally strong currents (>2.5 knots) should generally be avoided, though a strong current (1.5-2.5 knots) will tend to provide the water flow necessary to bring more oxygen, planktonic food, and nutrients in contact with the reef and effectively remove waste products. Also, strong currents may help prevent sedimentation from becoming a problem on the reef. However, reefs built on shifting sandy or silt bottoms in areas of strong currents can become undermined or sanded over, sometimes both in succession. In addition, reefs can be sand blasted in these areas so that an encrusting-organism forage base cannot develop, thus reducing their effectiveness.

Good water quality is necessary at an artificial reef site. In general, reefs should not be sited:

a) in chemically polluted or contaminated areas [All potential reef sites should be located where the water quality meets standards for classification as class "SC" or better, as defined in New York State Water Quality Regulations, section 701.20 (Appendix F). Eutrophic or thermally enhanced waters, although "polluted", may be acceptable];

b) in areas where extraordinarily wide or rapid fluctuations in temperature and salinity occur; and

c) where highly turbid conditions are the norm, particularly for a diving reef.

Generally, artificial reefs cannot make a productive area out of an unproductive one; rather, they can be used to enhance a site with productive potential. Many times one or more factors may be operating that prevent an area from reaching its full production potential. For example, strong currents or a sandy bottom substrate may inhibit attachment of certain biota. Placement of artificial reefs on this site could reduce currents and/or provide the necessary hard substrate that will allow the development of a hardbottom community.

Artificial reefs should not be sited directly on top of a productive live bottom. Areas where a naturally diverse and abundant epifauna and/or infauna are present, such as a mussel bed or surf clam bed, will not benefit from placement of artificial reef materials upon them. Reefs placed in close proximity to areas like these, however, can enhance the overall production in the

area. These areas can be identified with the aid of local fishermen. Indeed, such anecdotal information has been instrumental in siting all previously constructed artificial reefs in New York.

Though useful information can be derived from public input, specific site surveys should be conducted in order to determine the suitability of each site. It is recommended that the physical and ecological guidelines utilized by Hueckel and Buckley (1982) for artificial reef site selection in Puget Sound, Washington be adapted for use in New York. Their recommendations were to reject a site if:

a) bottom slope exceeds 45 degrees, or bottom sediments are predominantly unstable;

b) biological diversity is inhibited by other than the lack of suitable habitat; and

c) reef deployment would negatively impact the biota already in the area.

Specific site surveys should be accomplished before construction is considered.

Policy:

a) In siting artificial reefs, DMR will evaluate and assess: a) the demand for artificial reefs; b) user preferences; and c) potential conflicts.

b) DMR will site artificial reefs: a) with public input and

review; b) near major fishing centers, inlets and access points; c) in compliance with all State, COE and Coast Guard requirements; and d) in the interest of managing a sustained fishery.

4.2.2 Materials. There are two classes of materials used in artificial reef construction: so called "materials of opportunity" or scrap materials, and fabricated artificial reef structures (Stone 1985). New York's artificial reef program has been based almost entirely upon materials of opportunity. This is due to the ready availability of these materials and the lack of dedicated funding for reef construction.

The artificial reef program has handled a variety of different materials. Though DMR has rarely had the opportunity to evaluate the effectiveness of the various materials, staff experience combined with information from other sources permit the following evaluations.

Ships and Other Vessels. Vessels, such as surplus military vessels, tankers, fishing vessels, barges, and drydocks make excellent artificial reefs and are considered the number-one priority material in the Marine District. They offer: stabile substrate for attachment of organisms; a high profile that is attractive to pelagic as well as demersal species; surfaces that create turbulence, attractive sounds and low velocity zones; and, with proper preparation, the complexity and internal spaces for species that require them. Vessels offer diving opportunities as well as fishing, which will result in occasional user conflicts. Steel vessels, especially, are very stable and durable, making them highly desirable as reef material. Wood vessels have been used extensively in the past, though they are increasingly less

available. Wood vessels can attract distinctly different fouling-organism communities than other materials, especially marine borers. Anecdotal information from fishermen indicates that they believe wood vessels make the best artificial reefs. Wood vessels, however, have a number of drawbacks:

a) They require heavy ballasting to sink and prevent them from being moved by currents and storms.

b) Patterns of deterioration in wood are unpredictable and may result in pieces breaking loose and damaging live bottom, becoming a navigation hazard, or fouling nets and beaches.

c) Wood tends to absorb contaminants and oils, making it difficult to clean properly.

A possible alternative is fiberglass. Although these vessels are durable and more readily available than those made of wood, most are under 50 feet in length and require considerable ballasting. In addition, they will break apart in certain situations because of their high surface-to-weight ratio and could move off site.

Based on the above evaluation, steel vessels should be given the highest priority for reef substrate, with clean wooden vessels given consideration on a case-by-case basis. Generally, fiberglass vessels will not be considered, though they may have an application in some low-energy areas. All vessels will be handled in the following manner:

a) Wood and fiberglass vessels will be ballasted with clean rock, concrete, sand, gravel, or steel.

b) All vessels will be inspected by the U.S. Coast Guard, Vessels Compliance Office and DMR's reef program coordinator prior to acceptance as reef material.

c) All vessels will be cleaned of any pollutants and floatable debris prior to sinking.

d) All vessels will be anchored on site during sinking. Anchors should be left until stability is assured.

e) Limited use of explosives for sinking vessels is permitted, provided that this operation is carried out by a professional demolitions expert, such as specially trained military or police teams.

Concrete. Surplus concrete materials, such as culvert pipe, bridge support structures, blocks, and some building rubble make excellent reef substrate. Concrete has a number of properties that make it desirable as reef substrate, including high density and durability, though it has relatively low tensile strength compared with steel or rock. Waste concrete is also available in an array of sizes and shapes that present opportunity for designing reefs to approximate a variety of natural habitats. The National Artificial Reef Plan (Stone 1985) recommends placing concrete slabs or pilings on a rock or rubble base to provide a wide variety of habitats.

Transportation and deployment costs of concrete are high, though the materials themselves are often available at no cost. Often, the expense of land-based alternatives to placing the material on an artificial reef provides the incentive for the materials donor to incur the entire expense of the operations. This has been the recent history of most reef construction

activities in New York. This system of reef development economics is viable, however, only for reef sites closest to the source of materials. This means that, for New York, the reef sites closest to New York City have received the greatest proportion of concrete and other materials, while reef sites furthest from the city have been starved for this material. If this problem is to be addressed, a stable funding source must be found to enable DMR to cover the transportation costs to those sites furthest from the source of materials.

All concrete materials should be inspected by DMR's reef program coordinator and meet the following criteria:

a) Materials will be clean and free of any pollutants (adhering and compositional) and floatable debris.

b) No more than 10% of the total amount of any single bargeload or deployment unit should be comprised of pieces having overall dimension of less than one cubic foot. If materials are dredged from the sea bottom, it may be necessary to wash off the sediments with a high-pressure hose.

Tires. Scrap tires have been utilized in many reef construction projects worldwide, including New York. Tires are durable in the marine environment, have been deemed environmentally safe, and are adaptable to a wide variety of designs. When properly ballasted with concrete in proven designs (Myatt et.al. 1989), tire units are fairly stable and provide excellent habitat for demersal and cryptic species (Stone 1985).

Experience with tires in New York has shown that when they are not sufficiently bound and ballasted they will be moved by wave and

current action. When this occurs, tires can wash ashore, foul fishing nets or damage natural live bottom. Tires will no longer be used on ocean reefs in New York or in any high-energy environment unless the design has a record of proven stability in these environments. For example, concrete-ballasted tire units like those used in New Jersey's artificial reef program may have survived the effects of Hurricane Hugo off South Carolina (Wayne Hall, South Carolina Wildlife & Marine Resources Division, personal communication). Tire units of proven stable design can be used as well in low-energy bay and estuarine systems.

Rock and Stone. Rock and stone make excellent reef habitat and are the most environmentally acceptable substrate. As with concrete rubble, the selective use of different sized rocks can create a wide variety of habitat. However, there is no convenient local source of this material, making transportation and deployment costs prohibitively high for the purpose of reef construction. When available, rock and stone should receive highest priority as reef substrate and as ballast for vessels destined for reefs.

Rock jetties and groins often provide some limited functions of artificial reefs though these structures are not designed to facilitate angler or diver access. Where safety and liability may not be a concern, such projects could incorporate design elements that would allow access to the resources aggregated by the structure.

Experimental Materials: Stabilized Ash Blocks. A new waste material has been proposed for use on artificial reefs. Ash from combustion of coal, oil, and municipal solid waste has been combined with cement and pressed into blocks. These blocks have been used to construct experimental reefs in New York (Woodhead

et.al. 1985; V. Breslin, pers. com.), Delaware (Price 1987), Chesapeake Bay (Humphries 1984) and Florida (Kalajian et.al. 1987). Various studies have shown that reefs built of these materials can be compared favorably with reefs of like design built of other materials. The presence of potentially toxic substances in the pre-stabilized ash leaves substantial doubt as to the compatibility of the stabilized product with the marine environment. Studies have been conducted on the heavy metal leachate and physical properties of the stabilized ash blocks. Though the preliminary results are promising, longer term studies are necessary. In addition, investigations of organic contaminants are needed before this material is considered for reef applications. Because there exists the potential for placing in the marine environment tremendous quantities of stabilized ash blocks, a very high degree of confidence about the long-term physical stability and toxicity would be required prior to considering their use.

The objective for any large scale operation that would seek to stabilize incineration ash for ocean disposal is necessarily solid waste management. Due to the history of artificial reef construction in New York, this objective is not entirely incompatible with the reef program. However, the DEC's principal goals in artificial reef development relate to protection and enhancement of the fisheries resources and not solid waste disposal. Therefore, DMR must proceed with caution with regard to stabilized ash blocks. Stabilized ash blocks should be considered experimental reef substrate until such time as the material has an established record of environmental compatibility. DMR should be intimately involved in the permitting and oversight of any experimental reef site in which this material is used. Fishing on such a site would not be encouraged, and may need to be prohibited.

The Atlantic States Marine Fisheries Commission has passed a resolution that opposes the use of combustion/incineration ash products for artificial reef construction. The Commission requests that no permits be issued, other that for experimental applications, until the US Army Corps of Engineers and US Environmental Protection Agency have adopted standards and guidelines for marine applications of the material. In lieu of this, member states must develop such standards in order for use of this material to be considered. New York State has no such standards. Until we are given some guidance on this issue, The Division of Marine Resources' artificial reef program will follow the recommendations of the ASMFC resolution.

Materials Not Recommended. Some materials are not recommended for placement on reef sites, though they may have been used in the past. Automobiles require considerable and expensive preparation and are not durable. In fact, autos and like vehicles may last only three to six years in the marine environment. DMR will no longer consider autos for reef deployment. Appliances such as refrigerators and ranges (known as white goods) are neither dense nor durable and will not be used. Construction and demolition (C&D) debris often contains wallboard and wooden molding mixed with the desired block and brick. Removal of this material increases expense and makes C&D debris not cost effective. C&D debris will not be used as reef substrate. Asphalt materials are easily broken up and moved around by water action, and are not conducive to colonization by marine organisms. Asphalt materials will not be used.

Fabricated Reef Structures. Structures that are designed and constructed specifically for artificial reefs are becoming more widely used in US artificial reef programs. These structures are

available in a wide variety of designs, sizes and materials that are suitable for any number of reef applications. Most designs provide some combination of features that maximize profile, cryptic space, volume, and/or surface area while facilitating transportation, deployment and/or maintenance. Continued research on applications for these structures in US waters will provide information on best designs for specific fisheries objectives.

Initial construction costs will be very high when compared with materials of opportunity. However, these structures can be significantly more effective in achieving reef objectives than materials of opportunity (Sheehy 1985). A cost/benefit analysis of the use of these structures is necessary to demonstrate whether or not they should be used by DMR.

Policy:

- DMR will utilize the following materials of opportunity: a) rock and stone; b) surplus concrete materials and rubble; and c) steel vessels. Other materials will be considered on a case-by-case basis, except the following materials which will not be used: a) white goods; b) auto and truck bodies; c) construction and demolition (C&D) debris; d) asphalt materials; and e) tires in any ocean or high energy environment.

- DMR will continue to carefully monitor the development of stabilized incineration ash as artificial reef substrate. This material will not be used on any DMR reef until such time as the questions surrounding its long-term stability and compatibility with the marine environment are resolved.

- DMR will conduct a cost/benefit analysis for the use of specific prefabricated artificial reef structures. Appropriate design and deployment of these structures will be determined by technical review.

4.2.3 Design. The design of an artificial reef site refers to elements of size, surface area, substrate texture, shape, relief (height above bottom), profile (rise to run ratio), footprint (bottom area covered), orientation, and cryptic space (openings within the structure). Design is dependent upon the objective for the reef, compatibility with the site's physical and biological characteristics, and the availability of materials and funding.

The habits of target species will influence reef design. For example, abundance of black sea bass has been positively correlated to area of bottom covered by a reef, while negatively correlated with amount of cryptic space and volume of materials (Bortone and Oman, 1985). Scup seem to prefer similar habitat as well. Therefore, low-profile rubble piles that cover a broad area would be the design choice if these species are targeted. Tautog and American lobster require cryptic space for shelter. Reefs with a high profile attract pelagic species, such as bluefish. Species like summer flounder and red hake prefer open bottom area in proximity to structure.

Artificial reefs can be designed to attract a few or several species or species assemblages, depending upon design elements incorporated into them. As the objectives for artificial reefs in New York include enhancing habitat for all reef-associated stocks, and this objective should be accomplished with maximum economy, reefs built under DMR management should include design elements that will favor the greatest species and life stage diversity. The

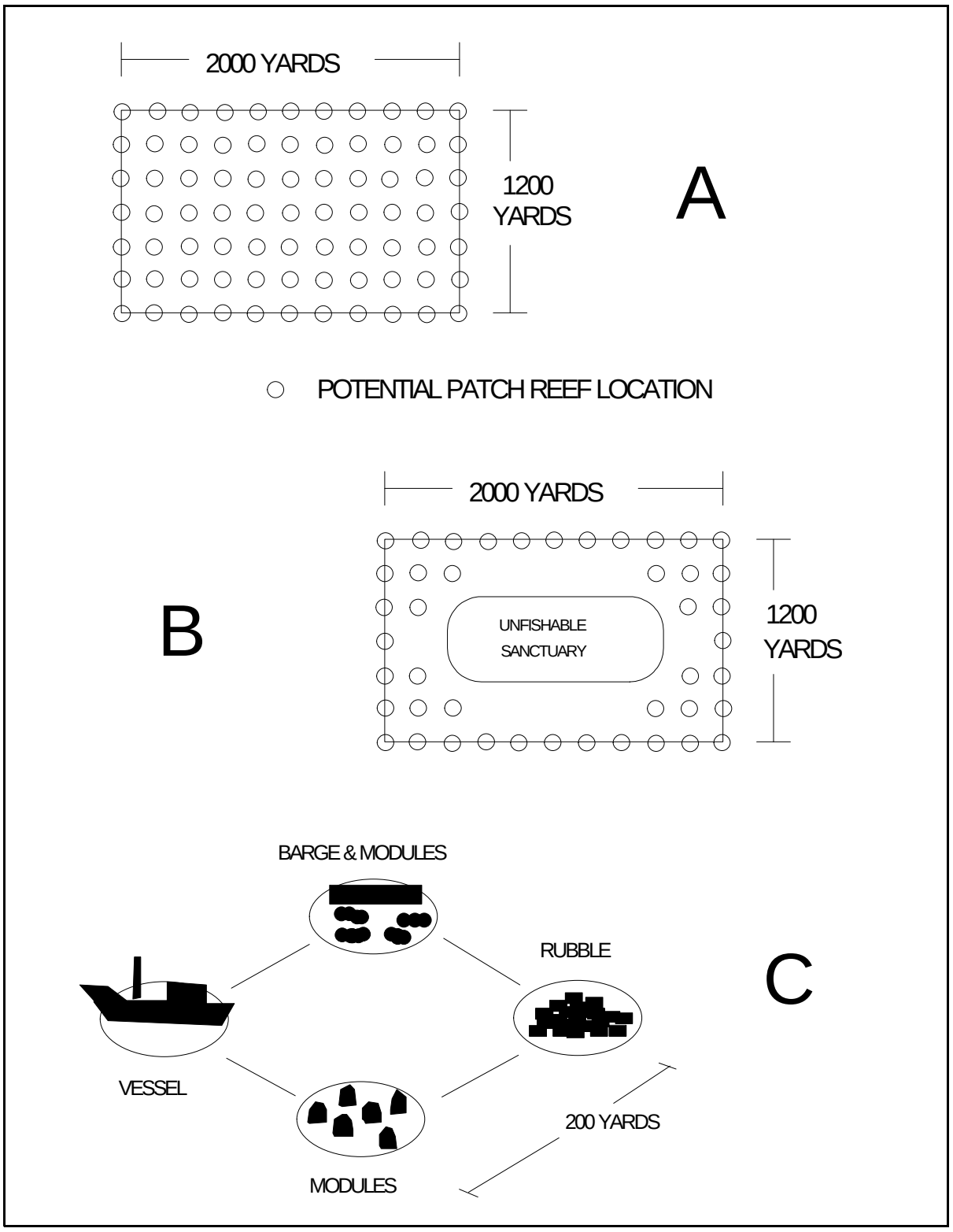


Figure 5. Artificial reef site design: A) typical site plan used in New York; B) site plan incorporating a partial sanctuary; C) typical patch reef layout within a site.

artificial reefs constructed to date have each been developed as a group of patch reefs or clusters of reefs within a reef site. Individual deployments of vessels, rubble, tires, or concrete block were placed on a reef site, separated by open bottom. This design maximizes the ecotone between hard substrate and surrounding sediments, providing a variety of habitats and increasing the species diversity on the site. This plan was based partly upon the availability and type of materials, and upon the contractors ability to accurately place the materials. The development of the LORAN C positioning system has enabled DMR to further enhance its ability to accurately place materials on reef sites.

Though only limited information exists on the success of this system, the indications are that the reef objectives have been met. Therefore, DMR will continue to build reefs using a variety of scrap materials on each site, leaving open bottom between individual vessels or rubble piles (Figure 5). An exception to this plan will be made in the case of sanctuary reefs. Experience with the Rockaway Beach Artificial Reef has shown that large rubble piles with steel rebar or other angular scrap steel inhibit anchoring and fishing. Though this effect was unplanned and fishermen complain, it makes Rockaway reef a type of sanctuary. Other sanctuary reefs could be built based on the Rockaway experience. In fact, all artificial reefs built by DMR could incorporate some aspects of a sanctuary, surrounded by patch reefs that are accessible to fishermen.

The Japanese have evaluated many elements of reef design and incorporated this knowledge into the fabrication of structures specifically for artificial reefs. DMR can utilize the results of this research, for reefs built from scrap, recycled material, and/or fabricated structures. At such time as DMR can consider the

use of fabricated materials, the following designs shall receive highest priority:

a) Terrace Blocks. This design provides an optimal mix of encrusting surface area and open space, presents a mid to high profile (depending upon water depth and size of unit), and is flexible in its use. A reef of this type is being evaluated in Delaware Bay (Figure 2A). DMR staff are monitoring the research efforts; and

b) Igloos. Studies conducted in Virginia (Feigenbaum et. al. 1985) show that certain igloo-like structures (Figure 2B) used as artificial reefs can increase catch per effort compared with control sites while still providing some sanctuary areas not easily accessible to fishing. DMR use of units of similar design is considered a high priority.

These designs could be used alone or in combination and with materials of opportunity to achieve desired objectives.

In addition to specially designed reef modules, certain commonly available or scrap materials can be modified before placement on an artificial reef to increase their effectiveness at achieving reef objectives. For example, concrete culvert pipe can be modified through the addition of large holes to increase open space and facilitate water and fish circulation (Bell et.al. 1989). Culvert pipe can be banded together in pyramid fashion to increase profile and improve resistance to rolling. Tires can be stacked,cabled together and ballasted to provide extremely stable, durable "rubber rocks" (William Figley, New Jersey Division of Fish, Game and Wildlife, personal communication).

Prefabricated reef structures are best suited for the following applications:

a) where total volume of reef needed is relatively low;

b) where bottom space available is very limited or positioning requirements are restricted, e.g., in close association with a fishing pier;

c) as in-kind mitigation for habitat loss or degradation. Initial cost of project can be justified by permanent loss of habitat (Prefab units are durable and cost effective over the long term);

d) as appropriately designed nursery grounds; and

e) in areas where building and construction rubble are not readily available, such as the eastern waters of Long Island.

Policy:

a) DMR will design artificial reefs, utilizing the best available information, for the accomplishment of specific resource objectives.

b) DMR will use the "patch reef" concept in site design where and when feasible.

c) DMR will investigate the concept of a reef design that would provide sanctuary from harvest.

d) DMR will investigate the potential of suggested fabricated units for inclusion on its reefs.

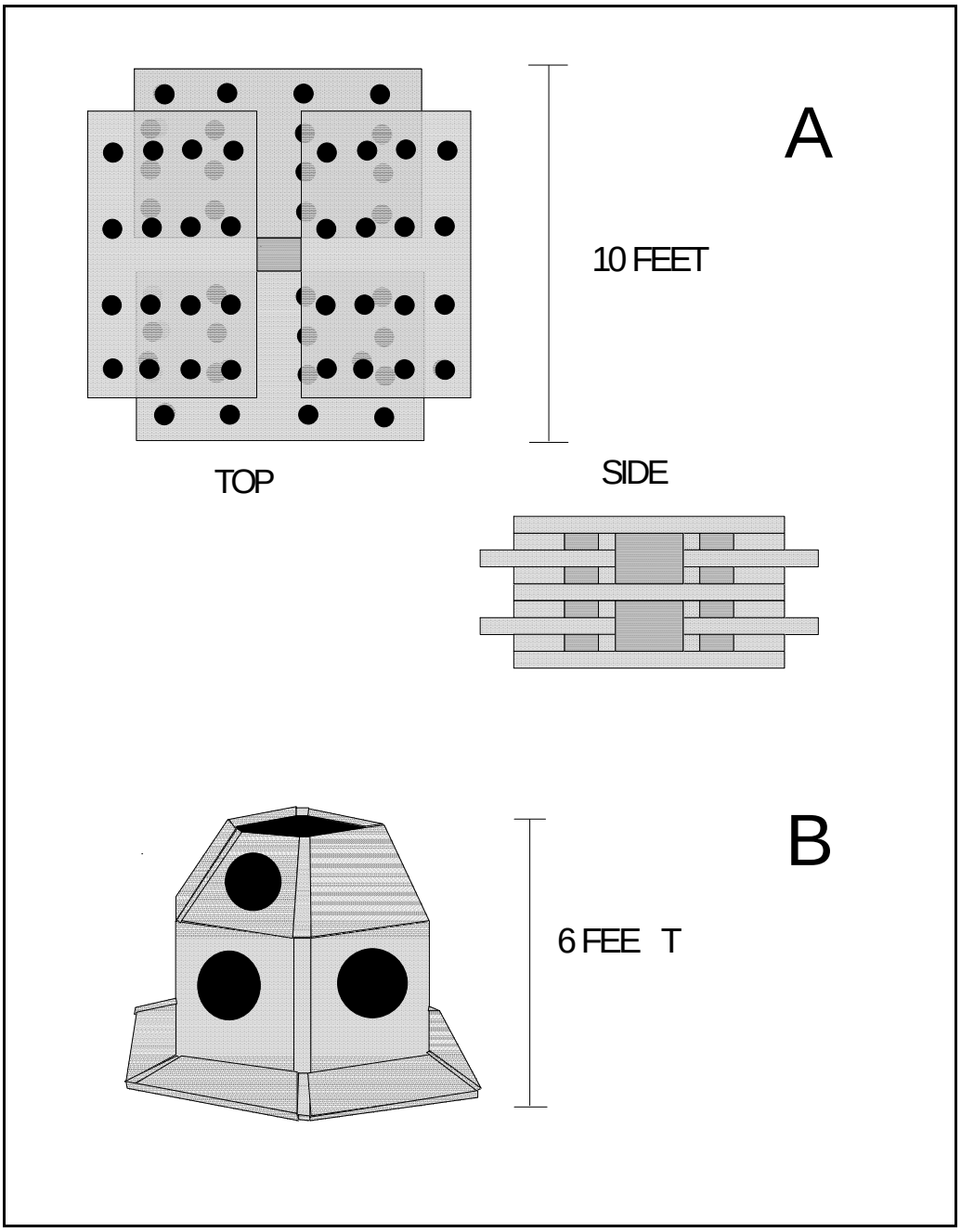


Figure 6. Fabricated artificial reef modules under consideration: A) terrace block (Van Doren model '20-20'); B) concrete bell housing ("Igloo")(after Feigenbaum et.al. 1985).

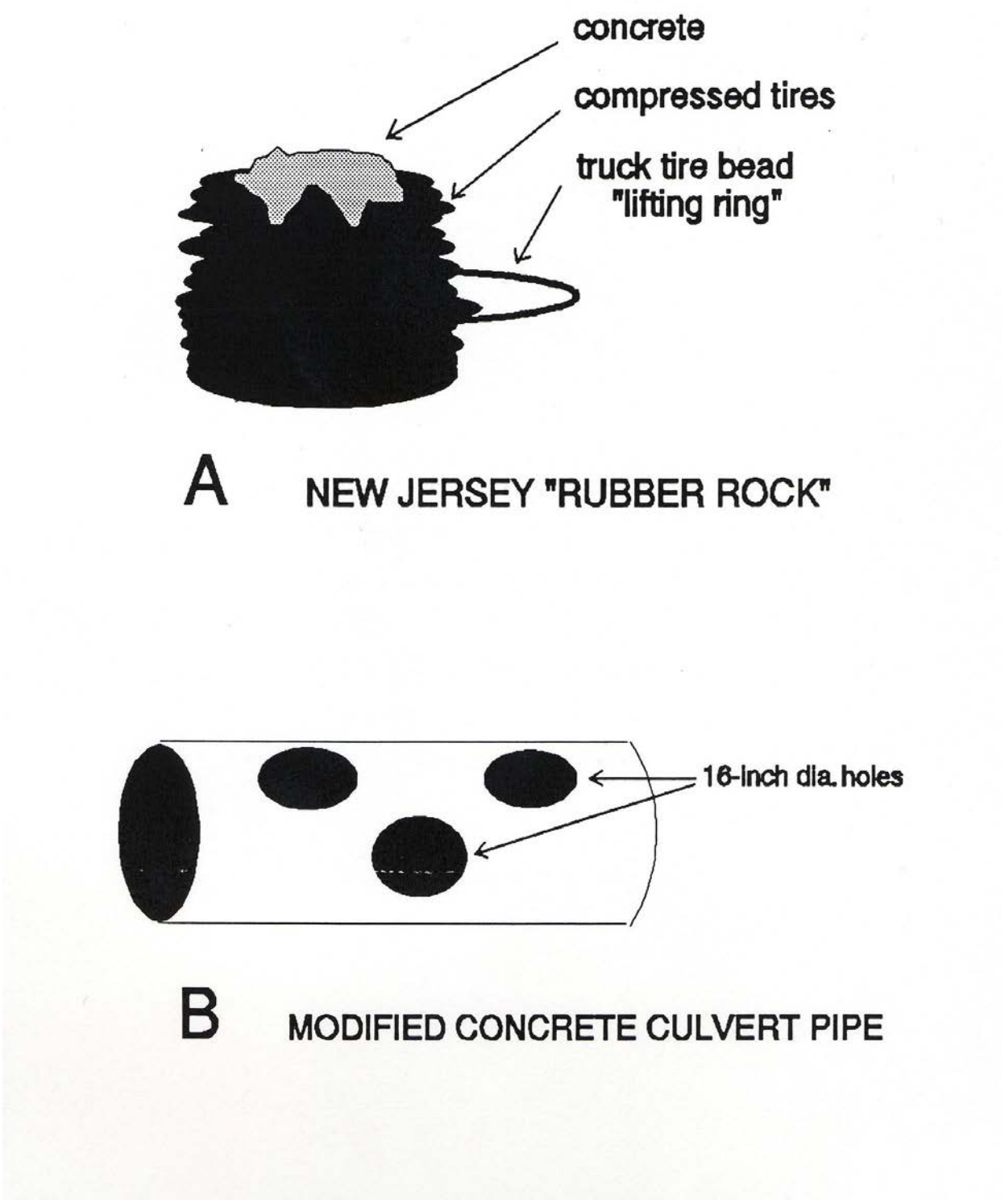


Figure 7. Scrap materials modified to form reef modules: A) tires compressed and ballasted with concrete; and B) concrete culvert pipe modified by cutting 16-inch holes along its length.

4.3 MANAGEMENT

4.3.1 Monitoring. Subsequent to their construction, artificial reefs require monitoring for compliance with Army COE permits and assessment of their performance in terms of reef objectives. Artificial reefs constructed in the Marine District have been monitored for compliance with permit conditions. However, only a few studies of the fish or crustacean populations in the system have been conducted. There has been no formal performance monitoring program.

DMR must comply with the requirements of permits and authorizations from the US Coast Guard, COE, New York's Office of General Services, and DEC. Requirements are satisfied by following the listed procedures.

a) Candidate materials must be inspected by DMR staff prior to placement on a reef. In addition, all vessels must be inspected by the US Coast Guard, Vessels Compliance section. The materials and vessels must be certified clean and safe for transport, and of sufficient density and durability to make suitable artificial reef substrate.

b) Reef deployments must be witnessed by DMR staff, or agents of DMR, and the location and proper deployment of materials verified.

c) Immediately following deployment, the materials must be located using depth sounding equipment and the location recorded as LORAN C coordinates and latitude/longitude. If the materials have settled above the minimum depth requirement for the site, they will need to be reduced in profile by some physical means (e.g. dragging a steel cable along the

material) into a configuration that meets the requirements. This must be accomplished by the materials donor. An alternative to this procedure is to petition the COE for an amendment to the permit that would allow for a decrease in the depth requirement. If the materials have settled off site, and the materials can be moved, an effort must be made to move them on to the site. If the materials cannot be moved, then the COE and the Coast Guard should be notified immediately.

d) Subsequent depth soundings must be taken on an annual basis over the major structures to ensure that these materials are stable and have not moved. Detailed depth soundings and side-scan sonar transects also provide information as to the physical condition of the material (i.e. deterioration) and the surrounding bottom (i.e. scouring, sanding over).

Monitoring the performance of the reef is generally considered voluntary (Stone 1985). However, Section 203 of the National Fishing Enhancement Act establishes the standards for artificial reefs and states that reefs "shall be sited and constructed, and subsequently monitored and managed" so as to enhance fishery resources, facilitate access by fishermen, minimize liability and environmental risks, and be consistent with international law. It is apparent that the intent of the Act was to enjoin the states to conduct performance monitoring as well as compliance monitoring.

DMR needs to conduct, or contract for, performance monitoring to accomplish the following:

a) evaluate the effectiveness of materials and designs in achieving the goals of the program;

b) assess the harvest (species, numbers, rates) from or over artificial reefs and document their effects on local and regional stocks of target species;

c) provide information necessary for adaptive management measures; and

d) assess the value of artificial reefs to the regional economy and determine the actual cost/benefit relationship.

It is anticipated that establishing and conducting the necessary performance monitoring programs will be complex and costly. However, aside from the mandate of the National Fishing Enhancement Act, continuous monitoring is considered essential to provide the information required for proper planning and management of artificial reefs, and to build public and administrative support for the reef program and management actions.

Policy: DMR will institute a regular monitoring program that will:

a) collect and analyze necessary basic biological data for target species, specifically tautog, scup, black sea bass, and red hake (These data will include species harvested, total catch, total effort, catch rates, and age, sex, and size structure of the catch);

b) ascertain that permit requirements are complied with; and

c) provide DMR with information necessary to maintain accurate and up-to-date reef maps.

4.3.2 Maintenance. Maintenance of the artificial reefs and

associated documentation is necessary to comply with requirements of the permits and to ensure the long-term effectiveness of the reefs. The information gathered in a formal monitoring program should be used to guide maintenance of the reefs.

Maintenance of the artificial reef sites will accomplish the following:

a) replace materials that have deteriorated to the point at which their effectiveness is diminished with like materials at the same location;

b) replace materials that prove unsuitable to the site, due to settlement, instability, or biological incompatibility with materials that might be more suitable;

c) improve a reef that attracts and holds only certain species of fish and not other, more desirable ones with the addition of materials that have proven their effectiveness at attracting target species;

d) provide new or clean surfaces to attract encrusting larval settlement (Reefs often attract more fish during the first few years of their existence. This may be due to the availability of forage items of a size or variety that is not found in climax communities); and

e) remove entangled fishing gear (ghost gear).

Documentation on the artificial reefs should be maintained in the following manner:

a) Every addition of new materials to a reef shall be recorded and prepared for public dissemination. This information will include: type of materials, amount, date of deployment, and location in LORAN C coordinates or latitude/longitude.

b) Results of monitoring will be used to update the information available to the public, e.g., fish species present.

Maintenance of accurate, up-to-date records will assist in determining reef effectiveness. In addition, these records will provide the basis for an historical evaluation of DMR's attempts at marine habitat enhancement.

Policy: DMR shall perform maintenance on artificial reef sites under its control, based upon an evaluation of the information obtained in its monitoring program. In addition, DMR will maintain accurate records of all artificial reef activities it conducts.

4.3.3 Reefs in the Exclusive Economic Zone. In its role as a resource management agency, DMR intends to develop and manage artificial reefs in the waters of the Federal Exclusive Economic Zone (EEZ) adjacent to the waters of New York State. This plan is consistent with the description of the states' role in artificial reef development outlined in the National Artificial Reef Plan. As such, DMR shall use this Plan and the National Artificial Reef Plan as guides for management of reefs in the EEZ. If necessary, DMR will petition the appropriate Fishery Management Council to create Special Management Zones around any artificial reef it develops.

