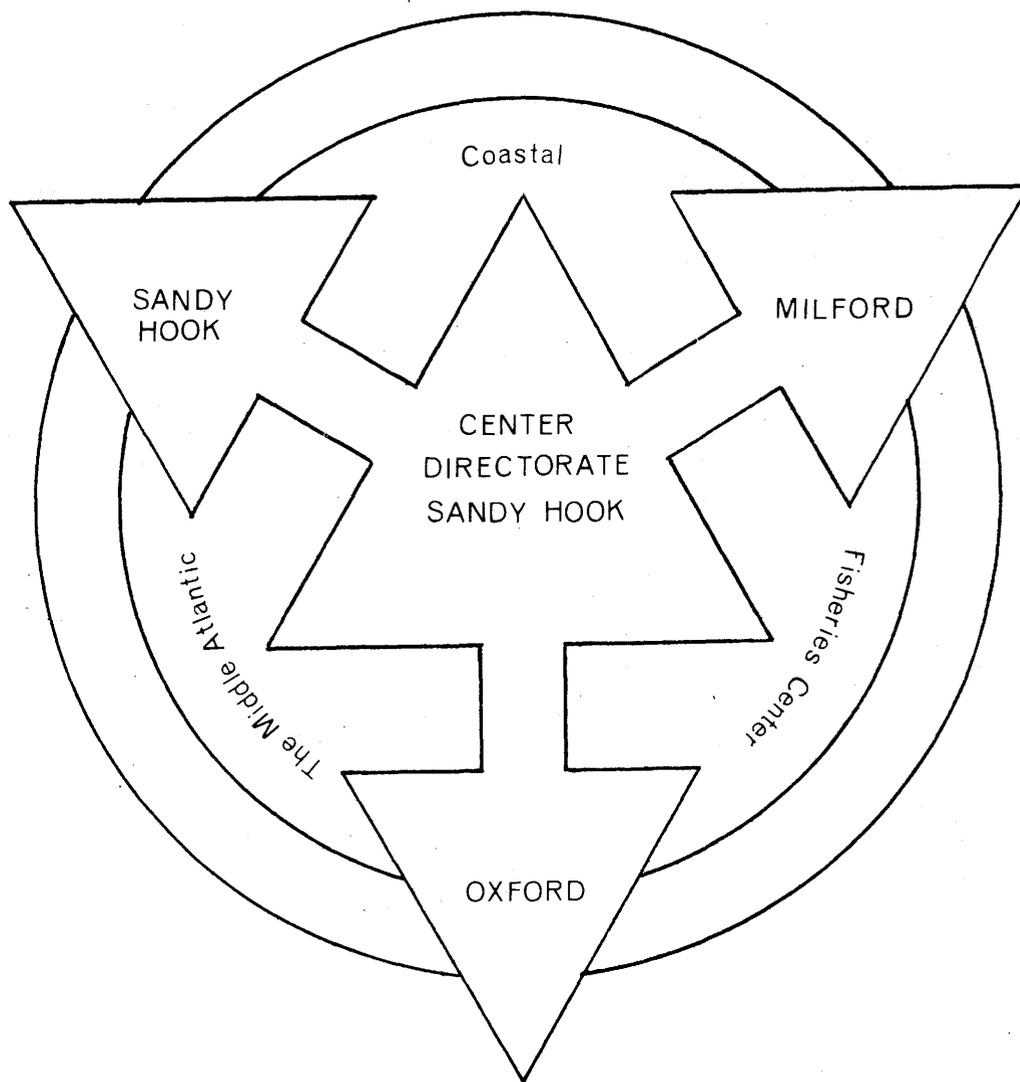


A PROPOSAL FOR BIOLOGICAL SURVEY OF AN ALTERNATE SITE
FOR DISPOSAL OF DREDGING SPOILS FROM THAMES RIVER,
CONNECTICUT



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Region

MIDDLE ATLANTIC COASTAL FISHERIES CENTER



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Biological Survey of an Alternate Site
for Disposal of Dredging Spoils
from Thames River, Connecticut

DRAFT PROPOSAL

INTRODUCTION

The Department of the Navy is dredging portions of the Thames River at Groton, Connecticut, to accommodate a new class of deep draft submarines, the SSN 688 Class. The dredging operation is arbitrarily divided into two phases. Phase I began in August 1974 and is utilizing the New London dumping ground, one of four designated sites in Long Island Sound, for spoil disposal. Completion of Phase I is presently scheduled for June 1975, with Phase II dredging to commence in January 1976 and to continue for approximately one year.

