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INFORMATION ON PRODUCTION OF MARINE SAND AND GRAVEL IN THE ICNAF AREAS OFF THE NORTHEAST COAST OF THE UNITED STATES

by

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The possible impacts on living resources of mining for marine sands and gravels were noted in ICES document C.M.1976/E:6. Other reports, symposia and workshops (e.g., Marine Minerals Workshop, Marine Board, National Research Council, Washington, D. C., 24-26 January) have also considered this subject and various reports and advisorys have been written which detail observed direct and indirect effects of excavation of marine geological resources.

Another ICES document, C.M.1976/E:10, provided information on the known production of marine sand and gravel in areas of interest to ICES. The introductory paragraphs asked what the best procedures would be for reporting such information in the future. More recently, in a letter dated 9 March 77, the General Secretary requested that materials such as maps, charts and figures be compiled for all areas of potential dredging activity. These materials might show the distribution of different types of sediment, bathymetry as well as "relevant fishing grounds, spawning areas, nursery areas, etc.".

This paper has been prepared in response to the foregoing. It contains information concerned with mining activities which have or might occur off states located in the areas of interest to ICNAF. In the past the U. S. Army Corps of Engineers (COE) has been involved with a permit process which authorized industry to remove sand and gravels for construction purposes from marine and estuarine habitats. Generally, the COE districts issue permits pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899. A specific COE district will usually develop an environmental assessment for a particular sand/gravel mining project proposed within it jurisdiction. If it is deemed necessary the COE may demand that an environmental impact statement (EIS) be developed for a particular project. In any case, public hearings are held prior to issuance of a permit for a particular mining project. The COE jurisdiction in regard to permits extends from the outer continental shelf into estuaries and as far upstream as interstate commerce can be conducted on navigable streams.

The COE districts maintain records on volumes of sediments authorized to be mined under permit; these are provided in cubic yards and are available upon request. The dredge volumes authorized are maximum values only. In some instances a particular state will maintain records on the approximate amounts of sediments actually removed.

In the areas of immediate interest to ICES three separate Districts of the Corps of Engineers have had jurisdiction over issuance of permits for mining sand and gravels: the Philadelphia District, Delaware and New Jersey; the New York District, New York; and the New England Division, Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine.

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As will be indicated, activities within the areas covered by the three districts vary considerably. It should also be noted that in addition to removal of "clean" sands and gravels for construction purposes and beach replenishment each district has numerous dredging projects ongoing in which navigational channels, harbors and marshlands are developed or maintained for navigation of a wide variety of vessels. Such channel or harbor improvement projects will not be covered by this paper although the impact of dredging and concomitant coastal or oceanic spoiling may be as significant as mining of sands and gravels for use by industry for construction and fill.

Information presently held by the three Corps of Engineers Districts on mining of sediments within marine waters under Federal jurisdiction is provided in the following paragraphs.

New England Division: This division has not utilized or authorized removal of any offshore sand and gravels within New England marine waters under Federal jurisdiction. The division has not, as of 22 November 1976, issued any permits to mine sands and gravels in these waters.

Correspondence with the New England Division does indicate that in 1973 a state anchorage in Hampton Harbor, New Hampshire, was dredged hydraulically and approximately 70,000 cubic yards (c.y.) of sand were removed and used to replenish public beaches at Hampton Beach and Wallis Sands Beach, New Hampshire.

The division also noted that there is presently a plan under study to develop a beach erosion project at Sherwood Island State Park near Westport, Connecticut. Sands, approximately 420,000 c.y., would be removed from near the mouth of the Connecticut River and transported to the beach erosion project site.

One of the principal future uses of offshore marine and estuarine sediments is for beach replenishment, where indigenous sands have been severely eroded by coastal currents and wave action and moved away from important recreational beach areas. The Coastal Engineering and Research Center (CERC), U. S. Army Corps of Engineers, Fort Belvoir, Virginia, has conducted studies to inventory sources of sands and gravels suitable for construction and beach replenishment purposes. Sources were located off various portions of the Atlantic coast bordering New England and in Long Island Sound.

New York District: Considerable amounts of sands and gravels have been removed from coastal and estuarine waters under the jurisdiction of this district during the past 8 years. The total approximate amount for construction purposes is 85 million cubic yards (yd^3), or approximately 0.84 million m^3/year. The principal locations at which the sediments are mined (dredged) are shown in Figure 1. The companies conducting the operations and the amounts authorized under each permit are shown in Table I.