In order to effectively manage artificial reefs outside of its Territorial Sea, New York will need the support of the Federal

government. DMR will work closely with the Regional Fisheries Management Councils to ensure that State and Federal fishery management goals are met. This process will be facilitated when the Atlantic States Marine Fisheries Commission Artificial Reef Committee petitions the Mid-Atlantic Fisheries Management Council for a policy on management of artificial reefs and associated fisheries in the EEZ. This policy will address states' concerns regarding their ability to properly manage any artificial reefs they build in the EEZ.

Any development in the EEZ will be impacted by, and impact upon, the fisheries of at least the neighboring states of New Jersey, Connecticut, Rhode Island and Massachusetts. Therefore, DMR needs to work closely with artificial reef planners and fishery managers from these states to ensure that development in the EEZ proceeds along mutually agreeable guidelines and considers overall regional cumulative effects on fisheries and resource populations.

Policy:

a) DMR will object to any proposed artificial reef development by another agency or entity whose goals and objectives for reef development are other than enhancement of fishery resources if that project will impact upon the fisheries.

b) DMR will encourage any agency or entity that proposes artificial reef development in the EEZ to submit their proposal to DMR for consideration. If the objectives of the proposed artificial reef project are not in accord with this Plan, DMR will object to that project.

c) DMR will coordinate the development and management of reefs in

the EEZ with neighboring states through the Atlantic States Marine Fisheries Commission and the Regional Fisheries Management Councils (New England and Mid Atlantic).

4.3.4 Special Management Concerns.

4.3.41 Estuarine reefs. Artificial reefs located in the coastal lagoons and bays of Marine District present a whole suite of unique problems and opportunities relative to inshore and offshore reefs. Estuarine reefs are accessible to a much larger number of users, particularly those with smaller vessels. In addition, estuarine reefs provide an alternative to fishing offshore when weather or sea conditions are unsuitable. New York's few existing estuarine reefs are often very crowded with fishermen, especially on weekends. Possible sites for estuarine reefs are greatly restricted by water depth, water quality, jurisdiction over bottom ownership and usage, bottom types, navigation channels and competing uses, such as aquaculture and commercial fishing.

A significant amount of submerged vegetation, such as eel grass, has been lost due to disease and/or human activities. This habitat has been identified as important to many juvenile fishes (Briggs and O'Connor, 1971). Properly designed and sited artificial reefs might be beneficial in providing a substitute for this lost habitat. These reefs would need to be in waters shallow enough to allow light penetration, which will encourage growth of attached macroagae. With proper management, these reefs could provide sanctuaries for juveniles.

In addition, there is already a significant amount of reef-like habitat (so-called de facto reefs) in local estuaries in the form of bridges, piers, docks, pilings, jetties, and derelict vessels. Hueckel and Buckley (1989) suggest that these structures

be evaluated for their effectiveness as juvenile habitat before additional reef development in estuaries occurs. DMR will have to balance the need for evaluation of existing habitat with the needs to alleviate crowding at existing artificial reefs. DMR should evaluate existing structure while constructing a limited number of new estuarine reefs as juvenile habitat. Fishing or other form of harvest on these reefs may need to be restricted.

The cost effectiveness of estuarine reefs is unclear. North Carolina has ceased development of estuarine sites until they can be properly evaluated (Noble 1988). Artificial structures should be designed specifically for estuarine applications, which would substantially increase costs over using materials of opportunity. Deployment and maintenance costs should be less than for ocean reefs, due to proximity to staging areas, shallower depths, and more sheltered conditions.

4.3.42 Mitigation. Artificial reefs have been used in some states as mitigation for destruction or degradation of various habitat. A major California power company funded construction of an artificial reef to replace kelp habitat damaged by plant operations (Grant 1987). An array of small artificial structures was used successfully in Florida to provide temporary shelter for spiny lobsters during reconstruction of a marina that had become lobster habitat (Davis 1985). Virginia received $100,000 for artificial reef research as a result of a settlement with a power company in which slightly less than four acres of marginal wetlands was filled for a coal handling facility. Virginia was able to construct several research reefs and collect very valuable information as a result.

Artificial structures were proposed as mitigation for the

filling of 269 acres of aquatic habitat in an interpier area of Manhattan's west side (Alevras and Edwards 1985). A great deal of controversy erupted over this proposal, as the existing habitat proved to be an important overwintering ground for striped bass.

A recommendation in the National Artificial Reef Plan (Stone 1985) is that if artificial reefs are to be considered as mitigation measures, then the technology should be used only to simulate the type of habitat that has been or will be lost. They should not be used to substitute for dissimilar habitats. For example, construction of an offshore benthic reef could not be considered as proper mitigation for loss of tidal marsh. The Artificial Reef Development Center of the Sport Fishing Institute goes further in stating that artificial reefs should not be used in mitigation unless the replacement habitat is of proven biologically productive design (Phillips 1988). This policy is endorsed and recommended in the North Carolina Artificial Reef Plan (Noble 1988).

At present, the Department has no policy governing the use of artificial structures as mitigation measures. Some recent project proposals submitted to the Department tout shoreline structures, breakwaters and piers as de facto artificial reefs, due to their potential for fish attraction. New York City's Public Development Corporation has proposed the use of artificial reefs as mitigation for potential impacts from a variety of proposed projects involving multiacre, pile-supported decks.

The Department should have a policy that will clear up uncertainties regarding proposals for reefs as mitigation. If the Virginia example is used, then artificial reefs could be used to mitigate loss of small areas of dissimilar habitat when the impacts

are minor and the value of the mitigation measure is readily demonstrable. If a project is large in scale with major potential impacts then any proposed mitigation would likely be unacceptable.

Policy: Artificial reefs shall not be considered as a mitigation measure unless:

a) environmental impacts cannot be avoided (Reefs as mitigation should be used only as a last resort. The first priority for DEC is to avoid impacts);

b) proposed habitat loss or degradation is on artificial or natural reef habitat; and

c) artificial structures can be designed and constructed that provide proven biologically productive habitat.

If the proposed habitat loss or degradation is other than artificial or natural reef habitat, artificial reefs could only be considered as mitigation if:

a) impacts of proposed project are minor, as determined by technical review; and

b) the value of productive habitat generated as a result of the mitigation project exceeds the value of the habitat lost.

In all cases, the mitigation reef should be constructed, evaluated and its productivity demonstrated for a period of no less than one year before work on the proposed project is begun (The time frame is likely to be modified for individual projects based upon input from Federal and State agencies during the review process).

4.3.43 Fish aggregating devices. Fish aggregating devices (FADs) are moored or floating structures designed to attract and congregate pelagic fish species, thus making them more easily located and caught. The reasons for fish attraction to these structures are not well understood, though man's exploitation of this behavior has a long history. A FAD is generally composed of an anchor, mooring line and float, with any number and type of fish attracting structures attached to the line at various depths. In fact, the anchor, line and/or float often function as attracting devices. FADs can be used singly or in groups or rows to provide "trolling alleys" for fishermen. They may be used as well in association with benthic reefs to enhance the fish attracting properties of that reef, or with fishing piers to enhance fishing opportunities on them.

Most research on FADs has been conducted in clear tropical or subtropical waters. The effectiveness of FADs in the waters off Long Island has not been demonstrated. However, experienced offshore fishermen in this region will successfully exploit the small numbers of pelagic species, such as dolphin, (Coryphaena hippurus), that congregate around floating debris in the Gulfstream. Hence FADs could probably be used to provide a more consistent fish producing area for certain species in these waters. In addition, mid-water attractors placed on or near existing benthic reefs could increase the attractiveness of these reefs and diversify the fishing opportunities on them.

When compared with benthic artificial reefs, FADs have a number of drawbacks:

a) They are not durable. Experimental FADs have had very short life expectancies.

b) They offer poor habitat complexity, if what they offer could be interpreted as habitat. More likely, FADs provide only some fishing opportunity and do not enhance fish production at all.

c) They are expensive to deploy and maintain.

Despite the drawbacks, FADs offer an alternative for some management problems. For example, they could be used to develop new fisheries for underutilized species, or shift fishing pressure from stocks of bottom species that may be overexploited to pelagics that may be better able to withstand increased pressure. The danger inherent in the use of FADs is that their use could place additional pressure on stocks of pelagic species that are already overfished.

DMR should investigate the potential uses of FADs in local waters, including:

a) use of FADs in association with existing benthic reefs, perhaps in conjunction with buoys used to mark the reef, provided FAD use does not interfere with other fishing activities;

b) use of FADs alone as offshore fish attractors; and

c) use of FADs in Long Island Sound, perhaps in association with proposed aquaculture projects.

A single experimental project in each of these areas should be constructed and evaluated. Pending outcome of these investigations, New York should develop a policy that addresses the

use of FADs as part of the fisheries management strategy for the region.

Of particular concern is the jurisdiction and control over the use of FADs. At present, any individual or club could apply to the US Coast Guard for the requisite permit. FAD use is not controlled as a fisheries management measure, though the implications of the widespread application of FAD technology is that a fisheries management strategy should be followed. Another potential problem arises with the potential for lost FADs becoming hazards to navigation or washing up on beaches. Both of these issues need to be addressed.

Policy:

a) DMR will oppose the deployment of FADs by any agency or entity, pending the proposed evaluation of FAD use in local waters by DMR or its agent.

b) DMR will consider FADs as artificial reefs and, as such, manage them in accord with fishery management objectives.

4.3.44 User group conflicts. Artificial reefs will attract sport divers, commercial and recreational fishermen. Conflicts between these users are inevitable from time to time and have occurred in the Marine District in the past. Proper management of the reef system will anticipate or recognize these problems and avoid or mitigate conflicts.

A recent survey of coastal states (Phillips 1988) revealed the extent of conflicts among U.S. artificial reef users. The report classifies users into 13 groups, based on fishing modes and gear.

Groups found most often in conflict within state waters were sport divers and recreational fishermen (bottom fishing and trolling), primarily because the presence of divers essentially excludes fishermen (USCG regulations establish buffer zones around divers), at least those concerned with diver safety (use conflict). In federal waters, the conflicts were mainly between recreational and commercial fishermen, due to their interest in catching the same species (shared stock conflict).

Conflicts in the Marine District are mainly over the use of the limited reef area available, and include conflicts between:

a) private boat recreational bottom fishermen versus sport divers;

b) private boat recreational bottom fishermen versus open boats;

c) private boat recreational bottom fishermen versus each other; and

d) commercial pot fishermen versus recreational anglers.

These conflicts arise mainly from the lack of sufficient wrecks and reefs to accommodate all users, complicated by discourteous behavior through ignorant or deliberate actions. In addition, there are some reports of open boats cutting off access to nearshore wrecks and reefs by shore-based anglers. Until recently, commercial use of artificial reefs had not caused any significant problems. Recent complaints from open boat operators indicated that they perceive increased competition for the tautog resource from commercial pot fishermen. In most instances, any such shared-stock conflicts are not isolated to artificial habitat. It is

difficult, however, to separate actual problems from the prevailing perception that "the other guy is taking all the fish". Some conflicts may arise simply from a lack of understanding between user groups.

Policy: In order to reduce present and future conflicts over artificial reef resources, DMR will:

a) increase the number of artificial reefs if doing so will reduce conflicts;

b) site artificial reefs to reduce encounters between different user groups, e.g., reefs placed in depths greater than 200 feet will effectively exclude sport divers;

c) select materials that may prove attractive to one group and not others, e.g. rubble piles may provide excellent bottom fishing but not be attractive to sport divers;

d) provide education on reef use ethics and courtesy to various user groups through public meetings and printed material; and

e) establish voluntary restrictions for specific reefs, (e.g., "no kill" sanctuaries; diver only).

Should voluntary management fail, more formal measures will be considered, including:

a) legislation or regulation to manage all State artificial reefs (i.e., restrict or control fishing effort);

b) regulation allowing some reefs to be designated for certain

user groups to the exclusion of others (e.g., diver only);

c) fisheries management measures, such as size and/or bag limits, gear restrictions or season closures; and

d) Special Management Zone (SMZ) designation for reefs in Federal waters (To achieve this DMR would have to petition the appropriate Regional Fisheries Management Council for each reef site to be included under this designation. SMZ-type management could be considered for State waters as well).

4.3.45 Illegal and destructive practices. Although all legal fishing methods will be allowed on artificial reefs initially, the use of fishing techniques that may damage a reef's ability to sustain fish populations and fishing opportunities must be anticipated and provided for in law or regulation. These destructive acts could include:

a) use of grappling hooks or like anchoring devices to attach an anchor line directly to an artificial reef structure;

b) manipulation or modification of the reef structure by wire dragging or otherwise moving structure, changing profile, removing materials or otherwise damaging the reef substrate (Salvage operations are included in this category);

c) use of toxic, incapacitating or irritating substances to force fish out of the habitat or otherwise make them easier to catch (This technique could result in damage to the attached reef biota as well as crustaceans, juvenile fish and other organisms that may not be able to escape the chemical effects);

d) use of explosives to stun fish or break up parts of the reef substrate; and

e) use of fishing gear that has a higher-than-normal likelyhood of becoming entangled in the reef and lost (e.g., bottom gill nets).

Many fishermen recognize the value of artificial reefs in providing increased fishing opportunities. Most fishermen prefer to have fishing locations that they can utilize in relative privacy, so-called "secret spots". In addition, a few fishermen feel that the rate of artificial reef development, locations and numbers of artificial reefs are inadequate for their needs. These factors, combined with a lack of inexpensive disposal options for old vessels, have led to a proliferation of illegal artificial reef construction.

These "pirate reefs" are often constructed under cover of darkness and placed in areas where responsible reef construction would not be allowed. For example, most of the water deep enough to provide sufficient clearance over a reef in Great South Bay is in navigation channels. DMR cannot place a reef in a channel, whereas a reef pirate can and does.

This type of activity violates Federal and State law. The Marine Protection, Research and Sanctuaries Act of 1972, administered by the US EPA, contains regulations pertaining to dumping in the ocean from the beach out to 12 miles offshore. Beyond 12 miles, regulation of this activity is covered under the Outer Continental Shelf Act, administered by the US Minerals Management Service. Within State waters, sections 13-0345(2) and 17-0503(2) of the Environmental Conservation Law apply. The

penalties range from up to $25,000 per day for an ECL violation, to $50,000 per day and/or imprisonment for up to one year for a Federal violation. In addition, these illegal structures are not built as part of a comprehensive fisheries management strategy. The effects that they are having on the resources are unknown and uncontrolled. Pirate reef construction will not be tolerated by DMR.

Policy:

a) DMR will research the need for legislation that outlaws destructive fishing techniques and salvage operations on artificial reefs under its control.

b) DMR will undertake an informational/educational campaign that exposes illegal reef building activity as a violation of the law and harmful to the resource and, potentially, to those who use it.

c) DMR will prosecute any violators to the fullest extent of the law.

4.4 PLAN REVIEW

This Plan is intended as a guide upon which to base the DMR's annual work plans for artificial reef construction and management. The state of the art in artificial reef technology changes rapidly and requires a dynamic, adaptive approach to management. The DMR recognizes this and will adjust this Plan, in the form of periodic Artificial Reef Plan Amendments, to reflect the gains in knowledge of how best to accomplish the goals of the program.

The Amendments will be subject to review by the DEC's Marine Advisory Council and approval of the Commissioner, followed by public hearings.

Policy: The DMR will review this Plan every five (5) years and amend it as appropriate.

5. ACTIONS

DMR will conduct specific tasks, contingent upon sufficient funding and staffing, that are designed to accomplish the goals and objectives of the artificial reef program. These tasks are listed and prioritized within program areas.

5.1 ADMINISTRATION

(a) DMR will seek a general permit(s) from the COE and DRA for all artificial reef sites previously developed in the Marine District.

(b) DMR will include any future artificial reef sites developed in the Marine District under the general permit(s) obtained from COE and DRA.

(c) DMR will seek a stable funding source for the purchase, preparation, transportation and deployment of artificial reef materials.

(d) DMR will seek stable funding for the accomplishment of its artificial reef research objectives.

5.2 RESEARCH

(a) DMR will examine the ASMFC's review of artificial reef research needs, identify and prioritize relevant research objectives, and seek funding for the implementation of those objectives.

(b) DMR will conduct or contract for a survey to assess: a) the demand for artificial reefs; b) user preferences; and c) potential conflicts.

(c) DMR will evaluate existing estuarine artificial reefs and de facto reefs for their effectiveness as juvenile fish habitat.

(d) DMR will conduct or contract for a cost/benefit analysis of the use of FADs in local waters.

(e) DMR will determine the effectiveness of FADs for local waters and conditions by evaluating one or more experimental FAD projects.

(f) DMR will research the jurisdiction and administration of FADs, including the State's ability to regulate the installation of such structures in Federal waters.

(g) If the above mentioned research proves it to be necessary, pursue legislation that would enable DMR to regulate and control the use of FADs in State and adjacent Federal waters.

(h) DMR will assess the potential for reef development in conjunction with shoreline fishing and diving access points.

(i) DMR will conduct or contract for a cost/benefit analysis for the use of specific prefabricated artificial reef structures. Appropriate design and deployment of these structures will be determined by technical review.

(j) DMR will investigate the concept of a reef design that would provide sanctuary from harvest.

(k) DMR will investigate the potential of prefabricated units for inclusion on its reefs.

(l) DMR will investigate the potential of using hard substrate to

establish vegetated areas for juvenile fish habitat.

5.3 DEVELOPMENT

(a) DMR will conduct pre-construction, site-specific evaluations of each potential new artificial reef site.

(b) From the following list, DMR will design, construct and evaluate a limited number (2-3) of new estuarine artificial reefs and at least one new offshore artificial reef:

Proposed Artificial Reefs

As a result of the current formal planning process, the role of each existing artificial reef is defined as it relates to an overall artificial reef system for the marine waters of the State. This system includes the following components:

i) Estuarine artificial reefs. These reefs will function as nursery habitat, increase fishing and diving opportunities, or serve both of these functions within Long Island Sound and local bays. These reefs can be an important method of providing fishing opportunities for those without the means to utilize reefs that are outside of inlets, or for all users when weather conditions make boat travel in the ocean unsafe or undesirable.

ii) Inshore artificial reefs. Those reefs within 10 miles of the shoreline in the Atlantic Ocean, in water depths generally less than 100 feet. These reefs will function primarily as fishing and diving reefs; and

iii) Offshore artificial reefs. Those reefs from 10 to 30 miles

off the shoreline in the Atlantic Ocean, in water depths generally greater than 100 feet. These reefs will function primarily as fishing reefs, especially for deep water pelagic and bottom species (cod, pollock, tunas). Materials to be placed on these reefs will include large vessels with high profiles that would preclude their use on shallower reefs.

The present system of artificial reefs does not contain a sufficient number of the above described components (estuarine, inshore and offshore reefs) to fully address the needs of the resource and the user groups. There are no offshore reefs in the system, only two estuarine reefs, and no reefs east of Shinnecock on the south shore and Smithtown Bay on the north shore. If problems with materials acquisition and program funding are solved, several new artificial reefs should be developed that will complete the network of reefs in the Marine District.

The following proposed sites for new artificial reef development in the Marine District are based on a preliminary assessment of several factors:

i) compatibility with resource management objectives;

ii) existing artificial and natural reef resources;

iii) proximity to access facilities and fishing and diving centers;

iv) water quality;

v) sediment characteristics; and

vi) perceived need of local fishing and diving interests.

Any potential reef site will require a complete site-specific evaluation for suitability before development as a reef. Additionally, resource user (commercial and recreational) input will be solicited to determine needs, locations and priorities for all new reef sites. This input will take the form of surveys and group meetings.

Ocean Artificial Reefs--Offshore

(1) SOUTHEAST OF CHOLERA BANK

Type: benthic and mid-water.

Dimensions: 3000 yards by 1200 yards.

Objectives: increase fishing opportunities; enhance structured bottom habitat.

Recommendations: obtain large vessels for placement on this site, possibly in cooperative venture with New Jersey; investigate potential of FAD placement.

(2) SOUTH OF SHINNECOCK

Type: benthic, mid-water.

Dimensions: 3000 yards by 1200 yards.

Objectives: increase fishing opportunities; enhance structured bottom habitat.

Recommendations: obtain large vessels for placement on this site; investigate potential for FAD placement.

Ocean Artificial Reefs--Inshore

(3) EAST OF SHINNECOCK, SOUTHWEST OF MONTAUK

Type: benthic, mid-water.

Dimensions: 3000 yards by 1200 yards.

Objectives: increase fishing opportunities; enhance

structured bottom habitat.

Recommendations: obtain large vessels for placement on this site; investigate potential for FAD placement.

Estuarine Artificial Reefs--South Shore

(4) LOWER BAY

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

(5) ROCKAWAY INLET

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

(6) GREAT SOUTH BAY

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

Estuarine Artificial Reefs--East End/Peconics

(7) BLOCK ISLAND SOUND, NORTHWEST OF MONTAUK

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

(8) GARDINERS BAY OFF ORIENT STATE PARK

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

Recommendations: possibly two separate smaller sites rather than a single large one; investigate potential as marine sanctuary.

(9) NOYAC BAY

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: enhance structured bottom habitat; provide "no kill" marine sanctuary.

Recommendations: possibly two sites here: one off Long Beach and the other off Jessups Neck. Jessups would be a fishing reef, while Long Beach would be a dive reef accessible from shore.

Estuarine Artificial Reefs--Long Island Sound

(10) LONG ISLAND SOUND OFF MATTITUCK INLET

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

Recommendations: investigate potential of FAD placement at this site.

(11) LONG ISLAND SOUND OFF MILLER PLACE/MT. SINAI

Type: benthic.

Dimensions: 1000 yards by 500 yards.

Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.
Recommendations: investigate potential of FAD placement at this site.

(12) LONG ISLAND SOUND OFF EATONS NECK
Type: benthic
Dimensions: 1000 yards by 500 yards
Objectives: increase fishing and diving opportunities; enhance structured bottom habitat.

5.4 MANAGEMENT

(a) DMR will work within the ASMFC Artificial Reef Committee towards the development of a policy for the management of artificial reefs in the EEZ, including the use of Special Management Zones. This policy will then be forwarded to the Regional Management Councils for consideration.

(b) DMR will institute a regular monitoring program that will: a) collect and analyze necessary basic biological data for reef-associated species, specifically tautog, scup, black sea bass, and red hake; ascertain that permit requirements are complied with; and provide DMR with information necessary to maintain accurate and up-to-date reef maps.

(c) DMR will research the need for legislation that outlaws destructive fishing techniques and salvage operations on artificial reefs under its control. Destructive fishing techniques are defined as those that damage an artificial reef's capacity to sustain fish populations and fishing opportunities.

6. ENVIRONMENTAL IMPACTS

6.1 ECOSYSTEM IMPACTS.

6.1.1 Water Quality. Artificial reef program activities will have construction and post-construction impacts upon water quality. There are currently no data available to document the impacts; however, reef construction can be roughly compared to certain ocean disposal activities, e.g. dredged sediment disposal.

6.1.11 Turbidity. Release of dredged sediment causes temporary resuspension of bottom sediments, increasing turbidity, though not above the level necessary to cause mortality of living organisms (Hirsch et.al. 1978). When artificial reef material is first placed in the marine environment, the turbidity will be of extremely short duration. Mitigation of sediment resuspension is accomplished by siting the reef in areas of coarse sediment composition (Section 4.2.1.).

The post-construction effects of artificial reef structures on turbidity are unknown. Any interruption of an otherwise flat sea floor will necessarily alter current patterns which may cause resuspension or deposition of sediments. This effect will likely be insignificant.

6.1.12 Nutrients. Nutrients released from some waste disposal operations can adversely affect changes in local biological production (Pequegnat et.al. 1978). As artificial reef materials are cleaned and inspected prior to placement in the ecosystem (Section 4.2.2), this effect is not expected to pose a problem.

Once an artificial reef is in place on the bottom, current

patterns may develop that cause localized upwelling of bottom waters. Though this change could cause nutrient enrichment of the water column over a reef and subsequent stimulation of biological activity, this effect has never been documented (Mottet 1981).

6.1.13 Dissolved oxygen. Dissolved oxygen levels can be slightly depressed during dredged material disposal (Lee et. al. 1975). This effect may occur slightly during reef construction if the materials used are similar in nature to dredge spoil. When a barge or other vessel is sunk, escaping air will cause bubbles and turbulence that may increase dissolved oxygen levels. Any effect will be of extremely short duration.

After artificial reefs have been submerged for 1-2 years, sessile and motile invertebrates will form an associated community. This concentration of organisms can increase oxygen demand and cause localized depression of dissolved oxygen levels (William Pfol, National Marine Fisheries Service Sandy Hook Lab, personal communication). If artificial reefs are properly sited (Section 4.2.1) in areas of moderate to strong current flow, this effect will not be significant.

6.1.2 Sediment. The potential exists for some slight alteration of sediment composition and chemistry under and around artificial reef structures, though no adverse changes will occur. Alteration of current patterns could lead to localized removal of fine sediments through resuspension or deposition of fines by settling. The most likely effect in the oceanic environment will be redistribution of fines in the vicinity of the structure, with some slight alteration of bottom topography. Any reefs constructed in a depositional environment may accelerate the depositional process. Artificial reefs will not be sited in areas of sediment

deposition.

6.1.3 Biota. The most significant potential for impacts of artificial reef construction are on the marine organisms in the vicinity. The objective for an artificial reef is to deliberately produce a significant alteration in the type of habitat on the site; to exchange featureless sand/gravel/silt bottoms with their associated biota for structured hard bottom and its biota. Therefore, the construction of an artificial reef will adversely impact some organisms while directly benefitting others.

6.1.31 Plankton. The impacts on planktonic organisms is unknown but is not expected to be significant. Once a reef is in place on the bottom, it will not produce a turbid plume that will reduce available light. Localized upwelling will probably not increase nutrient levels to the point of increased plankton production (Mottet 1981). Artificial reefs will be constructed from non-toxic materials (Section 4.2.2), so no effects from constituents of the materials are expected.

6.1.32 Benthos. Two significant effects on benthic organisms are expected from artificial reef construction: physical burial of living organisms at the time of construction and subsequent alteration of habitat. Deposit-feeding polychaete worms, amphipods, and echinoderms and certain suspension-feeding bivalves (surf clam, quahog, ocean quahog) would be covered by artificial reef materials during construction and subsequently unable to recolonize the sediments directly beneath the structures. This results in a net loss of sand or silty sand habitat and biota.

Post-construction reef effects on the benthos are variable. DMR will utilize an artificial reef site design (Section 4.2.3)

which leaves a large amount of open-bottom habitat undisturbed between reef structures. Although this design will provide habitat for sediment-dwelling organisms, the concentration of fish attracted to the structure may present a potential for increased levels of predation upon these organisms. Transient fishes attracted to artificial reefs do not necessarily feed upon reef biota and instead prey upon organisms found in the surrounding non-reef environment (Steimle and Ogren 1982, Mottet 1981).

The altered current patterns surrounding reef structures may increase settling rates for suspended organic material (plankton, detritus), particularly if the reef were designed to achieve this affect (Walton 1982). This material would then be available to deposit feeders and may stimulate production of these organisms.

Hard substrate is essential habitat for sessile invertebrates such as barnacles, mussels, hydroids, bryozoans, and annelid worms and for certain algal species. When first placed in the marine environment, artificial reefs provide clean attachment surfaces for these organisms to colonize. The colonization process takes two or more years to develop into a mature community, though the substrate can be completely covered with some organisms before then. The attached organisms provide microhabitat which attracts other invertebrates and fish for shelter and food. This community provides a forage base for certain reef-associated fish (tautog, cunner) and crustacean species and becomes part of the reason artificial reefs are successful in attracting important fish species.

Artificial reefs constructed by DMR will provide the maximum amount of surface area per volume of material as possible under program operating conditions. This policy should allow maximum

development of the attached community and result in a net increase in biomass over the reef site. In addition, reefs will not be sited directly upon so-called "live bottom" where the loss of benthic organisms may be significant.

6.1.33 Fish. Fishermen have known for centuries that fish are found in relatively high abundance over and around shipwrecks. Artificial reefs were used to duplicate the conditions of a shipwreck and capitalize upon this poorly understood phenomenon. Although the effects of the reefs are known, research to date has failed to provide information sufficient to construct a comprehensive theory of artificial reef function.

The general measure of success for an artificial reef is an increase in fish catch or fish abundance at the site (Bohnsack and Sutherland 1985). When a reef is first placed in the marine environment, it will often begin attracting fish within hours despite the lack of a developed reef forage base. These fish species do not feed directly upon reef organisms, e.g., planktivorous fishes are often found swimming over or near artificial reefs. Many species forage in areas off the reef and then return to the reef, possibly for shelter. As a reef ages, it becomes covered with attached algae and invertebrate organisms and, in turn, attracts certain other invertebrates and fish. These predators and grazers derive food and shelter from this artificial habitat. Large pelagic species, such as sharks and tunas, may be attracted to reefs due to the concentration of potential prey, though the true value of reefs to these species is not well understood.

When artificial reef fish communities are compared with communities of natural habitats, most studies show higher densities

and biomass on the artificial reefs. This may be true for natural reefs as well as open bottom habitat (Bohnsack and Sutherland 1985). However, few fish species in the Marine District are permanent residents of artificial reefs. Most are transients or seasonal migrants that frequent reefs at different times of the year. Though some increase in production is likely for resident species, the benefits derived by transients from their association with artificial reefs is unclear. The forage base and/or shelter provided may increase survival and growth. In other cases, reproduction may be facilitated by the close association of conspecifics. The primary value of these artificial reefs, however, seems to lie in their fish attracting properties rather than any increase in production of fish. The benefits are derived mainly by anglers and other user groups, with some benefit to the resource. The impacts of an artificial reef will depend upon fish species, reef size, reef age, location and other variables. A reef's effect upon non-reef fish species is unknown; however, the potential exists for adverse impacts on habitat required by these species (Polovina 1989).

The concentration of fish at a reef makes them more susceptible to fishing pressure than if they were scattered over natural bottom. This situation could lead to harvest of the resource beyond the production capacity of the reef. The adverse impact of aggregation is dependent upon the fishing mortality rate relative to any increase in production of the species taken from the reef. This impact can be mitigated by both: a) maximizing productive potential of a reef; and b) controlling fishing mortality.

The biological productive potential of an artificial reef can be maximized by constructing them within the optimum range of

important design and siting parameters. These parameters include area covered, reef volume, vertical relief, vertical profile, complexity, spatial arrangement and orientation, and location (Bohnsack and Sutherland 1985). In addition, each fish species will respond differently to various iterations of these parameters. Recommendations in Section 4.2 of the Plan fall within optimum ranges for values found in the literature. Biological productive potential will be maximized for New York reefs by basing future construction on a review of current research and the results of a reef monitoring program. This will not be an easy task.

If biological productive potential can be optimized, fishing mortality may need to be controlled as well. A critical step in deciding how and when to control fishing mortality is the estimation of the current level of fishing mortality. As fish populations at artificial reefs are mostly transient, in order to estimate fishing mortality on the reef one must estimate fishing mortality on the overall stocks of those fishes. The effect of fishing on fish populations is often difficult or impossible to separate from other variables such as climate. Therefore, actual estimates of fishing mortality for most species on an artificial reef may be virtually impossible. Instead, fisheries managers can use existing fisheries management plans and stock assessments in devising strategies for controlling fishing mortality of reef-associated stocks.

One of the benefits to management of an artificial reef is that it provides a known location in which special management measures can be applied. Catch per unit of fishing effort (C/E) is often higher at an artificial reef than on natural bottom (Bohnsack and Sutherland 1985). The angling public may respond positively to stricter controls on fishing at a reef site as long as C/E remains

high. Some examples of special management measures include bag limits, higher size limits than standard regulations, closed seasons, gear restrictions and closed areas. Section 4.3 fully describes DMR's management policy relative to artificial reefs.

6.2 IMPACTS ON HUMAN RESOURCES.

6.2.1 Commercial Fishing Industry. The commercial fishing industry in the area was described in Section 2.4.1. Construction of artificial reefs will preclude certain types of fishing gear while providing opportunities for use of others. Bottom trawling will be virtually impossible on a reef site, although trawling close to structure can be productive fishing. Dredging for shellfish will also be inhibited within a reef site. Conversely, use of fixed gear such as lobster pots and gill nets would not be inhibited by the presence of reefs. These fishermen may chose to exploit the concentration of fish and crustaceans present on the reef site. Although the reefs may provide some benefit to those who are equipped to fish on them, the limited amount of reef structure existing and proposed would not support a significant commercial fishery. In addition, theoretical work by Huntsman (1981) indicated bottom artificial reefs are not practical for sustained commercial use.

Artificial reefs will be sited in consultation with affected commercial fishing organizations and individuals (Section 4.2.1) in order to avoid conflicts. In addition, pre-construction surveys will reveal concentrations of commercially valuable species that would be adversely affected by reef construction, such as surf clams, so that these areas can be avoided.

6.2.2 Recreational Activities. The recreational activities affected by an artificial reef program are fishing, SCUBA diving,

recreational boating, swimming, and aesthetic appreciation of the natural environment. The recreational angling industry is of tremendous importance to this region (Section 2.4.1). Nearly all recreational anglers and SCUBA divers receive positive benefits from the development of artificial reef resources, though conflicts may arise over their use between different groups.

Recreational boating could be affected by concentrations of boats fishing on an artificial reef, particularly if the reef is located inside a bay. However, existing patterns of fishing already impinge upon recreational boating, particularly drift fishing for fluke in navigation channels. Properly sited artificial reefs could direct fishing effort away from high-traffic areas which would mitigate their impacts upon recreational boating. Similar conflicts could arise with swimmers and others that frequent shoreline areas for relaxation and aesthetic appreciation. Artificial reefs may provide an attractive nuisance if sited too close to bathing beaches, parks and other natural areas. In general, reefs will not be sited so close to shore as to provide this nuisance. In addition, the permitting process will identify potential conflicts so that they may be avoided.