To date, no alternate spoiling site(s) has been formally designated. One area currently under consideration is located southeast of Fishers Island at 41°14'N, 71°51'W and is known as "East Hole" (Cook and Morton, 1974). This proposal assumes that East Hole, or nearby West Hole, will be the alternate site and is subject to revision if another alternate site is selected.

A biological data base must be developed for an alternate site so that in the event of a shift from the New London dumping

ground an assessment of baseline biology and predicted impacts of dumping will be available. In addition, data are required for the preparation of an Environmental Impact Statement which must be developed prior to the use of an alternative site. The Middle Atlantic Coastal Fisheries Center (MACFC), National Marine Fisheries Service, hereby proposes a short-term, non-site-specific biological study of an alternate disposal area.

PROPOSED METHODS

Except as noted below, methods and objectives for benthic studies would be similar to those of the ongoing monitoring study at the New London dumping ground presently being conducted by MACFC. Details of this approach are contained in "A proposal for an environmental survey of effects of dredging and spoil disposal in the Thames River and New London dumping ground", Informal Report No. 25-A, MACFC, 1974.

Target organisms for this study would be the benthic macrofauna, which have been shown to be the best indicators of environmental conditions and change due to man-induced perturbation, as well as an important element in marine food webs culminating in many resource species.

Demersal finfish will be sampled using standard MARMAP procedures with a 3/4 yankee trawl. All specimens will be

identified to species, weighed and measured using standard procedures.

Station Location

Given the probable need to analyze five samples per station, the establishment of as many stations for the present site as at the definitive New London spoiling site (38) would be neither practical nor necessary for the proposed short-term survey. We propose a basic pattern of six stations: four stations each at one mile from a proposed disposal point, one station at two miles, and one at the release point. Placement of these stations would be determined by the bathymetric and hydrographic characteristics of the site in question. In general, the one mile stations would be placed on transects reflecting residual bottom drift and slope. The two mile station would be placed on the transect determined by residual drift. If the site were located such that a recreational shoreline or commercially valuable fisheries might be impacted upon by spoils movement a second two mile station would be created in that direction and given the same treatment as the six basic stations.

Bottom currents at East Hole exhibit a westerly drift with superimposed tidal fluctuations (Cook and Morton, 1974). Bottom drifters released at this point have generally moved to the west and have been recovered within Long Island Sound (Hollman and Sandberg, 1972). The primary axis for station

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placement at East Hole, therefore, would be east-west with the two mile station placed to the west of the release point.

For trawling the area would be stratified and randomly sampled consistent with current groundfish survey methods used by MACFC.

Benthic Sampling

A Smith-McIntyre quantitative bottom grab (0.1m²) would be used to collect replicate macrofauna samples at each station. Samples would be processed as outlined in MACFC, Informal Report No. 25-A. Initially, ten replicate grab samples will be collected from each station although we do not anticipate that all will be processed.

The number of replicates required to provide adequate data for this type of survey is impossible to determine without prior knowledge of the natural variability present in the area. Processing of five of the ten replicates will allow the estimation of variance in the area for four important population parameters: N (total individuals), S (total species), H' (diversity) and J' (equitability). It is then possible to calculate the required replicates to detect a specified amount of change by:

$$n \geq 2 \left(\frac{\sigma}{\delta}\right)^2 \left\{ t_{\alpha [v]} + t_{2(1-P) [v]} \right\}^2$$

where:

- | | |
|------------|--|
| n = | number of replicates required |
| σ = | population standard deviation |
| δ = | smallest true difference which is to be detected |
| [v] = | degrees of freedom |
| α = | significance level (.05) |

P = desired probability that a difference will be found to be significant (90%)

t = values from a two-tailed t table with
t (1-9) v probability and 2 (1-P) and v degrees of freedom.

