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ATLANTIC OFFSHORE USERS WORKSHOP

May 19-21, 1977
Newark, Delaware

$3.00

ATLANTIC OFFSHORE USERS WORKSHOP May 19-21, 1977
Clayton Conference Center, University of Delaware

Convened by:

William V. Roth, Jr.
U.S. Senate
(Delaware)

Joseph R. Biden, Jr.
U.S. Senate
(Delaware)

John B. Breaux
U.S. House of Representatives
(Louisiana)

Clifford P. Case
U.S. Senate
(New Jersey)

Lawton Chiles
U.S. Senate
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(Connecticut)

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(Virginia)

Hosted by the Atlantic Coast Sea Grant Institutions:

University of Maine
University of New Hampshire
Massachusetts Institute of Technology
Woods Hole Oceanographic Institution
University of Rhode Island
State University of New York/Cornell
New Jersey Marine Science Consortium
University of Delaware
University of Maryland
Virginia Institute of Marine Science
University of North Carolina System
University of South Carolina
University of Georgia
University of Florida System
University of Miami

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A Report On The
ATLANTIC OFFSHORE USERS WORKSHOP

held

May 19-21
Clayton Conference Center
University of Delaware
Newark, DE 19711

DEL-SG-11-77
June 1977

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FOREWORD

It can be said that the Atlantic Offshore Users Workshop was the product of an aggressive and talented cadre of men and women. But its true source was a growing sense of uneasiness about the Atlantic's future, a disquiet shared by a diverse group of scientists, Congressmen, and businessmen.

The purpose of the workshop was to focus on the Atlantic's future in specific ways. By bringing together a group of 50 ocean specialists from differing backgrounds, we sought to determine what first steps must be taken to protect the nearshore Atlantic without disregarding its assets.

In an immediate sense, the conference was a success. But success in the long view depends on what we -- you and I and others yet unaware of what we are striving for -- do with the results. The conference was not an end, but a beginning.

William V. Roth, Jr.
U.S. Senate

WORKSHOP OBJECTIVES, ORGANIZATION AND FOLLOW-ON PLANS

This workshop was held on May 19-20-21, 1977 at the University of Delaware's Clayton Conference Center in Newark, Delaware.

WORKSHOP OBJECTIVE

The workshop brought together commercial users of the Atlantic offshore areas, their governmental regulators and service organizations, and Sea Grant institutional representatives. The objective was to identify, and rank in priority order, the most important oceanographic and oceanographic engineering problems (or information gaps) which, if solved, could lead to better commercial use and to better resource management practices.

COMPOSITION OF INVITEES

The fifteen Sea Grant institutions on the East Coast hosted this workshop. They extend from the University of Maine in the north to the University of Miami in the south. Each Sea Grant director was asked to recommend the names of commercial users with active business interests on the Atlantic continental shelf. These users then led to a list of federal regulators. Users were identified by category of use and then individuals were identified to best represent that user group. Two categories of users were identified and invited but declined to attend because they felt that either their operations were in deeper water than the focus of this workshop was intended to address (mining and mineral recovery firms) or, that they saw no problems to contribute to this workshop (commercial research vessel operator). The list of attendees, shown by category is provided below. The percent of total attendees is shown in parentheses to the right of each subtotal. A full list of attendees and their affiliations is provided as Appendix 1.

USERS		
Cable Layers	1	
Commercial Fishing	1	
Commercial Research & Development	1	
Dredgers	1	
Diving & Submersibles	1	
Federal Dumpers	1	
Industrial Dumpers	1	
Instruments	1	
Investors & Insurers	1	
Municipal Dumpers	1	
Natural Gas	1	
Offshore Construction & Pipelaying	3	
Petroleum	1	
Power Generation	2	
Port Authorities	1	
Recreational Shoreline Users	1	
Salvage	1	
Shipping	3	
Department of Defense	2	
Weather & Sea Forecasters	1	
	26	(53%)

REGULATORS		
U.S. Coast Guard	1	
Office of Deepwater Ports	1	
U.S. Geological Survey	1	
Nuclear Regulatory Commission	1	
National Marine Fisheries Service	1	
Environmental Protection Agency	1	
Food and Drug Administration	1	
	7	(15%)

SERVICE ORGANIZATIONS		
National Ocean Survey	1	
National Weather Service	1	
	2	(4%)

SEA GRANT INSTITUTIONS		
University of Maine	1	
University of New Hampshire	1	
Massachusetts Institute of Technology	1	
University of Rhode Island	1	
State University of New York System and Cornell	1	

SEA GRANT INSTITUTIONS (cont.)

New Jersey Marine Consortium	1	
University of Delaware	1	
University of Maryland	1	
Virginia Institute of Marine Science	1	
University of North Carolina System	1	
University of Florida System	1	
University of Miami	1	
	12	(28%)
Total Attendees	47	(100%)

PREPARATIONS FOR WORKSHOP

Each participant was expected to prepare for the workshop by defining one or more oceanographic or oceanographic engineering problems which, if solved, would be of value to their commercial operations in the Atlantic offshore area. Greatest attention was given to problems on the continental shelf but that was not regarded as a firm restriction. Some problems involved estuaries and tributary rivers. Other problems extended beyond the 200-mile limit. Federal regulators or service organizations defined oceanographic problems unique to their missions. The Sea Grant institutional representatives were expected to define oceanographic problems of any type which they perceived to be of commercial or management significance to their region of the coast. Several have extensive commercial experience.

Forms were provided in advance for use in writing up these problems. Two pages were required for each. The first page is entitled Atlantic Offshore Oceanographic or Oceanographic Engineering Problem and asked for a problem title, the name of the proposer, a succinct description of the problem, and a statement about its commercial significance. The second page is a location map to show where the problem exists. The locations were often approximate and some included a primary and a secondary area. Both pages were completed for each problem.

Two example problems were sent to each participant in advance. One, "Oxygen Depleted Area off New Jersey Coast," is a problem concerned with a relatively small area off the New York, New Jersey and Delaware coasts. The second, "Instrumentation and Methodology to Measure, Quantify and Forecast Sea Condition," is concerned with information necessary for optimum ship routing and extends completely across the ocean.

There was no limit to the number of problems each participant could bring to the workshop. One person came with 12 and two came with none. Each problem was to be defined as clearly and as interestingly as possible. Also, each participant was encouraged to contact colleagues or business associates to obtain problems to bring to the workshop. The only requirement was that each participant understand the problem in sufficient depth to discuss it and, if necessary, modify it at the workshop. Each participant represented an entire commercial community or regulatory agency. This restriction was necessary to keep the working group to a manageable size.

It is also important to note that the workshop was <u>not</u> concerned primarily with <u>equipment or instrument development</u> needs but rather <u>oceanographic or oceanographic engineering problems</u>. Equipment will be needed to solve most of the problems identified but problem solving will be dealt with at a later date. Our goal was to define the problems clearly and to rank them in priority order.

Each participant was asked to submit his draft problems to the chairman by May 10 so that homework preparation could be insured and so that viewgraphs could be made and ready for use at the working session. Attendees were quite diligent in completing their homework. As expected, however, new problems were conceived and presented at the workshop.

HOW THE WORKSHOP WAS CONDUCTED

A modification of the Nominal Group Method was used. This approach is designed to insure full participation by each attendee. It was important for each participant to be there from beginning to end. A workshop schedule is attached as Appendix 2.

The workshop consisted of four parts. The first was registration and orientation on Thursday evening. The second part, problem identification and description, began Friday morning and continued until all the problems were presented by participants. This was done by asking each participant, in turn, to present his highest priority problem. Only one problem was presented by each participant at each turn. Each problem title was printed for posting on the wall of the work room and was assigned a number. This continued until each participant had exhausted all of his problems. Thus, if a person came with only one problem he spoke at the first turn but passed thereafter. Problem descriptions were kept as brief as possible and questions from other participants were held to points of information and clarification.

The third part of the workshop was problem consolidation and clarification. This was necessary because several individuals proposed similar problems. When this happened, one of the proposers was designated as chairman of a task group to draft a consolidated problem description which may have one or more parts. The other members of the task group (i.e. the individuals who suggested similar problems) were expected to review, modify, and agree to the consolidated problem description. When this was done, the consolidated problem description replaced the several similar problems proposed originally. At the conclusion of the third part of the workshop, on Saturday morning, each task group chairman summarized the consolidated problem for all of the participants.

The fourth and final part of the workshop was devoted to ranking the problems in priority order. This was done by each participant selecting and ranking the top 15 problems. This provided a consensus and guide to the participants' views on the most important problems that need attention.

Both typing and drafting support were available throughout the working meeting so that camera-ready problem descriptions and location maps were completed and agreed to before the participants departed.

OUTPUT OF WORKSHOP

The tangible output of the workshop is this report which includes all the problem descriptions (with their location maps) presented at the workshop. These are listed in the priority order established by the participants. Each participant and each Congressional sponsor will receive a copy of the report. Additional copies of the report are available at the cost price of $3.00 for as long as the supply lasts.

The intangible output of the workshop is a better appreciation by each participant of the interrelationship of the oceanographic problems confronting various commercial users and their regulators working on the Atlantic continental shelf.

WHAT ACTION WILL OCCUR AS A RESULT OF THE WORKSHOP?

Several things will no doubt happen, some planned and some serendipitous. The planned next step will be a second workshop to develop promising problem approaches to solve, or at least shed light on, the high priority problems. This workshop will involve most of the participants from the "users" workshop and will, in addition, involve researchers and other individuals best able to help develop rational and economical approaches to solving the high priority problems. Here we will ask the participants from the May "users" workshop to identify individuals who should be invited to the second workshop. The second workshop is scheduled for September 19-20-21, 1977 at the Clayton Conference Center in Newark, Delaware.

The output of this second workshop will provide the preliminary framework for action programs which can be presented to government and/or industry groups for support. Some elements of these high priority problems will require more detailed planning to develop a program design of sufficient detail to warrent support.

WHY DID SEA GRANT ORGANIZE THIS WORKSHOP?

The National Sea Grant Program was created in 1966, "to accelerate national development of marine resources, including their conservation, proper management, and maximum social and economic utilization." Sea Grant is now 11 years old and as noted earlier has established a solid base in universities from Maine to Florida. These Sea Grant institutions have developed close ties to both industry and to their state governments. Each is capable of dealing with short-term problems through their advisory service arm and also in dealing with longer-term problems through research. Of particular importance is the attention paid to the communication of results.

It has been clear to many Sea Grant directors and to many elected state and federal representatives that an increasing number of important oceanographic and oceanographic engineering problems are arising, particularly on our Atlantic continental shelf, and that adequate answers are not available. This, then, is a first step to turn to the commercial users, the corporations and individuals who create new wealth and who pay taxes to support our government and its regulatory and research activities, to learn first hand from them, and they from each other, just what their high priority problems are.

EXPENSES

Direct costs of the workshop were borne by the host Sea Grant institutions. This included all scheduled activities at the Clayton Conference Center, workshop support, and the publication of the report. The host institutions also paid the cost of motel accommodations in Newark if requested in writing no later than June 6, 1977. Each participant paid his travel expenses to and from the workshop. Each participant was encouraged to bring his spouse provided they paid the cost of the meals.

OBSERVERS

Observers included Congressional staff, interested scientists, federal administrators, and members of the press. A list of observers is attached as Appendix 3.

ACKNOWLEDGMENTS

Both the participants and support staff worked hard to make this workshop productive. It was important that each participant had the full text and map for each problem (there were 105) as soon as possible after it was presented. It was also important that each problem presented was given a descriptive title, a number and posted on the wall of the work room immediately after each presentation. As the participants will recall we adjourned at 2300 hours Friday night and the typists and draftspersons continued until 0030 hours Saturday morning so that each participant had a complete set of the 105 problems at his place on Saturday morning at 0830 when work resumed. The following individuals deserve a great deal of credit for their part in making the workshop operate smoothly:

Dr. Robert Biggs, deputy chairman and workshop secretary; Dr. Paul Jensen, assistant workshop secretary and technical editor; Mr. Joseph Pezley, graphic artist; Ms. Marianne Ottolini, typing and drafting supervisor; Ms. Jo Palmer and Ms. Ellen Ganzman, typists; Ms. Sandy Steele, reproduction and collation; Ms. Lois Butler and Ms. Lorraine Turner, draftspersons; Ms. Dorothy Kozey, conference coordinator. Ms. Linda Clymer typed the final report.

W. S. Gaither
Workshop Chairman

June 5, 1977

PRIORITY PROBLEMS

Participants identified 105 problems which were then consolidated into the 83 that are presented in order of priority in this section. Priorities were established by each participant completing a score sheet, listing his top 15 problems in descending order (see Analysis of Results, p. 177). When the score sheets were tallied, the problem with the lowest score represented (according to consensus of the group) the highest priority. While there are 83 priority problems, the lowest rank is only 65 because 13 problems received tie votes; tied problems are indicated by "a, b, etc." after the rank number.

Editor's Note: Delineation of the northern 200-mile limit is under dispute; these maps show boundaries claimed by both the U.S. and Canada.

1

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Develop Regional Dredged Material Disposal Plans Designating Sites that are Environmentally and Economically Compatible

(combines 10W, 40W, 43W, 46W, 87W and portions of 41)

Proposed by: J. Wrenn, V. T. Boartwright, R. Hanks, J. Schubel, D. Sensibar, and D. Suszkowski

PROBLEM DESCRIPTION:

Along the entire Eastern Seaboard there is a continuing and unabated need for dredging. Sedimentation rates in estuaries and harbors are naturally high and have been accelerated by man's activities in their drainage basins. Even if strict soil conservation measures were to be imposed, dredging would continue to be an essential activity to maintain ports and insure recreation and boating uses. New port development and deepening of existing berthing facilities, requires additional dredging.

Much of this material is fine-grained (silt and clay) and may be enriched with a variety of natural and man induced chemical constituents.

Tens of millions of cubic yards of this material have been disposed of in coastal waters for over 100 years

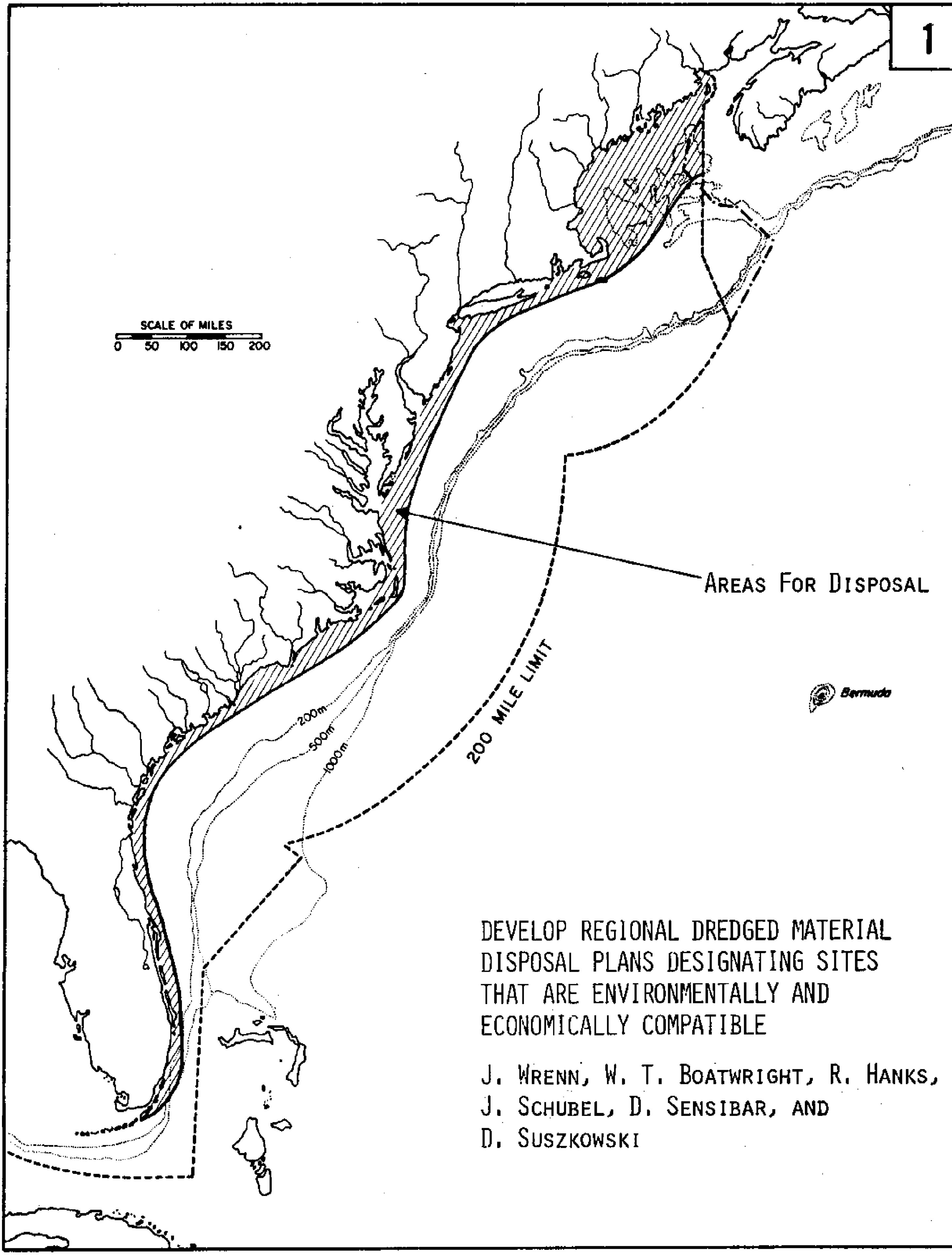
Concern over possible undesirable impacts of open water disposal have frequently resulted in prolonged delays in obtaining the required permits. The delays have, in many cases, resulted in great economic hardship, in the absence of any dredged material management plans.

The following special tasks in the development of solutions to the problems should be considered:

a. Identification of feasible methods of disposal.
b. Designation and ranking of various areas of disposal of different types, quantities and qualities of materials.
c. Time of year relationships to methods of disposal.
d. Assessment of creative uses of the dredged material.
e. Extensive studies of acute affects of dredging and disposal operatives have clearly shown that these activities can be carried out with minimal and predictable environmental damage. The chronic effects have not been adequately assessed. To do this, bio-uptake of trace containment must be studied.
f. Consideration of deep-hole disposal as an acceptable disposal method.

COMMERCIAL SIGNIFICANCE:

The economic life of the country depends to a great degree on the effective operaton of its ports. Failure to act in a timely manner will lead to economic disaster.



DEVELOP REGIONAL DREDGED MATERIAL DISPOSAL PLANS DESIGNATING SITES THAT ARE ENVIRONMENTALLY AND ECONOMICALLY COMPATIBLE

J. Wrenn, W. T. Boatwright, R. Hanks, J. Schubel, D. Sensibar, and D. Suszkowski

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Ocean's Assimilative Capacity for Waste Materials
(combines 5W, 23W, 45W)

Proposed by: R. R. Balmer, R. F. Williams, Jr., A. Hooper

PROBLEM DESCRIPTION:

Our technological society takes many natural materials, uses them, most likely altering their form, place and concentration and then discards them. We may change the nature of the materials, but we cannot avoid the ultimate requirement that deposition must take place somewhere. We cannot repeal the natural law of conservation of matter. For some materials, the ocean may be the best receptacle from both an environmental and social point of view.

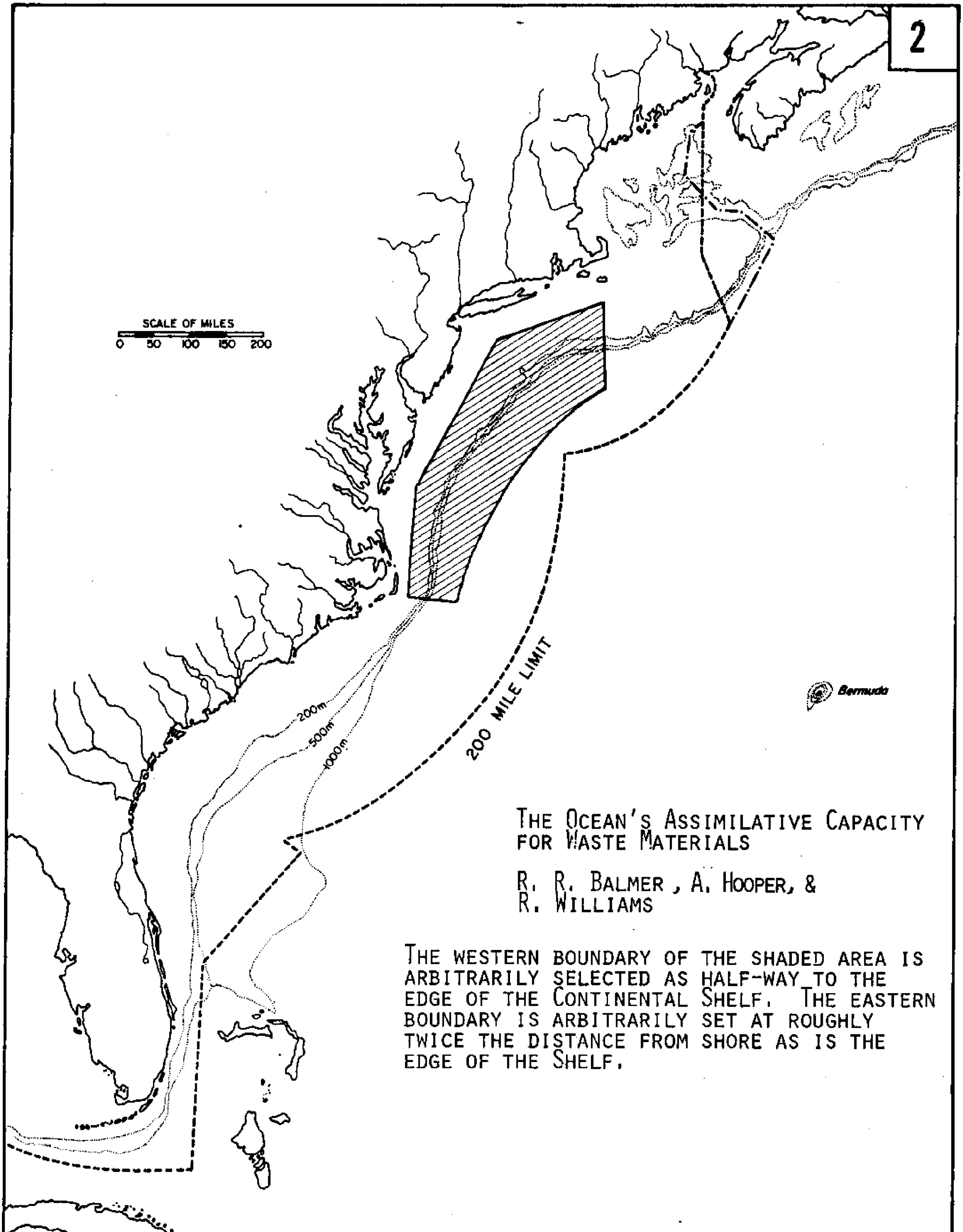
The problem needing solution is: how can the assimilative capacity of the ocean be determined? This can be approached specifically, such as finding out how much of a particular material can be safely disposed of in a given area, or generally such as determining what materials can be safely disposed of in the ocean. In the case of pathogens the critical information needed is their survival time and dispersion in the receiving waters. Current research is being conducted in use of high energy electron radiation to destroy not only bacterial but also viral material.

This general problem generates many subproblems such as characterization of marine biological and physical effects of waste materials, disposal site selection and efficient monitoring of impacts. Many of the other problems highlighted in this workshop require solution to help answer the problem herein proposed.

The attached map shows an inner area where population and technological development will likely create the greatest pressures for ocean disposal of waste materials.

COMMERCIAL SIGNIFICANCE:

Historically, coastal areas tend to develop more rapidly than inland areas. Future development, coupled with restrictions on available energy sources and land disposal sites, will likely make land-based waste material disposal systems unusually costly and/or environmentally less desirable. A solid base of oceanographic information will help determine where industrial wastes can be disposed of in the best interests of society.



THE OCEAN'S ASSIMILATIVE CAPACITY FOR WASTE MATERIALS

R. R. BALMER, A. HOOPER, & R. WILLIAMS

THE WESTERN BOUNDARY OF THE SHADED AREA IS ARBITRARILY SELECTED AS HALF-WAY TO THE EDGE OF THE CONTINENTAL SHELF. THE EASTERN BOUNDARY IS ARBITRARILY SET AT ROUGHLY TWICE THE DISTANCE FROM SHORE AS IS THE EDGE OF THE SHELF.

3

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Coastal and Offshore Wave Data
(combines 2W, 28W, 38W, 90W)

Proposed by: P.M. Aagaard, T. Saville, Jr., and H. B. Stewart, Jr.

PROBLEM DESCRIPTION:

Waves are among the most important of oceanic environmental conditions which affect man in coastal regions, including both the shore and the adjacent continental shelves. Extensive knowledge of wave conditions is required for planning and design of shore, nearshore, and offshore projects and operations. Beach erosion and restoration, navigation, and coastal flooding problems cannot be adequately solved without a substantive knowledge of the wave climate.

Statistics of extreme sea states are vital for selecting design values for proposed offshore and coastal installations or assessing the suitability of certain equipment that may be exposed to severe sea states. Improved data are required for development of better marine forecasting models, coastal management and planning, offshore environmental assessment and pollution programs, and input for local wave forecasts and disaster predictions. Available wave data are inadequate and consist of visual estimates of wave conditions made from ships, some scientific measurements made for short time periods, a few long-term measurements made from piers and offshore platforms, and hindcast values of insufficient accuracy and at large distances from this coast.

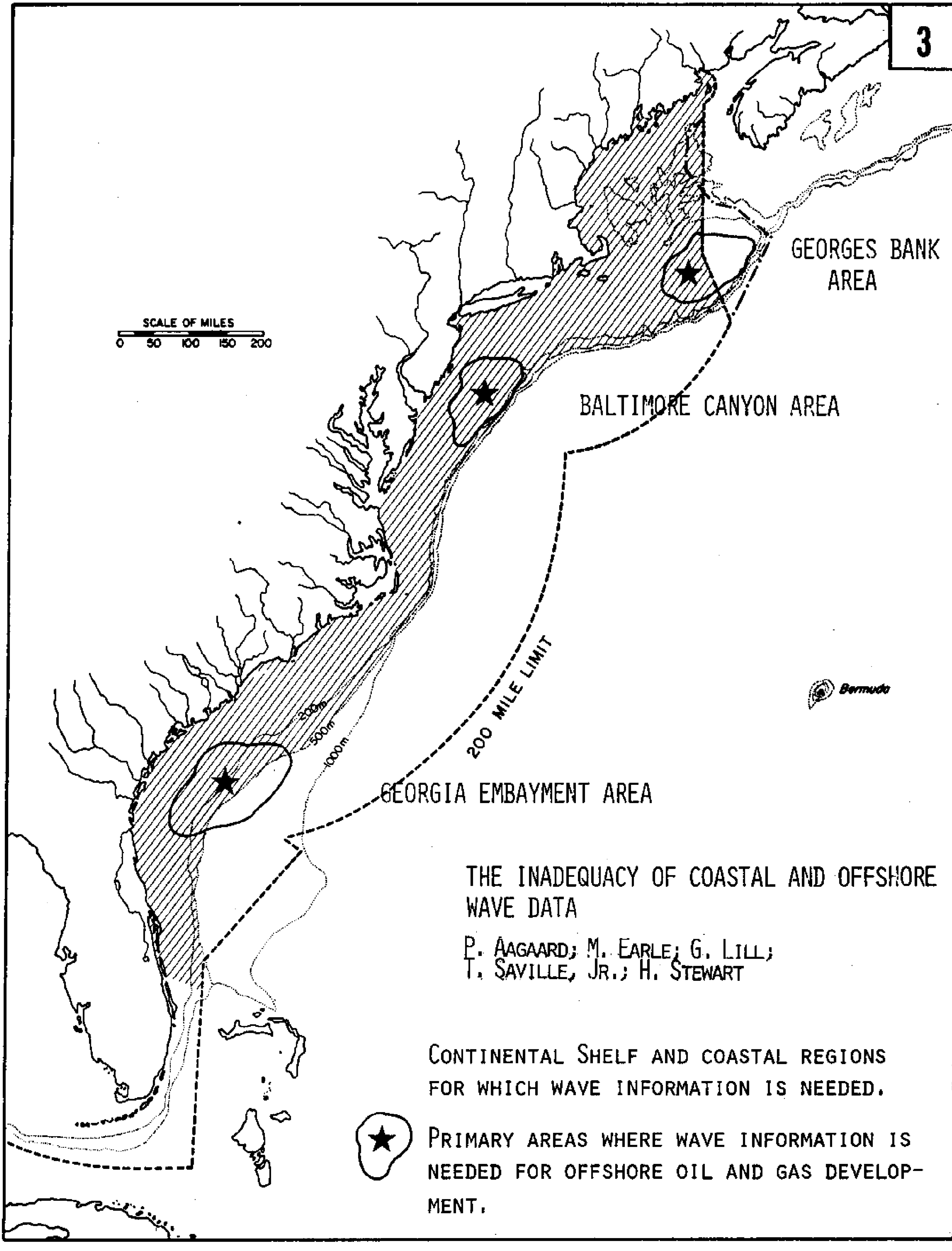
Accurate measured wave data should be collected to satisfy user requirements. While simple data of height and period will be useful, greatly increased benefit will accrue from data suitable for analysis to determine wave energy frequency and directional spectra. In addition, long-term wave conditions must be monitored to obtain an accurate statistical description of the frequency of occurrence of specific wave conditions particularly severe wave conditions. Existing wave data do not satisfy these requirements.

Field data, particularly on extremes, are required to calibrate and verify hindcast and forecast models to obtain quickly the long term statistics, and to provide the forecasts necessary for operations.

The needs are shown briefly in the table attached. The table also develops the measurements required.

COMMERCIAL SIGNIFICANCE:

Marine operations and ocean construction are extremely costly and solution of this problem would result in estimated cost savings of $50 million to $100 million per year. Known wave conditions and better wave forecasts are required to select equipment, to plan operations, and to reduce downtime. Comprehensive knowledge of wave conditions is essential for the optimum design of offshore structures, coastal erosion preventive measures, breakwaters, and submarine pipelines.


3
GEORGES BANK AREA
SCALE OF MILES
0 50 100 150 200
BALTIMORE CANYON AREA
200 MILE LIMIT
Bermuda
200m
500m
1000m
GEORGIA EMBAYMENT AREA
THE INADEQUACY OF COASTAL AND OFFSHORE WAVE DATA
P. AAGAARD; M. EARLE; G. LILL; T. SAVILLE, JR.; H. STEWART
CONTINENTAL SHELF AND COASTAL REGIONS FOR WHICH WAVE INFORMATION IS NEEDED.
PRIMARY AREAS WHERE WAVE INFORMATION IS NEEDED FOR OFFSHORE OIL AND GAS DEVELOPMENT.

3

NEED FOR COASTAL AND OFFSHORE WAVE DATA

TYPE OF USE OR APPLICATION	METHOD OF INFORMATION DEVELOPMENT	FORM OF DATA	LOCATION FOR WHICH DATA IS TABULATED	MFDIA
Extreme waves for (a) Design Criteria Selection (b) Regulation/ Verification	(a) Hindcast severe Storms over long data base (e.g. 30 yrs.) (b) Long term measurements	(a)Directional spectra (b)Omnidirectional spectra (c)Signif. wave ht., period, Direct. (d)Signif. wave ht., period	(a)200 mi. spacing at shelf edge or 200 mi. limit (b)50 mi. spacing at 50' to 100' contour (c)site specific locations	Report
Operating Wave Conditions for (a) planning operations construction (b) selecting equipment	(a) Hindcast at daily 12 hr. interval over moderately long data base (e.g., 5 yrs.) (b) Long term measurements	(a)Ht., Per., Dir., % occur./mo. (b)Uninterrupted duration of ht. greater than or less than specified ht.	Same as extremes	Report
Wave forecasts for (a) conduct of operations (b) recreation (c) ship routing	Calculation from met./ ocean/satellite real time data	(a)Dir. spectra (b)Signif. wave ht. per., dir. 12, 24, 48, 72 hr. forecasts	Same as extremes	Special radio, facsimile, telex circuits
Math. Model Calibration and research	Measurements of waves, winds, barometric press.	(a)Dir. spectra (b)Omni.Dir. spectra (c)Signif. Ht., Per., Dir., Max. wave ht.	Selected deep water and shallow water locations	Basic wave records
Forecast input	Same as Math. Model Calibration	→	→	Special Circuits

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need For An Adequate Long-Term Monitoring System for Continental Shelf Waters to Measure Major Changes in Environment and Living Resources

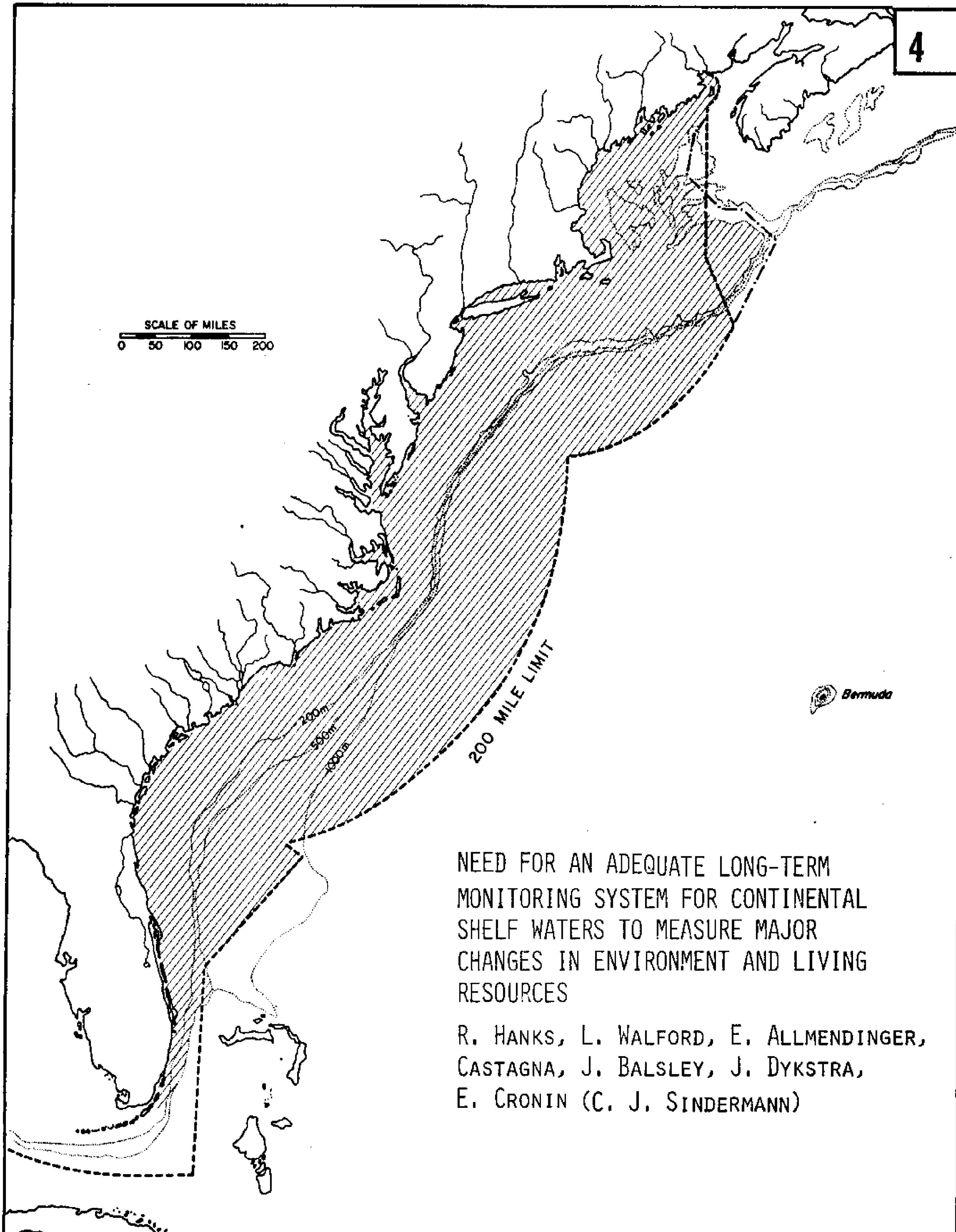
Proposed by: R. Hanks, L. Walford, E. Allmendinger, Castagna, J. Balsley, J. Dykstra, E. Cronin (C. J. Sindermann) (Combines 6W, 19W, 44W, 47W, 58W)

PROBLEM DESCRIPTION:

The detection of significant changes and the determination of their causes are essential to the effective management of shelf resources. To provide the necessary information base, there is a need for a major long-term program of monitoring environmental features, including the living resources of the U. S. Atlantic Continental Shelf from the inner reaches of estuaries to the 200-mile limit. This would require a unified and coordinated effort by academic, industry, State and Federal institutions. The monitoring program would include physical, chemical, and biological features, both natural and man-induced.

Natural catastrophic episodes such as "red tides" and anoxia of bottom waters can probably be explained only in the light of information obtained in such a program. Similarly the consequences of catastrophic events, short or long term, resulting from human activities, such as oil spills, dumping of waste materials and OCS explorations can only be measured in relation to a continuously changing base line.

COMMERCIAL SIGNIFICANCE:



NEED FOR AN ADEQUATE LONG-TERM MONITORING SYSTEM FOR CONTINENTAL SHELF WATERS TO MEASURE MAJOR CHANGES IN ENVIRONMENT AND LIVING RESOURCES

R. HANKS, L. WALFORD, E. ALLMENDINGER, CASTAGNA, J. BALSLEY, J. DYKSTRA, E. CRONIN (C. J. SINDERMANN)

5

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Need to Describe or Predict the Dynamics of Ocean Waters on the Continental Shel and Also the Location and Movement of Associated Characteristics or Enveloped Materials

Proposed by: R. K. Dearborn, C. N. K. Mooers and R. Dean (Combines 14W and 55W)

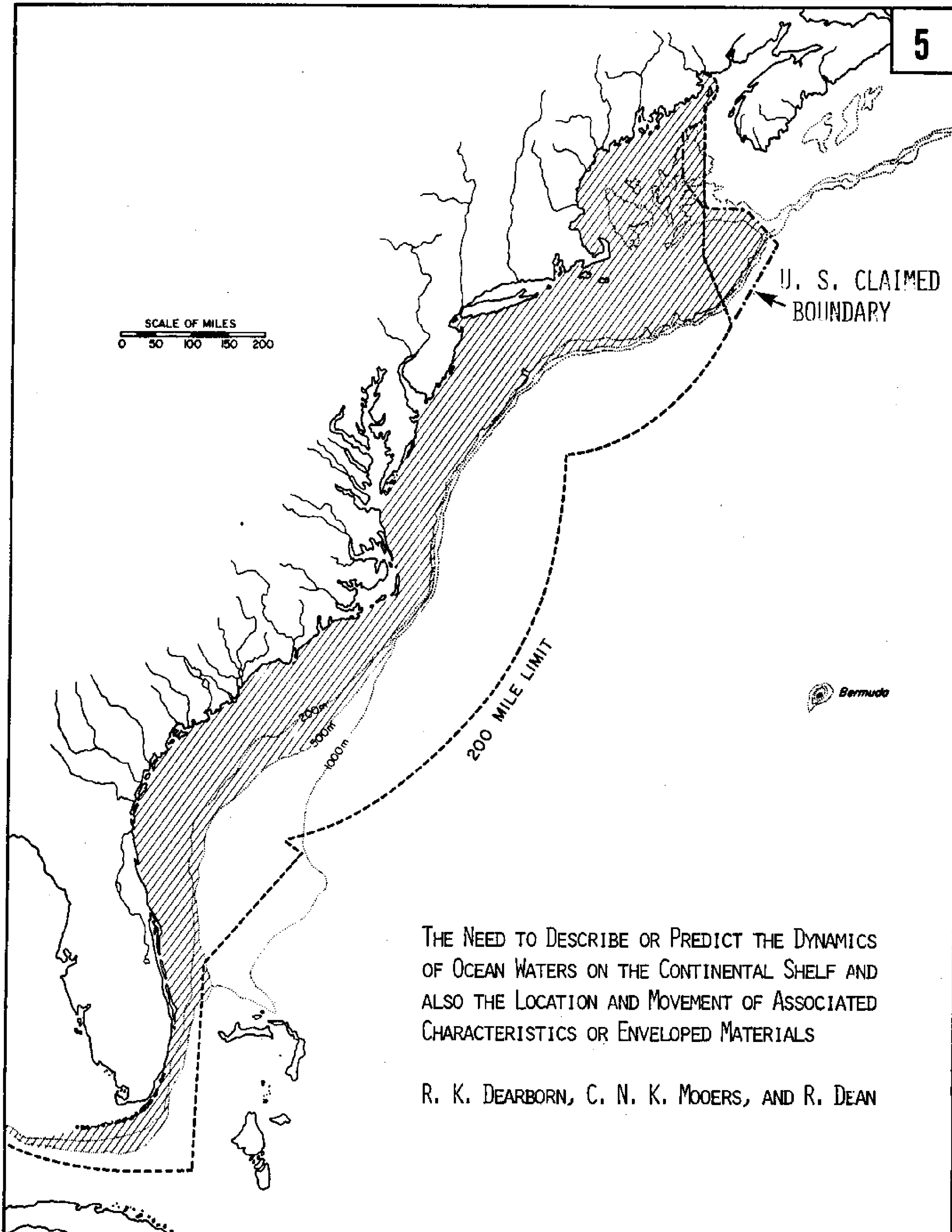
PROBLEM DESCRIPTION:

Whether for predicting the location of valued resources or the movement of pollutants within the water column, an understanding of the flow patterns which take place along our coast is important. Other important phenomena which must be described and predicted include storm surge, gravity waves, tides, storm driven currents and seasonal flows. A better understanding than presently exists of the responses of the shelf waters would allow such diverse groups as fishermen, ocean dumpers, designers, the environmentally concerned public, scientists of many disciplines, and regulatory agencies to pursue their ocean tasks more effectively and expeditiously.

Prediction (predictions here means both hindcast and forecast) of these physical phenomena is complicated and may involve the combination of climatologies, real-time data and numerical models. Some users of developed information require only long term values, extreme events or averages. Others would benefit primarily from daily predictions on a regional grid. The predictive models are interrelated and the task should begin.

COMMERCIAL SIGNIFICANCE:

Problems of coastal flooding, seabed stability, coastline erosion, sediment transport, the fate of pollutants, and the state of the marine coastal ecosystem all are strongly governed by storm surges and circulation. Hence, both to exploit and protect natural resources, i.e., to manage, the surges and currents must be known for both diagnosis and prognosis of environmental disasters and commercial operations.



The Need to Describe or Predict the Dynamics of Ocean Waters on the Continental Shelf and also the Location and Movement of Associated Characteristics or Enveloped Materials

R. K. Dearborn, C. N. K. Mooers, and R. Dean

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop a Better Understanding of Coastal and Estuarine Shoreline Dynamics for the Purpose of Developing Predictive Models

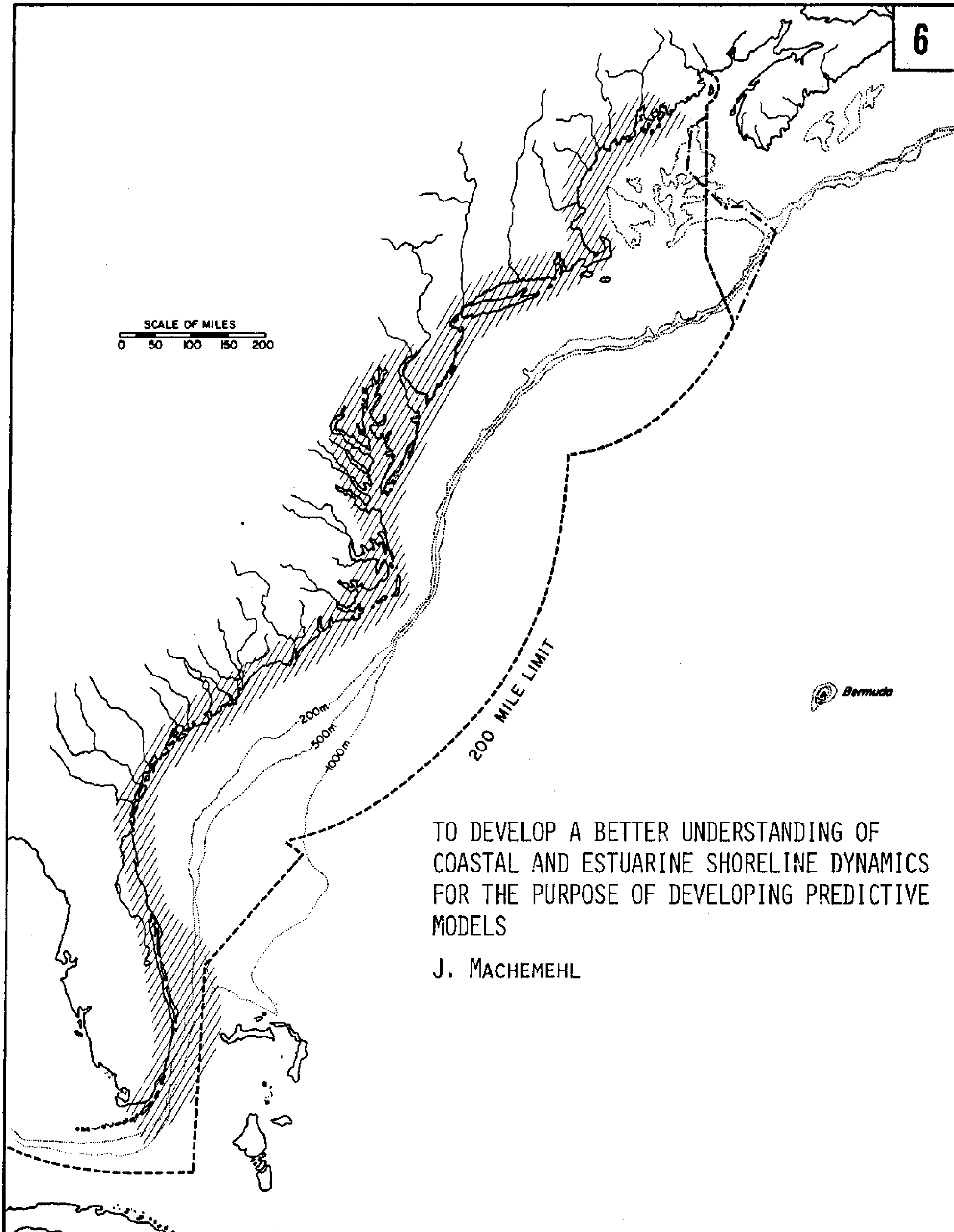
Proposed by: J. Machemehl

PROBLEM DESCRIPTION:

Atlantic storms (hurricanes and northeasters) affect our coastal and estuarine shorelines. Erosion of beaches and dunes due to storms is well documented by the U.S. Corps of Engineers and other federal agencies. Property and structures are lost as a result of severe erosion. A better understanding of coastal processes is essential for managing the coastline. A predictive capability is needed to assist engineers and managers in coastal zone management.

COMMERCIAL SIGNIFICANCE:

Valuable coastal property is lost as a result of severe erosion. Recreational beaches are lost. The prediction/forecasting of dynamic changes/erosion is important for managing the coastal zone.



6

TO DEVELOP A BETTER UNDERSTANDING OF COASTAL AND ESTUARINE SHORELINE DYNAMICS FOR THE PURPOSE OF DEVELOPING PREDICTIVE MODELS

J. MACHEMEHL

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Assess the Effects of Ocean Dumping on Quality, Safety and Production of Marine Food Species
(Related to 38, 2, 29, 1)

Proposed by: D. A. Hunt

PROBLEM DESCRIPTION:

Two commercially valuable species of shellfish, the sea clam and the ocean quohog range within the area between Cape Cod and Cape Hatteras, an area of approximately 30,000 square miles.

At the present time, advisory closures have been imposed upon approximately 365 square miles of that area because of ocean dumping of domestic and industrial wastes.

10^6 cubic meters of wastes including dredge spoils, sewage sludge, rubble, tin oxide and other chemical wastes were dumped on the middle Atlantic continental shelf in 1974, and the practice continues.

Questions:

Is ocean dumping compatible with the production of safe, high quality marine food species?

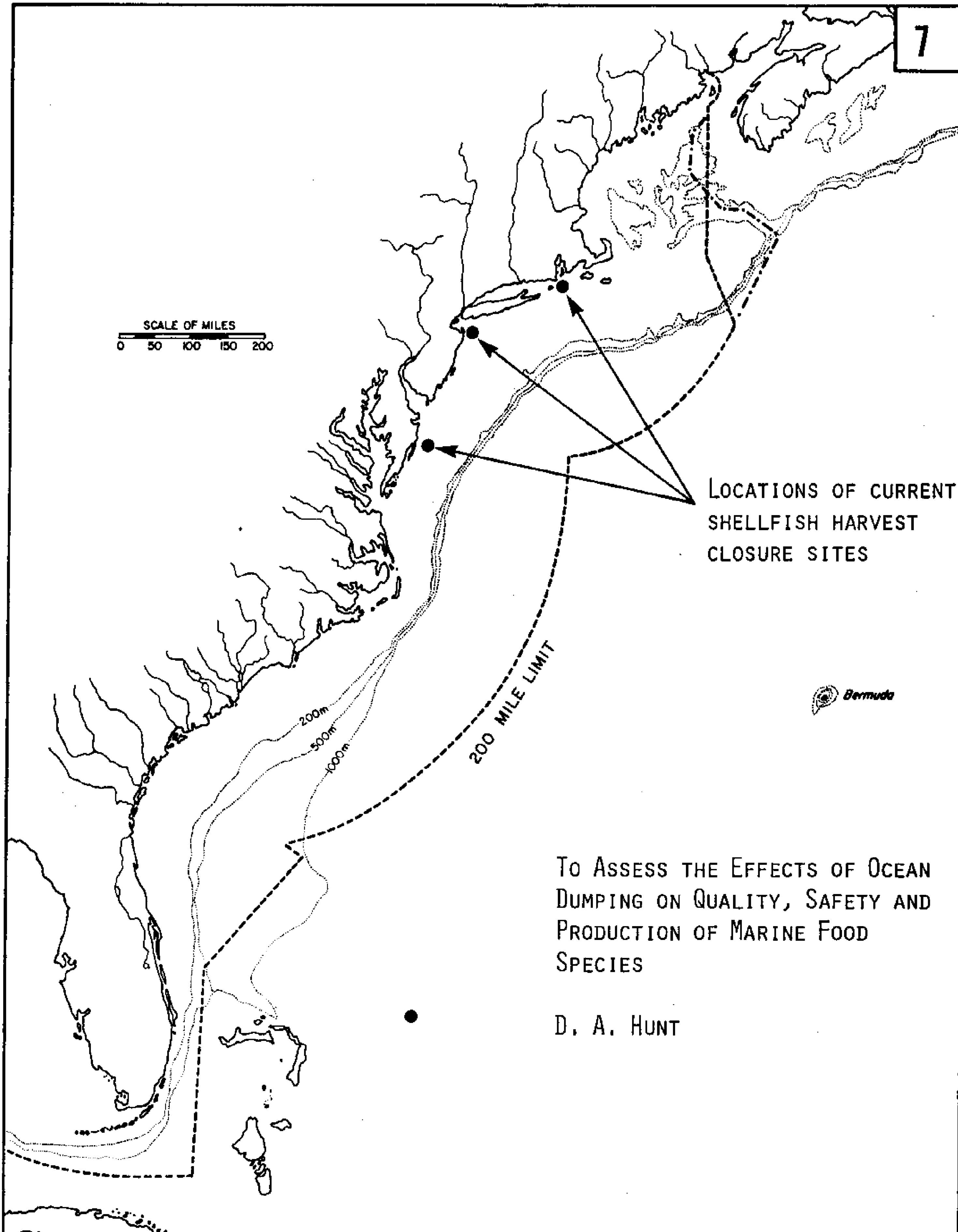
Does ocean dumping promote growth of harmful or undesirable biota?

What are the alternatives for waste disposal which are compatible with energy conservation and the production of marine food species?

Can O_2 depletion and the resulting "dead sea" areas be prevented? How?

COMMERCIAL SIGNIFICANCE:

Reduction of potential harvest of at least two marine food species.



TO ASSESS THE EFFECTS OF OCEAN DUMPING ON QUALITY, SAFETY AND PRODUCTION OF MARINE FOOD SPECIES

D. A. HUNT

8

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Improved Real Time Coastal and Offshore Marine Weather and Oceanographic Observational Data and Analytical and Forecasting Models
(combines with 31W)

Proposed by: L. Baer and V. C. McDermott

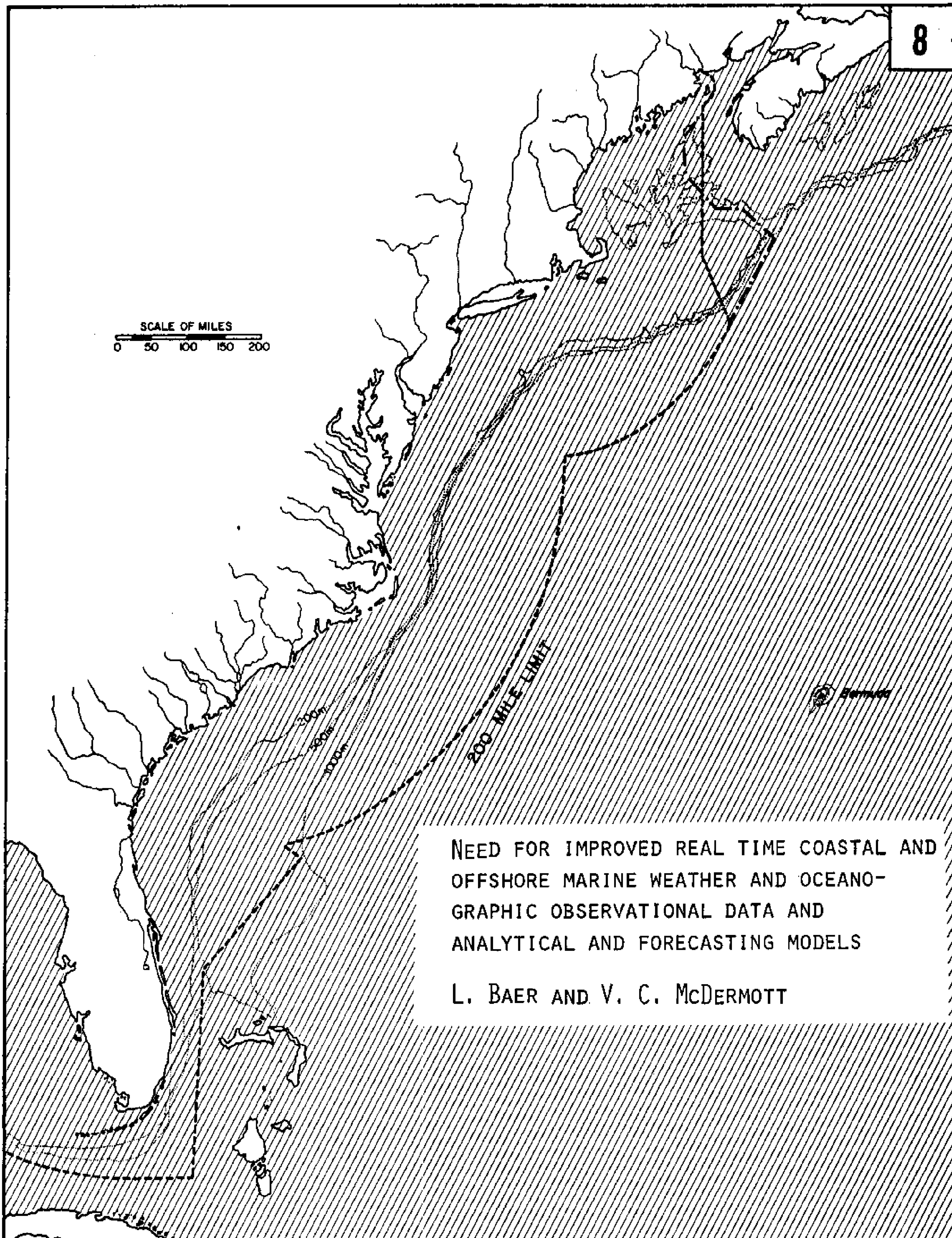
PROBLEM DESCRIPTION:

Data are needed both to develop analytical and forecasting models and to operate such models in support of all types of marine and coastal operations including recreation. The problem is complicated by the discontinuity and complexity of the coast which requires close proximity observations nearshore to properly provide the shoreward extension of analyses and forecasts into this area of maximum use. Such data and models (for hindcasting) should also be used in the development of long term statistics.

Adequate systems are not now available for subsurface oceanographic data or for automated meteorological observations. Models connecting surface wind with upper winds are not adequate. Complete coastal and estuarine oceanographic models are only embryonic.

COMMERCIAL SIGNIFICANCE:

Valuable for all coastal (onshore and offshore) operations.



NEED FOR IMPROVED REAL TIME COASTAL AND OFFSHORE MARINE WEATHER AND OCEANOGRAPHIC OBSERVATIONAL DATA AND ANALYTICAL AND FORECASTING MODELS

L. BAER AND V. C. MCDERMOTT

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop Guidelines for Designating Offshore Undersea Areas and Corridors Connecting Them To Shore

Proposed by: J. Hillmann, S. Orlofsky, and R. Dean

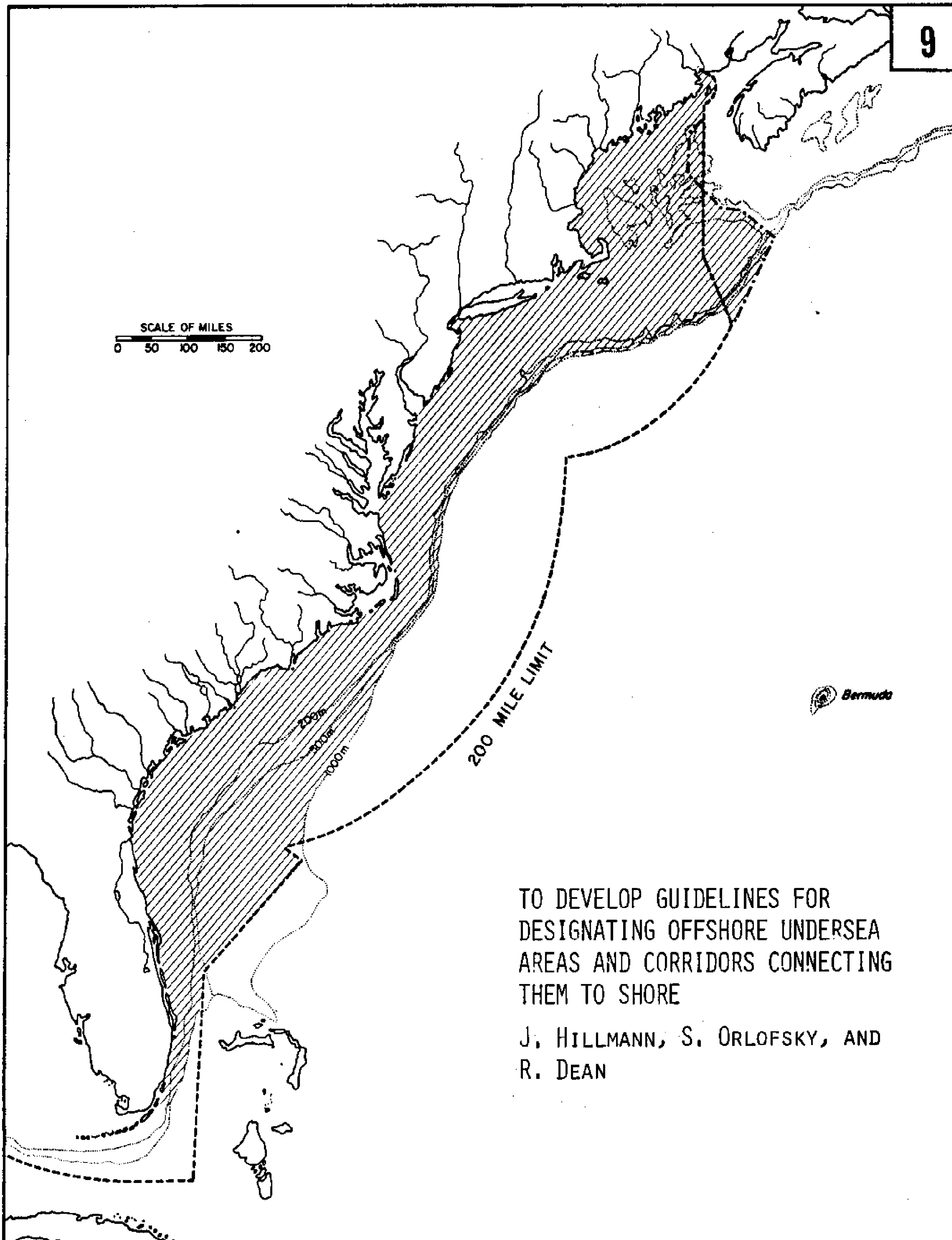
PROBLEM DESCRIPTION:

Atlantic undersea offshore corridors to contain oil and gas lines, electric cables and non-nuclear waste disposal lines should be established. The designation of corridors should be considered in view of the cumulative impact concerns to the shelf and ocean environment, engineering consequences and social impacts on the coastal and inland areas.

Pipeline excavation across the shelf will invariably encounter very different kinds of sediments. The difference in compaction and settling of the pipe structure in the laterally varying sediments presents engineering hazards. Reconnaissance exploration in potential pipeline corridors is needed to assess these hazards.

For example, over the past few years our geological exploration of the continental shelf has recovered sediments of various kinds. It is clear that there are lagoonal sediments, mostly clay-like muds, under the inner shelf as well as farther out near the shelf break, which contrast markedly with the coarse sands typical of the present shelf hydraulic regime. These lithologic contrasts control the engineering behavior of these markedly different sediments, and should be considered in establishing pipeline routines.

COMMERCIAL SIGNIFICANCE:



TO DEVELOP GUIDELINES FOR DESIGNATING OFFSHORE UNDERSEA AREAS AND CORRIDORS CONNECTING THEM TO SHORE

J. HILLMANN, S. ORLOFSKY, AND R. DEAN

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Evaluation and Coordination of Existing Estuarine Environmental Data Bases, and Their Development to Permit Improved Interdisciplinary Water Quality Management (combines 7W and 64W)

Proposed by: E. J. Barakauskas, E. H. Man, J. van de Krecke, H. DeFerrari

PROBLEM DESCRIPTION:

Because of the great interest in industry, academia, and government, a great deal of data usually exists on various estuarine systems, e.g., the Chesapeake Bay and the Delaware Bay. Seldom is a comprehensive, multi-discipline, data base available to form the basis for the study of individual problems. Nor is there an overall goal/policy to guide the broad range of activities tending to affect an estuarine system.

Typical estuaries and bays have multiple uses. They are a natural resource, often the local water supply, and they yield natural resources such as fish, oysters, and crabs. They are a major factor in transportation systems, must be kept dredged to allow ship movement, and contain navigation aids. They are used for recreation, boating, fishing, and swimming, each of which puts requirements upon water quality. And, they are used as a sink for waste disposal, ranging from storm water run off, to sewage plant output, to heat from the cooling of power plants.

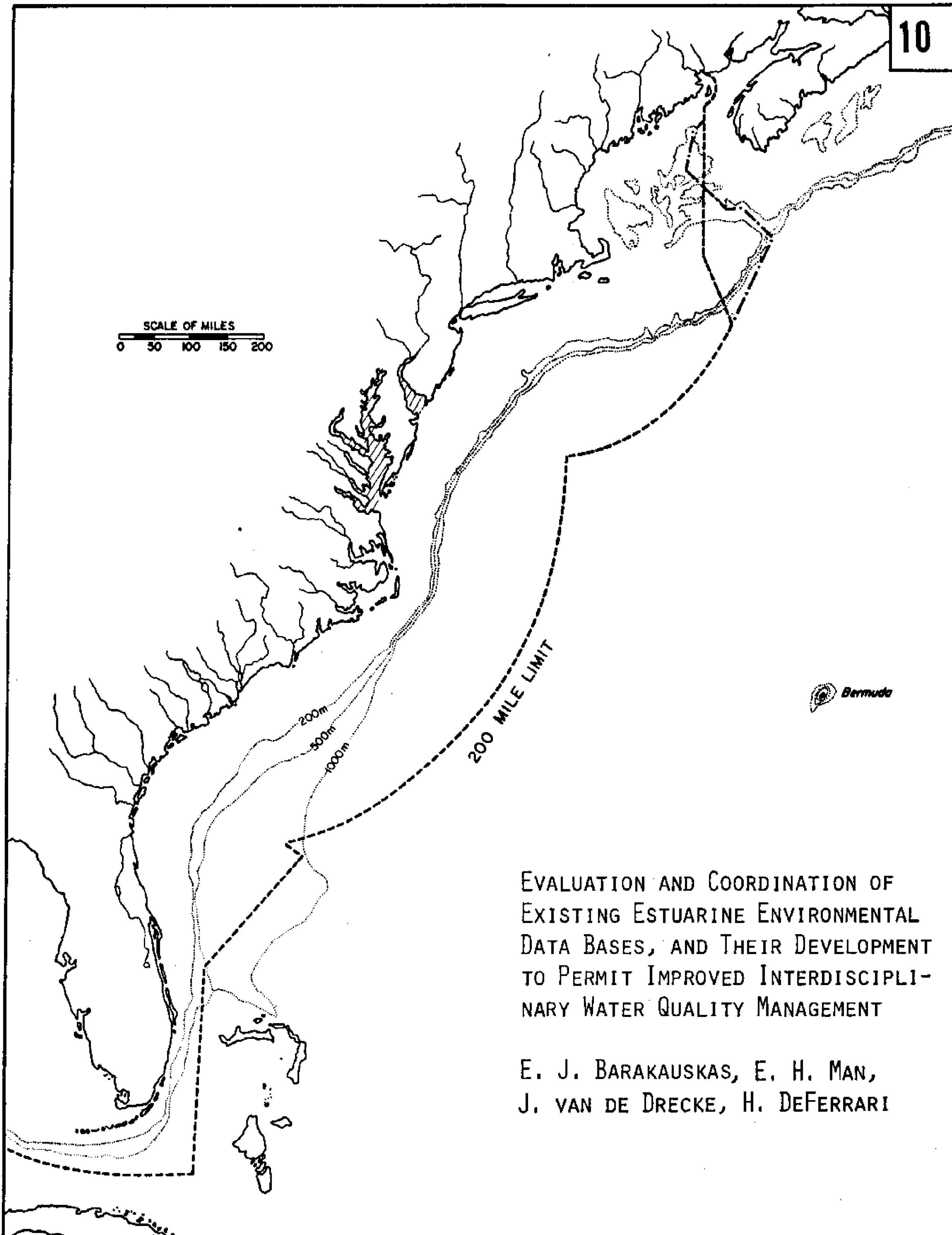
Much of the data obtained on these estuarine ecosystems has been gained in a series of fire drills, such as heavy metals, PCB's, and kepone. In addition, many organizations such as the EPA, the various states, the United States Coast Guard, and the Army Corps of Engineers have special interests. The Coast Guard regulates traffic and is responsible for oil spills. The Corps of Engineers determines bay utilization, grants permits, and does channel dredging. Each activity has its own data base.