In addition to the operations by commercial concerns, the COE New York District has awarded several contracts during the past five years for various Federal projects. The projects were conducted off Rockaway Beach and are indicated by Roman numerals in Figure 1. Similar projects have been conducted at Fire Island Inlet, an area 20 nautical miles east of Rockaway Inlet. Total amounts removed from both of these sites are given in Table I.

The majority of dredging/mining activities have occurred in Lower and Raritan Bays. In several instances the permits issued by the COE have authorized mining of sediments in or near navigation channels which must be dredged periodically to maintain proper depth for ships entering New York Harbor.

Unfortunately, the COE cannot easily provide the general size range(s) for sediments removed from the various dredging/mining sites. Because of changing economic and construction situations, and other factors, the COE has no feasible way of estimating the amounts of sands and gravels that might be removed during coming years or decades. Permits indicated in Table I do authorize projects with expiration dates in late 1978. It is therefore possible for mining to occur until these dates.

The waters in which the mining activities authorized by the New York District occur are well-known to be heavily polluted. Sediments in Lower and Raritan Bays are heavily contaminated with toxic heavy metals and hydrocarbons, probably of petroleum origin. Since studies in the late 1950's (Dean and Haskin, 1964; Dean, 1975), a considerable change has occurred in the benthic faunas of Raritan Bay (McGrath, 1973). Several species of animals in Raritan Bay which were once numerous have become rare or have almost completely disappeared. Nonetheless, many species of finfish habituate Lower and Raritan Bays and the New York Bight apex. While it is impossible to plot or delineate spawning areas, studies conducted on fish eggs and larvae in this area do indicate that many species of commercially and recreationally valuable finfish spend all or a major portion of their life history in these waters. These waters also once sustained dense populations of commercial shellfish. In recent years pollution has reduced in number many species and those still present cannot be legally harvested for human consumption because of bacterial contamination.

Philadelphia District: As of this date no sands and gravels have been authorized for excavation by this district. The district has recently made preliminary investigations concerning potential sources of marine sand and gravel deposits which might be mined for beach replenishment projects in New Jersey and Delaware. The potential "borrow" areas are located from one to four miles of the coastline (Figures 2 and 3).

Because the schedules for implementation of beach replenishment projects are indefinite at this time, estimates of the amounts of sediments to be used in the next decade cannot be ascertained; no materials will be removed from marine coastal waters during calendar year 1977.

Discussion: Unlike some countries (ICES Document C.M.1976/E:6) the United States does permit inshore dredging. A recent report (New England Marine Resources Information program, 1973) indicates that extensive deposits of offshore sands, gravel and muds represent some of the most "immediately useful" seafloor resources off the coast of the northeastern United States. The report further noted that sands and gravel production makes up about one-fifth of the total non-metallic mining industry in value; amounting to about 1 billion tons and $1.1 billion in value in 1970. The projection of the report is that increased offshore mining of building aggregates is virtually inevitable to meet the demands resulting from increased construction and diminishing land sources for these materials.

The present paper indicates the extent of sand and gravel mining operations in the Northwest Atlantic in recent years. The aforementioned report cites Manheim (1973) as stating that "biologists familiar with shelf flora and fauna indicate

that mining operations on the shelf are not inherently incompatible with proper maintenance of marine life and commercial and sports fisheries", provided that proper design of operation and coordination with fisheries authorities are carried out. In reviewing the literature on the subject of impacts of mining operations and suspended materials on marine life, contradictory findings are noted. However, several authors (Peddicord, 1976; Wilson and Connor, 1976) report limited or no effects of suspended matter where clean sediments are being excavated in offshore environments or where effluents from onshore mining are discharged into coastal waters. Obviously, additional studies will be required to document, in a highly quantitative fashion, the impact of extensive offshore sand and gravel mining on various developmental stages of valuable finfish and shellfish and the forage species important in total food webs.

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TABLE I. Listing of permits and contracts given to authorize sand and gravel mining in the COE New York District, 1968-1976.

