

U.S. ENVIRONMENTAL PROTECTION AGENCY



A BRIEF OUTLINE
OF A STUDY OF SEWAGE SLUDGE DUMPING
IN THE NEW YORK BIGHT

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Presented at
a Joint Meeting of
The New York District Corps of Engineers
and
The National Oceanic and Atmospheric Administration
at
Rockville, Maryland
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SLUDGE DUMPING IN THE NEW YORK BIGHT*

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INTRODUCTION:

The National Coastal Pollution Research Program, one of EPA's major marine research organizations, has recently initiated a research project consisting of a number of interrelated studies of domestic sewage sludge dumping in the New York Bight.

The purpose of the project is to aid in understanding and predicting both the fate of sewage sludge discharged into a near-shore ocean environment, and the ecosystem alterations which result.

The information specific to the study area may be of considerable immediate use to state, local, and federal agencies charged with the responsibility to regulate sludge dumping practices in the Bight. Besides generating this local knowledge, new and improved techniques will be sought to aid in regulating ocean dumping of other materials on a Nationwide scale. Practical aspects of regulation which may be enhanced through this research effort include: (1) procedures for pre-discharge evaluation of material proposed for dumping, (2) techniques for selection of safe discharge methods and locations, and (3) methods for evaluation of time-dependent ecosystem alterations.

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PARTICIPANTS:

The overall direction of the study is provided by the staff of the National Coastal Pollution Research Program of EPA, who also are the principal scientific participants in the field and laboratory work.

One phase of the study will be conducted through a research grant of the National Coastal Pollution Research Program to the U.S. Navy, Environmental Prediction Facility at Monterey, California.

The NOAA Sandy Hook Marine Laboratory is providing assistance as a base of operations for field studies and some vessel time. Additional vessel time, sampling assistance, analytical service, and liaison with the Corps of Engineers and the City of New York are being provided by the Surveillance and Analysis Division of EPA's New York Regional Office.

NATURE AND SCOPE OF THE STUDY:

A selected amount and type of digested domestic sewage sludge will be discharged under varying controlled conditions in a designated location of the New York Bight. The site tentatively selected with the assistance of several of the participants is about 15 miles south of Fire Island, where the depth is approximately 100 feet (latitude 40° 25' N, longitude 73° 11' W) (see Figure 1). As far as can be determined at this time, the site is essentially free of major influence from the present sludge dumping area.

Sludge from a number of New York City treatment plants is being analyzed for a large number of chemical parameters to aid in selecting the one (or ones) deemed most suitable for the experimental program. Sludge of essentially domestic origin is desired, based on the assumptions that absence of chemicals associated with industrial activities will

(1) lessen the chance of long-term environmental alteration of the experimental disposal site, (2) allow for broader application of the results to other areas concerned with the effects of municipal sewage sludge disposal, and finally (3) reduce the chance of abrupt and unknown variations in chemical, physical, and biological character of the sludge.

An ecosystem evaluation of a control volume surrounding the disposal site will begin in December, which will eventually consist of current meters, sediment traps, sea-bed and surface drifters, transmissometers, and the collection of cores, benthic organisms, and water column and surface film samples for laboratory analysis.

Following a period for satisfactory pre-discharge evaluation of the area, a series of controlled dumpings will be arranged based on calculations of expected distribution and bottom accumulation patterns. Field observations of particle transport, film formation, and settling will be made during and after the barge dumping operations along with measurements of ecological alteration. Various methods of sludge off-loading will be investigated, if possible, to determine those which cause a minimum impact on the environment.

Crucial to the planning, field study, and evaluation phases is a study of circulation patterns in the Bight which will be made possible by work already underway at Monterey to develop the capability for computer simulation of the local current and dispersion characteristics. Simulated discharges will be evaluated prior to prototype discharges, and, if possible, chemical and biological interactions will be evaluated in addition to the transport and dispersion calculations. The models will be tuned on the basis of the experimental results. The models

being developed for this study will cover different sections of the coastal regions affecting the Bight and will be of different scales. The limits of the largest model, the "shelf" model are shown in Figure 1 along with the approximate location of the proposed experimental dumping site. This model contains 1974 segments, each 3 nautical miles on a side. Both single layer and two layer circulation and dispersion will be simulated. As shown in Figure 2 more detailed modeling within any 3 n.m. grid can be provided by applying the output of the shelf model as input to a smaller grid. This may be necessary in order to evaluate localized effects, although other models are in our repertoire for this work. Figures 3 and 4 show limits for the "outer harbor" and "inner harbor" models which will be developed in the study.