Estuaries are fed by fresh water tributaries and interface with ocean water at their outlet. Demands to divert freshwater for various uses (such as agriculture), additional fresh water run-off from storms, or salt water transfer due to abnormal storms or tides affect the ecology of an estuarine system. An economical procedure is required to predict the effects of this interaction to permit decision making.

Because of the various sponsors, and different objectives of various research programs, they have not been integrated into a comprehensive multi-discipline data base which defines the relationships among the various factors. Such a comprehensive, multi-discipline data base is required in conjunction with an overall goal/policy in order to consistently compromise among the conflicting special interest groups which contest over any changes to the bay or the activity thereon.

COMMERCIAL SIGNIFICANCE:

Each and every undertaking on the bay, its shores, or its tributaries, affects the bay and its water quality. A comprehensive multi-discipline data base would certainly increase the efficiency of assessing the impact of proposed activities, would allow the preparation of the necessary Environmental Impact Statements, and could serve as the basis for deriving an overall goal/policy. Power plant siting, dredge disposal, allowable fishing areas, oyster harvests, are a few of the commercial activities involved.



EVALUATION AND COORDINATION OF EXISTING ESTUARINE ENVIRONMENTAL DATA BASES, AND THEIR DEVELOPMENT TO PERMIT IMPROVED INTERDISCIPLINARY WATER QUALITY MANAGEMENT

E. J. BARAKAUSKAS, E. H. MAN,
J. VAN DE DRECKE, H. DEFERRARI

11

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

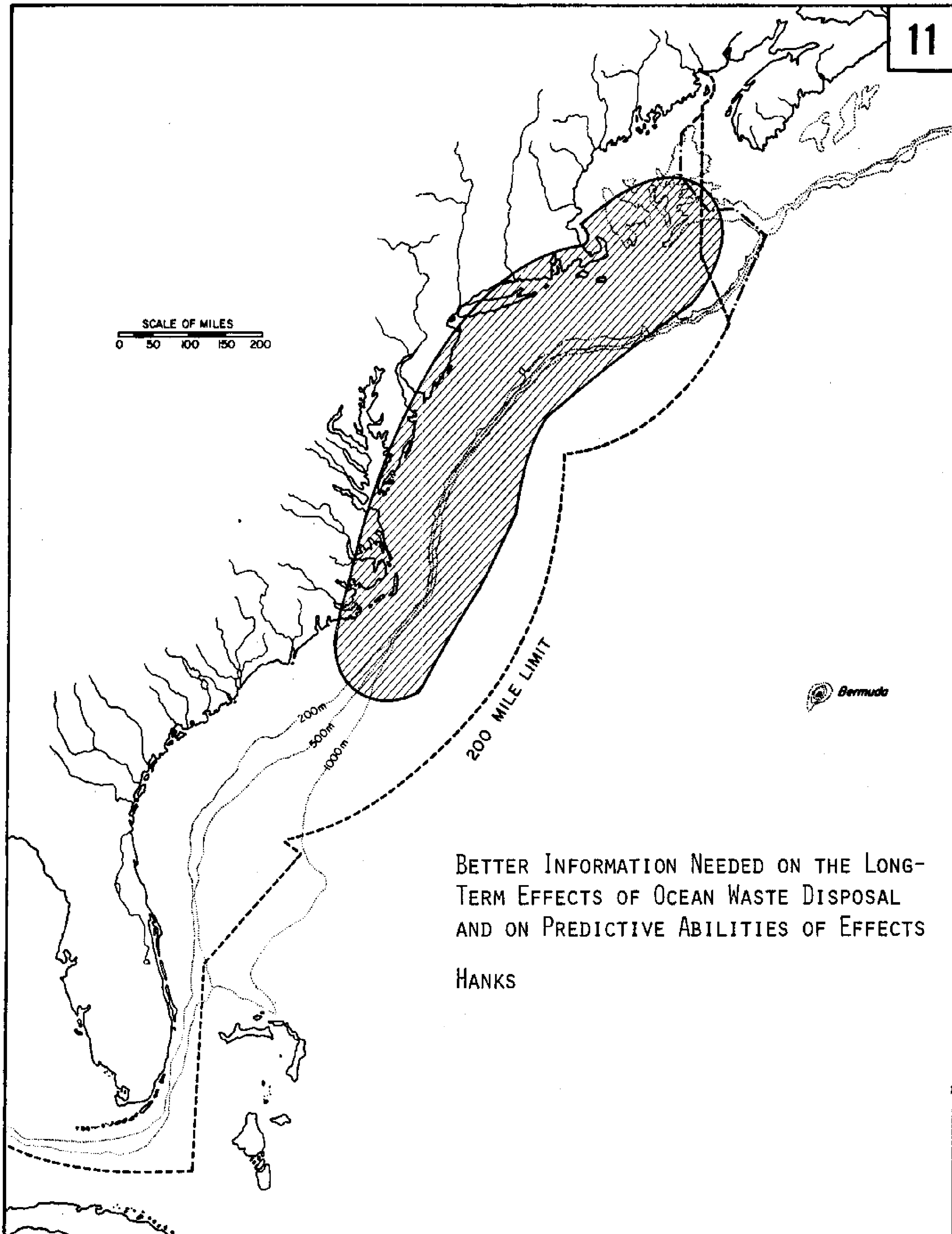
Title: Better Information Needed on the Long Term Effects of Ocean Waste Disposal and on Predictive Abilities of Effects

(Related to 2, 1, 7, 20, and combines 40W, 43W, 46W)

Proposed by: R. Hanks

PROBLEM DESCRIPTION: The problem of where to dispose of municipal and industrial wastes generated in coastal areas has typically been approached by dumping the waste material in the ocean. Increasing volumes of waste, in the face of a growing realization that the ocean, a finite resource, will absorb only a limited amount of waste without damage to the ecosystem, has led to: (1) more stringent regulation of ocean dumping, (2) a search for alternatives to ocean dumping as a means of waste disposal. Many questions are unanswered. What is the relationship of ocean placement of waste materials, whether clean or polluted, to the health of humans, marine organisms, and marine ecosystems? What are the long-term requirements for repositories of waste; whether at sea or on land? How closely can we predict the amounts and constituents of waste materials over the next 20 years? What alternate sites are available for placement of these wastes? What alternate technologies (e.g., recycling, composting) are currently available? What others can be developed?

COMMERCIAL SIGNIFICANCE: (1) Commercial fishing and ocean related recreation enterprises are dependent on maintenance of a viable ocean environment. (2) Navigation channels must be maintained for commercial purposes, and industrial and municipal wastes must be dealt with in some way, or the social and economic systems cannot function. (3) Products of recycling, composting, and other alternatives will be commercially exploitable. (4) Ocean disposal, especially if newly designated sites are near or beyond the continental shelf, will require more seaworthy craft and become more expensive.



BETTER INFORMATION NEEDED ON THE LONG-TERM EFFECTS OF OCEAN WASTE DISPOSAL AND ON PREDICTIVE ABILITIES OF EFFECTS

HANKS

12

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Need to Improve Sediment Transport Predictions on the Continental Shelf (combines 26W and 103W)

Proposed by: B. A. Johansen and R. G. Dean

PROBLEM DESCRIPTION:

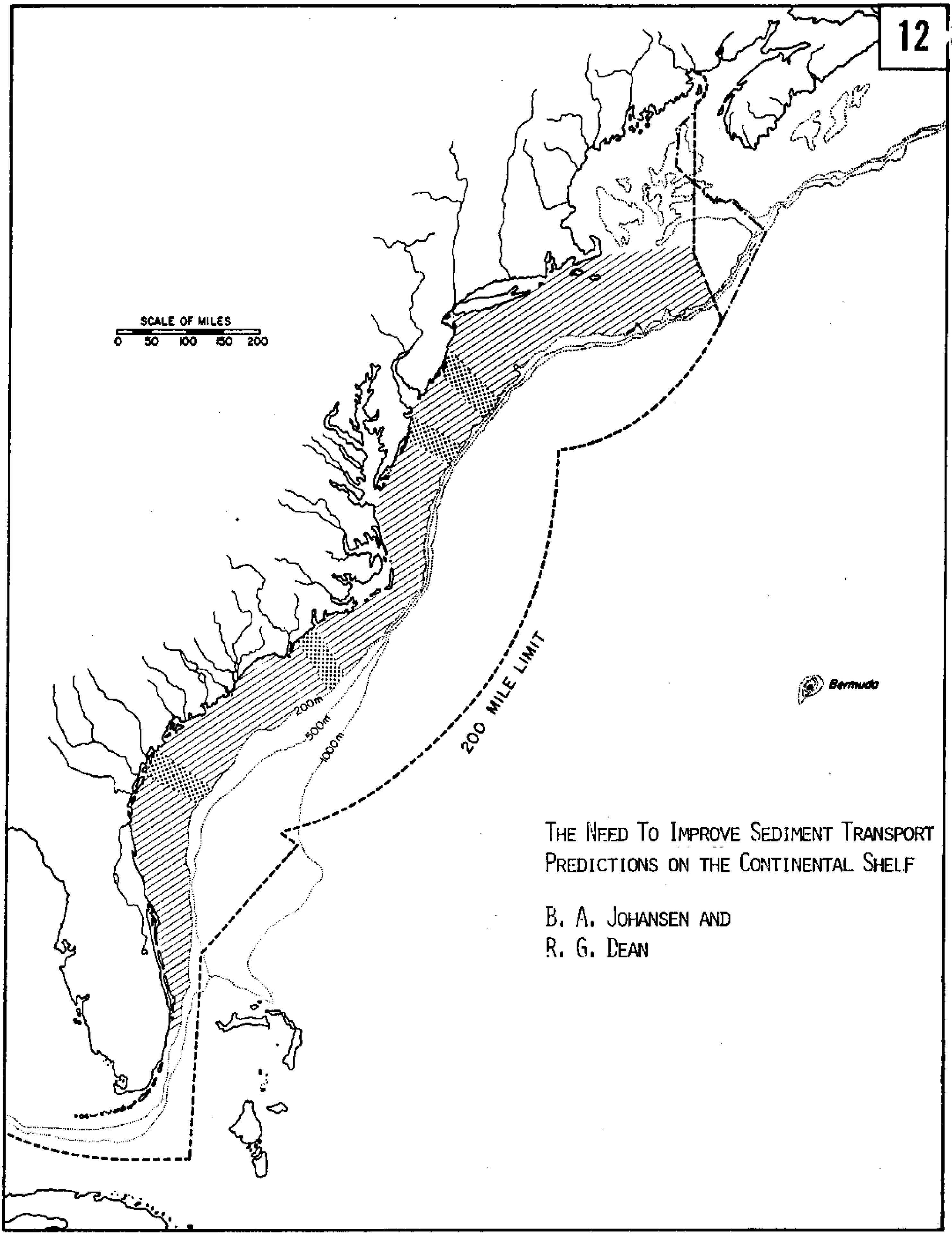
Our capability to predict sediment transportation and disposition and erosion on the continental shelf under varying storm conditions must be improved.

Estimates of bed load transport of both cohesive and noncohesive bottom sediments in the surf zone, nearshore zone and offshore zone, and with man-made structures in these zones have been developed by various investigators to predict accretion and deposition. However, a great deal of effort has been confined to river beds and the field test verification of the analytical methods on the continental shelf is limited. Present methods of predicting sediment transport are still crude.

Purpose of this task is to develop techniques to better predict sediment transport under varying sea conditions of the accretion and deposition on the continental shelf with and without man-made structures. A part of the development is establishment of the threshhold of motion for sediments of differing characteristics (size, shape, specific gravity) in various water depths, including effects of realistic ranges of wave and current conditions.

COMMERCIAL SIGNIFICANCE:

Increased use of the continental shelf requires information leading to better selection of resources (material) to protect the toes of the man-made islands and structures. In addition, the effectiveness of beach nourishment could be established more realistically including considerations of alternative sediment sizes. An improved basis for evaluating the potential effect of a borrow area on the stability of adjacent beaches would be provided.



The Need To Improve Sediment Transport Predictions on the Continental Shelf

B. A. Johansen and
R. G. Dean

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop a Climate of Understanding and Public Confidence In Offshore Data on Which Investment Can Be Encouraged

Proposed by: S. Sixfin

PROBLEM DESCRIPTION:

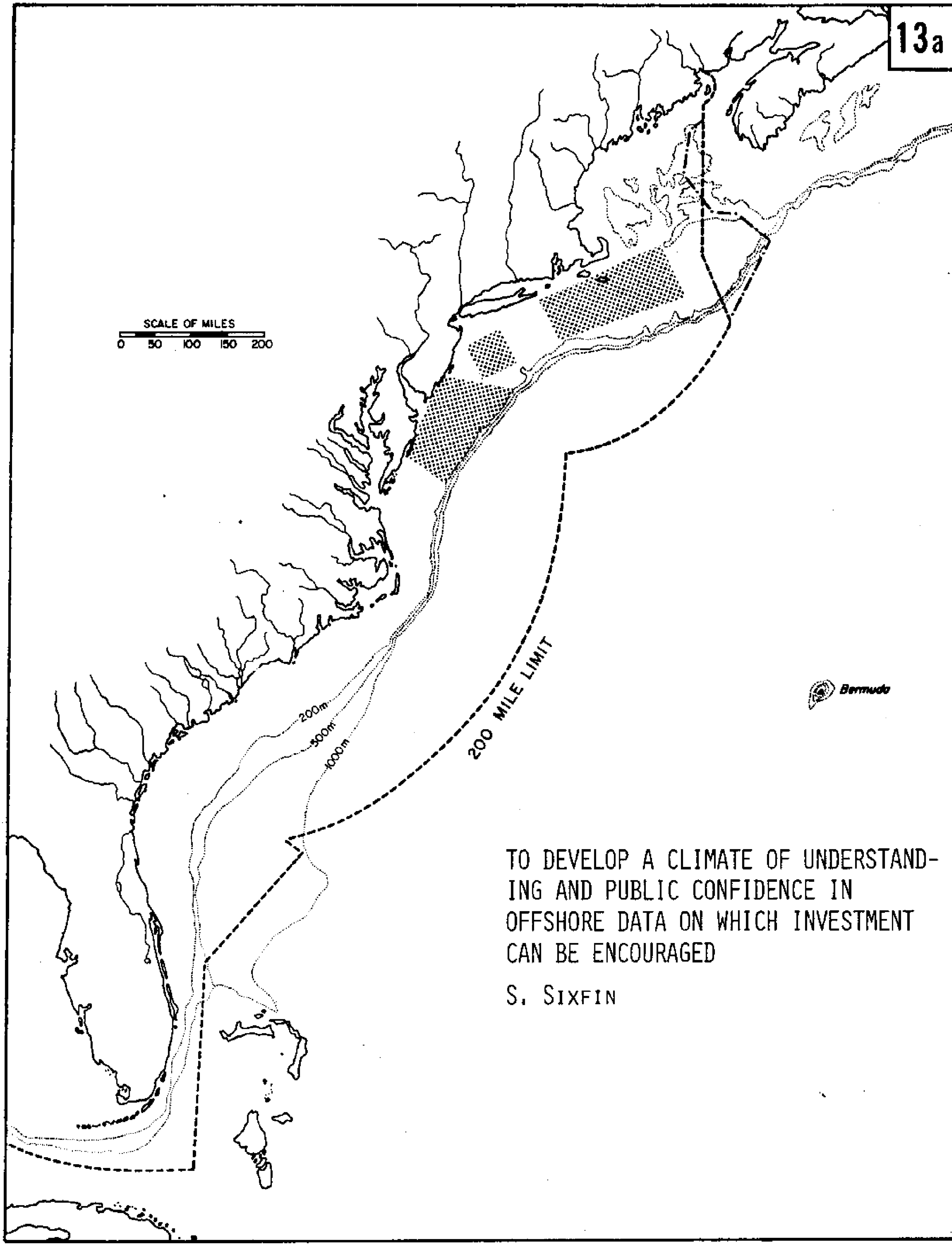
Political conditions in the Middle Atlantic and Northeast coastline states have in the past not generally been conducive to encouragement of offshore oil and gas development. The reasons are manifold. They include the historical availability of low cost energy supplies from the Southwest United States and from various foreign nations.

However, the picture has now changed and it is important for the economy of these and neighboring states to have conveniently available energy resources. Such resources could possibly be developed in the offshore areas but both exploration and development entail substantial economic risk. Investors are unwilling to accept these risks in the face of political and regulatory requirements that might not allow them to effectively and profitably develop the resources in the event that discoveries are made.

The problem is to consider how to possibly develop a framework of economic, political and regulatory environment which will induce people to make the necessary investment.

COMMERCIAL SIGNIFICANCE:

This problem is of the utmost significance to the basic question of the development of Outer Continental Shelf energy resources for the New England and Middle Atlantic states. In absence of an effective solution, it is unlikely that investments will be made to fully realize the potential of whatever energy resources exist. Without such realization, it is likely that the economic health of these and neighboring states will be most seriously impaired.



TO DEVELOP A CLIMATE OF UNDERSTANDING AND PUBLIC CONFIDENCE IN OFFSHORE DATA ON WHICH INVESTMENT CAN BE ENCOURAGED

S. SIXFIN

13 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: What Substances Are Truly Toxic to Ocean Resources?

Proposed by: Norman Nash

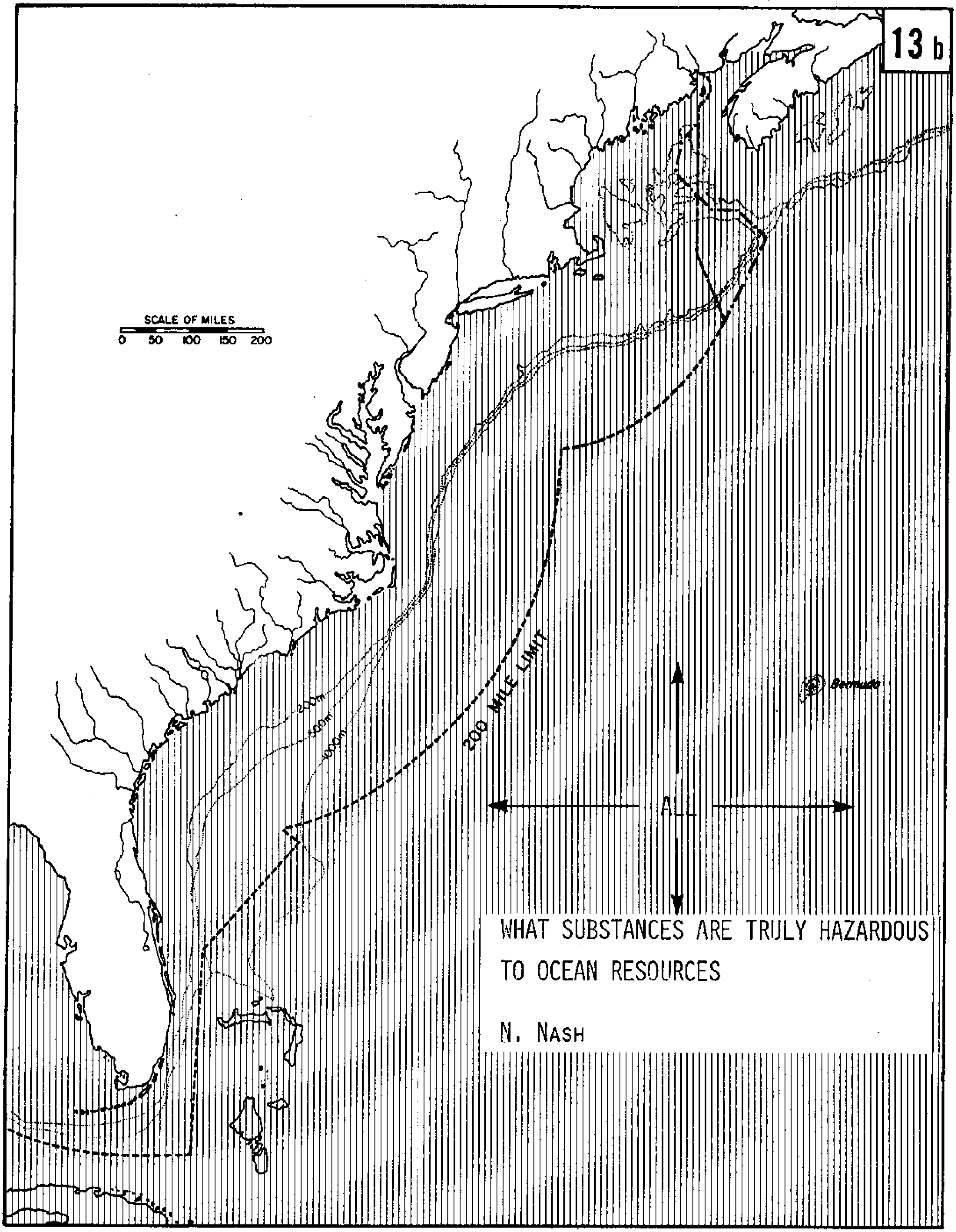
PROBLEM DESCRIPTION:

In 1975 the National Academy of Sciences published a report entitled "Assessing Potential Ocean Pollutants." The purpose of the study was to develop "procedures for predicting which materials might jeopardize future ocean resources. Potential radioactive marine pollutants had been successfully predicted in the past, and other sets of pollutants had been defined by such events as the Minimata Bay mercury poisoning and the pesticide deaths of non-target organisms. However, the thousands of substances that enter the ocean system through industrial, agricultural or domestic activities have remained largely unexamined. Which of these, if any, might have an undesirable environmental effect?"

The study reported on six groups of materials: transuranic elements; synthetic organic chemicals; municipal sludges, industrial wastes and plant effluents discharged directly to the ocean; metallic wastes; medicinal wastes; and marine litter, and rated each group as either clearly posing a potential hazard, or clearly unimportant, or as falling into an intermediate category and requiring further study.

The report concluded that the procedures were workable. The question is, should this work be continued, and who should do it?

COMMERCIAL SIGNIFICANCE:


13 b
SCALE OF MILES
0 50 100 150 200
200 MILE LIMIT
200m
500m
1000m
Bermuda
ALL
WHAT SUBSTANCES ARE TRULY HAZARDOUS
TO OCEAN RESOURCES
N. NASH

14

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop a Better Understanding of Soil-Structure Interaction

Proposed by: E. H. Harlow

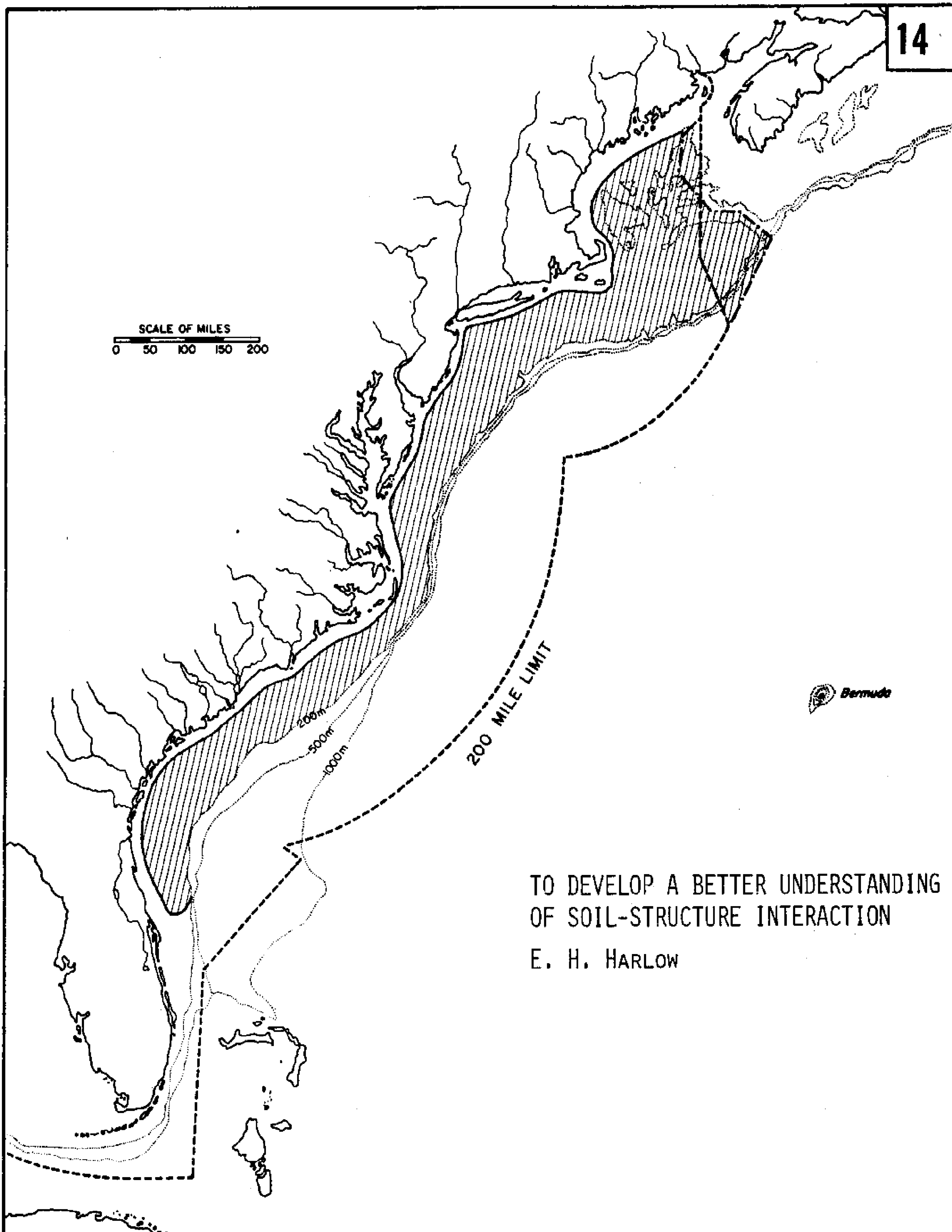
PROBLEM DESCRIPTION:

The soils comprising the thick sediments above the Atlantic Continental Shelf represent the potential foundation of many types of structures. One type may be large concrete or steel bodies seated upon the sea bottom. Another might be large cylindrical sites or caissons driven into the seabed to carry vertical (upward or downward) and lateral forces. Under the cyclic loading produced by horizontal and vertical components of constantly varying wave pressure, how do the soils respond? What is the short-term and long-term effect of oscillating pore pressures upon the intergranular forces that carry these structural loads? Is the risk of liquifaction increased or diminished by the oscillations? A study of this interaction with various types of foundations (mats, single piles, groups of piles, cable anchorages) should yield design guidelines for analytical models of the system response to cyclic loading.

This study should also consider the change in the soil properties caused by movements of the structural elements.

COMMERCIAL SIGNIFICANCE:

More reliable design and performance of bottom-seated structures, and designs that will assure an adequate factor of safety at a lower capital and maintenance cost.



TO DEVELOP A BETTER UNDERSTANDING OF SOIL-STRUCTURE INTERACTION

E. H. HARLOW

15

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Environmental Design Parameter Determination for Fixed Offshore Structures (combines 34W and 11W)

Proposed by: S. Nelson, L. K. Donovan and William R. Cox

PROBLEM DESCRIPTION:

Criteria now in use for design of fixed offshore structures treat the impact of environment in a similar manner to the impact of environment on a solitary structural member. The resultant influence of environment on a complex structure with many members is taken as the sum of the influence on each of its individual members, assuming that each member is a solitary member. An example is the computation of wave forces on a conventionally framed offshore jacket. Intuition guides one to understand that on some members there is significant shielding from wave forces by adjacent members. Yet, because the relationship of the shielding is not known, a conservative procedure of neglecting shielding is commonly used.

Wind, waves, ocean currents, ice flows, and even perhaps free field earthquake phenomena are modified by the presence of a fixed structure. There is need to define the influence of the real structure in modifying the environment and the sequel to this activity will be to develop criteria to predict the distribution of real loads on the structure. Instrumentation of existing and future structures would be a most convincing way to explore the truth of influence of the erratic and random marine environment on fixed structures.

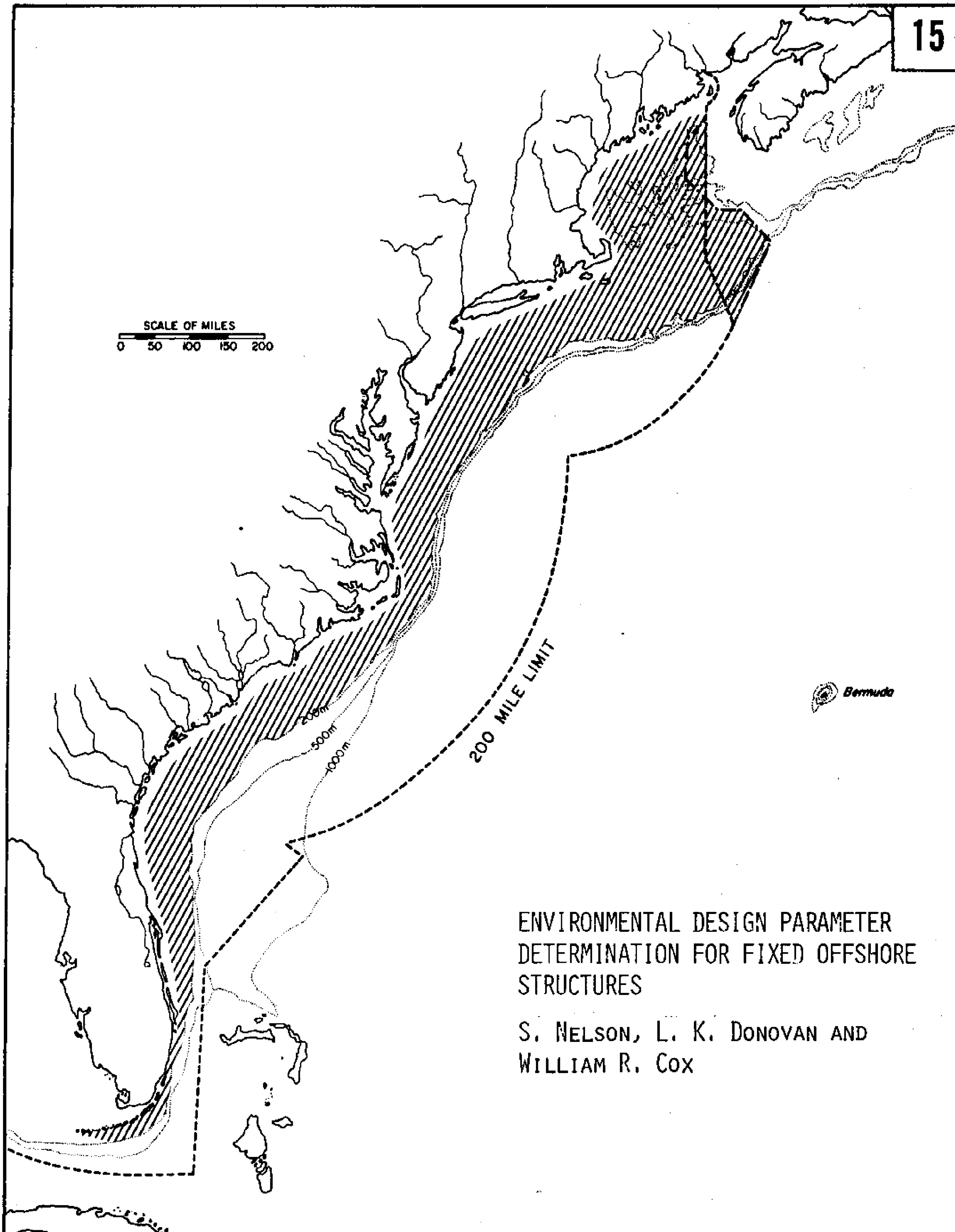
This problem underlies the need for the specific Atlantic continental shelf oceanographic and meteorological design parameters to optimize offshore structures construction cost and performance.

Definitive data on sea floor soil properties, current profiles, water chemistry, wave spectra, wind persistence and storm probabilities are required for proper design of fixed offshore structures.

COMMERCIAL SIGNIFICANCE:

Environmental design factors and data are required for east coast continental shelf platform design by both government and commercial organizations. Offshore platform performance, safety, cost, and schedule sensitivity are all related to the need for valid and reliable ocean engineering design parameters.

Note: This problem is addressed in the report, Seafloor Engineering: National Needs and Research Requirements, National Academy of Sciences, Wash., D.C., 1976.



ENVIRONMENTAL DESIGN PARAMETER DETERMINATION FOR FIXED OFFSHORE STRUCTURES

S. Nelson, L. K. Donovan and William R. Cox

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ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

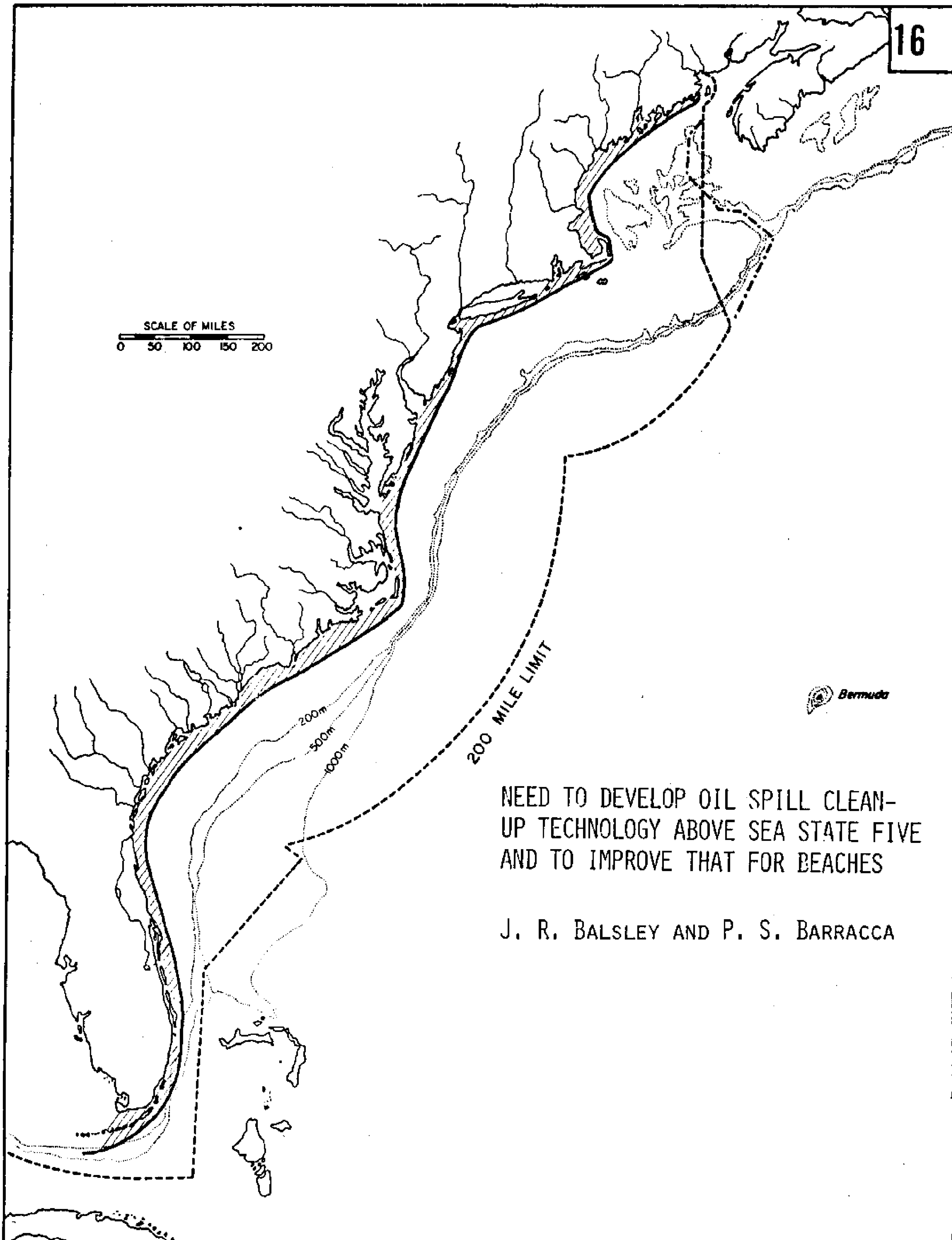
Title: Need To Develop Oil Spill Clean-Up Technology Above Sea State Five and To Improve That for Beaches.

Proposed by: J. R. Balsley and P. S. Barracca

PROBLEM DESCRIPTION:

Improvement in oil spill containment and clean-up techniques must be continued so that the impact of accidents can be reduced.

COMMERCIAL SIGNIFICANCE:



NEED TO DEVELOP OIL SPILL CLEAN-UP TECHNOLOGY ABOVE SEA STATE FIVE AND TO IMPROVE THAT FOR BEACHES

J. R. BALSLEY AND P. S. BARRACCA

17

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Definitive Studies on Engineering Properties of Marine Sediments

Proposed by: W. R. Cox

Problem from report "Seafloor Engineering: National Needs and Research Requirements" National Academy of Sciences - Washington, D.C., 1976

PROBLEM DESCRIPTION:

There is a need for a basic understanding of those engineering properties of marine sediments that can be studied in isolation. The program should be comprehensive and include theoretical analysis, in situ test procedures and instrumentation, improved core sampling techniques, and laboratory testing. The proposed research and development effort should focus on:

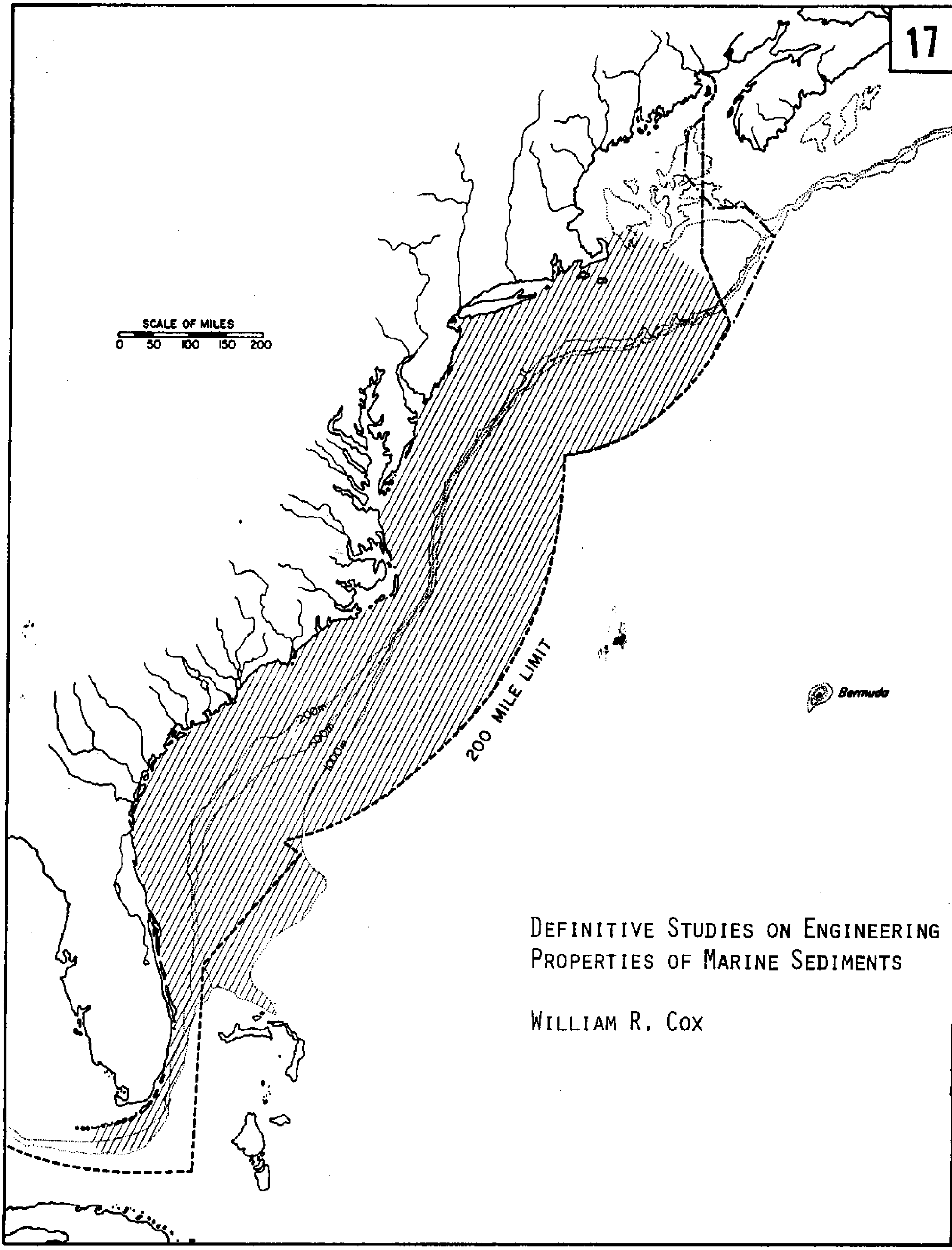
a. Research to improve the understanding of engineering properties of marine sediments such as creep strength, short-term shear strength, liquefaction, damping, change in strength and material properties under dynamic and static loading, and compressibility.

b. Development of comprehensive laboratory and in situ instrumentation and standardized techniques for determining realistic dynamic and static loads.

c. Development of improved core sampling equipment and techniques to provide relatively undisturbed soil samples for laboratory testing.

COMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



DEFINITIVE STUDIES ON ENGINEERING PROPERTIES OF MARINE SEDIMENTS

WILLIAM R. COX

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Provide Adequate Scientific and Engineering Assistance In the Regional Management of Fisheries (Combines 12W and 100W)

Proposed by: L. E. Cronin and C. M. Weld

PROBLEM DESCRIPTION:

The Fishery Conservation and Management Act of 1976 established the jurisdiction of the United States over almost all fishing within 200 miles of the coast and provided for the establishment of Regional Fisheries Management Councils to develop, recommend, and continuously improve plans for managing all significant fisheries which are substantially involved in activites 3-200 miles from shore. Such plans are now being designed, and the needs for both improved application of available knowledge and development of new science and technology are becoming apparent. No analysis of such needs has been completed, but the following questions, at least, will be pertinent.

1. How can domestic and foreign fishing vessels best be continuously detected, identified, and located?

2. How can fishery stocks be more accurately assessed?

3. How can recreational fishing be quantified for distribution, gear, effort and catch?

4. What improvements in theory or practice of fishery management for the pertinent species would be most advantageous?

5. What gear improvements can be applied or developed to increase yield and efficiency or reduce waste?

6. What are the roles of the rate of catch, the factors affecting reproductive success, habitat quality, interactions with other species and pollutants in determining the available stocks?

COMMERCIAL SIGNIFICANCE:

The solution to these and related problems would contribute greatly to optimal utilization, over a long period of time, of major present and potential fisheries.

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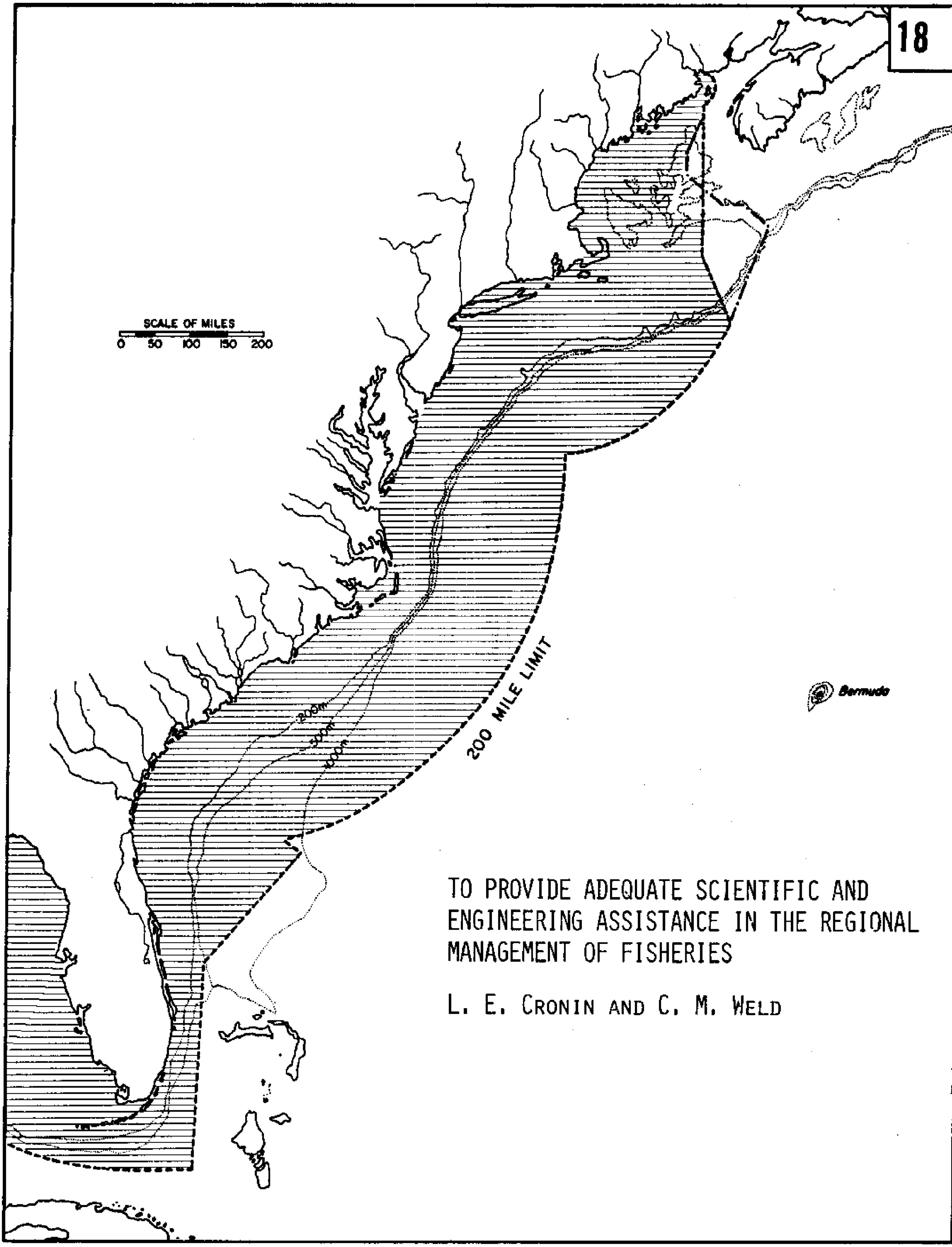


TO PROVIDE ADEQUATE SCIENTIFIC AND ENGINEERING ASSISTANCE IN THE REGIONAL MANAGEMENT OF FISHERIES

L. E. CRONIN AND C. M. WELD

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Improve the Ability to Quantify the Effects of Environmental Changes on Commercial and Recreational Fisheries (Related to 38, 28, 2, 6W, 10, 29, 1, 18, 21, 4, 65a, 7, 33a, 39a, 20, 40W, 43W, 44W, 46W, 35, 53a)

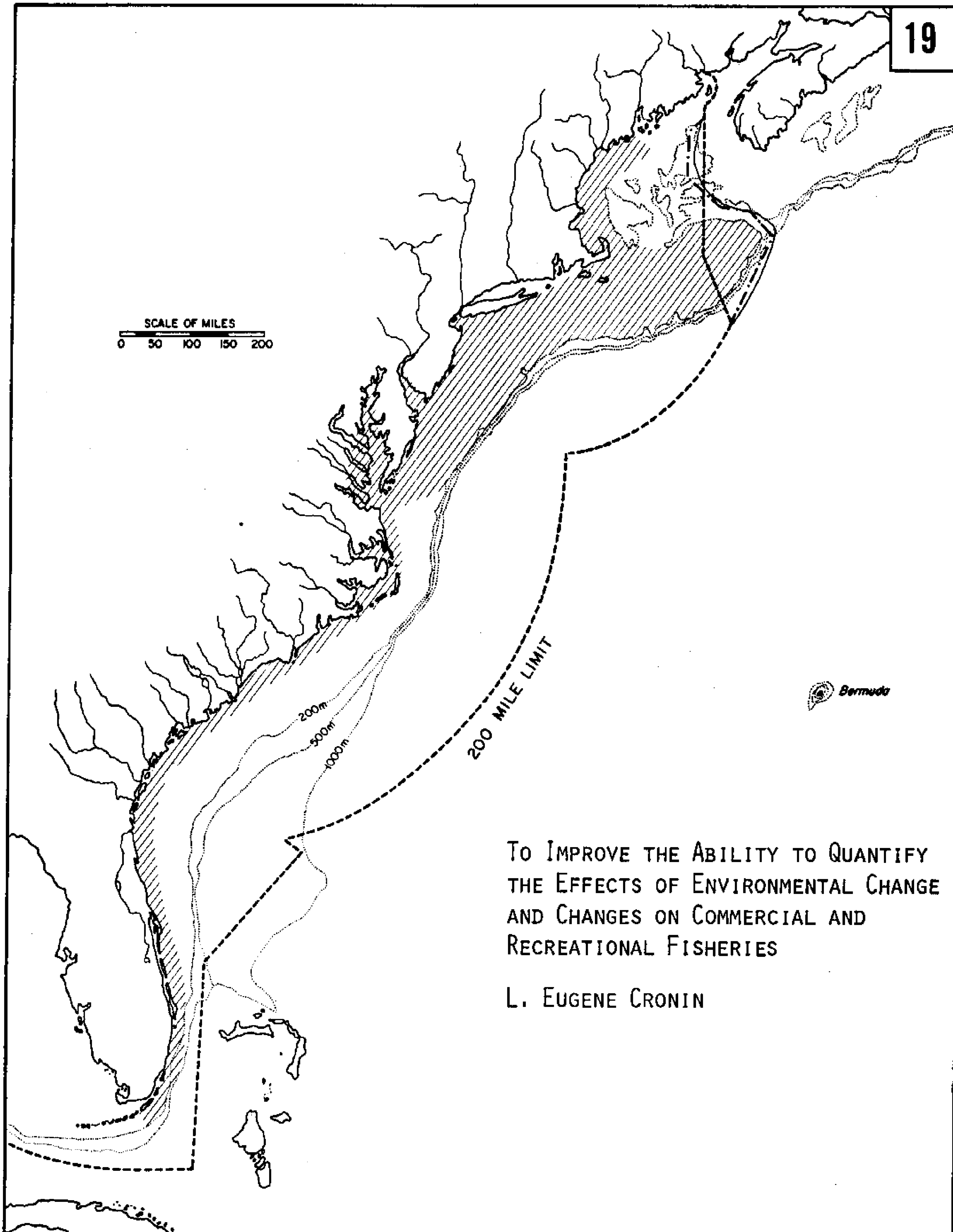
Proposed by: L. Eugene Cronin (also proposed by C. J. Sindermann)

PROBLEM DESCRIPTION:

The physical and chemical environment in estuarine and coastal waters has very great effects on the biological success of fish and shellfish and the recreational and commercial fishing industry. Some introduced changes--like heat and nutrients--can be beneficial in appropriate quantities and locations. Others--like sediments, conditions which reduce oxygen, dredged material placement, sewage and industrial sludge, and toxic chemicals--can be seriously destructive in some quantities and at some sites. It is exceptionally difficult to measure the biological effects of such changes, and nearly impossible to make quantitative predictions of such effects. Reasonable and rational choices cannot now be made except in rather gross and clumsy terms.

The effects of the most likely environmental changes in estuarine and coastal waters must be determined in a way that links through the food web to recreational and commercial fisheries. Only such knowledge can set the assimilation capacity of these areas for changes and protect these (and almost all other) uses, preventing destructive changes and encouraging beneficial ones.

COMMERCIAL SIGNIFICANCE:



To Improve the Ability to Quantify the Effects of Environmental Change and Changes on Commercial and Recreational Fisheries

L. Eugene Cronin

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: How Much Sewage Sludge and Industrial Wastes Can the Oceans Safely Accommodate

Proposed by: N. Nash

PROBLEM DESCRIPTION:

Ocean disposal of municipal sludge and industrial wastes will be replaced within 5 to 10 years, by EPA order, by some type of land-based treatment such as incineration or pyrolysis. The alternatives to ocean disposal will be much more costly, and may have serious long-term effects on air and ground water quality. The decision to end ocean disposal was not founded on any scientific evidence of damage to the oceans, except at the dumping sites themselves. There is yet time, before billions of dollars are committed to construction and permanent high operating costs are incurred, to dispassionately study the ability of the oceans to absorb dumped wastes. How much can they handle without hazard? Are some wastes perhaps beneficial to marine life? What additional treatment might be desirable? (High energy electron irradiation is now being tested at the Dear Island plant in Boston, which is claimed to remote viral and bacterial hazards.)

COMMERCIAL SIGNIFICANCE:

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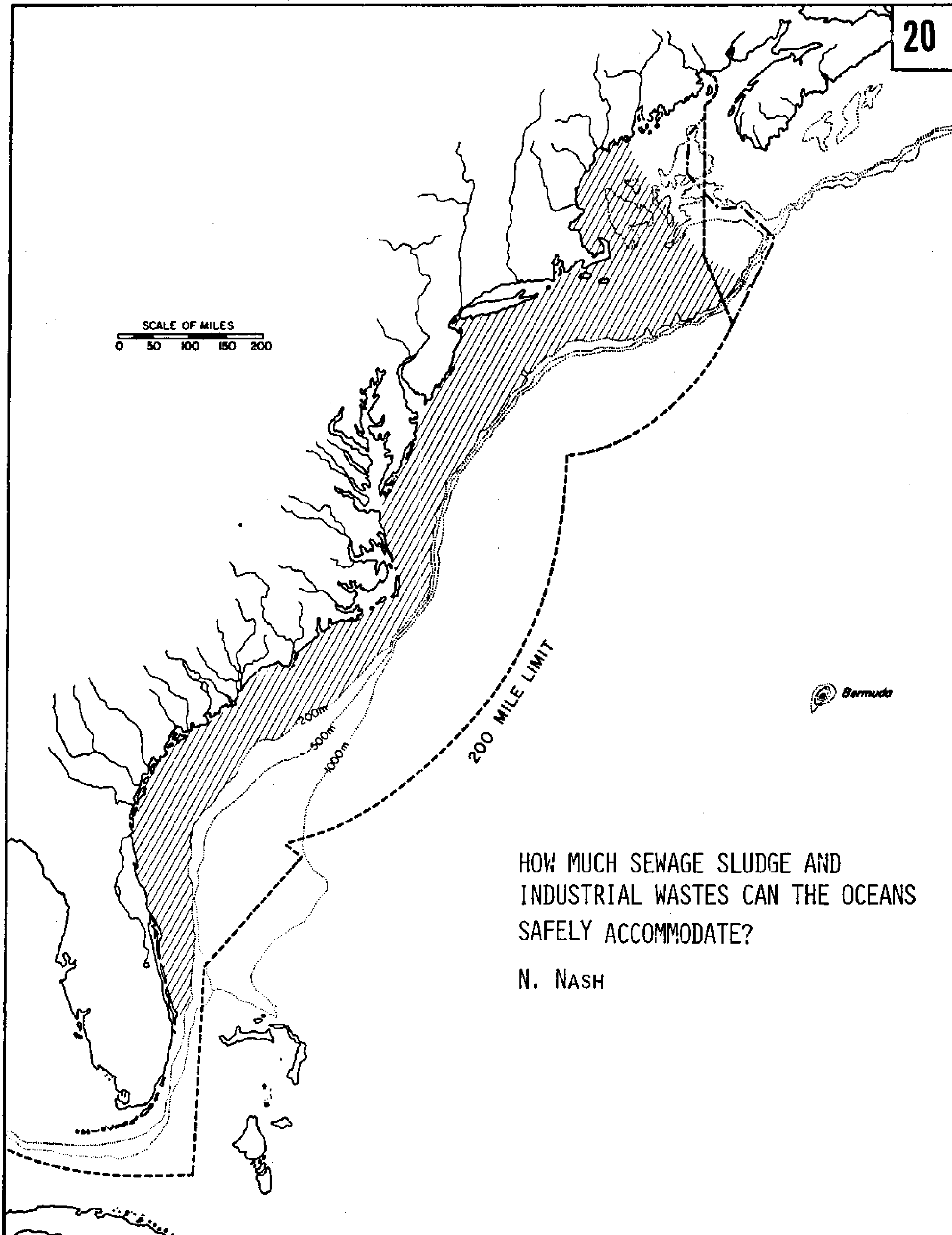


HOW MUCH SEWAGE SLUDGE AND INDUSTRIAL WASTES CAN THE OCEANS SAFELY ACCOMMODATE?

N. NASH

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Need for Efficient and Rapid Investigation/Monitoring of the Movement and Effects of Offshore and/or Nearshore Oil Spills to Fisheries and Coastal Regions to Assist in Oil Clean-Up Activities and to Assess Oil Impact Damage Claims - Proposed Oil "Super-Team"

Proposed by: J. J. Fisher

PROBLEM DESCRIPTION:

From an "ocean engineering point of view" there may exist the problem of increasing the effectiveness and efficiency in a cost effective manner of collection of offshore, and coastal data relating to oil spills behavior. This includes "at sea" sampling techniques, as well as baseline inventory, hydrodynamic modeling, satellite instrumentation. It includes both short-term studies (e.g., Argo Merchant oil spill studies), intermediate term studies (e.g., Bureau of Land Management's Georges Bank Environmental Studies) and even longer term studies. There are restraints in funding lead time and instrumentation. New England fisheries is a "troubled" but actively growing industry operating in the same general offshore oil region which relates to this problem of data gathering and analysis as do training programs for technicians, engineers, scientists and management personnel who will implement the gathering and use of this information. In addition, providing information on this problem to affected industries, fisheries, and coastal regions as well as the general public should be considered. These techniques should be applicable to open seas in varying sea states and coastal regions including beaches, estuaries, coral reef, mangrove and delta coasts. Information from this monitoring would be used in support of real time and long term for oil clean-up activities and assessment for oil spill damage claims.

PROPOSED "SUPER TEAM"

"Super Goof" = "Super Sleuth" = "Super Snoop" = "Super Fund"

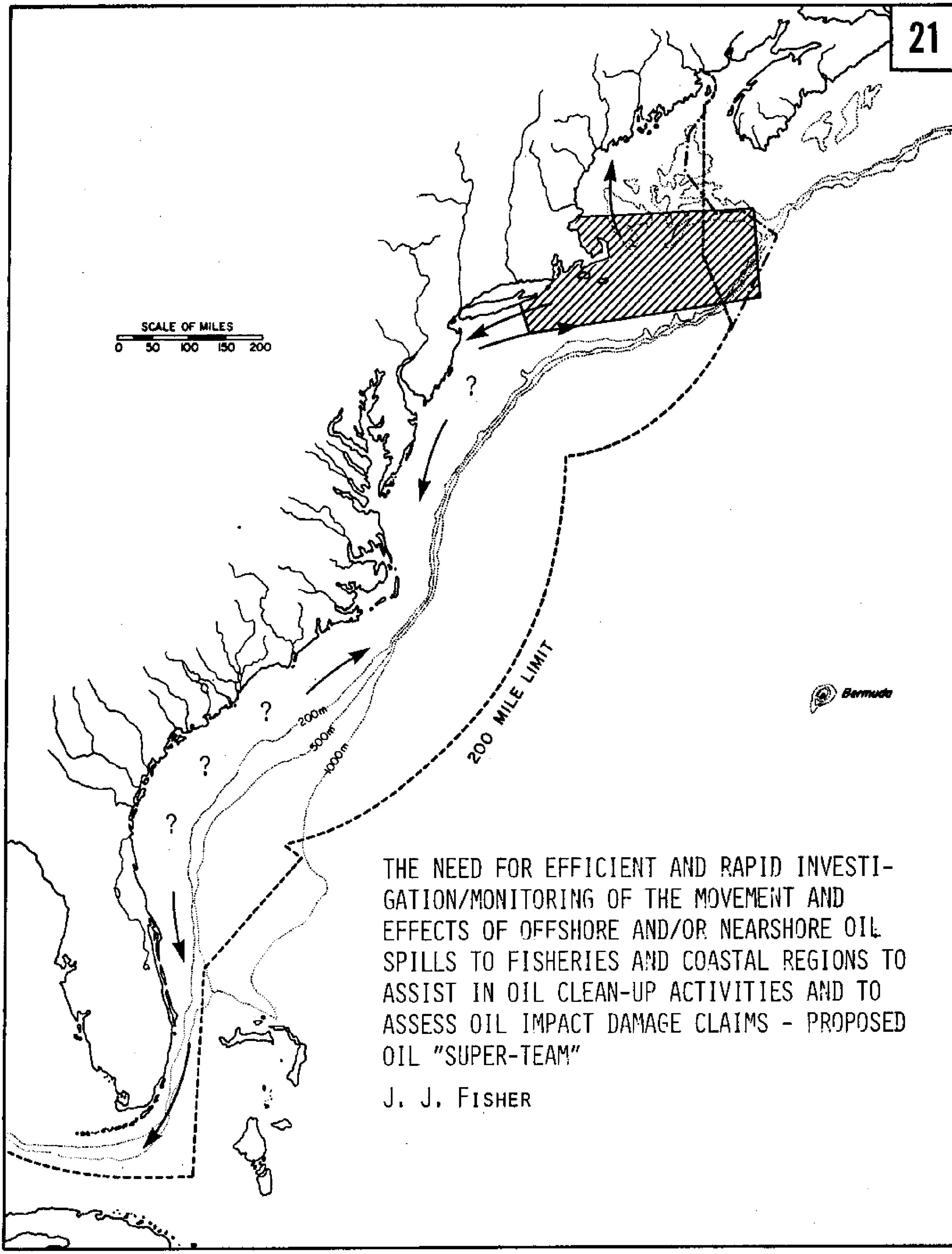
Oil Spill ⟶ Monitor ⟶ Assessment ⟶ Clean-up

COMMERCIAL SIGNIFICANCE:

1. Potential of offshore oil development on Georges Bank in region, as well as the Baltimore Canyon and Georgia Embayment will require this information for management purposes on both a regional and national basis.

2. Potential of spilled oil interacting with existing coastal zones (residential, resource and recreating) and bottom and surface fisheries will require this information for management purposes on both the state and regional basis.

21



THE NEED FOR EFFICIENT AND RAPID INVESTIGATION/MONITORING OF THE MOVEMENT AND EFFECTS OF OFFSHORE AND/OR NEARSHORE OIL SPILLS TO FISHERIES AND COASTAL REGIONS TO ASSIST IN OIL CLEAN-UP ACTIVITIES AND TO ASSESS OIL IMPACT DAMAGE CLAIMS - PROPOSED OIL "SUPER-TEAM"

J. J. FISHER

22

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Environmental Assessment of Coastal Areas for Potential Siting of Floating Nuclear Power Plants

Proposed by: B. L. Haertjens

PROBLEM DESCRIPTION:

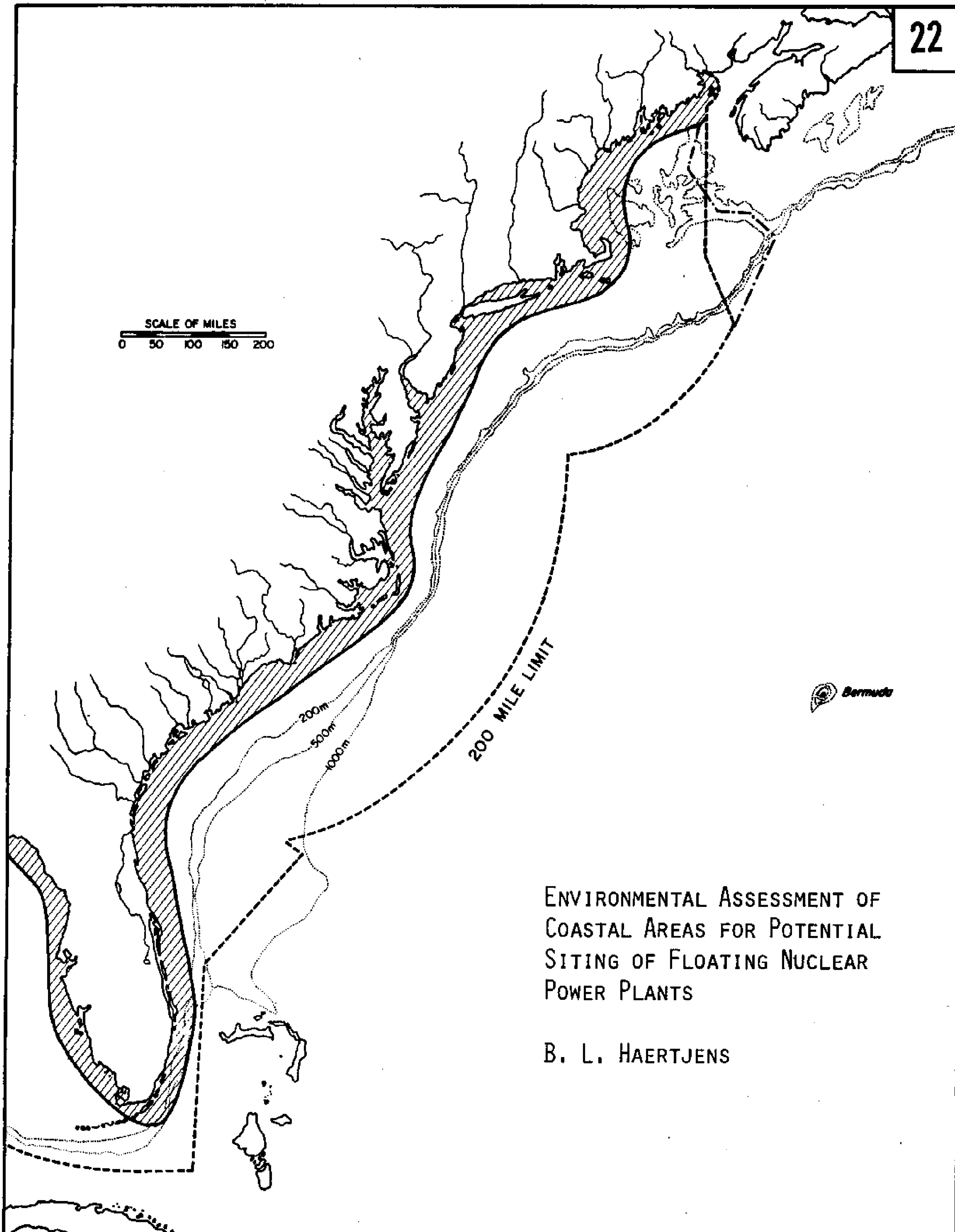
The separation of plant and site licensing inherent in the Floating Nuclear Plant (FNP) concept and Appendix M to 10CFR50 presents a unique set of siting considerations. The Floating Nuclear Plants are designed to a standard set of conditions which are the same for every plant. It is mandatory, therefore, that every potential FNP site be selected, and site structures be designed, so that FNP design limits are not exceeded during the lifetime of the plant(s).