6.2.3 Historic Shipwrecks. An unknown though significant number of shipwrecks exist in the area covered by the Plan. The historical or cultural value of most of these wrecks is undetermined. Many of the wrecks outside of State waters are visited by recreational and commercial SCUBA divers who have removed much of the salvageable materials from the wrecks. Artificial reefs have been the recipient of several vessels that may or may not have historical value. For example the tug Fran S, built in 1899, sunk in Jones Inlet in the early 1970s and was later moved to the Atlantic Beach Reef.

The effects of fishing and diving activities on these wrecks can be significant. When anchoring over a wreck, a boater often uses a type of anchor called a grapnel which hooks into the wreck or other substrate. This practice can cause damage when the boater retrieves the anchor by forcing it out using the boat's engine. In addition, anglers and commercial fishermen may damage a wreck when fishing line or gear becomes entangled in the wreck.

Existing wrecks can provide a focal point for the development of an artificial reef site, provided the wreck is of no known historic value. Artificial reefs for fishing and diving will not be constructed around historic shipwrecks, unless the objective for the reef is to provide a marine sanctuary. Fishing and diving may be prohibited on such a site.

6.2.4 Sand and Gravel Mining. Bottom composed of sand and/or gravel is desirable substrate for placement of artificial reefs. These materials are also valuable as building aggregate. Any reef sited on potentially valuable mineral resources will limit the potential use and development of such resources. Siting reefs in coordination with minerals management agencies (Section 4.2.1) will mitigate potential losses by avoiding areas with high priority for mineral resource development.

6.2.5 Navigation. Artificial reef construction activities often involve movement of scrap vessels or barges loaded with materials by towing through heavily trafficked navigation lanes. These actions are so infrequent, however as to be of no consequence. The on-site operations can occur over a protracted time period of six hours or more, which means that the vessels involved are often circling around the site during this time. In addition, curious boaters may be drawn to the activity and

congregate in the vicinity of the activity. This situation may constitute a transient navigational hazard. The situation can be mitigated somewhat by: a) conducting operations during daylight hours only; b) maintaining good radio and radar contact among the involved vessels; c) notifying the US Coast Guard prior to the activity; and d) posting a lookout vessel which would warn away curiosity seekers.

Any floating debris may pose a hazard to navigation, particularly large pieces of wood. Proper preparation of materials is essential in reducing or eliminating the floating debris hazard (Section 4.2.2).

Shoaling will result from the deployment of reef materials and may pose a hazard to navigation. Compliance with US Army Corps of Engineers permit conditions requiring maintenance of minimum water depths over the site will mitigate hazards resulting from shoaling. In addition, reefs will not be sited in navigation lanes (Section 4.2.1.).

6.3 UNAVOIDABLE ADVERSE IMPACTS.

The only unavoidable adverse impact associated with artificial reef construction is the smothering of benthic organisms. This impact will be minimized by proper siting and compensated by replacement with the hard-substrate communities associated with artificial reefs.

6.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES.

The materials used in constructing artificial reefs, particularly scrap steel vessels and waste concrete materials, have value as recyclable resources. Indeed, donations to the reef program of these materials is declining as recycling becomes more

economically feasible or is mandated by legislation. Any materials placed on artificial reefs will be lost as a source of scrap steel or building aggregate.

6.5 GROWTH-INDUCING IMPACTS.

The economic value of recreational angling is well known (Kahn 1989; Bell et.al. 1982). Construction of artificial reefs may increase angler participation rates, especially if people view reefs as a way to be more successful in catching fish. This could increase demand for goods and services and result in some growth in this industry. In addition, artificial reefs composed of ships or other vessels will attract divers and potentially increase interest in sport diving. Artificial reefs are not expected to provide much stimulus for commercial fisheries.

6.6 EFFECTS ON USE AND CONSERVATION OF ENERGY.

Bottom fishing while anchored over a reef site is less fuel-consumptive than drifting or trolling. Artificial reefs placed close to access points may induce anglers to fish at that location rather than a more remote one, thus reducing fuel demand. Conversely, if catch rates are higher on a reef site, anglers may be willing to travel further to fish at the site, thus increasing fuel consumption.

7. ALTERNATIVES

7.1 NO PROGRAM.

The current artificial reef program can be dropped from DMR's agenda. This alternative would allow DMR to use resources allocated to this program for other programs, e.g. fisheries investigations, and would have no effect on existing patterns of recreational and commercial fishing in the region. In addition, the State would be relieved of the liability concerns associated with the construction program. The State would apparently still have responsibility for existing structures, however.

The potential fishery benefits of artificial reefs would not be realized if DMR stopped constructing reefs. In addition, the demand for artificial reefs from the angling public will likely continue to increase. In the absence of a State program, fishing clubs, municipalities and other entities are likely to rush to fill the void by either developing their own programs or building their own reefs. The lack of a coordinated program would result in reefs being constructed for a variety of objectives that may or may not be consistent with the fisheries management strategies pursued by DMR.

7.2 NON-STRUCTURAL MEANS OF ENHANCING BIOLOGICAL PRODUCTIVITY AND FISHING OPPORTUNITIES.

7.2.1 Fish Hatcheries. Fish culture technology exists for many important saltwater fish species, including weakfish, striped bass and winter flounder. As an alternative to artificial reef construction, marine fish hatcheries could be built and stocking programs begun for the Marine District. This alternative presents a number of drawbacks, however. Since most fish species in the Marine District are migratory, stocked fish such as weakfish would

move out of the area and enhance fishing for anglers in other states while providing little or no benefit to New York anglers. In addition, stocking of fish does not improve habitat as does reef construction. Traditional arguments against stocking include the possibility for introduction of disease and the genetic pollution of wild fish stocks. The prevailing economic and legal factors at this time may significantly reduce the feasibility of this option

7.2.2 Fertilization. Addition of nutrients to the ecosystem could provide the stimulus for primary production that would start a "food chain reaction" and ultimately lead to increased production of important organisms. This could be accomplished by mixing nutrients already present in the system via artificial upwelling or adding nutrients such as sewage sludge, commercial fertilizer, or fish processing wastes (National Marine Fisheries Service 1972). The current legal and economic climate would preclude this alternative to artificial reef construction. Besides, we already introduce an oversupply of nutrients to our coastal waters with apparently adverse effects upon water quality and many marine organisms.

REFERENCES

Alevras, R.A. and S.J. Edwards. 1985. Use of reef-like structures to mitigate habitat loss in an estuarine environment. Bull. Mar. Sci. 37(1):396.

Bell, F.W., P.E. Sorensen & V.R. Leeworthy. 1982. The economic impact and valuation of saltwater recreational fisheries in Florida. Rep. No. 47, FL Sea Grant College. 118 pp.

Bell, M., C.J. Moore & S.W. Murphey. 1989. Utilization of manufactured reef structures in South Carolina's Marine artificial reef program. Bul. Mar. Sci. 44(2):818-830.

Berg, D. 1990. Wreck Valley Volume II. Aqua Explorers, Inc. East Rockaway, NY. 189 pp.

Bohnsack, J.A. & D.L. Sutherland. 1985. Artificial reef research: a review with recommendations for future priorities. Bul. Mar. Sci. 37(1):11-39.

Bortone, S.A. and D. Van Orman. 1985. Biological survey and analysis of Florida's artificial reefs. Florida Sea Grant Tech. Paper No. 34.

Breslin, V.T. 1990. Personal communication. Marine Sciences Research Center, SUNY Stony Brook, NY.

Briggs, P.T. 1975. An evaluation of artificial reefs in New York's marine waters. NY Fish & Game Journal 22(1):51-56.

_____ and J.S. O'Connor. 1971. Comparison of shore-zone fishes over naturally vegetated and sand-filled bottoms in Great South Bay. NY Fish & Game Journal 18(1).

_____ and C.S. Zawacki. 1974. American lobsters at artificial reefs in New York. NY Fish & Game Journal 21:73-77.

_____ 1989. Personal communication. NY State Dept. Environmental Conservation. SUNY, Stony Brook, NY.

Buckley, R. and J. Walton. 1981. Fishing piers and marine habitat enhancement in Washington State. Pp. 207-210 *in* D.Y. Aska, ed. Artificial reefs: conference proceedings. Florida Sea Grant Rept. No. 41.

Burke, L.B. 1986. A review of funding sources for artificial reef development. Sport Fishing Inst. Artificial Reef Dev. Center, Washington, DC. Report No. 8, 40 pp.

Davis, G.E. 1985. Artificial structures to mitigate marina construction impacts on spiny lobster, Panulirus argus. Bull. Mar. Sci. 37(1):151-156.

Ditton, R.B. and L.B. Burke. 1985. Artificial reef development for recreational fishing: a planning guide. Sport Fishing Inst. Artificial Reef Dev. Center, Washington, DC. 68 pp.

Feigenbaum, D., C.H. Blair, M. Bell, J.R. Martin and M.G. Kelly. 1985. Virginia's artificial reef study: description and results of year I. Bull. Mar. Sci. 37(1):179-188.

Figley, W. 1990. Personal communication. New Jersey Department of Environmental Protection, Division of Fish, Game & Wildlife. Port Republic, NJ.

_____ 1989. A guide to fishing and diving New Jersey's artificial reefs. New Jersey Dept. Env. Prot., Div. Fish, Game, & Wildlife. Information Series 89-1. 80 pp.

Freeland, G.L. & D.J.P. Swift. 1978. Surficial sediments. MESA New York Bight Atlas Monograph Series, No. 10. NY Sea Grant Institute, Albany, NY. 93 pp.

Grant, J.J. 1987. Mitigation policy versus artificial reef design (or, the marine biologist's impact wrench). Paper presented at the Fourth Inter. Conf. on Artif. Habitat for Fisheries; Nov. 2-6; Miami, FL.

Hall, W. 1990. Personal communication. South Carolina Wildlife and Marine Resources Division. Charleston, SC.

Hirsch, N.D., L.H. DiSalvo & R. Peddicord. 1978. Effects of dredging and dispersal on aquatic organisms. DMRP Tech. Rep. DS-78-5 Environmental Effects Lab. US Army Engineers Waterways Exp. Sta., Vicksburg, MS. 41 pp.

Hueckel, G.J. and R.M. Buckley. 1982. Site selection procedures for marine habitat enhancement in Puget Sound, Washington. State of Wash., Dept. Fish. Tech. Rep. No. 67. 82 pp.

_____ and _____. 1989. Mitigating rocky habitat loss using artificial reefs. Bull. Mar. Sci. 44:913-922.

Humphries, E. 1984. Stabilized coal-fired powerplant wastes as fouling substrates in estuarine waters. Univ. Maryland. Horn Point Env. Labs.

Hunstman, G.R. 1981. Ecological considerations influencing the management of reef fishes. Pp. 167-175 *in* D.Y. Aska, ed. Artificial reefs: a conference proceedings. FL Sea Grant Rep. 41.

Kahn, J.R. 1989. The economic value of Long Island saltwater recreational fishing. NY Sea Grant Inst./NYS DEC pub.; SUNY Stony Brook, NY.

Kalajian, E.H., I.W. Duedall, C.S. Shieh & J.R. Wilcox. 1987. Reef construction using stabilized oil ash. Presentation at Fourth Inter. Conf. Art. Hab. Fish.; Nov. 2-6; Miami, FL.

Lee, G.F., M.D. Piwoni, J.M. Lopez, G.M. Mariani, J.S. Richardson, D.H. Hover & F.Saleh. 1975. Research study for the development of dredged material disposal criteria. US Army Engineers Waterways Exp. Sta., Vicksburg, MS. 381 pp.

Mottet, M.G. 1981. Enhancement of the marine environment for fisheries and aquaculture in Japan. State of Washington, Dept. of Fisheries Tech. Rep. No. 69. 81 pp.

Murphey, S.W. 1989. Personal communication. North Carolina Div. Mar. Fish., Morehead City, NC.

Myatt, D.O. & R.B. Ditton. 1986. Exclusion mapping for artificial reef site selection to maximize recreational fishing benefits in the Gulf of Mexico. Sport Fishing Inst. Artificial Reef Devel. Ctr., Washington, DC. 151 pp.

_____, E.N. Myatt & W.K. Figley. 1989. New Jersey tire reef stability study. Bul. Mar. Sci. 44(2):807-817.

National Marine Fisheries Service. 1972. Final environmental statement: construction of artificial reefs in the Atlantic Ocean off Cape Henry, Virginia. NMFS/NOAA/DOC, Beaufort, NC. 11 pp.

New Jersey Dept. Env. Prot. 1987. Draft artificial reef management plan for New Jersey. Div. Fish, Game & Wildlife, Mar. Fish. Admin.; 70 pp.

Noble, E.B. 1988. The North Carolina artificial reef master plan. North Carolina Dept. Nat. Res. Comm. Dev., Spec. Sci. Rep. No. 47; 57 pp.

Pequegnat, W.E., D.D. Smith, R.M. Darnell, B.T. Presley & R.O. Reid. 1978. An assessment of potential impacts of dredged material disposal in the open ocean. DMRP Tech. Rep. D-78-2. Environmental Effects Lab. US Army Engineers Waterways Exp. Sta., Vicksburg, MS. 645 pp.

Phillips, S.H. 1988. Artificial reefs and fishery conflicts: problems and opportunities for the sport fishing industry. SFI Art. Reef Dev. Center, Washington, DC; 64 pp.

Phoel, W. 1990. Personal communication. National Marine Fisheries Service, Sandy Hook Lab. NJ.

Polovina, J.J. 1989. Artificial reefs: nothing more than benthic fish aggregators. CalCOFI Rep. 30:37-39.

Price, K.S. 1987. Project ASHREEF: a report on a stabilized coal waste fish reef on Delaware subaqueous lands. Univ. of Delaware, College of Mar. Sci., Lewes, DE.

Sheehy, D.J. 1985. New approaches in artificial reef design and applications. Pp. 253-263 *in* F.M. D'Itri, ed. Artificial reefs: marine and freshwater applications. Lewis Pub., Inc., Chelsea, MI.

Steimle, F.W.Jr. & L. Ogren. 1982. Food of fish collected on artificial reefs in the New York Bight and off Charleston, South Carolina. Marine Fisheries Review 44(6-7):49-52.

Stone, R.B. 1985. National Artificial Reef Plan. NOAA Tech. Memo. NMFS OF-6; 39 pp.

Swanson, R.L. 1976. Tides. MESA New York Bight Atlas Monograph Series, No. 4. NY Sea Grant Inst., Albany, NY. 93 pp.

Walton, J.M. 1982. The effects of an artificial reef on resident flatfish populations. Marine Fisheries Review 44(6-7):45-48.

Woodhead, P.M.J., J.H. Parker and I.W. Duedall. 1985. The use of by-products from coal combustion for artificial reef construction. Pp. 265-292 *in* F.M. D'Itri, ed. Artificial reefs: marine and freshwater applications. Lewis Pub., Inc., Chelsea, MI.

APPENDIX A

APPLICABLE LEGISLATION AND REGULATIONS

1. NATIONAL FISHING ENHANCEMENT ACT OF 1984: TITLE II--ARTIFICIAL REEFS.

SECTION 201. SHORT TITLE.

This title may be cited as the "National Fishing Enhancement Act of 1984".

SECTION 202. FINDINGS AND CONCLUSIONS.

(a) FINDINGS.--The Congress finds that--

(1) although fishery products provide an important source of protein and industrial products for United States consumption. United States fishery production annually falls far short of satisfying United States demand;

(2) overfishing and the degradation of vital fishery resource habitats have caused a reduction in the abundance and diversity of United States fishery resources;

(3) escalated energy costs have had a negative effect on the economics of United States commercial and recreational fisheries;

(4) commercial and recreational fisheries are a prominent factor in United States coastal economies and the direct and indirect returns to the United States economy from commercial and recreational fishing expenditures are threefold; and

(5) properly designed, constructed, and located artificial reefs in waters covered under this title can enhance the habitat and diversity of fishery resources; enhance United States recreational and commercial fishing opportunities; increase the production of fishery products in the United States; increase the energy efficiency of recreational and commercial fisheries; and contribute to the United States and coastal economies.

(b) PURPOSE.--The purpose of this title is to promote and facilitate responsible and effective efforts to establish artificial reefs in waters covered under this title.

SECTION 203. ESTABLISHMENT OF STANDARDS

Based on the best scientific information available, artificial reefs in waters covered under this title shall be sited and constructed, and subsequently monitored and managed in a manner which will--

(1) enhance fishery resources to the maximum extent practicable;

(2) facilitate access and utilization by United States recreational and commercial fishermen;

(3) minimize conflicts among competing uses of waters covered under this title and the resources in such waters;

(4) minimize environmental risks and risks to personal

health and property; and

(5) be consistent with generally accepted principles of international law and shall not create any unreasonable obstruction to navigation.

SECTION 204. NATIONAL ARTIFICIAL REEF PLAN.

Not later than one year after the date of enactment of this title, the Secretary of Commerce, in consultation with the Secretary of the Interior, the Secretary of Defense, the Administrator of the Environmental Protection Agency, the Secretary of the Department in which the Coast Guard is operating, the Regional Fishery Management Councils, interested States, Interstate Fishery Commissions, and representatives of the private sector, shall develop and publish a long term plan which will meet the purpose of this title and be consistent with the standards established under section 203.

The plan must include--

(1) geographic, hydrographic, geologic, biological, ecological, social, economic, and other criteria for siting artificial reefs;

(2) design, material, and other criteria for constructing artificial reefs;

(3) mechanisms and methodologies for monitoring the compliance of artificial reefs with the requirements of permits issued under section 205;

(4) mechanisms and methodologies for managing the use of artificial reefs;

(5) a synopsis of existing information on artificial reefs and needs for further research on artificial reef technology and management strategies; and

(6) an evaluation of alternatives for facilitating the transfer of artificial reef construction materials to persons holding permits issued pursuant to section 205, including, but not limited to, credits for environmental mitigation and modified tax obligations.

SECTION 205. PERMITS FOR THE CONSTRUCTION AND MANAGEMENT OF ARTIFICIAL REEFS.

(a) SECRETARIAL ACTION ON PERMITS.--In issuing a permit for artificial reefs under section 10 of the Rivers and Harbors Act of 1899, section 404 of the Federal Water Pollution Control Act, or section 4(e) of the Outer Continental Shelf Lands Act, the Secretary of the Army (hereinafter in this section referred to as the "Secretary") shall--

(1) consult with and consider the views of appropriate Federal agencies, States, local governments, and other interested parties;

(2) ensure that the provisions for siting, constructing, monitoring, and managing the artificial reef

are consistent with the criteria and standards established under this title;

(3) ensure that the title to the artificial reef construction material is unambiguous, and that responsibility for maintenance and the financial ability to assume liability for future damages are clearly established; and

(4) consider the plan developed under section 204 and notify the Secretary of Commerce of any need to deviate from that plan.

(b) TERMS AND CONDITIONS OF PERMITS.--(1) Each permit issued by the Secretary subject to this section shall specify the design and location for construction of the artificial reef and the types and quantities of materials that may be used in constructing such artificial reef. In addition, each such permit shall specify such terms and conditions for the construction, operation, maintenance, monitoring, and managing the use of the artificial reef as are necessary for compliance with all applicable provisions of law and as are necessary to ensure the protection of the environment and human safety and property.

(2) Before issuing a permit under section 402 of the Federal Water Pollution Control Act for any activity relating to the siting, design, construction, operation, maintenance, monitoring, or managing of an artificial reef, the Administrator of the Environmental Protection Agency shall consult with the Secretary to ensure that such permit is consistent with any permit issued by the Secretary subject to this section.

(c) LIABILITY OF PERMITTEE.--(1) A person to whom a permit is issued in accordance with subsection (a) and any insurer of that person shall not be liable for damages caused by activities required to be undertaken under any terms and conditions of the permit, if the permittee is in compliance with such terms and conditions.

(2) A person to whom a permit is issued in accordance with subsection (a) and any insurer of that person shall be liable, to the extent determined under applicable law, for damages to which paragraph (1) does not apply.

(3) The Secretary may not issue a permit subject to this section to a person unless that person demonstrates to the Secretary the financial ability to assume liability for all damages that may arise with respect to an artificial reef and for which such permittee may be liable.

(4) Any person who has transferred title to artificial reef construction materials to a person to whom a permit is issued in accordance with subsection (a) shall not be liable for damages arising from the use of such materials in an artificial reef, if such materials meet applicable requirements of the plan published under Section 204 and are not otherwise defective at the time title is transferred.

(d) LIABILITY OF THE UNITED STATES.--Nothing in this title creates any liability on the part of the United States.

(e) CIVIL PENALTY.--Any person who, after notice and an opportunity for a hearing, is found to have violated any provision of a permit issued in accordance with subsection (a) shall be liable to the United States for a civil penalty, not to exceed $10,000 for each violation. The amount of the civil penalty shall be assessed by the Secretary by written notice. In determining the amount of such penalty, the Secretary shall take into account the nature, circumstances, extent, and gravity of the violation. The Secretary may compromise, modify, or remit with or without conditions, any civil penalty which is subject to imposition or which has been imposed under this section. If any person fails to pay (an) assessment of a civil penalty after it has become final, the Secretary may refer the matter to the Attorney General for collection.

SECTION. 206. DEFINITIONS.

For purposes of this title--

(1) The term "artificial reef" means a structure which is constructed or placed in waters covered under this title for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

(2) The term "State" means a State of the United States, the District of Columbia, Puerto Rico, the United States Virgin Islands, American Samoa, Guam, Johnston Island, Midway Island. and Wake Island.

(3) The term "waters covered under this title" means the navigable waters of the United States and the waters superjacent to the outer Continental Shelf as defined in section 2 of the Outer Continental Shelf Lands Act (43 U.S.C. section 1331). to the extent such waters exist in or are adjacent to any State.

SECTION 207. USE OF CERTAIN VESSELS AS ARTIFICIAL REEFS.

The Act entitled "An Act to authorize appropriations for the fiscal year 1973 for certain maritime programs of the Department of Commerce and for other purposes", approved August 22, 1972 (16 U.S.C. 1220-1220c), is amended--

(1) by striking out "Liberty" each place it appears in section 3,4,5, and 6 and inserting in lieu thereof "obsolete";

(2) by striking out "Commerce" in section 3 and inserting in lieu thereof "Transportation";

(3) by striking out "shall" in the matter preceding paragraph (1) in section 4 and inserting in lieu thereof "may"; and

(4) by adding at the end thereof the following new section:

"SECTION 7. For purposes of sections 3,4,5, and 6, the term

"obsolete ship' means any vessel owned by the Department of Transportation that has been determined to be of insufficient value for commercial or national defense purposes to warrant its maintenance and preservation in the national defense reserve fleet and has been designated as an artificial reef candidate."

SECTION.208. SAVINGS CLAUSES.

(a) TENNESSEE VALLEY AUTHORITY JURISDICTION.--Nothing in this title shall be construed as replacing or superseding section 26a of the Tennessee Valley Authority Act of 1933, as amended (16 U.S.C. 831y-1).

(b) STATE JURISDICTION.--Nothing in this title shall be construed as extending or diminishing the jurisdiction or authority of any State over the siting, construction, monitoring, or managing of artificial reefs within its boundaries.

2. U.S. ARMY CORPS OF ENGINEERS--SPECIAL POLICY ON ARTIFICIAL REEFS

SECTION 322.5 SPECIAL POLICIES.

The Secretary of the Army has delegated to the Chief of Engineers the authority to issue or deny section 10 permits. The following additional special policies and procedures shall also be applicable to the evaluation of permit applications under this regulation.

(A) General. DA permits are required for structures or work in or affecting navigable waters of the United States. However, certain structures or work specified in 33 CFR Part 330 are permitted by that regulation. If a structure or work is not permitted by that regulation, an individual or regional section 10 permit will be required.

(B) Artificial Reefs.

(1) When considering an application for an artificial reef, as defined in 33 CFR 322.2(g), the district engineer will review the applicant's provisions for siting, constructing, monitoring, operating, maintaining, and managing the proposed artificial reef and shall determine if those provisions are consistent with the following standards:

(i) The enhancement of fishery resources to the maximum extent practicable;

(ii) The facilitation of access and utilization by United States recreational and commercial fishermen;

(iii) The minimization of conflicts among competing uses of the navigable waters or waters overlying the outer continental shelf and of the resources in such waters;

(iv) The minimization of environmental risks and risks to personal health and property;

(v) Generally accepted principles of international law; and

(vi) the prevention of any unreasonable obstructions to navigation. If the district engineer decides that the applicant's provisions are not consistent with these standards, he shall deny the permit. If the district engineer decides that the provisions are consistent with these standards, and if he decides to issue the permit after the public interest review, he shall make the provisions part of the permit.

(2) In addition, the district engineer will consider the National Artificial Reef Plan developed pursuant to section 204 of the National Fishing Enhancement Act of 1984, and if he decides to issue the permit, will notify the Secretary of Commerce of any need to deviate from that plan.

(3) The district engineer will comply with all

coordination provisions required by a written agreement between the DOD and the Federal agencies relative to artificial reefs. In addition, if the district engineer decides that further consultation beyond the normal public commenting process is required to evaluate fully the proposed artificial reef, he may initiate such consultation with any Federal agency, state or local government or other interested party.

(4) The district engineer will issue a permit for the proposed artificial reef only if the applicant demonstrates, to the district engineer's satisfaction, that the title to the artificial reef construction material is unambiguous, that responsibility for maintenance of the reef is clearly established, and that he has the financial ability to assume liability for all damages that may arise with respect to the proposed artificial reef. A demonstration of financial responsibility might include evidence of insurance, sponsorship, or available assets.

(i) A person to whom a permit is issued in accordance with these regulations and any insurer of that person shall not be liable for damages caused by activities required to be undertaken under any terms and conditions of the permit, if the permittee is in compliance with such terms and conditions.

(ii) A person to whom a permit is issued in accordance with these regulations and any insurer of that person shall be liable, the extent determined under applicable law, for damages to which paragraph (i) does not apply.

(iii) Any person who has transferred title to artificial reef construction materials to a person to whom a permit is issued in accordance with these regulations shall not be liable for damages arising from the use of such materials in an artificial reef,if such materials meet applicable requirements of the plan published under section 204 of the National Artificial Reef Plan, and are not otherwise defective at the time title is transferred.

3. NEW YORK STATE WATER QUALITY REGULATIONS--TITLE 6 ENVIRONMENTAL CONSERVATION LAW

SECTION 701.20 Classes and standards for saline surface waters. The following items and specifications shall be the standards applicable to all New York saline surface waters which are assigned the classification of SA, SB, SC, or SD, in addition to the specific standards which are found in this section under the heading of each such classification.

Quality Standards for Saline Surface Waters

Items	Specifications
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (Sec.17-0105)
2. pH	The normal range shall not be extended by more than one-tenth (0.1)pH unit.
3. Turbidity.	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
4. Color.	None from man-made sources that will be detrimental to anticipated best usage of waters.
5. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.
6. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules or grease.
7. Thermal discharges.	(See Part 704 of this Title.)

CLASS "SA" WATERS

Best usage of waters. The waters shall be suitable for shellfishing for market purposes and primary and secondary recreation.

Quality Standards for Class "SA" Waters

Items	Specifications
1. Coliform.	The median MPN value in any series of samples representative of waters in the shellfish-growing area shall not be in excess of 70 per 100 ml.
2. Dissolved oxygen.	Shall not be less than 5.0 mg/l at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for their specific waters which are assigned to this class.

CLASS "SB" WATERS

Best usage of waters. The waters shall be suitable for primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes.

Quality Standards for Class "SB" Waters

Items	Specifications
1. Coliform.	The monthly medial coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of a sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. Dissolved oxygen.	Shall not be less than 5.0 mg/l at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters, for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SC" WATERS

Best usage of waters. The waters are suitable for fishing and fish propagation. The waters are suitable for primary and secondary contact recreation even though other factors may limit the use for that purpose.

Quality Standards for Class "SC" Waters

Items	Specifications
1. Coliform.	The monthly medial coliform value for 100 ml of sample shall not exceed 2,400 from a minimum of five examinations and provided that not more than 20 percent of the samples shall exceed a coliform value of 5,000 for 100 ml of sample and the monthly geometric mean fecal coliform value for 100 ml of sample shall not exceed 200 from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. Dissolved oxygen.	Shall not be less than 5.0 mg/l at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation or that will be injurious to edible fish or shellfish or the culture of propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SD" WATERS

Best usage of waters. All waters not primarily for recreational purposes, shellfish culture or the development of fishlife, and because of natural or man-made conditions cannot meet the requirements of these uses.

Quality Standards for Class "SD" Waters

Items	Specifications
1. Dissolved oxygen.	Shall not be less than 3.0 mg/l at any time.
2. Toxic wastes and deleterious substances.	None alone or in combination with other substances or wastes in sufficient amounts to prevent survival of fishlife, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

APPENDIX B

MEMORANDUM OF UNDERSTANDING
BETWEEN NYS DEC AND NYS DOT REGION 11
REGARDING THE USE OF CONCRETE DEMOLITION DEBRIS
ORIGINATING FROM HIGHWAY PROJECTS
AS SUBSTRATE FOR ARTIFICIAL REEF DEVELOPMENT

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)
AND
THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION (DOT)
REGARDING
THE USE OF CONCRETE DEMOLITION DEBRIS ORIGINATING FROM HIGHWAY PROJECTS AS SUBSTRATE FOR ARTIFICIAL REEF DEVELOPMENT

The D.E.C. and the D.O.T. hereby agree to jointly share responsibility in the above described program as follows:

A. **It is agreed that the D.E.C. will be responsible for:**

1. Permit application, maintenance and renewal as necessary for the duration of the project(s). Permits include U.S. Army Corps of Engineers, N.Y. State Water Quality Certification,. N.Y. State Dept. of State Coastal Zone Consistency Application.

2. Defining the conditions under which material will be placed, including size, location, configuration.

3. Delineating the areas at each specific reef site where materials may be placed.

4. Periodic sounding survey of sector(s) to determine whether proposed deployment of material is creating profile and footprint desired.

5. Periodically evaluating the performance of the program.

6. Assisting in promoting and publishing the locations of materials for maximum public benefit.

7. If, in the judgement of the D.E.C., the D.O.T. or its contractor(s) is not in compliance with the conditions agreed to, the D.E.C. may upon 30 days written notice declare this agreement void. The D.E.C. will make every effort to assist the D.O.T. in meeting all requirements, responsibilities and special conditions described in this Memorandum.

B. **It is agreed that the D.O.T. will be responsible for:**

1. The performance of all contractors or their subcontractors engaged in delivery and deployment of materials at the areas authorized by the D.E.C. and approved by D.O.T.

2. Compliance with all conditions stated in the Dept. of Army Corps of Engineers (COE) permit under which the artificial reef is authorized particularly as to location and minimum clearance requirements.

3. Compliance with all special conditions (see attached document) stated in the D.E.C. letter of authorization under which permission is granted to the D.O.T. to utilize artificial reef site to place materials.

4. Providing an agent to act as a ""ship rider"" to witness and monitor each deployment of material. This agent will be a DEC employee (Marine Resources Technician-State Grade Level 8). The salary for this employee will be paid by the D.O.T. on a per diem basis when such employee works in this capacity. This agent will be supervised by the D.E.C. artificial reef coordinator. The duties and responsibilities of this agent include the development and maintenance of a trip log noting date, time and location of each dump (Loran C TD's) and overseeing the performance of the contractor for compliance with all conditions of the authorization. Such agent will sign each trip log and be solely responsible for its maintenance and accuracy.

5. Providing a D.O.T. agent to act as a reef construction coordinator. Duties and responsibilities include coordination between contractor(s) so that materials are accurately and effectively placed. Also to provide the D.E.C. with a monthly report of all activities regarding placement of materials at the artificial reef site. Such report will include copies of the original trip logs produced in 4. above. Such report shall be mailed to the D.E.C. within 10 working days after the end of the month for which the report covers.

6. Securing all permits for a location where materials determined to be unacceptable for use on the artificial reef may be placed.

READ AND ACCEPTED BY: Gordon C. Colvin

Gordon C. Colvin, Director
Division of Marine Resources
N. Y. S. D. E. C.

DATE: Dec. 19 1988

READ AND ACCEPTED BY: M. M. Francese

M. Michael Francese, Regional Director
Region 11
N. Y. S. D. O. T.

DATE: 12/22/88

SPECIAL CONDITIONS

1. NYS DEC will be held harmless from liability for any damages that occur in preparation, transportation and/or placement on site of all materials.

2. The DEC will accept only clean, select concrete materials or clean, unpainted steel. All materials will be free of any contaminants, including, but not limited to:

gasoline, other fuels or oils;
blacktop or materials containing asphalt, i.e. roofing;
tires;
asbestos or materials containing asbestos;
paints or painted materials;
pesticides;
antifreeze;
batteries;
chemicals and dye stuffs;
caustic materials, acids or lyes;
explosives;
electrical transformers, junction boxes or other electrical equipment.

3. All materials will be as large as physically possible within the limits of the ability of the NYS Department of Transportation, or its agent, to safely maintain the required minimum depth clearance of the site. All materials will be composed of no more than 10% by volume items less than one cubic foot. Any dredged material or materials removed from the bottom of a waterway will be washed of all sediment, with a high pressure hose if necessary.

4. Floating debris that results from reef deployment operations is unacceptable to the DEC. The listed procedures must be followed to ensure that no debris is left floating after any work that occurs on the reef site:

All floatable materials, wood or other low-density materials that may be moved by wave or current action will be removed prior to deployment.

Any and all inadvertent debris seen floating after the deployment of materials must be immediately removed from the water by the DOT or its agent and brought to shore for proper disposal. If any floating debris is too large to be safely brought aboard the vessel on site, then the DOT or its agent must notify the US Coast Guard of the location of the debris and make arrangements to remove it or have it removed from the water within 24 hours.

If a specific reef material proves to be a continuing source of inadvertent floating debris, the further deployment of this material will be terminated by the DEC.