TIMING:

(a) Selection of experimental dumping site: Tentative location and approval of Corps of Engineers has been obtained.

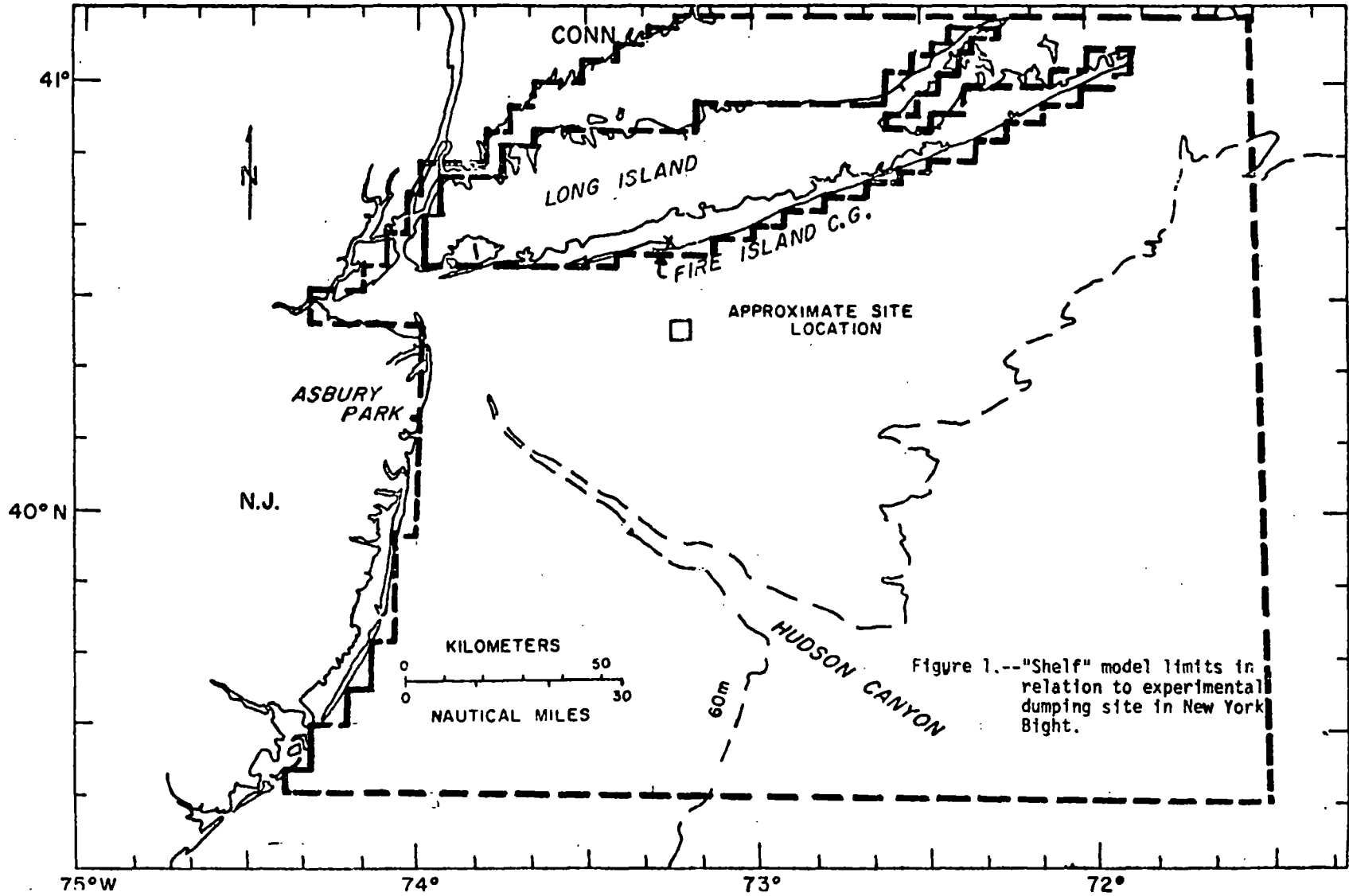
(b) Coastal flushing model: Study was initiated July 1, 1972, and is scheduled for completion in twelve to eighteen months.