To ensure that these limits are not exceeded a "site envelope" of limiting conditions has been developed. Potential sites must be investigated to ensure that conditions at the site will fall within or, by appropriate site structures design, can be altered to fit, the envelope requirements. The envelope requirements are based on safety of the plant structures and systems, the operating personnel and the public. The parameter limits in the site envelope were selected as an optimum balance between plant costs and siting flexibility.

Other plant-site interfaces that are related to efficient and reliable operation and not directly to safety are, nevertheless, important in the selection of an FNP site and the design of site structures. These include operating and maintenance concerns, circulating water and electrical systems, and others.

COMMERCIAL SIGNIFICANCE:

The FNP is a source of reliable energy that has minimal impact on the environment.



Environmental Assessment of Coastal Areas for Potential Siting of Floating Nuclear Power Plants

B. L. Haertjens

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Develop Specific Environmental and Operational Requirements for Atlantic OCS Uses to Identify Compatible Relationships Among Diverse Activities in Order to Provide a Basis for Rational Use of the OCS (Combines 67W and 88W)

Proposed by: S. Sixfin and S. B. Nelson

PROBLEM DESCRIPTION:

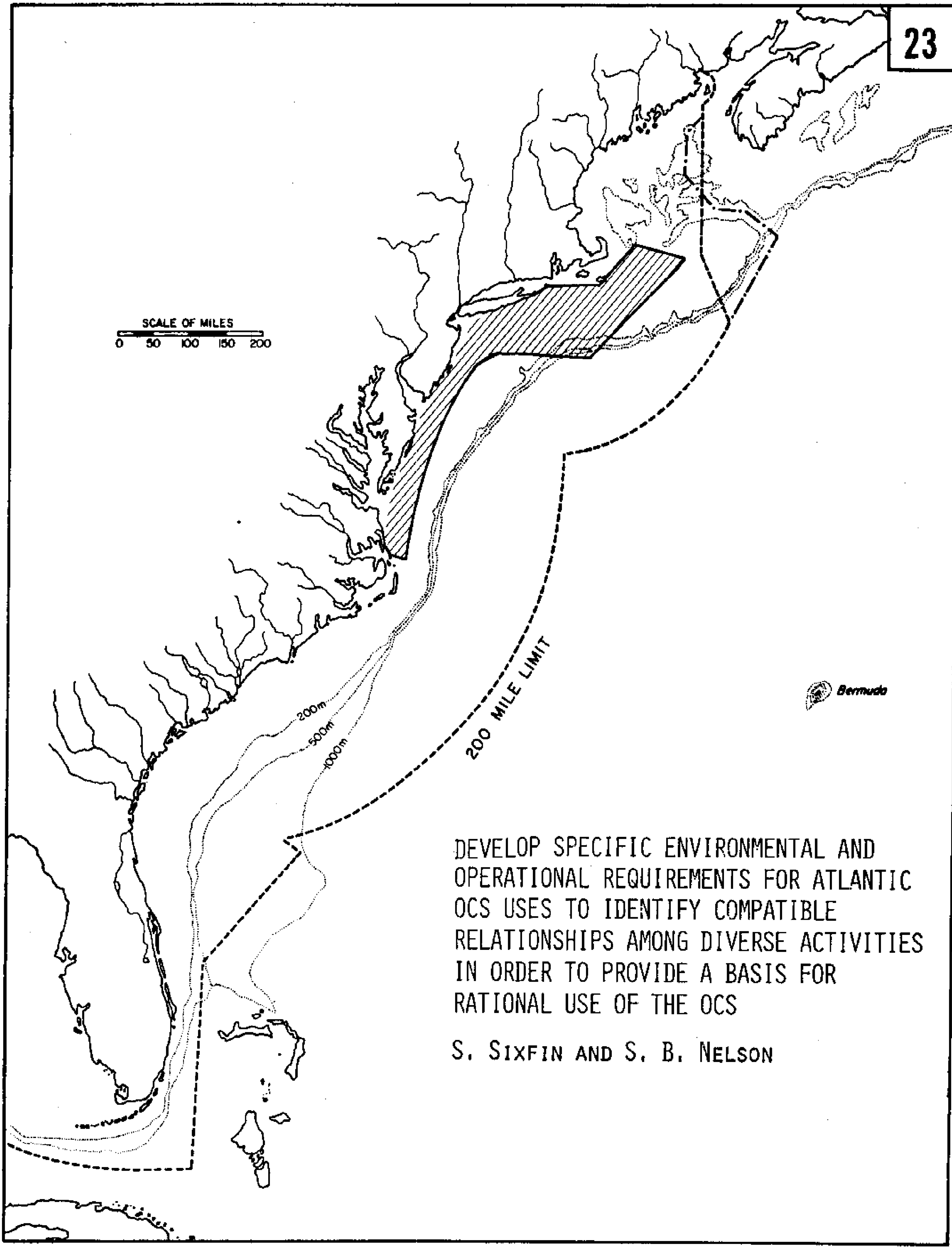
The Atlantic offshore area, an invaluable resource for millions of Americans, is subject to a host of on-going and projected permanent ocean activities. These include: waste material disposal, offshore drilling, ship traffic, fixed offshore structures, commercial fishing, floating nuclear power plants, offshore pipelines, submarine cables, artificial fishing reefs, aggregate exploitation, ocean energy systems, military ranges, recreational and sport fishing, duck hunting, ocean bathing, sailing and boating, shellfish production, etc.

Each activity can be characterized by a particular environmental and operational envelope. Recognizing that we are dealing with a finite areal space, attention should be given to identifying compatible ocean uses with the intent of grouping complementary activities.

Currently, commercial uses of the oceans are being evaluated on an individual basis whereas mutual benefits may accrue if the evaluation is expanded to include other compatible uses within a specific geographic area. Environmental requirements and conflicting uses must be reconciled to take maximum advantage of this unique environmental resource.

COMMERCIAL SIGNIFICANCE:

Each of the uses of the Outer Continental Shelf has important commercial and economic benefits associated with them. Proper ecological utilization and management of the Outer Continental Shelf are necessary in order to obtain combined usage which would properly serve the competing interests both on a short-term and long-term basis. The grouping of compatible ocean uses (equivalent to onshore industrial park zones) may enhance (1) the allocation of ocean space, (2) the efficiency of onshore support systems, and (3) the general management and conduct of offshore operation.



DEVELOP SPECIFIC ENVIRONMENTAL AND OPERATIONAL REQUIREMENTS FOR ATLANTIC OCS USES TO IDENTIFY COMPATIBLE RELATIONSHIPS AMONG DIVERSE ACTIVITIES IN ORDER TO PROVIDE A BASIS FOR RATIONAL USE OF THE OCS

S. SIXFIN AND S. B. NELSON

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Need to Measure the Consequences of Dumping Municipal Wastes on the Continental Shelf

(Related to problems 38, 2, 1, 7, 20, 40W, 43W, 35, 36, 19)

Proposed by: G. Lill and M. Devine

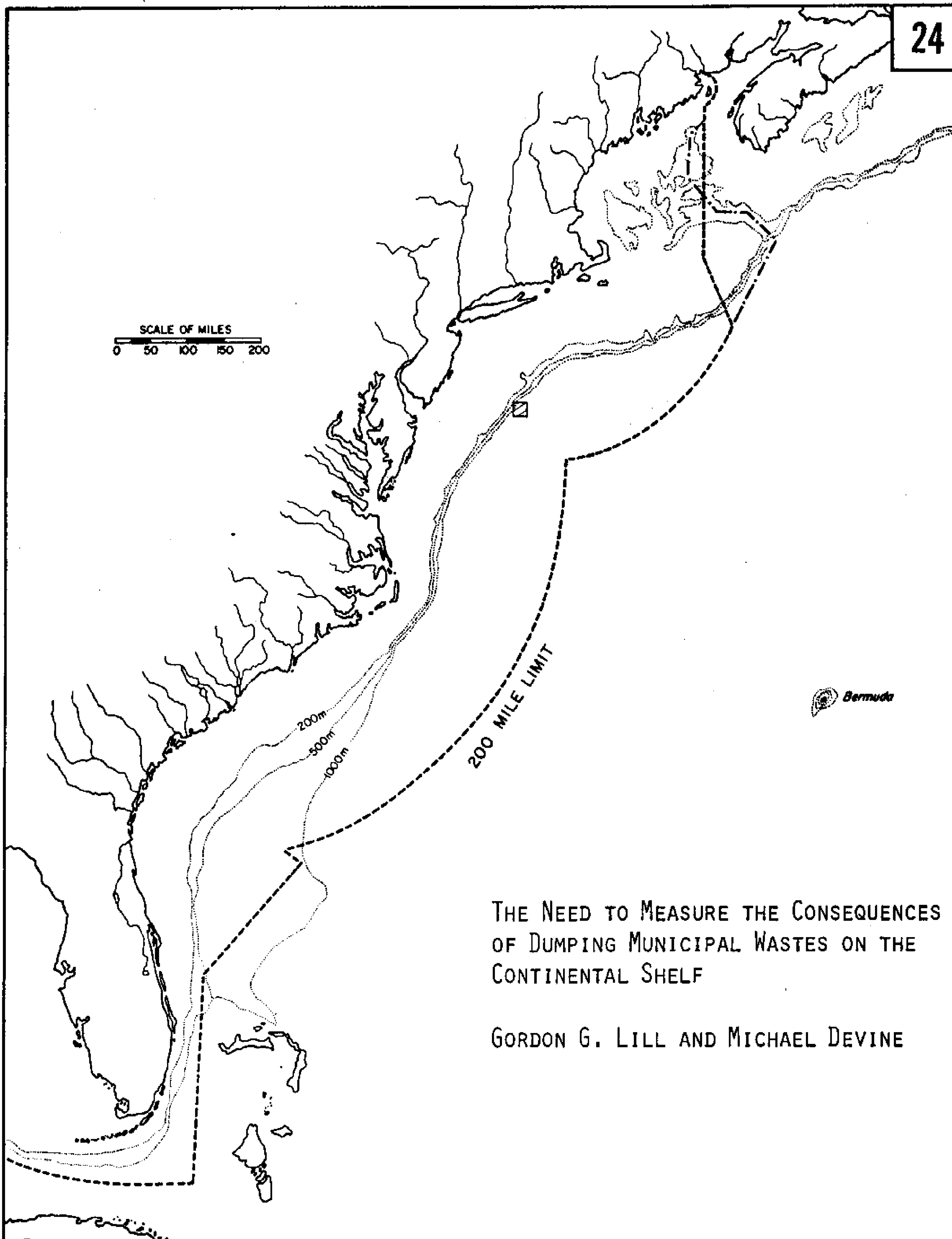
PROBLEM DESCRIPTION:

Substantial amounts of industrial wastes and small amounts of sewage sludge are presently being dumped at a site (DWD 106) off the continental shelf about 106 miles SE of Ambrose Light Tower in the New York Bight Apex region. Consideration is presently being given by EPA to moving very large amounts of sewage sludge from New York and Philadelphia from their present disposal sites on the near continental shelf to DWD 106. The National Ocean Survey is presently coordinating studies on dumping effects at DWD 106. Up to the present time, no definite severe direct or long-term effects of industrial waste dumping have been observed, although there is evidence of possible damage to fish eggs. The addition of municipal wastes would, however, place a great additional burden on DWD 106, while improving conditions nearshore. Intensive coordinated field and laboratory studies of the present and proposed dumpsites are required to assess the complete ecological and economic consequences of moving the dumping locations.

COMMERCIAL SIGNIFICANCE:

Moving the present dumpsites to DWD 106 would entail direct costs of over $10,000,000 per year. The improvement of the nearshore areas would have a positive economic impact, but this is difficult to quantify, and must be balanced against the costs of further degrading DWD 106. Potential effects on commercial fishing appear small, but also need consideration.

24



The Need to Measure the Consequences of Dumping Municipal Wastes on the Continental Shelf

Gordon G. Lill and Michael Devine

25

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Improved Technology Required to Maintain (Or Improve) Food Supplies From the Sea

Proposed by: E. H. Man, N. Leischen, and E. J. Barakauskas

PROBLEM DESCRIPTION:

With the ever increasing pressure on food supplies for the world, there is a major need to improve food production in the ocean. Techniques to date have focused on improving the efficiency of the harvesting of indigenous species of fish.

There is a similarity in the evolution of agriculture which evolved from hunting through grazing to a "feed lot" operation. Mariculture represents the equivalent of the "feed lot." Significant increases in productivity can be obtained in shifting from the hunting of indigenous species to the grazing of more productive commercially acceptable, species.

Destruction of the ecosystem, particularly the environment of the coastal hatchery system, has already adversely affected many indigenous species. Government intervention is required to maintain and improve the coastal zone hatcheries.

Long scale research is required to ascertain which species are suitable to be raised and harvested as grazing species.

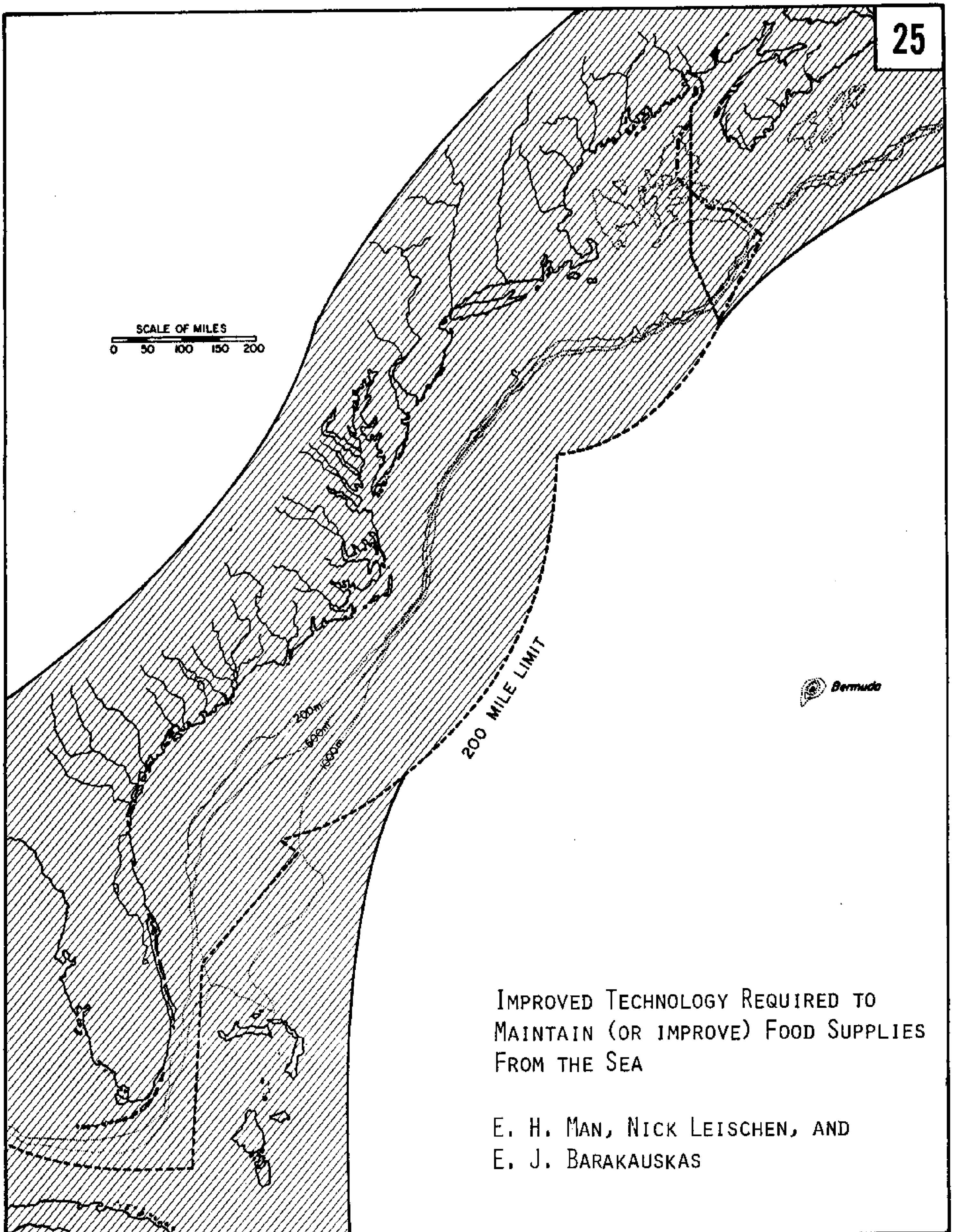
The recent definition of the 200-mile fishing zone sets the stage for control of grazing areas.

Modern day understanding and technology (ekistic planning, agronomy, agricultural practices, water management and treatment, sewage recycling, reverse osmosis, distillation, etc.) can be utilized to develop substitute environmental systems to replace endangered or lost nature forms through hatchery operations and to restore and upgrade such natural systems that are still capable and in existence.

COMMERCIAL SIGNIFICANCE:

The restoration of this eco-environmental system would be responsible for the regeneration of our marine food resources and the revitalization of the fishing industry, being once again the inspiration and provider of a sorely needed world food resource.

25



Improved Technology Required to Maintain (or improve) Food Supplies From the Sea

E. H. Man, Nick Leischen, and
E. J. Barakauskas

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Gathering of Soils Data and Oceanographic and Meteorological Data for U.S. Atlantic Continental Shelf

Proposed by: C. D. Osborn

PROBLEM DESCRIPTION:

As commercial quantities of oil and/or natural gas are discovered in areas offshore from the U. S. east coast, field development will follow with the construction of hydrocarbon production and transporation facilities. Platforms will be installed in the field to drill production wells and to support the equipment necessary to extract and process the petroleum products which will be transported to shore by either submarine pipelines or surface transportation systems.

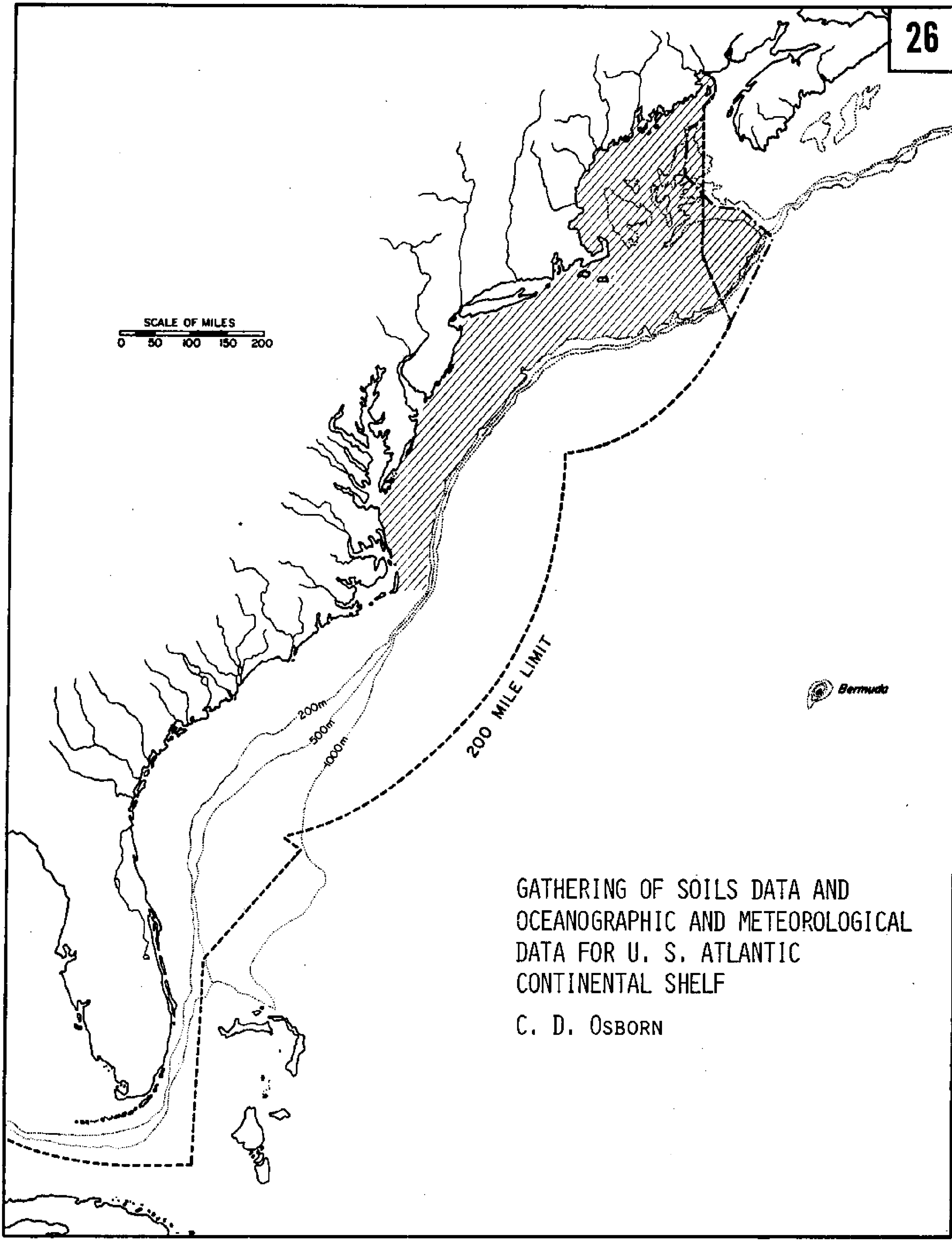
The type of soils in the areas to be developed play a major role in the design and installation of offshore platforms and pipelines. In the Gulf of Mexico soil data are available for a great number of locations due to the heavy field development in this area. While soil data are site dependent, at least in the Gulf of Mexico future designs are aided by a knowledge of soil types from nearby areas. In the offshore Atlantic area very little data are available for establishing designs. If areas mainly consist of dense sands or boulders, driving platform piles to depths of several hundred feet may be difficult and appropriate design considerations will be necessary. The types of soils also affect the stability and burial of pipelines.

In addition to soils data, oceanographical data are needed in order to properly design platforms and/or pipelines. Design wave heights and periods and currents are needed for maximum storm conditions for ultimate strength design. Everyday currents, wave heights, swell, and periods, are necessary for projecting offshore equipment working capability.

The purpose of this task is to gather and quantify soil and oceanographic data for several areas offshore which show promise for hydrocarbon recovery. These data would be very beneficial in establishing preliminary field development designs.

COMMERCIAL SIGNIFICANCE:

In developing new offshore oil and gas areas, there is a great need and demand for accurate and safe design, installation and operational procedures. The need for sound design and safety must also keep economics in perspective. In order to satisfy both needs, reliable design data are required.



GATHERING OF SOILS DATA AND OCEANOGRAPHIC AND METEOROLOGICAL DATA FOR U. S. ATLANTIC CONTINENTAL SHELF

C. D. Osborn

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: The Need for a Buoy System to Facilitate Precise Locations and Routing Within the 200 Mile Zone

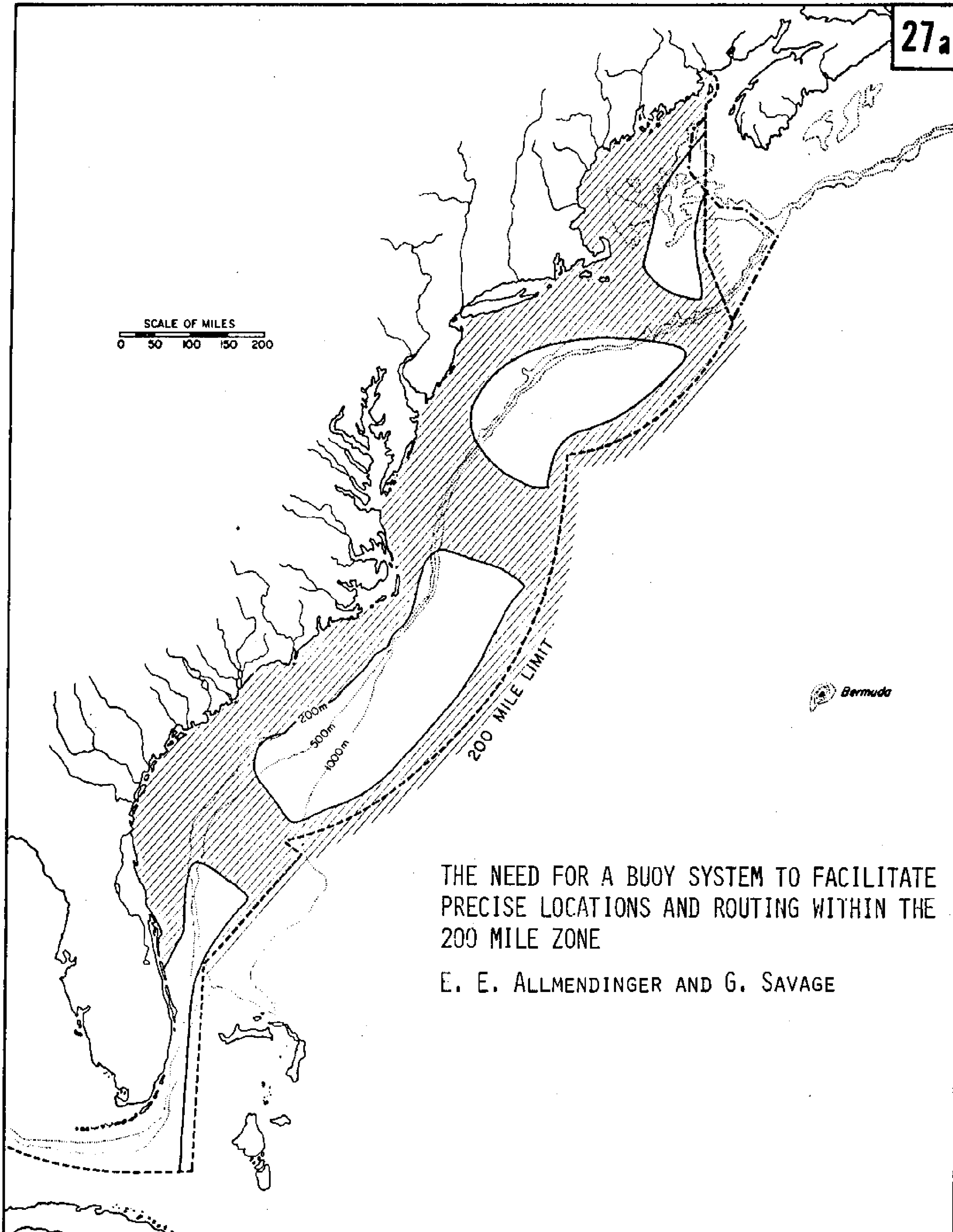
Proposed by: E. E. Allmendinger and G. Savage

PROBLEM DESCRIPTION:

There is need for the development of a new, precise-position maintaining, lightweight, easily maintained and less costly shallow-deep water buoy system to replace the current cumbersome and costly buoy system. The attributes of the new system will become increasingly significant as activity in the 200 mile zone increases with a commensurately increasing need for precision in positioning and routing of all types of marine vehicles. Applications of the proposed buoy system would include the marking of fairways, hazardous locations for surface vehicles and positions of activity on the seafloor.

COMMERCIAL SIGNIFICANCE:

This "benchmark" system could be used for purposes of resources or protected area location, exact territorial enforcement, ship lane control and hazardous area avoidance.



THE NEED FOR A BUOY SYSTEM TO FACILITATE PRECISE LOCATIONS AND ROUTING WITHIN THE 200 MILE ZONE

E. E. ALLMENDINGER AND G. SAVAGE

27b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development and Communication of Useful Environmental Information to the Fishing Fleet

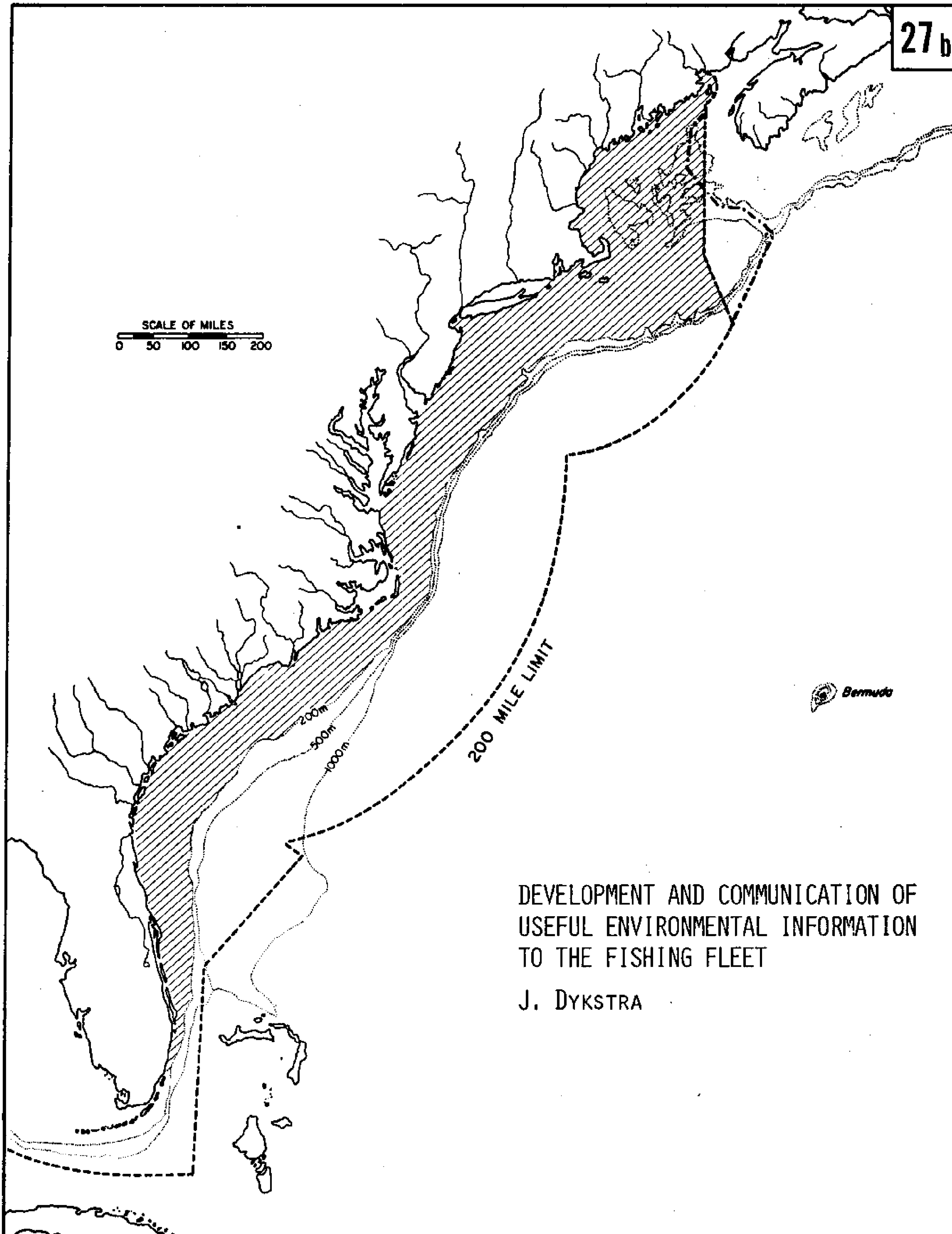
Proposed by: J. Dykstra

PROBLEM DESCRIPTION:

A great variety of instrumentation presently exists for measuring oceanographic conditions. General weather information, which is used to enhance the safety and profitability of fishing operations, is provided to the fishing fleet. What would be useful is information such as sea state, temperature, turbidity, etc. being made available in a time, form, and detail to enable a fishing captain or fleet more accurately to predict presence of commercial quantities of fish in an area.

COMMERCIAL SIGNIFICANCE:

This problem is of increasing significance as under 200 mile fisheries jurisdiction the fleet moves into areas and species not traditionally fished by U.S. vessels and because as fuel costs increase, search time -- always a critical factor -- becomes even more significant.



DEVELOPMENT AND COMMUNICATION OF USEFUL ENVIRONMENTAL INFORMATION TO THE FISHING FLEET

J. Dykstra

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for More Effective Oceanic Environmental Services

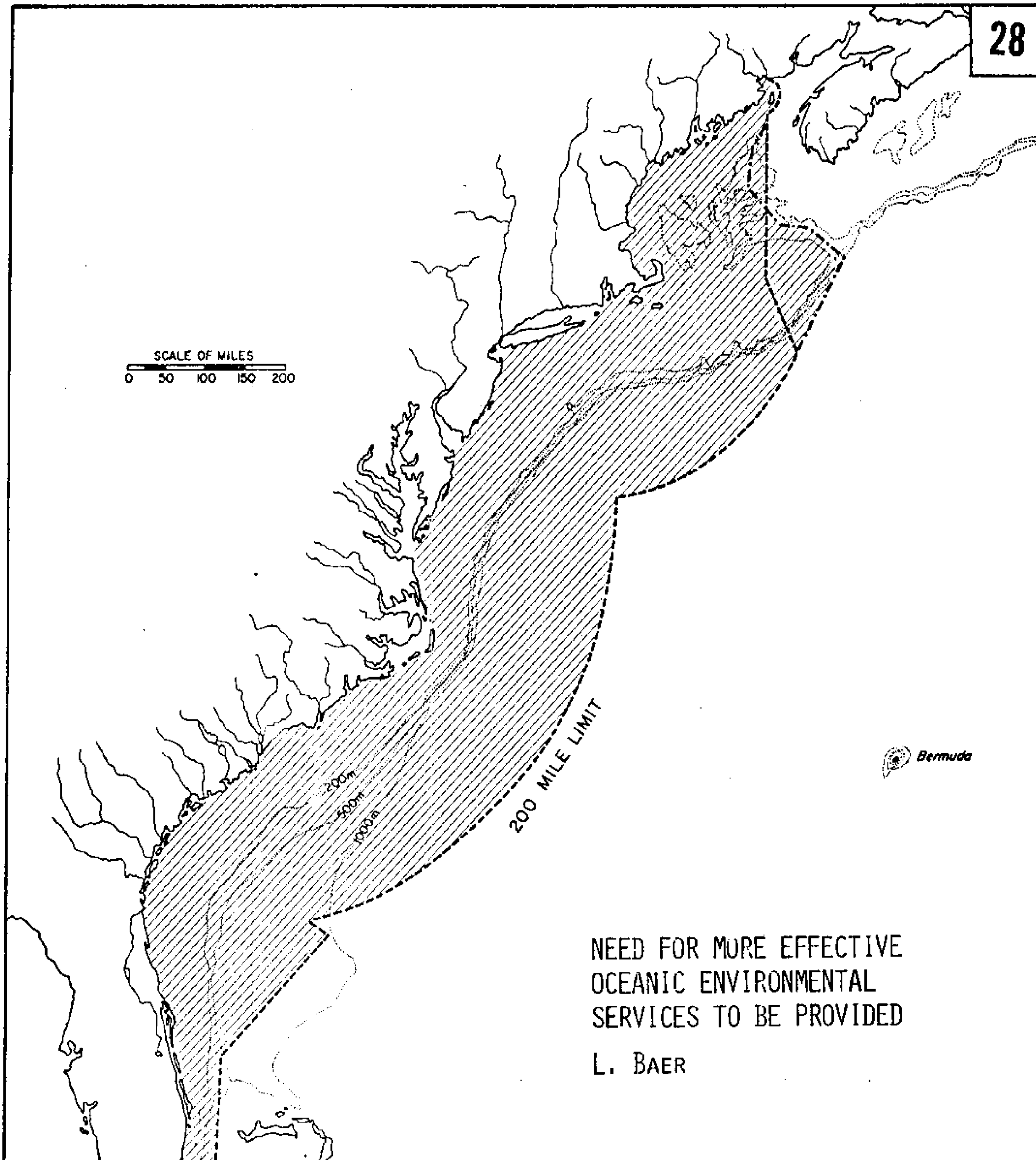
Proposed by: L. Baer

PROBLEM DESCRIPTION:

NOAA provides a wide range of services such as weather forecasts, tide tables, wave statistics, and raw data to an equally wide range of users. Many of the services do not appear to adequately satisfy users' needs. This is partly because user needs have not been well stated, partly because of inadequate planning and coordination between user and provider, partly because of unrealistic expectations considering the state of the art and partly because of resource limitations. Program planning suffers because in many cases the service provider does not fully appreciate or even know all the applications. Seldom can the total value of the products be determined. There is a lack of communication which complicates or makes impossible (1) the evaluation of product adequacy, (2) cost-effectiveness computations, and (3) efficient scheduling of program changes. Information on expected future needs of the users must be made available to plan for the products, data quality, critical values, communications, etc. These need to be coordinated between the user and the provider as early as possible. Too often users plan to use and request one type of information though other more useful information is available or could be made available with adequate lead time. For example, it does not appear that all members of the user community are taking maximum advantage of data from the NOAA environmental satellite systems; NOAA's Environmental Data Service has been making an intensive effort to inventory and acquire measure wave observation but needs to know the full range of specific derived parameters and products required by the community. Though this workshop will help, improved feedback is needed from the commercial user to government as to their service requirements. This feedback should include both technical requirements and economic importance.

COMMERCIAL SIGNIFICANCE:

Total quantified value is a major question because of the multiple users involved. Since such data are needed for all coastal and offshore designs, operations, and other activities the value is thought to be quite large and to increase with product quality.


28
SCALE OF MILES
0 50 100 150 200
200 MILE LIMIT
200m
500m
1000m
Bermuda
NEED FOR MORE EFFECTIVE
OCEANIC ENVIRONMENTAL
SERVICES TO BE PROVIDED
L. BAER

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Assessment of Impact on Continental Shelf Fisheries of Low-Land Freshwater/Saltwater Interactions With Point and Non-Point Wastes Washed or Dumped Into Coastal Marine Environments

Proposed by: D. R. Barker

PROBLEM DESCRIPTION:

The State of Florida, its land mass once entirely covered by the sea, can be considered in total as a gigantic marine productivity gradient. The transformation, scavenging, and filtration of upland waterborne wastes by complex, interdependent periphyton communities is an amazing natural water purification system which generates specific aquatic biota and salinity gradients throughout surface waters of the State. Such is this land-based system upon which the marine resource productivity (quality and quantity) of many thousands of miles of estuarine coastline depend.

Land-based or near shore dredging, sewage sludge disposal, ocean outfalls, storm-water run-off and air pollutant fall-out mechanisms will all affect marine-productivity via toxicity, oxygen consumption, turbidity or other well known mechanisms.

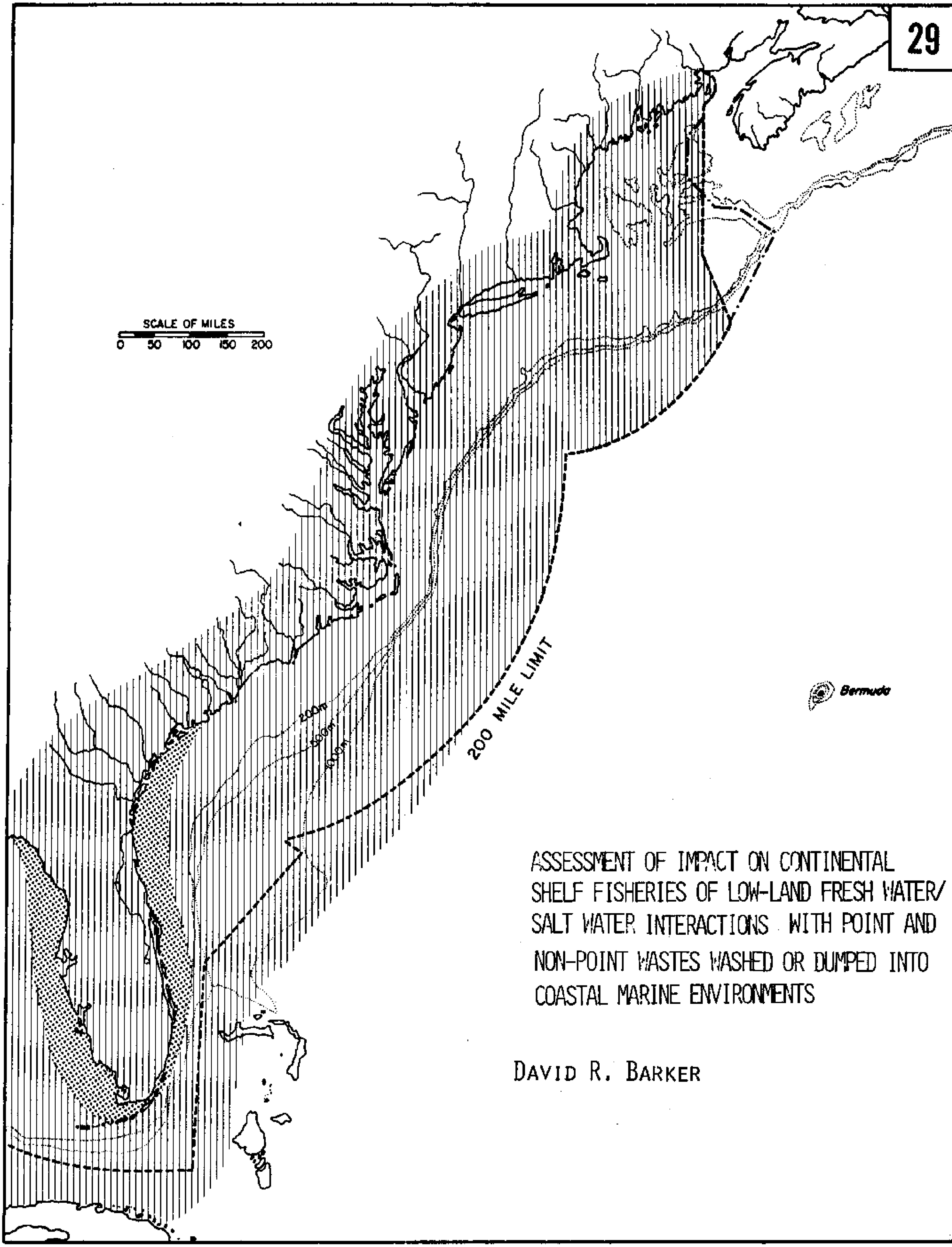
Data on survival of human pathogenic micro-organisms in the marine environment are minimal or non-existent. Halogenated hydrocarbons from chlorinated ocean outfalls are potential carcinogens.

$10^6 m^3$ of dredge spoils, sewage sludge, rubble and chemical wastes were dumped onto the central U. S. Atlantic coast continental shelf in 1974.

There is a real need for more comprehensive chemical, biological and physical coastal monitoring in order to define coastal areas of critical concern.

COMMERCIAL SIGNIFICANCE:

In Florida the primary commercial significance relates directly to the multibillion dollar tourist economy, sport fishing and commercial fishing. The comprehension and management of above mentioned problems will also have significant impact on public health and facilitate a more expedient, valid and comprehensive regulatory agency process related to the above activities.



ASSESSMENT OF IMPACT ON CONTINENTAL SHELF FISHERIES OF LOW-LAND FRESH WATER/ SALT WATER INTERACTIONS WITH POINT AND NON-POINT WASTES WASHED OR DUMPED INTO COASTAL MARINE ENVIRONMENTS

DAVID R. BARKER

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: On-Shore Impacts of Outer Continental Shelf Exploration and Production

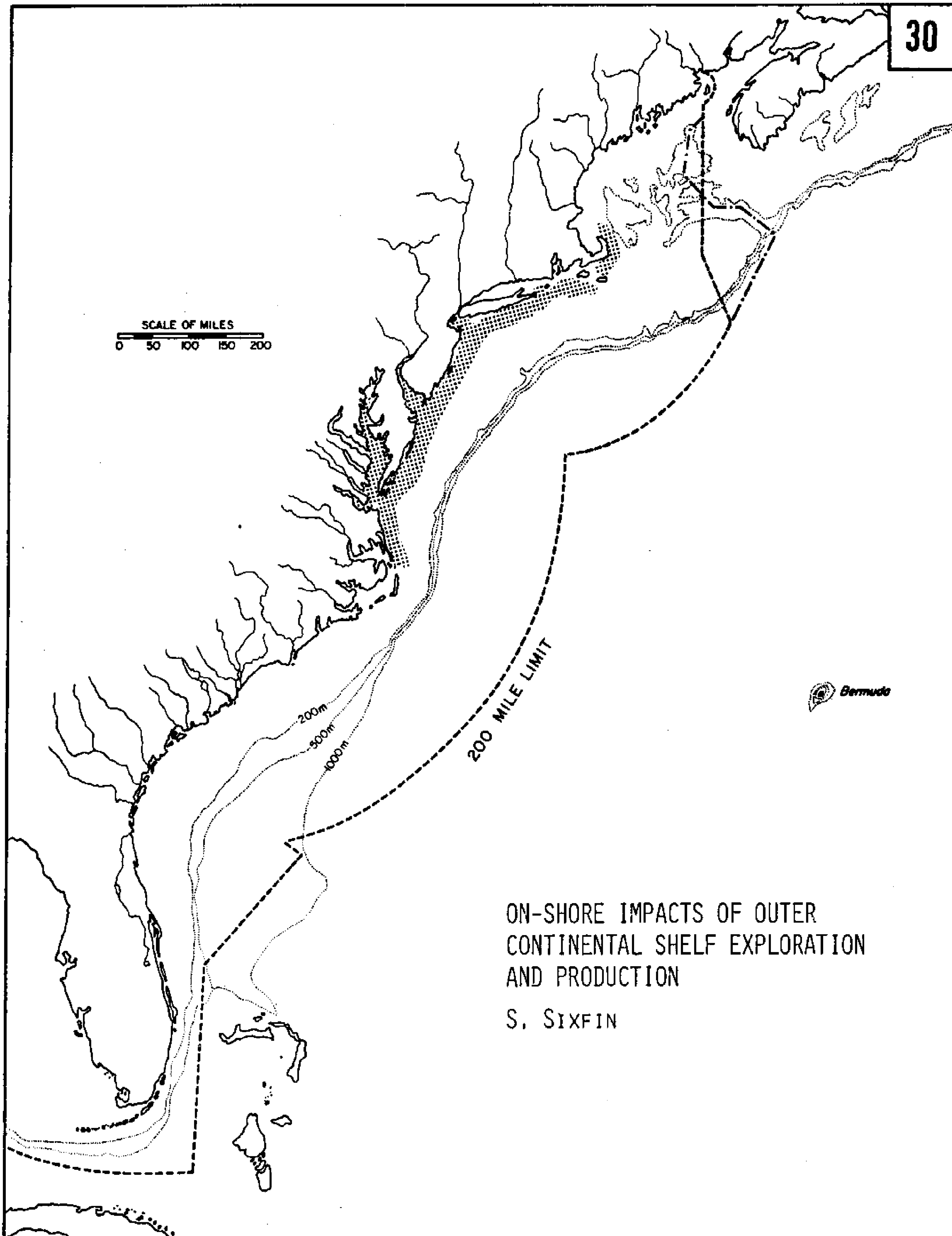
Proposed by: Sheldon Sixfin

PROBLEM DESCRIPTION:

The economic and environmental on-shore impacts of Outer Continental Shelf exploration and production must be explored from the standpoint of the states, regions and localities most directly involved. Severe dislocations and changes will be experienced in some localities. A program to study and ameliorate these dislocations is necessary in the overall interests of providing a sound ecological and economic basis for the developments that may be undertaken.

COMMERCIAL SIGNIFICANCE:

For specific localities, the economic and environmental trauma may be severe. Communities which have characteristically relied on fishing or recreation may be impacted by heavy industrial activity. This will benefit some and work to the disadvantage of others. Both from the economic and environmental viewpoints, certain costs will be required to reduce the unwanted impacts to manageable proportions.


30
SCALE OF MILES
0 50 100 150 200
200m
500m
1000m
200 MILE LIMIT
Bermuda
ON-SHORE IMPACTS OF OUTER CONTINENTAL SHELF EXPLORATION AND PRODUCTION
S. SIXFIN

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Assessment of Beach Restoration and Maintenance Problems
(Combines 73W and 74W)

Proposed by: D. Barker, W. M. Sensabaugh and R. Williams

PROBLEM DESCRIPTION:

Beaches are a major recreational asset of the nation and the states as well as being a major economic asset of the states. The maintenance of this asset through beach restoration and nourishment projects has stimulated the need for oceanographic information of both an engineering and biological nature.

Briefly, described, a beach nourishment project consists of obtaining sand from a borrow area, usually located offshore, and placing that sand on the beach area to be nourished by means of a pipe line or hopper dredge.

The needed information includes:

I. A long term assessment of offshore borrow areas including:

   A. Before dredging
      1. The bio mass and types of organisms present
      2. The extent or uniqueness of the habitat

   B. After dredging
      1. The rate of recovery of the site
         a. physical recovery
         b. biological recovery
      2. Long term impact of the activity

II. Inventory of reefs in the vicinity of proposed beach nourishment projects, i.e., Baseline data.

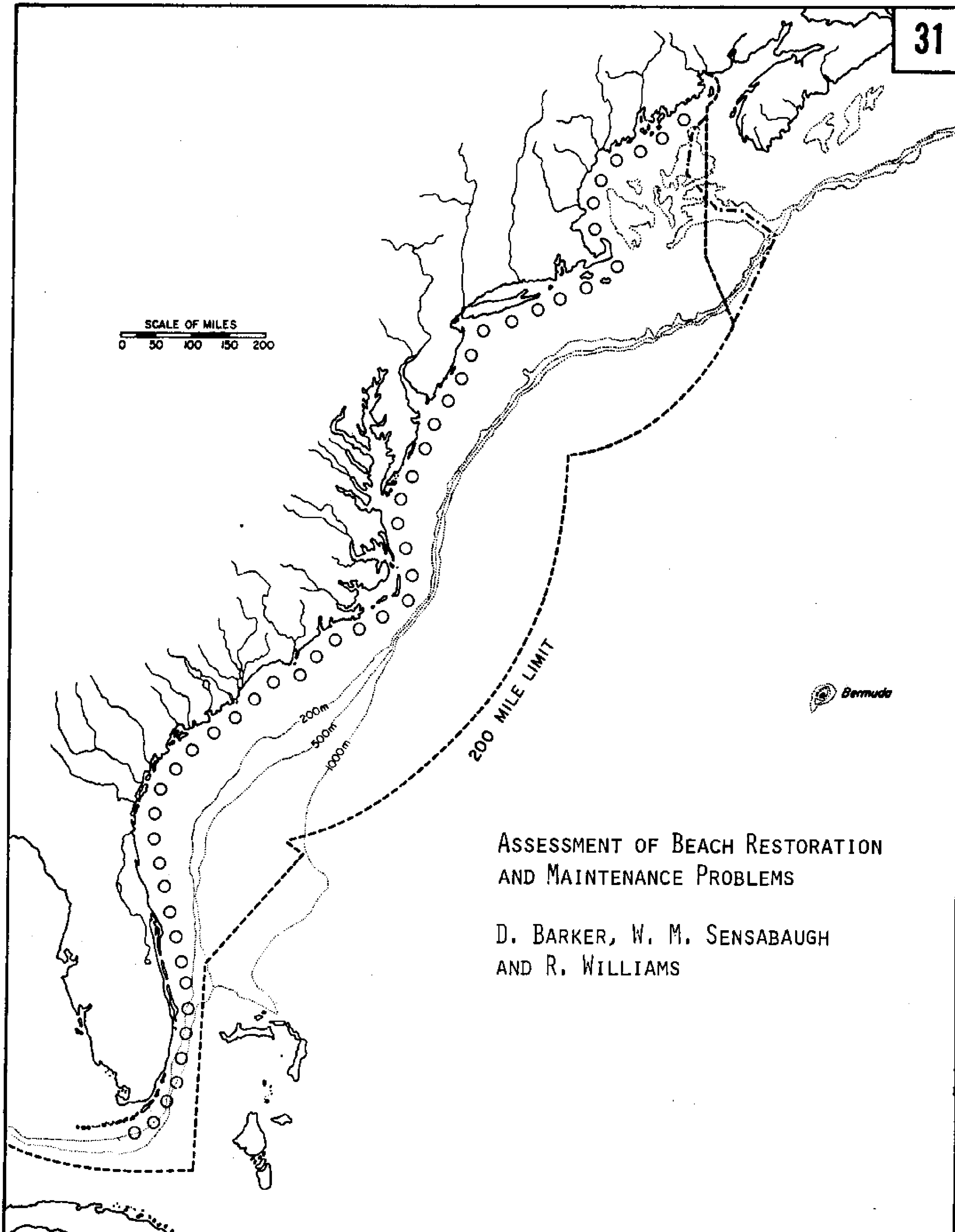
III. Comparison of turbidiy caused by nourishment projects to turbidity caused by coastal storm

IV. Field studies of wave run-ups on beaches to develop a predictive model

V. Develop a predictive model of dune erosion caused by coastal storms (some work presently funded by Florida Department of Natural Resources).

VI. Economic studies of the importance of beaches to coastal communities and the states.

COMMERCIAL SIGNIFICANCE:



ASSESSMENT OF BEACH RESTORATION AND MAINTENANCE PROBLEMS

D. BARKER, W. M. SENSABAUGH AND R. WILLIAMS

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Inventory Nearshore Aggregate Reserves to Encourage Exploitation

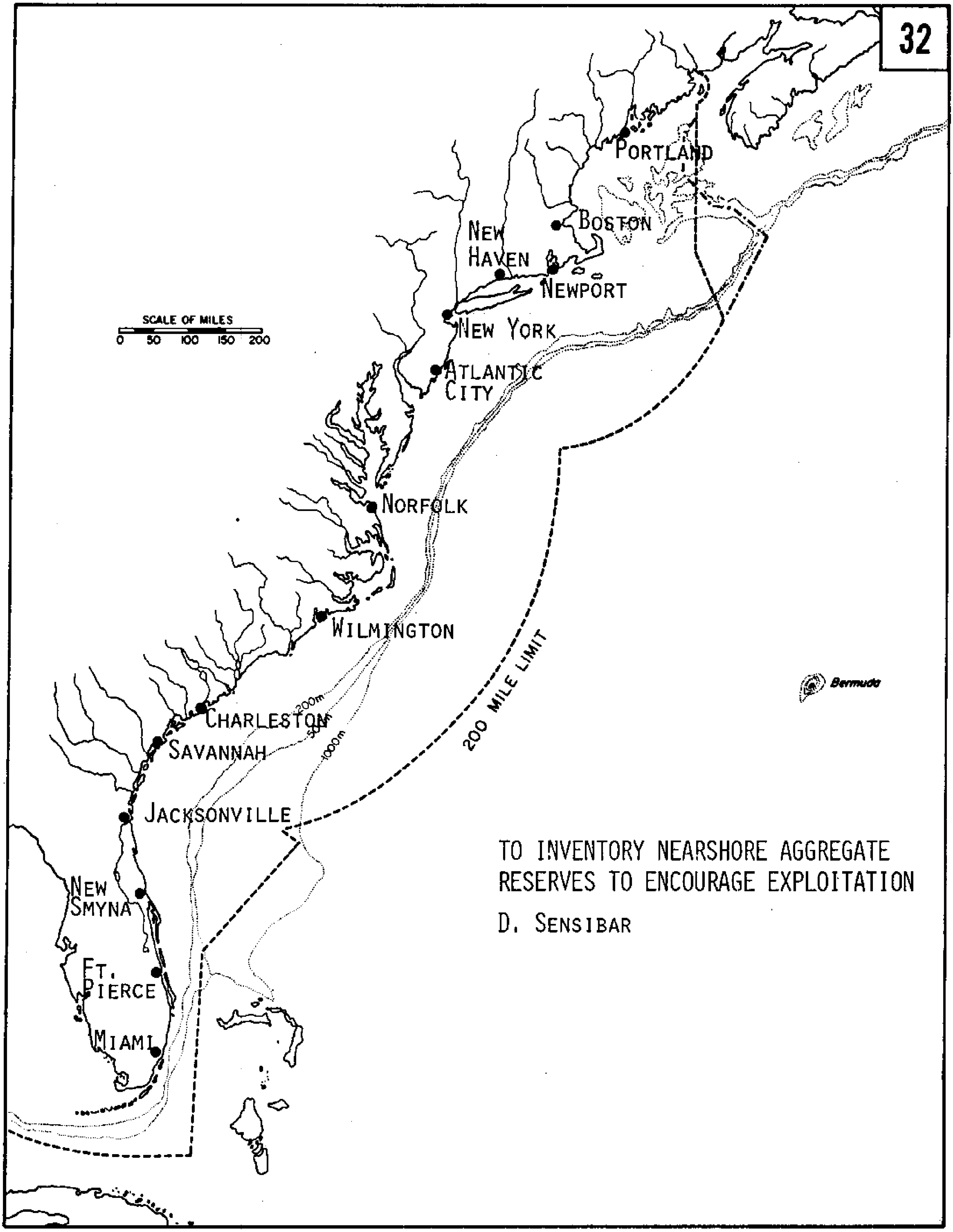
Proposed by: D. Sensibar

PROBLEM DESCRIPTION:

It is generally assumed that the Atlantic Continental Shelf is a future source of cheap construction aggregates for the populous Eastern Seaboard. However, hard information about the location, extent, and quality of aggregate deposits on the shelf is not available. Without it, the potential resource cannot be exploited. Given the nature of our aggregates industry it is unlikely that it will be able to develop this information. Government sponsored surveying and testing to locate and define the offshore aggregate deposits nearest most east coast ports are necessary before any exploitation of the Continental Shelf for aggregates is likely to occur.

COMMERCIAL SIGNIFICANCE:

The major component in the cost of aggregates is its transportation from its source to the end use site. Upland aggregate resources within reasonable proximity of the use sites are being exhausted rapidly or preempted by other uses. If the Atlantic Continental Shelf can provide a replacement for diminishing upland resources, the potential savings to the public, which consumes four tons of aggregates per person per year, would be measured in the hundreds of millions of dollars annually.


32
PORTLAND
BOSTON
NEW HAVEN
NEWPORT
NEW YORK
SCALE OF MILES
0 50 100 150 200
ATLANTIC CITY
NORFOLK
WILMINGTON
200 MILE LIMIT
Bermuda
CHARLESTON
200m
500
1000m
SAVANNAH
JACKSONVILLE
NEW SMYNA
FT. PIERCE
MIAMI
TO INVENTORY NEARSHORE AGGREGATE RESERVES TO ENCOURAGE EXPLOITATION
D. SENSIBAR

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of Rehabilitation Techniques to Promote Recreational and Commercial Uses of Deteriorated Estuaries

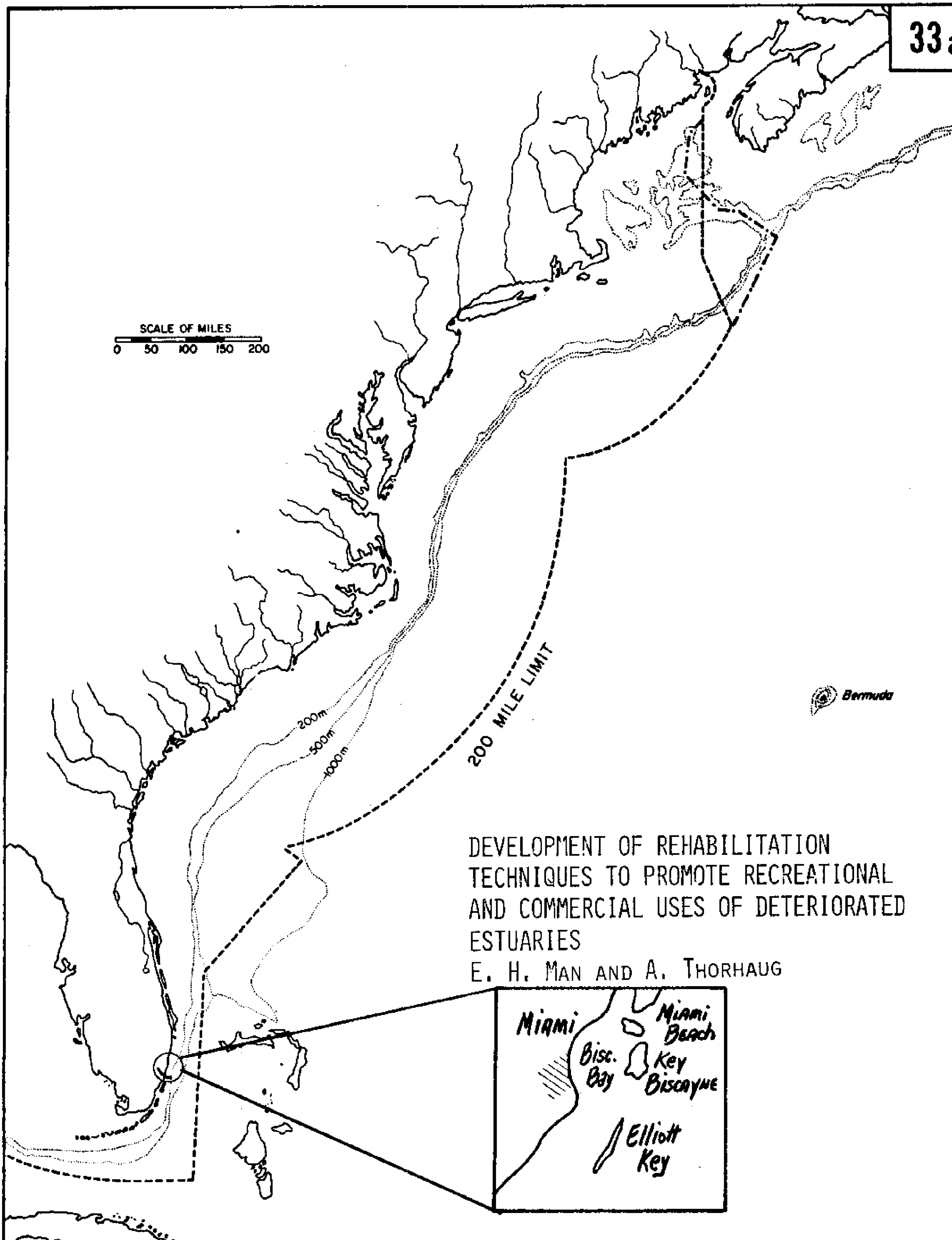
Proposed by: E. H. Man and A. Thorhaug

PROBLEM DESCRIPTION: Biscayne Bay is a shallow sub-tropical lagoon with a perimeter shoreline of approximately 138 miles. It lies almost entirely within Dade County, Florida on the southeast coast. The Bay is roughly divided north and south into two areas: North Bay offers views of city sky lines, homes and cruise ships; it is an urbanized area used for passive viewing and maritime commerce. In contrast, the south Bay offers thirty three miles of protected water, four to seven miles wide. The water is clear, and clean enough for swimming, fishing, and diving.

Of the approximately 70 miles of shoreline in north Biscayne Bay, 66% is used mainly for viewing, 4% for public parks (viewing only), 15% for commercial marine use and the remainder, about 21% is a mixture of unusable (developed) and undeveloped shoreline.

The problem is: the community is focused primarily in the north, yet this is the least useful part of the Bay. Can it be restored? What techniques are available? Can the shoreline be altered (e.g., substitute rifraf for retaining walls, or replant mangroves or other shoreline vegetation)? Can bottom grasses, e.g., *Thalassia*, be successfully (and within economic reason) replanted? Are there other techniques to reduce turbidity and permit Bay recovery?

COMMERCIAL SIGNIFICANCE: There are 1.5 million people in Dade County, and perhaps five times that many who visit each year as tourists. There is no way to estimate the economic impact on the community of an unusable body of water, but it is certain that it was the existence of the Bay in the first place which attracted residents, industry and visitors to the Miami area. Consequently, the Bay must be protected, preserved--and currently, the interest is in restoration.