5. The DEC Artificial Reef Program (ARP) Coordinator (telephone: 516-751-7900) will be notified by the DOT, or its agent, at least 24 hours prior to the planned hour of departure for the site. The DOT, or its agent, will also make provisions for a compliance inspection by the DEC prior to departure.

6. The COE permit allows for a minimum depth of 23 feet mean low water over the Rockaway reef site. The DOT or its agent will be responsible for the accurate location of materials and maintaining the minimum depth requirement. Pre- and post-deployment soundings will be conducted by the DOT or its agent. That information, along with locations of all materials deployed in TD's and LAT/LON, will be providec to the DEC ARP Coordinator on the last day of each month in which work is conducted, using trip log forms.

7. A hydrographic survey of the reef will be conducted by the DOT or its agent at the completion of the project. This survey will utilize Loran C navigation on the 43000 and 26000 lines of position, with soundings taken every 1/10 of a microsecond (60 to 90 feet) over the reef (e.g. 26931.0/43751.5, 26930.9/43751.5, 26930.8/43751.5, etc.). Soundings will be recorded for each intersection and plottec in Loran C TD's and LAT/LON. This survey will be completed and submitted to the DEC ARP Coordinator within 90 days of the final deployment of materials.

8. If a Loran C transmitter fails for either the 26000 or 43000 lines of position, the DOT, or its agent, will cease deployment operations and contact the DEC ARP Coordinator for further instructions.

9. Should the DOT or its agent violate any of the SPECIAL CONDITIONS, either through negligence or deliberate actions, the DEC may summarily suspend any dumping agreement with the DOT. The DOT may appeal such suspension within 30 days of its enactment.

NYS DOT agrees to accept the SPECIAL CONDITIONS as stated.

Date: 1-5-89 Signed: _____

APPENDIX C

FORMS REQUIRED
WHEN APPLYING FOR A PERMIT

95-19-3 (8/00) pfp

JOINT APPLICATION FOR PERMIT

New York State
United States Army Corps of Engineers

Applicable to agencies and permit categories listed in Item 1. **Please** read all instructions on back. Attach additional information as needed. Please print legibly or type.

1. Check permits applied for:

NYS Dept. of Environmental Conservation

- ☐ Stream Disturbance (Bed and Banks)
- ☐ Navigable Waters (Excavation and Fill)
- ☐ Docks, Moorings or Platforms (Construct or Place)
- ☐ Dams and Impoundment Structures (Construct, Reconstruct or Repair)
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Coastal Erosion Control
- ☐ Wild, Scenic and Recreational Rivers
- ☐ 401 Water Quality Certification
- ☐ Potable Water Supply
- ☐ Long Island Wells
- ☐ Aquatic Vegetation Control
- ☐ Aquatic Insect Control
- ☐ Fish Control

NYS Office of General Services
(State Owned Lands Under Water)

- ☐ Lease, License, Easement or other Real Property Interest
- ☐ Utility Easement (pipelines, conduits, cables, etc.)
- ☐ Docks, Moorings or Platforms (Construct or Place)

Adirondack Park Agency

- ☐ Freshwater Wetlands Permit
- ☐ Wild, Scenic and Recreational Rivers

Lake George Park Commission

- ☐ Docks (Construct or Place)
- ☐ Moorings (Establish)

US Army Corps of Engineers

- ☐ Section 404 (Waters of the United States)
- ☐ Section 10 (Rivers and Harbors Act)
- ☐ Nationwide Permit (s) Identify Number(s)

For Agency Use Only:
DEC APPLICATION NUMBER

US ARMY CORPS OF ENGINEERS

2. Name of Applicant (Use full name) | **Telephone Number** (daytime)

Mailing Address

Post Office | **State** | **Zip Code**

3. Taxpayer ID (If applicant is not an individual)

4. Applicant is a/an: (check as many as apply)
☐ Owner ☐ Operator ☐ Lessee ☐ Municipality / Governmental Agency

5. If applicant is not the owner, identify owner here - otherwise, you may provide Agent/Contact Person information.
Owner or Agent/Contact Person ☐ Owner ☐ Agent /Contact Person | **Telephone Number** (daytime)

Mailing Address

Post Office | **State** | **Zip Code**

6. Project / Facility Location (mark location on map, see instruction 1a.)
County: Town/City/Village: Tax Map Section/ Block /Lot Number:

Location (including Street or Road) | **Telephone Number** (daytime)

Post Office | **State** | **Zip Code** | **7. Name of Stream or Waterbody** (on or near project site)

8. Name of USGS Quad Map: **Location Coordinates:**
NYTM-E NYTM-N 4

9. Project Description and Purpose: (Category of Activity e.g. new construction/installation, maintenance or replacement; Type of Structure or Activity e.g. bulkhead, dredging, filling, dam, dock, taking of water; Type of Materials and Quantities; Structure and Work Area Dimensions; Need or Purpose Served)

10. Proposed Use: ☐ Private ☐ Public ☐ Commercial

11. Will Project Occupy State Land? ☐ Yes ☐ No

12. Proposed Start Date:

13. Estimated Completion Date:

14. Has Work Begun on Project? (If yes, attach explanation of why work was started without permit.) ☐ Yes ☐ No

15. List Previous Permit / Application Numbers and Dates: (If Any)

16. Will this Project Require Additional Federal, State, or Local Permits? ☐ Yes ☐ No If Yes, Please List:

17. If applicant is not the owner, both must sign the application

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, ficticious or fraudulent statement.

Date _____ Signature of Applicant _____ Title _____

Date _____ Signature of Owner _____ Title _____

General Instructions

Incomplete or inaccurate information may delay processing and a final decision on your application

A. Type or print clearly in ink. Attach FIVE copies of additional information required in i. through iii. below.
   i. A USGS map, or equivalent showing the project location. Include on the map wetlands, seasonally wet streams and ditches.
   ii A sketch plan drawn to scale or with dimensions given or engineering drawings showing location and extent of work as well as view directions of the photographs required in iii.
   iii At least three (3) representative color photographs of the project area and surroundings with time and date when they were taken indicated.

B. Applications by counties, cities, towns, and villages must be signed by the chief executive of that municipality or the head of the department or agency undertaking the project.

C. "Owner" in application item 4 holds title to the land, facility, easement or right-of-way on which the project will be undertaken. If someone other than the owner is the applicant, written consent of the owner to use the property or facility must accompany the application.

D. The applicant is responsible for obtaining any other federal, state or local permits. Separate authorization or letter of **No Jurisdiction** should be received from the **Department of Environmental Conservation (DEC), Office of General Services (OGS), Adirondack Park Agency (APA) or Lake George Park Commission (LGPC)** and the **Army Corps of Engineers (ACOE)** prior to initiation of work in wetlands or waterways.

E. Location Coordinates (section 8) are expressed in New York Transverse Mercator units or NYTMs (UTM Zone 18 expanded to encompass the entire state). These are based on the North American Datum 1983. If you are able to supply accurate coordinates, please do so. Otherwise the Department will determine them.

Other Requirements

F. If project is an unlisted action pursuant to the State Environmental Quality Review Act regulations - 6 NYCRR Part 617, a completed Part 1 of a Short Environmental Assessment Form must be submitted with the application.

G. If project is a Type 1 action pursuant to the State Environmental Quality Review Act regulations - 6 NYCRR Part 617, a completed Part 1 of a Full Environmental Assessment Form must be submitted with the application.

H. If project is classified as major pursuant to the Uniform Procedures Act regulations - 6 NYCRR Part 621, a completed Part 1 of a Structural Archeological Assessment Form must be submitted with the application.

I. If project requires a federal permit and lies within the Coastal Zone, a completed Federal Consistency Assessment Form must be submitted with the application.

J. If project is within the Adirondack Park, additional information is required by the APA to fully determine permitting applicability.

Special Requirements for Specific Permit Applications

K. Applications for the construction, reconstruction, or repair of a DAM or other IMPOUNDMENT STRUCTURE must be accompanied by Supplement D-1

L. Applications for DOCK, PLATFORM, or MOORING facility permits must be accompanied by Supplement D-2

M. Applications for Water Supply or Long Island Well permits must be accompanied by Supplement W-1

N. Applications for a permit to apply a Chemical to control or eliminate Aquatic Vegetation, Fish or Insects must be accompanied by the proper supplemental form available from the department.

O. Applications for a Wild, Scenic, or Recreational Rivers permit must be accompanied by Supplement WSR-1

P. Applications for a permit to disturb a wetland or waterway by placing fill or performing mechanized land clearing, ditching, channelization, dredging, or excavation activities under Section 404 of the Clean Water Act or Article 24 and 25 of the Environmental Conservation Law should provide a discussion of practicable alternatives considered to avoid, minimize and /or mitigate the proposed project impacts. Particular justification should be given as to why the alternatives are not suitable.

Contact the Regional Permit Administrator, Division of Environmental Permits, at the appropriate DEC office; OGS, APA, LGPC permitting agent; or the respective Corps District Office, as given below, for assistance regarding any of the above requirements. Consult other available application instruction materials for the appropriate permit types.

New York State Agencies:

Department of Environmental Conservation

REGION 1
Building 40, SUNY
Stony Brook, NY 11790-2356
(631) 444-0365

REGION 2
1 Hunter's Point Plaza
47-40 21st Street
Long Island City,NY 11101-5407
(718) 482-4497

REGION 3
21 South Putt Corners Road
New Paltz, NY 12561-1696
(845) 256-3054

REGION 4
1150 North Wescott Road
Schenectady, NY 12306-2014
(518) 357-2069

REGION 4 Sub-Office
Route 10
HCR #1 Box 3A
Stamford NY 12167-9503.
(607) 652-7741

REGION 5
Route 86, PO Box 296
Ray Brook NY 12977-0296
(518) 897-1234

REGION 5 Sub-Office
P.O. Box 220
Warrensburg, NY 12885-0220
(518) 623-1281

REGION 6
State Office Building
317 Washington Street
Watertown, NY 13601-3787
(315) 785-2245

REGION 6 Sub-Office
State Office Building
207 Genesee Street
Utica, NY 13501-2885
(315) 793-2555

REGION 7
615 Erie Blvd West
Syracuse, NY 13204-2400
(315) 426-7438

REGION 7 Sub-Office
1285 Fisher Avenue
Cortland, NY 13405-1090
(607) 753-3095

REGION 8
6274 E. Avon - Lima Road
Avon, NY 14414-9519
(716) 226-2466

REGION 9
270 Michigan Avenue
Buffalo NY 14203-2999
(716) 851-7165

REGION 9 Sub-Office
182 East Union,
Suite 3
Allegany, NY 14706-1328
(716) 372-0645

Office of General Services

Division of Land Utilization
Bureau of Land Management
Corning Tower, Empire State Plaza
Albany, NY 12242
(518) 474-2195

Adirondack Park Agency

PO Box 99
Ray Brook NY 12977
(518) 891-4050

Lake George Park Commission

P.O. Box 749 Fort George Road
Lake George NY 12845-0749
(518) 668-9347

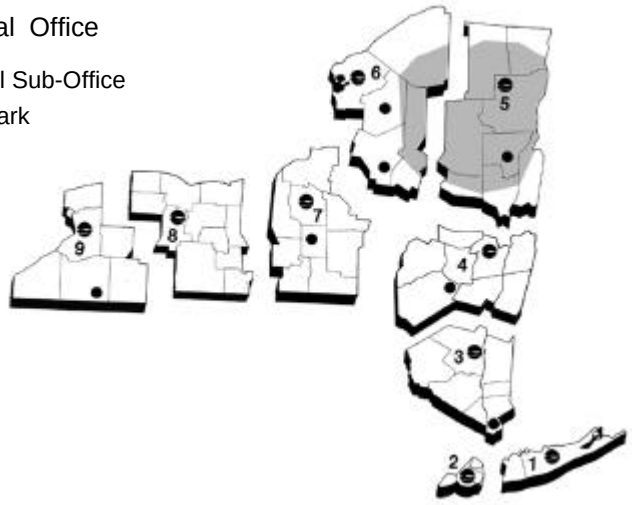
Distribution 1ST COPY Permit Administrator 2ND COPY Corps of Engineers 3RD COPY Program 4TH COPY NYS Agency 5TH COPY Applicant

Legend

DEC Regional Office

DEC Regional Sub-Office

Adirondack Park



United States Army Corps of Engineers

Department of the Army ATTN: Regulatory Branch
New York District, Corps of Engineers, 26 Federal Plaza, New York NY 10278-0090
Telephone
(212) 264-6731 for DEC Regions 1,2 and Westchester and Rockland Counties
(212) 264-0185 for DEC Region 3 except Westchester and Rockland Counties

Albany Field Office Telephone (518) 270-0588 / 0589 - DEC regions 4,5
1 Bond Street, Troy NY 12180

Buffalo District, Corps of Engineers Telephone (716) 879-4330 - DEC regions 6, 7, 8, 9
1776 Niagara Street, Buffalo NY 14207-3199

NEW YORK STATE DEPARTMENT OF STATE
COASTAL MANAGEMENT PROGRAM
Federal Consistency Assessment Form

An applicant, seeking a permit, license, waiver, certification or similar type of approval from a federal agency which is subject to the New York State Coastal Management Program (CMP), shall complete this assessment form for any proposed activity that will occur within and/or directly affect the State's Coastal Area. This form is intended to assist an applicant in certifying that the proposed activity is consistent with New York State's CMP as required by U.S. Department of Commerce regulations (15 CFR 930.57). It should be completed at the time when the federal application is prepared. The Department of State will use the completed form and accompanying information in its review of the applicant's certification of consistency.

A. APPLICANT (please print)

1. Name: _____

2. Address: _____

3. Telephone: Area Code ( ) _____

B. PROPOSED ACTIVITY

1. Brief description of activity:

_____

_____

_____

2. Purpose of activity:

_____

_____

3. Location of activity:

_____	_____	_____
County	City, Town, orVillage	Street or Site Description

4. Type of federal permit/license required: _____

5. Federal application number, if known: _____

6. If a state permit/license was issued or is required for the proposed activity, identify the state agency and provide the application or permit number, if known:

_____

C. COASTAL ASSESSMENT Check either "YES" or "NO" for each of these questions. The numbers following each question refer to the policies described in the CMP document (see footnote on page 2) which may be affected by the proposed activity.

		YES	NO
1.	Will the proposed activity result in any of the following:		
a.	Large physical change to a site within the coastal area which will require the preparation of an environmental impact statement? (11, 22, 25, 32, 37, 38, 41, 43)	___	___
b.	Physical alteration of more than two acres of land along the shoreline, land under water or coastal waters? (2, 11, 12, 20, 28, 35, 44)	___	___
c.	Revitalization/redevelopment of a deteriorated or underutilized waterfront site? (1)	___	___
d.	Reduction of existing or potential public access to or along coastal waters? (19, 20)	___	___
e.	Adverse effect upon the commercial or recreational use of coastal fish resources? (9,10)	___	___
f.	Siting of a facility essential to the exploration, development and production of energy resources in coastal waters or on the Outer Continental Shelf? (29)	___	___
g.	Siting of a facility essential to the generation or transmission of energy? (27)	___	___
h.	Mining, excavation, or dredging activities, or the placement of dredged or fill material in coastal waters? (15, 35)	___	___
i.	Discharge of toxics, hazardous substances or other pollutants into coastal waters? (8, 15, 35)	___	___
j.	Draining of stormwater runoff or sewer overflows into coastal waters? (33)	___	___
k.	Transport, storage, treatment, or disposal of solid wastes or hazardous materials? (36, 39)	___	___
l.	Adverse effect upon land or water uses within the State's small harbors? (4)	___	___
2.	Will the proposed activity affect or be located in, on, or adjacent to any of the following:	YES	NO
a.	State designated freshwater or tidal wetland? (44)	___	___
b.	Federally designated flood and/or state designated erosion hazard area? (11, 12, 17,)	___	___
c.	State designated significant fish and/or wildlife habitat? (7)	___	___
d.	State designated significant scenic resource or area? (24)	___	___
e.	State designated important agricultural lands? (26)	___	___
f.	Beach, dune or barrier island? (12)	___	___
g.	Major ports of Albany, Buffalo, Ogdensburg, Oswego or New York? (3)	___	___
h.	State, county, or local park? (19, 20)	___	___
i.	Historic resource listed on the National or State Register of Historic Places? (23)	___	___
3.	Will the proposed activity require any of the following:	YES	NO
a.	Waterfront site? (2, 21, 22)	___	___
b.	Provision of new public services or infrastructure in undeveloped or sparsely populated sections of the coastal area? (5)	___	___
c.	Construction or reconstruction of a flood or erosion control structure? (13, 14, 16)	___	___
d.	State water quality permit or certification? (30, 38, 40)	___	___
e.	State air quality permit or certification? (41, 43)	___	___
4.	Will the proposed activity occur within and/or affect an area covered by a State approved local waterfront revitalization program? (see policies in local program document)	___	___

D. ADDITIONAL STEPS

1. If all of the questions in Section C are answered "NO", then the applicant or agency shall complete Section E and submit the documentation required by Section F.

2. If any of the questions in Section C are answered "YES", then the applicant or agent is advised to consult the CMP, or where appropriate, the local waterfront revitalization program document*. The proposed activity must be analyzed in more detail with respect to the applicable state or local coastal policies. On a separate page(s), the applicant or agent shall: (a) identify, by their policy numbers, which coastal policies are affected by the activity, (b) briefly assess the effects of the activity upon the policy; and, (c) state how the activity is consistent with each policy. Following the completion of this written assessment, the applicant or agency shall complete Section E and submit the documentation required by Section F.

E. CERTIFICATION

The applicant or agent must certify that the proposed activity is consistent with the State's CMP or the approved local waterfront revitalization program, as appropriate. If this certification cannot be made, the proposed activity shall not be undertaken. If this certification can be made, complete this Section.

"The proposed activity complies with New York State's approved Coastal Management Program, or with the applicable approved local waterfront revitalization program, and will be conducted in a manner consistent with such program."

Applicant/Agent's Name:_____

Address:_____

Telephone: Area Code ( )_____

Applicant/Agent's Signature:_____ Date:_____

F. SUBMISSION REQUIREMENTS

1. The applicant or agent shall submit the following documents to the New York State Department of State, Division of Coastal Resources, 41 State Street - 8th Floor, Albany, New York 12231.

   a. Copy of original signed form.
   b. Copy of the completed federal agency application.
   c. Other available information which would support the certification of consistency.

2. The applicant or agent shall also submit a copy of this completed form along with his/her application to the federal agency.

3. If there are any questions regarding the submission of this form, contact the Department of State at (518) 474-6000.

*These state and local documents are available for inspection at the offices of many federal agencies, Department of environmental Conservation and Department of State regional offices, and the appropriate regional and county planning agencies. Local program documents are also available for inspection at the offices of the appropriate local government.

95-20-7 (5/93)

New York State Department of Environmental Conservation
Supplement to Joint Application for Permit

STRUCTURAL ARCHEOLOGICAL ASSESSMENT FORM (SAAF)

PART 1 - - APPLICANT COMPLETES	
APPLICANT INFORMATION	
1. Applicant Name	
2. Applicant Address	
PROJECT INFORMATION	
3. Project/Facility Name	
4. Project/Facility Location	
5. Is the proposed project adjacent to, or does it contain a building or structure listed in the State or National Register of Historic Places?	☐ Yes ☐ No
6. Are any buildings or structures adjacent to or within the proposed project area 50 yrs of age or older ?	☐ Yes ☐ No
If the answer to question 5 and/or 6 is yes, provide the following information for each building and structure (use attachments if necessary):	
a. Name of structure	
b. Location	
c. Type of structure (ex. house, outbuilding, barn, bridge, dam, ruins)	
d. Approximate age or date of construction	
7. Might the proposed project have any impact (physical/ visual) upon any buildings or structures listed in the State or National Register of Historic Places **or** built prior to 1940?	☐ Yes ☐ No
If yes, describe briefly (use attachments if necessary)	

APPLICANT SECTION CONTINUES ON REVERSE SIDE

Reset

PART 1 - - APPLICANT COMPLETES

8. Provide photographs of every building and structure that may be impacted by the project as described in number 7, on the opposite side of this page. The following standards are recommended:
   - Minimum of 2 photographs
   - Minimum size 4" X 4" prints from negatives preferred; polaroid photos are acceptable
   - Photos must be **clear** and **focused**
   - Clearly label photos so it is obvious what is being illustrated; key photos to map or plan, if possible
   - Photo 1: show both the entire front and side of the structure in a single shot from as close to the building as possible. Be sure the structure is not partially or fully blocked by trees or other obstructions
   - Photo 2: show relationship of building structure to roadway or surroundings

9.	Has the land within the proposed project area been previously disturbed or altered (excavated, landscaped, filled, utilities installed)?	☐ Yes ☐ No
	If yes, describe briefly, including depth of disturbance (use attachments if necessary):	
10.	Approximate percentage of proposed project area with slopes:	0-10% % 10-15% % 15% or greater %
11.	Approximate percentage of proposed project site with the following drainage characteristics:	Well drained % Moderately well drained % Poorly drained %
Prepared By (Print or type name):		
Signature:		Date:

Reset

PART 2 - - DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC) COMPLETES

APPLICANT/PROJECT INFORMATION		
1.	Applicant Name	
2.	Project/Facility Name	
3.	DEC Number	

BUILDINGS AND STRUCTURES		
4.	Might the proposed project have any impact (physical/visual) upon any buildings or structures listed in the State or National Register of Historic Places **or** built prior to 1940?	☐ Yes ☐ No

If yes, DEC must consult with the Office of Parks, Recreation and Historic Preservation (OPRHP). DEC must request a determination of eligibility for the State Register of Historic Places and/or comments regarding project impact. Include information supplied by the applicant in response to questions 5, 6, 7 and 8 of Part 1 of this form.

ARCHEOLOGICAL SITES		
5.	Does the proposed project area coincide with a circle, square or stippled area on OPRHP's Statewide Archeological Inventory Map?	☐ Yes ☐ No
6.	Is the proposed project area outside of a circle or square, but one for which information has been provided (ex: documented reports of known sites) that suggests the area is archeologically sensitive?	☐ Yes ☐ No
	If yes, what is the nature and source of information?	
7.	Is the proposed project area apparently undisturbed?	☐ Yes ☐ No
8.	Will the proposed action include a physical disturbance of the project area?	☐ Yes ☐ No
9.	Is the slope in the area characteristically less than 15% (unless on limestone/flint escarpments)?	☐ Yes ☐ No
10.	Is the proposed project area characteristically moderately well or well drained?	☐ Yes ☐ No

If the answers to 5, 7-10 are yes, an archeological survey should be performed by the applicant. Provide the applicant with a copy of *Report Format for Cultural Resource Investigations* and a list of archeological consultants.

If the answer to 5 is no, but answers to 6-10 are yes, DEC must consult with OPRHP before requiring that the applicant perform an archeological survey.

DEC SECTION CONTINUES ON REVERSE SIDE

PART 2 - - DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC) COMPLETES

RESULTS OF EVALUATION		
☐ **SHPA-1**	No buildings, structures or archeological sites identified at the project location.	
☐ **SHPA-2**	Buildings, structures or archeological sites identified, but no impacts will occur, no survey required. No further cultural resources review required.	
☐	Consultation by DEC with OPRHP required.	☐ Structures ☐ Archeology
☐	Archeological survey required.	
Prepared by:		Date:

ENVIRONMENTAL QUESTIONNAIRE

This is intended to supplement ENG Form 4345, Application for Department of the Army Permit, or the Joint Application for Permit used in the State of New York. Please provide complete answers to all questions below which are relevant to your project. Any answers may be continued on separate sheet(s) of paper to be attached to this form.

PRIVACY ACT STATEMENT

The purpose of this form is to provide the Corps of Engineers with basic information regarding your project. This information will be used to facilitate evaluation of your permit application and for public dissemination as required by regulation. Failure to provide complete information may result in your application being declared incomplete for processing, thereby delaying processing of your application.

GENERAL--APPLICABLE TO ALL PROJECTS

1. Explain the need for, and purpose of, the proposed work.

2. Provide the names and addresses of property owners adjacent to your work site (if not shown on the application form or project drawings).

(Please note that depending upon the nature and extent of your project, you may be requested to provide the names and addresses of additional property owners proximate to your project site to ensure proper coordination.)

3. Photographs of the project site should be submitted. For projects in tidal areas, photographs of the waterway vicinity should be taken at low tide. Using a separate copy of your plan view, indicate the location and direction of each photograph as well as the date and time at which the photograph was taken. Provide a sufficient number of photographs so as to provide a clear understanding of conditions on and proximate to your project site.

4. Provide a copy of any environmental impact statement, or any other environmental report which was prepared for your project.

5. Provide a thorough discussion of alternatives to your proposal. This discussion should include, but not necessarily be limited to, the "no action" alternative and alternative(s) resulting in less disturbance to waters of the United States. For filling projects in waters of the United States, including wetlands, your alternatives discussion should demonstrate that there are no practicable alternatives to your proposed filling and that your project meets with current mitigation policy (i.e. avoidance, minimization and compensation).

DREDGING PROJECTS

Answer the following if your project involves dredging.

1. Indicate the estimated volume of material to be dredged and the depth (below mean low water) to which dredging would occur. Would there be overdepth dredging?

2. You can apply for a ten-year permit for maintenance dredging. If you wish to apply for a ten-year permit, please provide the number of additional dredging events during the ten-year life of the permit and the amount of material to be removed during future events.

3. Indicate of your drawings the dewatering area (if applicable) and disposal site for the dredged material (except landfill sites). Submit a sufficient number of photographs of the dewatering and disposal sites as applicable so as to provide a clear indication of existing conditions. For ten-year maintenance dredging permits, indicate the dewatering/disposal sites for future dredging events, if known.

4. Describe the method of dredging (i.e. clamshell, dragline, etc.) and the expected duration of dredging.

5. Indicate the physical nature of the material to be dredged (i.e. sand, silt, clay, etc.) and provide estimated percentages of the various constituents if available. For beach nourishment projects, grain size analysis data is required.

6. Describe the method of dredged material containment (i.e. hay bales, embankment, bulkhead, etc.) and whether return flow from the dewatering/disposal site would reenter any waterway. Also indicate if there would be any barge overflow.

MOORING FACILITIES

Answer the following if your project includes the construction or rehabilitation of recreational mooring facilities.

1. It is generally recommended that any fixed piers and walk ramps be limited to four feet in width, and that floats be limited to eight feet in width and rest at least two feet above the waterway bottom at mean low water. Terminal floats at private, non-commercial facilities should be limited to 20 feet in length. If you do not believe your proposal can meet with these recommendations, please provide the reason(s).

2. Using your plan view, show to scale the location(s), position(s) and size(s) (including length, beam and draft) of vessel(s) to be moored at the proposed facility, including those of transient vessel(s) if known.

3. For commercial mooring sites such as marinas, indicate the capacity of the facility and indicate on the plan view the location(s) of any proposed fueling and/or sewage pumpout facilities. If pumpout facilities are not planned, please discuss the rationale below and indicate the distance to the nearest available pumpout station.

4. Indicate on your plan view the distance to adjacent marine structures, if any are proximate and show the locations and dimensions of such structures.

5. Discuss the need for wave protection at the proposed facility. Please be advised that if a permit is issued, you would be required to recognize that the mooring facility may be subject to wave action from wakes of passing vessels, whose operations would not be required to be modified. Issuance of a permit would not relieve you of ensuring the integrity of the authorized structure(s) and the United States would not be held responsible for damages to the structure(s) and vessel(s) moored thereto from wakes from passing vessels.

BULKHEADING/BANK STABILIZATION/FILLING ACTIVITIES

Answer the following if your project includes construction of bulkheading (also retaining walls and seawalls) with backfill, filling of waters/wetlands, or any other bank stabilization fills such as riprap, revetments, gabions, etc.

1. Indicate the total volume of fill (including backfill behind a structure such as a bulkhead) as well as the volume of fill to be placed into waters of the United States. The amount of fill in waters of the United States can be determined by calculating the amount of fill to be placed below the plane of spring high tide in tidal areas and below ordinary high water in non-tidal areas.

2. Indicate the source(s) and type(s) of fill material.

3. Indicate the method of fill placement (i.e. by hand, bulldozer, crane, etc.). Would any temporary fills be required in waterways or wetlands to provide access for construction equipment? If so, please indicate the area of such waters and/or wetlands to be filled, and show on the plan and sectional views.

The foregoing requests basic information on the most common types of projects requiring Department of the Army permits. It is intended to obviate or reduce the need for requesting additional information; however, additional information may be requested above and beyond what is requested in this form.

Please feel free to add any additional information regarding your project which you believe may facilitate our review.

APPENDIX D

LEGAL OPINION
BY NYS DEC ON DMR'S AUTHORITY OVER
ARTIFICIAL REEF CONSTRUCTION
IN STATE WATERS

15 (12-75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: Marc Gerstman
FROM: Dan Luciano
SUBJECT: Proposed Legislation - Artificial Reefs

DATE: September 19, 1989

I have been asked to review the captioned proposal to determine whether new legislation is needed in order to establish DEC as the sole applicant for federal permits to construct artificial reefs.

The federal government exerts jurisdiction over artificial reefs pursuant to the National Fishing Enhancement Act of 1984 (33 U.S.C. §2101, et seq.). Section 2104 of the Act requires a U.S. Army Corps of Engineers permit to construct an artificial reef. The Act also makes it clear that the primary purpose of artificial reefs is the enhancement of fishery resources.

There are presently seven existing artificial reefs, all of which were built subject to DEC direction and/or f nding since the early 1960s. Sporadic interest has been expressed by third parties in seeking federal permits, primarily town governments, but to date none have been granted. DEC has recently completed a draft program plan which generally endorses further construction at carefully selected locations on the basis of criteria in the State and federal management plans.

While there does not appear to be a significant existing problem in terms of non-DEC permit applicants, there is nothing in the federal statute restricting applicants to the states' fish and wildlife agencies. One of staff's concerns is that, given the proportions of the solid waste crisis, localities may pursue artificial reef construction as a means of solid waste disposal. This situation arose with the Town of Islip; the Town applied for a permit in order to dispose of car bodies, but it was withdrawn in the face of DEC objections. In any event, such a proposal appears to contravene the intent of the Act and the criteria for permit issuance.

The Department's general powers provide two distinct arguments in support of the position that DEC is the sole potential permittee relative to artificial reefs. First, ECL Article 3, and Title 3 of Article 11, vest the Department with exclusive jurisdiction in the area of fisheries management. This authority, read together with the intent of the Act that artificial reefs shall be sited, built, and monitored in a manner beneficial to fishery management, supports the conclusion that private parties, local governments, and other State agencies are precluded from acting in this arena.

Second, ECL §3-0301(2)(j) provides that DEC is authorized to "(a)ct as the official agency of the state in all matters affecting the purposes of the department under any federal laws". Again read in conjunction with DEC's fishery management mandate, this provision supports the conclusion that DEC is vested with exclusive standing relative to establishment of artificial reefs.

Given the absence of an existing problem with non-DEC applicants and the legal arguments outlined above, it does not appear that new legislation is necessary at this time.

I am available to discuss this issue further at your convenience.

DGL:kl
cc: J. Corr
L. Vernon
R. Binnewies
S. Weber
G. Colvin
C. Zawacki

APPENDIX E

INVENTORY OF ARTIFICIAL REEFS CONSTRUCTED IN NEW YORK

SITE NAME	:	ROCKAWAY BEACH ARTIFICIAL REEF
YEAR DEVELOPED	:	1967
USACE PERMIT	:	7087C
EXPIRES	:	1995
NYS DEC PERMIT	:	2-6309-00021/00001-0
EXPIRES	:	1995
LOCATION		
COUNTY	:	QUEENS
LATITUDE	:	40 32.50
LONGITUDE	:	73 50.52
LORAN C	:	26939.2/43749.6
SIZE		
ACRES	:	413
DIMENSIONS	:	2000 yds X 1000 yds
DEPTH (ft)	:	35-38
CONTROL DEPTH	:	24
MAX. RELIEF	:	11
MATERIALS (cu yd)		
CONCRETE	:	83,500
ROCK	:	25,000
VESSELS	:	0
TIRES	:	800
OTHER	:	40

REMARKS: Materials include 6000 tires in 3-tire units; 60 steel buoys; rock; and concrete slabs, piles, culvert, decking and rubble. One tire unit is configured into a 15-tire pyramid. Report of 16 auto bodies is unconfirmed.

CASE HISTORY: The permit for this site was originally issued to the New York State Department of Conservation, Division of Fish and Game on September 14, 1965. The area was chosen through the efforts of David H. Wallace (Chief of the Conservation Department's Bureau of Marine Fisheries), Captain Laddie Martin and Howard Berlin of the Sheepshead Bay Boat Owners Association. A wreck presumed to be the "Mistletoe" lies just southwest of the site. The proximity of the wreck allowed for a controlling depth of 24 feet MLLW over the reef site, much shallower than other ocean sites in New York. Divers from the American Littoral Society surveyed the site in 1966 and reported a hard-packed sand and shell bottom. Buoys were used to mark the site for a number of years until budgetary constraints forced the Department to abandon its buoying efforts. Materials from several public works projects have been placed on the reef, including demolition debris from the Cross Bay Boulevard's South Channel bridge. The deposition of large amounts of concrete and rock in the 1970's and 1980's has resulted in a jumble of materials concentrated in one area of the reef with scattered piles throughout the remainder. This configuration functions as a sort of sanctuary, as it is difficult for anglers to fish it effectively.

PLANS: This site may receive an additional 100,000 cubic yards of concrete rubble and rock from various public works projects. Pending an investigation of the effectiveness of the existing sanctuary, much of the material may be used to expand the sanctuary or construct an additional one.