(c) Evaluation of sludges: Laboratory analysis was started in July on samples of sludge from two New York City plants. Tentative selection date is June 1973.

(d) Pre-discharge evaluation of site: To be initiated in October 1972. Evaluation will be conducted at a number of sites in decreasing proximity to the experimental dumping site so that a gradient of responses may be observed. The termination date for the "pre" evaluation cannot be set until we have some idea of the temporal and spatial variation of ecologically-significant parameters observed in the study area. A rough guess would be one year.

(e) Commence controlled dumping: Negotiations have not yet been initiated with the City of New York or any other potential supplier of sludge. This will be an expensive operation lasting over a year or more and is, of course, the sine qua non of the experiment. The exact date of commencement hoped for cannot be set until pre-discharge evaluation is completed. The earliest date would seem to be October 1973.

(f) Post-discharge evaluation: This will commence with the first controlled discharge and will continue throughout the period of discharge. A period of observation following the cessation of controlled dumping should continue for approximately another year.



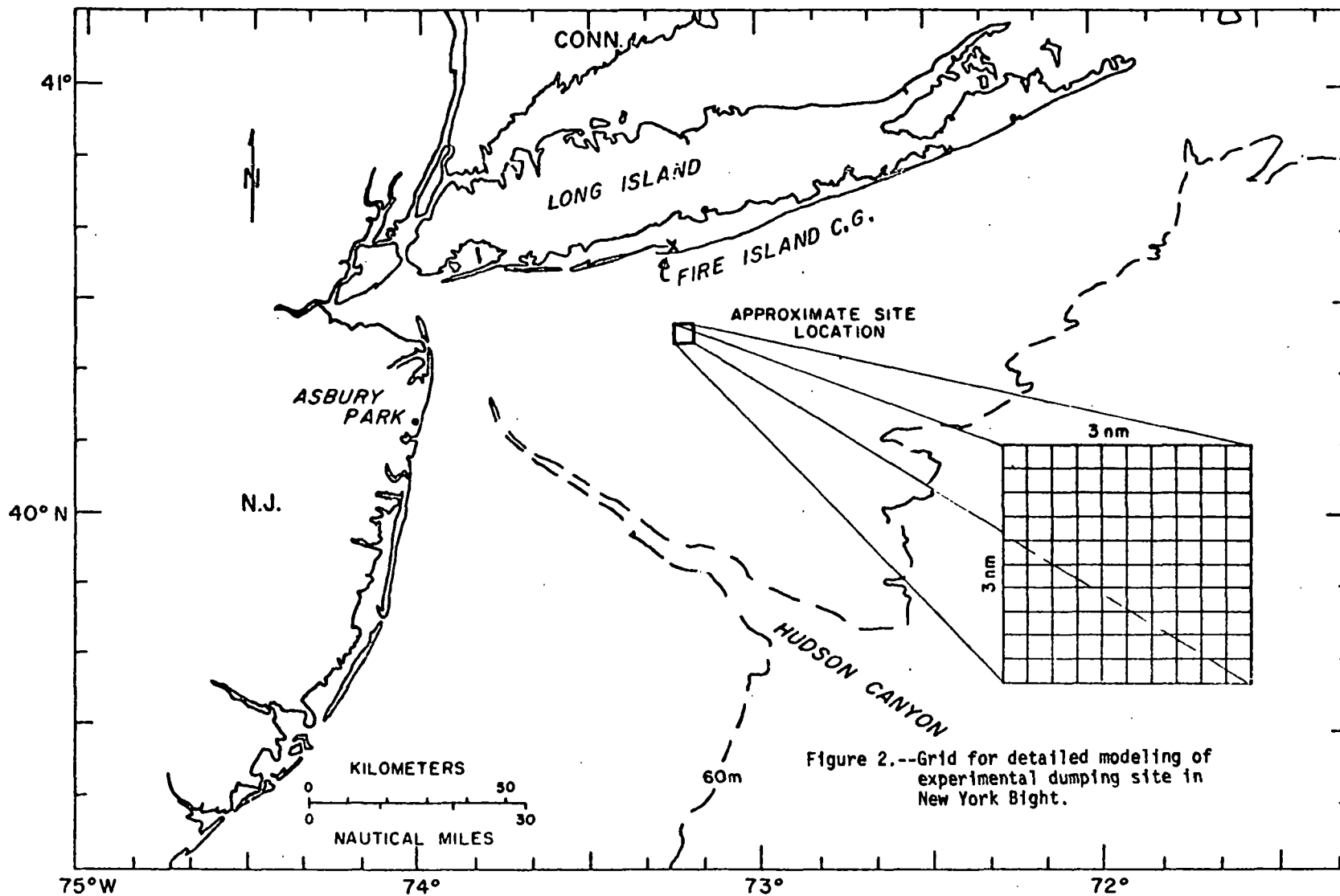


Figure 2.--Grid for detailed modeling of experimental dumping site in New York Bight.

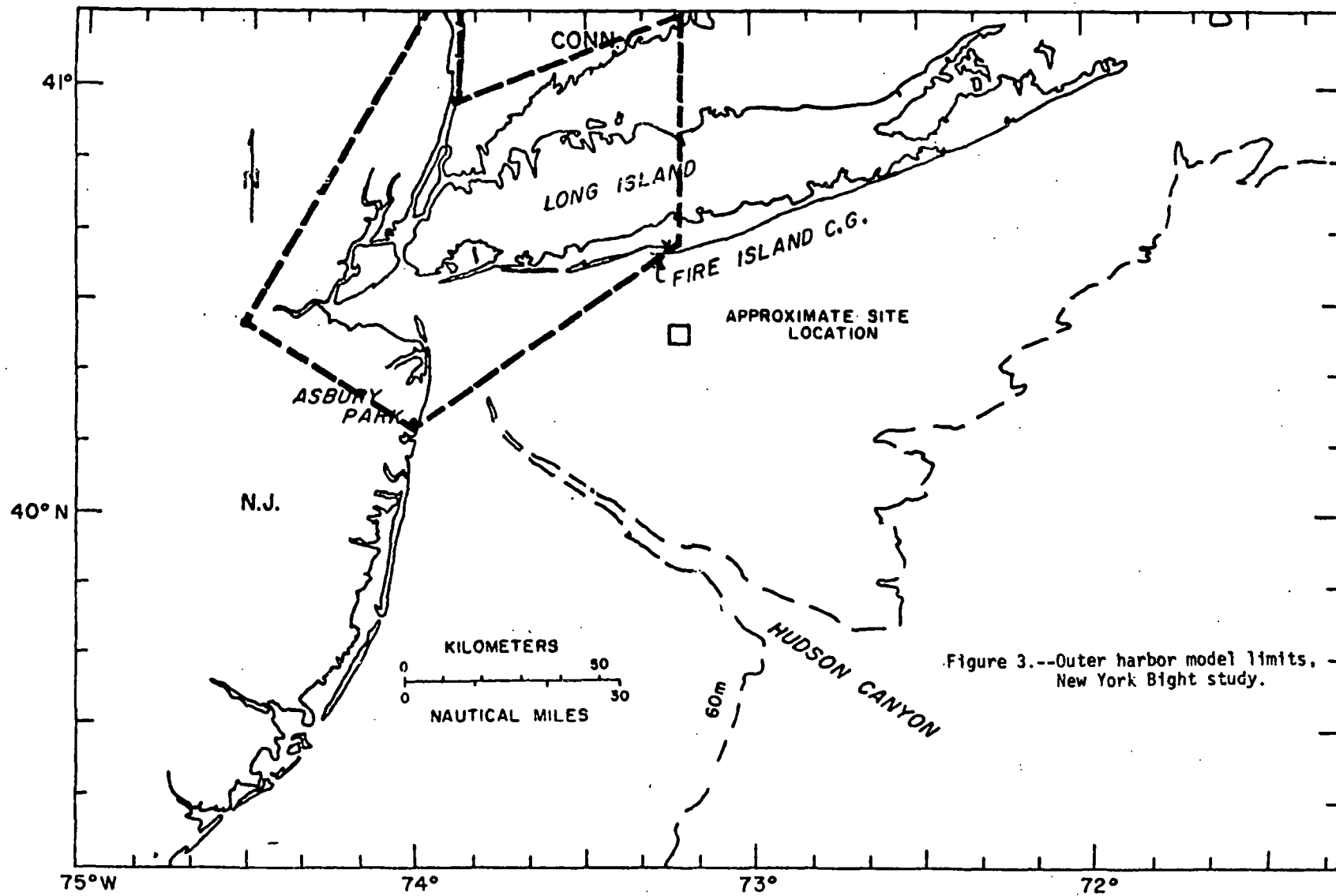


Figure 3.--Outer harbor model limits, New York Bight study.