DEVELOPMENT OF REHABILITATION TECHNIQUES TO PROMOTE RECREATIONAL AND COMMERCIAL USES OF DETERIORATED ESTUARIES

E. H. MAN AND A. THORHAUG

33 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need to Determine the Hydrocarbon Trends in the Atlantic Offshore Waters (Relates to 2, 21, 4, 35)

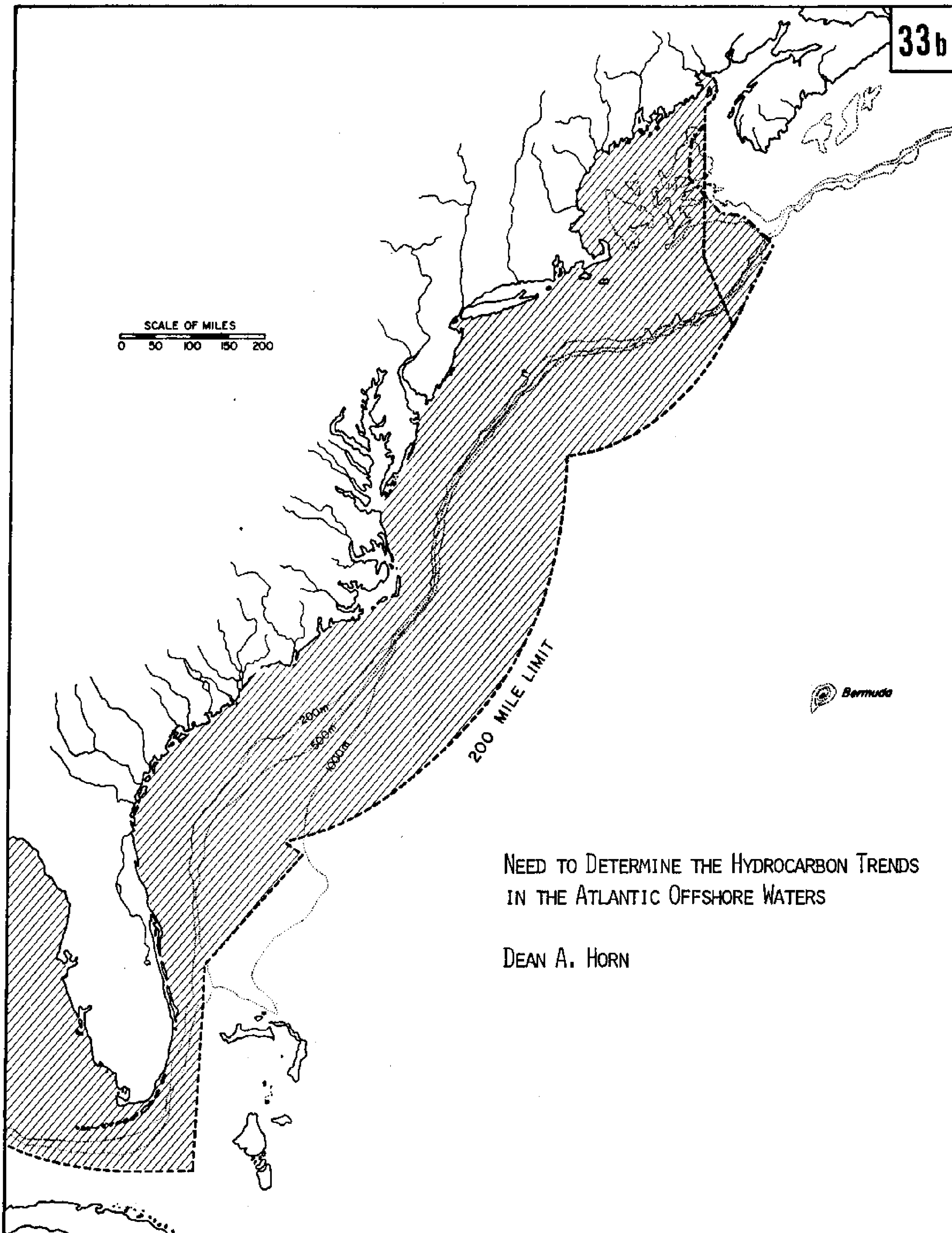
Proposed by: Dean A. Horn

PROBLEM DESCRIPTION:

For centuries the oceans of the world have absorbed millions of tons of natural oil seeps. Pirates careened ships south of Brownsville in the 17th and 18th centuries to use the natural tar balls and wild sisal to clean and caulk their ships. NOAA's MESA study entitled "Hydrocarbons in the Ocean" April 1976 recently released, is an invaluable landmark effort but it must not stop here. Even more important is to establish the natural background hydrocarbon levels in the Atlantic offshore area, to determine the factual budget distribution sources, and most importantly, to assure a monitoring system to reliably measure and determine trends--Are the hydrocarbon levels increasing or decreasing? How effective are our clean-up efforts? What level of clean-up effort is adequate to maintain an acceptable (legally establish) hydrocarbon levels.

COMMERCIAL SIGNIFICANCE:

There are major industrial research and development opportunities for the equipment and system needs to accomplish this task. The national wealth could benefit greatly by establishing reasonable and effective pollution levels, which in turn, set some cost limits for national and industrial regulatory, operating and clean-up costs.



Need to Determine the Hydrocarbon Trends in the Atlantic Offshore Waters

Dean A. Horn

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of New and Improved Materials for the Marine Environment

Proposed by: W. R. Cox Problem from report "Seafloor Engineering: National Needs and Research Requirements", National Academy of Sciences - Washington, DC, 1976.

PROBLEM DESCRIPTION:

It is recommended that an information exchange and coordination service be established for research and development activities concerned with development of materials particularly suited for seafloor use.

Such a service could be provided if it were sponsored by a professional society or assigned to a laboratory or agency with marine environmental responsibilities.

The proposed coordinative efforts should focus on:

a) Improvements in commonly used materials for general marine use.

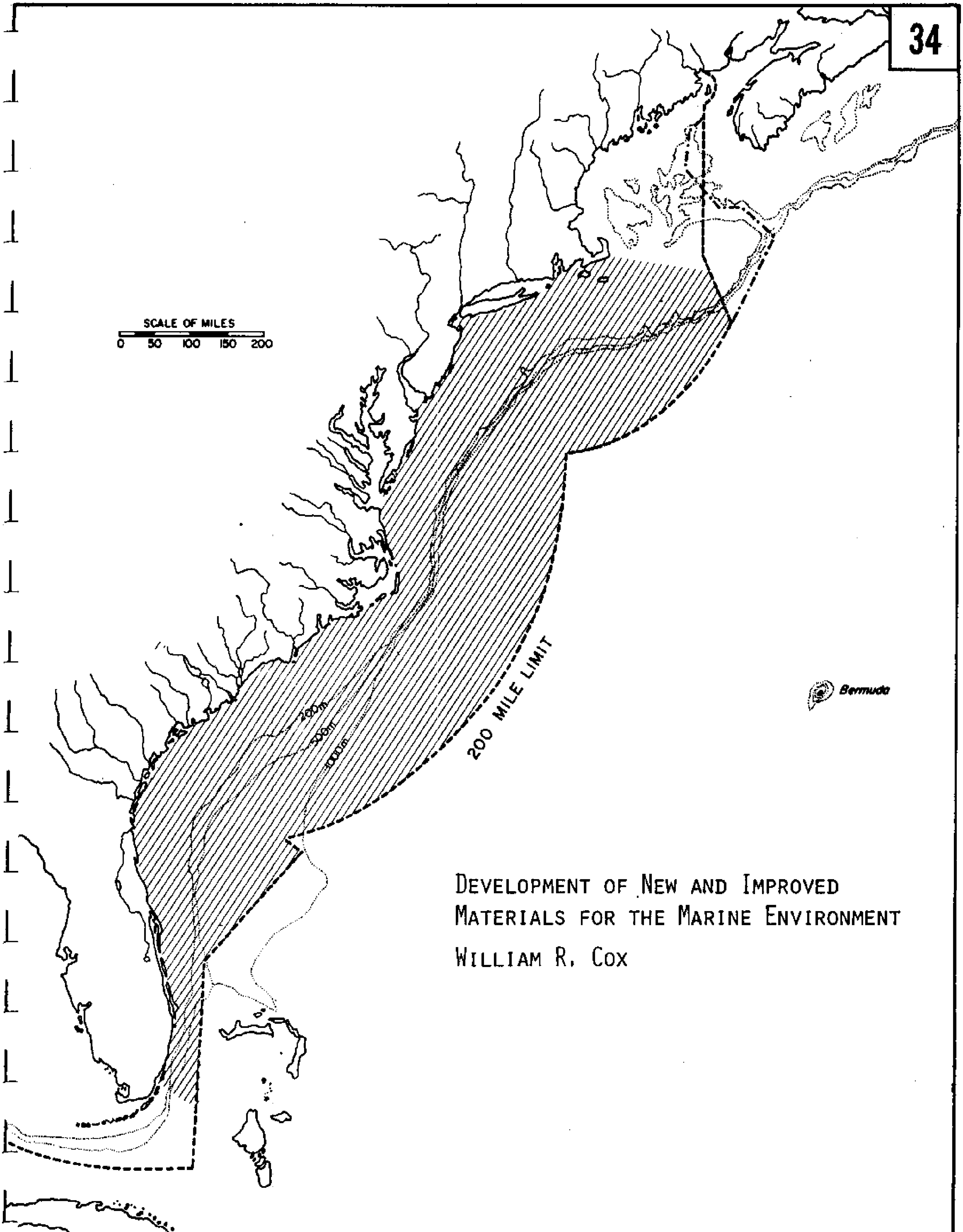
b) Development of new materials to satisfy specific seafloor engineering needs. Such materials may be plastics for piling, for example.

c) Determination of the properties and capacities of materials in the sea environment, including behavior under high hydrostatic pressures, continued submergence, cyclic loading and impact.

d) Dissemination of information on special marine materials to interested parties.

COMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



Development of New and Improved Materials for the Marine Environment

William R. Cox

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop Methods for Efficient Monitoring and Assessing Long Term Effects of Perturbations on the Coastal Zone Environment and Resources

Proposed by: R. Hanks and L. Baer

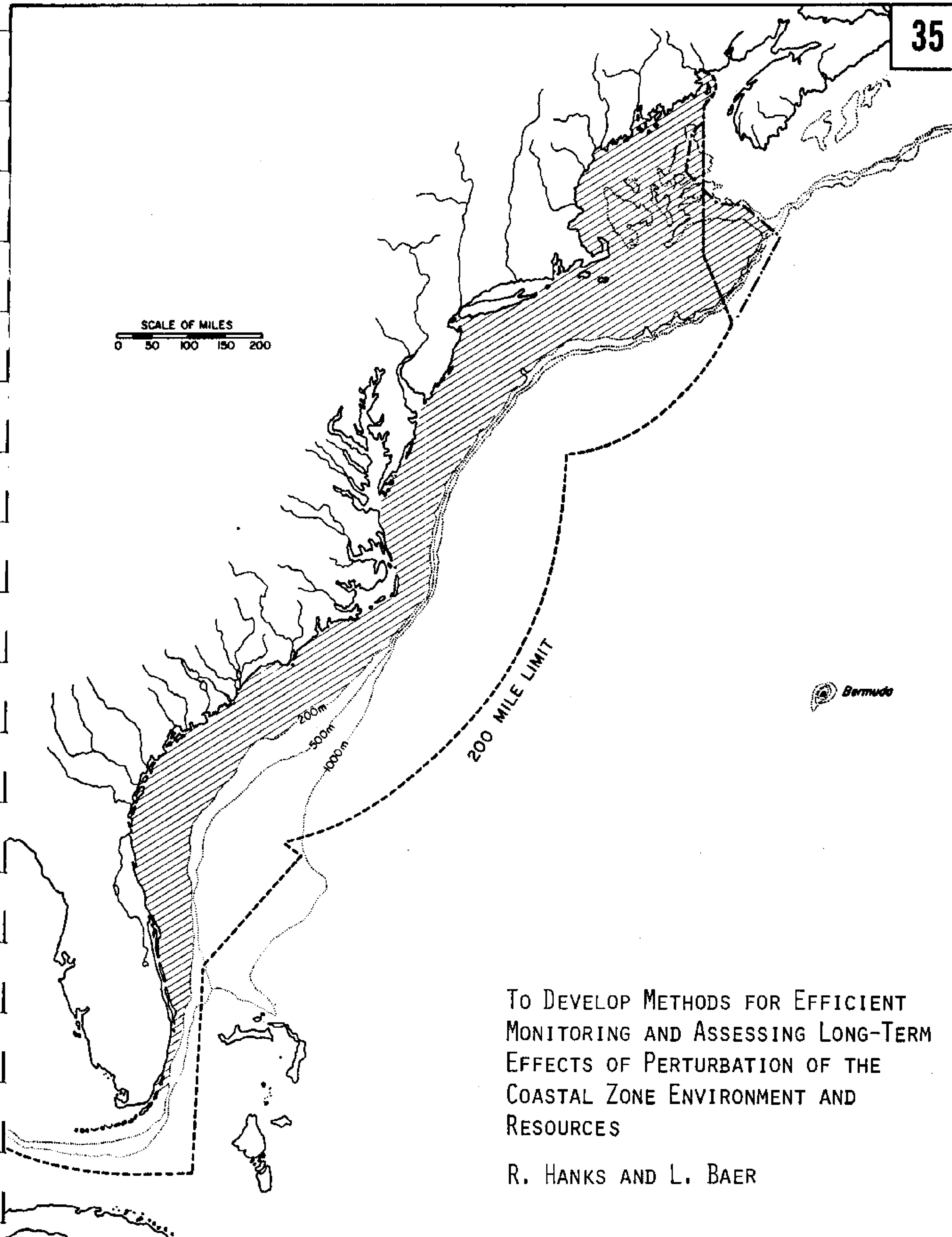
PROBLEM DESCRIPTION:

We are faced with the problem of monitoring and predicting the long-term effects of our activities on the environmental quality of the continental shelf. To fulfill this responsibility, more effluent methods are needed such as identifying critical indicator species, and physical/chemical processes. Such methods are not now available. How should such programs be designed? How can funding support for implementation be obtained?

Currently there are significant resources being expended on the continental shelf aimed at characterizing or establishing baseline conditions. These efforts are in response to the need for environmental information in OCS lease sale areas, certain areas subject to pollution (i.e., the New York Bight) and for stock assessment and management of our nation's fisheries. Such programs need to include the design and testing of monitoring methods for the specific area.

COMMERCIAL SIGNIFICANCE:

Without an adequate program accepted by the scientific and political communities, industry and municipalities cannot adequately plan and be assured of construction or operational costs. This lack, therefore, has the effect of slowing development. Identification of only those critical parameters necessary for environmental monitoring could save substantial resources by narrowing the focus of these programs. Monitoring programs designed to indicate when marine resources, recreational areas or human health are being threatened, could save significant resources if steps were taken to avoid the problem at the first warnings.



To Develop Methods for Efficient Monitoring and Assessing Long-Term Effects of Perturbation of the Coastal Zone Environment and Resources

R. Hanks and L. Baer

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Modeling Short- and Long-Term Dispersion in the Ocean

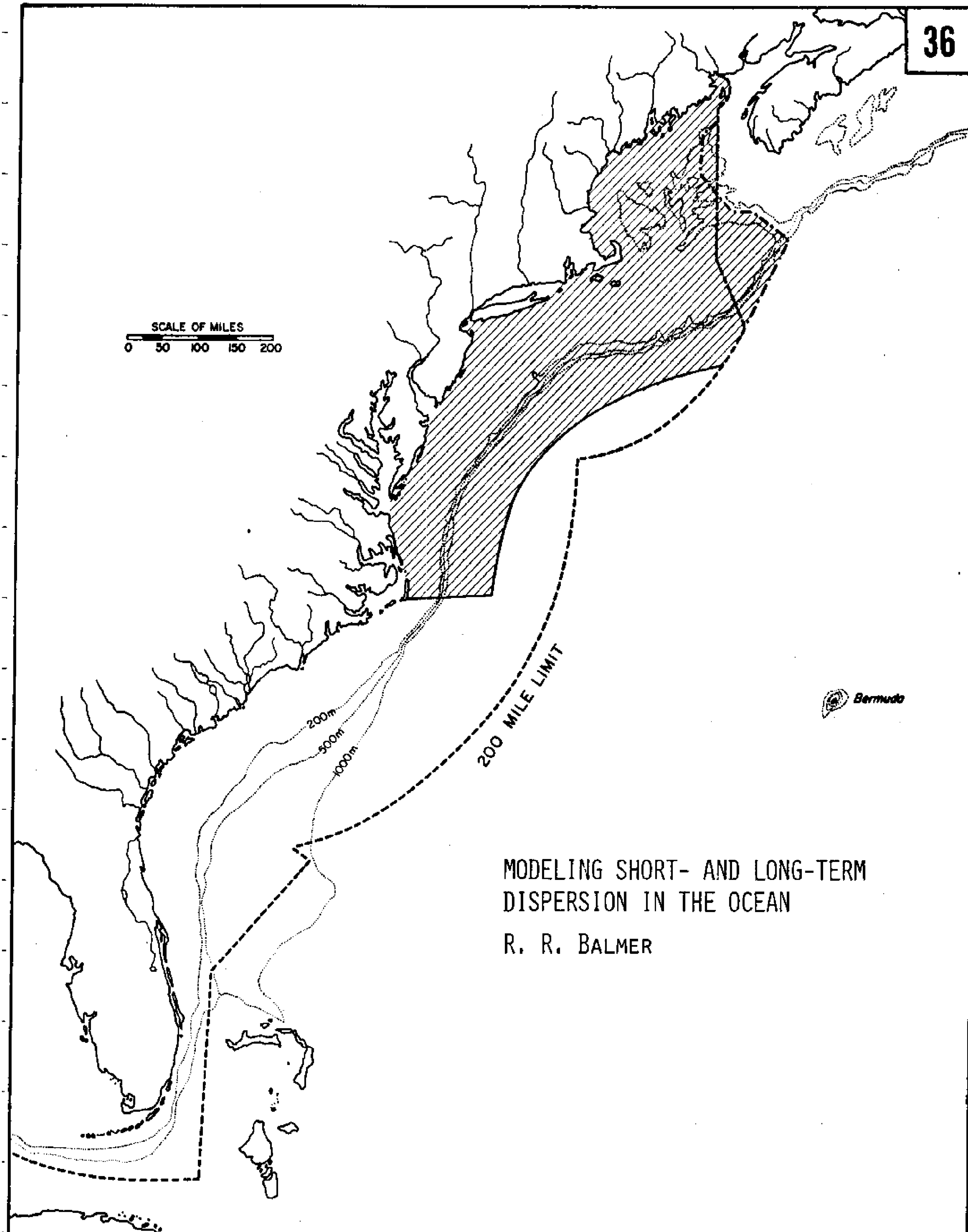
Proposed by: R. R. Balmer

PROBLEM DESCRIPTION:

Some work has been done on mathematical modeling of short-term dispersion of waste materials after release from a barge into ocean waters. Less work has been done on longer-term dispersion. The problem needing solution is better modeling to enable improved forecasting of not only the rate of mixing which occurs in the first few hours after release but also the dispersion and transport occurring over a period of days or weeks. Modeling for short-term dispersion should incorporate the influence of barge design and the discharge system.

COMMERCIAL SIGNIFICANCE:

The ability to better forecast short- and long-term rates of mixing and transport of waste materials discharged in the ocean will allow more accurate assessments of the relative environmental and economic costs and benefits of various disposal alternatives.



MODELING SHORT- AND LONG-TERM DISPERSION IN THE OCEAN

R. R. BALMER

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop More Adequate Ship Salvage Facilities as Major Preventor of Oil Spills

Proposed by: P. S. Barracca

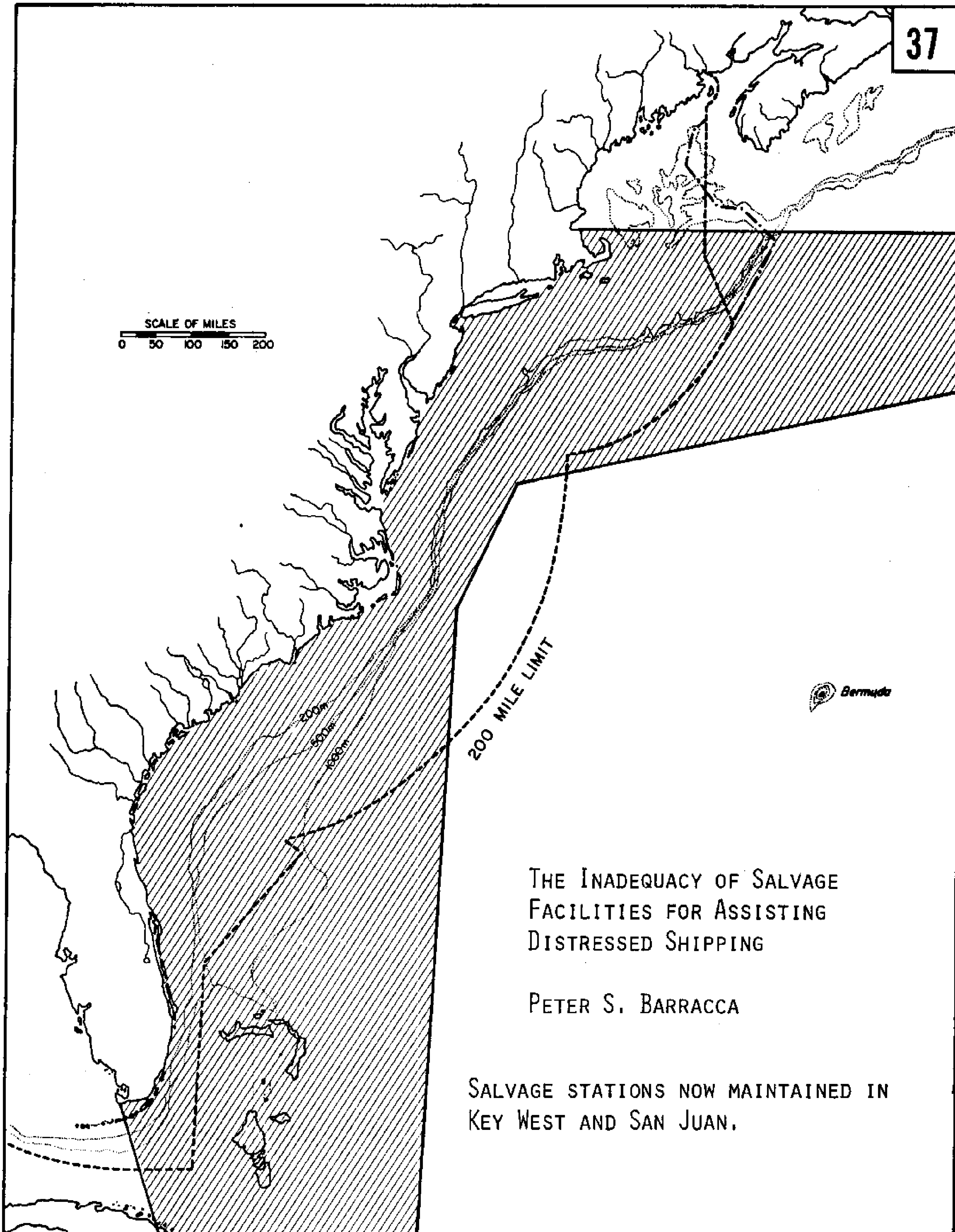
PROBLEM DESCRIPTION:

It is a matter of consensus that the east coast of the United States will become increasingly dependent on the importation of foreign oil resulting in an increase in tanker traffic in the Atlantic offshore area. As the result of the ARGO MERCHANT and similar casualties, Congress and regulatory agencies have under consideration a variety of legislation and regulations aimed at increasing the safety level of tanker design and operations and proposing a number of ways to handle the cost of clean-up operations.

It is suggested that a major segment of the problem has not been adequately addressed and that is, removal of stranded tankers and other vessels before they can break up and thereby minimizing or completely preventing a spill before it occurs. What facilities and techniques do we currently have to deal with stranded vessels? Are they adequate in number, distribution and engineering design? Should additional research and development funds be earmarked to develop new techniques or improve the current state of the art?

COMMERCIAL SIGNIFICANCE:

This problem has widespread impact on the marine environment affecting prime fishing and recreational areas. The loss of ships and cargoes impacts shipowners, shippers and marine underwriters. The end result is increase in cost to the consumer and adds to inflation.



The Inadequacy of Salvage Facilities for Assisting Distressed Shipping

Peter S. Barracca

Salvage stations now maintained in Key West and San Juan.

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Causes and Effects of Oxygen Depleted Area Off New Jersey Coast

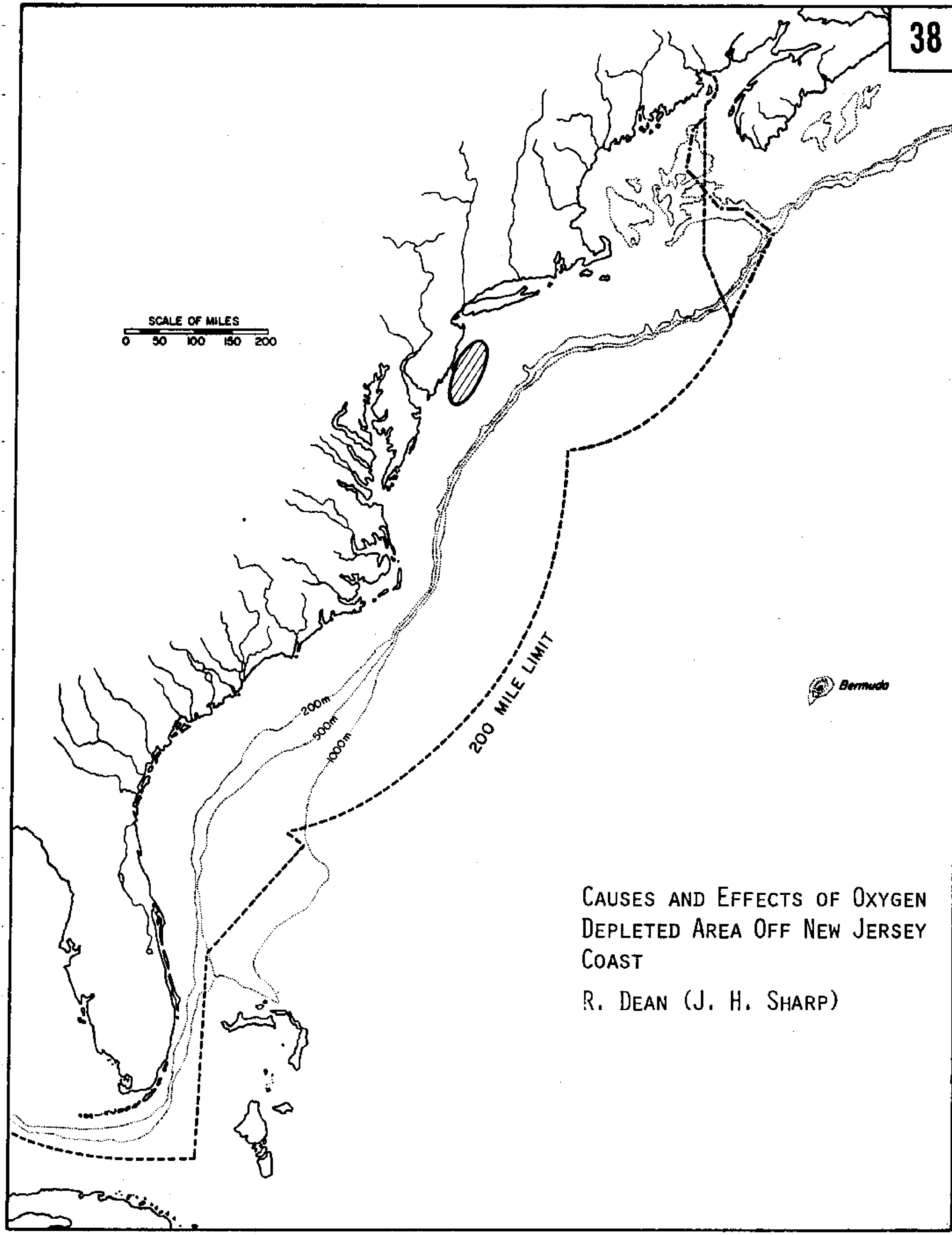
Proposed by: R. Dean (J. H. Sharp)

PROBLEM DESCRIPTION:

The bottom waters below a large (about 30 miles x 100 miles) area of the coastal ocean off New Jersey, New York and Delaware experienced extreme oxygen depletion (0-2 ppm) in the summer of 1976. There was a resultant high mortality of shellfish and demersal finfish. Preliminary examination by scientists has not pinpointed the cause. Possibilities include: atmospheric fallout, natural run-off, causes and effects of large algae blooms, effluent discharges, and sludge dumping. How important is the use of parts of this area, or adjacent areas, for sewage sludge disposal in jeopardizing its use for sport and commercial fishing? What are other factors contributing to this phenomenon and how important are they? Can the occurrence of this situation be predicted and if so, what can be done about it?

COMMERCIAL SIGNIFICANCE:

This problem was of the greatest significance to the surf clam (Spisula) industry. It also had an adverse effect on sport fishing and pleasure diving. The estimated loss to the surf clam industry in 1976 from this situation was $5-10 million.



CAUSES AND EFFECTS OF OXYGEN DEPLETED AREA OFF NEW JERSEY COAST

R. DEAN (J. H. SHARP)

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Radionuclide/Sediment Transport Evaluations Applicable to Floating Nuclear Power Plants

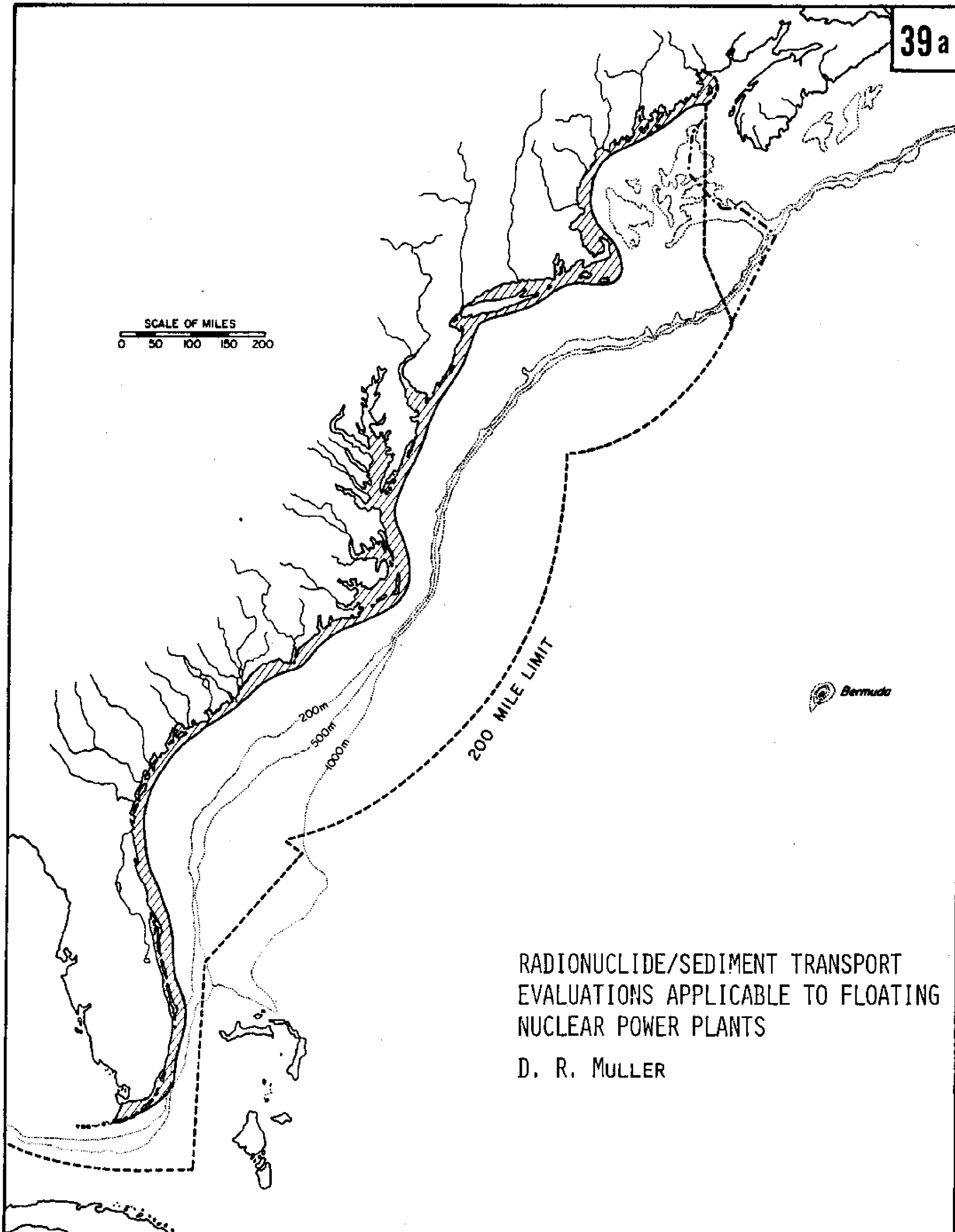
Proposed by: D. R. Muller

PROBLEM DESCRIPTION:

In past evaluations of the consequences of postulated radiological accidents at proposed floating nuclear power plants, radionuclide transport models were used that did not account for sediment sorption effects by predicting that radionuclides are flushed from the ocean coastal zone water system at the same rate that water is exchanged. However, the sediment sorption effects may cause the radionuclides to flush at a different rate (i.e., at approximately the rate at which sediment is exchanged in the water system). Inclusion of sediment effects could change the radiological dose to man through the dominant pathways, i.e., fish injestion and direct exposure (beach activities). A mathematical simulation capability is needed that can account for radionuclide adsorption/desorption, sediment transport, and sediment deposition/resuspension in ocean coastal zone water systems.

COMMERCIAL SIGNIFICANCE:

Including the effects of sediment sorption would allow more accurate prediction of radionuclide distributions in time and space and thus more confidence in our accident dose predictive ability.



RADIONUCLIDE/SEDIMENT TRANSPORT EVALUATIONS APPLICABLE TO FLOATING NUCLEAR POWER PLANTS

D. R. Muller

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Review and Assessment of the Effect of Some Bottom Fishing Gear on Fish Habitats and on Divers and Submarines

Proposed by: A. Galerne

PROBLEM DESCRIPTION:

The fishing industry is using a huge variety of gear to make their catch. Some of those gear when abundant on the bottom of the sea can represent a real danger to the fish, the divers, and to small submersibles. Some traps abandoned on the bottom of the sea represent also a danger for the local habitat. We recommend the following action:

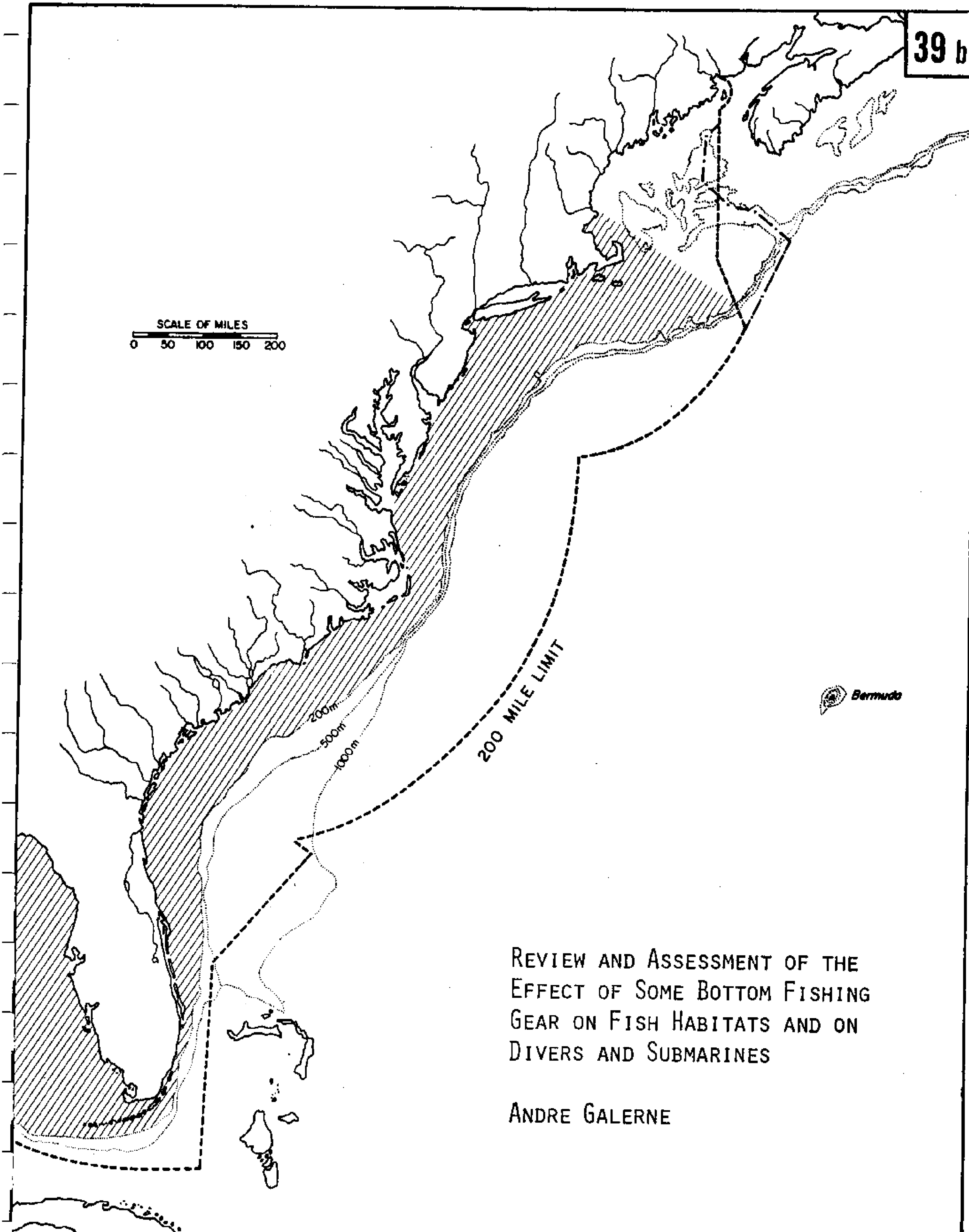
1. A regulation demanding that when a fishing boat loses a monafilament gill net to report it to the Coast Guard to determine the proper action to retrieve it or destroy it;

2. Lobster traps or similar gear have to have a self-destructing hatch permitting the animal to escape if the trap is not retrieved after a few weeks;

3. A study to be made on the effect of the bottom trawler net on the living habitat;

4. Recommend an economic study of the interest to use some new and very cheap (less than $100) underwater pingers self-activated that can permit a very fast location of any lost gear and permit any small submersible, by using their sonar, to know if there is a close dangerous obstacle.

COMMERCIAL SIGNIFICANCE:



Review and Assessment of the Effect of Some Bottom Fishing Gear on Fish Habitats and on Divers and Submarines

Andre Galerne

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Instrumentation and Methodology Are Needed to Quantify and Forecast Sea Conditions for Optimal Ship Management

Proposed by: E. Schorsch & M. C. Shakshober

PROBLEM DESCRIPTION:

Weather routing is used today for different objectives; i.e., minimize fuel, minimize transit time, minimize cargo damage, minimize vessel damage, etc. Such weather routing does not take into account the specific responses of a given vessel to the sea condition, nor does it permit evaluation of alternative actions such as reduced speed or definite changes in heading coupled with speed changes.

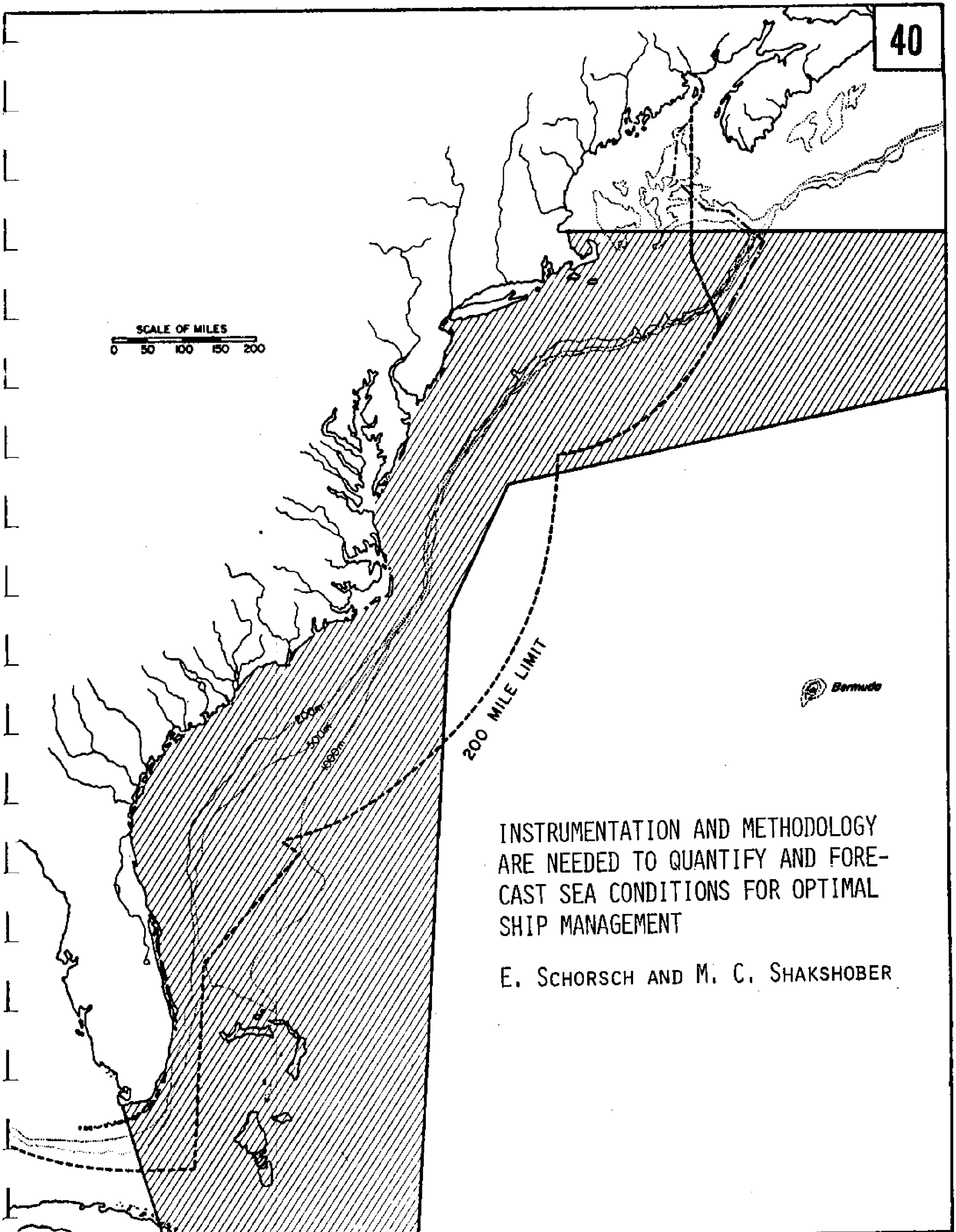
Various investigators are developing analytical tools to predict ship's response in a given sea condition at a particular heading and at a particular speed. These analytical programs require test verification. Their use requires adequate definition of sea spectra. If used for routing, sea spectra forecasts are required.

One investigator, Sun Shipbuilding & Dry Dock Company, is preparing such an analytical program and intends to instrument a real ship to test the analytical method in a real sea condition. Means are needed to measure and quantify that real sea condition. Application of the ship response prediction requires accurate forecasts of sea condition.

It is the purpose of this task to develop and demonstrate techniques for measuring directional sea spectra during ship test and to improve methods for forecasting sea conditions. It is broken into two phases: 1) to develop an inexpensive, telemetered, deployed instrument package which will provide sea spectrum as a function of sea direction in 5° sectors, or, preferably, an instrument package which can be installed aboard ship to make such measurements; 2) develop methodology which will permit forecasts of sea conditions having a power spectrum accuracy of $\pm$ 2 feet in all bands, directionality to be determined in 5° sectors.

COMMERCIAL SIGNIFICANCE:

Moderately heavy seas, STATE 6, can reduce speed by 8% or increase power requirements and hence fuel consumption by 25% on many high performance ships. Optimized course and speed selection due to forecasted sea conditions can lead to far more efficient ship operation.



INSTRUMENTATION AND METHODOLOGY ARE NEEDED TO QUANTIFY AND FORECAST SEA CONDITIONS FOR OPTIMAL SHIP MANAGEMENT

E. Schorsch and M. C. Shakshober

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of High-Resolution Bathymetrics, i.e. Survey of Continental Margin (Combines 52W and 81W)

Proposed by: W. R. Cox and M. Castagna

PROBLEM DESCRIPTION:

A bathymetry study should be made in areas that are expected to have depth-critical operations. The study should provide bathymetric charts for siting offshore structures, for assessing slope stability, for quantifying the effects of scour and accretion, for delineating mineral and marine resources, for mapping scientific and engineering data, and for assuring depth-safe navigation lanes. This study should:

a. Prepare bathymetric charts, contoured for true (not sonic) depths, at 1 meter intervals in critical areas and 3 meter intervals in non-critical areas.

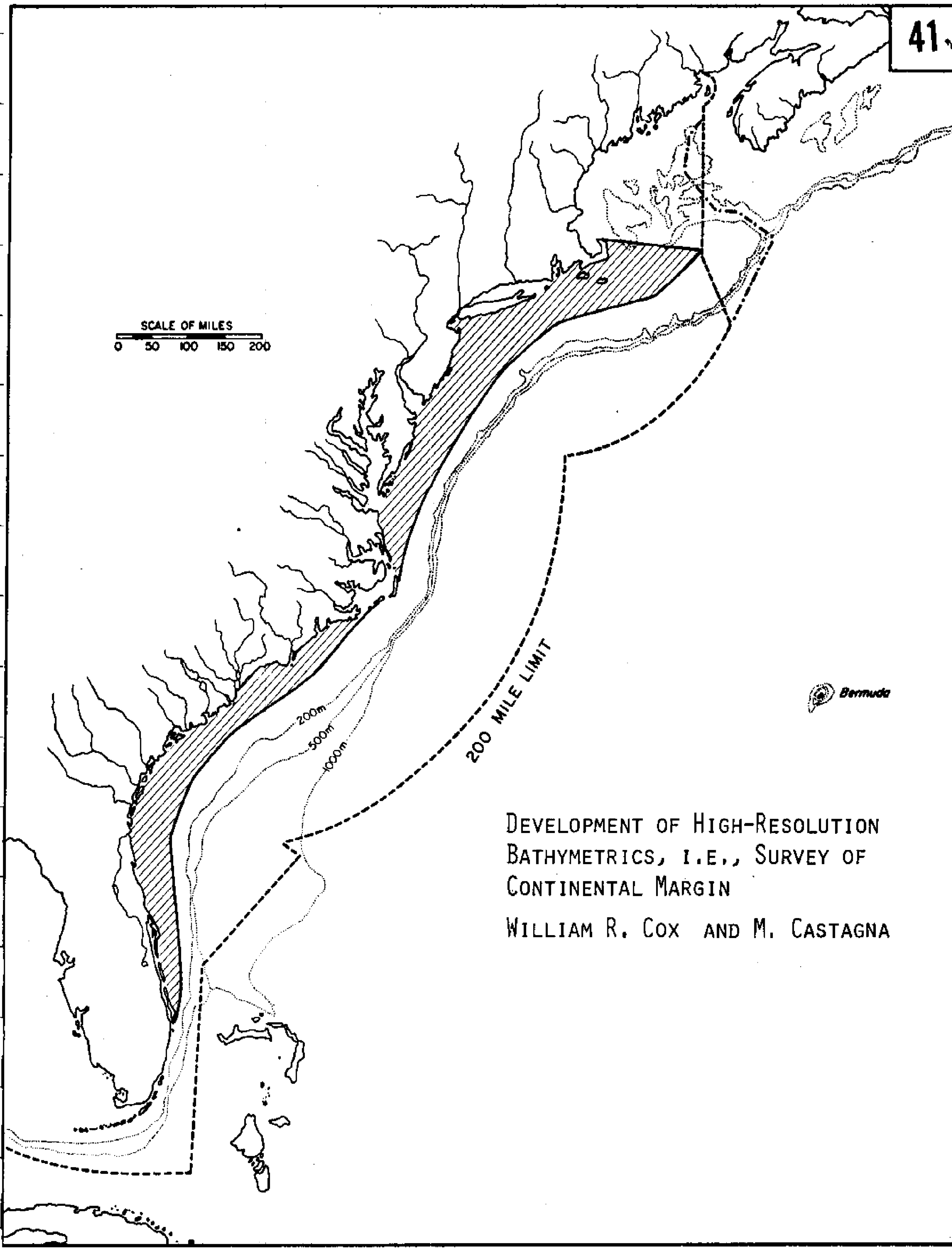
b. Identify and locate pinnacles or obstacles to a depth of at least 50 meters, although in some critical-use lanes a depth of 100 meters would be preferable.

c. Establish specially-detailed geotechnical corridors in selected areas of the continental margins over different soil types. The geotechnical properties and locations should be determined and surveyed. Near-bottom currents required for sand-transport should be identified. Coupled with periodic and post-storm surveys to measure soil movement, these data will provide information to predict scour potential along offshore pipelines and communication cables.

d. Locate large topographic depressions or swales.

Ongoing survey work has demonstrated that these are related to the ridge and swale topography of the Middle Atlantic shelf and are habitats of inordinate biological significance. These environments are rather large (order of magnitude 10-100 km^2), well defined and persistent features. Abundance, biomass and diversity of benthos are higher in swales than in surrounding areas. Also, utilizaton of swale habitats by motile species such as demersal fishes has been shown to be greater in terms of distribution and foraging. Swales are also the most likely locations for deposition of pollutants as they are the only sites on the shelf where there is appreciable deposition of fine sediments. A case in point is the "sludge blanket" sitting in a swale at the Philadelphia dump site. In short, swale environments are biological "hot spots" on the continental shelf where environmental impacts are most likely to conflict with resource protection.

COMMERCIAL SIGNIFICANCE: Bathymetric data are first order priority for most marine projects. Swale identification and locations will be of value to commercial fishermen since it is known that demersal fishes selectively inhabit and feed in these environments.



DEVELOPMENT OF HIGH-RESOLUTION BATHYMETRICS, I.E., SURVEY OF CONTINENTAL MARGIN

WILLIAM R. COX AND M. CASTAGNA

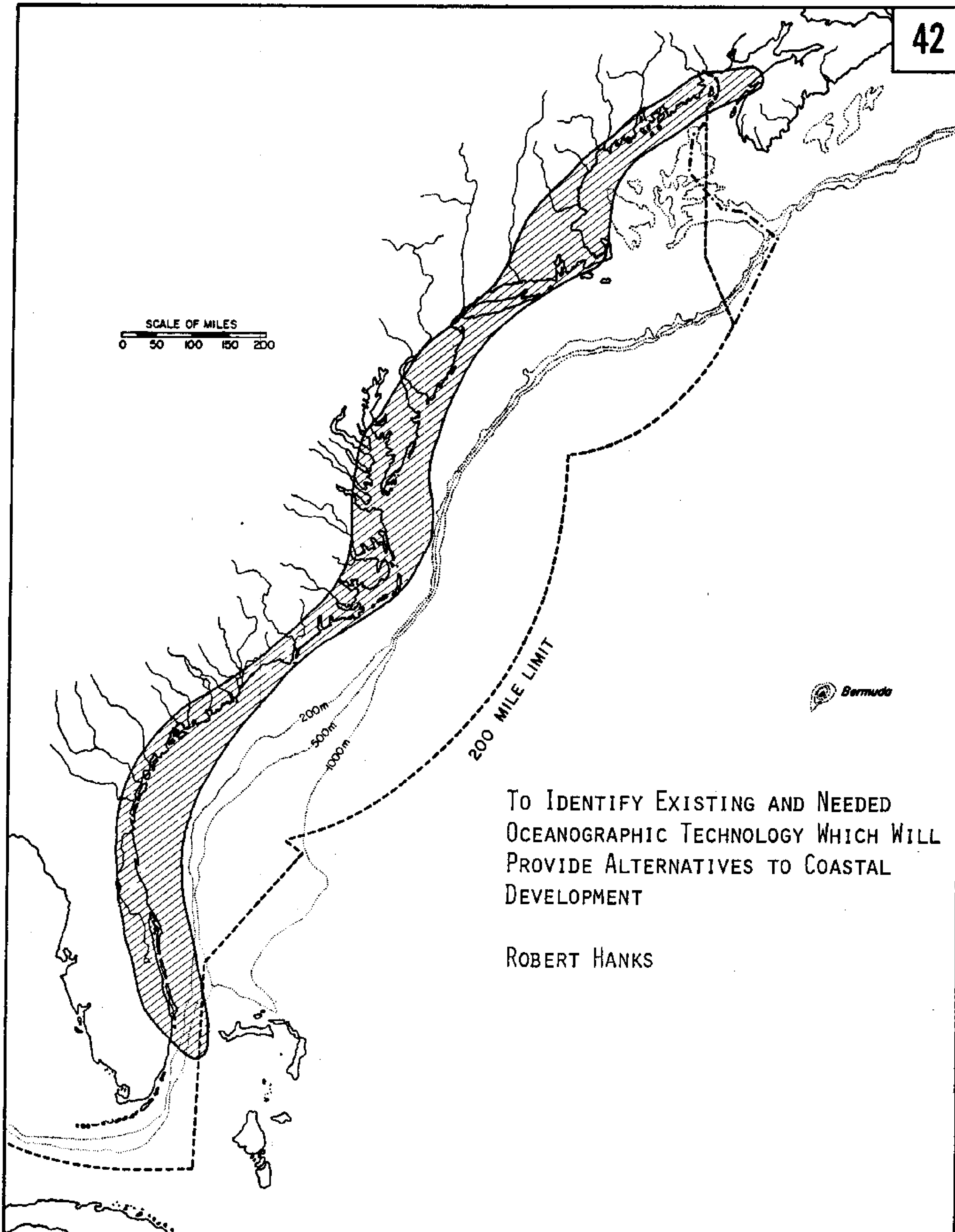
ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Identify Existing and Needed Oceanographic Technology Which Will Provide Alternatives to Coastal Development

Proposed by: R. Hanks

PROBLEM DESCRIPTION: Demands on coastal and nearshore ocean environments are increasing because of a growing population, industrial needs, recreation demand, energy requirements, etc. These uses are competing for a limited and dwindling resource base of great environmental value. It must be determined what further combination and magnitude of uses, if any, can be imposed on coastal areas, without undue damage to this historic resource base. Which developments must be sited along the coast, and which might be sited elsewhere, given development of alternate technologies to meet transportation needs, water needs, etc.? How can institutional arrangements be made to bring all pertinent, competing interests, including environmental, into the planning process before a proposed development is locked into a specific site? How can approval or rejection time for developments be shortened without jeopardizing the natural resource base?

COMMERCIAL SIGNIFICANCE: Costs of delays in site approval have been documented by some commercial enterprises. Costs of loss of the resource base to commercial and recreational fishermen and other users are more difficult to quantify, but are nevertheless very great. Design alternatives developed to obviate the need for coastal siting could have other commercial applications.



To Identify Existing and Needed Oceanographic Technology Which Will Provide Alternatives to Coastal Development

Robert Hanks

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

'itle: The Lack of Capability of the Coast Guard to Assist Commercial Divers or Submersibles in Distress

'roposed by: A. Galerne

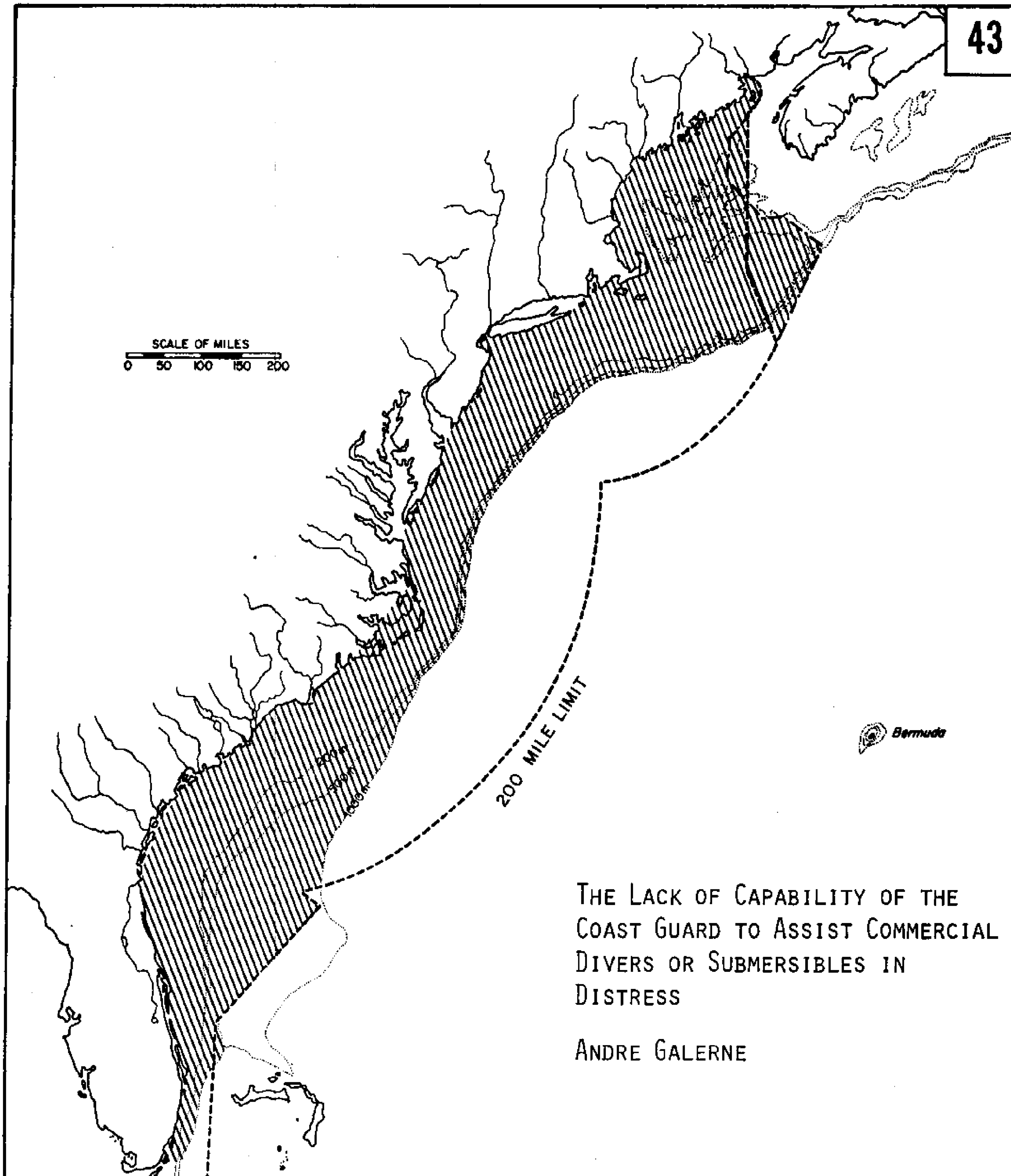
'ROBLEM DESCRIPTION:

Although the U.S. Coast Guard has, by its charter, the responsibility for the safety and rescue of civilian vessels in American waters, it is not prepared to rescue any manned submersible working on the continental shelf. It is most probably due to lack of funds, certainly not lack of willingness. At the present time, we are obliged to rely on the benevolent assistance of the Navy for the rescue of small manned submersibles. Although the Navy has been most cooperative up to the present, it can happen that they may be unavailable and this would lead to a real catastrophe. To the best of my knowledge, the Coast Guard has not yet started to work on establishing a compatibility with submersibles working in American territorial waters, i.e., compatibility of radio, submerged beacons attached to the sub, lifting systems, etc. It would be most appropriate for the Coast Guard to begin gearing up to be ready for the offshore exploration.

Further, at present there are no rescue facilities on the drawing board for the intervention in case of a disabled diver under pressure. My personal experience with the North Sea Hyperbaric Center demonstrates that the lead time necessary to be ready is tremendous and it is our opinion that if we hope to drill before the end of this year using divers in substantial quantities in 1978 and 1979, then rescue facilities should be prepared now.

Action. Organize a panel between the U.S. Navy and the Coast Guard and Marine Technology Society to define the problem and decide the following possibilities:

1. The Coast Guard can request the necessary funds to equip themselves under their charter;
2. Modify the U.S. Navy charter and make them responsible to ensure the safety of the professional diving and civilian submersibles (Not recommended);
3. The Coast Guard can give a contract to a civilian organization to provide the rescue responsibility for divers and submersibles similar to the contract given by the Navy to civilian organizations to rescue ships;
4. Ensure the participation of the diving community and submersible operators in the preparation of the safety regulations which have to be the responsibility of the U.S. Coast Guard in all navigable water. It will be very detrimental to the industry if the new OSHA regulation will be cumulative with the Coast Guard regulation and double the paper work load imposed on offshore operation. At this time the Coast Guard is responsibl for the certification of diving bell, recompression chamber, etc. It will be ridiculous to have another administration responsible for the certification of the diving equipment and try to regulate a profession they do not comprehend.



The Lack of Capability of the Coast Guard to Assist Commercial Divers or Submersibles in Distress

Andre Galerne

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Environmental Examination of Aggregate and Sandfill Mines Leading to Rational Dredging Permits

Proposed by: D. Sensibar

PROBLEM DESCRIPTION:

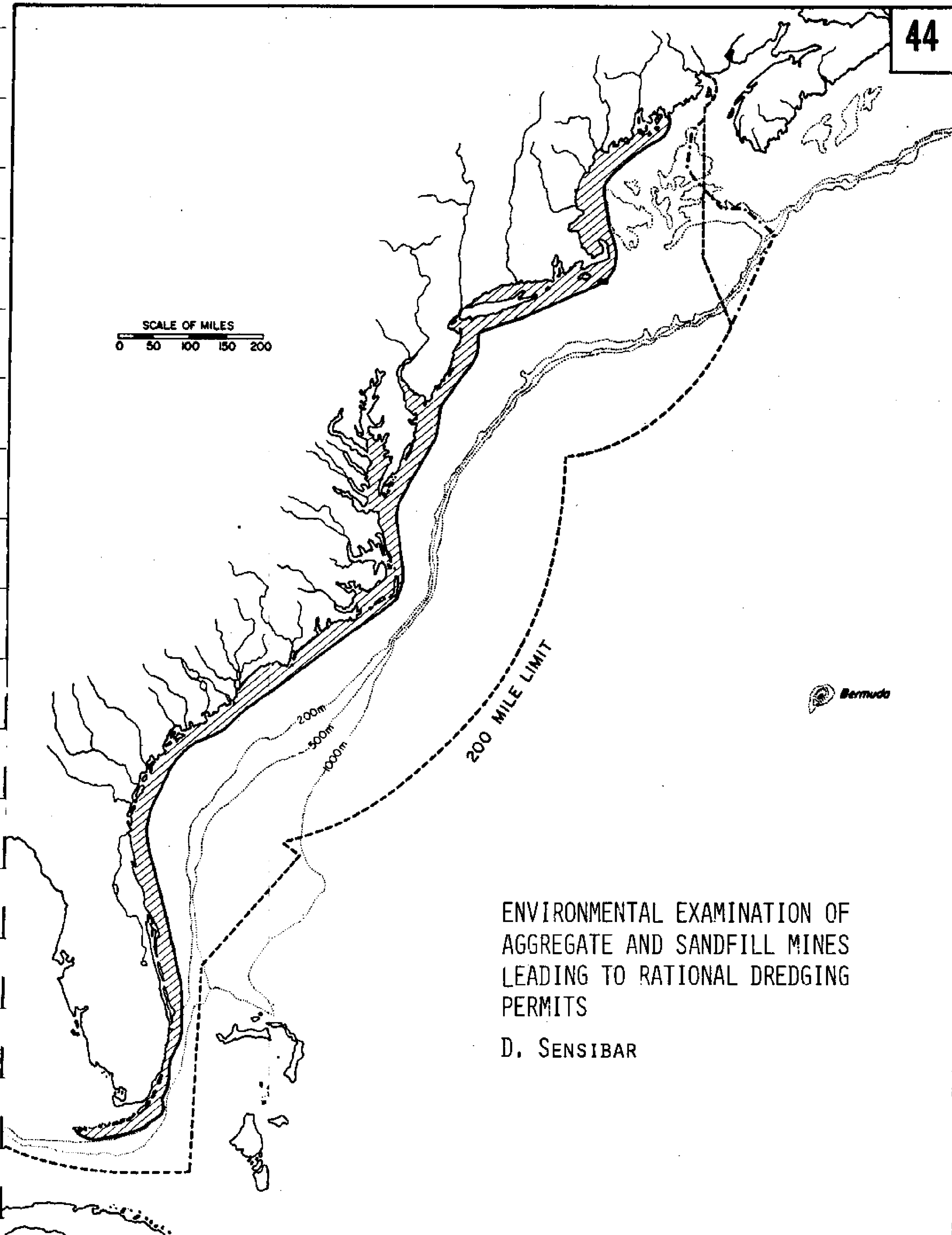
The sandfill industry is aborted, dead, or dying at some shelf locations because of restrictions on operations in the interest of protecting the environment. These restrictions are on depth, area, time, turbidity, etc. and add very significantly to cost of operations. Yet even the regulators will admit to a general ignorance of the true effects on the environment of the activities they control.

What is needed is a full scale environmental test on an aggregate or sandfill mine on the continental shelf. This test should monitor the mine location and surroundings before, during, and after mining. The test would be unsatisfactory and incomplete unless it included the environmental effects of not mining the shelf, too. Any extraction industry disturbs the environment. Whether the aggregate comes from the ocean or the land a hole will be made somewhere, though in the ocean at least it is not an eyesore. Flora and fauna will be disturbed somewhere. Transportation to market will cause air pollution, use energy, damage highways, cause noise pollution.

Once all the environmental factors are known we should know what mining activities to encourage and what to discourage. Then we will be in a position to make permit requirements rational.

COMMERCIAL SIGNIFICANCE:

This problem is difficult to quantify. Largely it is a question of what restrictions which would otherwise be imposed can be thereby avoided. However present environmental control often increases the cost of a single dredging contract by several hundred thousand dollars.