SITE NAME	:	ATLANTIC BEACH ARTIFICIAL REEF
YEAR DEVELOPED	:	1967
USACE PERMIT	:	10704
EXPIRES	:	1988
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	NASSAU
LATITUDE	:	40 31.90
LONGITUDE	:	73 43.00
LORAN C	:	26870.6/43734.7
SIZE		
ACRES	:	413
DIMENSIONS	:	2000 yds X 1000 yds
DEPTH (ft)	:	56-63
CONTROL DEPTH	:	40
MAX. RELIEF	:	13
MATERIALS (cu yd)		
CONCRETE	:	29,500
ROCK	:	0
VESSELS	:	13,500
TIRES	:	4,000
OTHER	:	100

REMARKS: Materials include 30,000 tires in 3-tire units; 404 auto bodies; 10 Good Humor trucks; 9 barges; the tug "Fran S"; a steel lifeboat; steel crane and boom; and concrete culvert, rubble, abutments and decking.

CASE HISTORY: The Atlantic Beach site was started in 1967 as an auto body reef, with seven barge-loads (404 cars) deployed in that year. The Sandy Hook Marine Lab under the direction of Richard Stone added 15,000 tires in both 1968 and 1969. The NYSDEC contracted for the placement of 5 wood barges, 4 steel barges and 200 tons of concrete culvert. In 1971, NYSDEC became aware that tires deployed in 1968-69 were washing ashore on local beaches. Commercial surf clam dredges were encountering tires between the reef and the beach. Apparently, the concrete bases of some tire units were breaking up and allowing non-ballasted tires to float free. NYSDEC personnel removed tires from the beach each spring for two years. In 1974, the 65-foot tug "Fran S" ran aground in Jones inlet and sunk, creating a hazard that needed removal. The Army Corps of Engineers requested the use of the reef for disposal of the wreck. The permit was modified in 1975 to allow the current 40-foot controlling depth in order to accommodate the wreck of the tug. The years 1986-88 saw the additions of a wood barge, steel crane, steel lifeboat and nearly 50,000 tons of concrete rubble.

PLANS: This site may receive an additional 100,000 cubic yards or more of concrete rubble and rock from various public works projects. Pending an investigation of the effectiveness of the existing sanctuary on Rockaway, much of the material may be used to construct one on this site.

SITE NAME	:	MCALLISTER GROUNDS ARTIFICIAL REEF
YEAR DEVELOPED	:	1949
USACE PERMIT	:	UNKNOWN NO.
EXPIRES	:	1949
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	NASSAU
LATITUDE	:	40 32.12
LONGITUDE	:	73 39.27
LORAN C	:	26840.8/43733.6
SIZE		
ACRES	:	6.5
DIMENSIONS	:	circular, 200 yds in diameter
DEPTH (ft)	:	52
CONTROL DEPTH	:	NONE GIVEN
MAX. RELIEF	:	2
MATERIALS (cu yd)		
CONCRETE	:	*
ROCK	:	*
VESSELS	:	0
TIRES	:	0
OTHER	:	* 4,000

REMARKS: * Materials include rock, brick and concrete rubble.

CASE HISTORY: The McAllister Grounds artificial reef was created by the planned dumping of at least two barge-loads of rock, rubble and brick (commonly referred to as "cellar dirt") offshore Long Beach, New York. The project was developed by James R. Westman, Senior Biologist of the Bureau of Marine Fisheries, NYS Conservation Department and Captain Jefferson D. Beard, USN, Supervisor of New York Harbor. The first loads were recorded dumped by the McAllister Lighterage Line of New York City on December 6, 1949. Captain Chris Sprecht of the partyboat "Margaret" out of East Rockaway Inlet is credited with being among the first to exploit the population of black sea bass that were congregated at the site. The profiles created were estimated at only one or two feet. The site remained productive through the 1980's until it was finally destroyed by trawling activity.

PLANS: This bottom on this site is close to the controlling depth of the nearby Hempstead reef. This shallow area will be developed as a drift-fishing area utilizing low-profile rubble with a minimum of re-bar. The site has a capacity to receive approximately 25,000 cubic yards of materials.

SITE NAME	:	HEMPSTEAD TOWN ARTIFICIAL REEF
YEAR DEVELOPED	:	1967
USACE PERMIT	:	15110A
EXPIRES	:	1999
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	NASSAU
LATITUDE	:	40 31.25
LONGITUDE	:	73 32.59
LORAN C	:	26782.5/43715.5
SIZE		
ACRES	:	744
DIMENSIONS	:	3000 yds X 1200 yds
DEPTH (ft)	:	50-72
CONTROL DEPTH	:	50 (40 over structure at 26779.3/43718.5)
MAX. RELIEF	:	15
MATERIALS (cu yd)		
CONCRETE	:	5,200
ROCK	:	0
VESSELS	:	17,500
TIRES	:	0
OTHER	:	0

REMARKS: Materials include nine vessels, a drydock and concrete rubble.

CASE HISTORY: The Hempstead Town artificial reef was originally authorized under an Army Corps of Engineers permit issued to the Town of Hempstead, Department of Conservation and Waterways on June 22, 1967. The reef site received seven wood barges in July and August of that year. The barges were ballasted with concrete culvert pipe and ready-mix concrete. The permit was reissued to the NYS Department of Environmental Conservation on February 14, 1989, including a major increase in site area. Reef construction was renewed in 1989 with the addition of 4000 tons of concrete slabs from the reconstruction of bridges on the Wantagh Parkway. A wood drydock was added in 1990 and two 63-foot wood ferry boats and 2000 tons of rubble in 1991. The original barges are greatly reduced in profile but still provide excellent fishing opportunity for fares aboard party and charter boats from Point Lookout and Freeport, NY.

PLANS: This bottom on this site is close to the controlling depth in the northeast corner. This shallow area will be developed as a drift-fishing area utilizing low-profile rubble with a minimum of re-bar. The remainder of the site will be developed as patches of structure separated by open bottom. The site has a capacity to receive approximately 150,000 cubic yards of materials.

SITE NAME	:	FIRE ISLAND ARTIFICIAL REEF	
YEAR DEVELOPED	:	1962	
USACE PERMIT	:	14049	
EXPIRES	:	1990	
NYS DEC PERMIT	:	NONE	
EXPIRES	:		
LOCATION			
COUNTY	:	SUFFOLK	
LATITUDE	:	40 35.75	
LONGITUDE	:	73 12.60	
LORAN C	:	26633.0/43735.0	
SIZE			(PROPOSED)
ACRES	:	85	744
DIMENSIONS	:	2025 yds X 200 yds	3000 yds X 1200 yds
DEPTH (ft)	:	68-73	65-75
CONTROL DEPTH	:	40	40
MAX. RELIEF	:	10	
MATERIALS (cu yd)			
CONCRETE	:	30,000	
ROCK	:	1,200	
VESSELS	:	25,710	
TIRES	:	200	
OTHER	:	700	

REMARKS: Materials include 1500 tires; 10 barges; 2 boat hulls; 2 drydocks; coal waste blocks (experimental); rock; and concrete rubble and cesspool rings.

CASE HISTORY: This site was authorized under a Corps of Engineers permit originally issued to the Captree Boatmen of Captree State Park, Babylon, NY on May 18, 1962. The area was chosen by Captain William Joseph, then chairman of the Captree Boatmen's Association. Inspection of the site by divers of the American Littoral Society showed the bottom to be hard-packed sand with few marine organisms present. In 1962-63, 13 barge-loads of concrete building rubble and rock were dropped on the site. By May and June of 1963, good catches of red hake and black sea bass were being reported. In 1965, the permit was renewed in the name of the NYS Conservation Department. During 1965, the Department contracted for the manufacture and deployment of 40 reinforced concrete "fish houses" (modified cesspool rings) to be placed on the site. These structures were not located after deployment. During the early 1970's, DEC constructed tire-in-concrete units and contracted for their deployment on site. The last 15 years have seen several wood and steel barges and two wood drydocks placed on the reef. The largest drydock, christened the "Ocean Prince" after the tug that towed it to the site, is the most popular fishing and diving spot on the reef, producing good catches of black sea bass, tautog, red hake and many large lobsters. The Fire Island Reef is also the site of the Coal-Waste Artificial Reef Project (CWARP).

PLANS: Many materials were placed inaccurately during early years of reef development. Modern navigation aids have enabled DEC to accurately survey the site and determine locations of materials. Reef boundaries should be expanded to include these materials and provide space for further development.

SITE NAME	:	MORICHES ANGLERS ARTIFICIAL REEF
YEAR DEVELOPED	:	1968
USACE PERMIT	:	7737B
EXPIRES	:	1985
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	SUFFOLK
LATITUDE	:	40 43.50
LONGITUDE	:	73 46.44
LORAN C	:	26431.0/43771.5
SIZE		
ACRES	:	14
DIMENSIONS	:	450 yds X 150 yds
DEPTH (ft)	:	72
CONTROL DEPTH	:	50
MAX. RELIEF	:	UKNOWN
MATERIALS (cu yd)		
CONCRETE	:	0
ROCK	:	0
VESSELS	:	500
TIRES	:	78
OTHER	:	0

REMARKS: Materials on this site consist of two small wooden boats and 600 tires.

CASE HISTORY: In 1968, Moriches Anglers Club requested a permit to construct an artificial fishing reef from the Corps of Engineers. The club became interested in artificial reefs following the success of the Shinnecock Anglers in creating their reef off Shinnecock Inlet the previous year. The permit was issued to the NYS Conservation Department after the club agreed that this situation was in the best public interest. Work began on the reef in 1970 with the sinking of two small wooden boats and 600 tires. The DEC was not contacted nor presented an opportunity to supervise the work, despite specific requests to the club. Trawl fishermen soon complained that they were catching the reef materials in their nets off the permitted location. The Secretary of the Long Island Fishermen's Association petitioned the Corps to force the State to more closely supervise the operations. The DEC cautioned the club about their obligations. Interest in the project waned and the permit lapsed in 1985. Reports of angling success from this location are unavailable.

PLANS: Following an investigation of existing structure, this site will be completely developed utilizing the patch-reef concept with concrete materials and scrap vessels used as reef substrate.

SITE NAME	:	SHINNECOCK ARTIFICIAL REEF
YEAR DEVELOPED	:	1969
USACE PERMIT	:	13753
EXPIRES	:	1995
NYS DEC PERMIT	:	10-85-0250
EXPIRES	:	1991
LOCATION		
COUNTY	:	SUFFOLK
LATITUDE	:	40 47.98
LONGITUDE	:	72 28.55
LORAN C	:	26287.5/43787.5
SIZE		
ACRES	:	14
DIMENSIONS	:	450 yds X 150 yds
DEPTH (ft)	:	76-85
CONTROL DEPTH	:	50
MAX. RELIEF	:	20
MATERIALS (cu yd)		
CONCRETE	:	100
ROCK	:	0
VESSELS	:	8,300
TIRES	:	380
OTHER	:	4,300

REMARKS: Materials include 3,000 tires in three-tire units; 3 barges; a tug; a wood drydock; two wood boats; a steel cruiser; steel and concrete tower; and steel and concrete bridge rubble.

CASE HISTORY: The impetus for the creation of this reef came from the Shinnecock Anglers Club and the Long Island Fishing Reef Foundation, co-sponsors of the early construction work. The NY State Conservation Department obtained a permit from the Army Corps of Engineers in 1968. Work commenced in 1969 with the placement of 1,000 tire-in-concrete units, constructed and deployed by two local commercial fishermen. Money for this work was raised from entry fees collected at fishing tournaments hosted by the Shinnecock Anglers. Subsequent additions included wooden barges which generated some concern within the trawl fishing community. Some fishermen caught large chunks of wood in their nets and complained. In the last several years, wooden vessels have been placed on this reef without subsequent complaints from fishermen. This reef is heavily utilized by a few commercial trap fishermen, many sport divers and recreational anglers.

PLANS: The DEC will continue to place surplus vessels and scrap concrete materials on this site in a patch-reef configuration.

SITE NAME	:	GREAT SOUTH BAY (KISMET) ARTIFICIAL REEF
YEAR DEVELOPED	:	1967
USACE PERMIT	:	6785B
EXPIRES	:	1987
NYS DEC PERMIT	:	1-4728-00528/00001-0
EXPIRES	:	1992
LOCATION		
COUNTY	:	SUFFOLK
LATITUDE	:	40 38.20
LONGITUDE	:	73 12.75
LORAN C	:	26637.3/44757.9
SIZE		
ACRES	:	10
DIMENSIONS	:	1000 yds X 50 yds
DEPTH (ft)	:	16-25
CONTROL DEPTH	:	16
MAX. RELIEF	:	8
MATERIALS (cu yd)		
CONCRETE	:	1,160
ROCK	:	0
VESSELS	:	2,640
TIRES	:	500
OTHER	:	1,050

REMARKS: Materials include 4,000 tires in 3- or 4-tire units; two barges; 24,000 cement blocks; and concrete culvert and rubble.

CASE HISTORY: This site was permitted to the NYS Conservation Department, Bureau of Marine Fisheries by the Army Corps in 1964. The reef was built in 1965 by the Captree Boatmen's Association who carried 24,000 concrete blocks to the site on barges and their own fishing vessels. Two wood barges were sunk in the same year. Tire units were added in 1967 and concrete culvert in 1974. The reef was seasonally marked with buoys until 1975, when funds for buoy maintenance dried up. The reef was considered fully developed in 1977 and the permit was allowed to expire. Additional material, in the form of concrete rubble, was placed on site in 1990-91 through a permit modification (6785C). In 1969 through 1972, the tautog population of the Kismet Reef was studied by Department personnel. Today, the area of the reef is nearly completely covered by a blue mussel bed. It is one of New York's most popular fishing spots in the spring and fall, probably due to its location inside Great South Bay.

PLANS: This site should be evaluated for its capacity to receive additional materials. The extensive bottom coverage by blue mussels may obviate the need for further development. Inclusion of the site under the artificial reef permit will allow DEC to add materials as deemed appropriate.

SITE NAME	:	GREAT SOUTH BAY (YELLOW BAR) ARTIFICIAL REEF
YEAR DEVELOPED	:	NOT DEVELOPED
USACE PERMIT	:	8039
EXPIRES	:	1977
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	SUFFOLK
LATITUDE	:	40 37.96
LONGITUDE	:	73 14.50
LORAN C	:	
SIZE		
ACRES	:	7
DIMENSIONS	:	400 yds X 85 yds
DEPTH (ft)	:	25-38
CONTROL DEPTH	:	20
MAX. RELIEF	:	0
MATERIALS (cu yd)		
CONCRETE	:	0
ROCK	:	0
VESSELS	:	0
TIRES	:	0
OTHER	:	0

REMARKS: No materials have been placed in this site by DEC, though several small "wrecks" of unknown origin have accumulated in the area.

CASE HISTORY: This site was originally permitted by the Army Corps of Engineers to the Long Island State Park Commission as part of a larger project. The Park Commission had the area, called Yellow Bar, dredged to provide the fill needed to construct parking areas on the adjacent Fire Island. After dredging, the area was to receive materials for the creation of an artificial fishing reef. In 1971, the Conservation Department requested that responsibility for the permit be transferred to it, rather than the Park Commission. This was done, and the permit was renewed once in 1974. The permit expired in 1977 with nothing ever have been placed on the site. Several small wrecks in the vicinity provide good fishing in spring, summer and fall, while adjacent mussel beds also attract fish.

PLANS: This site will be developed similar to the nearby Kismet Reef, with low-profile concrete materials and several small vessels providing reef substrate. Blue mussels will eventually cover the site, providing a forage base and habitat for other forage species important to local fishes.

SITE NAME	:	SMITHTOWN BAY ARTIFICIAL REEF
YEAR DEVELOPED	:	1976
USACE PERMIT	:	9732A
EXPIRES	:	1989
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	SUFFOLK
LATITUDE	:	40 56.00
LONGITUDE	:	73 11.10
LORAN C	:	26667.5/43916.2
SIZE		
ACRES	:	3
DIMENSIONS	:	150 yds X 100 yds
DEPTH (ft)	:	38-40
CONTROL DEPTH	:	23
MAX. RELIEF	:	15
MATERIALS (cu yd)		
CONCRETE	:	0
ROCK	:	0
VESSELS	:	18,195
TIRES	:	2,900
OTHER	:	355

REMARKS: Materials include 22,000 tires; 5 barges; and 6 concrete-filled steel cylinders.

CASE HISTORY: The idea for an artificial reef in Smithtown Bay came from Steve Resler, then with the Town of Smithtown Conservation Advisory Council. The site off Long Beach was authorized under an Army Corps of Engineers permit issued to the NY State Department of Environmental Conservation in 1976. Construction began in that year with the placement of 22,000 auto tires. The original plan called for volunteer divers to stack the tires into pyramidal piles. This effort fell short due to waning diver interest in the difficult task. The volunteers numbered 200 at the outset and dwindled to Mr. Resler and one other diver toward the end. In 1979, the first wood barge was sunk at the site. Other barges were added: one in 1981; one in 1982; and two in 1984. Six steel cylinders were added in 1980. A small underwater research laboratory was deployed on the site in 1977 by the State University of New York (SUNY) at Stony Brook, College of Engineering. The laboratory was used for research on the site until 1981. It was later removed and now sits in a museum in New York City. The reef was used in 1981 by the Marine Sciences Research Center of SUNY at Stony Brook as a site for algal research. No additions have been made since 1984.

PLANS: The site is fairly well developed. As the wooden structures deteriorate, they will be monitored and augmented or replaced when their effectiveness diminishes. This site is ideal for the use of prefabricated concrete structures.

SITE NAME	:	MATINECOCK POINT ARTIFICIAL REEF
YEAR DEVELOPED	:	NOT DEVELOPED
USACE PERMIT	:	UNKNOWN NO., ISSUED 16 JUNE 1969
EXPIRES	:	1972
NYS DEC PERMIT	:	NONE
EXPIRES	:	
LOCATION		
COUNTY	:	NASSAU
LATITUDE	:	40 54.57
LONGITUDE	:	73 37.50
LORAN C	:	
SIZE		
ACRES	:	41
DIMENSIONS	:	800 yds X 250 yds
DEPTH (ft)	:	35-45
CONTROL DEPTH	:	UNKNOWN
MAX. RELIEF	:	
MATERIALS (cu yd)		
CONCRETE	:	0
ROCK	:	0
VESSELS	:	0
TIRES	:	0
OTHER	:	0

REMARKS: No materials have ever been placed in the site by DEC.

CASE HISTORY: In 1968, the NY State Conservation Department discovered a large number (30-40) of wood barges in Hempstead Harbor, which were owned by the Colonial Sand and Stone Company. An investigation revealed that the company no longer wanted the barges and was looking for avenues for disposal. The Department reef program had successfully utilized wood barges on it's south-shore reefs. Cost estimates for bringing the barges around to the south made the project impossible. A search for a site in Long Island Sound produced the Matinecock Point location. The Department obtained the permit in 1969 and pressed Colonial Sand and Stone to take the barges out to the site. The permit expired in 1972 with Colonial Sand and Stone taking no action. These barges, along with many other wood and steel barges, litter Hempstead Harbor today (1991).

PLANS: This site will receive up to 12 of the steel barges from Hempstead Harbor if they can be safely removed in compliance with NYSDEC permit requirements. Concrete and rock rubble will be added to provide low-profile habitat.

APPENDIX F

FORMS USED BY NYSDEC FOR POTENTIAL DONORS OF ARTIFICIAL REEF MATERIALS

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BUILDING #40, SUNY STONY BROOK, NY 11790-2356
(516) 751-7900 EXT 273

ARTIFICIAL REEF PROGRAM

DONOR'S CHECK LIST

- ☐ NYS DEC INSPECTION
- ☐ US COAST GUARD INSPECTION (VESSELS)
- ☐ COMPLETED DONOR'S REQUEST FORM
- ☐ SIGNED COPY OF SPECIAL CONDITIONS
- ☐ CERTIFICATE OF INSURANCE
- ☐ PROOF OF OWNERSHIP (VESSELS)

An application is considered complete only when the listed paperwork is completed and received by DEC. Only then will a LETTER OF PERMISSION be issued. The LETTER OF PERMISSION must be in the possession of the contractor before any work is begun.

Twenty-four hour notification is required before beginning any work. The number to call is (516) 751-7900 ext 273, or 751-8611.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BUILDING #40, SUNY STONY BROOK, NY 11790-2356
(516) 751-7900 EXT 273

ARTIFICIAL REEF PROGRAM DONOR'S REQUEST FORM

Name of Donor_____

Company Name_____

Address_____

Telephone_____ FAX_____

DESCRIPTION OF PROPOSED ARTIFICIAL REEF MATERIAL

Vessels:

Length_____ Beam_____ Height overall_____

Hull type_____ Material_____

Vessel Name_____ Owner_____

NOTE: Vessel donors must provide proof of ownership of same. Vessels must be inspected and certified clean by a US Coast Guard representative.

Other material:

Type_____ Amount (cubic yards)_____

ARTIFICIAL REEF SITE REQUESTED_____

DEPLOYMENT PLAN (Include details of preparation, transportation, towing, maintaining position on site and sinking. State names and addresses of contractors and other parties to this work.):

_____

_____

_____

_____

_____

_____

_____

_____

_____

I hereby certify that the above listed information is true to the best of my knowledge, and request that the listed material be considered for placement on a New York State artificial reef site.

Signed_____ Date_____

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Marine Resources
Building 40 - SUNY
Stony Brook, New York 11790-2356

L E T T E R O F P E R M I S S I O N

Date: _____

Name: _____

Company: _____

Address: _____

_____

The above named party is hereby granted permission to placed the following material upon the listed artificial reef site, in accordance with the SPECIAL CONDITIONS agreed to by said party (copy attached).

Material: _____

_____

_____

Artificial Reef Site: _____

Minumum Depth Requirement: _____

You are required to place the material on site as close as possible the following LORAN C coordinates: _____

_____

or in one of the areas indicated on the enclosed site plan.

This permission in no way implies any liability on the part of the Department of Environmental Conservation for damages caused by negligent actions of the above named party during the preparation, transportation, and/or deployment of the materials listed.

You are required to notify the Department of Environmental Conservation twenty four (24) hours prior to departure for the site. That number is: (516) 751-7900 ext. 273 or (516) 751-8611.

Thank you for your interest in fisheries habitat enhancement.

Signed: _____ Date: _____

SPECIAL CONDITIONS

1. NYS DEC will be held harmless from liability for any damages that occur in preparation, transportation and/or placement on site of all materials. In addition, the materials donor(s), contractor, subcontractor, and/or agent performing any preparation, transportation and/or placement of materials on site shall provide the DEC's Artificial Reef Program (ARP) Coordinator with a copy of a Certificate of Insurance prior to performing any work on the materials.

2. The DEC will accept only clean, select concrete materials or clean steel. All materials will be free of any contaminants, including, but not limited to:

gasoline, other fuels or oils;
blacktop or materials containing asphalt, i.e. roofing;
asbestos or materials containing asbestos;
pesticides;
antifreeze;
batteries;
chemicals and dye stuffs;
caustic materials, acids or lyes;
explosives;
electrical transformers, junction boxes or other electrical equipment.

3. All materials will be as large as physically possible within the limits of the ability of _____, hereafter known as the 'contractor', or its agent, to safely maintain the required minimum depth clearance of the site. All materials will be composed of no more than 10% by volume items less than one cubic foot. Any dredged material or materials removed from the bottom of a waterway will be washed of all sediment, with a high pressure hose if necessary.

4. Floating debris that results from reef deployment operations is unacceptable to the DEC. The listed procedures must be followed to ensure that no debris is left floating after any work that occurs on the reef site:

- all floatable materials, wood or other low-density materials that may be moved by wave or current action will be removed prior to deployment;

- any and all inadvertent debris seen floating after the deployment of materials must be immediately removed from the water by the contractor or its agent and brought to shore for proper disposal. If any floating debris is too large to be safely brought aboard the vessel on site, then the contractor or its agent must notify the US Coast Guard of the location of the debris and make arrangements to remove it or have it removed from the water within 24 hours.

- o If a specific reef material proves to be a source of inadvertent floating debris, the contractor will be responsible for the removal/resinking of the material, and any injuries and/or damages resulting from the material for a period of two (2) weeks after the initial sinking date. The further deployment of such material by the contractor will be terminated by the DEC.

5. VESSELS AND DRYDOCKS.

- o wood vessels are not acceptable for artificial reef sites in ocean waters;
- o vessel and drydock donors must provide proof of ownership of same;
- o all vessels and drydocks must be inspected by the US Coast Guard, Vessels Compliance Office, and DEC staff prior to acceptance as reef material;
- o any vessel or drydock must meet the minimum depth requirement for the site. This may require some modification to that vessel, i.e. cutting down of masts, pilot houses, wing walls, etc. No part of the vessel or drydock shall remain above the minimum depth requirement for the site;
- o wood vessels or drydocks must be ballasted with clean rock, gravel, sand, concrete or steel sufficient to prevent movement of the vessel off site, determination of which will be made by DEC staff;
- o all vessels and drydocks must be anchored on site prior to and during sinking. Anchors will be left until stability is assured;
- o limited use of explosives is permitted for sinking vessels or drydocks, provided this operation is performed by a professional demolitions expert.
- o DEC will assume ownership and responsibility for a vessel or drydock only after it is determined that said vessel or drydock is resting on the bottom, on site, in a stable configuration, and only after a two-week period has elapsed following deployment. This determination will be made with depth sounding equipment.

6. The DEC ARP Coordinator (telephone: 516-751-5422) will be notified by the contractor, or its agent, at least 24 hours prior to the planned hour of departure for the site. The contractor, or its agent, will also make provisions for a compliance inspection by the DEC prior to departure.

7. The COE permit allows for a minimum depth of ___ feet mean low water over the _____ reef site. The contractor or its agent will be responsible for the accurate location of materials and maintaining the minimum depth requirement. Pre- and post-deployment soundings will be conducted by the contractor or its agent. That information, along with locations of all materials deployed in TD's and LAT/LON, will be provided to the DEC ARP Coordinator on the last day of each month in which work is conducted, using trip log forms. The reporting requirement may be waived if a DEC person is present during deployment operations.

8. If a Loran C transmitter fails for either the 26000 or 43000 lines of position, the contractor, or its agent, will cease deployment operations and contact the DEC ARP Coordinator for further instructions.

9. Should the contractor or its agent violate any of the SPECIAL CONDITIONS, either through negligence or deliberate actions, the DEC may summarily suspend any dumping agreement with the contractor.

_____ agrees to accept the SPECIAL CONDITIONS as stated.

Date: _____ Signed: _____

APPENDIX G

ASMFC RESOLUTION
IN OPPOSITION TO
THE USE OF STABILIZED ASH PRODUCTS
ON ARTIFICIAL REEFS

ATLANTIC STATES MARINE FISHERIES COMMISSION

RESOLUTION IN OPPOSITION TO THE USE OF COMBUSTION/INCINERATION ASH FOR ARTIFICIAL REEF CONSTRUCTION

WHEREAS, the Atlantic States Marine Fisheries Commission is concerned with the promotion of sound and effective use of artificial reefs in fishery development and management; and

WHEREAS, the National Artificial Reef Plan, developed pursuant to the National Fishing Enhancement Act of 1984 (P.L. 98-623, Title II) states that "artificial reef materials...should minimize environmental risks", and that "Whenever a material is proposed, the standards for function, durability, stability, availability, compatibility, and safety must be assessed and satisfied"; and

WHEREAS, there is a lack of clear federal or state guidelines and standards for the testing and classification of cement-stabilized combustion/incineration ash; and

WHEREAS, the ASMFC is concerned that in addressing the growing problem of solid waste disposal, precipitous decisions will be made to use the ocean environment as a disposal outlet for unproven, potentially toxic waste products; and

WHEREAS, substantial uncertainty exists as to the long-term stability of cement-stabilized combustion/incineration ash, and the eventual fate of the potentially toxic constituents of this material;

NOW THEREFORE BE IT RESOLVED that the Atlantic States Marine Fisheries Commission request that the Environmental Protection Agency and the United States Army Corps of Engineers develop and adopt standards for the use of stabilized combustion/incineration ash products in the marine environment, particularly as artificial reef substrate;

AND BE IT FURTHER RESOLVED that the Atlantic States Marine Fisheries Commission opposes the use of said stabilized combustion/incineration ash products as artificial reef substrate and requests that permits not be issued, other than for experimental applications, until such time as these guidelines and standards are adopted; or until the time member states adopt such standards that ensure the protection of the marine environment.

APPENDIX H

HEARING REPORT

STATE OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
BUILDING #40, SUNY
STONY BROOK, NEW YORK 11790-2356

In the matter of the Department's Draft Plan and Generic Environmental Impact Statement for the Development and Management of Artificial Reefs in New York's Marine and Coastal District: The Draft Plan/GEIS was prepared in conformity with Section 8-0109 of Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law and Part 617 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York.

HEARING REPORT

William M. McGroarty, Marine Resources Specialist II, Division of Marine Resources, hereby submits this Hearing Report summarizing the comments received in the captioned matter.

W. M. McGroarty

William M. McGroarty
Hearing Officer
Division of Marine Resources

PROCEEDINGS

The New York State Department of Environmental Conservation (NYSDEC) scheduled two public hearings to provide the public with opportunity to comment on NYSDEC's Draft Plan for the Development and Management of Artificial Reefs in New York's Marine and Coastal District/Generic Environmental Impact Statement (Plan/GEIS).

Notice of Completion of Draft and Notice of SEQR Hearing was published in NYSDEC's Environmental Notice Bulletin on 9 April 1992, while a Notice of Public Hearing appeared in Newsday (Suffolk, Nassau and New York editions) on 22 April 1992. In addition, copies of the Plan/GEIS with the Notice attached were sent to all members of the State Assembly and Senate; county and local government offices; Marine Resources Advisory Council; researchers; and various individuals and groups known to have an interest in the Plan/GEIS in the affected area. A NYSDEC Press Release, describing the Plan/GEIS and listing dates, times and locations of public hearings, was sent to all local newspaper, radio and television news bureaus on 2 May 1992.

The Plan/GEIS was prepared in conformity with Section 8-0109 of Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law (ECL) and Part 617 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York. The program activities addressed in this document are based upon the management and regulatory authority provided by Section 11-0303 of the ECL. Included in this section are directions and authorization for NYSDEC to generally promote natural propagation and maintenance of desirable species in ecological balance and to make them available to the public.

SEQR hearings on the Draft Plan/GEIS were held before William M. McGroarty, Marine Resources Specialist II, "Hearing Officer" for the Division of Marine Resources. The hearings were held on 8 May 1992 at 7:30 pm at NYSDEC Region I Headquarters, room B-02 of Building #40 on the SUNY Stony Brook campus, and on 11 May 1992 at 7:30 pm at Kingsborough Community College, room U219 of the College Center in Sheepshead Bay, New York.

NYSDEC staff was represented at each hearing by Stephen W. Heins, Marine Resources Specialist, and Teresa Rotunno, Seasonal Laborer, Bureau of Finfish and Crustaceans, Division of Marine Resources. A total of 25 other persons attended the hearings, 17 of whom presented oral statements.

The deadline for submitting written comments, as originally stated in the Public Hearing Notice, was 22 May 1992. No extensions of this deadline were made, though comments were received after the deadline.

PUBLIC HEARING COMMENTS ON DRAFT GEIS FOR THE DEVELOPMENT AND MANAGEMENT OF ARTIFICIAL REEFS IN NEW YORK'S MARINE AND COASTAL DISTRICT

Stony Brook Session - Friday, May 8, 1992

Comment Type	Person's Name	Person's Title	Representing
Oral	Mark Malchoff		self
Oral	Floyd Carrington	member	Shinnecock Environmental Reef Foundation (SERF)
Oral	John Schaub	member	Moriches Anglers Fishing Club
Oral	Steven Romalewski	LI coordinator	New York Public Interest Research Group (NYPIRG)
Oral/written	Elizabeth Shepherd	chairperson	Village of Head of the Harbor, Environmental Conservation Board
Oral	Chet Wilcox	proprietor	B&B Tackle & Sports Shop
Oral	Martin Arrow	president	SERF
Oral	Victor Calabrese		self
Oral	Jim Gillen	representative	Captree Boatmen's Association

Sheepshead Bay Session - Monday, May 11, 1992

Comment Type	Person's Name	Person's Title	Representing
Oral	Douglas Soroka		Long Island Divers Association
Oral	Kevin Bradshaw	owner/captain	Open Boat "Dorothy B VII"
Oral	Michael Daniewicz	member	Mid-Atlantic Anglers Association
Oral	George O'Connell	captain	Open Boat "Pilot II"
Oral	Bunny Gabel	member	West Village Committee
Oral	Marcy Benstock	Director	Clean Air Campaign
Oral	Anthony D. DiLernia	President	Long Island Commercial Passenger Fishing Vessel Association
Oral	Robert W. Wiegand		self

SUMMARY OF PROPOSED PLAN AND GEIS

As this hearing report is appended to the Plan/GEIS, see the Executive summary beginning on page vi.

SUMMARY OF ORAL STATEMENTS

Stony Brook Hearing Session; 7:30 pm, Friday, May 8, 1992.

Mark Malchoff, Riverhead, spoke in favor of the Plan/GEIS. He would like to see DEC fully explore the potential of using artificial reefs to reduce fishing mortality instead of increasing it, through the use of sanctuaries or Special Management Zones. He also feels it is very important to monitor artificial reefs for biological and economic impacts.

John Schaub, Moriches Anglers Fishing Club, Center Moriches, spoke in support of DEC's initiative and expressed the desire of his club members to be involved with all aspects of artificial reef development in their area.

Floyd Carrington, Shinnecock Environmental Reef Foundation, Hampton Bays, was enthusiastic about DEC's plans and expressed his concern that New York lagged behind other coastal states in reef development, citing Florida as an example. He felt it important that DEC work with local user groups in reef development and was looking forward to working with us. He spoke in favor of estuarine reefs as a way to restore or replace nursery habitat lost to development and degradation. He also supported the concept of a blanket permit for reef construction. His foundation is offering their assistance with reef development in the area, suggesting the use of underwater videography, at their expense, as a means of monitoring the biology of the reefs.