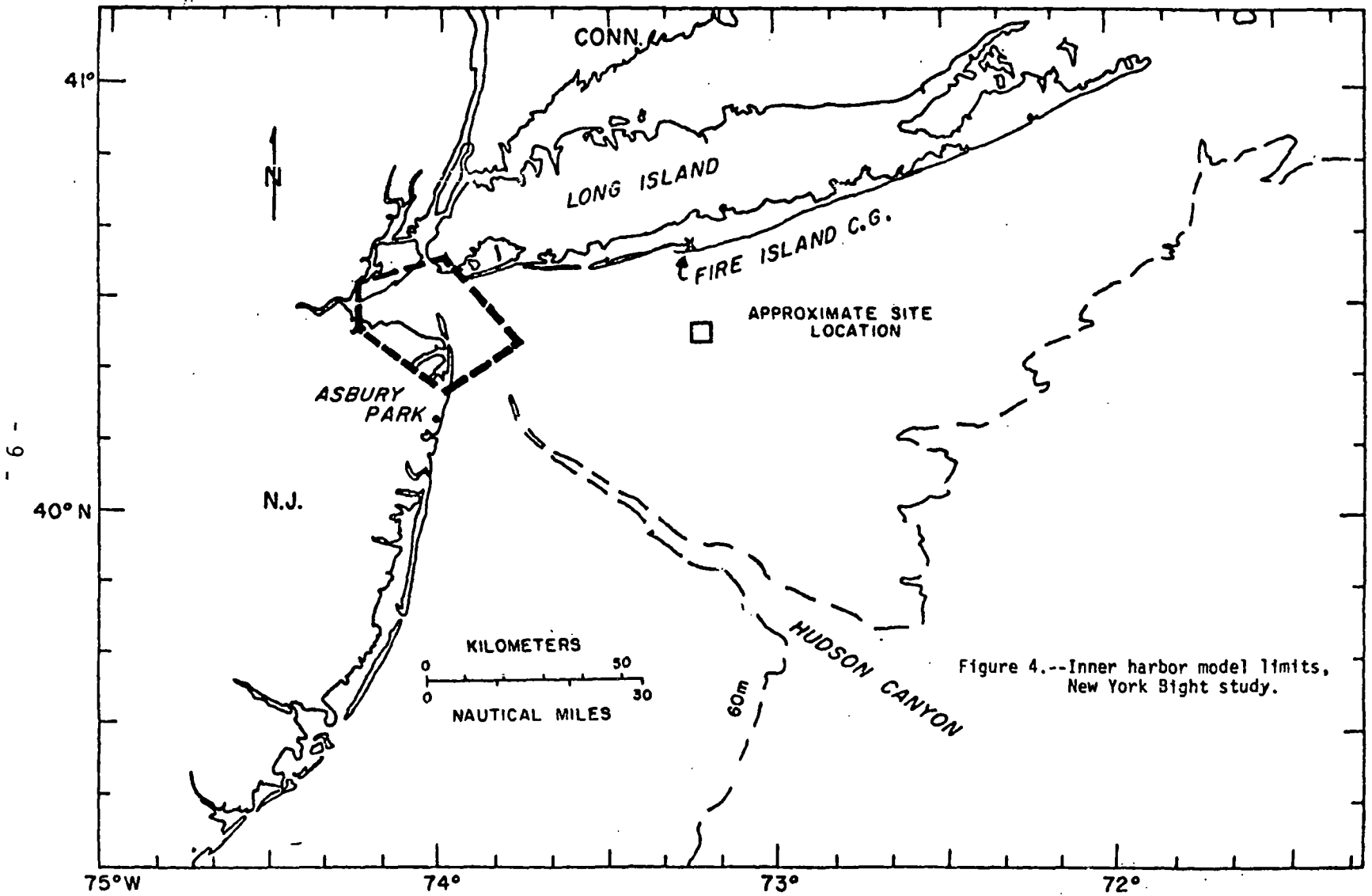


Figure 4.--Inner harbor model limits, New York Bight study.