ENVIRONMENTAL EXAMINATION OF AGGREGATE AND SANDFILL MINES LEADING TO RATIONAL DREDGING PERMITS

D. Sensibar

45 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Methods of Pipeline Installation for the Atlantic OCS
(Combines 22W and 84W)

Proposed by: J. F. Hillmann; J. Machemehl

PROBLEM DESCRIPTION:

The applications received by DOT early in 1976 for construction of deepwater ports in the Gulf of Mexico provide for burial of the pipelines connecting the offshore terminal to the onshore storage facility. In the absence of regulatory criteria, depth of burial was based on past experience with production pipelines in the Gulf.

In August 1976, the Office of Pipeline Safety Operations in DOT issued revised regulations (49 CFR 195) to include offshore pipelines associated with deepwater ports. These regulations stipulate a minimum depth of burial for offshore pipelines but do not specifically require backfilling of the pipeline trench. This is not unusual in view of existing practice which involves jetting of the pipeline to the bottom of a trench without recovering the excavated material to be used as backfill.

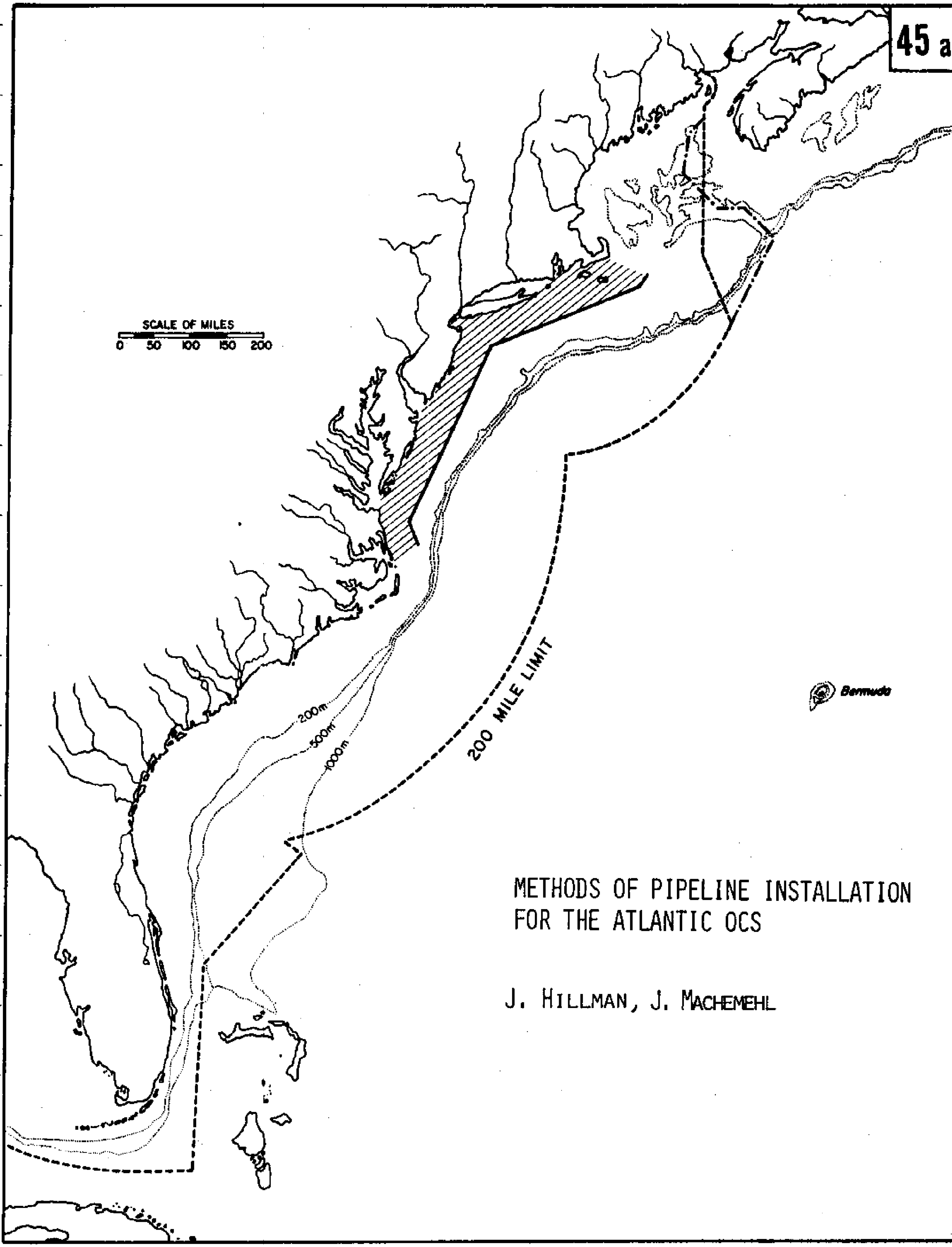
Oil and gas leasing of the Southeast Atlantic OCS is slated by the Bureau of Land Management, U. S. Department of the Interior for the near future. One of the stipulations will doubtless call for the burial of all pipelines resulting from any production. Current practice is to bury all pipelines in water depths of 200 feet or less. In the Gulf of Mexico, this is readily accomplished by jetting the trench along a pre-layed line. There, however, the sediments consist of sands, silts, and clays of sufficient thickness to accommodate burial. On the SE Atlantic OCS, there are many areas where the sediment veneer is either very thin or non-existent. Pipeline burial and/or anchoring techniques will have to be developed to insure the stability of the pipelines over hard and broken (rough topography) bottoms in water depths up to 200 feet.

The current approach to offshore pipelines presumes that natural processes will act over a reasonably short period of time to cover the pipeline. At issue is whether this is an adequate procedure, or whether other means are required to assure sufficient coverage of the pipeline.

In order to determine the most cost-effective burial depth and amount of backfill, an analysis of hazard probably appears necessary. Potential hazards include: impact of fishing gear and ship's anchors, seabed movement, loss of stability and support due to bottom currents, etc. It will be necessary to collect and evaluate data in locations with existing offshore pipelines, and to extend the hazard assessment to other areas, such as the Atlantic coast, by means of computer simulation or other means.

COMMERCIAL SIGNIFICANCE:

The amount of backfill required will have a direct impact on construction costs for deepwater ports and similar offshore facilities. Conversely, the persistence of a trench due to the burial of a pipeline may result in impacts on bottom life, and associated fishing activities as well as risk of damage to the pipeline itself.



METHODS OF PIPELINE INSTALLATION FOR THE ATLANTIC OCS

J. HILLMAN, J. MACHEMEHL

45 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Identify the Existing and Potential Shelf Users Who May Be a Hazard to Submarine Cables

Proposed by: L. E. Overhiser

PROBLEM DESCRIPTION:

There are presently 11 Bell System ocean submarine cables that route from the U.S. East Coast to foreign terminals in Europe, Bermuda, the Bahamas and the Caribbean. Additional cable installations are planned through the 1980's to meet growing overseas communications needs.

Ocean cables are susceptible to damage by a variety of causes. The majority of breaks occur on the Continental Shelf inside the 1,000 meter curve and are primarily due to bottom fishing activity. Trawling, shellfish dredging and factory ship anchors have been the prime source of cable failures. In addition to fishing, any offshore resource exploitation, at or below the sea bed, poses a hazard for ocean cables. This includes, but is not limited to, oil and gas drilling, pipelaying, dredging, mining and dumping.

Cable breaks on the shelf for 4 existing Transatlantic cables routing from Rhode Island and New Jersey have been substantially reduced by embedding them to a depth of 2 feet below the bottom with a specially designed sea plow. Future cables will also be protected by plowing in damage prone areas.

Identification of the known and probable users of shelf resources that pose a hazard to cables would permit:

- Establishment of a mutually beneficial liaison between AT&T and other users.
- Optimized route selection for future cable to minimize conflicts with other users.
- Dissemination of location data for existing and proposed cables to concerned users.
- Joint planning of user activities to minimize hazards to cables and users.

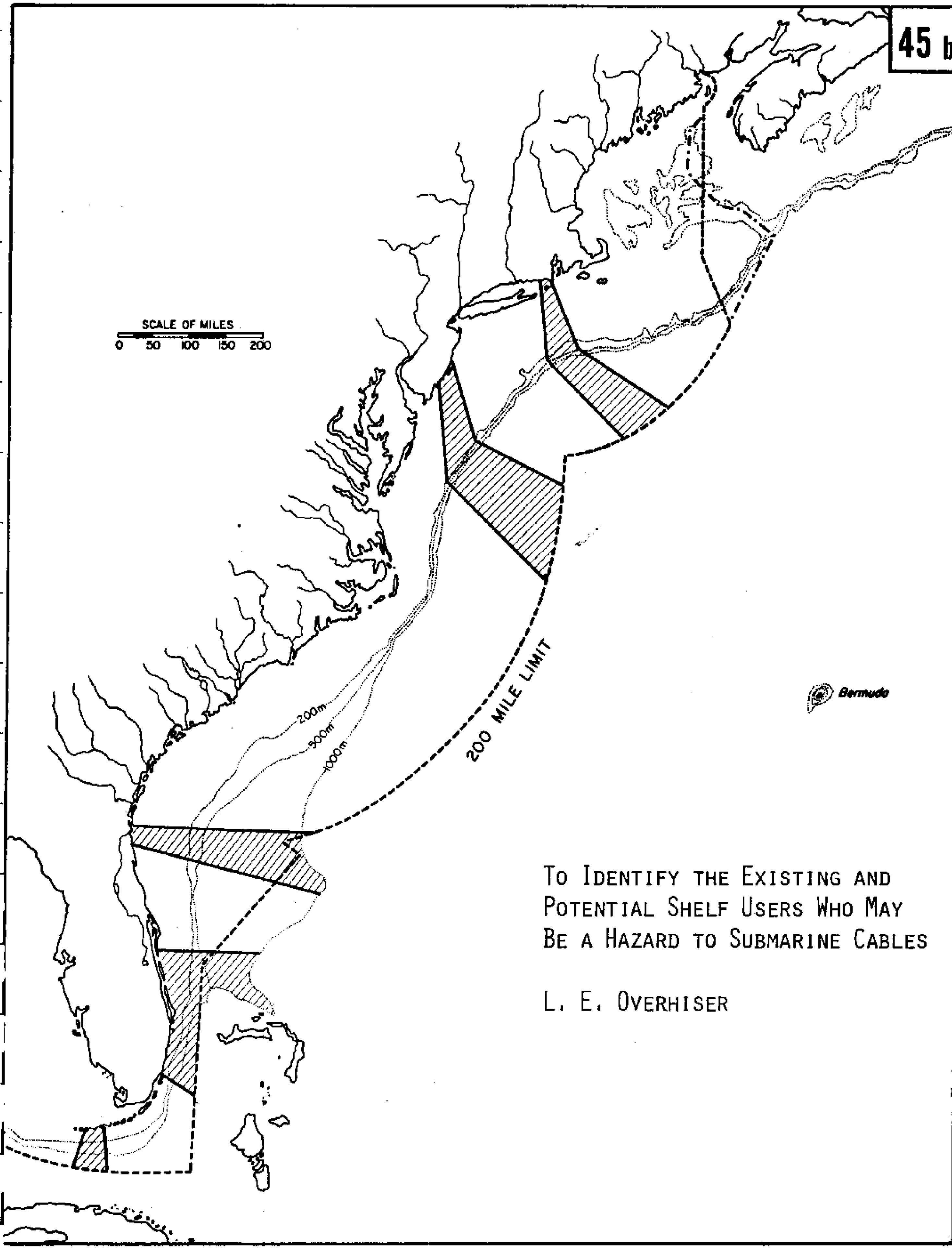
Identification of hazardous sea bed activities could be best utilized for current and long range cable planning, if available in base chart and overlay format, showing:

- User classification (trawling, pipelaying, dredging, etc.).
- Known and projected user activity for next 5 years.
- Probable activity for 5-25 years in 5 year increments.

COMMERCIAL SIGNIFICANCE:

Minimize ocean cable breaks that result in:

- disruption of vital international communications
- costly cable repairs and restoration of lost service via satellite
- frequent loss or damage to fishermen's gear



To Identify the Existing and Potential Shelf Users Who May Be a Hazard to Submarine Cables

L. E. Overhiser

45c

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Develop Understanding of the Geologic Evolution of Transgressive and Regressive Coastal Zones

Proposed by: J. C. Kraft

PROBLEM DESCRIPTION:

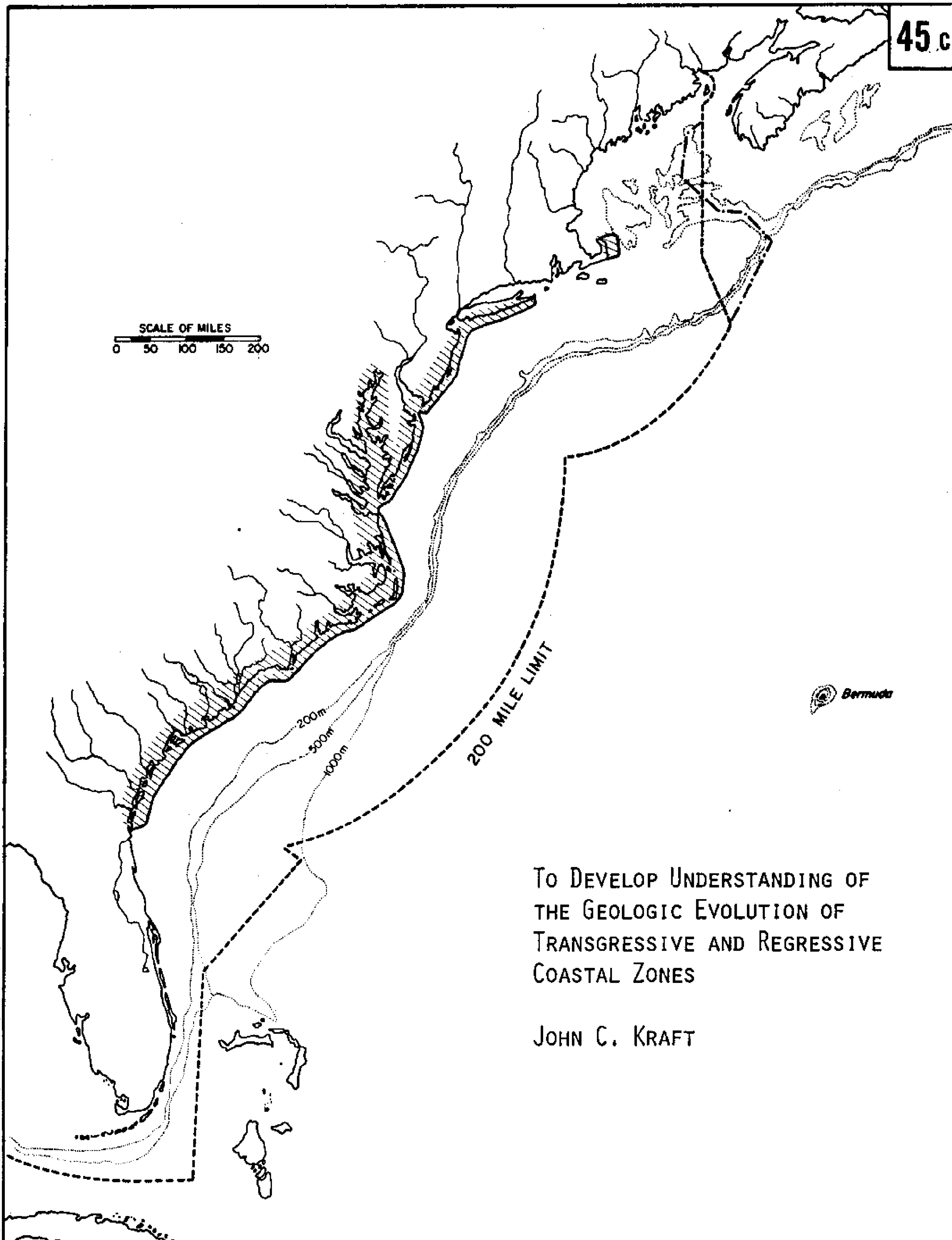
The Atlantic Offshore area is part of a greater body know as the Atlantic continental margin. This Atlantic continental margin is, in the mid-Atlantic Bight area and Delaware area, a geologic province that extends from the Piedmont or foot hills near Newark, Baltimore, Annapolis, Philadelphia, Trenton, etc. to the outer edge of the continental slope-rise. Throughout recent geologic history (past 10,000 years) this shoreline has migrated across the outer continental shelf to its present position. Thus a full understanding of the surficial bottom sediments of the outer continental shelf cannot be made without forming a detailed analysis of the present coastal zone for possible projection to studies on the outer continental shelf.

Two problems exist. The first is the effect of stabilizing a shoreline horizontally and vertically in an era of sea level rise. To maintain the horizontal position will require either construction of seawalls or the placement of large quantities of sand to maintain a quasi-equilibrium beach profile. As sea level rises, the quantities of sand required to maintain a beach may increase; our present understanding of this problem is very qualitative. The second problem relates to the interpretation of the distribution surficial sediments present on the continental shelf. An improved understanding of the mechanics of present day barrier island retreat would be applicable to this problem.

COMMERCIAL SIGNIFICANCE:

A recent study the State of Delaware led to a cost analysis for protecting the 30 km long Atlantic coastal zone varying in dollar amounts from $39 million (in terms of 1968) to 3/4 of a billion dollars in terms of bonded indebtedness of 30 year bonds issued every year with a pay out over 80 years.

An improved understanding of the above problem would allow more rational assessment of future beach maintenance needs and sediment type distribution across the continental shelf.



To Develop Understanding of the Geologic Evolution of Transgressive and Regressive Coastal Zones

John C. Kraft

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Water Mass Movement Data from Which to Develop Adequate Theory for Calculating a Time History Grid In Three Dimensions

Proposed by: E. H. Harlow

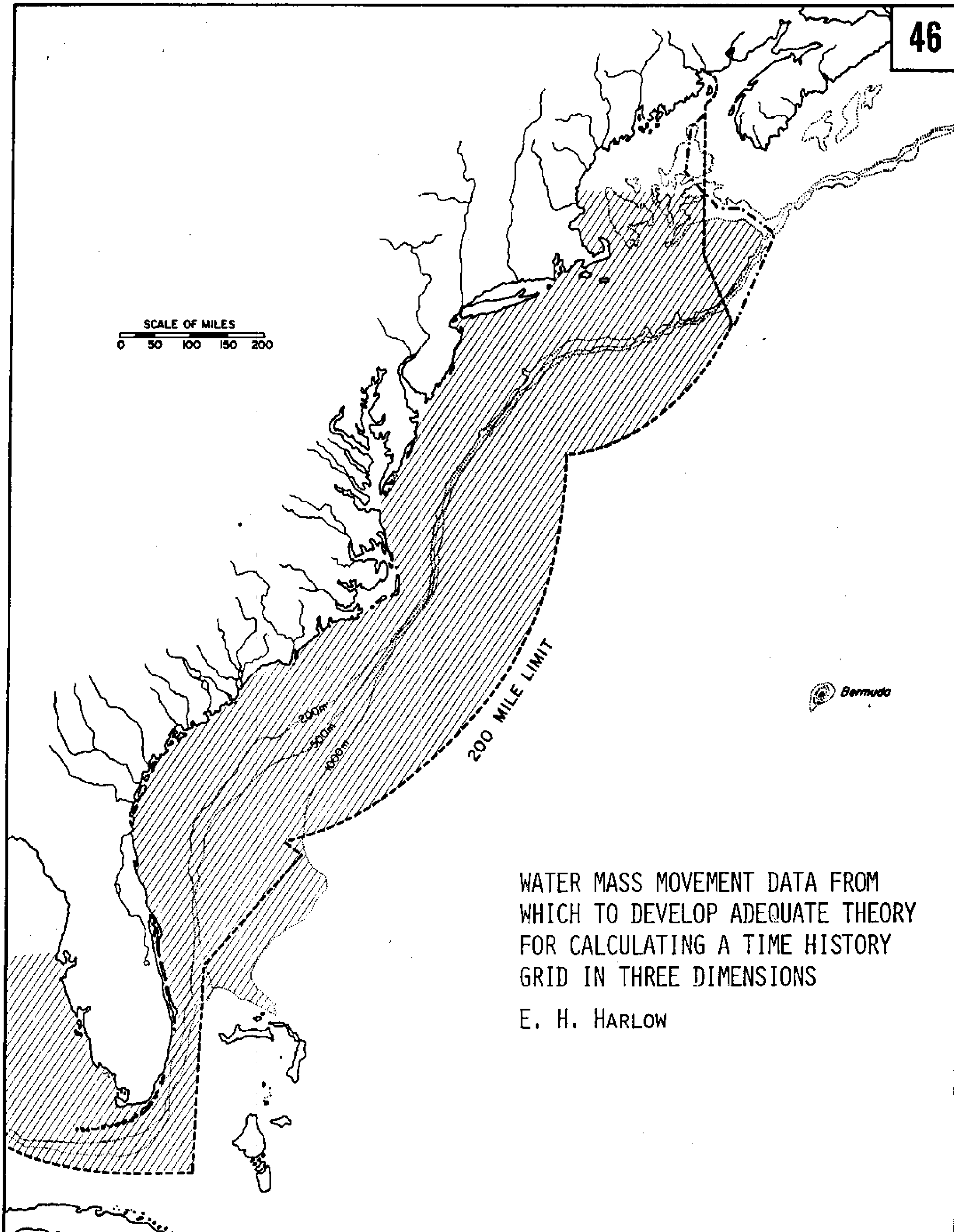
PROBLEM DESCRIPTION:

Ocean water moves in response to many forces. These include differences in density, wind shear on the surface, coreolis effects, and bathymetric constraints. The density differentials are caused by both variations in temperature, chemical compositions or salinity, dissolved or suspended materials such as air or colloids.

The research needed to understand such complex global and local movements may eventually lead to analytical methods for calculating the stratification, direction and velocity of ocean currents (three dimensions).

COMMERCIAL SIGNIFICANCE:

Determination of waste effluent transport, heat plume dispersion, oil spill drift, OTEC design, etc.



WATER MASS MOVEMENT DATA FROM WHICH TO DEVELOP ADEQUATE THEORY FOR CALCULATING A TIME HISTORY GRID IN THREE DIMENSIONS

E. H. Harlow

47 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Quantified Oil Spill Damage Assessment Techniques for Use with "Superfund" Claims

(Related to problems 6W, 21, 4, 44W, 53a, 33b)

Proposed by: W. Lehr and C. Bates

PROBLEM DESCRIPTION:

Congressional Office of Technology Assessment's study (1976) concludes (Issue 8):

> "The effects of pollutants which may be discharged during OCS operations cannot presently be determined with any accuracy, and recent research efforts have not clarified conflicting claims by oil companies and environmental groups regarding the amount and consequences of marine pollution."

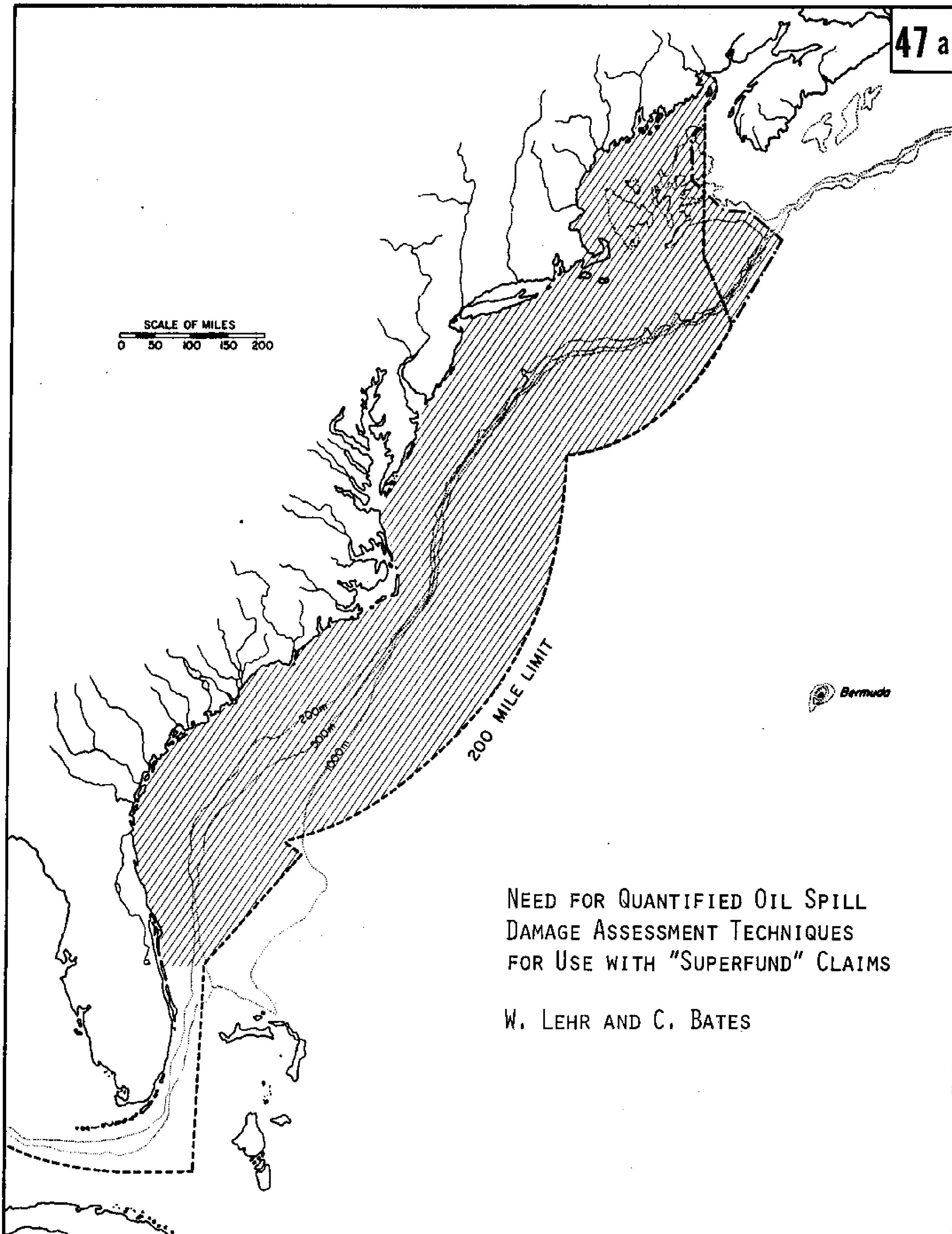
In addition, the U.S. Congress (HR6803) will likely soon establish a "Comprehensive Oil Pollution Liability and Compensation Act" which provides for payment by both the spiller and a self-replenishing Federal "Superfund" for economic loss arising out of or directly from oil pollution. Such damage could be injury to, destruction of, loss of use of natural resources, or the loss of tax money. Further, the Congress proposes using private insurance and claims adjusting organizations or State agencies in processing claims against the fund. Claims may be made up to 6 years after the spill.

As of the moment, there are no insurance adjustment manuals to aid in properly paying claimants for economic loss from oil spills. Quantified procedures will be needed, however, for damage assessment if there is to be consistency in paying for this type of economic damage.

COMMERCIAL SIGNIFICANCE:

Legal concepts of how to price out economic loss from oil spills are in the formative stage. In the late 1940's in Mississippi Delta, law suits for oyster mortality from estuarine oil pollution totaled over $100 million. Union Oil paid out over $5 million for damage from the 1969 blow-out off Santa Barbara. In the case of the Mizushima oil spill (1974) in the Inland Sea of Japan, clean-up and economic damage costs actually did exceed $100 million.

47 a



NEED FOR QUANTIFIED OIL SPILL DAMAGE ASSESSMENT TECHNIQUES FOR USE WITH "SUPERFUND" CLAIMS

W. LEHR AND C. BATES

47 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need to Improve the Energy Efficiency of U.S. Flag Shipping

(Relates to 59, 65d)

Proposed by: E. G. Frankel

(Horn)

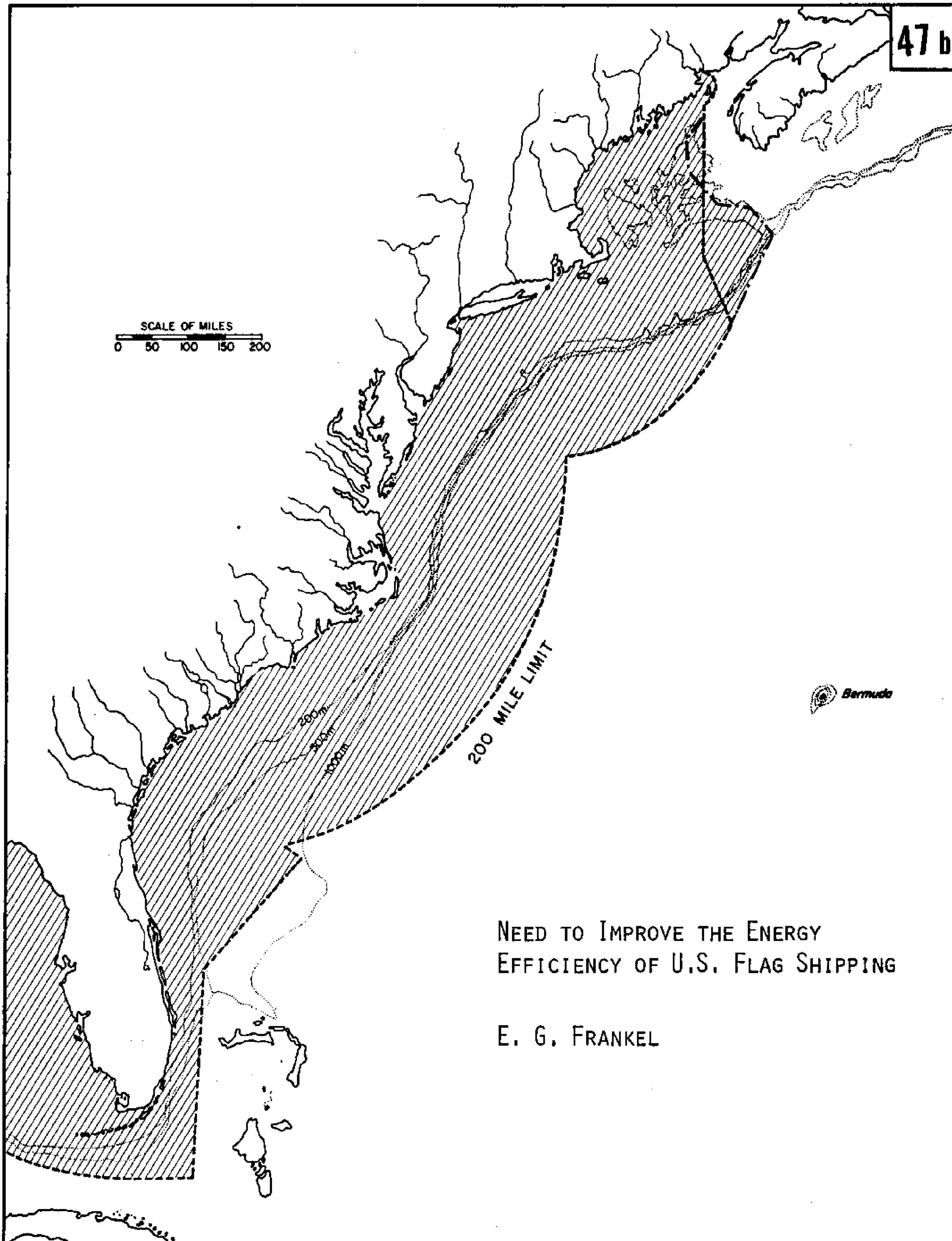
PROBLEM DESCRIPTION:

Increasingly high fuel costs are making it harder for subsidized and non-subsidized US flag vessels to compete. 99.2% of all US flag, foreign going tonnage is propelled by steam turbine systems which require an average of 39% more fuel by weight and 35% more in cost than the average foreign flag vessel, of which 89% are diesel driven. Conclusion: (1) conversion or partial conversion of US flag vessels to medium speed diesel and (2) development of standard diesel propelled design for US built vessels are needed and long overdue.

Wind energy systems may be able to provide limited energy savings, but the resultant very low average speeds and high cargo holding costs seem to preclude any significant benefits for the foreseeable future. More effective novel energy sources may be shipbourne wind generators and solar energy convertors which can assist the prime mover by providing all or make-up thermal, mechanical, and/or electrical energy.

COMMERCIAL SIGNIFICANCE:

Any significant improvement in operating èfficiency is to the economic and energy advantage of US flag ships.



Need to Improve the Energy Efficiency of U.S. Flag Shipping

E. G. Frankel

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of Means for Providing Adequate Traffic Control for Hazardous Cargo Vessels Operating in the Approaches to U. S. Ports

Proposed by: R. G. Day

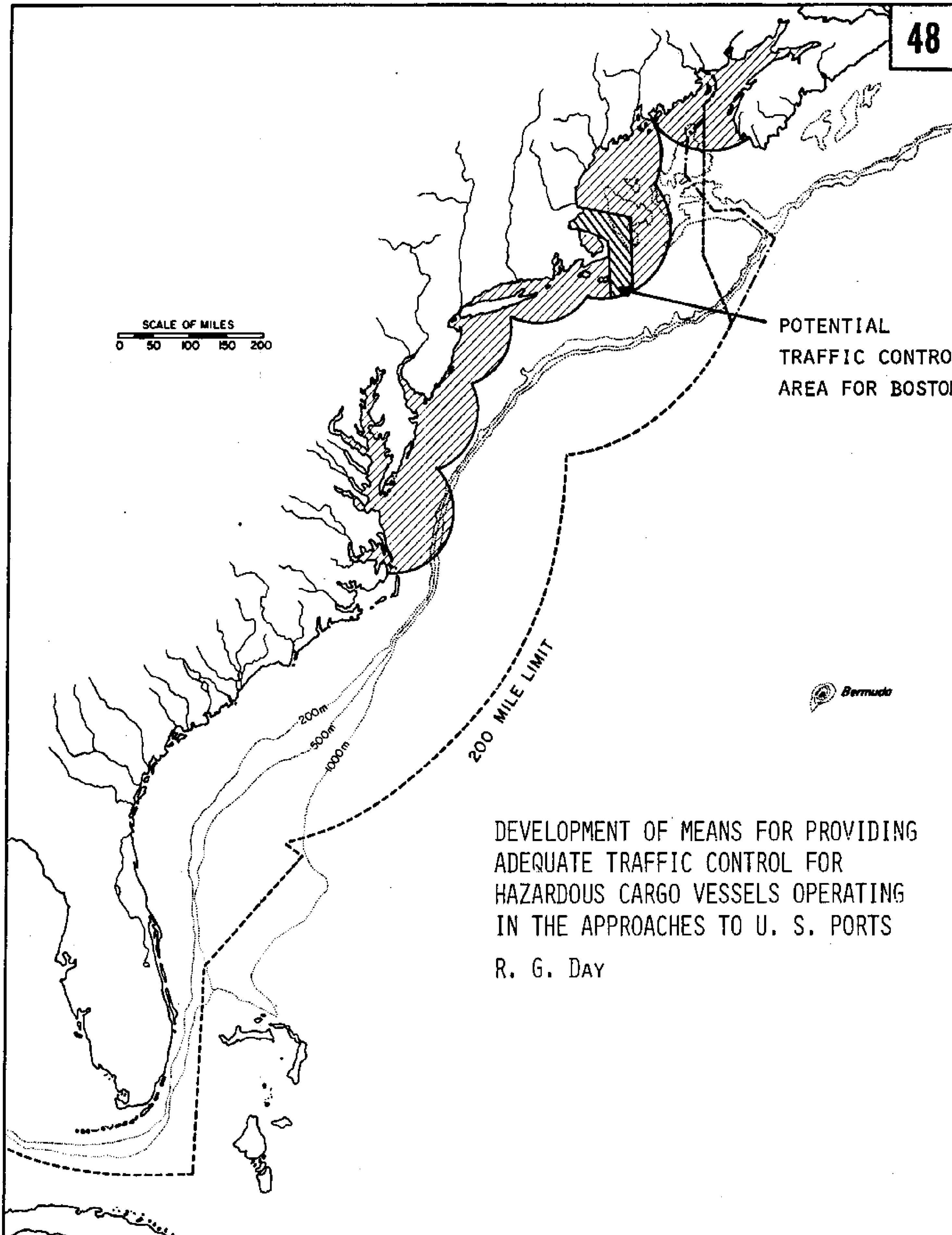
PROBLEM DESCRIPTION:

The "Argo Merchant" incident made the United States population aware of the need for protecting the environment from the results of needless human failure. The indications are that this grounding and subsequent oil spill could have been prevented by reasonable diligence in the use of existing ship's equipment by the crew. Detection of potential for the grounding and track correction instructions from an external source could reduce the hazard.

Can practical means for electronic tagging of hazardous cargo vessels combined with radar position tracking and radio communications be employed to affect traffic control in the presence of many uncontrolled non-critical vessels? Does such a system result in an incremental energy cost which is less than the cost of alternatives?

COMMERCIAL SIGNIFICANCE:

The economic consequences of major oil spills vary greatly, but often have a multimillion dollar impact. The cost of prevention is part of the total cost of energy. This method may be less costly than some alternates and a logical complement to others.



DEVELOPMENT OF MEANS FOR PROVIDING ADEQUATE TRAFFIC CONTROL FOR HAZARDOUS CARGO VESSELS OPERATING IN THE APPROACHES TO U. S. PORTS

R. G. DAY

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Offshore Oil and Fishing -- Habitat Enhancement and Increasing Compatibility

Proposed by: J. Dykstra

PROBLEM DESCRIPTION:

If and when commercial exploitation of offshore oil and gas becomes a reality on Georges Banks it will be desirable for both the oil companies and the fishermen to minimize interference with each others operations and provide mutual assistance. Suggestions are:

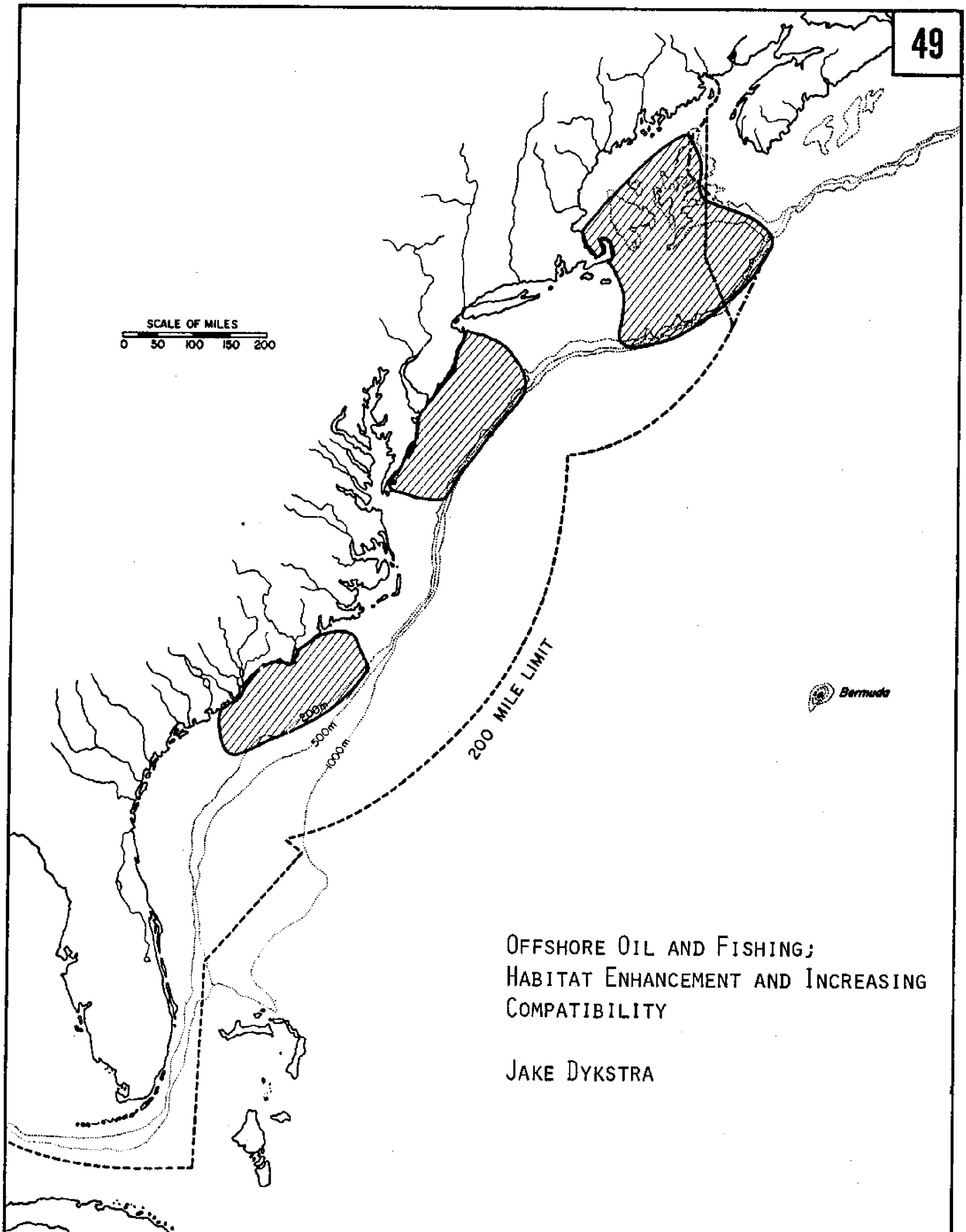
1. Steps could be taken to enhance areas denied to mobile fishing gear (such as the vicinity of platforms) by modification of installations and other artificial feeding or protection of fish.

2. In areas to be shared by both -- for instance trawling in areas occupied by pipelines and other equipment -- work to be done on more compatible equipment.

3. Modify and equip platforms to provide sanctuary and emergency service to fishing vessels.

COMMERCIAL SIGNIFICANCE:

Georges Bank is an unusually productive fishing ground. Conflicts have occurred in other areas where oil and gas have been exploited. Since both activities must go forward, this type of effort would minimize conflict.



Offshore Oil and Fishing; Habitat Enhancement and Increasing Compatibility

Jake Dykstra

50 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Determination of the Exchange Processes Between Bay and Coastal Waters and the Continental Shelf

Proposed by: D. Maurer

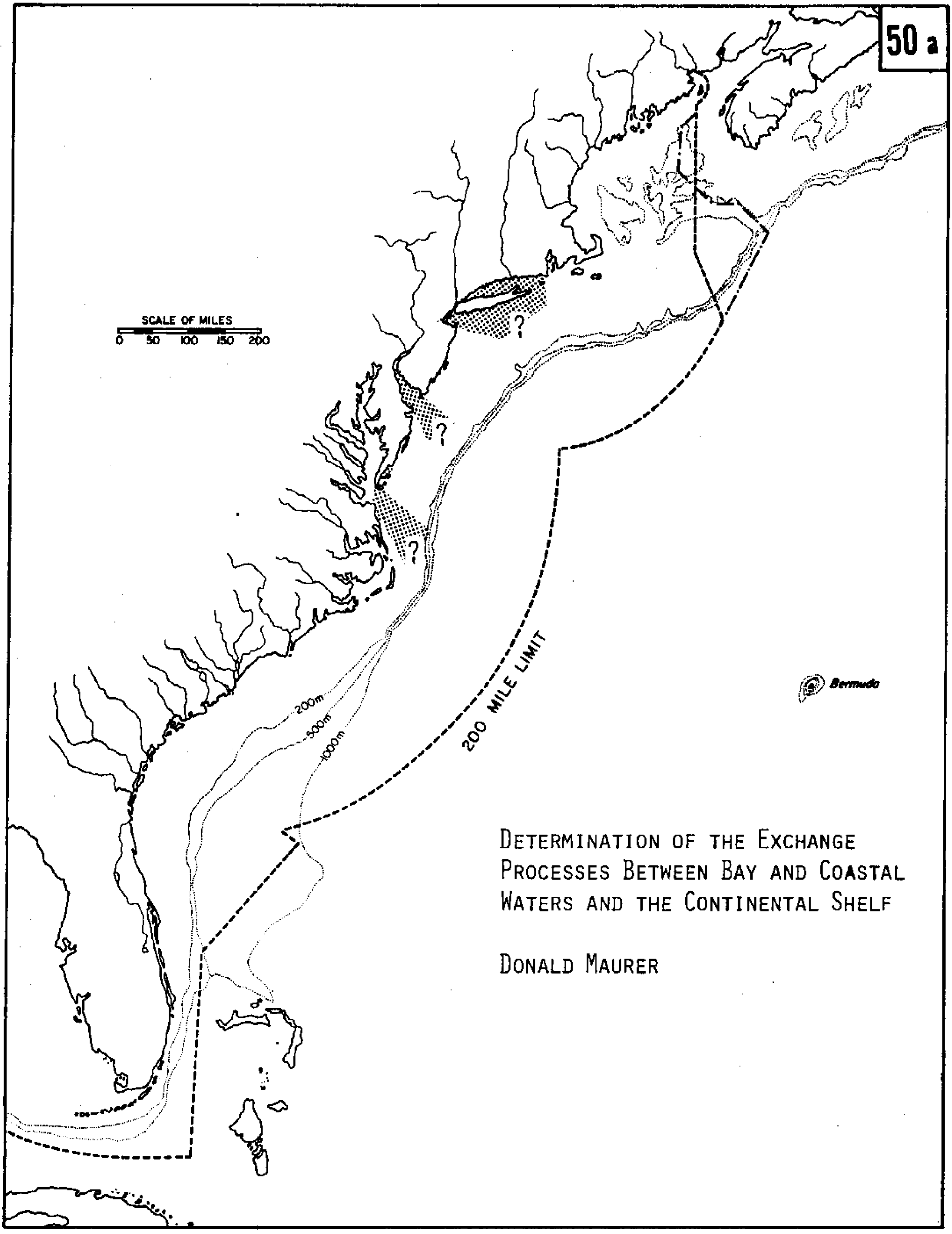
PROBLEM DESCRIPTION:

The exchange processes between bays and coastal waters are relevant to the ability of a bay to accept pollutants without serious degradation and also relate to the nutrient level distribution in a bay due to a given rate of production along the bay perimeter. Exchange of bay and shelf waters due to storms is poorly understood and may be several orders of magnitude higher than that due to the normal levels associated with astronomical tides. Exchange rates are necessary in any attempt to model quantitatively the distribution of chemical and/or biological processes in a bay.

An example is Delaware Bay in which secondary production of benthic invertebrates is several orders of magnitude lower than in other northeastern U.S. bays and estuaries. Although the surrounding marshes contribute nutrients to the bay, there seems to be a short circuit in the system wherein the benthos is not responding in a productive manner. The influence of exchange processes (physical, chemical, biological) between the marshes and the bay and the Continental Shelf are poorly known. How these habitats react and interact with one another is of particular and general interest. The problem of low secondary production in Delaware Bay is particular, the problem of exchange processes between the Continental Shelf and bays and wetlands is general with the many bays and estuaries on the east side of the United States.

COMMERCIAL SIGNIFICANCE:

Estuaries and bays accommodate about 70% of the species of commercial fisheries for various portions of their life cycle. Many fish depend on the benthos. The Continental Shelf provides migration routes for these fisheries. The influence of estuary-ocean interface on secondary production and these fisheries must be enormous but presently remains inferential. A knowledge of the exchange processes of a bay would allow an improved understanding and hence provide a better basis for managing bay fisheries and discharge regulations. In addition, an improved framework would be proved for interpreting bay behavior.


50 a
SCALE OF MILES
0 50 100 150 200
200m
500m
1000m
200 MILE LIMIT
Bermuda
DETERMINATION OF THE EXCHANGE PROCESSES BETWEEN BAY AND COASTAL WATERS AND THE CONTINENTAL SHELF
DONALD MAURER

50 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of New Instruments for Navigation and Positioning

Proposed by: W. R. Cox Problem from report "Seafloor Engineering: National Needs and Research Requirements", National Academy of Sciences, Washington, DC, 1976

PROBLEM DESCRIPTION:

It is recommended that an exchange of information on improvements to instrumentation for navigation and positioning on the ocean surface and on the seafloor be encouraged.

Special problem areas required:

a) Improved electronic positioning equipment on the sea surface.

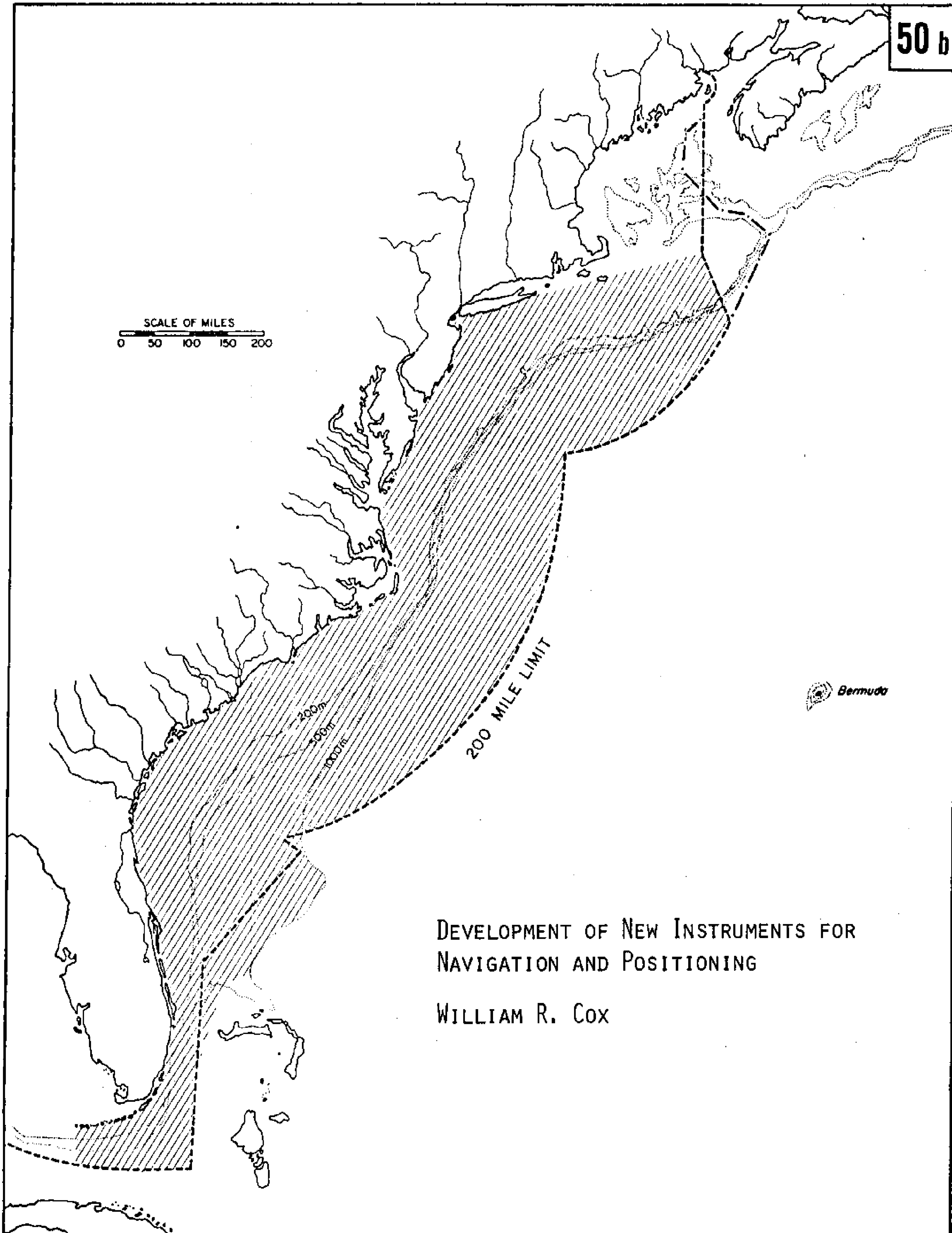
b) Permanent marking of positions (acoustic beacons).

c) Improved navigational (homing) ability to return to a designated work area. For example, there is necessity to re-enter oil wells completed on the ocean bottom.

d) Improved tracking of undersea vehicles from surface craft.

COMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



Development of New Instruments for Navigation and Positioning

William R. Cox

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Develop the Necessary Information to Improve Recreational Fishing

Proposed by: R. F. Williams, Jr.

PROBLEM DESCRIPTION:

Recreational fishing is a growing activity which provides great satisfaction to a significant segment of the population and revenue to coastal communities. Data on many segments of this fishery are sketchy and unreliable -- or in some instances non-existent. This condition makes it almost impossible to quantify the extent and importance of the fishery. Effective management measures cannot be undertaken until an agressive program is instituted to develop an understanding of the sport fisheries to a much greater degree than presently obtains. Some suggested measures are:

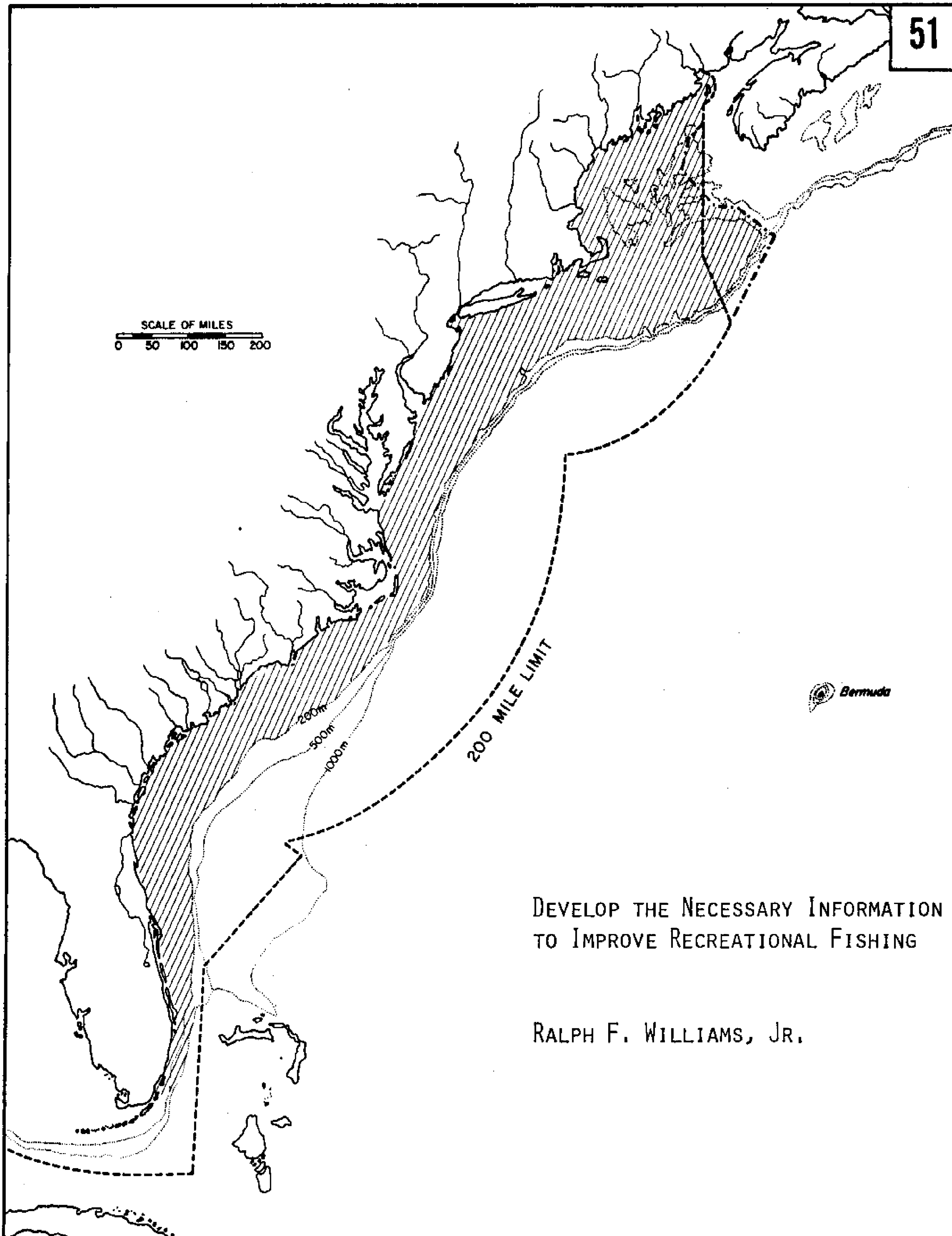
. Develop a program to ensure that the rapid increase in demand and effort do not decrease satisfaction of marine fisheries recreation, or limit future marine recreational opportunities.

Develop a program to ensure the maintenance of stocks, their fair allocation to all users, and their use and appreciation by anglers.

A program to avoid increasing congestion, additional shoreline and marine access for fishing, must be developed, making opportunities available to as many geographic, economic, and social groups as possible.

We need to address ourselves to the social and economic values of recreation. Such studies are needed to permit a better evaluation of the relative economic contribution and social benefits of marine recreation.

COMMERCIAL SIGNIFICANCE:



Develop the Necessary Information to Improve Recreational Fishing

Ralph F. Williams, Jr.

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Uniform Evaluation Method of Vessel Performance in Relation to Weather Conditions

Proposed by: V. C. McDermott

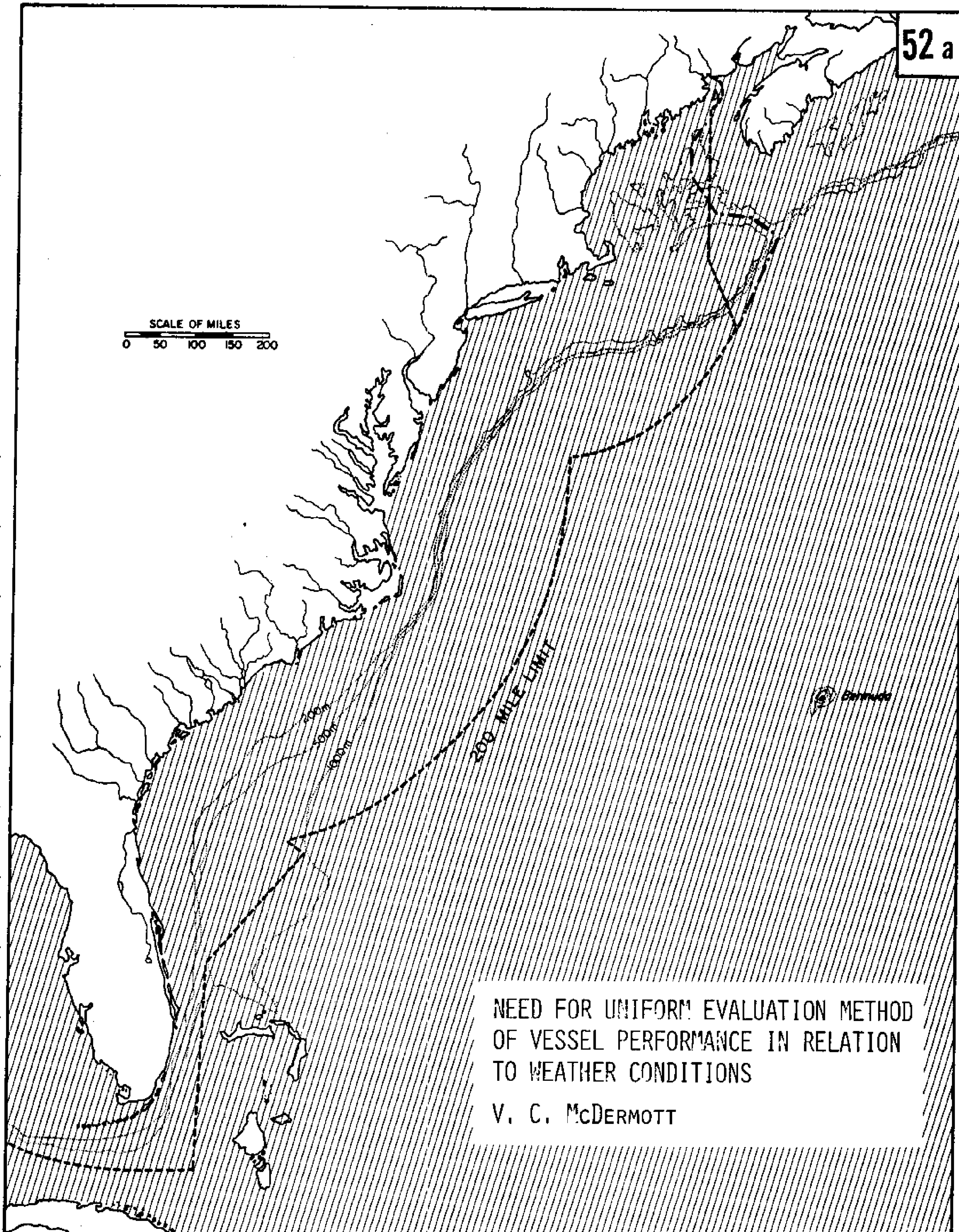
PROBLEM DESCRIPTION:

Most ship owners and operators make evaluations of ship performance. Factors considered include fuel consumption, time enroute, weather encountered, effectiveness of ship weather routing, etc. Weather encountered enroute has a strong influence on performance. There are methods available to evaluate vessel performance with respect to weather conditions, but there is apparently no method which satisfies all requirements.

(Refer to #39)

COMMERCIAL SIGNIFICANCE:

Ever increasing costs have created more demand for an accurate evaluation of vessel performance, particularly with respect to weather encountered enroute. A uniform evaluation method which meets the requirements of most evaluators would be helpful to ship owners and operators.



NEED FOR UNIFORM EVALUATION METHOD OF VESSEL PERFORMANCE IN RELATION TO WEATHER CONDITIONS

V. C. McDermott

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Determine the Sources, Routes, and Rates of Dispersal of Floatables in the New York Bight and Their Probable Stranding Sites (Relates to 38, 2, 29, 1, 4, 7, 12, 33a, 39a, 20, 38W, 40W)

Proposed by: J. R. Schubel

PROBLEM DESCRIPTION:

To determine the sources, routes, and rates of dispersal of floatables in the New York Bight, and their probable stranding sites.

1. What are the sources? -- their locations and relative strengths. (Variations of strengths with time)

2. What are the most effective strategies for controlling the inputs (sources)?

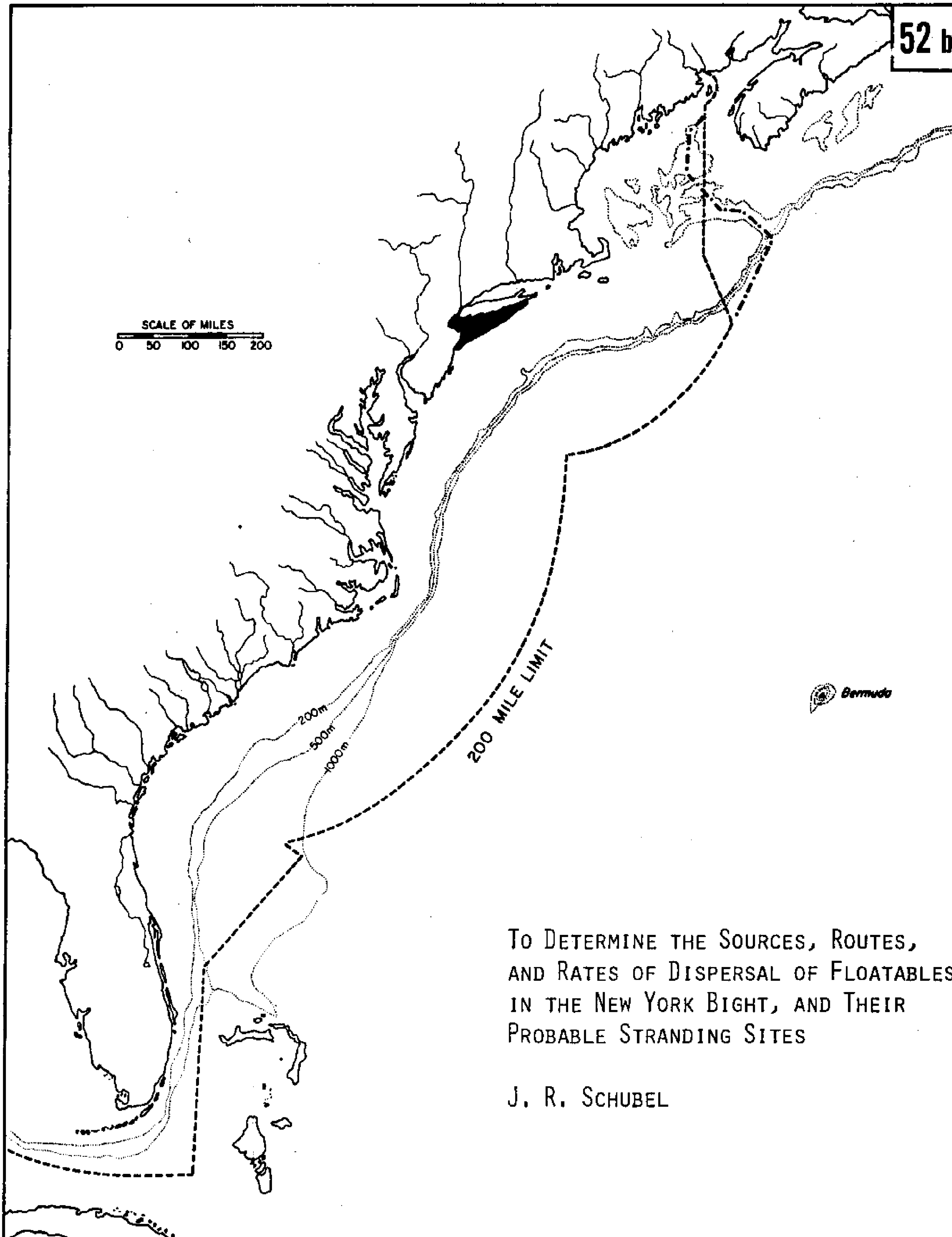
3. What are the routes and rates of dispersal?

4. What are the driving mechanisms?

5. Can we predict what meteorologic and oceanographic conditions will lead to the stranding of floatables, and where are the probable stranding sites?

COMMERCIAL SIGNIFICANCE:

Considerable impact on recreational uses, particularly bathing; and on fisheries.