Martin Arrow, Shinnecock Environmental Reef Foundation, Hampton Bays, seconded comments by Mr. Carrington and emphasized the connection between artificial reef construction and environmental awareness. He is concerned about habitat loss and degradation and the resultant decline in public use of the waterways. His organization would use an artificial reef and the associated ecology as a tool to educate the public as to the importance of habitat to the fishery resources, tying in water quality as well.

Steven Romalewski, New York Public Interest Research Group (NYPIRG), Huntington, stated that his organization's main concern on Long Island is waste disposal. DEC's proposed artificial reef policy on stabilized incineration ash is very encouraging to them. His organization, as well as the Long Island Sound Water Shed Alliance (LISWSA), is concerned that artificial reefs could be used as a cheap and easy means of disposing of incineration ash. He is aware of research done on stabilized ash in artificial reef and other applications, but feels the results do not provide assurance of long-term stability and safety of this

material in the water or on land. He expressed concern about the levels of toxic contaminants contained in the ash itself, and the perceived move by DEC's Solid Waste Management Plan to "sweep the ash issue under the rug" by exempting it from hazardous waste regulation. He stated that NYPIRG and LISWSA are encouraged by DEC's draft artificial reef plan and ASMFC's caution regarding the use of ash as artificial reefs, but would go further in banning its use even for experimental purposes. They are concerned about the momentum that would build once the incineration industry got its "foot in the door". They offered their assistance in providing information or encouragement and want to share information. They also expressed concern that the type of public involvement in artificial reef development not become like many public benefit corporations or non-profit organizations which are removed from public accountability. He submitted a copy of a NYPIRG report on solid waste on Long Island for background purposes.

Elizabeth Shepherd, Head of the Harbor Environmental Conservation Group; Chairperson, Village of Head of the Harbor Environmental Conservation Board; Commissioner, Governor's Commission on Coastal Zone Management, also submitted written comments and simply read them into the record. Her statement appears in its entirety in the section of this document with the other written comments. She is concerned that DEC lacks adequate financial resources to implement its program. She also questioned the propriety of DEC's self regulation. Her comments can be grouped as follows:

1. **Goals.** DEC's mission of protecting fishery resources and associated habitat should be stated with the other goals. Additionally, artificial reefs should not be used to "enhance or restore fishery resources" without a clear understanding of: a) previous or initial condition of resources and habitat; b) the desired level of enhancement/restoration; and c) the effectiveness of artificial reefs in providing the desired results.

2. **Citizen Participation.** When involving citizens in artificial reef activities, monolithic corporations should not be involved, due to their exclusion of citizen participation and the lack of legislative oversight. Also, how will support of citizens who are not members of clubs or foundations be obtained?

3. **Materials.** How will DEC deal with artificial reefs already constructed of unsuitable materials? How does DEC monitor materials collected for deployment on reefs by others? How will DEC handle the pressure to use stabilized incineration ash before sufficient long-term data are collected? What criteria will be used in siting experimental ash reefs? If DEC will prohibit fishing on experimental reefs, how will they keep fish from feeding on them?

4. **Exclusive Economic Zone.** What power does DEC have to prevent development of artificial reefs in the EEZ by other entities?

5. **Mitigation.** When will DEC develop a policy governing artificial reefs as mitigation tools? Does DEC have authority to implement such a policy? How will DEC determine if the value of an artificial reef is greater than a natural habitat? Would marine artificial reef construction be considered as mitigation for destruction of a coastal wetland? How would productivity of such a reef be quantified and over what time period? One year seems insufficient.

6. **Development.** What will be the site selection criteria for estuarine reefs? Interference with other activities and natural habitat should be avoided. Why use artificial reefs to replace vital estuarine habitat when DEC itself states that estuarine nursery habitat is more important than reef habitat for juveniles of some reef species?

Chet Wilcox, owner and proprietor, B & B Tackle and Sports, Center Moriches, also a member of the Moriches Anglers Fishing Club, spoke in favor of the Plan/GEIS. He felt that artificial reefs provide increased economic benefits to local communities, and this benefit is maximized when the reefs are used by recreational anglers. He spoke in favor of scattering reef materials over a wide area in order to maximize utilization by fishermen and disperse the fish populations so that impacts of fishing are reduced. He would also like to see some sort of anti-trawling device used to protect artificial reefs from damage. He endorsed the concept of local public financial support, with monies raised by groups used only in their locale.

James Gillen, Captree Boatmen's Association, Captree State Park, spoke for Ed Laske, president of his organization. He stated that the Captree Boatmen have been involved with the artificial reef program since it started in 1962. He feels that DEC's efforts have been successful, though the existing reef in the ocean off Fire Island should have been expanded. He calculated 200,000 people fish annually from Captree party boats and artificial reefs are important to their fishing experience. He stated "the sooner, the better" regarding expansion of artificial reef development in his area.

Victor Calabrese offered, on behalf of his employer, to donate three wooden boats to the artificial reef program.

Brooklyn Hearing Session, 7:30 pm, Monday, May 11, 1992

Douglas Soroka, Long Island Divers Association, stated that the LIDA agrees with DEC and finds the Plan/GEIS generally diver friendly. The LIDA endorses the concept of sanctuary reefs and recommends that the reefs be properly marked as such. Mr. Saroka

recommended that volunteer divers be used in performance monitoring of the reefs. The LIDA would also like to see shallow water reefs, accessible from shore, developed on Long Island's east end. LIDA had several suggestions for making the wording of the Plan/GEIS more diver friendly. Mr. Saroka would submit these in writing at a later date.

Kevin Bradshaw, owner of the open boat "Dorothy B VII", Sheepshead Bay, stated that most of the open boats in Sheepshead Bay are in favor of artificial reef development. He went further in saying that the boat owners would like some say in where new reefs are constructed. They are particularly in favor of construction in shallower water than existing reefs, about 30 feet of water. He suggested that Raritan Bay would be a great place to construct a new reef.

Michael Daniewicz, Mid-Atlantic Anglers Association, representing 4500 members, stated that his organization wants DEC to consider a site in Raritan Bay, both to provide additional habitat and a place to fish when the weather prohibits fishing in the ocean. He also believes that structure could help prevent illegal trawling in Raritan Bay.

George O'Connel, captain of the open boat Pilot II, Sheepshead Bay, seconded the comments of Kevin Bradshaw, that reefs placed in shallow water (25- to 30-foot depths) would produce more fish and be better reefs than those in deeper water. He echoed the sentiments of Mr. Bradshaw and Mr. Daniewicz that a reef is needed in Raritan Bay.

Bunny Gabel, West Village Committee, Manhattan, stated that her group is strongly opposed to artificial reef construction because they believe it to be an unnatural and unnecessary intrusion into marine waters that will destroy productive habitats. They are also opposed to habitat creation as part of mitigation for development on the waterfront.

Marcy Benstock, Executive Director, Clean Air Campaign, Manhattan, stated that her group strongly opposes the plan and believes that the GEIS does not adequately address the impacts of the program. They feel migratory species dependent upon estuarine habitat will be adversely affected by artificial reef construction. She said that the news of the hearings was not sufficiently broadcast. DEC should start over and draft a new GEIS, distributing information about public hearings more widely. She complained that the EIS gave no information about specific reef projects reported in newspapers over the years. One article in particular mentioned the use of stabilized incineration ash as artificial reef substrate. Ms. Benstock felt that this issue should be thoroughly explored in the GEIS, since DEC will no doubt be using stabilized incineration ash on its reefs. She felt the GEIS did not adequately address the affects of reef development on non-reef species, on fishing and natural mortality of reef species, and on overproduction of reef species. Her

group also opposes the use of artificial reefs as mitigation for development-related habitat loss or damage. They feel DEC could make better use of money used in reef construction, particularly for habitat protection. DEC is woefully underfinanced and cannot do that job adequately now. She went on to state that the events and circumstances surrounding the proposal to develop the Westway project are critical to the GEIS. Artificial reefs were proposed as mitigation for filling the inter-pier area of the waterfront to be developed. Ms. Benstock further stated that DEC is right in wanting to exercise control over artificial reef construction, but adds that public control is necessary through the processing of individual permits for each new artificial reef. Full public review, environmental assessment and exploration of alternatives should be required of each new proposal. Ms. Benstock finished by calling once again for a new EIS.

Anthony D. DiLernia, President, Long Island Commercial Passenger Fishing Vessel Association, on behalf of his organization, commended DEC on the Plan, stating it was long overdue. His organization would like to offer advice on artificial reef development. They feel that the benefits to the fishing industries and affected communities have been clearly demonstrated by reef programs in neighboring states. They expressed confidence in DEC and fully support the Plan.

Robert Weigand, party boat captain, Gerritsen, spoke in support of increased artificial reef construction in general, stating that reefs, when properly sited and built, are beneficial to the environment and marine species.

APPENDIX I

WRITTEN COMMENTS

May, 1992

Division of Marine Resources
NYS DEC
Bldg. 40, SUNY
Stony Brook, NY 11790-2356

Dear Sir:

The Babylon Village Earth Day Committee strongly supports the opposition to the use of incinerator ash for artificial reef construction since there is controversy and question about the long range safety of this project.

We already have too many examples of ecosystem destruction due to development and progressive industrialization to take a chance with known toxic materials for artificial reefs.

Most Sincerely,

Stanis Beck, Chairman
Babylon Village Earth Day Comm.
210 Deer Park Ave.
Babylon, NY 11702

cc: Comm. Thomas Jorling
Hon. Owen Johnson

May 5, 1992

GEIS ARTIFICIAL REEF

PUBLIC HEARING 5/8/92

Gentlemen:

My name is Capt Ed Laske, and I own a 75 foot party charter boat, The DIXIE II, sailing from Captree Boat Basin, located in the Fire Island Inlet area on the south shore of Long Island. Captree, is a party fishing boat port having some 34 boats, with a capacity of carrying over 3000 people and provides a fishing experience for over 200,000 passengers per year. I am also Secretary of the Captree Boatmen's Association for the past 5 years, and additionally for the past two years, Secretary of the Long Island Commercial Passenger Fishing Vessel Association; an industry group comprised of members from the ten major Long Island party boat ports. This group represents some 250 plus party and charter boats, which provide a major impetus to the billion dollar New York fisheries industry.

Reef existence on Long Island, and nationally, has a long proven history of success in preserving and enhancing our fisheries. Adding structure and habit to the long sloping sand terrain of our area has shown over the years not only to enhance our fisheries stock but support an industry and our local economy.

We believe the GEIS adequately addresses concerns noted, and allows for progress in upgrading the existing reefs and providing for new ones. With the noted centralized control and licensing system for artificial reefs, we also believe the DEC will provide the necessary safeguards for material selectivity, inspection of preparation, placement and monitoring required to obtain the desired positive impacts to the habitat, its fishery, industry and the Long Island economy.

Thank you for the opportunity of addressing you this evening.

Capt Ed Laske
20 Iroquois Place
Massapequa, N Y 11758
(516) 541-4538

CITY OF NEW YORK
Comments on the Draft GEIS
for the Development and Management of
Artificial Reefs in New York's Marine and Coastal District

The potential for enhancement of fisheries and other marine aquatic life from the creation of underwater structures is well documented. In the appropriate circumstances, such artificially constructed conditions can create important habitat features which provide nurseries for finfish and shellfish, hiding and resting areas for fish and benthic organisms, and surfaces for plants and animals to colonize creating food webs for many organisms. These structures also create a localized change in current and water movement which can cause increased sedimentation.

By virtue of the creation of such habitats the opportunity for fishing, diving and other human recreation can also be affected. Depending on the size and location of such structures, their use by recreational or commercial fishermen and individual and group diving tours can create new pressures on the newly aggregated marine aquatic resources which could be greater than the use before the structures were put in place.

New York City's interest in the proposed artificial reef program stems from a variety of economic and waterfront management concerns. The City is currently developing a comprehensive waterfront plan for all of its 578 miles of waterfront. This plan seeks to balance the variety of natural, public, working and redeveloping interests that must be considered.

We have reviewed the GEIS and have the following general and specific comments.

Goals and Objectives

* What is the definition of a "reef"? Does this proposal include only submerged structures or intertidal structures as well?

* How is a structure's effectiveness as a "reef" evaluated? Is the reef's worth or effectiveness defined by the habitat it provides; if so how will the overall evaluation of such needs in the region be determined? There should be a clear understanding of the fisheries management needs of the region prior to a blanket permit issuance if such a permit removes the opportunity for site-by-site review of new reefs or significant modifications of old reefs.

* If the main reason for this reef program is to increase the biomass of the fisheries resources in the area, shouldn't the reefs be sanctuaries and not fishing areas? There seems to be some objectives articulated for this program which fundamentally are in conflict. The purposes of the program must be more fully presented to illustrate how the conflict between enhancing fisheries and increasing fishing can be resolved. It seems that the only way to achieve such a balance is to commit to the increased

staffing of the program for active management of these reefs.

Materials

* What type of evaluation of the material (visual, testing results, etc) would be instituted to assure that all the materials used are safe and will remain safe for the environment in which they are deposited. Since the GEIS states that DEC would retain no liability for the reef, any potential future need for remediation or clean-up of materials damaging to the environment could, in the worst case, fall to a local government. How would DEC's program guard against such a situation?

* Since the GEIS acknowledges the DEC's present lack of staff for this program, how would DEC evaluate, test and monitor the materials to be used for any such reef installation, and the installations themselves?

Impact Assessment

* The City University of New York should also be involved as collaborator with SUNY and others for the research aspects of the program.

* Since extensive use of such reefs by commercial fishermen, party boats or organized diving groups could exert greater pressure on newly aggregated fisheries and other marine resources than previously possible when fishing or diving spots were more dispersed, what is the actual potential for further stress on presently overexploited resources? How would the DEC propose to guard against such impacts if they are possible.

* The reference to "estuarine reefs" is misleading since all of the marine district in New York City would be within areas considered part of the estuary. Specifically of concern though is the reference to new reefs in shallow areas. A reef in a pass or present eelgrass bed could not "... provide a substitute for this lost habitat." It could provide only a few of the many specific characteristics of an eelgrass bed, namely fish cover or resting area and some food (but not the same diversity of food).

We would have great concern if shallow areas, which support or have the potential to support eelgrass were the site of artificial structures. This could seriously disrupt the nursery or vegetative nutrient cycling in the area by attracting significant angler or diver use.

Regulatory Process

* Is it an appropriate circumstance for the DEC to issue itself a blanket 401 Water Quality Certification when typically there would be an individual analysis and Water Quality Certification for each proposed action? Such an individual process would be the normal way to notify the public and local governments that such a proposal is being considered.

Further, how is the SEQR review for this blanket Water Quality Certification considering the cumulative impact of this program if an initial survey of the present "reef" habitat and the "future built reef habitat" have not been completed?

* Is it appropriate that all reef construction would be covered under only one Coastal Zone Management Review performed for this one permit action? It is possible that the placement of a reef, while water dependent certainly, might effect other uses in the area or may be proposed in a significant coastal fish and wildlife habitat without additional review.

* It is indicated in the GEIS that illegal or destructive practices on the reef (improper fishing, divers damage, etc) would be prosecuted. If this is not a regulatory program, does the DEC have the authority to actually apprehend, issue violations and prosecute? Under what authority?

Reef Siting

* Where in the "Lower Bay" and "Rockaway Inlet" are reefs proposed (Geis, P. 85, 86).

LAURA LEE
PT. NEIL DELANOY

Bay Shore Fishing Corp.

90 Cedar Point Drive
West Islip, N.Y. 11795
(516) 669-3937

May 11, 1992

Stephen W. Heins
NYS Department of Environmental Conservation
Building #40, SUNY
Stony Brook, NY 11790-2356
(516) 751-5422

Re: Draft plan for the development and management of artificial reefs in New York's marine and coastal district/generic environmental impact statement

Dear Mr. Heins,

I am the owner and operator of the third largest party fishing boat in the Fire Island Inlet area. The "Laura Lee" carries up to 94 fishermen per trip and up to 7,000 per year. Approximately 20% of our fishing, or about 1,400 passenger fishing trips per year, is on wrecks and artificial reefs.

My comment on the plan is simply this: congratulations, what a great plan! How soon can you start? The party fishing boat industry on Long Island is so depressed that many boats may soon go out of business. Although this plan will be too late to help them all, its implementation will definitely help some.

This plan has the potential to have a long term positive impact on recreational fishing in New York's marine and coastal district.

Yours truly,

Neil Delanoy

Captain Neil Delanoy

Recd MAY 15, 1992 5b

LONG ISLAND DIVERS ASSOCIATION, INC.
P.O. Box 7304, Hicksville, New York 11801

Box 13 Driftwood Cove
9th St. & Rt 25
Greenport, New York 11944
May 13, 1992

Stephen W. Heins
NYS Department of Environmental Conservation
Building #40, SUNY
Stony Brook, New York 11790-2356

Dear Mr. Heins,

The Long Island Divers Association would like to comment on the Draft for the Development and Management of Artificial Reef in New York's Marine and Coastal District and Environmental Impact Statement. We thank you for giving us the opportunity to comment of this document. This development plan has taken a lot of time and effort to produce and we of LIDA appreciate the work that has gone into it. Overall we are very pleased with this document. We encourage the use of sanctuary reefs especially in shallow water at the eastern end of Long Island need shore access to them.
Our changes are as follows;

page 1 add as (F)
Enhanced recreational Diving Opportunities

page 14 2.4.1 2nd paragraph add to 2nd sentence
and the SCUBA diver and related industries would also be significant.

page 28 4.1.3 to be included in part C
The organized diving community as LIDA or its equivalent as a resource for volunteer diver services.

page 29 part A add to end
which would be updated every (5) five years as needed

page 29 Policy - add after citizen participation
with such groups as the Long Island Divers Association and other organized groups.

page 33 add to end of Monitoring paragraph
use of volunteer divers nay be used to assist in keeping service costs down

page 36 Policy add after SUNY
LIDA

LONG ISLAND DIVERS ASSOCIATION, INC.
P.O. Box 7304, Hicksville, New York 11801

page 37 add as F to 4.2.1
increase recreational diving and spear fishing opportunities

page 38 add to B after fishing -support
SCUBA diving and SCUBA diving industries

page 40 4th paragraph 2nd sentence change
can occurs to should occurs

page 61 Policy D add
utilize to investigate and utilize suggested fabricated units ...

page 65 1st paragraph 4th sentence change to
volunteer anglers and divers

page 68 4.3.41 add to 2nd sentence
alternative to fishing and diving attractions when ...

page 76 Policy add E to the end
with appropriate visual markers
(personal note: similar to Lake George Navigational Buoy)

page 77 C add
or recreational variances ie. no catch or specific catch

page 84 add to last paragraph
and organized groups of special interest as diving and charter fishing boat organizations

page 97 1st paragraph 6th sentence add
but should be sites where possible to allow shore access

page 100 1st sentence add to end
and associated services

Thank you for the opportunity to respond to this plan and if we may be of further assistance please let us know.

Sincerely,

Douglas Soroka

clear

May 29, 1991

Mr. Stephen W. Heins
Division of Marine Resources
Department of Environmental Conservation
Building 40
SUNY Stony Brook, NY 11790

Dear Mr. Heins:

The following comments on the Draft GEIS for the "Development and Management of Artificial Reefs in New York's Marine and Coastal District," April 1992, address pages 51-53 which concern "Experimental Materials: Stabilized Ash Blocks."

CLEAR rejects incineration and favors comprehensive recycling as a means of trash disposal. Without incineration, there would be no toxic ash.

The issue of incinerator ash can be resolved on the basis of the contract for operating a mass-burn incinerator and the characteristics of the trash allowed into a mass-burn incinerator. On the basis of this documentary evidence, the situation is that there should be no incineration--and, therefore, no incinerator ash--since 98% of the trash allowed into an incinerator has been shown to be capable of processing with the various state-of-the-art recycling technologies.

1. ASH BLOCKS ARE **NOT** A PRODUCT OF RECYCLING

a) Where will ash come from?

The perceived need for desperate measures, such as dumping toxic incinerator ash into the waters will be avoided in the near future when full recycling supplants incineration as the basic means of waste disposal.

Information generally available in the press and publications indicate that the national trend is to avoid incineration--as well as to shut down existing incinerators---in favor of comprehensive recycling and composting as a means to deal with trash. The reasons encompass economic, energy-savings, environment and public health factors. Markets exist for all recyclable materials.

On Long Island, the five East End towns are building recycling facilities. The towns of Brookhaven, Oyster Bay and North Hempstead have opted for full recycling, not incineration. In Huntington, there is a citizens' drive to convert Ogden's incinerator into a full recycling facility. According to Huntington's incinerator consultants (Dvirka & Bartilucci), 92% of the total waste stream is recyclable.

b) Huntington/Smithtown Ash Decreasing

When Ogden's mass-burn trash incinerator in East Northport went on-line at the end of 1991, only about half of Huntington and Smithtown's total waste stream was still available for incineration, in part due to 13% recycling. The rest of the trash was being taken by private carters directly to recycling vendors. Six months after Ogden's incinerator opened, officials state that trash from

Citizens for a Livable Environment And Recycling, Inc.—CLEAR

P.O. Box 145 • Huntington, LI, NY 11743-0145 • (516) 673-9638

both towns can fill only 47% of Ogden's incinerator capacity. Ironically, both towns had held environmental scoping sessions to expand the incinerator by one-third only one year before the incinerator opened because officials feared it might be too small.

c) Incinerators Propped-Up

Because of the general shortage of trash now available on Long Island for the four existing Long Island incinerators--a result of rapidly increasing recycling--officials are forced to take drastic measures to prop-up incineration. For instance, the DEC's regional director recently suggested in public remarks that an issue need to be addressed to prevent recycling prices from dropping beyond some acceptable levels. Municipalities are passing laws to require local carts to deliver trash to the incinerator in the town.

d) Incinerator Price Wars

Officials in the four Long Island towns with incinerators are currently scrambling to make deals to import garbage from elsewhere to fill their incinerators. By artificially lowering incinerator tipping fees, they are forcing local taxpayers to subsidize trash imported to burn in the incinerator, while at the same time these taxpayers are already bearing the brunt of paying taxes rapidly escalating to pay incinerator bonds and operations.

In Huntington, for instance, the cost to incinerate materials is currently $150/ton, but officials lowered the tipping fee to $65/ton to attract trash. Compare incinerator tipping fees with the current cost in Huntington to recycle those same materials: average $25/ton. Note that 98% of the materials burned in Ogden's incinerator are recyclable, according to Huntington's incinerator consultants, Dvirka & Bartilucci.

2. ASH: THE ACHILLE'S HEEL OF INCINERATION

a) How much does ash disposal cost?

Whenever incineration is the basic means of trash disposal, a municipality quickly encounters major financial difficulties. In Huntington, if Ogden's incinerator were to operate 20 years, the total average cost to taxpayers would be $45 million average a year. Obviously, vast savings can be immediately realized the moment Ogden's incinerator is shut-down and full recycling is instituted.

Meanwhile, approximately 20% of the net cost of Ogden's Huntington incinerator is spent on long-hauling ash (one-quarter of the trash incinerated remains as toxic ash). Long-hauling almost cancels out the revenues earned from electricity generated by the incinerator.

b) Where else can ash be put?

Currently the regional DEC's Solid Waste Division is encouraging officials of

the four Long Island incinerator towns to dump the ash on Long Island. Deals are in the works whereby Hempstead's ash goes to the Yaphank dump, over the aquifer in Brookhaven. Islip and Babylon were permitted to construct ashfills adjacent to mixed trash landfills, slated to close. Islip's landfill is over the aquifer.

Smithtown was permitted to more-than-double the size of its landfill over the aquifer in order to accept mixed trash from both Huntington and Smithtown. This landfill began operations after the implementation of the LI Landfill Law, and is now under heavy pressure by DEC and town officials to be converted into another ashfill.

3. ASH BLOCKS AND REEFS: A SOLUTION OF LAST RESORT

a) Medieval alchemy at Stony Brook

Officials are well aware of the economic impacts and implications of conventional ash disposal. They are so interested in the notion of "recycling" ash as blocks and reefs--a scenario which would avoid both long-haul costs, as well as the costs of constructing ashfills on Long Island--that they are oblivious to any environment and health consequences. Funds from all jurisdictions are being thrown into the Stony Brook Marine Sciences Research Center/Waste Management Institute experiments (as well as into other research projects elsewhere), with the goal of converting toxic ash into "benign" and "beneficial" concrete blocks, "ashphalt" paving, road beds, "rolite" landfill cover, and vitrified material.

b) Fuel-Cleaning

At a presentation before the Suffolk County Legislature's Energy & Environment Committee, it was apparent that the managers of the Stony Brook project were pointing towards the advisability of "fuel-cleaning" (recycling) trash before incineration, so that the resulting ash would be less toxic. Incineration industry trade journals spell out this function of limited recycling from their viewpoint. It was also apparent at the presentation that trash would need to be sorted to exclude, homogenize or better manage those materials which are not so conducive to bonding with Portland cement. This concern indicates an acknowledgment of the toxicity of ash. Furthermore, their recognition of the need for pre-sorting raises the question: why not fully recycle these materials in the first place?

c) Change of goal

Concern for the quality of ash blocks reflects a change of emphasis--from ash blocks as a form of trash disposal to manufacturing ash blocks as an entire new industry. In some ways this is even more frightening than the original goal of the experiment. That change in emphasis has already led the directors of the Stony Brook project to promote the manufacture of toxic incinerator ash blocks as a means of ringing Long Island and parts of New York City with ash blocks in the event of global warming inundation. They also suggest using ash blocks

to construct offshore islands for ports, incinerators and nuclear plants, as well as for buildings.

4. TOXICS AND HEALTH EFFECTS OF ASH

a) Ash flunks tests

Fly ash exceed regulatory limits for lead. Bottom ash and combined ash have high lead levels. All forms of ash contain high levels of cadmium. (Richard A. Denison, Environmental Defense Fund).

b) Amounts of Toxics in Ash

Based on test averages for ash samples (Hazardous Waste News), the pounds per day of chromium, cadmium, lead and arsenic found in ash resulting from Ogden's East Northport 750 tons per day incinerator would be:

lead 1,093 pounds per day
chromium 18.5 pounds per day
cadmium 22 pounds per day
arsenic 36 pounds per day

Therefore, with 4,523 tons per day incinerator capacity presently on Long Island, there is approximately 3.3 tons per day maximum of lead alone contained in the ash produced on Long Island.

Since bottom ash contains 6 times more lead than fly ash, attempts to circumvent tests by dilution--by combining fly and bottom ash--are fraudulent.

In addition to the 228 organic compounds and a range of heavy metals which enter the incinerator in mixed trash, dioxins and furans are actually manufactured in the incinerator itself by chemicals combining.

c) Sources of Toxics

Some major sources of toxics in incinerators are: pesticides, pharmaceuticals, plastics, batteries, paints, dyes & inks, fluorescent lights, fungicides, rubber and paper.

d) Threats to health

Threats to health include: asthma, blood, bones, brain, cancer, eyes, gastrointestinal, genetic & birth defects, growth, heart & blood pressure, immunity, kidney & liver, neurological, nose, respiratory, skin, throat.

Health risks are highest for infants, pre-teen children, the elderly, and those who already have health problems.

e) Ash is Hazardous

The U.S. Court of Appeals for the 7th Circuit (Chicago) declared in November 1991: "...we hold that the ash generated from the incinerators of municipal resource recovery facilities is subject to regulation as a hazardous waste..." As a consequence, ash in that area must be taken to hazardous waste dumps.

f) Impacts on marine environment

Incinerator emissions of mostly uncontrolled mercury have been observed drastically bioaccumulating in aquatic life in middle-western and Scandinavian lakes, and Florida Everglades. To add the toxics from incinerator ash blocks as reefs would pose an additional impact to the marine environment.

g) Where are those blocks?

And finally, there is fear that ash blocks dumped into the water today will not be retrievable when the day comes that officials finally acknowledge their toxicity.

6. SUMMARY

In the final analysis, there is no reason or need to dump toxic ash in the waters, in landfills, or any other place. Any attempts at this time to accommodate incinerator ash only postpones the end of incineration on Long Island and its assault on our fragile environment. Despite massive regulatory discrimination against recycling, compared to governmental favors given to the incineration industry, recycling has overwhelmingly and rapidly increased. Incineration, on the other hand, perpetrates economic hardships on taxpayers and municipalities. And, worst of all, incineration has already introduced vast amounts of pollution into the lives of citizens and wreaked irreparable damage to our environment. Do not compound this impact by introducing toxic ash blocks.

Sincerely,

Dorothy Gibson

Dorothy Gibson
President

cc: Senator Owen H. Johnson
Assemblyman Maurice D. Hinchey
Commissioner Thomas C. Jorling, DEC
Regional Director Raymond Cowen, DEC

Recd MAY 15, 1992 S/T

NEW YORK PUBLIC INTEREST RESEARCH GROUP, INC.
10 Oakwood Road Huntington, NY 11743 516-673-5536 Fax 516-673-5539
OFFICES IN: ALBANY, BINGHAMTON, BUFFALO, CORTLAND, LONG ISLAND, NEW PALTZ, NEW YORK CITY, PURCHASE & SYRACUSE

May 12, 1992

Stephen W. Heins
Division of Marine Resources
NYS DEC
Building 40, SUNY
Stony Brook, NY 11790-2356

Dear Mr. Heins:

Thank you for the opportunity to present written comments on the Draft Generic Environmental Impact Statement (DGEIS) on the "Draft Plan for the Development and Management of Artificial Reefs in New York's Marine and Coastal District." This letter will supplement my oral statement made at the May 8, 1992 hearing.

The Toxics Project of the New York Public Interest Research Group, Inc. (NYPIRG) strongly supports the DGEIS's statement in opposition to the use of so-called stabilized incinerator ash for artificial reef construction. The Division of Marine Resources (DMR) is correct to express extreme caution regarding incinerator ash. We urge you to maintain your opposition, and to press your colleagues in the Division of Solid Waste to oppose the "beneficial use" of ash, as well.

In addition, DMR should act with the highest level of caution regarding artificial reefs, in general. Ash is not the only waste for which disposal is becoming increasingly difficult. The use of any waste in a reef, especially construction debris, highway debris, and old automobiles and tires, is tantamount to ocean disposal and could pose wholly unnecessary risks to the marine environment. Moreover, reefs should not be considered as a method of "mitigating" the loss or impairment of an existing natural habitat, regardless of the value or impact of the new habitat.

Allow me to detail our concerns regarding incinerator ash. When garbage is burned, it does not disappear. Instead, recyclable waste is transformed into toxic air emissions and contaminated ash residues. Depending on the efficiency of the incinerator, as much as 30 percent of the weight of the garbage which is burned remains as ash. Generally, the ash is generated in two ways. First, the heavier residue falls through the incinerator's furnace grate and is considered "bottom ash." This material typically accounts for as much as 85 percent of the ash. The second category, "fly ash," is created when the lightweight soot particles from the burning process are captured by filters and other air pollution controls. Fly ash is often collected and mixed with bottom ash, and the mixture is referred to as "combined ash."

Ash is far from the "inert and innocuous" or "special" material that DEC's Division of Solid Waste once carelessly considered it. One result of the incineration process is to concentrate the toxic heavy metals already contained in the garbage in the ash. These metals are elements; they are essentially indestructible. They also can be made more bio-available when concentrated in the ash.

Leachate tests of fly, bottom, and combined ash from incinerators across the nation typically produce levels of lead and cadmium which fail federal hazardous waste standards. Recent tests of ash dust from an ash treatment process at the Islip landfill revealed high levels of several known or suspected carcinogens, including lead, cadmium, chromium, and several polycyclic aromatic hydrocarbons.

Due to growing concerns over the toxicity of incinerator ash, the expense and difficulty of ash disposal has increased greatly. Incinerator owners and operators, along with the public officials

who support incineration, are desperate to find inexpensive, easy-to-use disposal sites for their ash. Five incinerators now operate on Long Island, three operate in New York City, several others are burning trash throughout the metropolitan area, and more are proposed. The Long Island incinerators, alone, burn almost 1.6 million tons of garbage, and generate roughly 400,000 tons of ash, per year. Some of this ash is dumped in landfills locally, some is trucked to distant sites, and some is "stockpiled" in anticipation of disposal alternatives.

Despite ash's toxic hazards, some researchers, state officials and others have proposed to mix ash with concrete and use the material in the creation of artificial reefs. The Long Island Regional Planning Board estimated in 1990 that as much as 4.9 million tons of ash could be used in artificial reefs on Long Island. Researchers at the SUNY at Stony Brook Waste Management Institute have suggested that "a single square mile of the ocean's bottom, in water 80 feet deep—approximately four miles off Long Island's south shore—could easily accommodate 30 million tons of blocks."[1] (Emphasis in original.) These researchers even suggest that roughly one million ash blocks could be used "to make a complete circuit around Long Island" to protect our coastal communities from being flooded from a rising sea level.[2]

These proposals are absurd, but indicate the wide-eyed zeal of those who would use ash in ways that disregard real environmental concerns. In contrast, based on NYPIRG's research and the investigations of numerous scientists and government officials, we have concluded that the use of incinerator ash in artificial reefs, and in any other so-called "beneficial" use, should be prevented. We are heartened that DEC's Division of Marine Resources also has expressed strong caution regarding the use of ash in artificial reefs.

The DGEIS is correct in assuming that solid waste disposal, not the protection and enhancement of fishery resources and the marine environment, is the primary goal of those who wish to use ash in artificial reefs. The one local example of an ash reef—the experimental reef in Port Jefferson's Conscience Bay—has been tested for its short-term toxic impact, but these initial tests provide no long-term assurances that the ash will not release toxic substances into the environment as the ash blocks wear away and break down over time. NYPIRG agrees with the concern presented in the resolution of the Atlantic States Marine Fisheries Commission, that "precipitous decisions will be made to use the ocean environment as a disposal outlet for unproven, potentially toxic waste products."