COE PERMIT NO.	PERMITTEE	VOLUME AUTHORIZED (YD3)*	DREDGING AREA (FIG. 1)
7630	Great Lakes Dredging & Dock Co.	4,000,000	1
7760	Const. Aggregates Corp.	2,000,000	1
7885	American Dredging Co., Inc.	2,000,000	10
7780	Hydromar Corp.	4,000,000	4
7834	American Dredging Co., Inc.	10,000	2
7918	Great Lakes Dredging & Dock Co.	4,000,000	5
7935	Schiarvone Const.	10,000,000	4
7963	Buckely & Schiarvone Const.	40,000	6
8108	Twin Pines Village, Inc.	1,000,000	3
8133	Great Lakes Dredging & Dock Co.	4,000,000	4
8265	Const. Aggregates Corp.	19,000,000	4
8102	American Dredging Co., Inc.	2,000,000	11
9013	American Dredging Co., Inc.	6,000,000	4
9052	Great Lakes Dredging & Dock Co.	4,000,000	4
9123	Const. Aggregates Corp.	18,000,000	4
9423	American Dredging Co., Inc.	2,000,000	11
9961	Dumbar & Sullivan Dredging Co.	750,000	8
	New Jersey Turnpike Authority	2,000,000	7
	TOTAL	84,000,000	

Sand mining contracts the New York District COE has awarded during the past five years for Federal project in:

Rockaway Beach

1st Contract	3,815,300 yd 3 ---- dredged to date	3,668,720 yd 3	
2nd Contract	1,900,000 yd 3 ---- dredged to date	1,521,681 yd 3	I, II, III
3rd Contract	1,750,000 yd 3 ---- is contemplated		

Fire Island Inlet

1st Contract	1,068,580 yd 3 ---- dredged to date	954,080
2nd Contract	931,310 yd 3 ---- dredged to date	897,553
3rd Contract	2,300,000 yd 3 ---- dredged to date	1,637,000
	TOTAL	3,488,633

*NOTE: The dredge volumes authorized are maximum volumes only; COE does not maintain records on actual volumes removed annually.

Figure 1. This chart shows the location of important sand and gravel mining operations in New York metropolitan estuaries and coastal waters. Arabic numbers are referenced in Table I; roman numerals indicate sites where beach replenishment materials are obtained. The letter A indicates potential site for sand and gravel operations.

Figure 2. This chart shows potential sites where construction aggregates may be mined in the future. These sites have been shown to have potential for mining operations.

Figure 3. This chart indicates possible borrow areas off the Delaware coastline. Again, surveys suggest that these sites, indicated in solid black, may contain considerable construction aggegregate material.

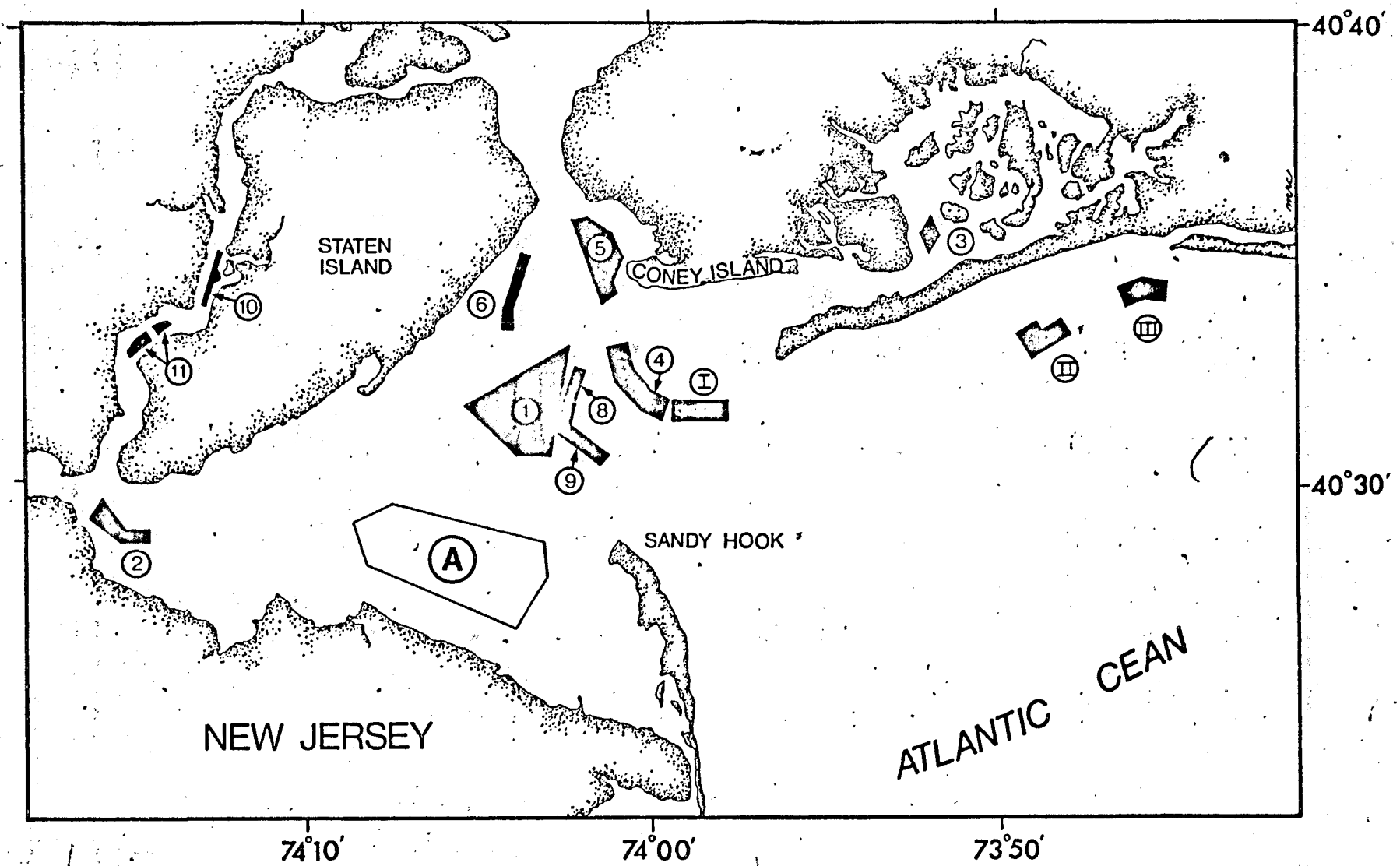
40°40′
40°30′
STATEN ISLAND
CONEY ISLAND
SANDY HOOK
NEW JERSEY
ATLANTIC OCEAN
74°10′
74°00′
73°50′
1
2
3
4
5
6
8
9
10
11
A
I
II
III