To Determine the Sources, Routes, and Rates of Dispersal of Floatables in the New York Bight, and Their Probable Stranding Sites

J. R. Schubel

53 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Improved Methods to Assess Impact of Oil Spills On Aquatic Life On Reefs

Proposed by: D. R. Barker

PROBLEM DESCRIPTION:

In July of 1974 and in April of 1977 major oil spills were experienced along an 85 mile stretch of the Florida coast. Estimates of damage to the nation's most valued and extensive coral communities are unobtainable. Minor oil spills occur on a continuous basis.

There is no question, however, that oil spills or discharges such as these and the many smaller unrecorded incidents have an effect upon the coral reefs, mangrove estuarine areas, and the entire marine food web. Effects can range from food and habitat destruction to reduced immunity factors and toxicity towards natural animal populations.

The long term effect of biomagnification and biodegradation of residual shoreline and benthic spill components are largely unknown.

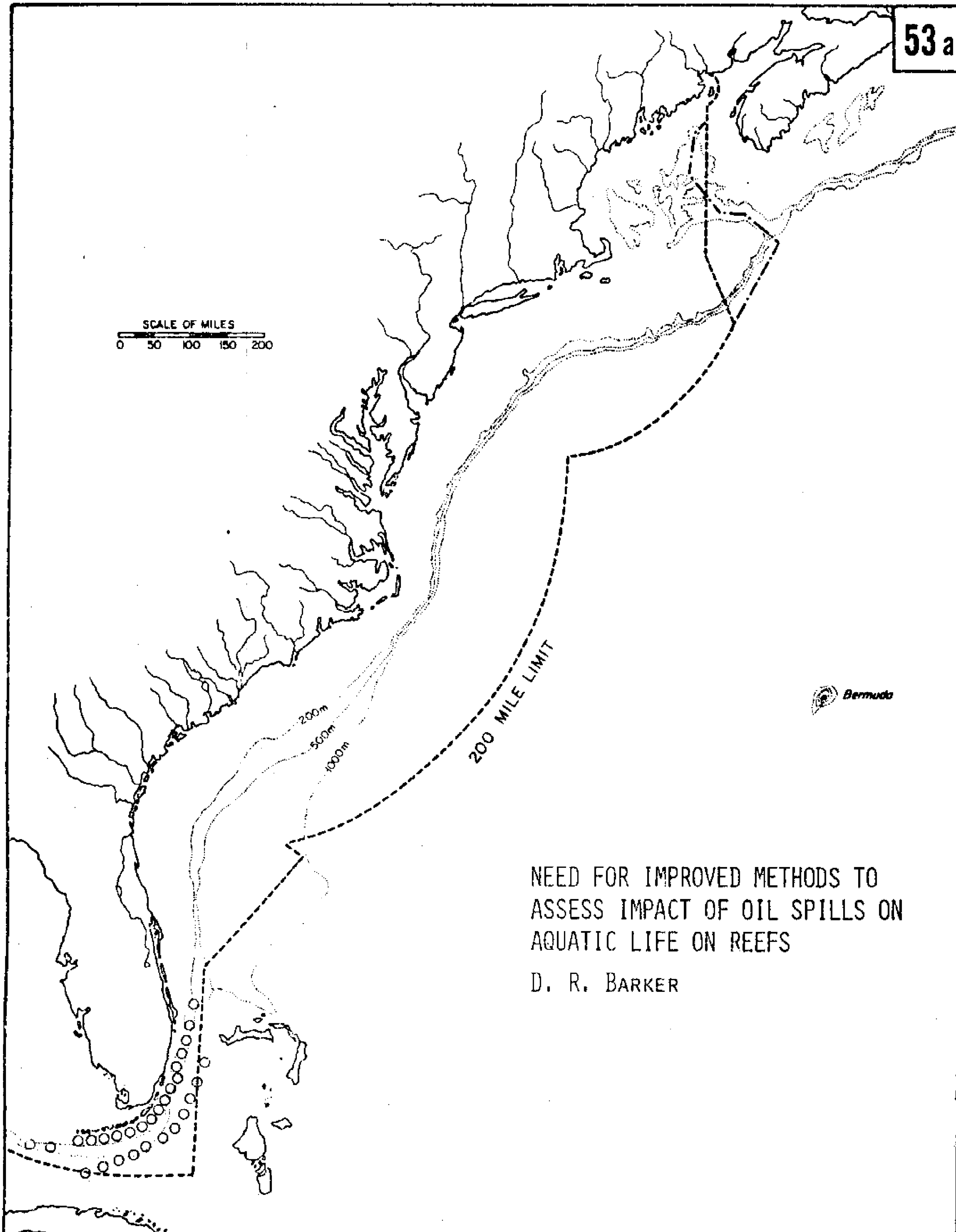
Heavy tanker and cargo vessel traffic in the Florida Straights make the task of detection, enforcement and prosecution a very difficult one for the Coast Guard authorities.

Enforcement aspects such as chemical/physical identification of the oil, chain of evidence, 200 mile limit regulations, and the legal problems associated with ships of foreign registration present very real problem areas.

Clean-up procedures for a 25 to 100 mile long, and possibly several mile wide oil slick are virtually non-existent. Floating booms, adsorbent materials, dispersants and rotating skimmers are some of the methods used to attempt near-shore clean-ups or spill control. As in most waste control efforts we may be well advised to focus more heavily upon the source of the problem than upon clean-ups.

COMMERCIAL SIGNIFICANCE:

The multi-billion dollar Florida tourist trade depends markedly upon the abundance of easily accessible marine life and healthy corals in the Florida Keys. The dollar value impact of oil spills on the Florida tourist trade, the coral reefs (which physically protect the Florida Keys real estate interests), and commercial fishing is indeterminate, but certainly one of tremendous significance to Florida's economy.



NEED FOR IMPROVED METHODS TO ASSESS IMPACT OF OIL SPILLS ON AQUATIC LIFE ON REEFS

D. R. Barker

53b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Seek Means for Obtaining Private Data and Techniques On the Interaction of Storm Waves and Mud Slides

Proposed by: W. R. Cox

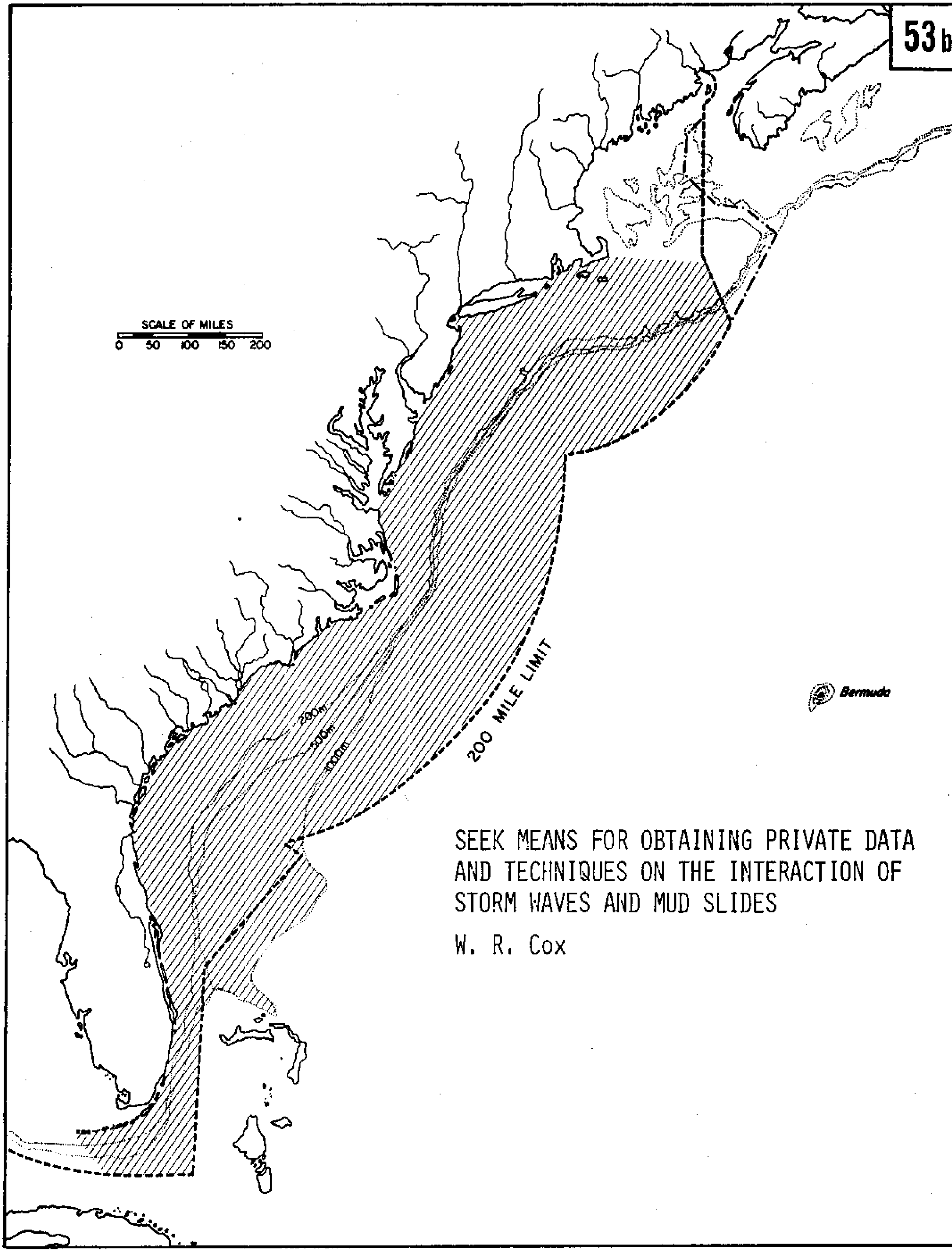
PROBLEM DESCRIPTION:

In 1969 three large offshore platforms in some 300 ft of water were destroyed by Hurricane Camille as it raced across the Gulf of Mexico just east of the Mississippi. Although the maximum wave height in this storm was reported to have been 70 feet, it is now known that the primary reason for the loss of the structures was mudslides triggered by wave pressures on the ocean floor. The large economic loss of these structures encouraged extensive investigations of the phenomena of submarine soil movements caused by wave pressure. The results of some of these studies are proprietary. There is need for release of and further development of information on the changes in soil properties and changes in regional and local soil stability caused by wave forces, pressure gradients, currents and earthquakes.

There has been considerable effort expended on this subject by educational groups, consulting engineers, and industry. A first step in obtaining information on interaction of soil with the marine environment would be to seek means and funds to obtain public release of the data obtained in proprietary studies.

COMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



SEEK MEANS FOR OBTAINING PRIVATE DATA AND TECHNIQUES ON THE INTERACTION OF STORM WAVES AND MUD SLIDES

W. R. Cox

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Assessment of Building Science Technology in Coastal Hazard Areas for Improvement in Building Standards and Codes

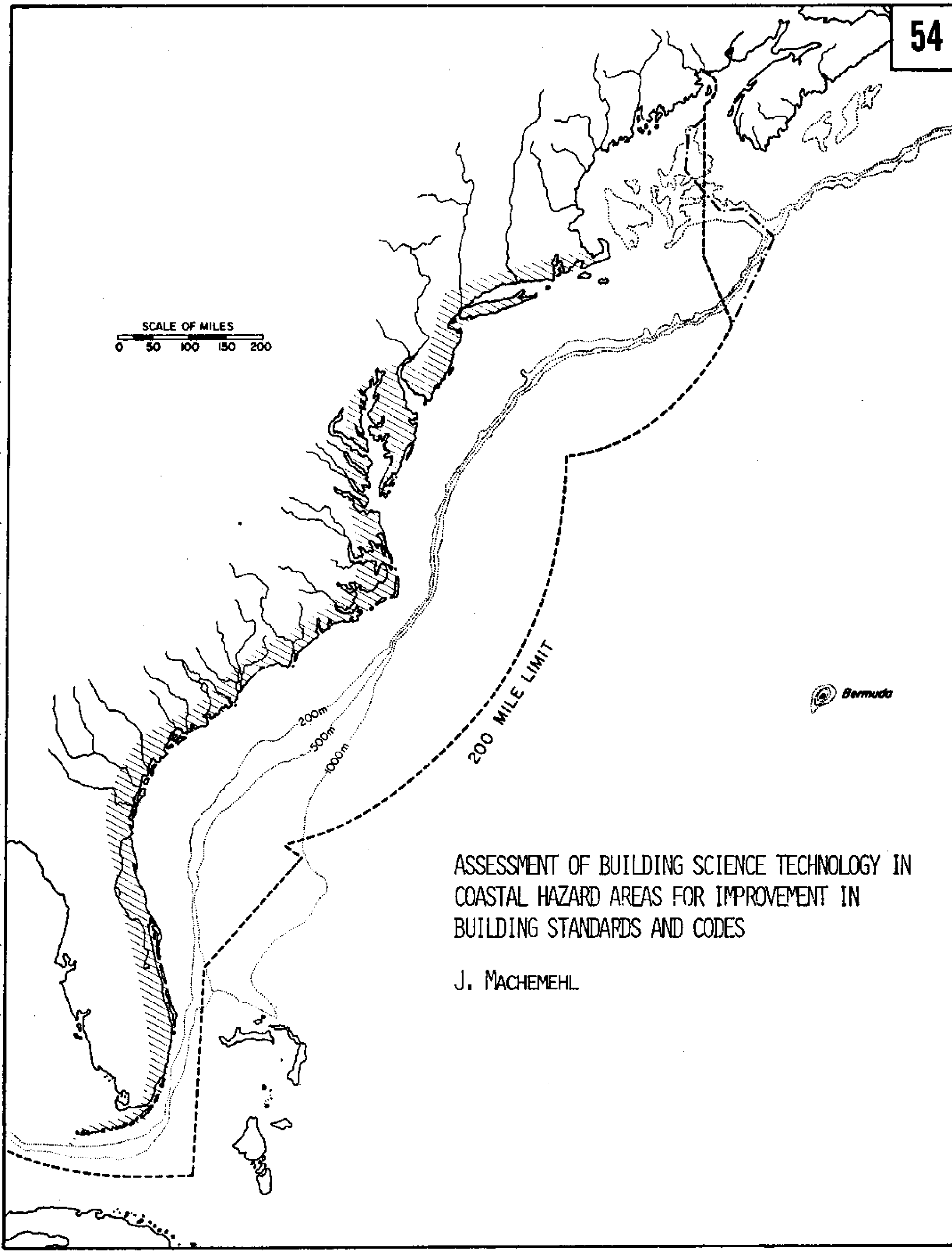
Proposed by: J. Machemehl

PROBLEM DESCRIPTION:

Residential and commercial structures are being constructed in coastal hazard areas. These structures are susceptible to the forces of winds and waves from coastal storms (hurricanes and northeasters). Many of these structures are not adequately constructed to withstand the forces of nature. These forces need to be included in building standards and codes. An assessment of building science technology in the coastal zone is needed.

COMMERCIAL SIGNIFICANCE:

Protection of life and property in the coastal zone.



ASSESSMENT OF BUILDING SCIENCE TECHNOLOGY IN COASTAL HAZARD AREAS FOR IMPROVEMENT IN BUILDING STANDARDS AND CODES

J. MACHEMEHL

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Can In Situ Monitoring Systems Be Designed for Selected Materials and Areas Which Will Provide Data Useful for Prescribing Dumping Rates Which Are Adapted to Changing Physical Oceanographic and Toxic Load Conditions?

Proposed by: R. G. Day

PROBLEM DESCRIPTION:

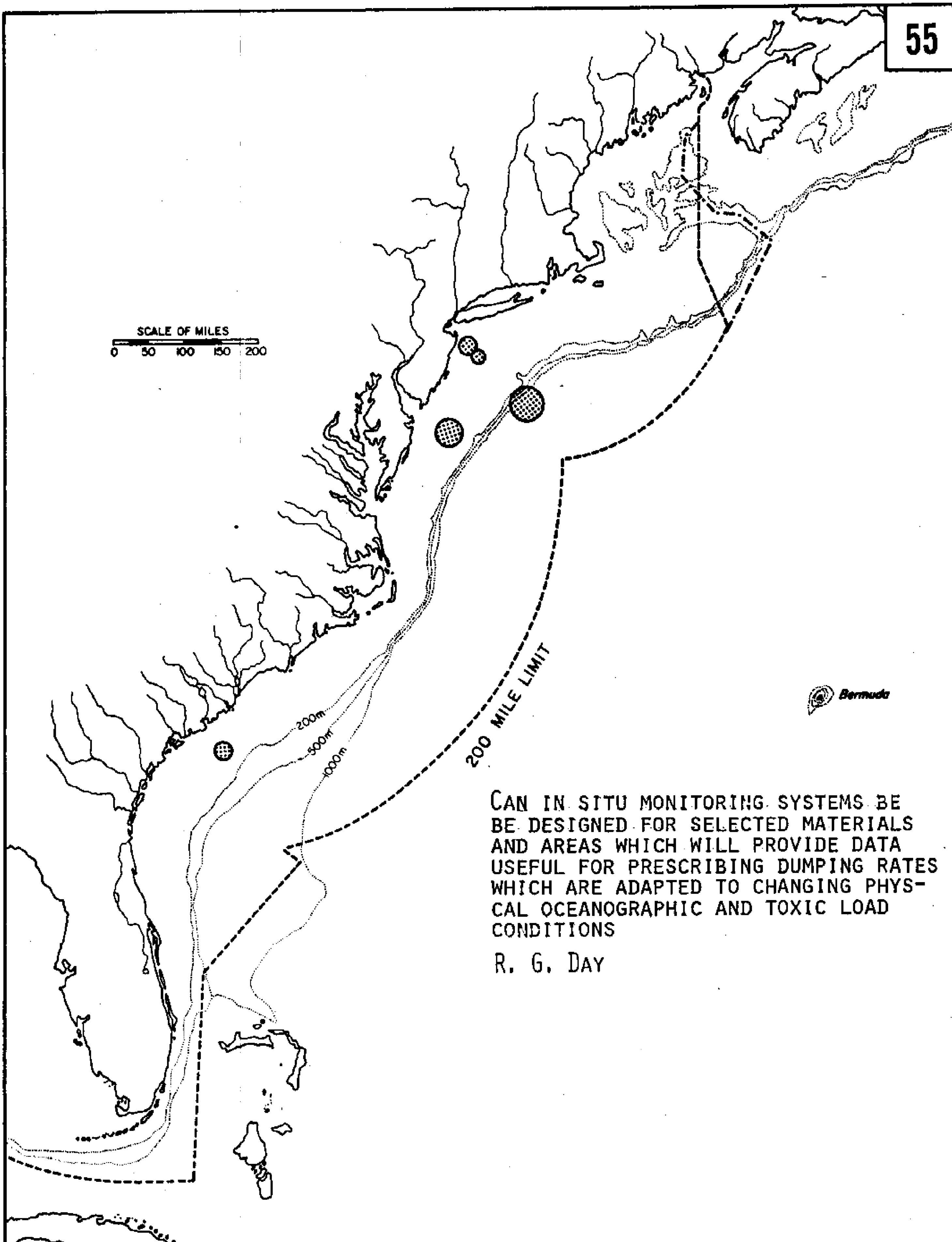
The EPA's expressed intention of stopping offshore dumping of sludge and acid waste by 1981 will cause serious economic adjustment for the dumpers. In some cases the technical case for stopping dumping is no better than the case for continuation.

Our ability to monitor some water quality parameters may provide data which are indicative of the ability of ocean environment to assimilate dump products. The presumption is made that the time rate and spatial distribution of dumping could be controlled below present thresholds of acceptability to allow dumping to continue beyond 1981.

Present monitoring requirements utilize periodic field data collection from ships. Will in-situ data collection systems be more cost effective?

COMMERCIAL SIGNIFICANCE:

East coast dumpers spend on the order of $11 million per year in ocean disposal. Alternate disposal means will more than triple these costs. In some cases no economically viable alternate exists at this time.



CAN IN SITU MONITORING SYSTEMS BE BE DESIGNED FOR SELECTED MATERIALS AND AREAS WHICH WILL PROVIDE DATA USEFUL FOR PRESCRIBING DUMPING RATES WHICH ARE ADAPTED TO CHANGING PHYSCAL OCEANOGRAPHIC AND TOXIC LOAD CONDITIONS

R. G. DAY

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Methods for Developing and Exploiting Offshore Phosphate Deposits (Related to 32, 44)

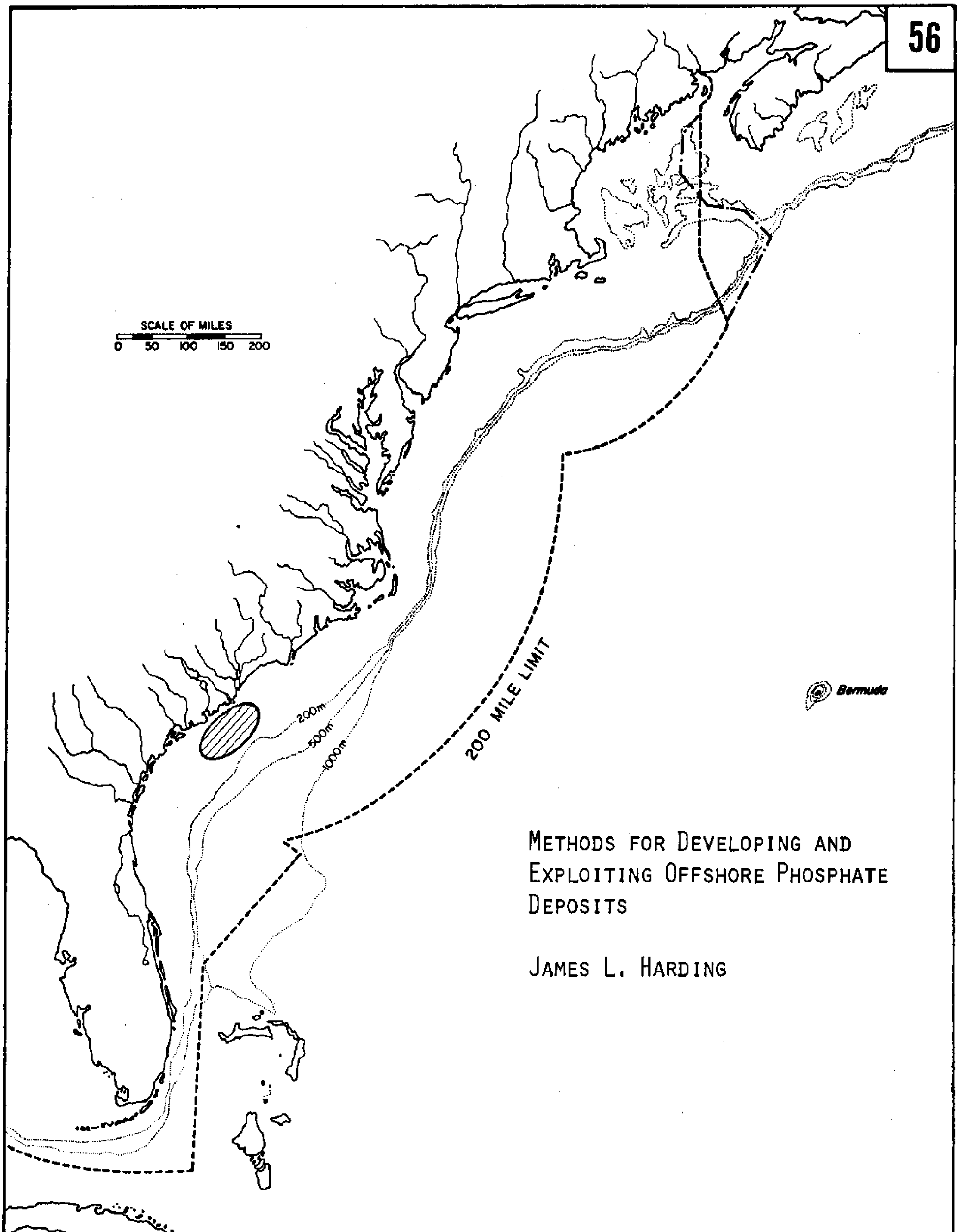
Proposed by: J. L. Harding (Machemehl)

PROBLEM DESCRIPTION:

Potential deposits of bedded marine phosphorite ore are known to exist in the surficial strata of the continental shelf offshore Georgia and South Carolina. Mining methods will have to be developed in order to exploit these deposits. Any method employed will have to include environmental safeguards and oceanographic studies will have to be included in order to predict the fate of sediment plumes associated with tailings disposal, etc.

COMMERCIAL SIGNIFICANCE:

The mining of these submarine deposits will help replace the loss in our national phosphate production that will begin to develop within a decade as a result of depletion and environmental pressure on land-based mines.



Methods for Developing and Exploiting Offshore Phosphate Deposits

James L. Harding

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Definition of Striped Bass Stock Structures in the Mid-Atlantic (Related to 7, 44W, 35, 19, 58W, 51)

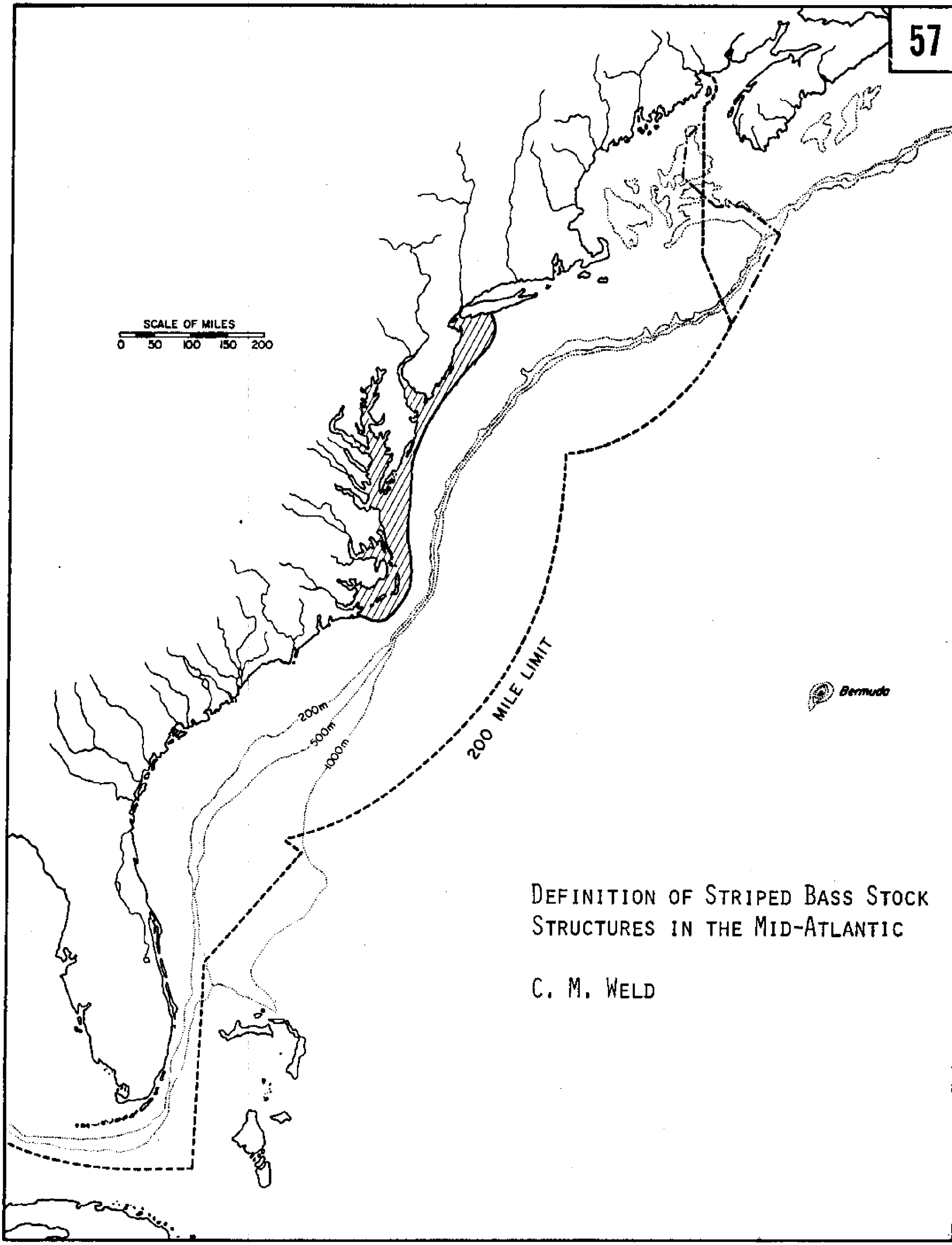
Proposed by: C. M. Weld

PROBLEM DESCRIPTION:

It is widely recognized that striped bass, a species caught in large quantities by both commercial and recreational fishermen on the East Coast, must come under management soon if substantial depletion of Atlantic stocks is to be avoided. The fish range from St. Johns River, Florida to the St. Lawrence and spawn in the Hudson River as well as in tributaries of Albermarle and Pamlico Sound, North Carolina and the Chesapeake Bay. At present, stock identification is a problem, and it is not understood which stocks are supported by which spawning areas. Since the striped bass spawns inshore, the impact of pollutants such as hydrocarbons and PCBs may be of greater significance than to offshore spawning species. Such data also bear upon decisions concerning the siting of energy facilities in the relevant estuarine areas.

COMMERCIAL SIGNIFICANCE:

A recent census sponsored by NOAA/NMFS counted some 10 million recreational fishermen in the coastal northeastern states from Virginia to Maine. In this area striped bass are regarded as being among the 10 most popular target fish species. The estimated annual recreational catch is about 18 thousand metric tons, while the 1975 commercial catch was a little over 4,000 tons worth about $4 million.



Definition of Striped Bass Stock Structures in the Mid-Atlantic

C. M. Weld

58 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need to Develop Systematic Analysis of Extreme Bending Moments for Ships

Proposed by: T. Loukakis and C. Chryssostomidis (Horn)

PROBLEM DESCRIPTION:

The purpose of this problem study is to systematically analyze the wave induced bending moments for commercial ships in order to identify the parameters that affect its value and present the results in a suitable form for use by designers and Regulatory Agencies. Such a study is needed because our understanding of this subject which affects the structural integrity of ships is rather limited. In some instances present regulations allow under-design in this area. For example, as can be seen from Figure 1 below there is a combination of ship dimensions where the predicted and the required wave bending moment differ by as much as 10%. Such a situation can arise in the case of a shallow draft supertanker. This problem arises because the present regulations treat draft as an unimportant variable. The other result shown here suggests that the level of safety is affected by length. For example a longer ship requires a much larger percentage increase from a base value to accomplish the same level of safety than a shorter ship.

Legend for figures:

MW wave bending moment actual
MW_b wave bending moment by rules for
L = 1000 ft and L = 400 ft
B = 181.8 ft (held constant)
T = 60.0 ft
Block coefficient = 0.85
Froude Number = 0.2

MW wave bending moment actual
MW_b wave bending moment for baseship
CB = 0.85, L/B = 5.5, B/T = 3.0
Froude number = 0.2 v = 2

$P = 10^{-v}$ where P is probability of failure.

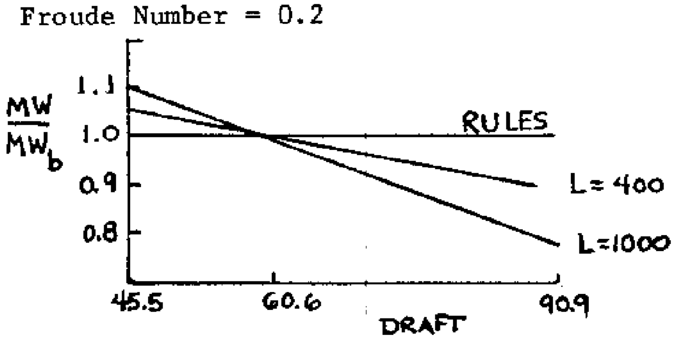


Figure 1

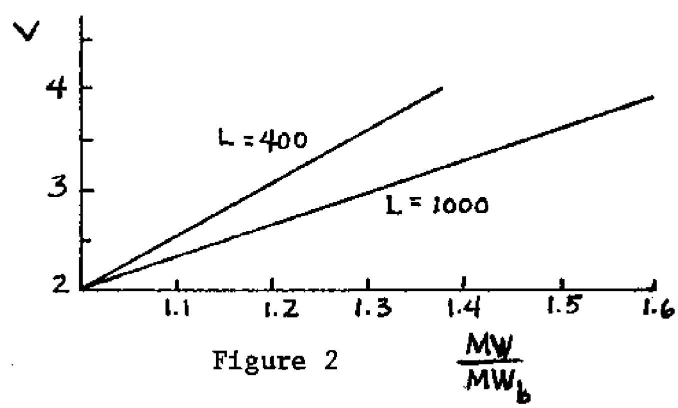
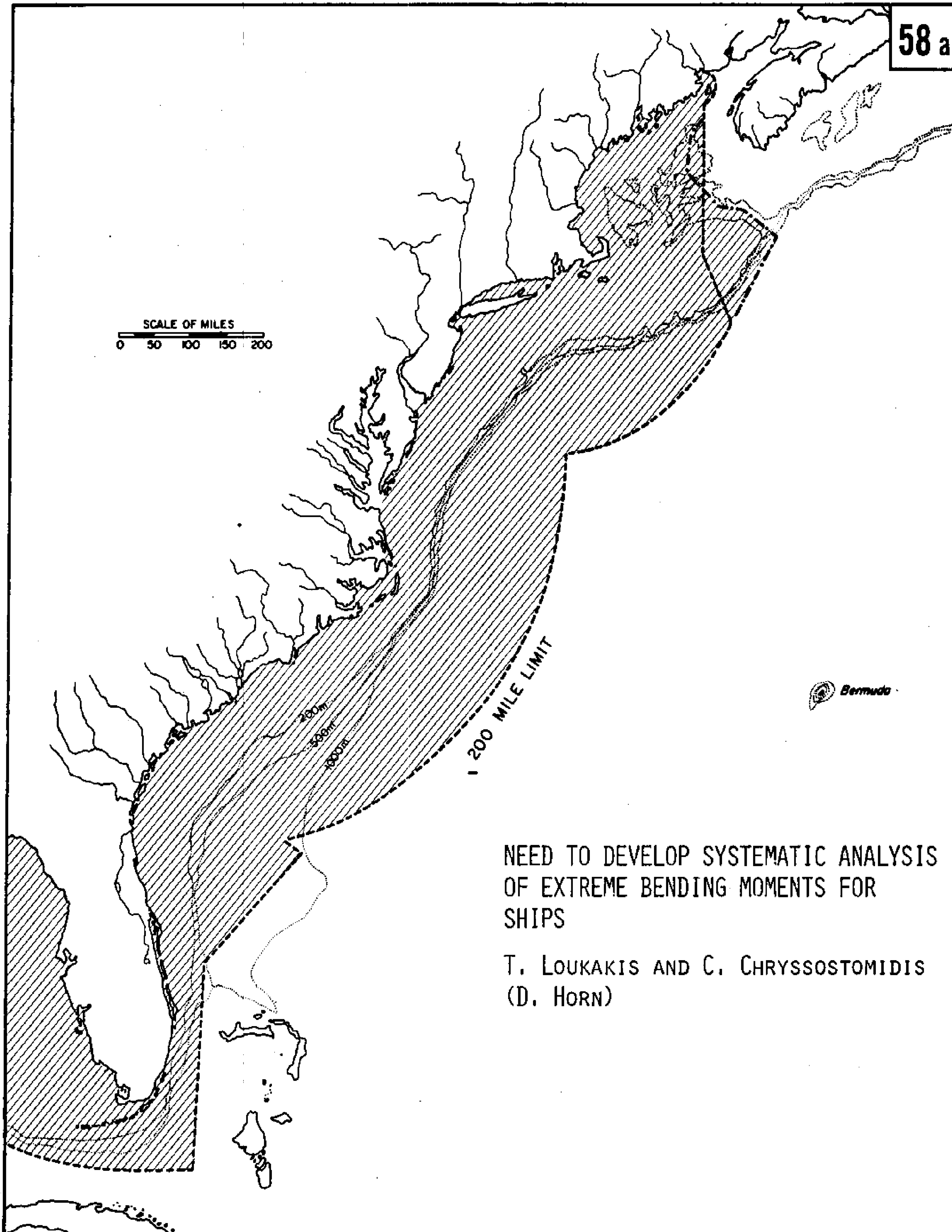


Figure 2

COMMERCIAL SIGNIFICANCE:

The study described above is expected to have a twofold benefit. First it is expected to advance the state of understanding in the prediction of wave induced bending moments for design purposes thus allowing us to construct safer ships. Second it is expected to identify the areas where the present rules require overdesigning thus allowing more economical designs.



NEED TO DEVELOP SYSTEMATIC ANALYSIS OF EXTREME BENDING MOMENTS FOR SHIPS

T. LOUKAKIS AND C. CHRYSSOSTOMIDIS
(D. HORN)

58 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of High Speed Platforms with Good Low Speed Motion Characteristics

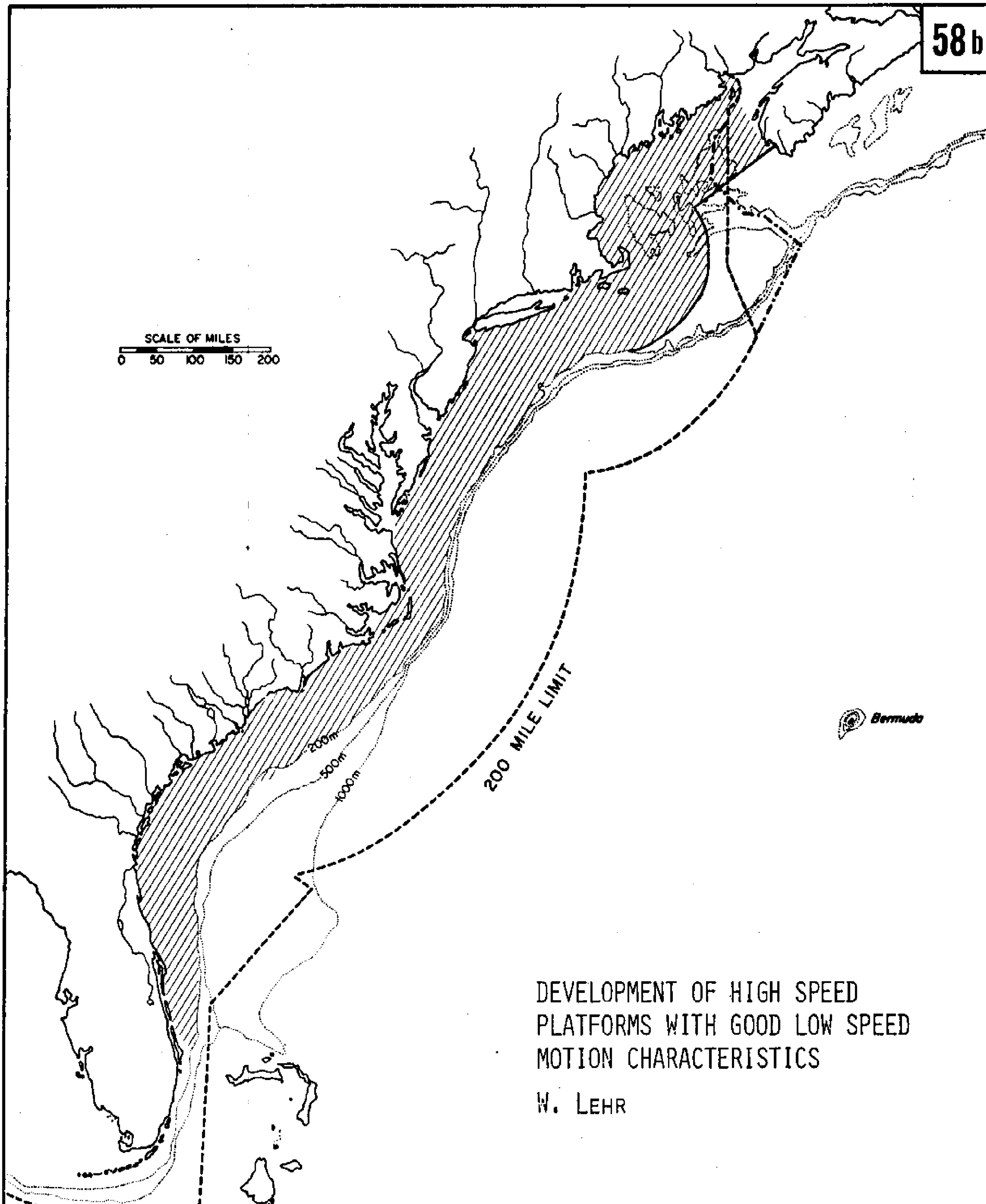
Proposed by: W. E. Lehr

PROBLEM DESCRIPTION:

Boat hulls of the planing or semi-planing type provide relatively high speed transportation to the work area. At low work speeds, however, roll motions are often excessive and greatly limit the boat's usefulness as a work platform. This problem applies to all offshore, and many inshore work areas.

COMMERCIAL SIGNIFICANCE:

Availability of a good high speed work boat would minimize transit time to the work area and allow users to take advantage of short periods of good weather in the winter months.


58 b
SCALE OF MILES
0 50 100 150 200
200m
500m
1000m
200 MILE LIMIT
Bermuda
DEVELOPMENT OF HIGH SPEED
PLATFORMS WITH GOOD LOW SPEED
MOTION CHARACTERISTICS
W. LEHR

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Feasibility of Selective Culture of Sea Water Microorganisms on Vessels to Reduce Drag

Proposed by: E. Schorsch

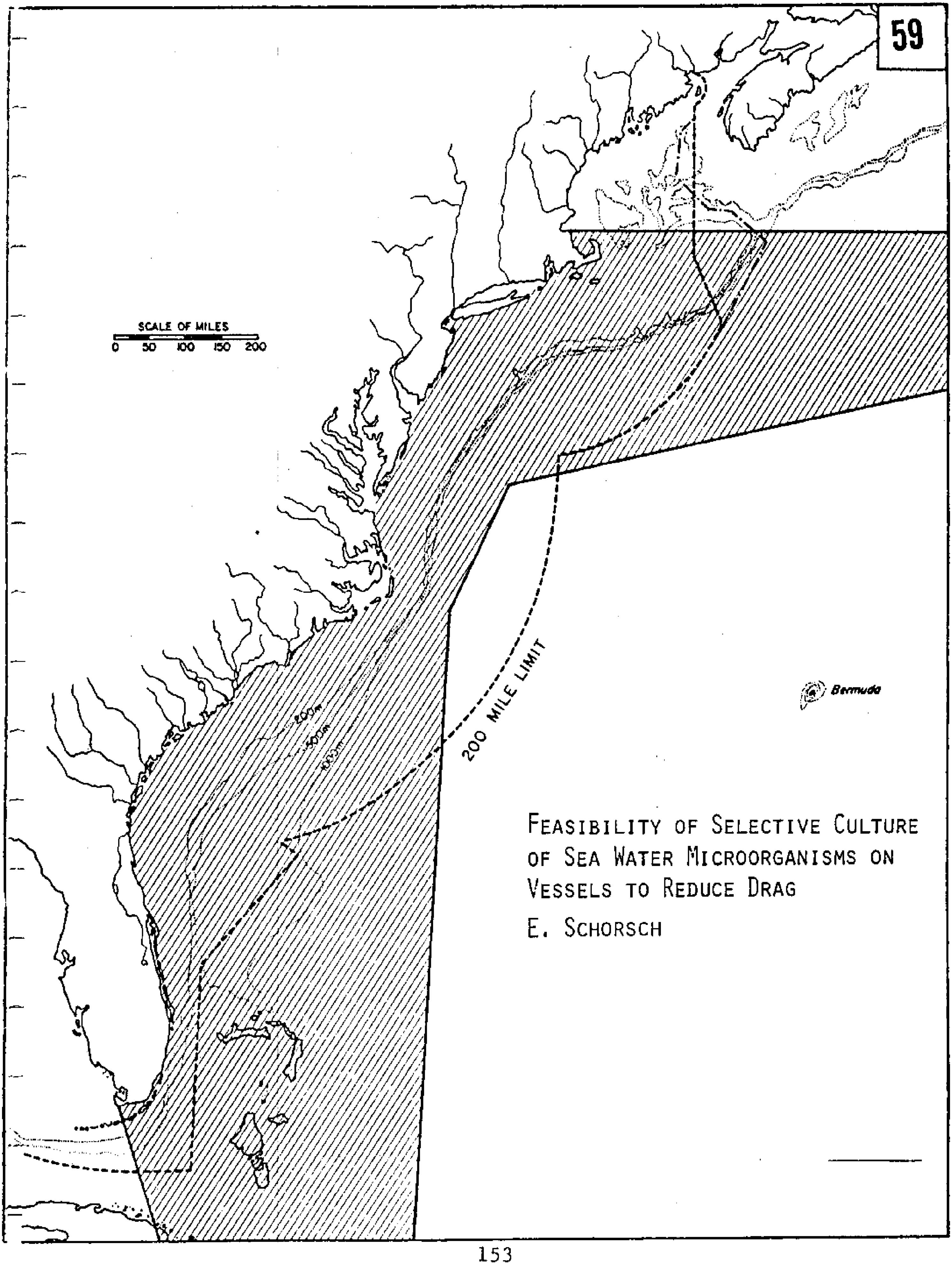
PROBLEM DESCRIPTION:

Dinoflagellates (Prorocentrum micans), diatoms (Chaetoceros didymus) and algae (Porphyridium species) have been shown to excrete long chain polymers which are beneficial for drag reduction through suppression of boundary layer turbulence. An effective method for selective growth of these organisms from randomly collected sea water may be necessary to economically utilize this drag reduction phenomenon on seagoing ships.

COMMERCIAL SIGNIFICANCE:

Permit a 25% reduction in a ship's fuel consumption by injecting such polymers into the ship's boundary layer. Polymer source must be low in cost and non-petroleum-related to be practical.

59



FEASIBILITY OF SELECTIVE CULTURE OF SEA WATER MICROORGANISMS ON VESSELS TO REDUCE DRAG

E. SCHORSCH

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Determination of the Influence of Interacting Wave Patterns on Maximum Wave Height (Relates to 2W, 11W, 55W, 8)

Proposed by: E. H. Harlow

PROBLEM DESCRIPTION:

Conduct (1) full scale observation (by satellite or plane) and by site measurement

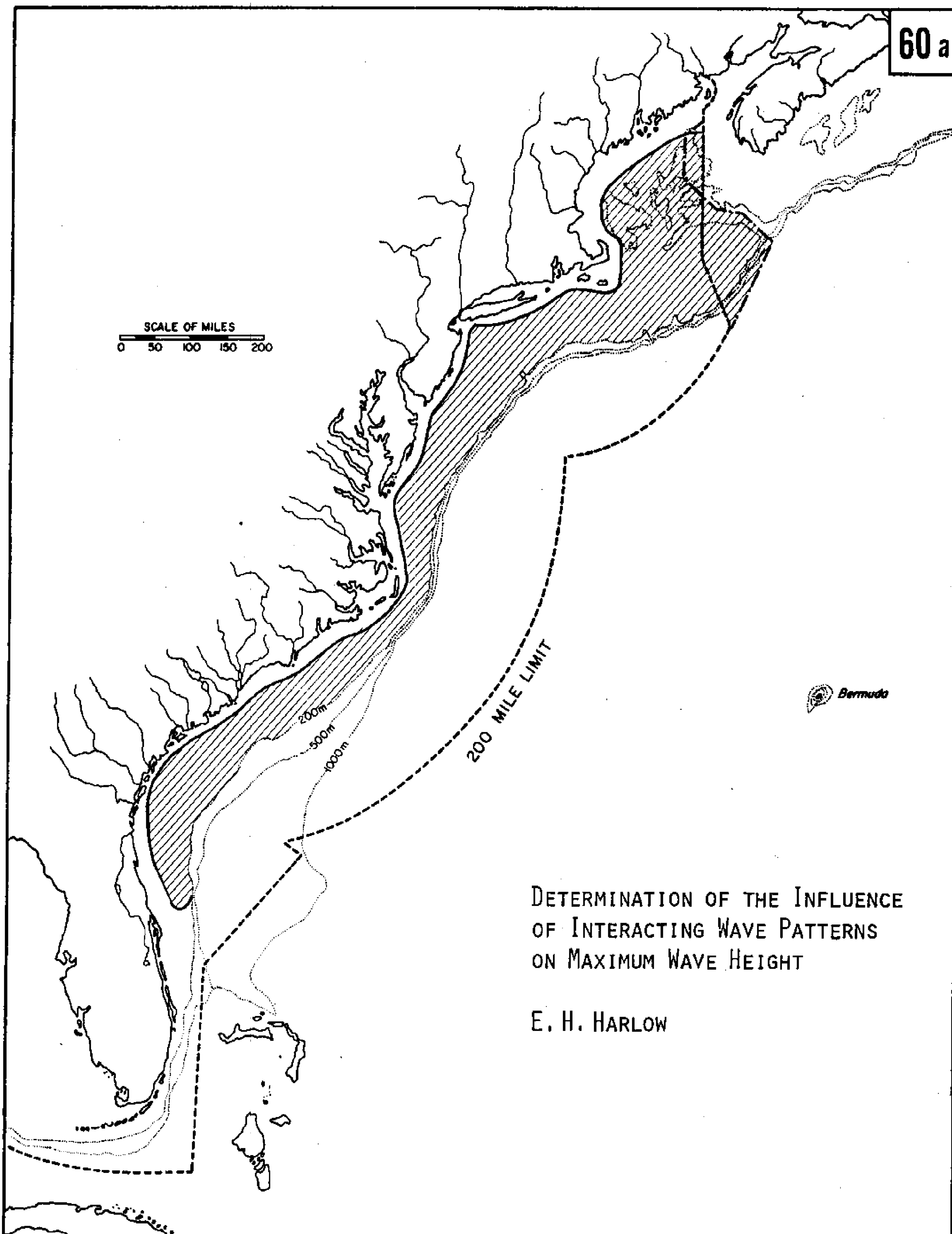
(2) Model experiment

(3) Analysis

To develop correlation for 3 wave trains, or more, different heights and periods, various combinations of directions. The analysis should not use spectral methods.

COMMERCIAL SIGNIFICANCE:

Better understanding of PMH (probably maximum hurricane) waves and "rogue waves" than can be gained from spectral analysis.



DETERMINATION OF THE INFLUENCE OF INTERACTING WAVE PATTERNS ON MAXIMUM WAVE HEIGHT

E. H. HARLOW

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Study of Marine Riser Dynamics and Drilling Vessel Station Keeping to Improve Safety of Offshore Operations

Proposed by: C. Chryssostomidis (Horn)

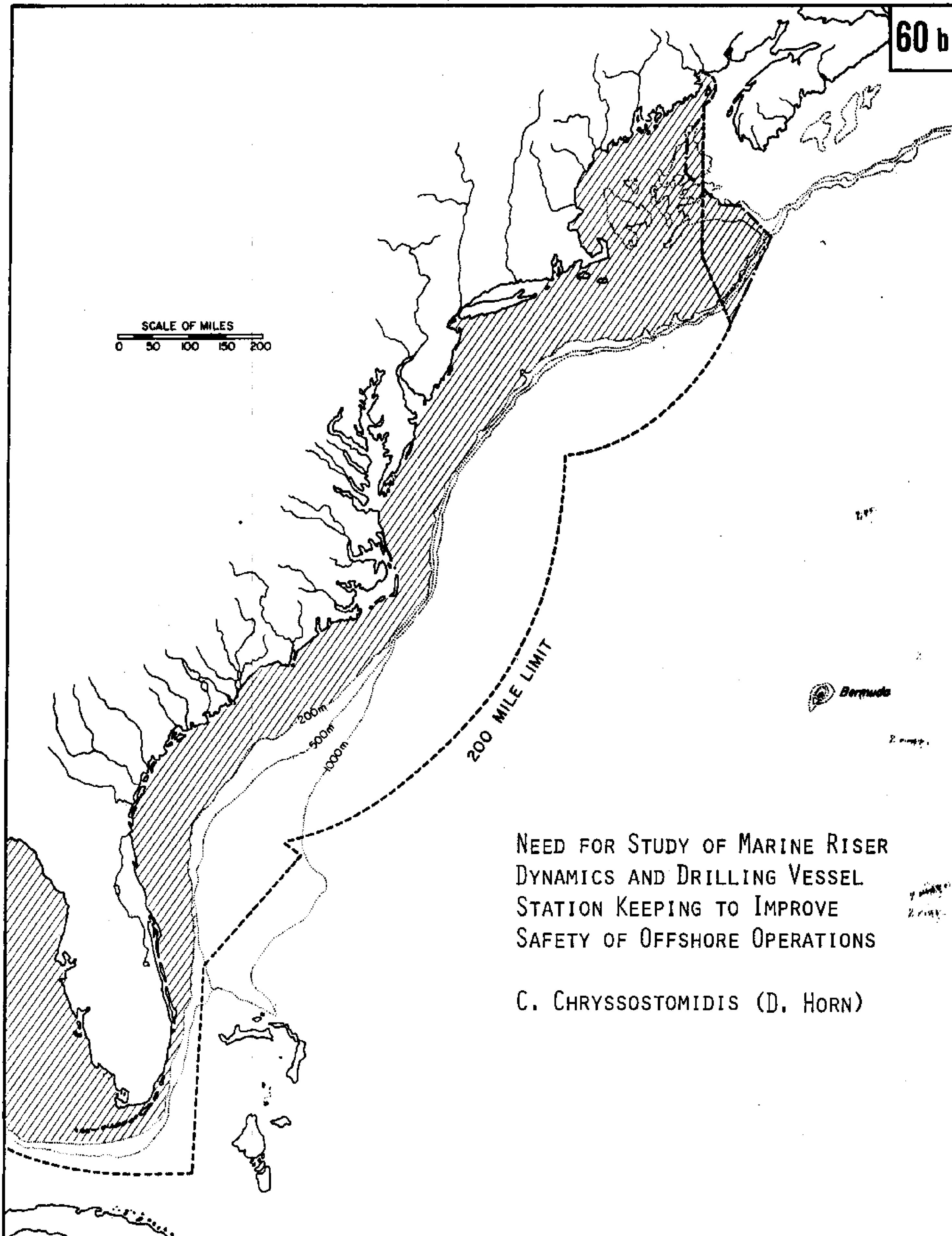
PROBLEM DESCRIPTION:

Marine riser failures have been reported by oil industry engineers as one of the most serious problems that the offshore oil industry is faced with today. It has been estimated that at least a fifth of the exploration working days in the North Sea are lost because of marine riser associated problems. This problem is expected to be aggravated as we explore in deeper waters. What is proposed here is to study the problem of marine riser dynamics in order to identify the limitations inherent in the present designs and thus be able to design a system that will allow exploration in deeper water with a higher probability of success.

A closely related problem to the above, although it can be treated separately, is that of station keeping for drilling ships. Our ability to predict the forces that affect station keeping is still very crude. Non-linear effects must be considered. What is proposed here is to study the entire problem of station keeping, i.e. drift force prediction and control system design. Correct solution of this problem should have a beneficial impact in the overall efficiency of the operation.

COMMERCIAL SIGNIFICANCE:

The significance of the research proposed above is that it is expected to contribute toward the solution of two of the most important problems affecting the efficiency of oil exploration. The knowledge gained by this study is expected to benefit the ocean mining industry also.



NEED FOR STUDY OF MARINE RISER DYNAMICS AND DRILLING VESSEL STATION KEEPING TO IMPROVE SAFETY OF OFFSHORE OPERATIONS

C. CHRYSSOSTOMIDIS (D. HORN)

61 a

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of a Liquid Dynamic Absorber for Offshore Structures to Increase Endurance and Reduce Hazards

Proposed by: J. K. Vandiver (Horn)

PROBLEM DESCRIPTION:

To significantly improve the structural integrity and endurance of fixed offshore platforms, a reliable and effective method to suppress the dynamic response of such platforms to wind, wave and seismic excitation is badly needed. A device or system to provide this needed suppression is not now designed into or available to be added to an offshore structure. Yet the principles are well understood in both mechanical or liquid systems that could be adapted to fixed offshore platforms.

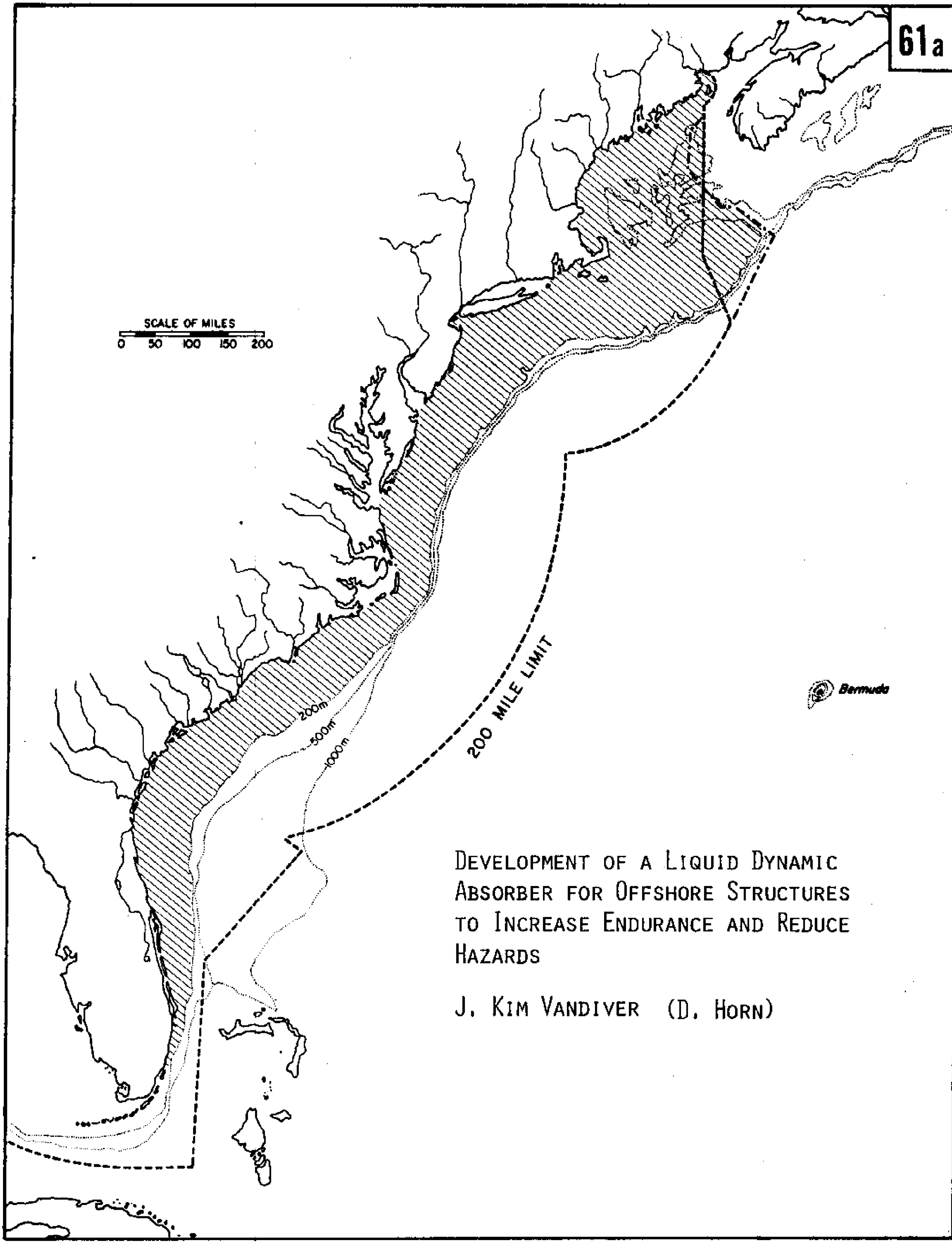
Research to date indicates the feasibility of using the liquid storage system to reduce the environmentally induced vibrations. A liquid in a tank has natural standing wave, or sloshing, frequencies whose properties are well known. By proper choice of tank dimensions, the sloshing motions of the liquid can be adjusted so that the dynamic properties of the tank and liquid are similar to that of a dynamic absorber. The viscous damping of the liquid provides the required damping. This damping may be adjusted by choosing a liquid of proper viscosity and by providing the correct surface area in the tank exposed to the liquid motions. There are at present no dynamic absorbers of any kind on offshore platforms. There are liquid storage tanks on most platforms that have been designed for storage applications only. These tanks could be modified and future ones designed to provide the proper dynamic absorbing properties. Liquid dynamic absorbers would be effective in reducing motions of the platform that produce horizontal motions of the tank. It would be particularly effective at reducing the dynamic amplification of such structures at their flexural and torsional natural frequencies.

A systems patent embodying the principles described is being filed in accordance with governmental sponsor requirements.

COMMERCIAL SIGNIFICANCE:

Successful damping systems would improve the structural integrity of offshore platforms to:

(a) reduce operating hazard during heavy weather conditions;
(b) improve the structural design and possibly save on material costs by increasing the fatigue life of the of the structure;
(c) potential reduction in insurance costs.



Development of a Liquid Dynamic Absorber for Offshore Structures to Increase Endurance and Reduce Hazards

J. Kim Vandiver (D. Horn)

61 b

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Development of Standards for Concrete Marine Structures

Proposed by: W. R. Cox

Problem from report "Seafloor Engineering: National Needs and Research Requirements" National Academy of Sciences - Washington, D.C., 1976

PROBLEM DESCRIPTION:

It is recommended that standards for design and construction of concrete structures be prepared and incorporated into existing rules and guidelines for offshore concrete structures.

Existing industrial and professional committees should expedite joint efforts with responsible agencies and certification/classification organizations to prepare guidelines for recommended practice and standards for concrete sea structures, and to promulgate recommendations at an early date.

The objective of the standards is to promote an adequate level of safety and to allow for advancing technology based on operating experience.

One or more of the relevant U.S. regulatory agencies should participate with industry in the preparation of these standards.

The joint efforts and coordination should include:

a. Defining the engineering criteria for standards and regulations.

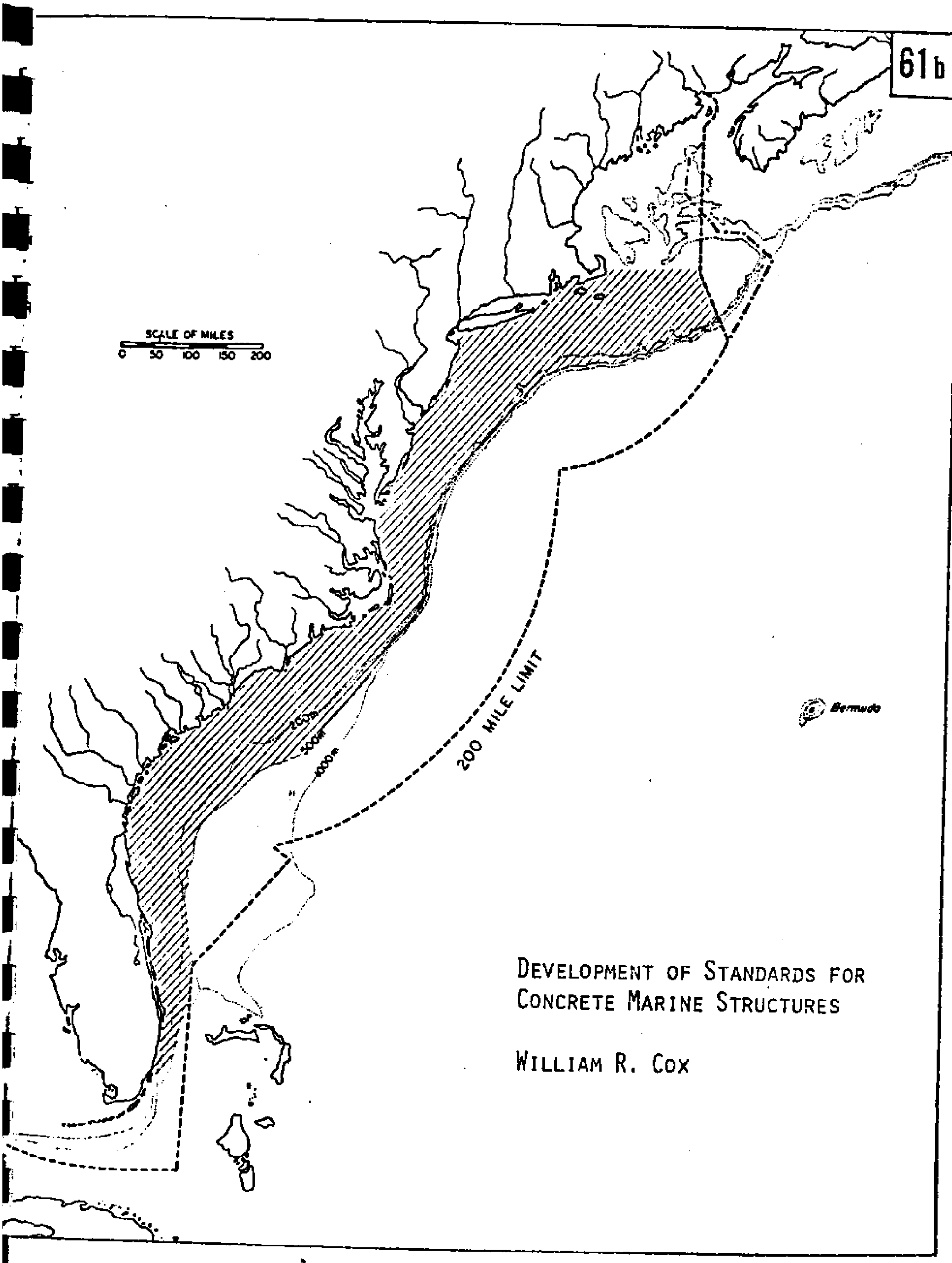
b. Establishing programs for needed R & D.

c. Preparing and coordinating standards.

d. Establishing the certification process.

COMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



DEVELOPMENT OF STANDARDS FOR CONCRETE MARINE STRUCTURES

WILLIAM R. COX

ATLANTIC OFFSHORE

OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need for Effective Monitoring of Gulf Stream Meanders and Eddies on the Fishing Grounds of the Shelf

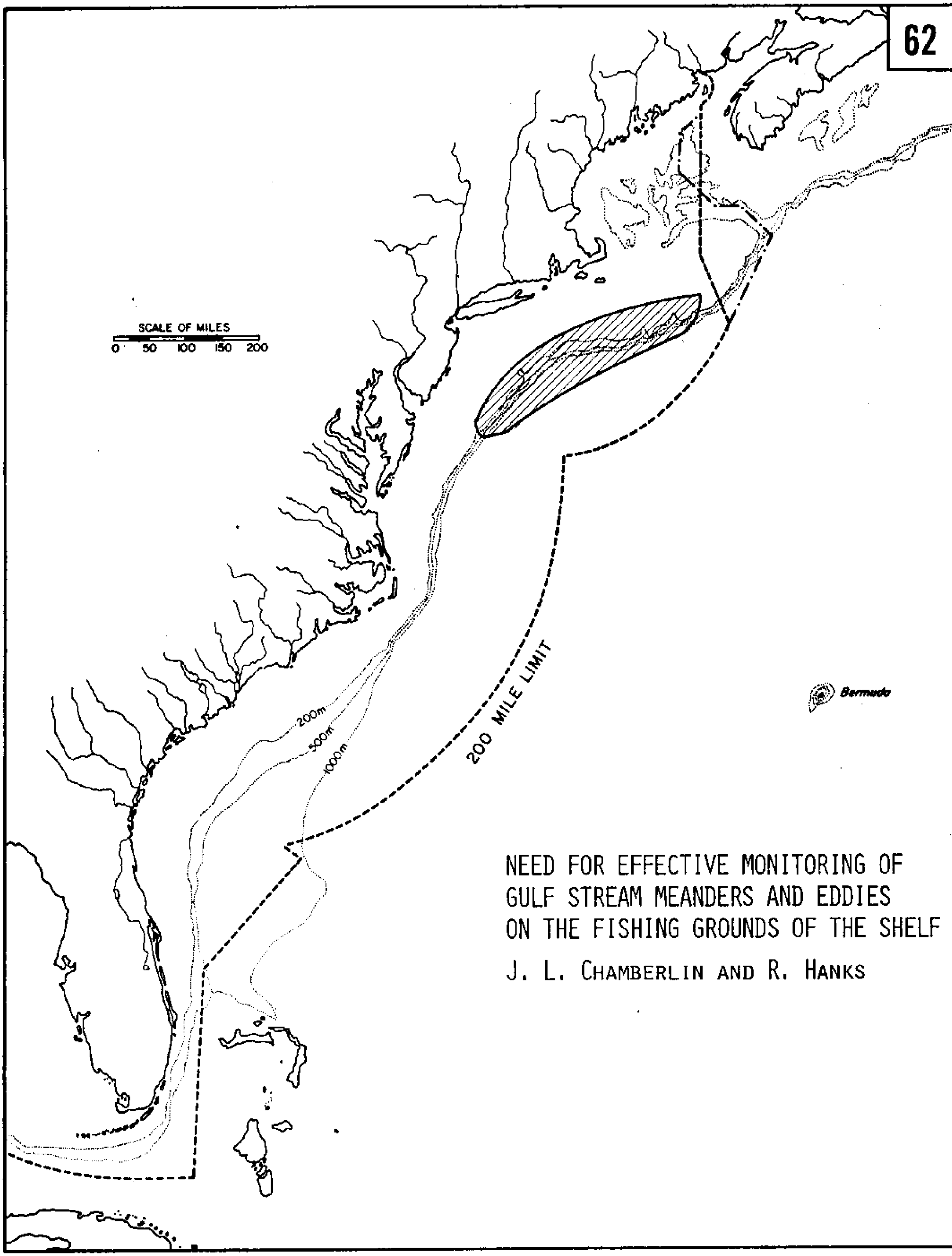
Proposed by: J. L. Chamberlin and R. Hanks

PROBLEM DESCRIPTION:

Gulf Stream meanders and eddies can be a major source of environmental variability in the slope water region adjacent to the continental shelf of New England and the Middle Atlantic States, and can affect adjacent fishing grounds. Effects on fishery resources can be exerted by temperature changes in bottom waters and entrainment of eggs and larvae. Unusually large eddies and associated meanders can be of particular significance.

COMMERCIAL SIGNIFICANCE:

Gulf Stream meanders and eddies can influence distribution and survival of living marine resources and can entrain and disperse fish eggs and larvae into unfavorable environments.



NEED FOR EFFECTIVE MONITORING OF GULF STREAM MEANDERS AND EDDIES ON THE FISHING GROUNDS OF THE SHELF

J. L. CHAMBERLIN AND R. HANKS

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: To Conduct Acoustic Sea Trials With Acceptable Acoustic Background Noise

Proposed by: V. T. Boatwright, Jr.

PROBLEM DESCRIPTION:

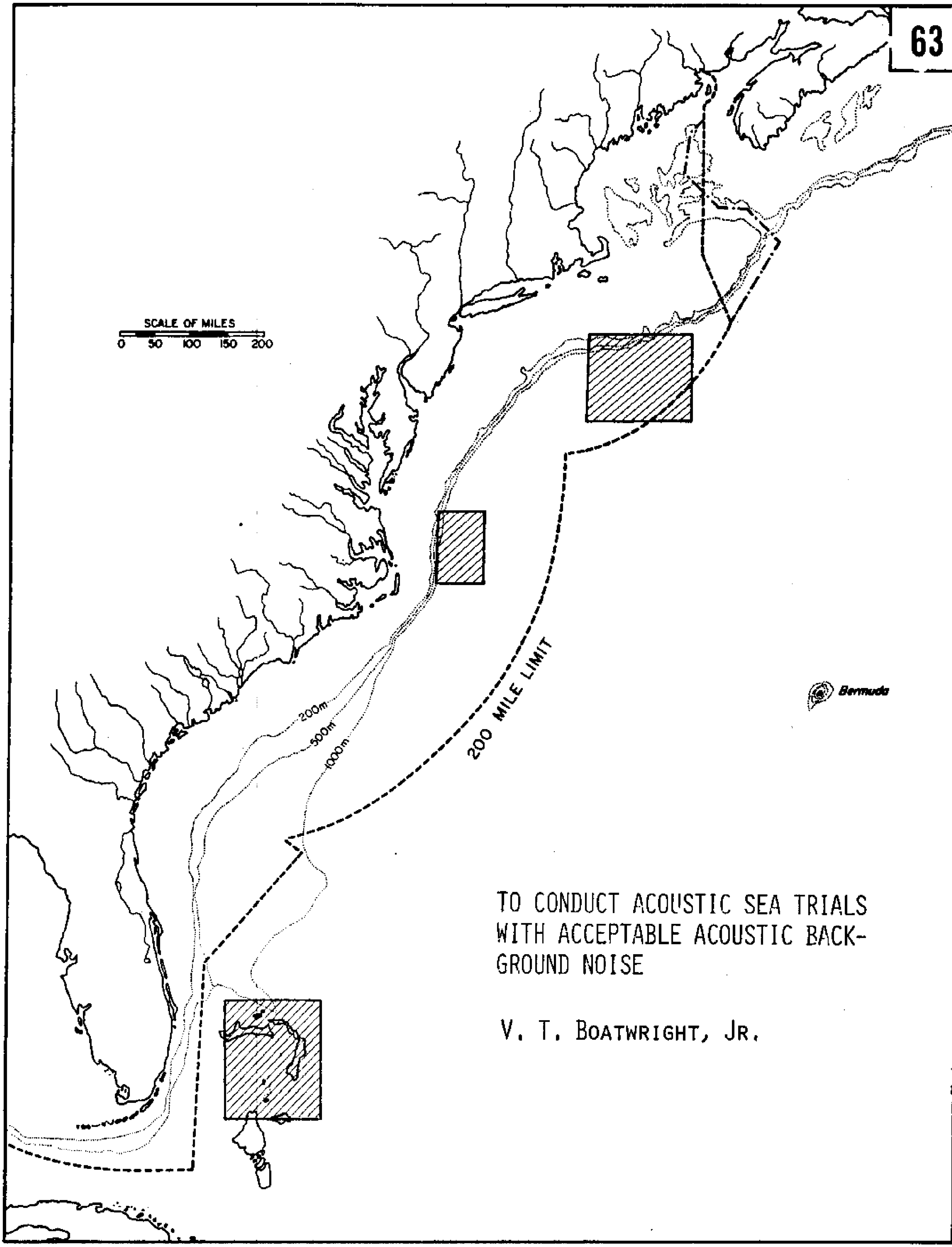
Submarines and many surface ships in the U. S. Navy are required to meet certain standards for radiated and self-noise, in order to make them effective. Naval shipbuilders, and the U. S. Navy as part of their effort to construct and maintain effective fighting ships, conduct acoustic trials, in which the acoustic performance of the vessel is measured as accurately as possible.

Today most of these measurements are made, for the Atlantic Coast at least, at special ranges in the Bahamas ("AUTEC", using fixed sensors, and "Tongue of the Ocean", where a mobile, instrumented barge is used). In the past, however, Deep Water Underway Radiated Noise Surveys, have been made offshore, beyond the 100 fathom line, using small vessels properly instrumented.

A recurring problem which is highly annoying, and costly in terms of ship time, is that very frequently acoustic conditions are such that it is impossible to carry out the trials. This is because of high background noise, either due to high sea state, or to ship traffic, or to ambient noise from other sources (e.g. underwater mining, construction, etc.) Consequently, means must be sought to conduct these acoustic trials satisfactorily, either through use of areas where there is a strong (and perhaps predictable) likelihood of acceptable conditions prevailing, or by use of instrumentation which will minimize the effects of high background noise and still provide accurate acoustic measurements.

COMMERCIAL SIGNIFICANCE:

Significance is almost completely to the builders and operators of military submarines and surface ships, that is, the U. S. Navy and those shipyards who design and build Naval vessels. However, the cost-benefits of solution of the problem to those involved is great.



TO CONDUCT ACOUSTIC SEA TRIALS WITH ACCEPTABLE ACOUSTIC BACKGROUND NOISE

V. T. Boatwright, Jr.

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Determine Feasibility of Sea Plow Burial of Proposed Transatlantic Cables

Proposed by: L. E. Overhiser

PROBLEM DESCRIPTION:

Ocean cables on the Continental Shelf are particularly susceptible to damage by bottom trawlers and shellfish dredging. Cable breaks on the shelf for 4 existing Transatlantic cables routing from Rhode Island and New Jersey have been substantially reduced by embedding them to a depth of 2 feet below the bottom with a specially designed sea plow.

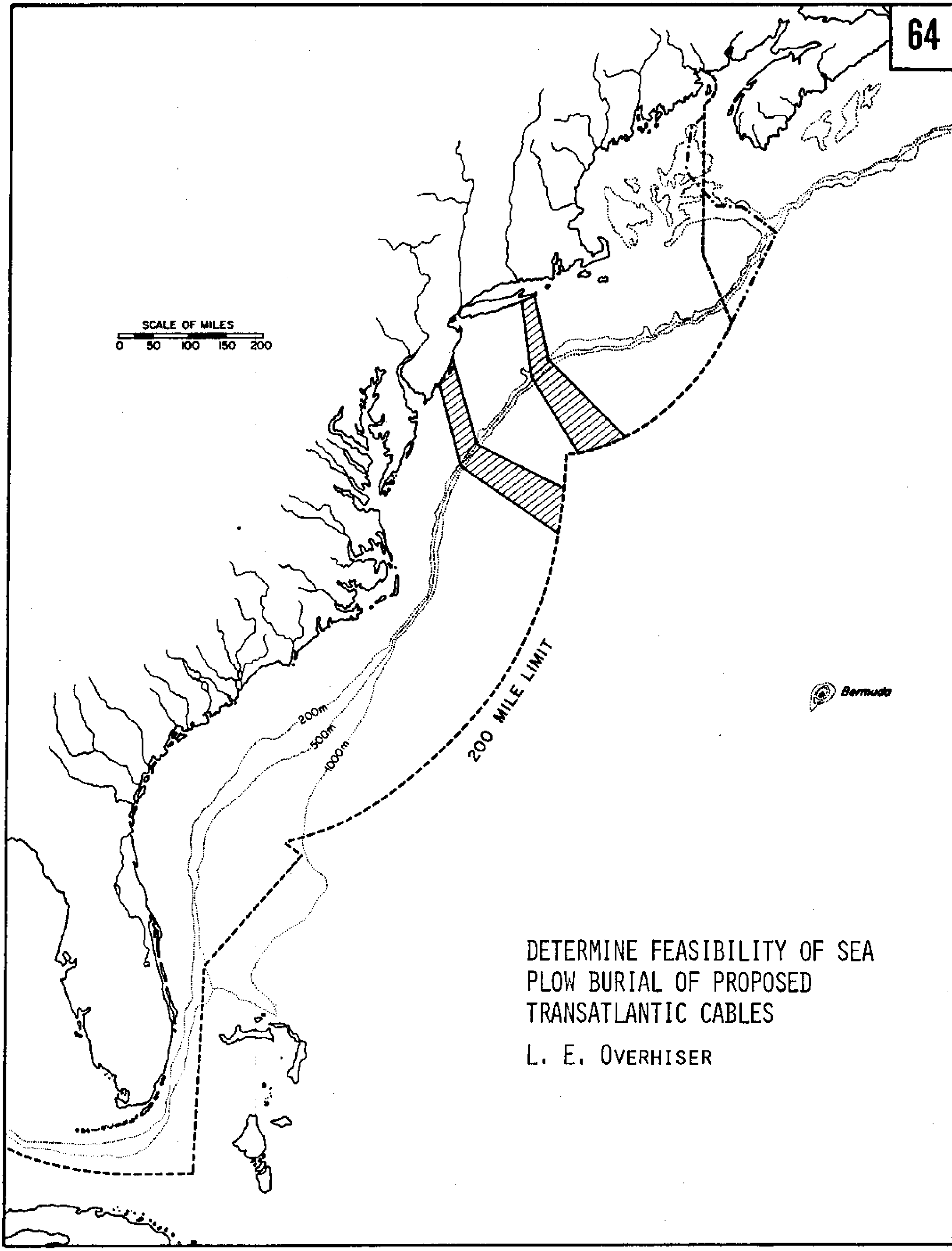
Two additional Transatlantic cables are scheduled for installation in the 1980's. They will route from East coast terminals across prime bottom fishing areas on the U. S. shelf. It is planned to protect these cables by plowing between the beach and 500 fathom curve. Subsequent burial by a specially designed submersible, may be undertaken beyond 500 fathoms if trawling activity occurs at such depths.

Before embedment can begin, the "plowability" of the bottom must be determined and a feasible routing selected. Rock outcrops and soft unconsolidated sediments (such as the "Mudhole" Area South of Block Island) are unsuitable for plowing and are avoided when possible. Plowing feasibility is determined by sub-bottom profiling, side scan sonar and selected coring surveys.

Availability of data on the first 4 feet of bottom sediments on the shelf would permit improved selection of a route for feasibility confirmation by field survey. Prior availability of detailed sediment data could possibility eliminate the need for a costly plowing feasibility survey.

COMMERCIAL SIGNIFICANCE:

Access to data on the makeup of the upper layers of shelf sediments would:
- optimize selection of a route for a plowing feasibility study.
- substantially reduce survey costs by limiting the area covered.
- improve cable burial to the advantage of both international communications and fishing interests.



DETERMINE FEASIBILITY OF SEA PLOW BURIAL OF PROPOSED TRANSATLANTIC CABLES

L. E. OVERHISER

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Need to Identify and Assess Neuston (surface related biota) of East Coast Continental Shelf Waters

Proposed by: M. Castagna, G. Grant (W. Hargis)

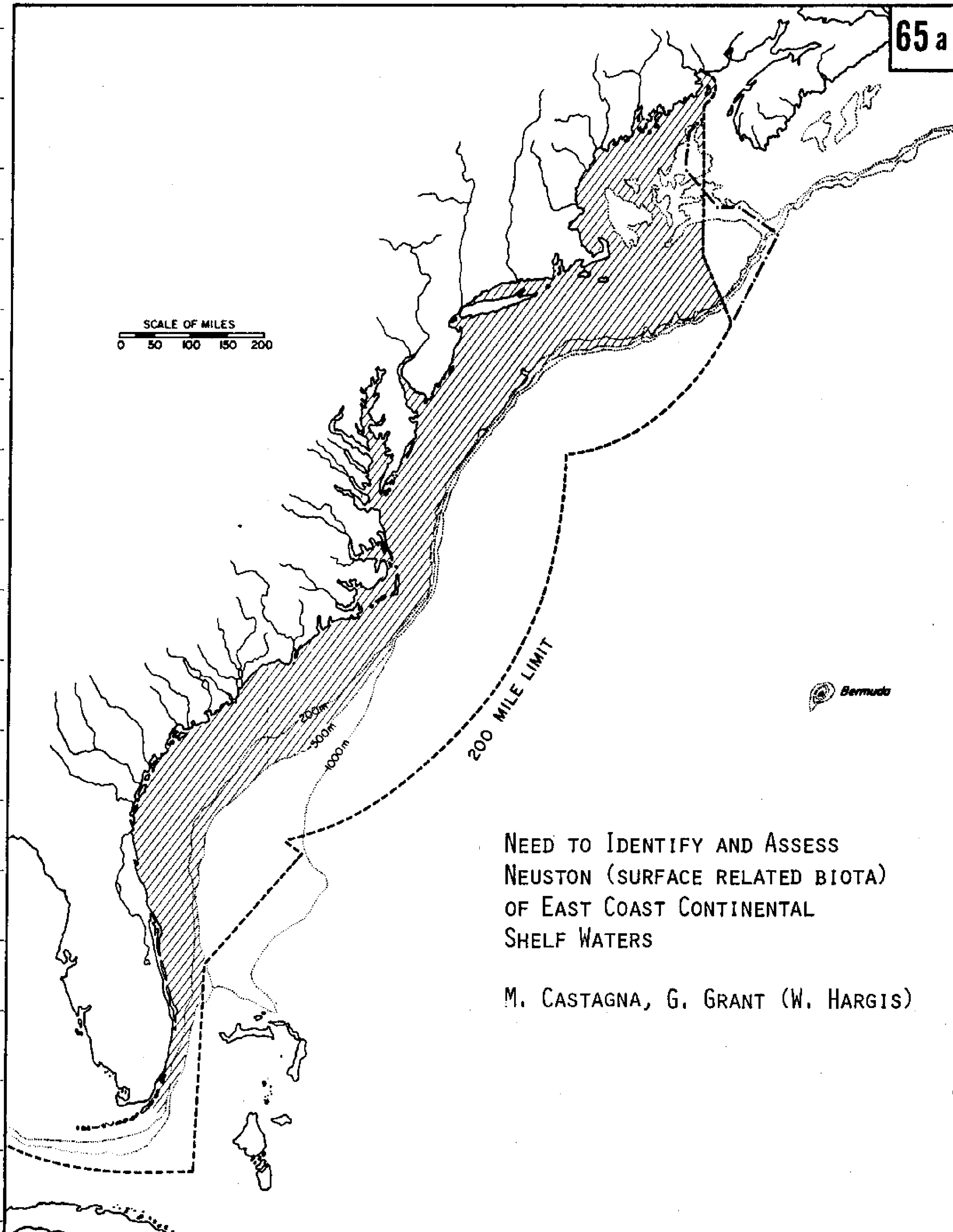
PROBLEM DESCRIPTION:

An abundance of fish eggs and larvae and the larvae of commercially important decapod crustaceans has been discovered in the surface layer of Middle Atlantic Bight waters. In shelf waters off New Jersey, spring collections of neuston were numerically dominated by fish eggs (46% of tows), decapod larvae (25%) and copepods (15%). In other seasons, from 70-83% of neuston collections were dominated by copepods. Conventional subsurface collections of zooplankton, on the other hand, are nearly always numerically dominated by copepods.

This concentration of reproductive stages in the surface layer, presently lacking recognition, needs to be assessed over the productive continental shelves. Previous studies of neuston have been concerned primarily with open ocean waters, where the surface layer has been shown to be an impoverished zone. This is not the case within the 200-mile zone. Extensive oil spills that remain on the surface are not, as press reports after the *Argo Merchant* incident would imply, innocuous. Depending upon the season of the year and the coincidence with spawning grounds, such spills could have serious effects on recruitment to the commercial fisheries.

COMMERCIAL SIGNIFICANCE:

Most fishes and decapod crustaceans of commercial significance are continental shelf forms with pelagic eggs and/or larvae. Those species found in abundance in the neuston off New Jersey include menhaden, hakes, whiting, mackerel, cod, white mullet, bluefish, sea bass and butterfish; decapods included the American lobster, blue crab, rock crabs (*Cancer* spp.) and the deep sea red crab.



NEED TO IDENTIFY AND ASSESS NEUSTON (SURFACE RELATED BIOTA) OF EAST COAST CONTINENTAL SHELF WATERS

M. CASTAGNA, G. GRANT (W. HARGIS)

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Determination of a Framework for Regulation of the Use of the Acoustic Spectrum

Proposed by: R. G. Day

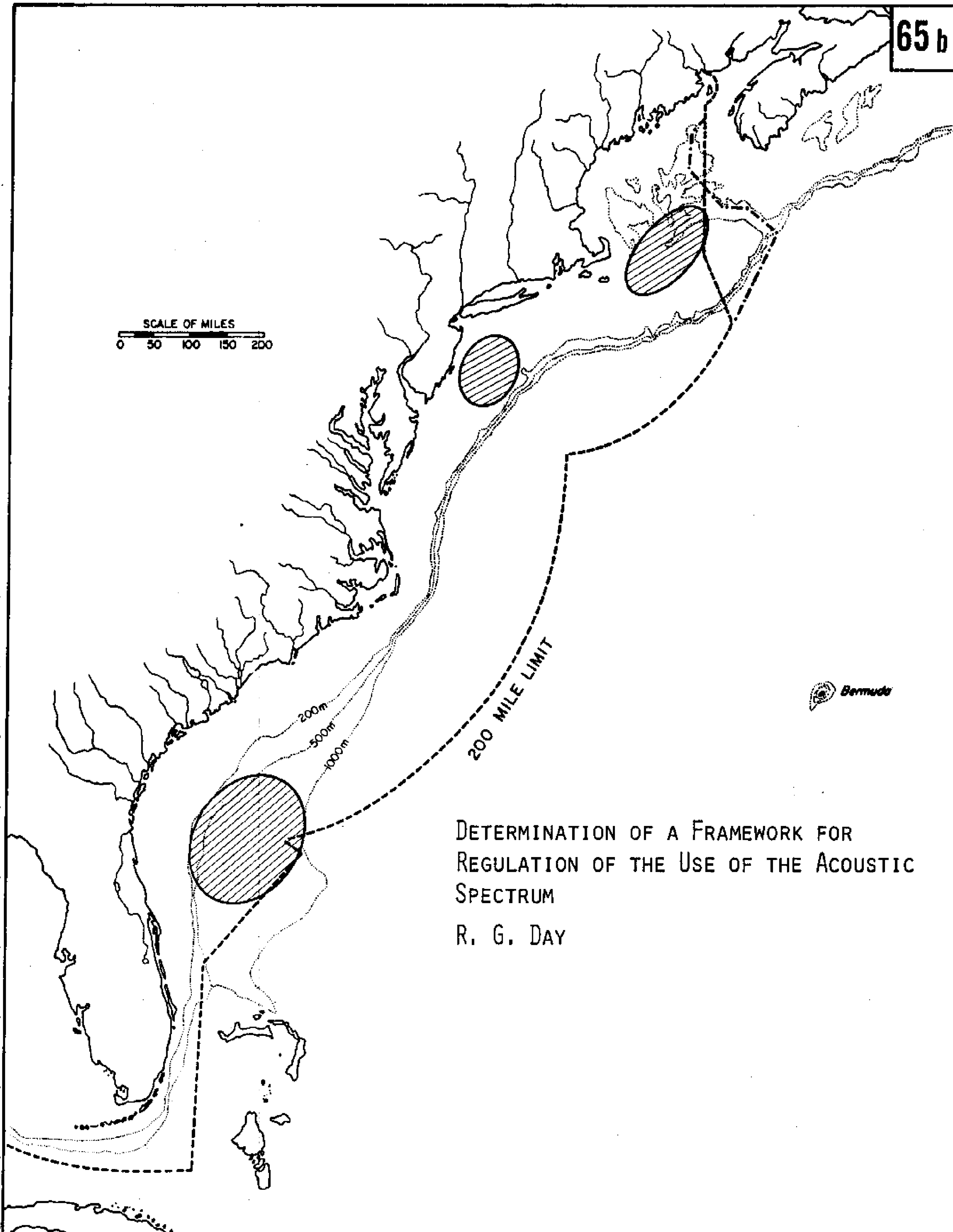
PROBLEM DESCRIPTION:

The value of acoustics for detection, communication and control has long been recognized by military users and is rapidly becoming accepted by commercial resource exploiters. With the increase in deep water drilling for oil and gas and the resulting increase in sub-sea well completions for the recovery of these resources, acoustic interference has begun to be a problem in areas heavily populated by users.

The trade off between system complexity built into acoustic equipment to avoid false actuation or to assure data integrity on one hand versus the need to keep system costs within bounds suggests that acoustic spectrum use regulation may be advantageous. What framework for technical standards for such regulation would be practical?

COMMERCIAL SIGNIFICANCE:

An annual business volume on the order of $25 million will exist by 1985 in fixed acoustic command and telemetry systems. Business growth is partially dependent on system cost. Growth could be enhanced by system simplification resulting from spectrum use regulation.



DETERMINATION OF A FRAMEWORK FOR REGULATION OF THE USE OF THE ACOUSTIC SPECTRUM

R. G. DAY

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Assessment of the Need for Mobile Tethered, Float Breakwaters

Proposed by: G. Lill and R. Kay

PROBLEM DESCRIPTION:

Conventional structural breakwaters are unsuitable for several types of applications. These include:

- Wave protection in deep water where conventional systems cannot be built.
- Wave protection where water level changes are extreme, such as in areas of very high tidal range or in reservoirs behind dams.
- Wave protection for a temporary or limited time, where the protected area shifts with a transient maritime operation (e.g., pipeline laying, dredging, off-shore oil platform erection, installation of ocean outfalls, etc.).

Evidence of interest in non-conventional breakwaters is demonstrated by the Proceeding, Conferenc on Floating Breakwaters, University of Rhode Island, Newport, R.I., April 23-25, 1974; and by articles in the Proceedings, 11th Annual Conference of the Marine Technology Society, September 1975; and the Proceedings, Eighth Annual Offshore Technology Conference, May 1976, et al.

One of the better concepts in non-conventional breakwaters is the Tethered Float Breakwater. In this design, a large number of buoyant spherical floats are held nearly submerged by long tether cables. When these floats are driven by the oscilatory motion of the water in surface waves, th oscillate somewhat like inverted pendulums. If the tether is selected with an appropriate length the float will amplify the water motion (move further than the water particles do) and also be o of phase (move offshore while the water moves onshore). This keeps the relative velocity of the float with respect to the water very high enabling each float to be very effective in dissipating wave power and thereby reducing wave height and wave destructive potential.

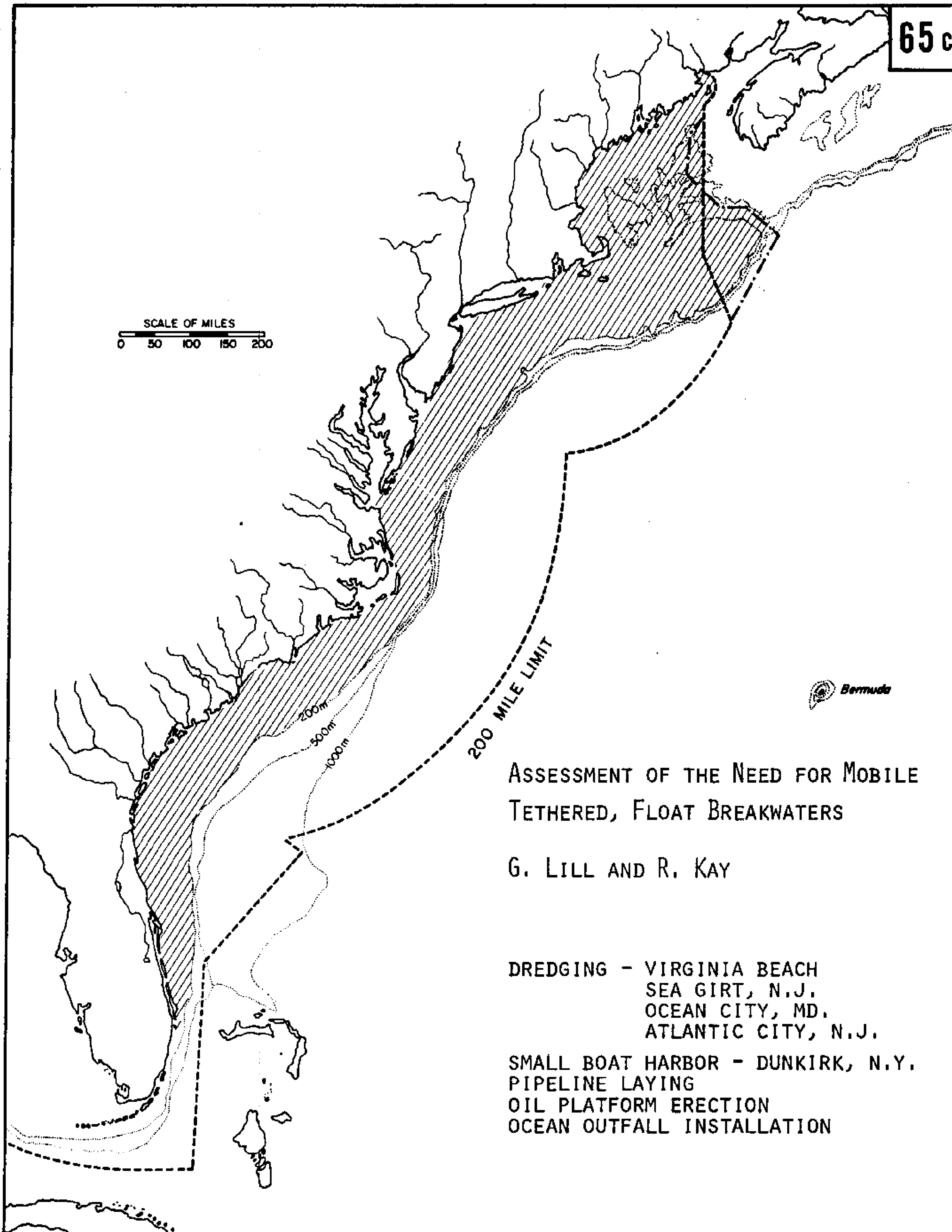
The first functional application of the Tethered Float Breakwater is by the San Diego Unified Po District at the Market St. Pier, where it is in use for protection from boat and ship wakes. The design of this breakwater is suitable for marina protection and other wave abatement requirement in sheltered waters and several other installations are being planned.

In general, however, potential users of the tethered float breakwater have a reluctance to depart from current practices and established procedures. They desire practical-use demonstration prio to commitment of funds for use of a Tethered Float Breakwater. The problem, therefore, is to obtain more actual field applications to stimulate interest by potential users.

COMMERCIAL SIGNIFICANCE:

As a result of the above exposure, there are commercial opportunities for the business of supplyi and/or operating ocean-scale or marina-scale Tethered Float Breakwaters.

In addition, the Tethered Float Breakwater offers opportunities to extend operating time or increase safety for the many transient maritime operations highlighted above.



Assessment of the Need for Mobile Tethered, Float Breakwaters

G. Lill and R. Kay

DREDGING - VIRGINIA BEACH
SEA GIRT, N.J.
OCEAN CITY, MD.
ATLANTIC CITY, N.J.

SMALL BOAT HARBOR - DUNKIRK, N.Y.
PIPELINE LAYING
OIL PLATFORM ERECTION
OCEAN OUTFALL INSTALLATION

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Effect of Slime Formation on Paint Roughness

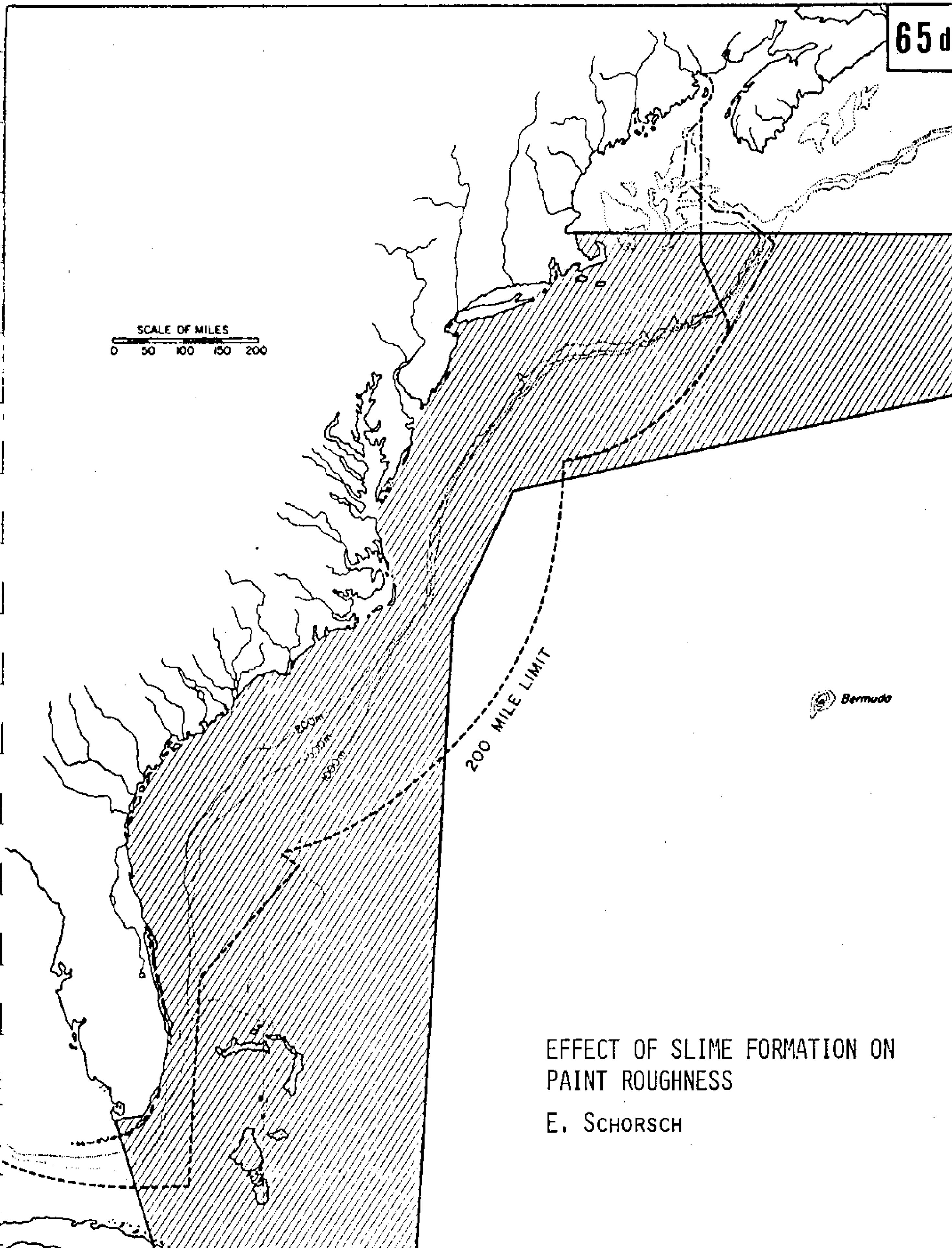
Proposed by: E. Schorsch

PROBLEM DESCRIPTION:

Methods have been developed for measuring the roughness of ship bottoms. Reliable means for correlating these measurements to ship resistance are still being developed. Shortly after a newly painted ship re-enters the water a layer of slime forms on the paint surface. Does this slime change the roughness of the bottom? If yes, to what degree? Is such fouling beneficial and how is it related to initial surface roughness and frictional resistance?

COMMERCIAL SIGNIFICANCE:

Lead to better understanding of the part paint roughness plays in determining ship resistance, and thus, reduced fuel consumption due to better paint selection and improved maintenance policies.



EFFECT OF SLIME FORMATION ON PAINT ROUGHNESS

E. SCHORSCH

ANALYSIS OF RESULTS

The participants identified 105 problems which were consolidated into the 83 problems, presented in order of priority, in the previous section of this report.

It was the intent of each task group leader charged with consolidating several problems into a single revised problem, to not lose in the process detail or specifics from the original problems. However, to insure that the maximum amount of information brought to the workshop is included in this report, the 22 problems eliminated through this process are included as Appendix 4. The "W" following the presentation number of the problem is used to prevent confusion with rank numbers.

To establish priorities, each of the 46 participants completed an individual score sheet on which he listed his top 15 problems in descending order. The criteria agreed to was that each individual would select those problems of greatest importance to his parent organization or to the professional area in which he was most active. To increase objectivity, the assumption was made that the funding of problem solutions would be from federal sources, possibly supported to some degree by industrial sources.

Scoring was done by assigning the priority number to each problem so that the problem among the 83 finalists which received the <u>lowest</u> score was the <u>highest</u> priority in the opinion of all participants considered as a group. For example, a first priority note on an individual's sheet would cause a score of one to be entered for that problem. A score of 11 would cause a score of 11 to be entered for another problem. For all problems beyond the 15 ranked by an individual, a score of 16 was assigned. The results of this ranking are included in Appendix 5. Only three problems remained unranked; that is, none of the 46 participants voted for them.

It was agreed by the participants that the priorities of each individual would not be published. It was further agreed that there might be some value to readers of this report if the priorities of certain special interest groups were tallied, still without revealing individual priorities. This has been done through ten groupings defined by William Gaither and Robert Biggs. The criteria used were that there should be no fewer than three individuals in a group and that each group should be made up of individuals with recognized organizational affiliations or professional activities in that area. The following groups are listed with the names of individuals included and a list of all of the problems which they ranked. Problems that were ranked by the group as a whole, but were not ranked by the special interest group, are omitted from these tables. For example, in the case of Group #1, Communications and Instrumentation, none of the four people ranked in their top 15 the problem that the workshop consensus rated as priority #6.

Group #1. COMMUNICATIONS AND INSTRUMENTATION

Members

Barakauskas -- Westinghouse Electric Company
Boatwright -- General Dynamics Corp.
Day -- Raytheon Company
Overheiser -- American Telephone & Telegraph Company

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 1 Ranking*
1	29	4	0	39	1
2	13	2	32	45	4a
3	15	2	32	47	5a
4	13	2	32	45	4b
5	22	2	32	54	12c
7	11	2	32	43	3
8	22	2	32	54	12e
9	16	2	32	48	6a
10	7	1	48	55	13a
12	7	1	48	55	13b
13b	2	1	48	50	8b
14	9	1	48	57	15a
16	14	1	48	62	19a
17	4	1	48	52	10b
18	10	1	48	58	16a
19	10	1	48	58	16c
20	3	1	48	51	9
22	21	3	16	37	2
23	2	1	48	50	8d

*Problems numbered "a, b, c" etc. indicate tie votes

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 1 Ranking *
24	15	1	48	63	20b
25	5	1	48	53	11b
26	5	1	48	53	11a
27b	27	3	16	43	3
28	6	1	48	54	12b
30	14	1	48	62	19b
31	15	1	48	63	20d
32	12	1	48	60	17a
33a	8	1	48	56	14
34	1	1	48	49	7b
38	6	1	48	54	12a
39a	10	1	48	58	16b
39b	6	1	48	54	12d
40	15	2	32	47	5b
41	4	1	48	52	10a
42	9	1	48	57	15b
43	13	1	48	61	18
44	15	1	48	63	20c
45a	18	2	32	50	8a
45b	1	1	48	49	7a
46	15	1	48	63	20a
47b	16	2	32	48	6b
50a	12	1	48	60	17b
64	2	1	48	50	8c

Group #2. DUMPING

Members

Balmer	-- DuPont Company
Musser	-- Environmental Protection Agency
Nash	-- New York City
Suszkowski	-- U.S. Army Corps of Engineers
Wrenn	-- Port Authority of New York and New Jersey

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (5-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 2 Ranking *
1	14	5	0	14	1
2	16	5	0	16	2
3	26	2	48	74	18b
4	27	4	16	43	4
5	17	2	48	65	10
6	8	1	64	72	16c
7	28	4	16	44	5
8	15	1	64	79	22b
10	9	2	48	57	9a
11	21	3	32	53	7b
12	13	1	64	77	21b
13b	14	3	32	46	6
17	12	1	64	76	20b
19	2	1	64	66	11
20	21	3	32	53	7a
21	22	2	48	70	14
22	10	1	64	74	18a
23	3	1	64	67	12b
24	17	4	16	33	3

*Problems numbered "a, b, c" etc. indicate tie votes

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (5-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 2 Ranking *
26	7	1	64	72	16d
27a	13	1	64	77	21a
29	3	1	64	67	12a
32	11	1	64	75	19a
33b	15	1	64	79	22a
35	25	3	32	57	9b
36	38	4	16	54	8
38	40	3	32	72	16a
39a	5	1	64	69	13a
39b	12	1	64	76	20a
41	9	1	64	73	17a
42	7	1	64	71	15
48	24	2	48	72	16b
50a	9	1	64	73	17b
52b	21	2	48	69	13b
55	11	1	64	75	19b

Group #3. FISHERIES

Members

Castagna -- Virginia Institute of Marine Science
Cronin -- University of Maryland
Dykstra -- Pt. Judith Fisherman's Cooperative Association
Hanks -- National Marine Fisheries Service
Hunt -- Food and Drug Administration
Walford -- New Jersey Sea Grant Program

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (6-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 3 Ranking *
1	26	5	16	42	2
2	7	2	64	71	8a
3	17	3	48	65	5
4	21	6	0	21	1
5	18	2	64	82	13a
6	15	2	64	79	11
7	19	3	48	67	6a
8	11	1	80	91	20c
9	9	1	80	89	18c
10	16	3	48	64	4
11	9	2	64	73	9
13b	19	2	64	83	14b
16	8	1	80	88	17d
17	10	1	80	90	19b
18	6	3	48	54	3
19	19	3	48	67	6b
22	9	1	80	89	18b
24	13	2	64	77	10
25	23	3	48	71	8c

*Problems numbered "a, b, c" etc. indicate tie votes

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (6-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 3 Ranking *
26	24	2	64	88	17b
27a	17	2	64	81	12a
27b	1	1	80	81	12b
28	9	1	80	89	18a
29	13	1	80	93	22a
30	12	1	80	92	21b
33a	35	3	48	83	14a
33b	11	1	80	91	20b
34	15	1	80	95	24b
35	14	1	80	94	23a
36	8	1	80	88	17c
37	21	2	64	85	15a
38	11	1	80	91	20a
39a	7	2	64	71	8b
39b	6	2	64	70	7
43	8	1	80	88	17a
45a	15	1	80	95	24a
45b	7	1	80	87	16b
45c	15	1	80	95	24c
46	13	1	80	93	22b
47a	12	1	80	92	21a
47b	14	1	80	94	23d
49	2	1	80	82	13b
50a	9	1	80	89	18d
51	24	2	64	88	17e
53a	5	1	80	85	15b
54	10	1	80	90	19a
56	14	1	80	94	23e
57	3	1	80	83	14c

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (6-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 3 Ranking *
58b	7	1	80	87	16a
59	14	1	80	94	23b
62	14	1	80	94	23c
64	13	1	80	93	22c

Group #4. OIL & GAS

Members

Aagaard -- Chevron Oil Field Research Company
Balsley -- U.S. Geological Survey
Cox -- McClellan Engineers, Inc.
Geer* -- Shell Oil Company
Orlofsky -- Columbia Gas System, Inc.
Osborn -- Brown & Root, Inc.

*Mr. Ronald L. Geer, Consulting Mechanical Engineer, Shell Oil Company, P. O. Box 2463, Houston, Texas, 77001 was invited by Paul Aagaard to provide a separate problem ranking following the workshop. His priorities seemed useful to include with this group.

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (6-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 4 Ranking *
1	4	2	64	68	7a
2	15	3	48	63	5
3	28	5	0	28	1
4	11	3	48	59	5
5	4	1	64	68	7b
7	8	1	80	88	17b
8	34	4	16	98	24
9	23	3	32	55	3
11	4	1	80	84	14b
13a	8	3	48	56	4
14	21	2	48	69	8
15	20	2	48	68	7c
16	29	4	32	61	6
17	21	3	32	53	2
19	10	1	80	90	19

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (6-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 4 Ranking *
20	24	2	64	88	17c
21	4	1	80	84	14a
23	18	2	64	82	12
24	13	1	80	93	21
25	5	1	80	85	15
27a	7	1	80	87	16
27b	14	1	80	94	22a
29	9	1	80	89	18a
30	16	2	64	80	11
32	12	1	80	92	20a
33b	20	3	48	68	7d
35	12	1	80	92	20b
37	8	1	80	88	17a
39b	8	1	80	88	17d
41	24	3	48	72	9
43	9	1	80	89	18b
44	14	1	80	94	22b
45b	3	1	80	83	13
45c	9	1	64	73	10a
49	15	1	80	95	23a
53b	9	1	64	73	10b
55	12	1	80	92	20c
61b	15	1	80	95	23b

Group #5. PIPELINES & CABLES

Members

Aagaard -- Chevron Oil Field Research Company
Geer -- Shell Oil Company
Orlofsky -- Columbia Gas System, Inc.
Osborn -- Brown & Root, Inc.
Overheiser -- American Telephone & Telegraph Company

Problems Ranked

(1) Priority Problem *	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (5-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 5 Ranking *
1	13	2	32	45	8
2	12	2	32	44	7
3	8	3	16	24	1
4	4	1	48	52	13b
5	4	1	48	52	13a
7	15	2	32	47	9a
8	36	4	0	36	4
9	18	3	16	34	3
13a	7	2	32	39	5
14	10	1	48	58	19b
15	8	1	48	56	17c
16	8	2	32	40	6
17	3	1	48	51	12b
18	10	1	48	58	19a
20	24	2	32	56	17b
22	14	1	48	62	22a
23	11	1	48	59	20
24	28	2	32	60	21b
25	5	1	48	53	14b

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (5-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 5 Ranking *
26	5	1	48	53	14a
27a	7	1	48	55	16a
27b	23	2	32	55	16b
28	6	1	48	54	15
29	9	1	48	57	18a
30	3	1	48	51	12a
32	24	2	32	56	17d
33b	15	2	32	47	9b
39b	8	1	48	56	17e
41	16	3	16	32	2
44	14	1	48	62	22b
45a	8	1	48	56	17a
45b	1	1	48	49	10
45c	9	1	48	57	18b
55	12	1	48	60	21a
64	2	1	48	50	11

Group #6. POWER GENERATION

Members

Haertjens -- Offshore Power Systems Company
Harlow -- Frederic R. Harris, Inc.
Johansen -- Public Service Electric & Gas Company
Muller -- Nuclear Regulatory Commission

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 6 Ranking *
1	40	3	32	72	16a
2	7	2	48	55	8a
3	10	3	16	26	1b
4	14	2	48	62	9
5	17	2	32	49	6
6	20	2	32	52	7a
8	28	3	16	44	5
10	10	1	64	74	18a
12	26	4	0	26	1a
13a	2	1	64	66	12
14	11	3	16	27	2
15	16	3	16	32	3
17	4	1	48	52	7b
18	14	1	64	78	21
22	9	2	32	41	4
23	15	2	48	63	10
26	24	2	48	72	16b
30	7	1	64	71	15a
32	21	2	48	69	14a
33b	12	1	64	76	19

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 6 Ranking *
34	5	1	64	69	14b
36	24	2	48	72	16c
39a	10	1	64	74	18b
40	13	1	64	77	20c
42	8	1	64	72	16d
43	13	1	64	77	20a
45b	25	2	48	73	17
46	7	2	48	55	8b
48	20	2	48	68	13
50a	15	1	64	79	22
58b	13	1	64	77	20b
60b	7	1	64	71	15b

Group #7. SALVAGE & DIVING

Members

Barracca -- Murphy Pacific Marine Salvage Company
Galerne -- International Underwater Contractors, Inc.
Lehr -- U.S. Coast Guard

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (3-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 7 Ranking *
1	4	2	16	20	1b
2	4	2	16	20	1a
3	7	1	32	39	12a
4	4	1	32	36	9a
6	10	1	32	42	15
7	9	1	32	41	14b
9	13	1	32	45	17a
11	7	1	32	39	12b
13a	6	1	32	38	11c
14	12	1	32	44	16a
15	6	1	32	38	11b
16	29	3	0	29	5
18	5	1	32	37	10a
20	12	2	16	28	4
21	22	2	16	38	11a
22	19	2	16	35	8b
23	9	1	32	41	14d
25	6	2	16	22	2
26	12	1	32	44	16b
27b	15	2	16	31	6

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (3-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 7 Ranking *
28	3	1	32	35	8a
29	9	1	32	41	14a
31	8	1	32	40	13
32	5	1	32	37	10b
33b	25	2	16	41	14c
34	15	1	32	47	19b
37	9	2	16	25	3
39b	13	1	32	45	17b
43	16	2	16	32	7
44	15	1	32	47	19a
47a	13	1	32	45	17c
56	4	1	32	36	9b
58a	14	1	32	46	18

Group #8. SAND & GRAVEL

Members

Saville -- U.S. Army Coastal Engineering Research Center
Schubel -- SUNY -- Cornell Sea Grant Program
Sensibar -- Construction Aggregates Corp.

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (3-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 8 Ranking *
1	6	3	0	6	1
2	21	2	16	37	10b
3	14	2	16	30	3
5	4	1	32	36	9a
6	15	2	16	31	4
7	24	2	16	40	13c
10	7	1	32	39	12a
13a	4	1	32	36	15b
13b	7	1	32	39	12b
14	22	2	16	38	11a
17	13	1	32	45	16b
19	14	1	32	46	17a
20	28	3	0	28	2a
21	8	1	32	40	13a
22	13	1	32	45	16a
25	14	1	32	46	17c
28	5	1	32	37	10a
30	7	1	32	39	12c
31	16	2	16	32	5
32	12	2	16	28	2b

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (3-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 8 Ranking *
33a	8	1	32	40	13d
35	26	2	16	42	15b
36	5	1	32	37	10c
38	3	1	32	35	8
42	5	1	32	37	10d
44	1	1	32	33	6
45a	8	1	32	40	13b
48	2	1	32	34	7
49	14	1	32	46	17b
50b	9	1	32	41	14b
52b	6	1	32	38	11b
55	9	1	32	41	14a
58a	10	1	32	42	15a

Group #9. SHIPPING

Members

Boatwright	--	General Dynamics Corp.
Hooper	--	IOT Corp.
Hilman	--	Deepwater Ports Office
Lehr	--	U.S. Coast Guard
McDermott	--	Allen Weather Corp.
Schorsch	--	Sun Shipbuilding & Dry Dock Company
Wrenn	--	Port of New York and New Jersey

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (7-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 9 Ranking *
1	8	4	48	56	1
2	28	5	32	60	2
3	31	5	32	63	3
4	22	2	80	102	19a
5	25	2	80	105	22a
6	9	1	96	105	22b
7	4	1	96	100	17a
8	25	3	64	89	8
9	5	2	80	85	6
10	17	2	80	97	14a
11	22	2	80	102	19d
12	20	2	80	100	17b
13a	8	2	80	88	7b
13b	8	1	96	104	21a
14	24	3	64	88	7a
15	14	2	80	94	12b
16	22	2	80	102	19c
17	29	3	64	93	11b

*Problems numbered "a, b, c" etc. indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (7-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 9 Ranking *
18	5	1	96	101	18a
20	30	3	64	94	12a
21	33	3	64	97	14b
22	28	3	64	92	10a
23	11	2	80	91	9d
24	1	1	96	97	14c
26	13	2	80	93	11a
27b	34	4	48	82	5
28	11	2	80	91	9b
32	5	1	96	101	18b
33b	30	3	64	94	12c
34	28	3	64	92	10b
36	6	1	96	102	19b
38	11	2	80	91	9a
39a	15	2	80	95	13a
40	11	3	64	75	4
41	9	1	96	105	22c
42	15	1	96	111	25a
44	7	1	96	103	20
45a	2	1	96	98	15
45b	10	1	96	106	23a
46	15	1	96	111	25b
47a	31	3	64	95	13b
47b	19	2	80	99	16
52a	11	2	80	91	9c
53b	6	1	96	102	19e
58a	14	1	96	110	24
59	8	1	96	104	21b
61b	9	1	96	105	22d
62	10	1	96	106	23b

Group #10. SHORELINE USE

Members

Machemehl -- North Carolina Sea Grant Program
Man -- University of Miami Sea Grant Program
Saville -- U.S. Army Coastal Engineering Research Center
Williams -- Delaware Sea Grant Program

Problems Ranked

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 10 Ranking *
1	29	4	16	45	3
2	5	2	48	53	6a
3	15	2	32	47	4
4	4	1	64	68	16a
5	28	2	32	60	10b
6	22	3	16	38	1
7	27	3	32	59	9b
9	6	1	48	54	7
10	12	2	48	60	10a
11	14	2	48	62	12b
12	21	2	32	53	6b
13a	4	1	64	68	16b
13b	10	2	48	58	8b
14	10	1	48	58	8d
15	10	1	48	58	8a
16	14	2	48	62	12a
17	13	1	48	61	11
18	10	1	64	74	21
19	2	1	64	66	15
20	1	1	64	65	14

*Problems numbered "a, b, c" indicate tie vote

(1) Priority Problem #	(2) Total Points For Problems Ranked 1-15	(3) Total in Group Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (4-Nx16)	(5) Total Points (Col. 2 + 4)	(6) Group 10 Ranking *
24	9	1	64	73	20b
27a	16	2	48	64	13
28	11	2	48	59	9a
29	11	1	64	75	22
31	42	4	0	42	2
33a	32	4	16	48	5
35	22	2	48	70	17a
38	14	1	64	78	24
42	29	2	48	77	23
45c	10	1	48	58	8c
50a	8	1	64	72	19
51	6	1	64	70	17b
53a	7	1	64	71	18
54	4	1	64	68	16c
55	9	1	64	73	20a

APPENDIX 1

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University of Delaware
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(203) 446-5960

Mr. Adrian S. Hooper, Chairman
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Philadelphia, PA 19102
(215) 864-1234

UNITED STATES OFFSHORE REGULATORS

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(202) 426-2430

Mr. John Hillmann
Office of Deepwater Ports
Department of Transportation
400 Seventh St., S.W.
Washington, D.C. 20590
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also: R. George Pierides
on 5/20/77 only

Dr. J. R. Balsley, Assistant Director
U. S. Geological Survey
Mail Stop 104
Reston, VA 22092
(703) 860-7411

Dr. Daniel R. Muller
Division of Site Safety and
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Nuclear Regulatory Commission
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(301) 492-7207

Dr. Robert Hanks, Deputy Regional
Director, N.E. Region
National Marine Fisheries Services
14 Elm Street
Gloucester, MA 01930
(617) 281-3600 ext. 200

Mr. Daniel Hunt
U.S. Food & Drug Administration HFF-417
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Mr. T. William Musser
Deputy Chief of Marine
Protection Branch
Environmental Protection Agency
401 M. Street, S.W.
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(202) 245-3051

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6010 Executive Boulevard
Rockville, MD 20852
(301) 443-8743

Dr. Gordon G. Lill
Deputy Director
National Ocean Survey NOAA
Rockville, MD 20852
(301) 443-8128

UNITED STATES DEPARTMENT OF DEFENSE

Mr. Stewart Nelson
Office of the Oceanographer of the Navy
200 Stovall Street
Alexandria, VA 22332
(202) 352-9275

Mr. Thorndike Saville, Jr.
Technical Director
Coastal Engineering Research Center
Department of the Army
Kingman Building
Ft. Belvoir, VA 22060
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WEATHER & SEA FORECASTERS

Mr. Vincent McDermott, General Manager
Allen Weather Corporation
5207 Wisconsin Ave., N.W.
Washington, D.C. 20015
(202) 363-7221

APPENDIX 2

SCHEDULE OF ACTIVITIES

SCHEDULE OF WORKSHOP ACTIVITIES

Clayton Conference Center, University of Delaware
Newark, Delaware
May 19, 20 & 21, 1977

THURSDAY, MAY 19, 1977

1800 hours	Registration & social hour Clayton Hall Lobby
1900	Dinner (Room 101B)
2000	Address on Competing Commercial Activities in offshore Atlantic by Senator William V. Roth, Jr.

FRIDAY, MAY 20, 1977

0830	Working Session I Problem Identification - Nominal Group Method (Room 120)
1200	Lunch (Room 119)
1300	Working Session II Continue Problem Identification
1800	Social Hour & Picnic on Lawn
2030	Continue Problem Identification and begin Problem Consolidation
2300	Adjourn

SATURDAY, MAY 21, 1977

0830	Working Session III Complete Task Group Work and describe consolidated problems to participants (Room 120)
1200	Lunch (Room 119)
1300	Participants establish priorities for problems (Room 120)
1445	Adjourn

APPENDIX 3

OBSERVERS

OBSERVERS

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Academic and Professional Programs
Division of Continuing Education
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Mr. Curtis Moore
c/o Senator W. V. Roth
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National Science Foundation
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Atlantic Oceanography Laboratory
Bedford Institute of Oceanography
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Dr. Carolyn A. Thoroughgood, Associate Director
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Mr. Andrew Wallace, Staff Writer
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APPENDIX 4

ORIGINAL TEXTS OF REVISED PROBLEMS

2W

(incorporated by #3)

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Field Measurement of Extreme Sea State Conditions on the Atlantic Shelf

Proposed by: P. M. Aagaard, Chevron Oil Field Research Company

PROBLEM DESCRIPTION:

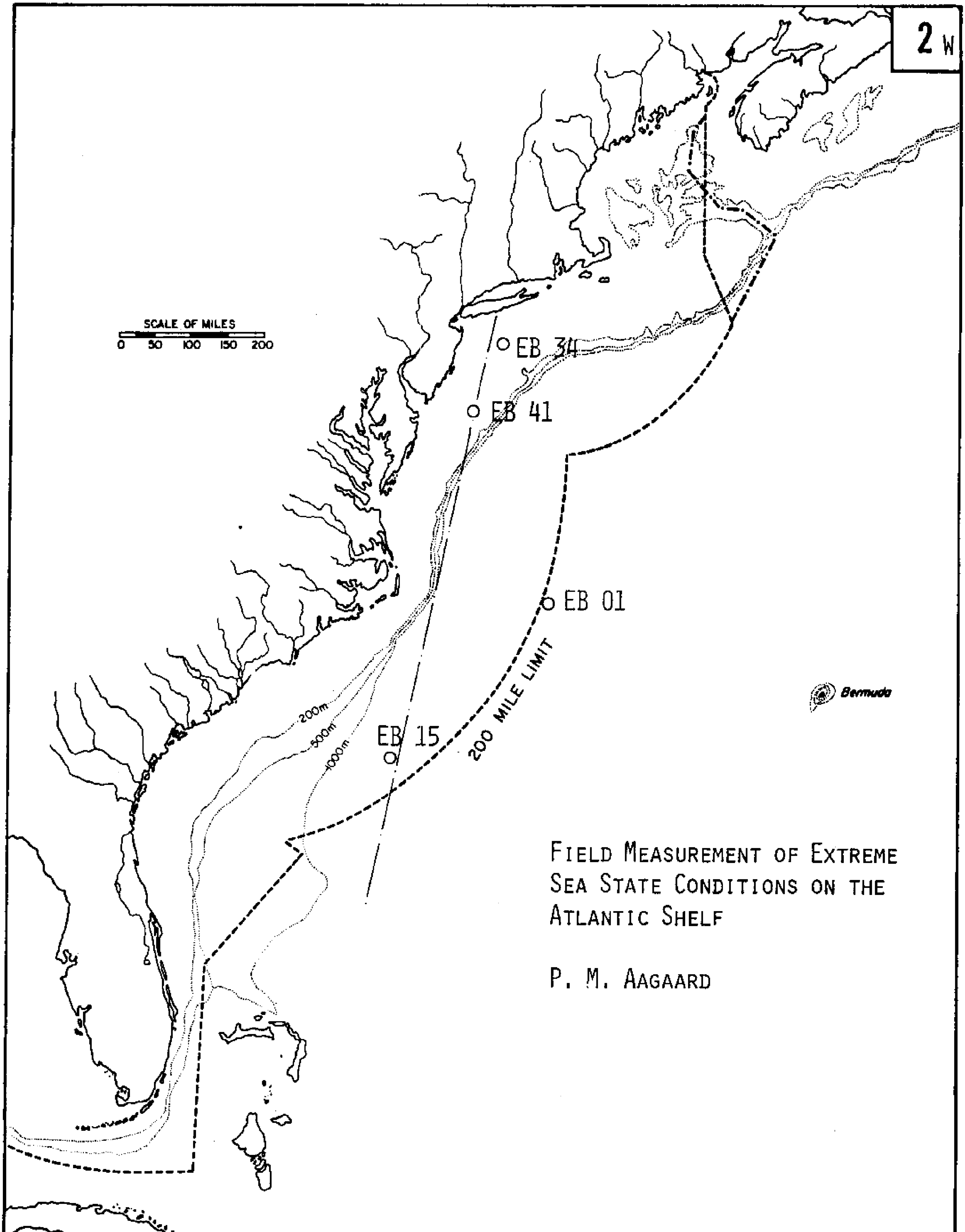
Statistics of extreme sea states are important for selecting design values of proposed offshore and coastal installations or assessing the suitability of certain equipment that may be exposed to severe sea states. Statistics of extreme sea states are obtained by hindcasting the most severe historical storms affecting the location of interest and estimating extremes from probability distributions fit to the maximum values of the hindcast sea states. The data base used for determining sea state extremes is typically 30-40 years depending on the quality of available meteorological data.

Mathematical models for hindcasting sea states from barometric pressure fields are available for both hurricanes and extratropical storms. The calibration of these models with measured data is desirable in order to verify the reliability of the model.

Sea state information is presently being obtained from some of the NOAA buoys along the Atlantic coast. It is proposed that additional sea state measurements be made, particularly during extreme storms. The most desirable form of sea state data is directional spectra. It is also important that data be recorded continuously during the passage of the peak of the storm.

COMMERCIAL SIGNIFICANCE:

Sea state is often the most important design parameter for offshore and coastal installations. Improvement in the reliability of extreme sea states reduces the need for selecting overconservative values.



Field Measurement of Extreme Sea State Conditions on the Atlantic Shelf

P. M. Aagaard

6 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM (incorporated into #4)

Title: To Determine the Effects of Drilling Muds, Cuttings and Formation Waters on Fish and Shellfish Populations

Proposed by: J. R. Balsley, Bureau of Land Management, Department of the Interior

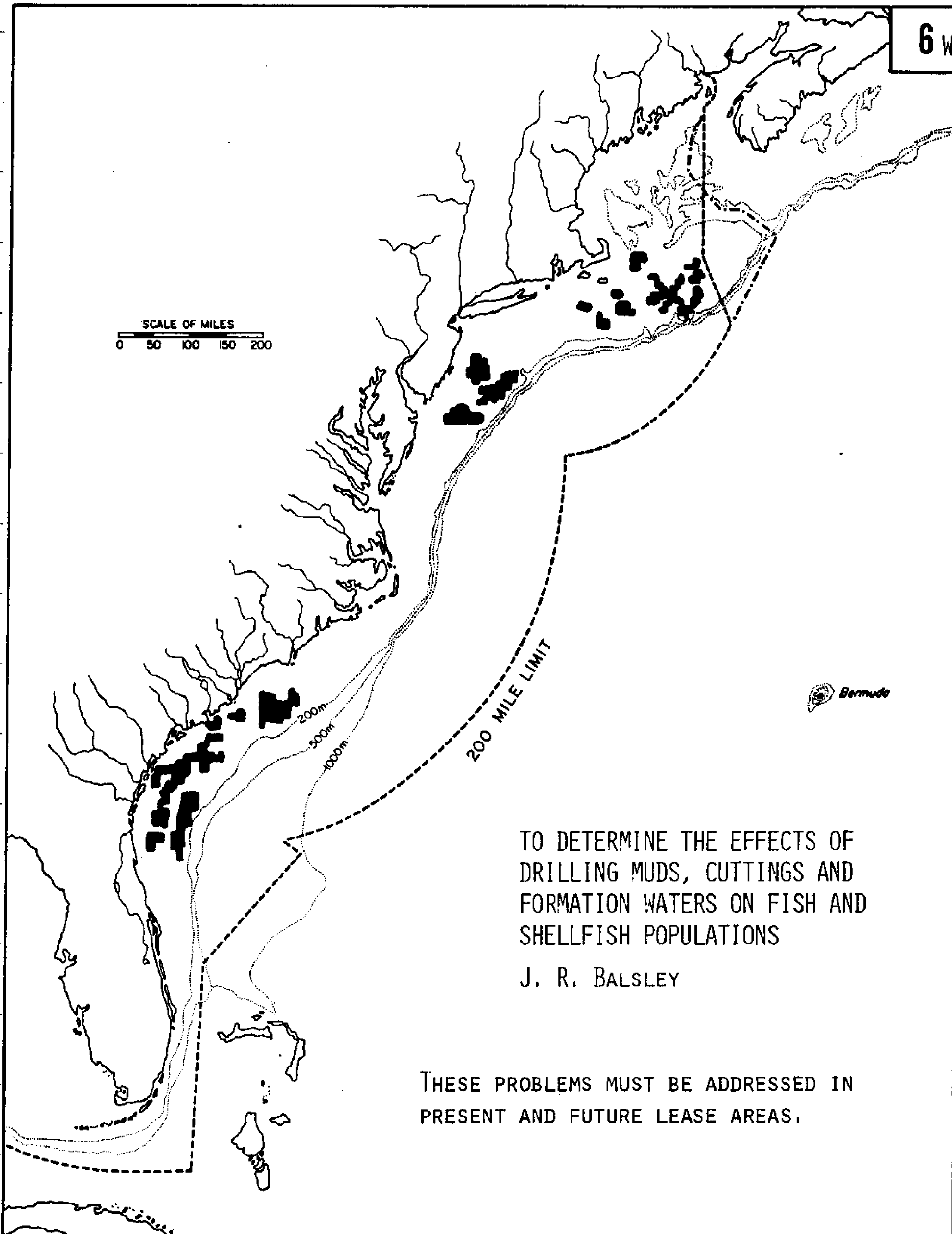
PROBLEM DESCRIPTION:

There has not yet been an adequate definition of the effect of drilling-related effluents on fish and shellfish populations. These effluents can include the crushed rock produced by the drilling operation (cuttings), the high density mud used to prevent collapse of the hole, and the frequently highly saline waters encountered in the formations penetrated by the drill. Experience in the Gulf of Mexico demonstrates that drilling operations and fish and shellfish operations can be conducted compatibly but no hard data are available to allow prediction of effects of drilling-related effluents that may be produced in the development of the Eastern OCS.