Given the uncertainty regarding the long-term stability of treated incinerator ash, coupled with the eventual fate of the toxic heavy metals contained in the ash, we strongly support DMR's decision to oppose the use of ash in artificial reef construction. We also support DMR's desire to be "intimately involved" with the permitting and oversight of any experimental ash reefs which may be proposed. Indeed, DMR should expand its current efforts to closely monitor the ash blocks which were dumped by Stony Brook researchers several years ago in Conscience Bay. If these blocks exhibit the slightest level of contamination of the surrounding marine environment, they should be removed immediately and disposed of at an approved hazardous waste site.

In addition, DMR should take an active role in preventing the use of ash in non-DEC artificial reefs, if any are allowed to be built. It is critical that any private effort not move ahead without DMR's input and veto power over the use of ash in such a project.

---

[1] Roethel, P. (1987). "Ash Disposal Solution is 2,000 Years Old." Waste Age, February 1987.

[2] Schubel, J.R., and R.L. Swanson (1988). "Can We Convert Garbage Ash Into an Asset?" From a prepared presentation to the 110 Action Committee, Huntington, NY.

In general, we urge DMR to view the proposed construction of any artificial reef with the highest level of caution. Reefs can too easily be viewed as a quick-fix method of dumping questionable materials which can pose long-term pollution hazards. In particular, the DGEIS's recommendation to prevent the use of construction and demolition (C&D) debris, white goods, vehicle bodies, asphalt, and tires must be followed rigorously. This should include close coordination with the Division of Solid Waste regarding their enforcement of transfer stations and disposal sites. The Division also should include continuous monitoring of waterfront barging and transfer operations in order to prevent the potential for midnight dumping via "garbage barge" type situations.

We also believe DMR should not allow the use of artificial reefs for any attempt to restore a lost or degraded habitat. We are highly concerned that such "mitigation" efforts can allow existing habitats or ecologically sensitive areas to be destroyed by development or other construction projects. We appreciate DMR's proposal to require that a mitigation reef be demonstrated for one year before a proposed project is begun. This may not be enough, however, to halt or delay a potentially damaging development project once it has begun moving through the regulatory process.

Finally, public input and participation in decisions related to proposed artificial reefs is absolutely critical. The DGEIS states that the "establishment of non-profit artificial reef foundations or corporations should receive highest priority." (p. viii) Yet certain non-profit corporations, such as public authorities and the Urban Development Corporation, have resulted in highly limited public participation and closed-door decision making. The Division should ensure that the public process is as open as possible.

In closing, I reiterate NYPIRG's strong support for DMR's caution regarding the use of incinerator ash in artificial reefs. Given the long-term environmental threats which ash can pose, we look forward to your continued opposition to the use of this material. If we can be of any assistance in this regard, please do not hesitate to contact us.

Thank you for the opportunity to offer these comments on the DGEIS. I would be glad to answer any questions my statements may have raised, and can be reached at the above address and phone number.

Sincerely,

Steven Romalewski
Long Island Coordinator

cc: Commissioner Thomas Jorling
Hon. Maurice Hinchey
Hon. Owen Johnson

CAPTREE QUEEN II

YEAR ROUND FISHING FROM CAPTREE STATE PARK GATEWAY TO THE GREAT SOUTH BAY

May 20, 1992

Rec'd
MAY 26
1992

N.Y. State Dept. of Environmental Conservation
Division of Marine Resources
Building #40, SUNY
Stonybrook, New York 11790-2356

Attn: Mr. Stephen W. Heins - Marine Fishing Access

Re: **Draft General Environmental Impact Statement - Artificial Reefs**

Dear Mr. Heins,

I operate the Captree Queen II out of Captree State Park and have personally fished the Fire Island Reef and wrecks offshore Fire Island for the last thirteen years.

I am in favor of N.Y. State proceeding as expeditiously as possible with the "Development and Management of Artificial Reefs in New York's Marine and Coastal District" as outlined in the April 1992 Draft Statement.

The Draft Statement is thorough and I have no major disagreements with the proposals. There are only two minor suggestions/considerations as follows:

1. Reef Locations: Consideration should also be given to ocean reefs in shallower water (40 - 60 ft.) constructed of low profile materials.

2. Sanctuary Areas: I strongly support the concept of these reefs being for recreational purposes (recreational fishing and diving) only and therefore being "off limits" to commercial net or pot fishing. Making areas of the reefs "sanctuaries" from all types of recreational or commercial use would seem virtually impossible to enforce, and unnecessary as well. All offshore reefs and wrecks are only fishable in good weather, and there are many unknown wrecks, reefs, etc. that act as "sanctuaries".

I would like to compliment the DEC on its efforts in producing what is a very thorough reef development plan. I hope it is implemented as soon as possible.

Sincerely,

Gordon G. Roman

CAPT GORDON ROMAN • 17 LAUREL ROAD • FREEPORT, NY 11520 • PHONE 516 - 623-0983

18 Harbor Road
St. James, NY 11780
May 8, 1992

To Division of Marine Resources
NYS Department of Environmental Conservation
Building 40, SUNY
Stony Brook, New York 11790-2356

Before commenting on the Draft Generic Environmental Impact Statement for the Development and Management of Artificial Reefs in New York's Marine and Coastal District (April 1992), I should like to thank you for drafting such a clearly written, well organized statement. Having tried myself to write a GEIS, I truly appreciate the nature and difficulty of your task. Further though I have not yet had time to consult the references you supply, I am grateful for your careful review of the literature.

I am concerned however that DEC may lack funding resources to carry out its objectives and meet its goals. Since existing DEC programs chronically suffer from underfunding, adequate and continuing sources of funds should be in place before any such new and ambitious program is undertaken. As I read the GEIS, I wondered also if it is appropriate for one government agency to carry out what are essentially legislative, administrative, and judicial roles—DEC will write regulations, grant permits, and enforce them—a difficult balancing act. In any event, I hope that your basic policies and actions will always be informed by your mandate to protect the environment for the use and enjoyment of this and all future generations.

These considerations apart, my comments are chiefly in the form of questions, questions that should, I believe, be addressed in the Final GEIS. Among the **Goals** enumerated (p. 21), one obvious and elementary one is

strangely missing, perhaps because it should go without saying: "to protect fishery resources and associated habitat." To reflect your commitment to responsible resource stewardship, this goal should be explicitly stated.

I am disturbed by Goal (b) "to enhance or restore fishery resources..." This appears to echo the Federal view (p. 25) that *any* artificial reef if properly constructed and managed is beneficial, even though research supporting this view is, at best, very limited (see p. 34, 56, etc).

When one restores or renovates (read "enhances") an old house to its former glory or some greater glory, one has old photographs, blueprints, and other knowledge on which to build. Such knowledge about marine ecosystems is small despite their importance in our lives. Exactly what resources are to be enhanced or restored? Fishermen with whom I have talked say that even more than pollution or loss of habitat, overfishing with the advent of modern technology is responsible for the decline in commercial and recreational fisheries. Will enhanced habitat reverse the decline? restore what is lost? or ?

Citizen Participation. (p. viii & 28) How will citizen support be encouraged? The suggestions given (page 29) I fear are inadequate, based on my experience. For example, on May 7—this week—I received from DEC an 8-page announcement of WATER WEEK (May 3-9), well-laid-out, interesting, attractive, but, typically, a bit late to maximize public participation locally. The budget item may appear as "citizen participation" but the result is not encouraging.

Presumably DEC reaches nonprofit citizen groups more efficiently. I read recently that a Shinnecock Environmental Reef Foundation has been organized by a local fisherman and manufacturer of sport fishing equipment. I take it that this is the type of non-profit group you envisage

as taking an active role in reef construction. Will non-member citizens be able to participate in that process?

What sort of corporations will participate as "citizens"? entities like the Urban Development Corporation or the Port Authority? Such entities of course prevent citizen participation even as their formation precludes legislative oversight. If DEC wishes to involve citizens, it would seem such monolithic corporations should not be encouraged or involved. Surrendering control of the resources of our marine and coastal districts to development entities is incompatible with citizen participation.

Materials. (p. 47 f) I am reassured that you do not intend that artificial reefs become solid waste dumps by another name, but what will become of reefs already constructed or being constructed with unsuitable scrap materials? I think for example of the asphalt rubble the River Project is rearranging as a "rocky reef" in the area south of Pier 40 on the Manhattan side of the Hudson River. For that matter is any one now monitoring the materials the Shinnecock Foundation or others are currently collecting?

How will the DEC be able to resist political pressures, which must surely grow, to deposit stabilized incinerator ash before adequate longterm studies are complete? What will be the criteria for siting experimental incinerator ash reefs (p. 52)? If no fishing will be permitted in such areas—presumably for health reasons—will any efforts be made to keep fish from feeding in such potentially toxic habitats?

Reefs in the Exclusive Economic Zone (p. 67f), DEC's powers to prevent adverse effects on the environment need strengthening (see policy: a) and b) p. 68). What happens if DEC objects to a destructive

development by another agency with goals or objectives at variance with the National Artificial Reef Plan?

Less theoretically, when is DEC going to develop a "policy governing the use of artificial structures as mitigation measures" (p. 70)? How will it respond to the plans of New York City's Public Development Corporation for the 269 acres of biologically productive habitat in the interpier area north of Battery Park City? Does DEC now have any power to implement a policy if it had one?

Mitigation. (p. 69 f) It seems that the original concept of mitigation is shifting away from preventing degradation of natural habitats to justifying the destruction of such habitats. DEC states (p. 71-72) "...artificial reefs could only be considered as mitigation if: a) impacts of proposed project are minor as determined by technical review; and b) the value of productive habitat generated as a result of the mitigation project exceeds the value of the habitat lost."

These statements raise many questions. For example, what has happened to the concept of cumulative impacts? How will DEC determine if the value of the artificial reef is greater than that of the natural habitat destroyed? Will this determination be based on economic values only?

Would construction of a marine reef be considered as mitigation for destruction of a coastal wetland? Can a patch reef with macroalgae be more "productive" than a comparable area of salt marsh? How would this be quantified? If a mitigation reef were constructed, is one year sufficient time for evaluation given the many variables involved. Elsewhere (p. 72) you note parenthetically that depending on input from other agencies "the time frame is likely to be modified" up? down?

Moving ahead to **Actions: Development (b)** (p. 83) what will the criteria be for selecting sites for artificial reefs so that the reef does not interfere with other activities or damage a significant natural habitat during or after construction.

As you note, "estuarine nursery grounds are more important than coastal reef habitat for juveniles of many reef species." (p. 14) Why then replace any existing estuarine habitat with an artificial reef? Recently I asked this question of representatives of the River Project. I was told that their reef project is an experiment and that no research data on urban estuarine reefs exists. Such a reef might attract landbased fishermen—a plus. It might ultimately empoverish the resource—a minus. But pilot projects generate excitement and take on a life of their own. (Think of the gamma ray project at Brookhaven Laboratories!).

But garbage in, garbage out—and DEC has enunciated a policy of no garbage. Stick to it. Thank you.

ΣS

Elizabeth Shepherd
Chairman
Environmental Conservation Board
Village of Head of the Harbor

THE ASSEMBLY
STATE OF NEW YORK
ALBANY

DEBORAH J. GLICK
Assemblymember 61st District
New York County

COMMITTEES
Children and Families
Governmental Employees
Governmental Operations
Social Services
Environmental Conservation

May 9, 1992

Thomas Jorling
Commissioner
Department of Environmental Conservation
Building 40-SUNY Stony Brook
Stony Brook, NY 11790-2356

Dear Commissioner Jorling,

I am writing in response to the Draft Generic Environmental Impact statement for the Development and Management of Artificial Reefs in New York's Marine and Coastal District.

My first objection to this Draft is the fact that it is a **generic** Environmental Impact Statement (EIS). The purpose of an EIS is to evalute specific proposals and alternatives at specific sites. I vehemently oppose the use of a generic EIS as a method of avoiding addressing specific concerns related to particular projects. In no way should this generic EIS be used as a substitute for an EIS on a specific artificial reef proposal. This is particularly true when I sincerely doubt that affected local communities have been made aware of this proposal -particularly when they may not know that they are to be affected.

The GEIS is not only generic it is absolutely vague and unsubstantiated on important issues. The GEIS attempts to use guesses and anecdotal information in place of scientific evidence. For example, on page 34 the GEIS does not state whether reefs actually increase fish production or simply attract fish so that they are more easily caught. Furthermore, they state they have not planned any formal performance monitoring. The purpose, as I understand it, is to provide scientific evidence which can be utilized in determining the effects of a proposal or alternatives. The lack of clear evidence supporting the necessity of an artificial reef would indicate to me that this is not a worthwhile endeavor.

My third objection is based upon my fear that by approving of this Generic Draft EIS the Department of Environmental Conservation is in effect allowing ocean dumping. I am aware of the quick mention of attempts to educate the public, but the GEIS fails to substantiate their claims that this is not an attempt to condone ocean dumping.(p.5) While specific forms of truly abhorrent artifcial reefs, such as motor vehicles and tires, are recommended against, the plan clearly states that certain artificial reefs are advised, but others could be adopted in their stead for mitigation purposes. (p.102) The GEIS also mentions Incinerator Ash with the caveat that it will not be used until questions are resolved.

JUN 15 1992

☐ DISTRICT OFFICE: 853 Broadway, Suite 2120, New York, New York 10003, (212) 674-5153, FAX (212) 674-5530
☐ ALBANY OFFICE: Room 432, Legislative Office Building, Albany, New York 12248, (518) 455-4841, FAX (518) 455-4649

(51-53) The GEIS makes no mention of the fact that the Marine Sciences Research Center of the State University at Stony Brook has utilized incinerator ash in at least two reef sites for experiments. (New York Times, December 7, 1989) This calls into question the accuracy of the GEIS.

My fears about this EIS were further fanned by the allusion to my own district -the West Side Waterfront of the Hudson River in Manhattan- and proposals to use artificial structures as mitigation measures. I was further shocked by the fact that the Department has no policy governing the use of such structures for mitigation measures. The Westway project -which the report was clearly alluding to- was finally halted in 1985 in direct response to the damage the reef would pose to the striped bass population in the Hudson River. (p.71-2) I am aware that construction or destruction materials are often dumped in our waters with permits from the Army Corps. of Engineers. (p.3)

My fifth concern is related to the "unavoidable adverse impacts." (p.99) According to the report artificial reef construction will result in smothering benthic organisms, the GEIS argues that this will be minimized due to their replacement with new organisms associated with the artificial reef. Other adverse impacts mentioned by the GEIS are: overfishing, damage to the natural habitat, and interruption of migratory patterns. What we are discussing here is irreparbly altering the food chain. I believe that these negative impacts are avoidable -we do not have to create artificial reefs. Why must we continue to repeat our past mistakes? When will we recognize that in every instance that we have disrupted or destroyed the flow of the food chain the results are horrendous. The food chain has a specific goal, ensuring sustenance to all connected to it. It is not our place to decide which organisms are dispensible or preferable. We should not be making choices of organisms based on which we would we would like to see more of for recreational fishing.

I believe that this GEIS is vague, lacks scientific evidence to support the positions taken and should therefore be dissaproved. I therefore adamantly oppose this Draft Generic Environmental Impact Statement. I would urge you to closely review this proposal and disapprove it.

Sincerely,

Deborah J. Glick

Deborah J. Glick
Assemblymember

The following document is a typed copy of the original, which was hand-written. It is typed exactly as written.

5/25/92

MR STEVE HEINS
NYS DEC

DEAR STEVE

THANKS FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT.

I HAVE THE FOLLOWING COMMENTS/SUGGESTIONS

1- A NUMBER OF REFERENCES ARE MADE TO SANCTUARY REEFS - EITHER BY NOT ALLOWING FISHING OR BY DESIGNING THE REEF SO THAT IT IS DIFFICULT TO FISH. PLEASE DON'T BE OFFENDED BUT THE FISHERMEN I TALK TO ARE ALL AWARE OF HOW LIMITED YOUR ENFORCEMENT CAPABILITY IS. YOU WOULD NEED A BOAT ON SITE AT ALL TIMES TO ENFORCE A NO FISHING RULE. MAKING THE REEF HAZARDOUS TO NORMAL ANCHORING CAN BE OVERCOME BY USING A CINDER BLOCK (SMALL BOATS) A REBAR GRAPLING HOOK ANCHOR THAT WILL BEND OR WELDING A RING TO YOUR ANCHOR SO THAT YOU CAN HAVE A TRIP MECHANISM TO RELEASE YOUR ANCHOR IF IT BECOMES STUCK.

MY SUGGESTION IS THAT WE INCREASE THE SIZE LIMITS - 12" FOR BLACKFISH IS OK BUT NO RECREATIONAL LIMIT FOR PORGIES AND SEA BASS **SHAME ON THE DEC** - ALSO THE EXISTING COMMERCIAL SIZE LIMITS OF 7" FOR PORGIES AND 8" FOR SEA BASS ARE FAR TOO LOW. A 10" SEA BASS WEIGHS ABOUT 1/2 # (YES I HAVE WEIGHED A 10" SEA BASS)

I THINK YOU HAVE A MUCH BETTER CHANCE OF PROTECTING A SPECIES OF FISH BY HAVING A REALISTIC SIZE LIMIT.

2- PAGE 46 STATES THAT "ARTIFICIAL REEFS SHOULD NOT BE SITED DIRECTLY ON TOP OF LIVE BOTTOM" I FULLY AGREE AND MY PERSONAL PREFERENCE IS THAT WE DO NOT PUT NEW MATERIAL DIRECTLY ON TOP OF AN EXISTING STRUCTURE

3- LOCATION OF NEW REEFS -
A- OFFSHORE SOUTHEAST OF CHOLERA BANKS 120 FEET
I BELIEVE THAT LARGE VESSELS TO BE SUNK OFFSHORE SHOULD NOT BE CONFINED TO A ONE SQUARE MILE AREA. INSTEAD I THINK THEY SHOULD BE SELECTIVELY SITED TO COMPLIMENT EXISTING WRECKS AND ALLEVIATE THE USUAL WINTER CONFLICT OVER THE USE OF WRECKS DURING THE CODFISH SEASON. I HAVE SOME VERY SPECIFIC IDEAS ON SITING OF THE WRECKS AND WOULD BE HAPPY TO DISCUSS THEM WITH YOU.

B- OCEAN ARTIFICIAL REEFS - INSHORE
I AGREE AND HOPE YOU ARE SUCCESSFUL BUT WHAT ABOUT WEST OF JONES INLET. THIS WOULD THEN GIVE EAST ROCKAWAY JONES F.I. & MORICHES A REEF EAST AND WEST OF THEIR INLETS

THANKS AGAIN FOR THE IMPACT STATEMENT

JOHN G. MIHALE
153 CALIFORNIA PLACE NORTH
ISLAND PARK, NY 11558

TOWN OF SMITHTOWN

TOWN SUPERVISOR
PATRICK R. VECCHIO

TOWN COUNCIL
EUGENE A. CANNATARO
MICHAEL J. FITZPATRICK
JANE E. CONWAY
SANDRA L. SGROI

Main Office (24 Hrs.) (516) 360-7514
Marina (516) 862-6663
Marine Patrol VHF Channel 16

DEPARTMENT OF
ENVIRONMENT &
WATERWAYS

RUSSELL K. BARNETT
SUPERVISOR

CERTIFIED MAIL
P 711 241 858

May 15, 1992

Mr. Stephen Heins
Bureau of Finfish and Crustaceans
N.Y.S.D.E.C., Building 40
SUNY at Stony Brook
Stony Brook, N.Y. 11790-2356

Re: Draft GEIS for the Development and Management of Artificial Reefs in New York's Marine and Coastal District

Dear Mr. Heins:

Regarding the above referenced document, I believe that the following areas need to be addressed:

1. Coordination with local government

   Coordination with local governments may greatly assist the DEC in such areas as site evaluation, reef design, and construction. Lack of state funding or DEC personnel should not unnecessarily delay new reef construction if local governments are willing and able to provide assistance in these areas.

2. Limitation of ash block usage to experimental reefs

   A great deal of literature exists regarding the use of stabilized oil ash, coal ash and incineration ash blocks in the marine environment, and a more thorough review of this literature should be undertaken by the DEC.

   In a study performed in Conscience Bay, N.Y., metal levels in biomass colonizing stabilized coal ash blocks were compared to metal levels in biomass on standard concrete blocks (Roethel et al., 1980; Parker et al., 1981). Both sets of blocks had been submerged for up to 22 months. Metal analysis for Cd, Pb, Cu, Cr, Zn, Se, and Hg showed no elevation in the levels of these trace metals in the biomass collected from the coal ash blocks as compared to the biomass on control blocks of concrete. In all cases where a significant ($P < .05$) difference in hydroid metal levels were observed, the biomass on the concrete blocks showed higher metal concentrations than those on the coal ash blocks.

Similar work was performed on stabilized incineration ash blocks placed in Conscience Bay (Breslin et al., 1988). After six months of block submergence, hydroids colonizing stabilized incineration ash blocks showed no significant difference in metal content when compared to hydroids that colonized concrete blocks. Subsequent data was also collected in this study, and should also be reviewed.

Bioassay studies have also been performed to assess the toxicity of leachates derived from both stabilized coal ash and stabilized incineration ash residues (Woodhead, 1985; McShane, 1991). Acute and chronic bioassays were performed for both the stabilized coal and incineration residues. Both studies concluded that exposure to the block materials was not likely to pose a hazard to organisms in the marine environment.

Prior to forming any policies regarding the use or prohibition of stabilized ash blocks in artificial reefs, the DEC should consider the results of these studies and other relevant studies in the literature.

Thank you for the opportunity to comment on this matter. Please feel free to contact this office if you have any questions or require further information.

Sincerely,

Kathleen McShane

Kathleen McShane
Environmental Analyst

LITERATURE CITED

Breslin, V.T., Roethel, F.J., and Schaeperkoetter, V.P. 1988. Physical and chemical interactions of stabilized incineration residue with the marine environment. Marine Pollution Bulletin, 19(11B), 628-632.

McShane, K.A. 1991. Bioassay studies of seawater leachates derived from incineration residues. M.S. Thesis, Marine Sciences Research Center, SUNY at Stony Brook, Stony Brook, New York.

Parker, J.H., Woodhead, P.M.J., and Duedall, I.W. 1981. Coal Waste Artificial Reef Program, Phase 3. Electric Power Research Institute, Palo Alto, California.

Roethel, F.J., Duedall, I.W., O'Connors, H.B., Parker, J.H., and Woodhead, P.M.J. 1980. The interactions of stabilized scrubber sludge and fly ash with the marine environment. Journal of Testing and Evaluation, 8, 250-254.

Woodhead, P.M.J. 1985. Coal waste in the sea II: toxicity tests with shrimp and winter flounder eggs and larvae. In Wastes in the Ocean Vol 4: Energy Wastes in the Ocean, pp. 585-596. Wiley-Interscience, N.Y.

Recd May 26 1992

STATE OF NEW YORK
DEPARTMENT OF STATE
ALBANY, N.Y. 12231-0001

GAIL S. SHAFFER
SECRETARY OF STATE

May 21, 1992

Mr. Stephen W. Heins
NYS Department of Environmental
Conservation
Division of Marine Resources
Building #40, SUNY
Stony Brook, New York 11790-2356

Dear Mr. Heins:

Thank you for submitting the Draft Generic Environmental Impact Statement for the Development and Management of Artificial (sic) Reefs in New York's Marine and Coastal District, April 1992. The New York State Department of State does not have any comments on the draft GEIS at this time.

The Department of State looks forward to receiving the final EIS for the Development and Management of Artificial Reefs in New York's Marine and Coastal District.

Sincerely,

William F. Barton
Chief, Consistency Review and
Analysis Bureau
Division of Coastal Resources
and Waterfront Revitalization

WFB/NK/mm

Recd 28 MAY 1992

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

MAY 22 1992

Steven W. Heins
NYS Department of Environmental Conservation
Building #40, SUNY
Stony Brook, NY 11790-2356

Dear Mr. Heins:

This letter is in response to your request for comments on the document entitled, **"Draft generic environmental impact statement for the development and management of artificial reefs in New York's Marine and coastal district"** that was prepared by the New York State Department of Environmental Conservation's (DEC) Division of Marine Resources. My staff in the Marine and Wetlands Protection Branch have reviewed this document and have included the following comments for your consideration.

We are pleased to see the modifications (from the 3/90 draft artificial reef plan) on pages 52 and 53 stating that the DEC will follow the Atlantic and Gulf States Marine Fisheries Commissions' resolutions that oppose the use of combustion/incineration ash products for artificial reef construction until such time as state or federal standards and guidelines are developed. The one exception cited in this resolution is for experimental applications.

We are also pleased that you recognize that the introduction of additional nutrients to the marine environment for fertilization of the reefs (pages 105 and 106) is not a good idea. It would not only be counterproductive to all of the efforts to reduce nutrient loadings to the marine waters, but also would appear to be in violation of the Clean Water Act, the Ocean Dumping Ban Act, and/or the Marine Pollution, Research and Sanctuaries Act.

Thank you for the opportunity to review the document. If you have any questions, please contact Robert Nyman of my staff at (212) 264-5565.

Sincerely,

Mario P. Del Vicario, Chief
Marine and Wetlands Protection Branch

APPENDIX J

DEC’S RESPONSES
TO SUBSTANTIVE ORAL AND WRITTEN COMMENT

DEC'S RESPONSES TO SUBSTANTIVE ORAL AND WRITTEN COMMENT.

(Note: DEC has grouped similar comments into ISSUE sections, each dealing with a specific element of the Plan/GEIS. Comments were edited and condensed for clarity. Some comments do not appear in their original form; some not at all. This was done to avoid duplicative responses. The original comments appear in the letters elsewhere in this appendix. Original transcripts of oral comments are archived at DEC's offices in Stony Brook.)

ISSUE 1: Compliance with SEQR

Comment: The purpose of an EIS is to evaluate specific proposals and alternatives at specific sites. This generic EIS is being used as a method of avoiding addressing specific concerns related to particular projects. In no way should this GEIS be used as a substitute for an EIS on a specific artificial reef proposal. The GEIS is also vague and unsubstantiated on important issues. Guesses and anecdotal information are used in place of scientific evidence. For example, on page 34 the GEIS does not state whether reefs actually increase fish production or simply attract fish so they are more easily caught. Furthermore, they state they have not planned any formal performance monitoring. The purpose of an EIS is to provide scientific evidence for use in determining the effects of a proposal or its alternatives.

Response: *The subject Generic Environmental Impact Statement (GEIS) is, in fact, a plan for development and management of marine artificial reefs as well as a GEIS. In accordance with 6NYCRR part 617, the regulations which implement the State Environmental Quality Review Act (SEQR), a generic environmental impact statement may be used to determine the effects of "an entire program or plan having wide application or restricting the range of future alternative policies or projects". The use of a GEIS is, in this case, wholly appropriate and necessary. The Department is not attempting to avoid addressing any issues or concerns relevant to either the artificial reef program or any specific artificial reef project. Each new reef project will be subject to a site-specific*

environmental assessment with full regulatory and public review. This intent is clearly stated in the Plan/GEIS (Section 4.1.1). As to the matter of public awareness of this activity, the Department fulfilled its obligations under SEQR for public notice, including: (1) mailing 300 copies of the Plan/GEIS with a Notice of Completion of Draft to all members of the state assembly and senate, county and local government offices in the affected area; (2) publishing the Notice of Completion of Draft in the Environmental Notices Bulletin (April 9, 1992); (3) paying for Newsday to publish a Public Notice (April 22, 1992); (4) sending news releases to newspapers, radio and television news offices in the affected areas; (5) holding two public hearings (May 8 and 11, 1992); and (6) making copies of the Plan/GEIS available to the general public upon request.

DEC disagrees with the assessment of the Plan/GEIS as vague and unsubstantiated. While several hundred reference documents were analyzed during preparation of the document, an effort was made to make it concise and readable. Several people who commented on the document told us that our objective had been achieved [including members of the Atlantic States Marine Fisheries Commission (ASMFC), Environmental Protection Agency, National Marine Fisheries Service, and members of other government agencies and environmental organizations]. The examples cited indicate that the commenter may have misunderstood or misread those passages. The statement regarding aggregation versus production of fish is taken from a section on research needs, rather than the discussion of impacts. The Department wanted to make it clear that this complex, unresolved issue is a priority in its research efforts. The effects on fish of their aggregation at artificial reefs is addressed in section 6.1.33 of the Plan/GEIS. Another example cited is that the Department has not planned any formal performance monitoring. The proposed monitoring program is detailed in Section 4.3.1 of the draft and has, in fact, begun on a limited scale.

Comment: There is doubt that affected local communities have been made aware of this proposal, and may not know that they are to be affected.

Response: *DEC complied with SEQR requirements in publishing the Notice of Completion of this document, including sending press releases to media in all affected communities. DEC has no control over the media's treatment of this issue. Please see the Hearing Report at the beginning of this section for a complete description of DEC's notification efforts.*

ISSUE 2: Program Goals and Objectives

Comment: What is the definition of a reef? Does this proposal include only submerged structures or intertidal structures as well?

Response: *For the purposes of the Plan/GEIS, our use of the term "reef" or "artificial reef" is limited to those structures placed in a subtidal marine environment with one or more of the objectives listed in Section 4.2.1. No reefs are currently proposed by DEC for the intertidal zone. We recommend that intertidal habitat provided by shoreline structures such as jetties and piers be evaluated as marine habitat (Section 4.3.41). These structures are designed and built with objectives other than those of our program, however. Therefore, they are defined as something other than reef or artificial reef.*

Comment: Among the goals enumerated on page 21, one obvious and elementary one is missing, perhaps because it should go without saying: "to protect fishery resources and associated habitat." To reflect your commitment to responsible resources stewardship, this goal should be explicitly stated.

Response: *It is the mission of the Division of Marine Resources to manage and maintain the State's living marine, estuarine and anadromous resources, and to protect and enhance the habitat upon which these resources depend,*

in order to assure that diverse and self-sustaining populations of these resources are available for future generations. The goals of the artificial reef program as stated in the Plan/GEIS are consistent with this mission and with the law. Environmental Conservation Law, section 11-0303, states, in part, that DEC must manage the fish and wildlife resources of the State; maintain, restore or improve important habitats; and make the resources available to the people of the State.

Comment: If the main reason for this reef program is to increase biomass of the fisheries resources in the area, shouldn't the reefs be sanctuaries and not fishing areas? There seems to be some objectives articulated for this program which are fundamentally in conflict. The purposes of the program must be more fully presented to illustrate how the conflict between enhancing fisheries and increasing fishing can be resolved. It seems that the only way to achieve such a balance is to commit to the increased staffing of the program for active management of these reefs.

Response: *As previously stated, the principal goal of the program is to provide new fishing and diving opportunities using artificial reefs. Each reef will have specific objectives, some of which may be best achieved by reducing or eliminating harvest of resources from the site. If a reef is to be built primarily to enhance a restore fishery resources, the best use of the site would be as a sanctuary and it would be managed as such. The application of this concept would require DEC to commit to: increased law enforcement activity; active management of the site; and an aggressive education and information program to obtain public support. DEC is developing these capabilities and will be ready to apply the sanctuary concept in the very near future.*

Comment: One of the goals of the program is "to enhance or restore fishery resources..." This appears to echo the view that any artificial reef if properly constructed

and managed is beneficial, even though research supporting this view is limited. Our knowledge of marine ecosystems is small despite their importance in our lives. Exactly what resources are to be enhanced or restored? Even more than pollution or loss of habitat, over-fishing with the advent of modern technology is responsible for the decline in commercial and recreational fisheries. Will enhanced habitat reverse the decline, restore what is lost, or what?

Response: *Though the enhancement or restoration of certain fishery resources is a goal of this artificial reef program, this can only be achieved by targeting specific objectives, by building reefs to obtain these objectives. Artificial reefs built to date by DEC have been constructed solely for fishery development. Some resource enhancement has been achieved, though not documented. If specific restoration or enhancement needs are identified that can be satisfied with artificial reefs, DEC can respond within the framework of the existing program and Plan/GEIS. Some possible uses are listed in Sections 4.2.1 and 4.3.41.*

Comment: Since extensive use of such reefs by commercial fishermen, party boats or organized diving groups could exert greater pressure on newly aggregated fisheries and other marine resources than previously possible when fishing or diving spots were more dispersed, what is the actual potential for further stress on presently overexploited resources? How would the DEC propose to guard against such impacts if they are possible?

Response: *As discussed in section 6.1.33 of the Plan/GEIS, artificial reefs do not always result in increased fishing mortality. Reef-dependent species are mostly aggregated in existing habitat rather than dispersed. As artificial reefs are developed, fish can move to the new habitat. Additionally, changes in fishing patterns occur as new locations are added, distributing fishing pressure. DEC has to manage the stocks of existing fishing resources, many of which are over-harvested, with or without artificial reefs. Artificial reefs can be used as a management tool if DEC is allowed to*

restrict the use of them. Completion of this Plan/GEIS is part of the mechanism required to do so.

Comment: The reference to "estuarine reefs" is misleading since all of the marine district in New York City would be within areas considered part of the estuary. Specifically of concern though is the reference to new reefs in shallow areas. A reef in a past or present eelgrass bed could not "...provide a substitute for this lost habitat." It could provide only a few of the many specific characteristics of an eelgrass bed, namely fish cover or resting areas and some food (but not the same diversity of food). Siting artificial structures in shallow areas could seriously disrupt the nursery or vegetative nutrient cycling in the area by attracting significant angler or diver use.