(from Sokal and Rohlf, 1969)

Experience at the New London dumping ground, the closest area for which data are available, indicates that five grabs are generally adequate to distinguish changes in N, S, H' or J' of magnitude which would be cause for serious concern. If variability in the alternate area is greater than anticipated additional replicates can be processed to provide the necessary resolution. In addition, an estimation of variability will allow more precise planning of a monitoring survey should the site become active.

Finfish

In conjunction with each benthic sampling period (March and June) eight otter trawl tows will be taken using established groundfish survey methods and materials. Although assessment of stocks of these species is more difficult than for the benthic macrofauna and their motility limits their use as indicators we feel a study of this type would be inadequate without some attention being given to this valuable resources group. The proposed sampling periods will enable assessment of boreal and resident species present during winter and species moving inshore during summer.

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The trawl surveys will provide biomass estimates of resident and migratory fishery resources in the study area. These data will not only help in evaluating local finfish populations but will provide additional input to ongoing Atlantic shelf assessment studies.

Sediment Grain-Size

Core samples will be removed from the intact Smith-McIntyre grabs to be analyzed for grain-size distribution. It is expected that this work will be done under a subcontract to be let by MACFC. Changes in the composition of the sediments can be an important clue to possible spoils movement, particularly at East Hole where relatively fine sediments would be deposited on a naturally coarse bottom.

Sediment Heavy Metals

Core samples will also be taken for heavy metal analysis. This work will also be subcontracted. The spoils originating in New London are rich in heavy metals and it is possible that these metals may provide a natural "tag" which may be used to follow spoils movement with great sensitivity.

PROPOSED SCHEDULE

Two surveys of the alternate site would be conducted: March and June, 1975. At the end of June a report would be submitted detailing macrofauna characteristics and sediment relations from the March cruise. A more comprehensive final report would be prepared and submitted by March 1976, utilizing data from both the March and June 1975 cruises. Reports would also synthesize historical data, if any, for the selected site. ~~Optimally,~~ seasonal cruises should be

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conducted to delineate predisposal conditions. The proposed research will, however, cover the critical spring and early summer reproduction and recreational periods as well as late winter conditions. Surveys should be continued semi-annually if the site becomes active (perhaps each April and September, in an effort to sample minimum and maximum macrofaunal populations), with annual reporting, for at least five years in order to determine long-term disposal effects and recolonization rates. This proposal and our subsequent planning and budget request, extend only through the March 1976 report, however.

Our proposal considers only biological and certain geological characteristics at an alternate site. Other information may be desired to gain a more comprehensive picture of predredging conditions and projected impacts. Data on currents and bathymetry before, during and after dumping would be of value in analyzing observed macrofauna patterns. We therefore would request that such studies be carried out preferably as an extension of the report by Cook and Morton (1974).

The scope of the study outlined in this proposal should be regarded as the minimum consistent with the goal of providing a meaningful data base for the subject area. If the site is selected for use as a spoiling ground a more intensive baseline survey should be undertaken. If site use reaches

the same intensity as that at the New London dumping area, then a monitoring study of similar magnitude as that in process by MACFC should be initiated. Proposals for work of this type can be generated by MACFC as they become necessary.

Although research proposed for the alternate site has some connection with the ongoing program at the definitive disposal site at New London, this proposal is viewed as a document concerned solely with the alternative site and does not anticipate any change in research activities at the New London spoiling site, either now or during subsequent monitoring studies.

LITERATURE CITED

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NEW LONDON ALTERNATE SITE - BIOLOGICAL SURVEY

PROPOSED BUDGET

<u>Labor</u>		39,140
<u>Other Objects</u>		
Vessel Operation	6,000	
Contracts/supplies/materials	29,695	
Travel	<u>3,500</u>	
		39,195
Support		<u>18,278</u>
		96,613