Figure 1.

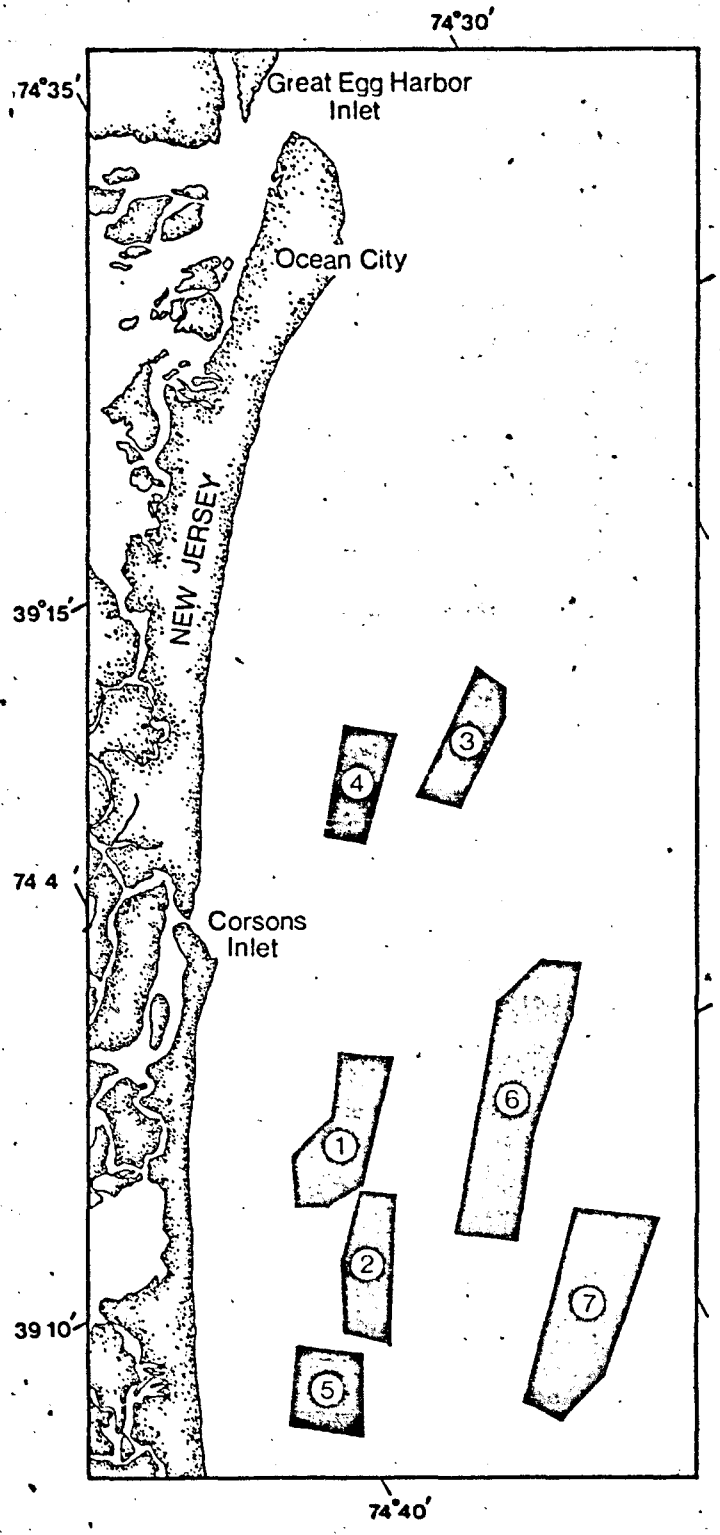