Response: *DEC agrees that an artificial fishing reef in a bay is no substitute for productive vegetated areas. Properly designed, sited and managed artificial habitat may, however, provide some of the benefits of vegetated areas. This application of artificial habitat technology is in an early phase of development. DEC will not propose or support any full-scale project without obtaining the results of experimental work conducted in local estuarine systems. Even then, artificial reef construction will be subordinate to habitat protection and restoration of natural systems. Additionally, any artificial habitat constructed for such purposes would be off-limits to exploitation. All of this does not mean that DEC will not construct artificial fishing reefs in bays and the Sound. Artificial reefs can be built which provide all of the functions of their ocean counterparts. The artificial reefs in Smithtown Bay and the Great South Bay are examples. DEC will need to be cautious in siting more reefs in estuarine systems however, in order to guard against potential adverse effects on the nursery function of these systems.*

Comment: According to the report, artificial reef construction will result in smothering benthic organisms. The GEIS argues that this will be minimized due to their

replacement with new organisms associated with the artificial reef. Other adverse impacts mentioned by the GEIS are: over-fishing; damage to the natural habitat; and interruption of migratory patterns. What we are discussing here is irreparably altering the food chain. These negative impacts are avoidable--we do not have to create artificial reefs. Why must we continue to repeat our past mistakes? When will we recognize that in every instance that we have disrupted or destroyed the flow of the food chain the results are horrendous. The food chain has a specific goal--ensuring sustenance to all connected to it. It is not our place to decide which organisms are dispensable or preferable. We should not be making choices of organisms based on which we would like to see more of for recreational fishing.

Response: *DEC disagrees with the view that artificial reef construction is destructive and a mistake. We believe that, as outlined in the Plan/GEIS, limited artificial reef development can provide increased fishing opportunities while stimulating marine productivity. The hard structure of an artificial reef provides a substrate for the natural development of communities of organisms normally associated with rocky or rough marine habitat. As stated in the Plan/GEIS, this productivity can be maximized through manipulation of design parameters and proper siting. Impacts on non-reef biota are minimized by siting reefs to avoid highly productive and important benthic habitats such as surf clam or mussel beds and natural rocky bottom.*

Comment: The lack of clear evidence supporting the necessity of an artificial reef indicates that construction of the reef is not worthwhile.

Response: *This is true. Artificial reef construction is expensive. Construction of an artificial reef where one is not needed or wanted is a waste of effort and resources.*

Artificial reefs have been built in New York, and around the world, based on local and regional needs or desires. Their benefits to the reef-dependent

fisheries are well-established. The first step in planning an artificial reef is the definition of the users and purpose for building one. In New York, artificial reefs are built to enhance the fisheries for such species as tautog, black sea bass, scup, cod and lobster. There are established user groups, including anglers, party and charter boatmen, SCUBA divers and commercial fishermen. DEC is responding to the needs of these groups for fishery development. These groups, along with state and federal agencies and local governments, feel that artificial reef construction is very worthwhile. DEC is currently documenting usage patterns and fish catches on artificial reefs which will be used to analyze the economic and social value of its existing reef system.

ISSUE 3: DEC's Financial Ability to Implement the Program

Comment: DEC may lack funding resources to carry out its objectives and meet its goals. Since existing DEC programs chronically suffer from under-funding, adequate and continuing sources of funds should be in place before any such new and ambitious program is undertaken.

Response: *DEC's artificial reef program has been in operation since 1962. Funding has always been minimal, enough to keep the program staffed for inspections, deployments and obtaining permits. Recently, the State's share of federal funding has increased, through expansion of the Federal Aid in Sportfish Restoration fund (better known as Wallop-Breaux). With this expansion, the potential exists for new initiatives in monitoring the existing artificial reefs and constructing new ones. Indeed, limited monitoring of reef fisheries commenced in 1988 and is expanding. As the program commitments expand, DEC anticipates being able to keep up with funding requirements. This is particularly true if the reef-utilizing public contributes to the cause through foundations or organizations.*

Comment: DEC's effort in protecting existing natural habitats is woefully underfinanced. Those natural systems are the ones that work, the ones that nature has perfected and the ones that need protection. Funding that would go into artificial reef construction should be dedicated to DEC's top priority, which should be saving all the productive natural habitat that's left.

Response: *DEC agrees that its highest priority is protection of the environment. A large proportion of its resources is devoted to that task. DEC has additional responsibilities, one of which is to provide access to resources by those who would use them. Marine artificial reef construction qualifies in this regard, with the additional benefit of increasing certain types of marine habitat. As stated in the previous response, DEC anticipates utilizing dedicated funding for the artificial reef program. Funds contributed by the public for use in artificial reef construction would be used solely for that purpose. Federal funds dedicated to sportfish restoration can be used, in part, to fund fishing access programs like DEC's artificial reef program.*

ISSUE 4: Administration

Comment: If any more artificial reefs are to be built, only DEC should be allowed to build them. In addition, each new reef should have to go through an individual permit process with full public review and full environmental assessment and the exploration of alternatives. If a certain goal is desired, state that goal and explore the alternatives for achievement.

Response: *DEC agrees with the statement that only DEC should build artificial reefs. This is consistent with the policy stated in section 4.1.1. DEC also agrees that proposed new artificial reef sites should receive public and agency scrutiny. This is assured by the SEQR process.*

There may be some confusion about what a blanket permit will allow DEC to do. A blanket permit, if one

is issued, would cover only those sites for which DEC had previously held permits. The permit will not be issued until the full SEQR process is completed, including a Final Plan/GEIS. The permit would allow DEC to add materials to the site as part of a construction/maintenance program. Only approved materials would be used. All work would be done in accordance with the guidelines in this Plan/GEIS. If DEC, with approval from NY Office of General Services, seeks to develop an additional reef site, we must request a modification of the blanket permit to incorporate the new site. If the proposed new reef would be built in accordance with the accepted Final Plan/GEIS, with approved materials, no further EIS is required. The application for permit modification is, however, subjected to the same regulatory and public review as the original permit application. Artificial reefs need permits from the US Army Corps of Engineers and, in State waters, NYS DEC Division of Regulatory Affairs. They are subject to review during the application process by NYS DEC Marine Habitat Protection and other programs; NYS Department of State; US Fish and Wildlife Service; US Coast Guard; National Marine Fisheries Service; and US Environmental Protection Agency.

Comment: Is it appropriate for one government agency to carry out what are essentially legislative, administrative and judicial roles. DEC will write regulations, grant permits and enforce them--a difficult balancing act.

Response: *DEC agrees that its function as the State environmental protection agency is a challenging job. The different aspects of this job--regulation, enforcement, resource management--are carried out by separate and distinct divisions, bureaus and programs with various duties and responsibilities. The specific action of artificial reef construction is carried out by one program within the Division of Marine Resources. Although we work within a single agency toward the same goals, we must apply for permits from, be regulated and monitored by different units within the agency. We are regulated as well by the Federal government. In this respect, we*

are treated no differently than any private individual. In fact, we hold ourselves to a higher standard because of our responsibilities.

Comment: DEC's powers need strengthening. What happens if DEC objects to a destructive development by another agency with goals and objectives at variance with the National Artificial Reef Plan?

Response: *DEC's authority over artificial reef construction is derived from the ECL, section 11-0303 (see Section 1 of the Plan). No entity other than DEC may build artificial reefs if their construction will impact marine resources. The State's role in reef development outside its territorial sea stems from its responsibilities for marine fisheries management. Federal agencies involved in permitting artificial reef activity recognize DEC's artificial reef program as best suited to oversee these activities in Federal waters. They give our comments considerable weight in matters such as non-DEC applications for reef permits.*

Comment: Is it an appropriate circumstance for the DEC to issue itself a blanket 401 Water Quality Certification (WQC) when typically there would be an individual analysis and WQC for each proposed action? Such an individual process would be the normal way to notify the public and local governments that such a proposal is being considered. How is the SEQR review for this blanket WQC considering the cumulative impact of this program if an initial survey of the present "reef" habitat and the "future built reef habitat" have not been completed?

Response: *The initial request for blanket permits from DEC and the US Army Corp of Engineering(ACE) covers all existing DEC artificial reefs. These reefs were originally built under individual permits issued to DEC Division of Marine Resources by DEC and ACE. The permit process allows public and agency review of the new application covering previously approved activity and sites. Any additional sites requested by DEC will be added to the blanket permit via modification, a*

process that will require public and agency review of the new proposal. The blanket permit system is DEC's attempt to simplify administration of the permits, not escape regulatory and public scrutiny.

DEC complied with SEQR in preparation of this Plan/GEIS and in the permit application process. The current permit covers only existing artificial reef sites and contains an inventory of existing reef structure for each site, as well as plans for improvements to the sites. Any consideration of potential impacts will involve the information included in the permit application and that in the Plan/GEIS.

In addition, DEC is continuing to expand its information base. In 1992, we began side-scan sonar surveys of all existing reef sites, direct observation of usage patterns, and a creel census. In 1993 we plan to couple videography with the side-scan surveys in order to document reef condition and community development.

Comment: Is it appropriate that all reef construction would be covered under only one Coastal Zone Management Review performed for this one permit action? It is possible that the placement of a reef, while water dependent, might affect other uses in the area or may be proposed in a significant coastal fish and wildlife habitat without additional review.

Response: *As previously stated, all existing reefs will be covered under the initial application process, reviewed by Department of State for consistency with coastal management policy. All new reef sites will require modification of that permit, with the requisite regulatory and public review. The siting of new reefs will be accomplished according to DEC guidelines (Section 4.2.1 of the Plan/GEIS) through the permit modification process. Artificial reefs are incompatible with a number of other water uses, but significant coastal fisheries habitat is not one of them. Many of the areas designated as significant coastal fisheries habitat are heavily fished and one area has existing artificial reefs (Great South Bay).*

Comment: How is a structure's effectiveness as a "reef" evaluated? Is the reef's worth or effectiveness defined by the habitat it provides? If so, how will the overall evaluation of such needs for the region be determined? There should be a clear understanding of the fisheries management needs of the region prior to a blanket permit issuance if such a permit removes the opportunity for site-by-site review of new reefs or significant modifications of old reefs.

Response: *Artificial reefs built under DEC's program must meet the goals and objectives outlined on pages 21 and 22. The primary goal is to provide new fishing and diving opportunities using artificial habitat. This is a social goal with specific performance criteria that we can measure. The reefs will be evaluated to see if this goal is met by collecting data on the reef users through direct observation or interviews. Reef users are expected to benefit in one or two ways: (1) increased recreational benefit (eg. higher catches) with no increase in travel costs; or (2) some benefits with a reduction in costs. Collecting data from the users will enable DEC to conduct a cost/benefit analysis to determine reef performance.*

A secondary goal of the program is to use artificial reefs to "enhance or restore fishery resources". The resources benefitting from addition of structure to the marine environment are those that can exploit the reefs as feeding, shelter, spawning and nursery areas. These species are generally non-migratory and reef-dependent during some or all of their lives. Assuming that structure placed in the marine environment provides the functional equivalent of rocky or rough bottom habitat, any artificial reefs built in areas devoid of this habitat should increase the number of reef-dependent animals in the area and not simply redistribute existing ones. The magnitude of this productive effect depends upon a number of variables, including: availability of natural reef habitat; fishing intensity; population dynamics; reef dependency; and behavior (Bohnsack, 1989).

There has been little satisfactory evaluation of the "aggregation versus production" issue. DEC is

keenly interested in the issue but lacks the resources necessary for the desired resolution. There has, therefore been no evaluation of the needs for artificial reefs in the region from the standpoint of habitat enhancement. The need for artificial reefs is a social one and DEC is responding to public demand.

DEC has asked for a blanket permit for artificial reefs constructed under the State program according to regulatory and program guidelines. It is not our intent to avoid regulatory and public scrutiny of individual projects or the overall program. The requested permit system should streamline and simplify the process through which DEC administers its program. Site-by-site descriptions and plans are part of the original permit application. Expansion or alteration of the bounds of any existing sites would require permit modification. Addition of new reef sites will require a modification to any blanket permit with accompanying regulatory and public review. Existing reef sites will be maintained under the permits, with addition of structure to the reefs coordinated and supervised by DEC and other federal or state agencies if required.

Comment: It is indicated in the GEIS that illegal or destructive practices (improper fishing, diver damage, etc.) on artificial reefs will be prosecuted. If this is not a regulatory program, does DEC have the authority to actually apprehend, issue violations and prosecute? Under what authority?

Response: *The Plan/GEIS is very clear as to DEC's intentions toward the problem of destructive fishing practices. The policies in Section 4.3.45 state that "DEC will research the need for legislation that outlaws destructive fishing techniques...". If and when we have the legal authorities we will "prosecute any violators to the fullest extent of the law." Under existing statutes, no one may construct artificial reefs or place anything in any marine waters, without first obtaining permits from the State (Environmental Conservation Law, Article 15, Section 15-0505) and Federal governments (Section 10, River and Harbor Act of 1899; Section 404 of Public Law 92-500).*

ISSUE 5: Citizen Participation/Public Involvement

Comment: How will citizen support be encouraged? The suggestion given on page 29 are inadequate. It is assumed that the recently found Shinnecock Environmental Reef Foundation is the type of organization that DEC envisions as taking an active role in reef construction. Will non-member citizens be able to participate in that process? What sort of corporations will participate as "citizens"? Entities such as the Urban Development Corporation in the Port Authority prevent citizen participation even as their formation precludes legislative oversight. If DEC wishes to involve citizens, it would seem such monolithic corporations should not be encouraged or involved. Surrendering control of the resources of our marine and coastal districts to development entities is incompatible with citizen participation.

Response: *Section 4.1.3 of the Plan/GEIS lists several ways that interested members of the fishing and diving public (called "interested groups") would be encouraged to take an active role in the artificial reef program. It is assumed that only these groups and individuals will be interested in facilitating the development of artificial reefs consistent with the goals and objectives of the reef program. Presumably, the non-user public is likely to be less interested in artificial reefs for fishing and diving but more interested in reefs as sanctuaries. DEC does not envision development corporations becoming involved in supporting reef construction by DEC. Instead, corporations like fishing tackle manufacturers, fishing magazine publishers, bait and tackle shops, SCUBA shops and not-for-profit organizations (like the Shinnecock Environmental Reef Foundation) will be encouraged to become involved. DEC will solicit participation in the most cost effective ways, which means targeting groups rather than individuals. This does not mean individuals will be ignored; public notices, press releases and newsletters will reach many.*

Comment: Public input and participation in decisions related to proposed artificial reefs as absolutely critical. The DEC should ensure that the public process is as open as possible.

Response: *DEC agrees. Every effort will be made to notify the public of new reef proposals.*

Comment: Organized groups such as the Long Island Divers Association should be encouraged to participate. Volunteer divers could assist in siting and monitoring artificial reefs.

Response: *Divers of several affiliations, including the American Littoral Society and Long Island Divers Association, have been invaluable in assisting DEC with siting and evaluating artificial reefs. This has been true despite the fact that artificial reefs are built primarily for New York's recreational anglers. There are some impediments to the development of a formal relationship with volunteer divers, and with constructing artificial reefs for divers. These are liability issues that may or may not be resolved in favor of diver participation. DEC will make every effort possible to facilitate participation in the program by volunteer divers and to accommodate their needs in siting, designing and constructing reefs.*

Comment: Coordination with local governments may greatly assist the DEC in such areas as site evaluation, reef design and construction. Lack of state funding or DEC personnel should not unnecessarily delay new reef construction if local governments are willing and able to provide assistance in these areas.

Response: *DEC agrees. Section 4.1.3 reflects the opinion expressed in this comment.*

ISSUE 6: Research

Comment: The City University of New York should also be involved as collaborator with SUNY and others for the research

aspects of the program.

Response: *DEC agrees that CUNY should be given opportunity to participate in any artificial reef research efforts. The policy in Section 4.1.7 is not exclusive; SUNY and SeaGrant were listed as examples.*

ISSUE 7: Siting of New Artificial Reefs

Comment: What will the criteria be for selecting sites for artificial reefs so that the reef does not interfere with other activities or damage a significant natural habitat during or after construction?

Response: *Section 4.2.1 details the concerns and issues that must be considered when siting a new reef. As stated in this section, DEC will evaluate these factors, comply with all permit requirements and work with public input before siting new reefs. Additionally, each individual prospective site will be surveyed before construction is considered.*

Comment: As you note, "estuarine nursery grounds are more important than coastal reef habitat for juveniles of many reef species" (p.14). Why then replace any existing estuarine habitat with an artificial reef?

Response: *DEC has no intention of replacing existing estuarine nursery habitat with artificial reef habitat. As stated in Section 5.2, we will investigate the potential of using habitat as a means of enhancing or restoring important nursery habitat.*

Comment: Where in the "Lower Bay" and "Rockaway Inlet" are reefs proposed (pp. 85-86)?

Response: *No sites have been specified. These areas have been selected because of the demand by anglers in the New York City area and the need for artificial reefs more accessible by small boat anglers. At such time as DEC is ready to pursue the matter, we will work closely*

with local communities and agencies toward securing the best locations.

Comment: Large vessels to be sunk offshore should not be confined to a one-square-mile area. Instead, they should be selectively sited to compliment existing wrecks and alleviate the usual winter conflict over the use of wrecks during the codfish season.

Response: *DEC agrees with this concept; however, the process of obtaining permits forces us to be frugal with our permit applications. Two or three sites where more than one vessel could be sunk is more cost effective than a dozen or more individual sites with separate permit processes.*

Comment: Artificial reefs should be sited, where possible, to allow access for divers from the shore.

Response: *DEC agrees, although measures must be taken to prevent conflicts between shore divers and boat anglers.*

Comments: A new reef should be sited west of Jones Inlet and east of East Rockaway Inlet.

Consideration should be given to ocean reefs in shallower water (40-60 ft.) constructed of low-profile materials.

Artificial reefs should also be built in 25-to-30-foot depths. These reefs seem to hold more fish in the summer than reefs in deeper water.

A new reef should be built in Raritan Bay to provide more habitat and a place to fish in bad weather. It could also help to reduce illegal trawling activity in the Bay.

Response: *All suggestions for reef siting are appreciated. DEC will consider this information during the planning phase for new reef sites.*

ISSUE 8: Materials Criteria and Standards

Comment: What will become of reefs already constructed or being constructed with unstable scrap materials? Is anyone monitoring materials the Shinnecock Foundation or others are currently collecting?

Response: *To the best of our knowledge, no one is stockpiling materials to be utilized as reef substrate. DEC has, in the past, examined many materials proposed for use as reef substrate. We continue to inspect and accept materials according to the guidelines of this Plan (Section 4.2.2). By adhering to these standards, developed through years of reef construction by DEC, problems with unsafe or unstable materials have been avoided. During this process, some materials were introduced that became problematic. The use of these materials was discontinued and any threats to the environment or public health and safety were eliminated by DEC. These actions included the removal of tires and floatable materials from the water and/or beaches.*

Comment: The use of any waste in a reef, especially construction debris, highway debris, and old automobiles and tires, is tantamount to ocean disposal and could pose wholly unnecessary risks to the marine environment. We urge DMR to view the proposed construction of any artificial reef with the highest level of caution. Reefs can too easily be viewed as a quick-fix method of dumping questionable materials which can pose long-term pollution hazards. In particular, the DGEIS's recommendation to prevent the use of construction and demolition (C&D) debris, white goods, vehicle bodies, asphalt, and tires must be followed rigorously. This should include close coordination with the Division of Solid Waste regarding the enforcement of transfer stations and disposal sites. The Division also should include continuous monitoring of waterfront barging and transfer operations in order to prevent the potential for midnight dumping via "garbage barge" type of situations.

Response: *DEC shares the concerns that artificial reef construction not be used as an excuse for ocean disposal. As DEC will be the only entity building artificial reefs for fishing and diving, all such reefs will be built to the standards outlined in this Plan/GEIS. Any scrap or waste material used on the reefs will be subject to those standards. The objectives for artificial reefs built by DEC do not include waste disposal (Section 4.2.1). Only materials that meet our standards and can be safely used to achieve our program objectives will be considered as reef substrate. Any unauthorized at-sea disposal of any material is illegal, whether it occurs on DEC's permitted sites with acceptable materials or not. Such activity constitutes violations of sections of New York Environmental Conservation Law as well as Federal law. New York environmental conservation officers enforce such laws in the Marine and Coastal District, as do the US Coast Guard and local marine police.*

Comment: What type of evaluation of the material (visual, testing results, etc.) would be instituted to assure that <u>all</u> materials used are safe and will <u>remain safe</u> for the environment in which they are deposited. Since the GEIS states that the DEC would retain no liability for the reef, any potential future need for remediation or clean-up of materials damaging to the environment would, in the worst case, fall to a local government. How would DEC's program guard against such a situation?

Response: *The comments about DEC's responsibilities to provide safe, environmentally compatible materials for artificial reefs can be answered in part with our SPECIAL CONDITIONS imposed upon any donor of reef material (Appendix F). DEC will only accept materials with a proven record of compatibility with the marine environment, such as steel and concrete. DEC has the means to screen materials, monitor their deployment, and inspect them on site. It is therefore unlikely that any hazardous materials will be placed on DEC's reefs.*

The history of DEC's involvement with artificial reef construction holds examples of our commitment to

responsible management. When automobile tires began washing upon ocean beaches in the early 1970's, DEC's reef program was blamed. We immediately discontinued the ocean tire reef program and cleaned up the tires despite the lack of clear evidence that the mess was the fault of DEC. When certain wooden vessels placed on our reefs failed, DEC acted swiftly to remove and eliminate any threat to health, safety or the environment. DEC has responsibly supervised its reefs and will continue to do so.

Comment: Construction or destruction materials are often dumped in our waters with permits from the Army Corps of Engineers (p.3). By approving this GEIS, the DEC is, in effect, allowing ocean dumping. Though the GEIS states that attempts will be made to educate the public, it fails to substantiate the claims that this is not an attempt to condone ocean dumping (p.5). The plan clearly states that, though specific materials such as motor vehicles and tires are advised against and others recommended, others could be adopted in their stead for mitigation purposes (p.102).

Response: *DEC disagrees with this assessment of the artificial reef program. The program objectives and standards are clearly defined in the document. The accusation that this program is a cover for ocean dumping is unfortunate and troubling. The last statement is a misinterpretation of DEC's proposed alternatives to the use of recommended materials. Nowhere in the document is the statement in the above comment made. Instead, the referenced section explores alternatives to the use of recommended materials, rejecting those alternatives for specific reasons that are clearly stated in the section. Additionally, the use of the word mitigation here is confusing, and we cannot decipher its meaning in this context.*

Comment: Since the GEIS acknowledges the DEC's present lack of staff for this program, how would DEC evaluate, test, and monitor the materials to be used for such reef installation, and the installations themselves?

Response: *DEC's existing staff has been sufficient to provide inspection and oversight of deployment of artificial reef materials. All materials are inspected by DEC staff prior to deployment; vessels are inspected by US Coast Guard as well. Program guidelines ensure that only clean, stable materials are used. All deployments of reef materials are currently witnessed and supervised by DEC staff. The current rate of construction, approximately four to six deployments per year, is very manageable using existing staff. Should this rate increase, DEC will operate the program at the level necessary to ensure that program guidelines are observed, even if that means turning away offers of material.*

ISSUE 9: Draft Policy Regarding the Use of Stabilized Ash Products on Reefs.

Comment: The stabilized incinerator ash issue was not sufficiently addressed in the GEIS. DEC will no doubt be using the material on its reefs in the future. DEC should summarize all the research that's been done and discuss the results of the projects that have been done in New York's waters.

Response: *The DEC believes that, for the purposes of this document and the proposed continuation of the existing artificial reef program, the issue of stabilized ash products as reef material was sufficiently addressed. The assumption that DEC will definitely be using ash blocks on its reefs is not a valid one.*

In order for DEC to construct artificial reefs, we must first obtain permits from US Army Corps of Engineers and NYS DEC, and approvals from the Department of State, and Office of General Services. If and when the permit(s) is issued, it will contain conditions under which DEC, as permit holder, must operate. Any changes in the way DEC conducts its program will require modification to the permit. The use of stabilized ash as a reef material would result in the type of change that would require modification to the permit. The modification process, reviewed by

the agencies listed above, would result in a request for an environmental impact statement (EIS) before review of the application could begin. The preparation of an EIS does not guarantee that a modification would be granted.

Comment: Ash residue from incineration of municipal solid waste contains elevated levels of heavy metals and organic compounds. Leachate tests performed on ash typically produce levels of lead and cadmium that fail federal hazardous waste standards. Based on NYPIRG's research and investigations of numerous scientists and government officials, we have concluded that the use of incinerator ash in artificial reefs should be prevented. There are no assurances that ash is stable or safe in the long term, either on land or in the water. DEC should not even allow the use of stabilized ash on experimental artificial reefs as this would simply allow the industry to get their "foot in the door".

Response: *DEC agrees that there are potential problems with ash and stabilized ash which must be fully understood before any decision is made. We do not, however, feel that a ban on experimental ash use on artificial reefs is necessary to ensure public health and safety. DEC's policy as written in Section 4.2.2 of the Plan/GEIS is a prudent one based upon our analysis of the available test results, scientific literature, public attitudes, artificial reef needs and the Atlantic States Marine Fisheries Commission resolution (Appendix G).*

Comment: DEC should take an active role in preventing the use of ash in non-DEC artificial reefs, if any are allowed to be built. It is critical that any private effort not move ahead without DEC's input and veto power over the use of ash in such a project.

Response: *DEC's role in the permitting of ash use on non-DEC artificial reefs is the same as with any proposed non-DEC reef (Section 4.3.3). This policy prohibits construction of artificial reefs by anyone other than DEC.*

Comment: How will DEC handle the pressure to use stabilized incineration ash on artificial reefs before sufficient long-term data are collected? What criteria will be used in siting experimental ash reefs? If DEC will prohibit fishing on experimental ash reefs, presumably for reasons of public health and safety, how will DEC prevent fish from feeding on the reefs?

Response: *DEC believes that existing policies and authority are sufficient to prevent actions on stabilized ash reefs without clear understanding of the environmental, social and economic consequences of such action. Any experimental reef will be sited similar to existing artificial reefs, according to this Plan/GEIS. Experimental reefs would be used to assess environmental impacts, particularly over the long term. By prohibiting fishing on these reefs, the DEC would allow research conducted on relatively undisturbed fish populations.*

Comment: The GEIS states that incineration ash will not be used until questions are resolved, yet does not mention two experimental reefs built of stabilized ash by Marine Sciences Research Center of SUNY Stony Brook. This calls into question the accuracy of the GEIS.

Response: *DEC disagrees with this statement. A full discussion of the research conducted on stabilized ash reefs is not necessary for this GEIS, since the material is not being considered for use in the program. At such time as stabilized ash products are proposed for this program, a full research analysis would be part of a necessary EIS.*

Comment: A great deal of literature exists regarding the use of stabilized oil, coal and incineration ash blocks in the marine environment. A more thorough review of this literature should be undertaken by the DEC prior to forming any policies regarding the use or prohibition of these blocks on artificial reefs.

Response: *DEC conducted a thorough literature review prior to drafting the policy contained in the Plan/GEIS. Factors other than the results of these studies were also considered during preparation of this document. These factors included: 1) potential long-term effects of a program that would put large amounts of the material in the marine environment; 2) public perceptions and interests; 3) program needs for reef materials; 4) current practices and standards for acceptance of reef materials nationwide; and 4) the ASMFC and GSMFC resolutions in opposition to the use of stabilized ash products on artificial reefs except for experimental purposes. The policy contained in this Plan reflects the analysis of all these factors and will stand as written.*

Issue 10: Mitigation.

Comments: It seems that the original concept of mitigation is shifting away from preventing degradation of natural habitats to justifying the destruction of such habitats. DEC states that artificial reefs could only be considered as mitigation if: a) impacts of proposed project are minor as determined by technical review; and b) the value of productive habitat generated a result of the mitigation project exceeds the value of the habitat lost. What has happened to the concept of cumulative impacts? How will DEC determine if the value of the artificial reef is greater than that of the natural habitat destroyed? Would construction of a marine reef be considered as mitigation for destruction of a coastal wetland? Can a patch reef with macroalgea be more "productive" than a comparable area of salt marsh? How would this be quantified? If a mitigation reef were contacted, is one year sufficient time for evaluation given the many variables involved?

When is DEC going to develop a policy governing the use of artificial structures as mitigation measures? Does DEC now have any power to implement a policy if it had one?

Reefs should not be considered as a method of mitigating environmental damage, regardless of the value of the new habitat. Such mitigation efforts can allow existing habitats or ecologically sensitive areas to be destroyed by development or other construction projects.

My fears about this EIS were further fanned by the allusion to my own district--the West Side Waterfront of the Hudson River in Manhattan--and proposals to use artificial structures as mitigation measures. I was further shocked by the fact that the Department has no policy governing the use of such structures for mitigation measures. The Westway project--which the report was clearly alluding to--was finally halted in 1985 in direct response to the damage the reef would pose to the striped bass population in the Hudson River (p.71-2).

During the legal action resulting from the Westway proposal, it was finally revealed that the area that was slated for development was important for survival of striped bass, and possibly other species. This area was intensely studied in order to produce this information. The only thing that makes any sense is to never build anything in the water that doesn't need to be there because you don't know how much you're destroying. This applies to artificial reefs as well.

There's no question that artificial reefs would be used by developing interests as part of mitigation trading schemes whether DEC approves or not.

Response: *DEC's draft policy regarding artificial reefs as mitigation had undesirable effects. One was to lump, in the minds of some, what DEC does in its artificial reef program in with development-related mitigation proposals. Another was to convey the impression that DEC's artificial reef program would somehow regulate the use of artificial reefs for mitigation purposes, perhaps even building them ourselves. Both of these beliefs are wrong. DEC is not building artificial reefs to compensate for environmental loss or damage,*

only for the objectives outlined in Section 4.2.1. Any proposals to build such reefs are regulated, through the existing permit application process, by Federal, State and local agencies. DEC's artificial reef program supports the view stated in the National Artificial Reef Plan, that artificial reef technology be used only to simulate the type of habitat that has been or will be lost. They should not be used to substitute for dissimilar habitats. The section (4.3.42) on mitigation in the Plan/GEIS has been changed to clarify our position.

ISSUE 11: Artificial Reefs as Marine Sanctuaries

Comment: A number of references are made to creating sanctuary reefs, either by rule or design. DEC's enforcement capability is inadequate to prevent fishing on offshore reefs. Making the reef hazardous to normal anchoring can be readily overcome by using special anchoring techniques. You have a much better chance of protecting fish species by having realistic size limits. The current commercial size limits for porgies and seabass are far too low, and there should be equivalent size limits for recreational fishermen.

Response: *DEC agrees that a need exists for regulation of the scup and sea bass fishery. These fisheries will be managed in a manner consistent with the Demersal Species Fisheries Management Plan in preparation by the Mid-Atlantic Fishery Management Council. DEC will investigate the potential of the use of artificial reefs as sanctuaries. It may be necessary to site sanctuaries in areas that are either: a) remote from most fishing activity and difficult to locate; or b) in proximity to shore sites where any fishing activity could be readily noticed. Sanctuaries would probably be most effective for areas in bays and harbors adjacent to parks or wildlife areas, used as nurseries for juvenile fish and other organisms.*

Comment: We encourage the use of sanctuary reefs especially in shallow water at the eastern end of Long Island with

shore access to them.

Response: *Non-consumptive use of sanctuaries by SCUBA divers and snorklers is consistent with DEC's vision of this application of reef technology. The question of access will need to be addressed on a site-by-site basis. A sanctuary located adjacent to a federal preserve may not be suitable for access from shore, while one near DEC property might be. Artificial reefs sited with specific resource enhancement objectives will not always be available for non-consumptive or consumptive uses. When artificial reefs are built to satisfy the needs of the shore diver, resource enhancement will be subordinate to accessibility and safety.*

Comment: Artificial reefs should be designated for recreational use only, making them off-limits to commercial net and pot fishing.

Response: *DEC agrees that some artificial reefs could be managed by restriction of specific gear types. We have no plans, however, to designate all existing artificial reefs as off-limits to commercial fishing. Some reefs may require gear restrictions to avoid conflict or resource damage. As problems arise, they will be dealt with case by case. DEC will need to request authority to manage artificial reefs in the Exclusive Economic Zone through the use of Special Management Zones.*

Comment: DEC should fully explore the potential of using artificial reefs to reduce fishing mortality, through either sanctuaries or Special Management Zones.

Response: *DEC agrees.*

ISSUE 12: Environmental Impacts

Comment: The GEIS does not adequately assess the adverse impacts likely to come from an expansion of the artificial reef program. We are all in favor of sustaining local fisheries, but feel that expansion of the reef program is as likely to harm estuary-dependent fish species as

help them. Non-reef species are important to the fishing industry; the impacts on non-reef species were not discussed. Also important and not discussed is the impact on fish caused by aggregation at the reefs, not only by humans but by fish predators as well. Another potential impact is over-production of certain species of reef fish that may throw off the area's natural balance. DEC should go back to the drawing board, do a new EIS that explains more, and distribute the information more widely about a next hearing.

Response: *The effects of artificial reefs on fish and other organisms was discussed in Section 6.1 of the Plan/GEIS. Section 6.1.33 examines what is know about the effects of reef construction on fish. There are information gaps in our knowledge of these effects; these gaps are acknowledged in the text.*

The effects of construction of artificial reefs on non-reef fish species is unknown. However, if artificial reefs are sited and built consistent with the ecology of the site, effects on non-reef species, if any, will be minimized. Further, there is no reason to suspect that overproduction of a reef species may occur to "throw off balance" local ecology.

The effects of aggregation of fishes at artificial reefs was discussed in Section 6.1.33. As we stated in this section, effects of fishing can be controlled through fishery management measures. Also, fish that concentrate at artificial reefs are usually concentrated at natural reef or rough-bottom areas. Artificial reefs may provide additional shelter from predators for some species, both human and piscine.

DEC feels that these issues were adequately addressed for the purposes of the program and that further argument would be counterproductive.

Comment: Artificial reefs are unnatural and unnecessary intrusions into marine waters that will destroy productive habitats.

Response: *DEC disagrees. Artificial reefs may not be essential for the protection or survival of any marine organism,*

but they provide the functional equivalent of habitat composed of rocky or coral substrate. In this regard, they themselves can be productive habitat, while providing fishery benefits to resource consumers. The addition of any man-made structures to the marine environment must be consistent with environmental constraints. Artificial reefs must be consistent with local ecology and user needs as well. DEC is confident that its marine artificial reef program responsibly meets these requirements.