Figure 2.

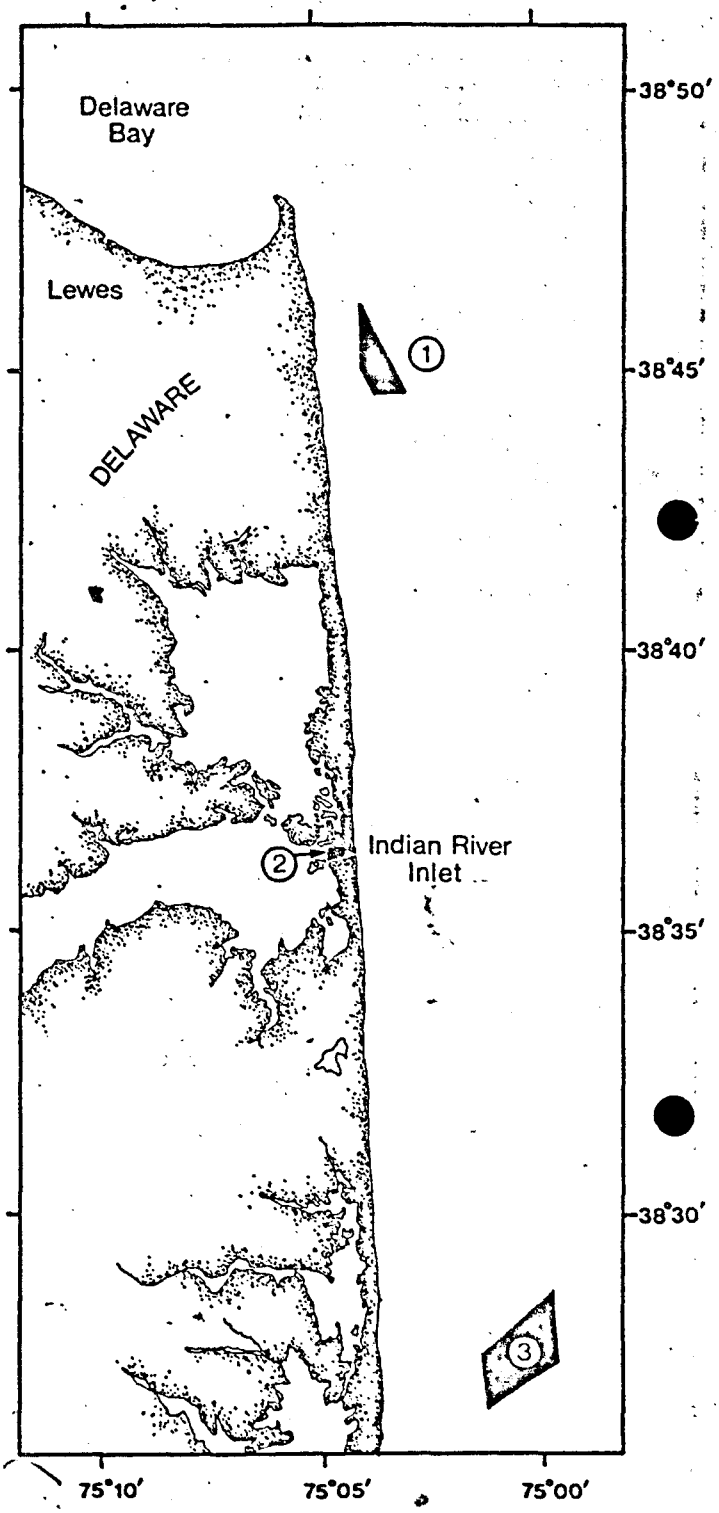

Figure 3.