Proper experiments must be designed and conducted to accumulate these data so that requirements can be developed which will protect the environment but will not uneconomically limit the development of OCS energy resources.

COMMERCIAL SIGNIFICANCE:

Will have great significance for both the fishing and petroleum industries active in leasing areas in the OCS.



TO DETERMINE THE EFFECTS OF DRILLING MUDS, CUTTINGS AND FORMATION WATERS ON FISH AND SHELLFISH POPULATIONS

J. R. BALSLEY

THESE PROBLEMS MUST BE ADDRESSED IN PRESENT AND FUTURE LEASE AREAS.

11W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #15)

Title: The Interaction of the Physical Environment with Fixed Offshore Structure

Proposed by: William R. Cox, McClelland Engineers, Inc. Houston, Texas
Problem from report "Seafloor Engineering: National Needs and Research Requirements" National Academy of Sciences - Washington, DC, 1976

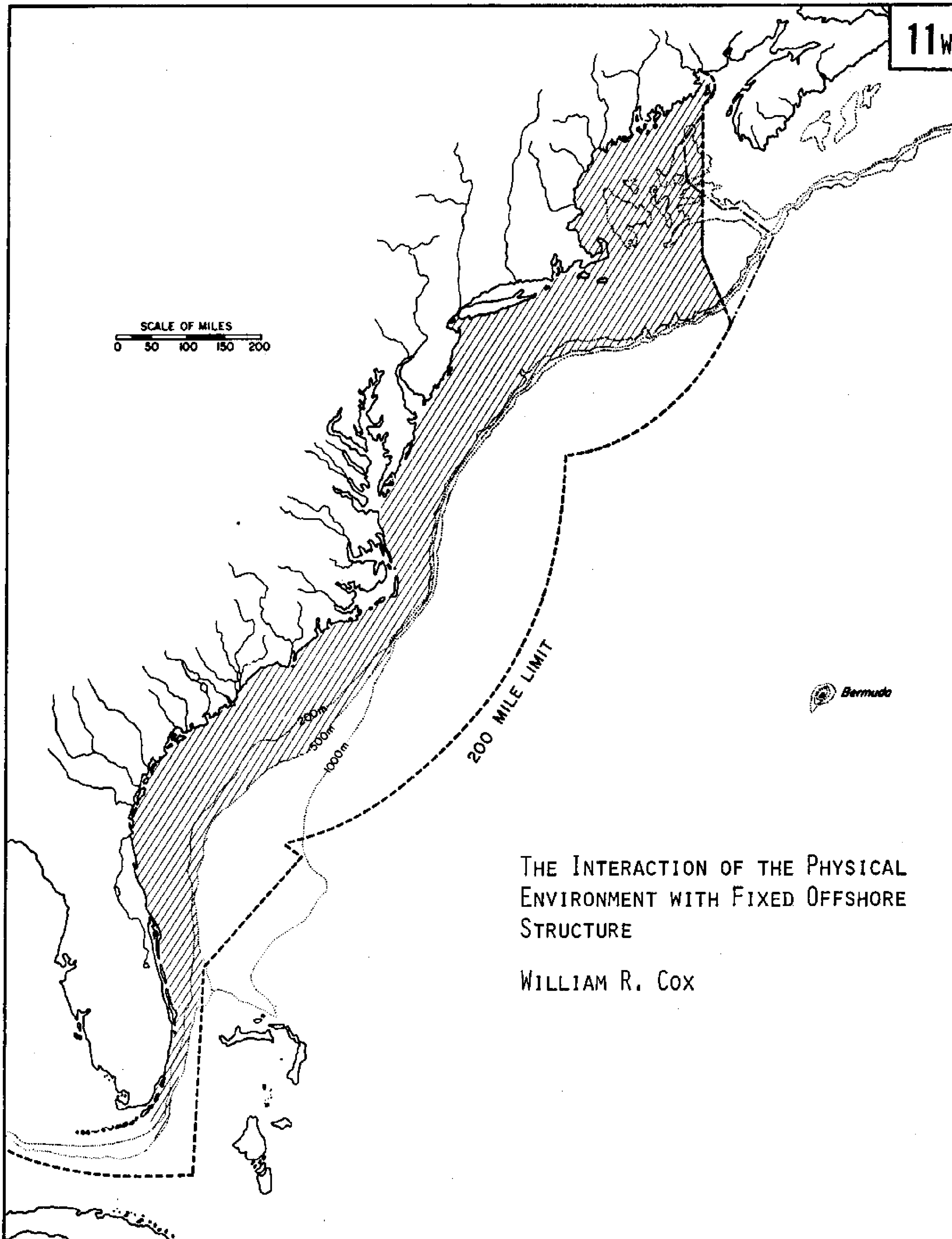
PROBLEM DESCRIPTION:

Criteria now in use for design of fixed offshore structures treat the impact of environment in a similar manner to the impact of environment on a solitary structural member. The resultant influence of environment on a complex structure with many members is taken as the sum of the influence on each of its individual members, assuming that each member is a solitary member. An example is the computation of wave forces on a conventionally framed offshore jacket. Intuition guides one to understand that on some members there is significant shielding from wave forces by adjacent members. Yet, because the relationship of the shielding is not known, a conservative procedure of neglecting shielding is commonly used.

Wind, waves, ocean currents, ice flows, and even perhaps free field earthquake phenomena are modified by the presence of a fixed structure. There is need to define the influence of the real structure in modifying the environment and the sequel to this activity will be to develop criteria to predict the distribution of real loads on the structure. Instrumentation of existing and future structures would be a most convincing way to explore the truth of influence of the erratic and random marine environment on fixed structures.

OMMERCIAL SIGNIFICANCE:

Research effort on this problem should improve reliability and cost effectiveness of marine structures.



The Interaction of the Physical Environment with Fixed Offshore Structure

William R. Cox

23 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #2)

Title: The Ocean's Assimilative Capacity for Waste Materials

Proposed by: Adrian Hooper

PROBLEM DESCRIPTION:

Our technological society takes many natural materials, uses them, most likely altering their form, place and concentration and then discards them. We may change the nature of the materials, but we cannot avoid the ultimate requirement that deposition must take place somewhere. We cannot repeal the natural law of conservation of matter. For some materials, the ocean may be the best receptacle from both an environmental and social point of view.

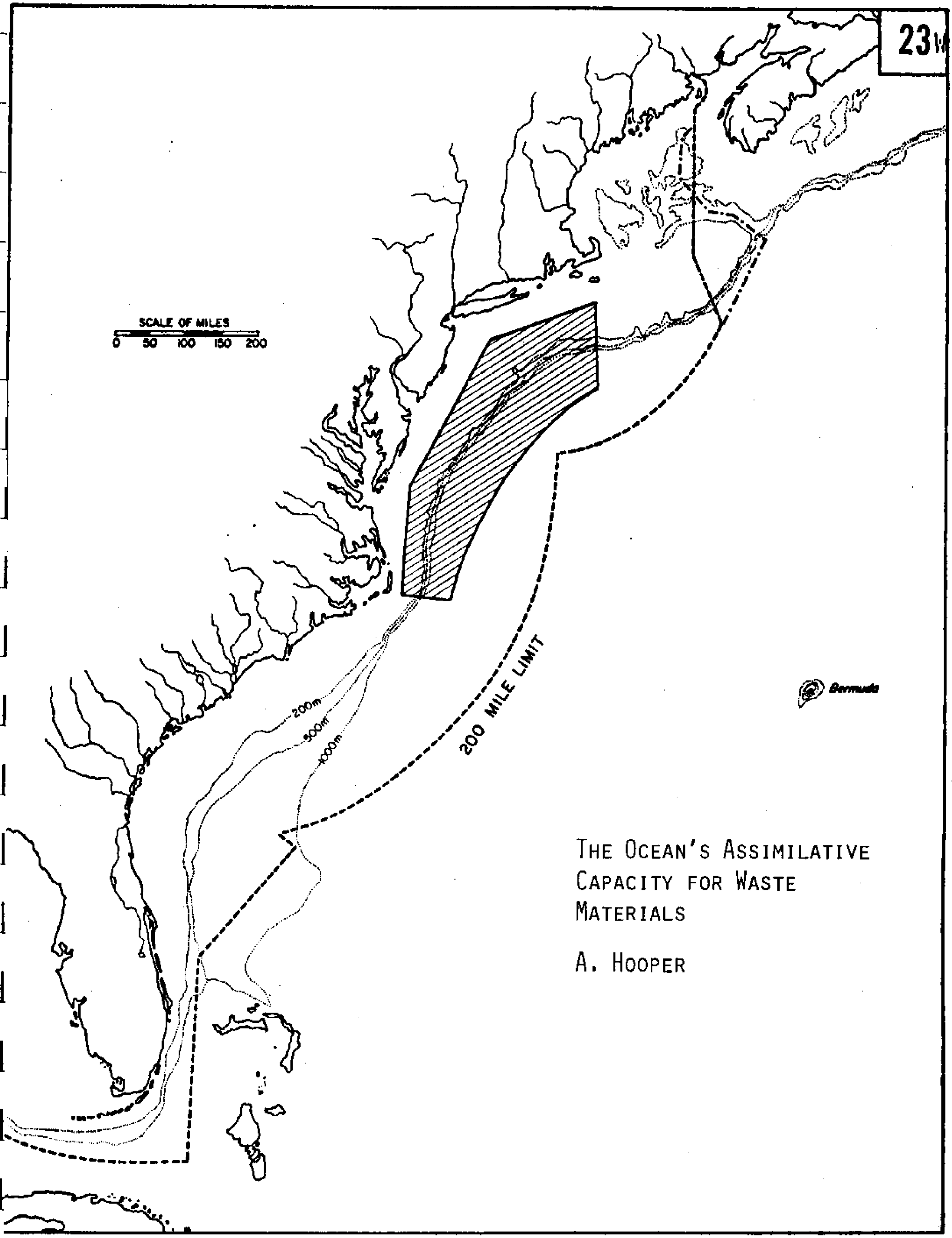
The problem needing solution is: how can the assimilative capacity of the ocean be determined? This can be approached specifically, such as finding out how much of a particular material can be safely disposed of in a given area, or generally such as determining what materials can be safely disposed of in the ocean.

This general problem generates many subproblems such as characterization of marine biological and physical effects of waste materials, disposal site selection and efficient monitoring of impacts.

The attached map shows an area where population and technological development will likely create the greatest pressures for ocean disposal of waste materials.

COMMERCIAL SIGNIFICANCE:

Historically, coastal areas tend to develop more rapidly than inland areas. Future development, coupled with restrictions on available energy sources and land disposal sites, will likely make land-based waste material disposal systems unusually costly and/or environmentally less desirable. A solid base of oceanographic information will help determine where industrial wastes can be disposed of in the best interests of society.



THE OCEAN'S ASSIMILATIVE CAPACITY FOR WASTE MATERIALS

A. HOOPER

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #8)

Title: Need for Increased Weather Data Observations in the Atlantic Offshore Area

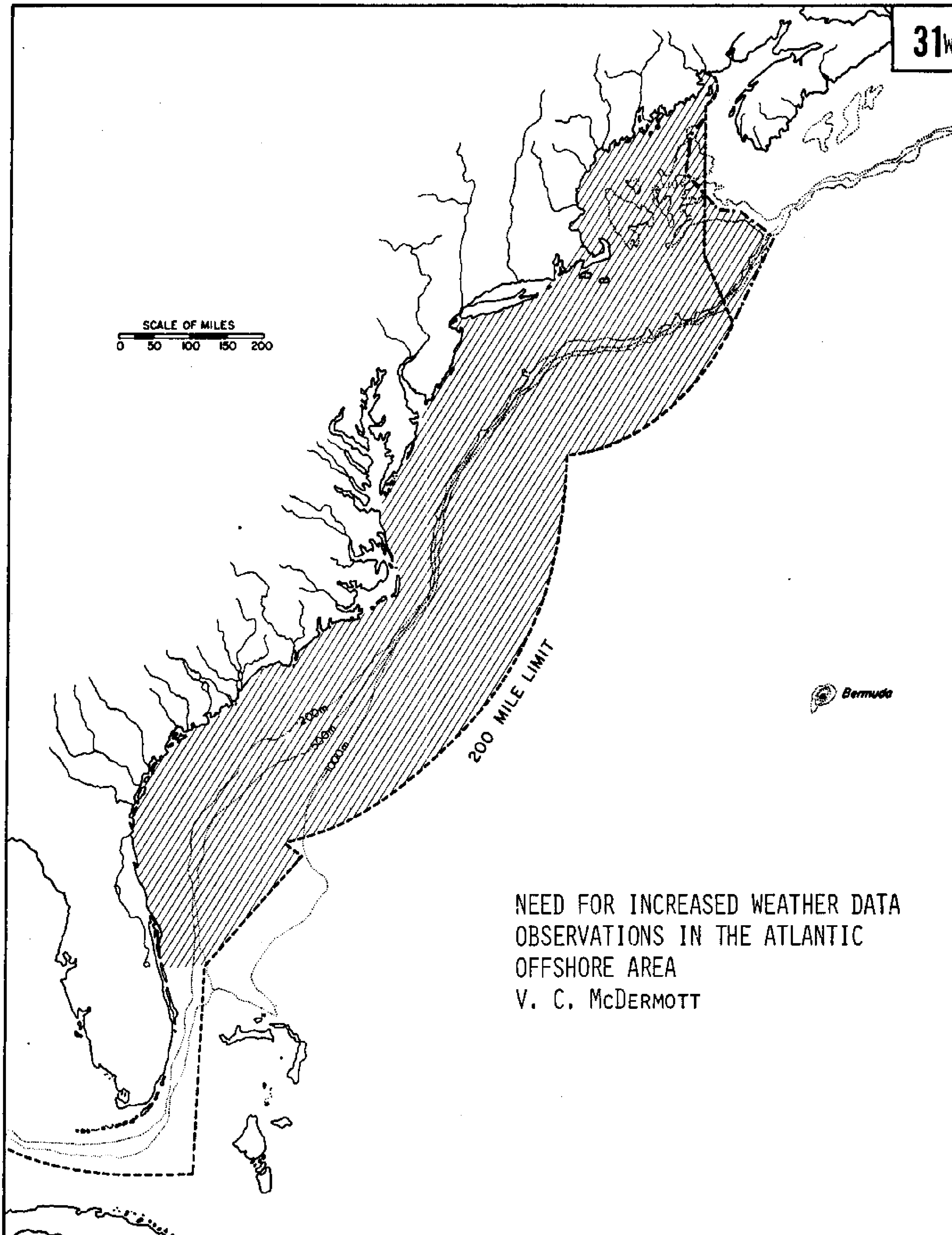
Proposed by: V. C. McDermott, Allen Weather Corporation

PROBLEM DESCRIPTION:

Activities of all types are expected to increase in the Atlantic Offshore Area. These activities are greatly influenced by weather conditions. Accurate weather forecasts are vital. The accuracy of forecasts is greatly determined by the amount of the observed weather data available. An increase in observed weather data is essential for accurate forecasts.

COMMERCIAL SIGNIFICANCE:

Accurate weather forecasts for the Atlantic Offshore area can result in increased safety, more efficient operations, and reduced costs.



NEED FOR INCREASED WEATHER DATA OBSERVATIONS IN THE ATLANTIC OFFSHORE AREA
V. C. McDermott

38W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #3)

Title: Need for Long Term Data on Wind and Waves for Climate Prediction

Proposed by: U. S. Army Corps of Engineers, T. Saville, Jr.

PROBLEM DESCRIPTION:

Most engineering projects in coastal areas would benefit from an adequate knowledge of the local wind wave climate. Beach erosion, navigation and many coastal flooding problems cannot be adequately designed, constructed and operated without a substantive knowledge of the local wind wave climate.

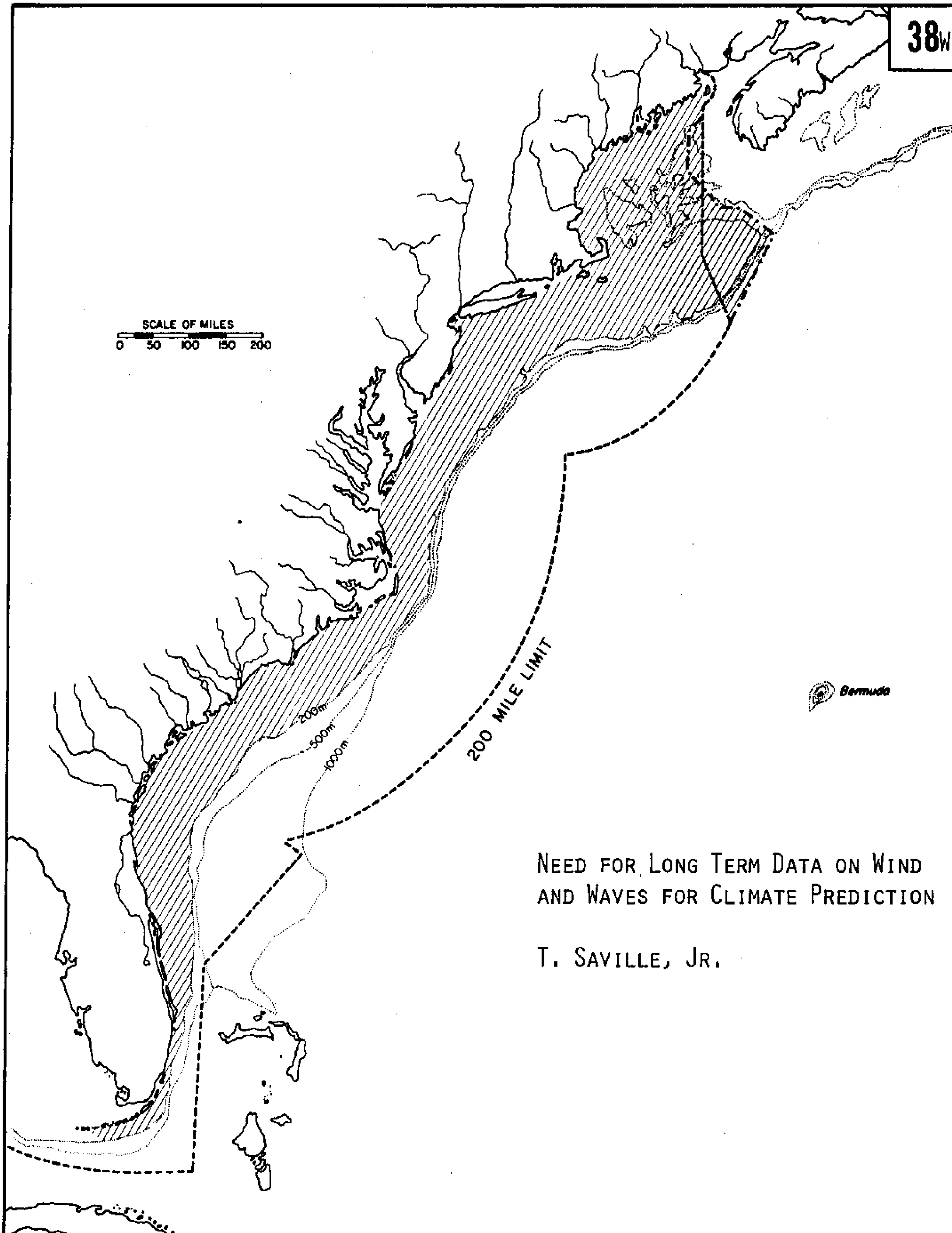
Wind wave data are available from several sources. The National Weather Service obtains, stores and disseminates data on wind wave heights, periods and directions provided by observers on ships. The Corps of Engineers has maintained gages in shallow water at many coastal points. In addition, the U.S. Navy makes deep ocean wave hindcasts at its Fleet Numerical Weather Central at Monterey, California.

However, all available data has inadequacies that makes it less than completely useful in coastal projects. The ship wave observations are spotty and inaccurate, the shallow water gage data does not include wave direction and coverage is inadequate and the Navy's data is of doubtful accuracy and the coastal points covered are 200 miles apart and usually more than 100 miles offshore.

Therefore, there is a need for an accurate offshore (at depths of 50 to 100 feet) wind wave climate at points 50 miles or less apart (alongcoast) which can be transformed to any desired shore point using existing numerical procedures. The resulting shore data could be used to design coastal structures (to insure stability, adequate elevation and proper function) and to assess the effects of coastal sediment transport on beach erosion and navigation projects.

These data are needed in statistical format for planning and design (as opposed to real time data required for ship routing and operational work, such as dredging or construction). Lacking from most statistical accumulations are duration values - of lows as well as highs. For planning of most operations at sea, it is at least as important to know the expected duration of low waves during which operations can be carried out, as it is to know the highest waves on which major damage can occur.

COMMERCIAL SIGNIFICANCE:



NEED FOR LONG TERM DATA ON WIND AND WAVES FOR CLIMATE PREDICTION

T. SAVILLE, JR.

40W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #1)

Title: To Develop Regional Management Plans for Disposal of Waste Materials

Proposed by: J. R. Schubel, Marine Sciences Research Center, State University of New York

PROBLEM DESCRIPTION:

To develop regional management plans for disposal of waste materials. The plans should include:

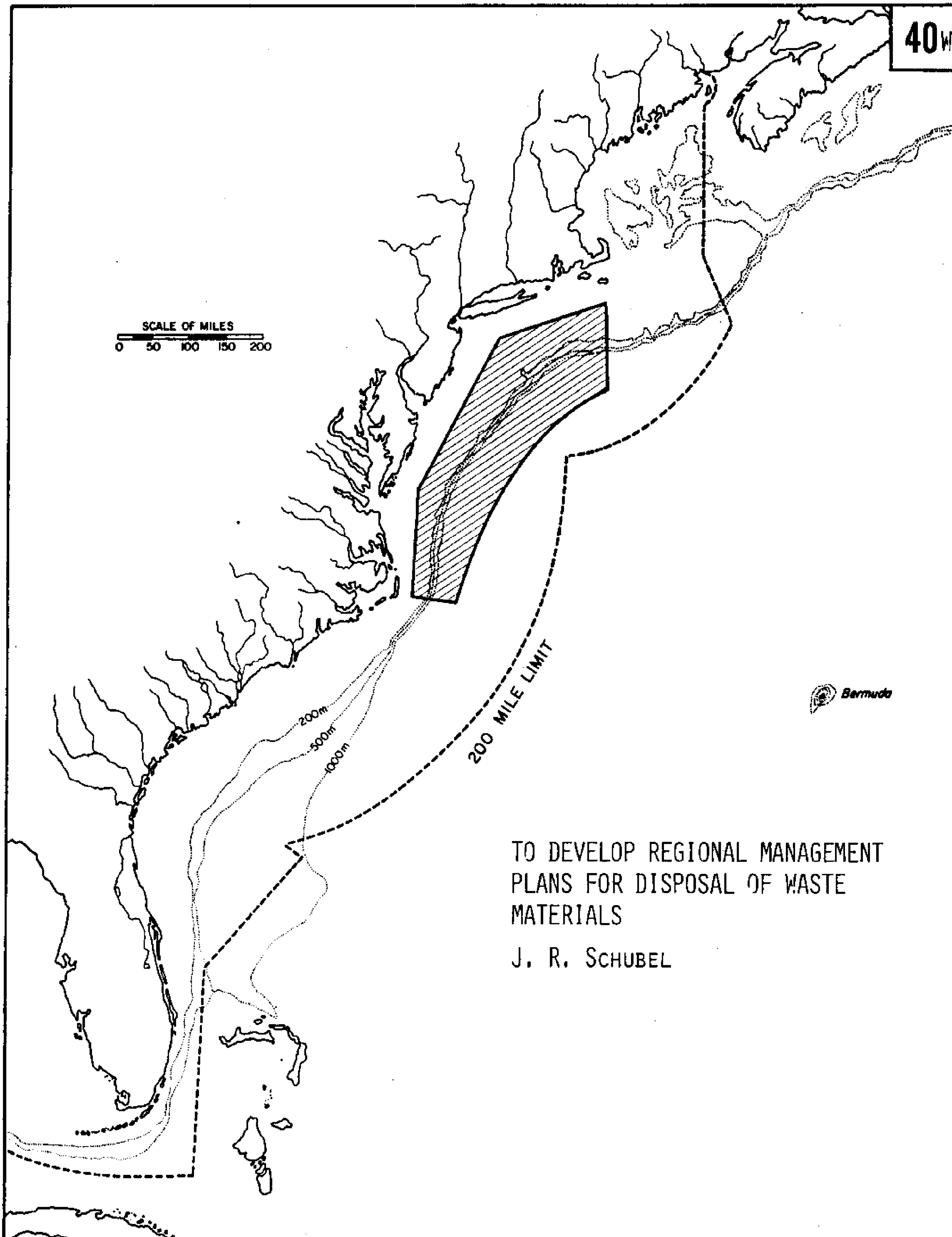
1. Designation and ranking of various areas for disposal of different "types" -- quantities and qualities of waste materials.

2. Recommendations as to time of year and methods of disposal to minimize any deleterious environmental impacts.

3. An assessment of possible creative uses of waste materials.

COMMERCIAL SIGNIFICANCE:

"Humongous"



TO DEVELOP REGIONAL MANAGEMENT PLANS FOR DISPOSAL OF WASTE MATERIALS

J. R. SCHUBEL

43W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

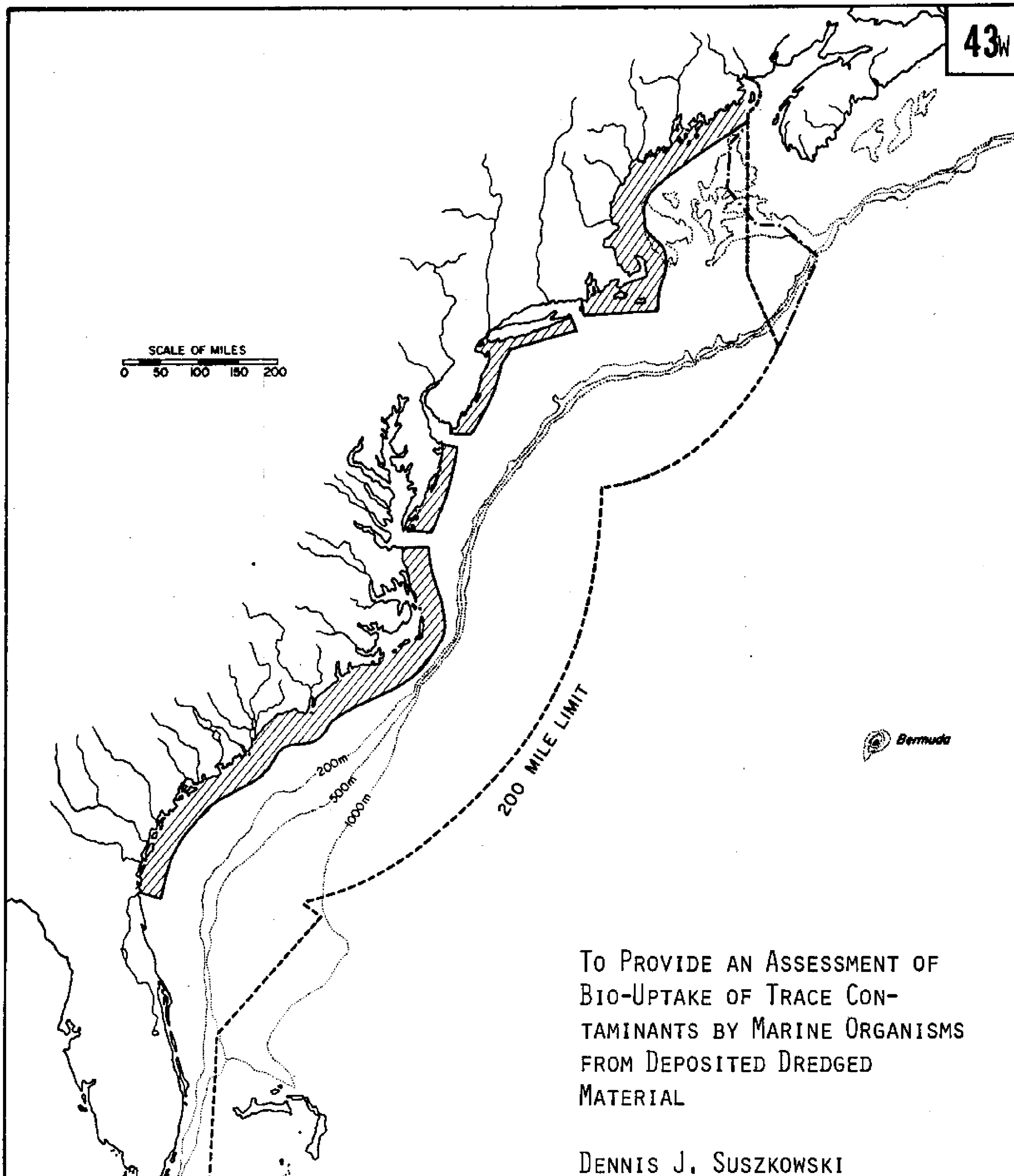
(incorporated into #1)

Title: To Provide an Assessment of Bio-Uptake of Trace Contaminants by Marine Organisms from Deposited Dredged Material

Proposed by: Dennis J. Suszkowski, New York District, Corps of Engineers

PROBLEM DESCRIPTION: Large quantities of dredged material are annually dumped into the Atlantic Ocean. Many of these sediments are dredged from urbanized harbors and estuaries where trace contaminants (i.e. trace metals, PCBs, etc) become associated with the bottom sediments. Several recent studies have shown that contaminants associated with dredged material are not readily released to the water column during open water disposal operations. Consequently these contaminants do not appear to be causing an immediate water quality problem. However, a potential exists for uptake of contaminants by bottom dwelling organisms which live on or use the dredged material disposal site for feeding purposes. The uptake may result in chronic effects and possibile mortality to the organisms. Also, the trace contaminants may migrate and concentrate up the food chain. The question becomes; how does one assess and quantify these potential impacts in an ocean environment?

COMMERCIAL SIGNIFICANCE: This problem is very significant in relationship to commercial harvests of shellfish and bottom dwelling fish. As a first priority it is essential to prevent a public health problem due to the consumption of contaminated organisms. PCB contaminated fish in the Hudson River is a case in point.



To Provide an Assessment of Bio-Uptake of Trace Contaminants by Marine Organisms from Deposited Dredged Material

Dennis J. Suszkowski

44 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #4)

Title: Systematic monitoring of environmental features of the Atlantic shelf to 200 miles, in relation to movements, spawning, and survival of fish.

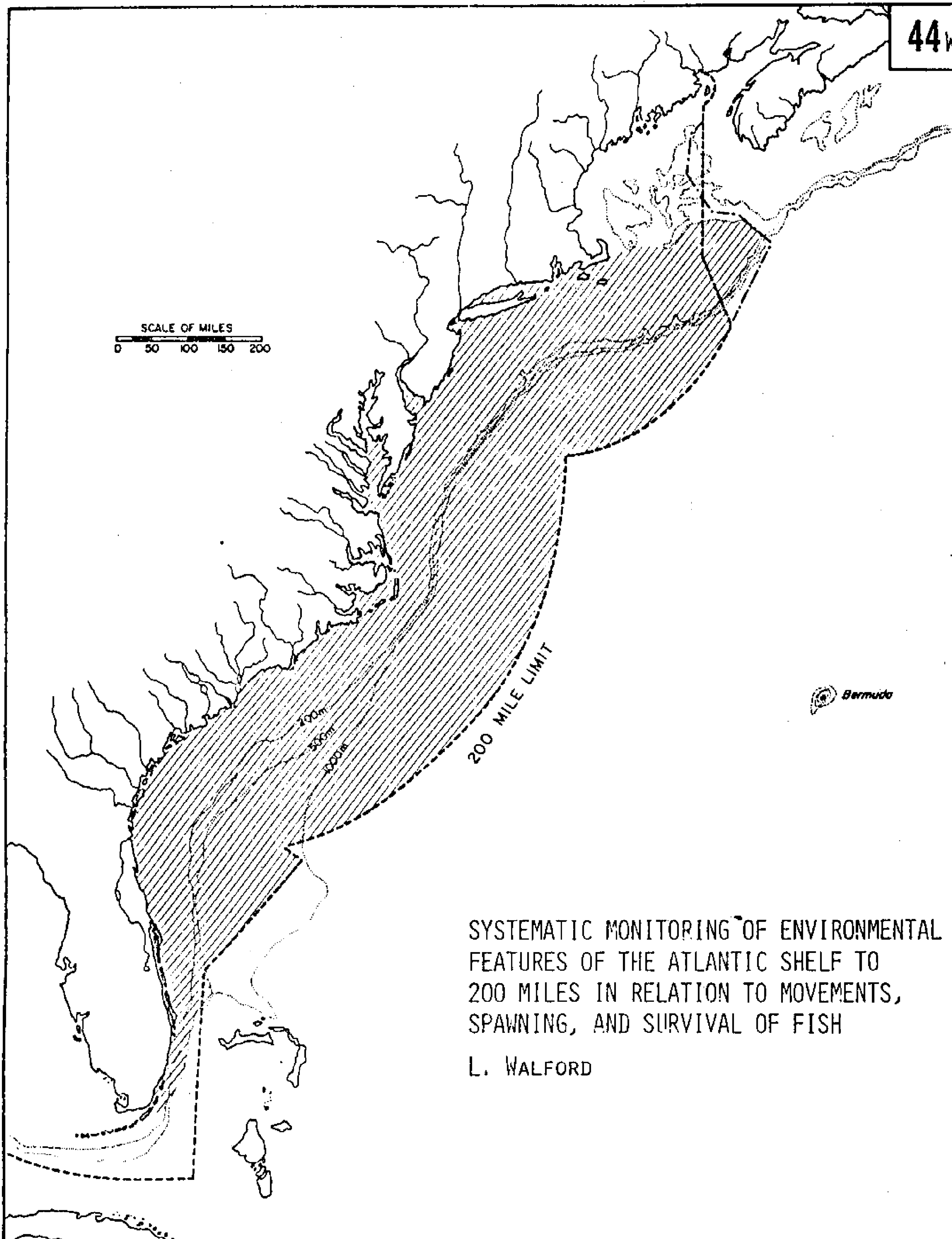
Proposed by: L. Walford, New Jersey Sciences Consortium

PROBLEM DESCRIPTION:

Migrations of fish species that extend along the Atlantic shelf vary in time and in course from one year to another. These vagaries of migrations as well as times and areas of spawning are evidently associated with temperature, salinity and other parameters of environment. Lack of complete coverage of the shelf frustrates all effort to establish such association & makes predictions which would be valuable to fishermen and fishery managers.

Nevertheless millions are spent annually by various government and private organizations, including academic institutions. These efforts taken altogether are spotty, conducted by different standards and different techniques and their results cannot be integrated into complete pictures of oceanographic parameters for reasonably brief periods of time such as a month. The Problem: How can all the oceanographic efforts be coordinated to provide usefully complete coverage for the Atlantic shelf?

COMMERCIAL SIGNIFICANCE:



SYSTEMATIC MONITORING OF ENVIRONMENTAL FEATURES OF THE ATLANTIC SHELF TO 200 MILES IN RELATION TO MOVEMENTS, SPAWNING, AND SURVIVAL OF FISH

L. WALFORD

45 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #2)

Title: More information is needed on the survival of human pathogenic microorganisms in the marine and estuarine environment

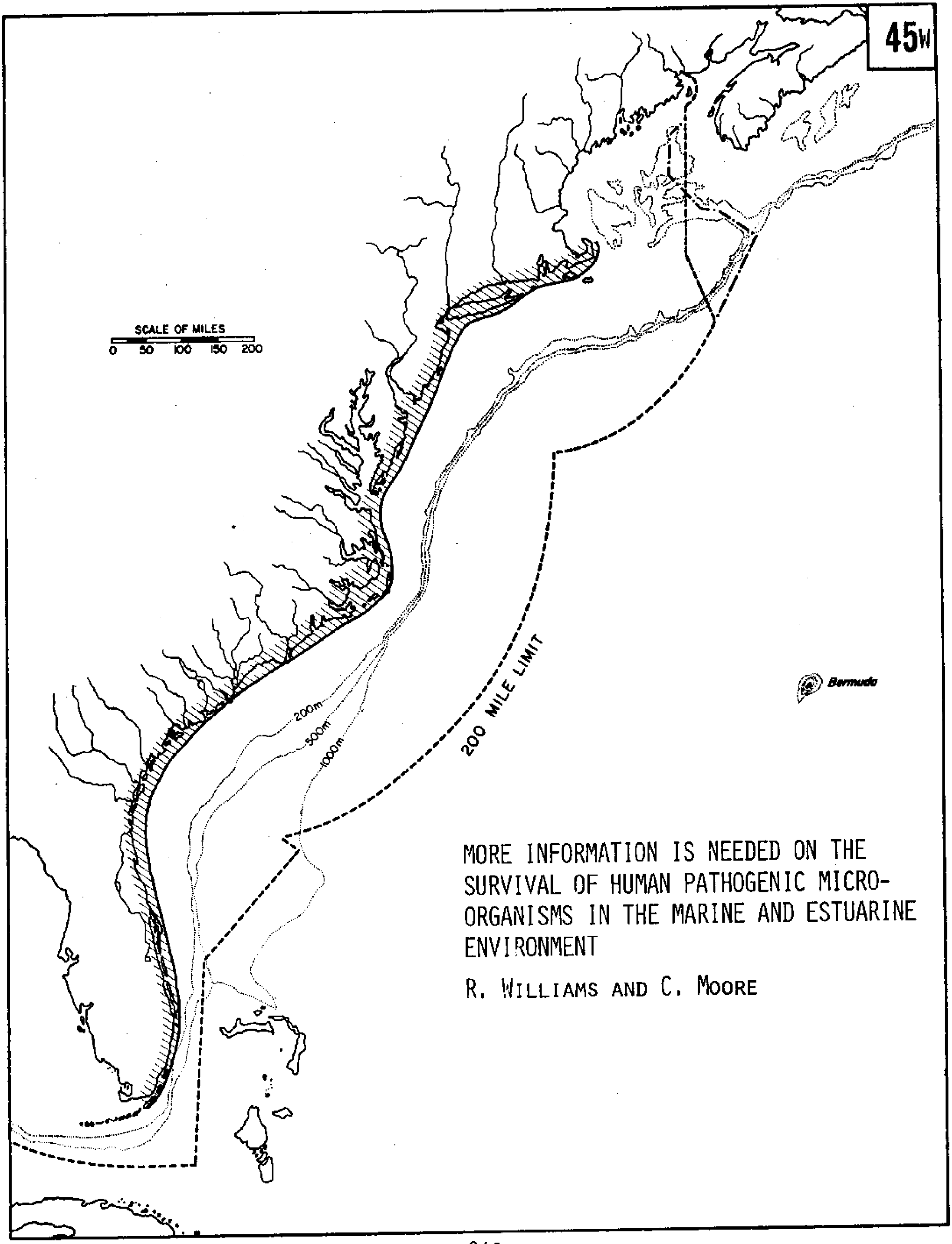
Proposed by: R. Williams and C. Moore (Senator Roth's staff) on behalf of EPA

PROBLEM DESCRIPTION:

Pathogens are inserted into the marine and estuarine environment through discharges from sewage treatment plants, the dumping of sewage sludge, outfalls, and urban runoff. Information on the survival and dispersion of these is inadequate to effectively manage water quality.

Problem concern! This type of problem causes a scare situation that affects the recreation industry; this is not to say we are to ignore the specific effects have on the total environment.

COMMERCIAL SIGNIFICANCE:



MORE INFORMATION IS NEEDED ON THE SURVIVAL OF HUMAN PATHOGENIC MICRO-ORGANISMS IN THE MARINE AND ESTUARINE ENVIRONMENT

R. WILLIAMS AND C. MOORE

46 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #1)

Title: To Determine the Effects, Alternatives, Solutions, and Cost/Benefit Ratios of Ocean Dumping

Proposed by: The Port Authority of New York & New Jersey
One World Trade Center, New York, New York 10048

PROBLEM DESCRIPTION:

The Federal Environmental Protection Agency has issued regulations pursuant to Title I of the Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532, (revised January 11, 1977) which ban ocean dumping in 1981, of polluted materials such as the spoil dredged from ship berths in the United States seaports.

There are six to ten million cubic yards of such material derived from maintenance and deepening dredging in the Port of New York-New Jersey each year. Little if any of this can conform to the E.P.A. pollution limitations. There is little if any possibility of disposing of this spoil as land fill, or other alternate means.

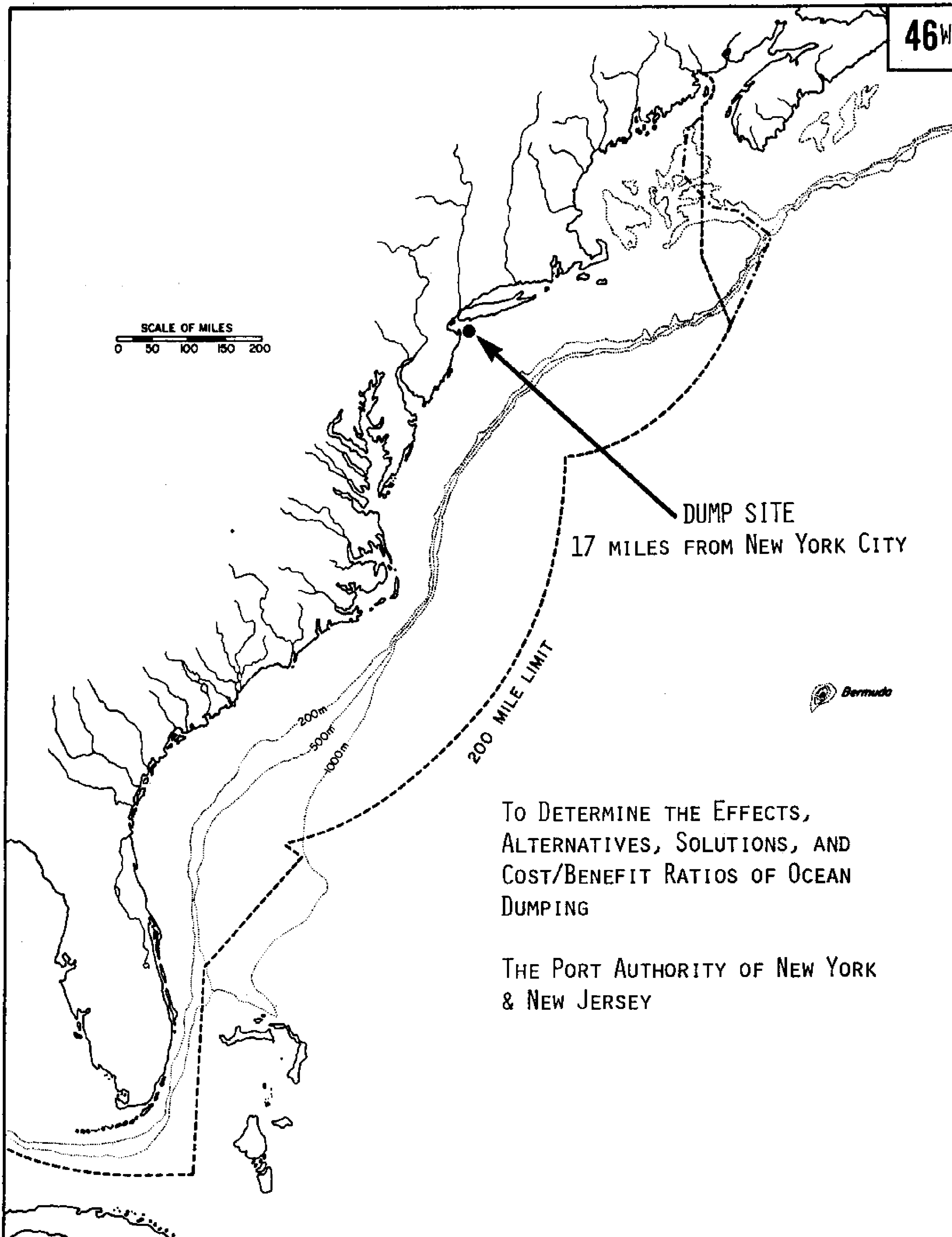
A solution to this dilemma will be required at an early date.

COMMERCIAL SIGNIFICANCE:

In the New York-New Jersey Port there are some of the nation's largest ship container handling facilities. Most of an estimated ten miles of berthing is deep-draft, for modern freighters, and deepening is continuing, to keep abreast of increasing draft requirements.

Well over 20,000 persons are employed in New York Port work, with an annual payroll exceeding 200 million dollars. Additionally, there are many general cargo piers and several passenger ship berths.

Disruption, delay or cessation of the operations of this port could prove to be an economic disaster.


46W
SCALE OF MILES
0 50 100 150 200
DUMP SITE
17 MILES FROM NEW YORK CITY
200 MILE LIMIT
200m
500m
1000m
Bermuda
TO DETERMINE THE EFFECTS, ALTERNATIVES, SOLUTIONS, AND COST/BENEFIT RATIOS OF OCEAN DUMPING
THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

47W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #4)

Title: A Continuous, Year-Round, Biological Baseline Survey of Key Locations Along the U.S. Atlantic Shelf to Provide a Reference Base for Pollution/Environmental Changes

Proposed by: E. E. Allmendinger & G. H. Savage
Engineering Design and Analysis Laboratory, University of New Hampshire

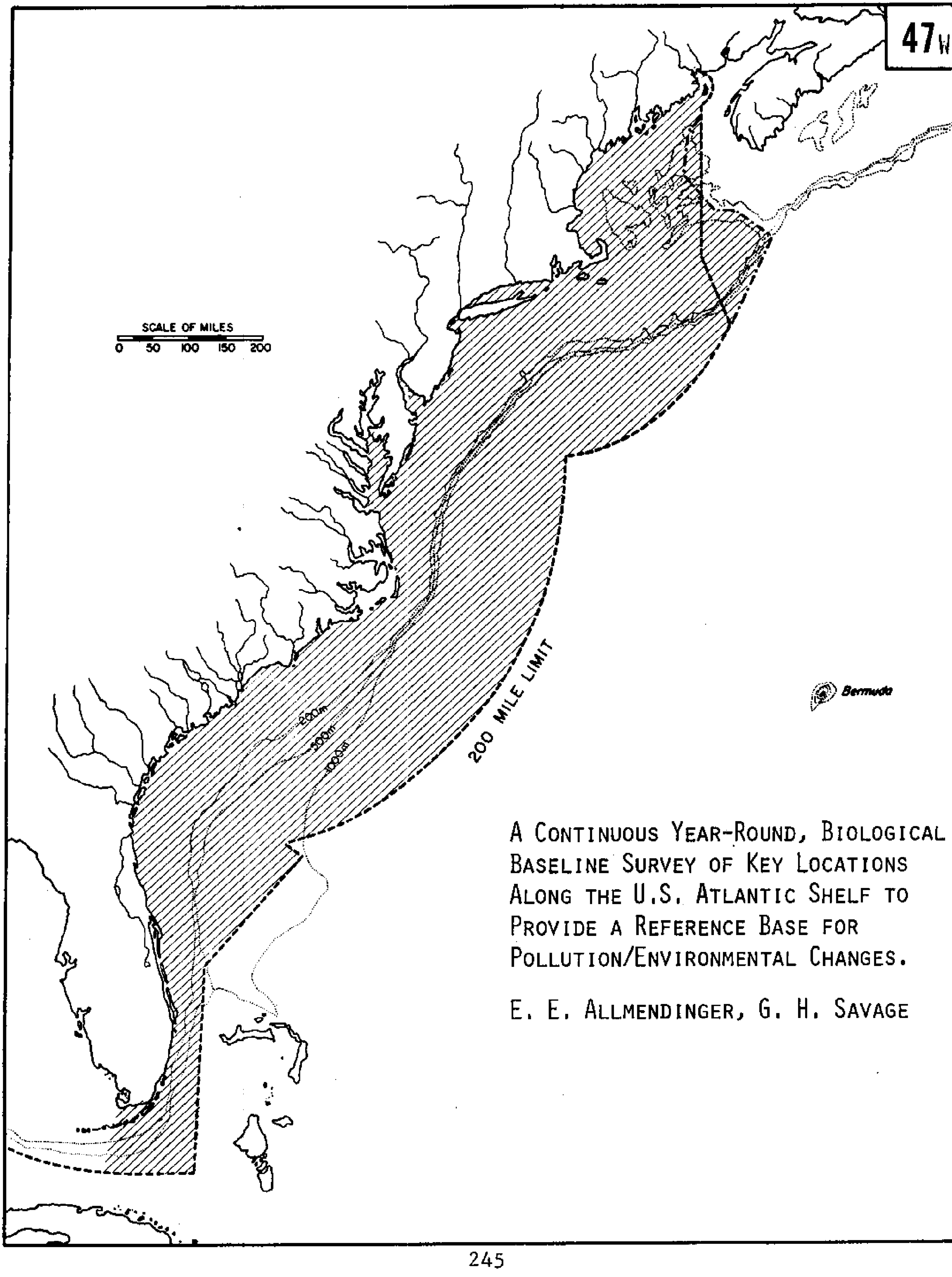
PROBLEM DESCRIPTION:

It is proposed that some agency of the government be given responsibility and the means for executing such a continuous base line survey which would be a similar charge as was given to the U. S. Geological Survey when it was formed, but this time for *biological* national interests. A *continuous* survey is made necessary because biological activity is dynamic rather than quasi-static as is the case with most geological phenomena. The need is to establish key biological areas along the entire shelf which would be periodically monitored by ship ~~and~~, remote instruments and manned underwater systems. These key locations would be used to determine any environmental changes caused by oil spills, dredge spoils, waste dumping, and so forth.

It is recognized that the PROJECT PULSE proposed for the New England shelf area has this objective. It is recommended that this activity be extended to include the entire Atlantic shelf of the U. S.; particularly the area between New York and North Carolina.

COMMERCIAL SIGNIFICANCE:

The introduction of factual criteria into disputes over liscensing or environmental damage will greatly improve the logic of decisions and public confidence and the responsibility of commercial operations; thereby reducing the financial risk of responsible offshore operations. More important, it will speed up decisions and solutions of such legal disputes which suffer from lack of decisive facts.



A CONTINUOUS YEAR-ROUND, BIOLOGICAL BASELINE SURVEY OF KEY LOCATIONS ALONG THE U.S. ATLANTIC SHELF TO PROVIDE A REFERENCE BASE FOR POLLUTION/ENVIRONMENTAL CHANGES.

E. E. ALLMENDINGER, G. H. SAVAGE

55 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #5)

Title: Prediction of waves and currents in the Atlantic Coastal Ocean

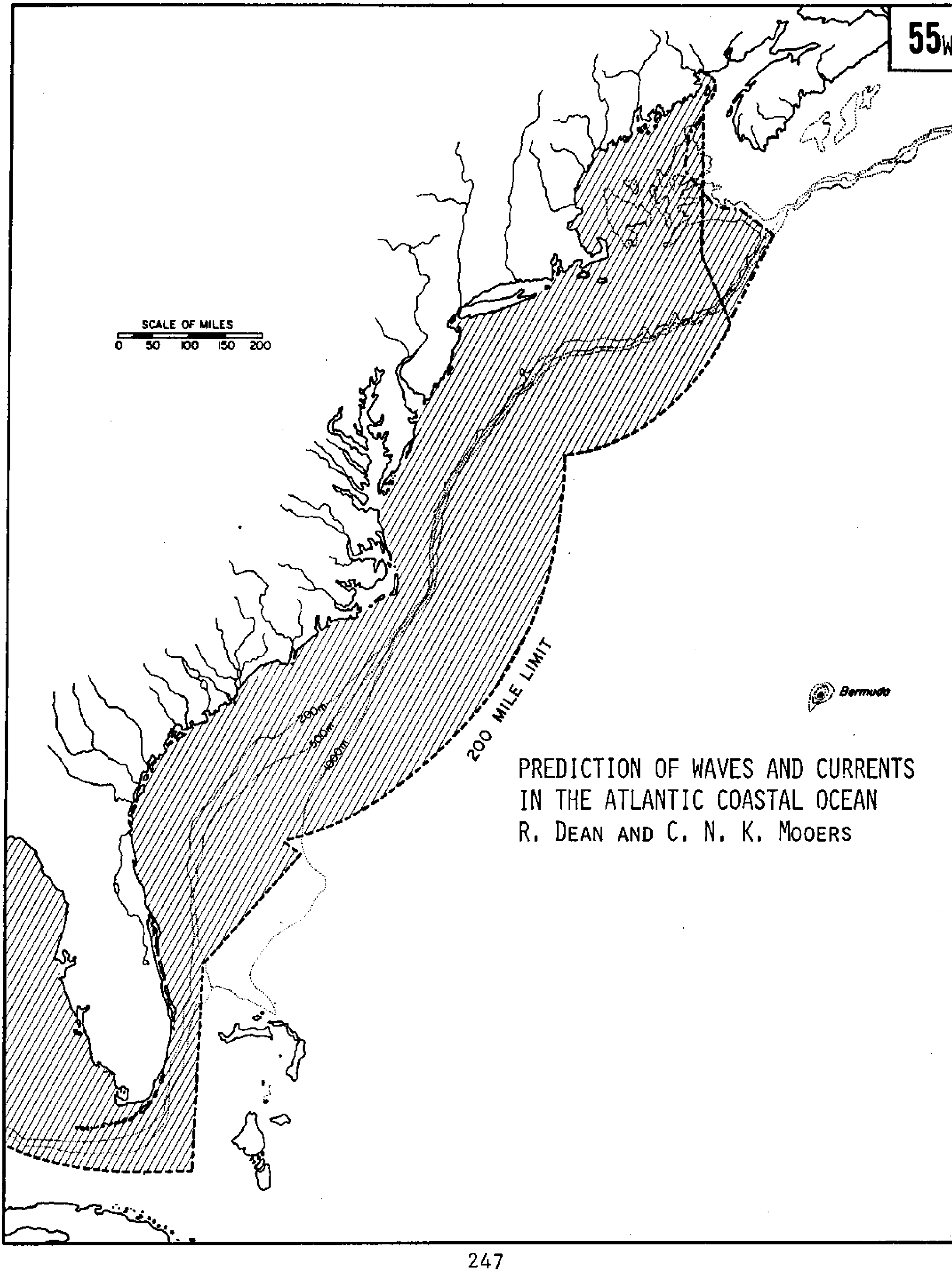
Proposed by: R. Dean and C. N. K. Mooers

PROBLEM DESCRIPTION:

The waves and currents in the Atlantic coastal ocean, from the shoreline to ca. 400 km offshore, need to be predicted and the information made available on a routine basis and in a useful form to commercial concerns and regulatory agencies. Here, prediction means hindcast as well as forecast, the former is always superior to the latter because it has more information input to it. Prediction may involve a combination of climatologies, real-time data, and numerical models. The waves and currents span the spectrum from gravity waves, to tides, to storm-driven currents, and through the seasonal flows. The driving forces include the winds and other atmospheric forces, river runoff, the tides, the Gulf Stream, and offshore oceanic eddies.

COMMERCIAL SIGNIFICANCE:

Problems of forces on structures, seabed stability, coastline erosion, sediment transport, the fate of pollutants, and the state of the marine coastal ecosystem all are strongly governed by waves and currents. Hence, both to exploit and protect natural resources, i.e., to manage, the waves and currents must be known for both diagnosis and prognosis of environmental disasters and commercial operations.



PREDICTION OF WAVES AND CURRENTS
IN THE ATLANTIC COASTAL OCEAN
R. DEAN AND C. N. K. MOOERS

58 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #4)

Title: Need for Long Term Biological Surveys in Selected Areas of the 200 Mile Zone (Qualitative and Quantitative)

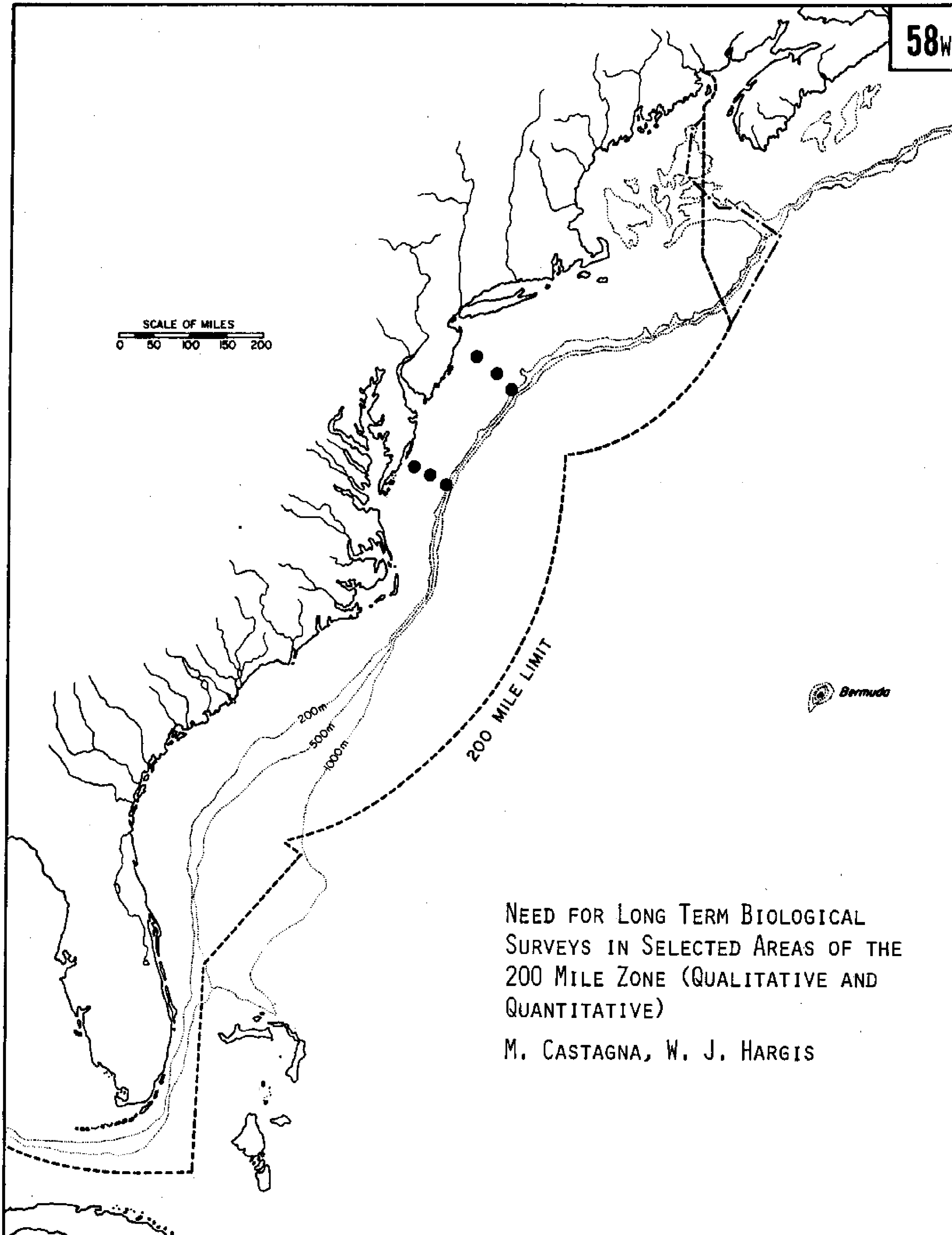
Proposed by: M. Castagna, W. J. Hargis

PROBLEM DESCRIPTION:

Biological sampling has been carried out in many areas of the 200 mile zone in response to specific problems or part of specific studies. Most of the sampling and pursuant studies have been of relatively short term. The lack of long term sampling often hinders evaluation of data secured from these studies. Long term sampling should be carried out in selected areas to assess the effects of man induced changes to the environment. Present studies such as impact studies carried out for the Bureau of Land Management off New Jersey would provide an excellent starting point in one area.

COMMERCIAL SIGNIFICANCE:

Studies such as environmental impact studies could be interpreted more intelligently and predicted more accurately if some long term reference studies were available.



NEED FOR LONG TERM BIOLOGICAL SURVEYS IN SELECTED AREAS OF THE 200 MILE ZONE (QUALITATIVE AND QUANTITATIVE)

M. CASTAGNA, W. J. HARGIS

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporate into #10)

Title: Effective Management of Salinity Variations in Inland Waters by Improved Prediction Techniques

Proposed by: E. H. Mann, J. van de Krecke and H. DeFerrori

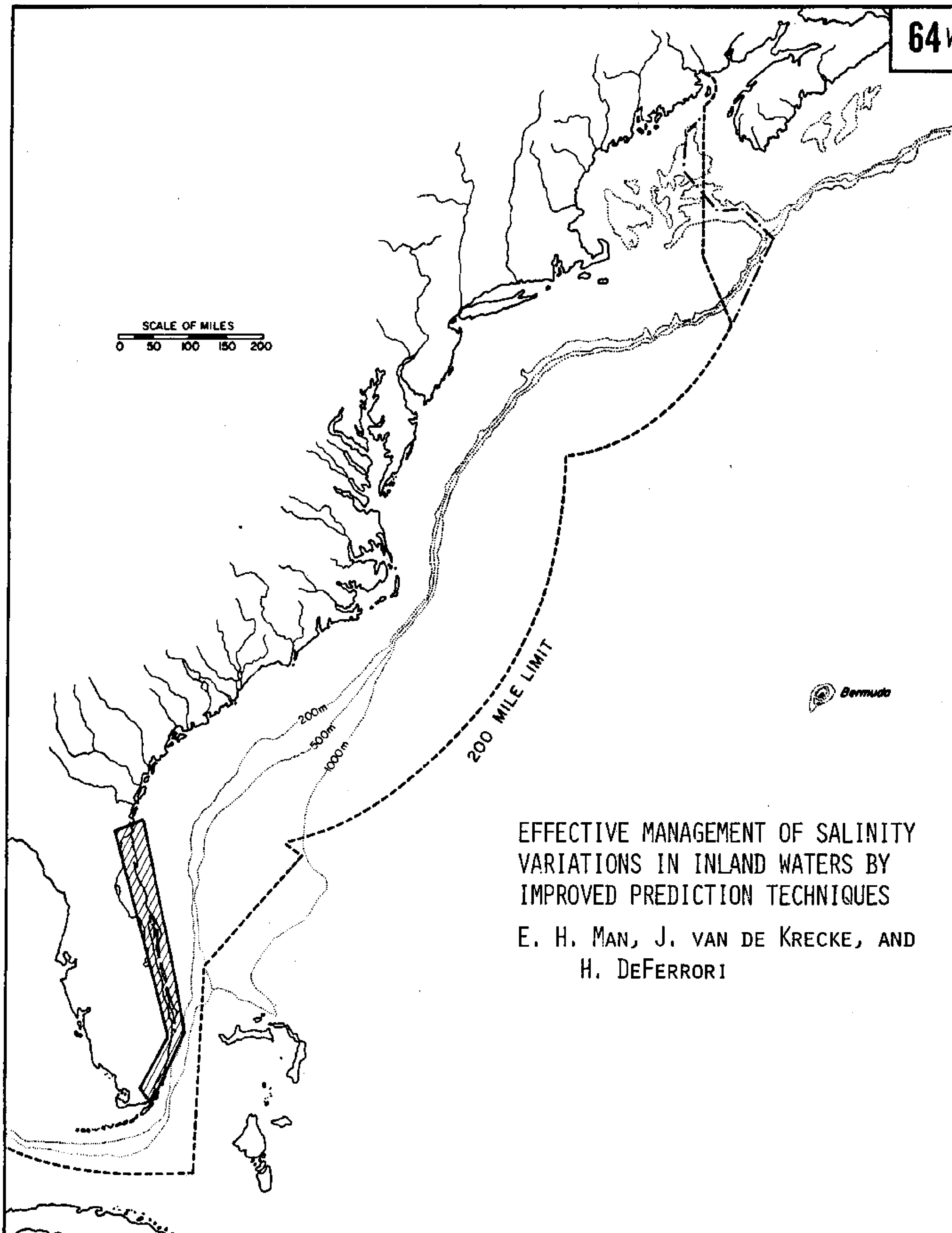
PROBLEM DESCRIPTION:

The estuaries which occur along the south Florida coast are fed by a combination of freshwater rivers and canals which have varying impact on the salinity in the estuaries. As demands grow to divert freshwater to areas for irrigation, groundwater replenishment, etc., less freshwater reaches the inland coastal waters.

The problem of effective management of freshwater supplies in the coastal zone requires a basic understanding of the changes in the lagoons in question resulting from decreases in freshwater inflow. The commonly used models to predict changes in salinity in estuaries are of a deterministic nature, i.e. the salt influx is simulated by a set of equations which are solved numerically. The values of the dispersive coefficients in the equations need to be determined by elaborate and expensive field experiments. An alternate procedure based on statistical methods could be more economical and hopefully lead to more reliable predictions.

COMMERCIAL SIGNIFICANCE:

State and local agencies, as well as commercial developers need to have the kind of information which the proposed study will provide, for effective water management.



EFFECTIVE MANAGEMENT OF SALINITY VARIATIONS IN INLAND WATERS BY IMPROVED PREDICTION TECHNIQUES

E. H. Man, J. van de Krecke, and H. DeFerrori

67 W

(incorporated into #23)

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

Title: Develop compatible relationships (environmental and operational) between permanent (present and projected) Atlantic offshore activities for industrial grouping of offshore uses.

Proposed by: S. B. Nelson, Office of the Oceanographer of the Navy

PROBLEM DESCRIPTION:

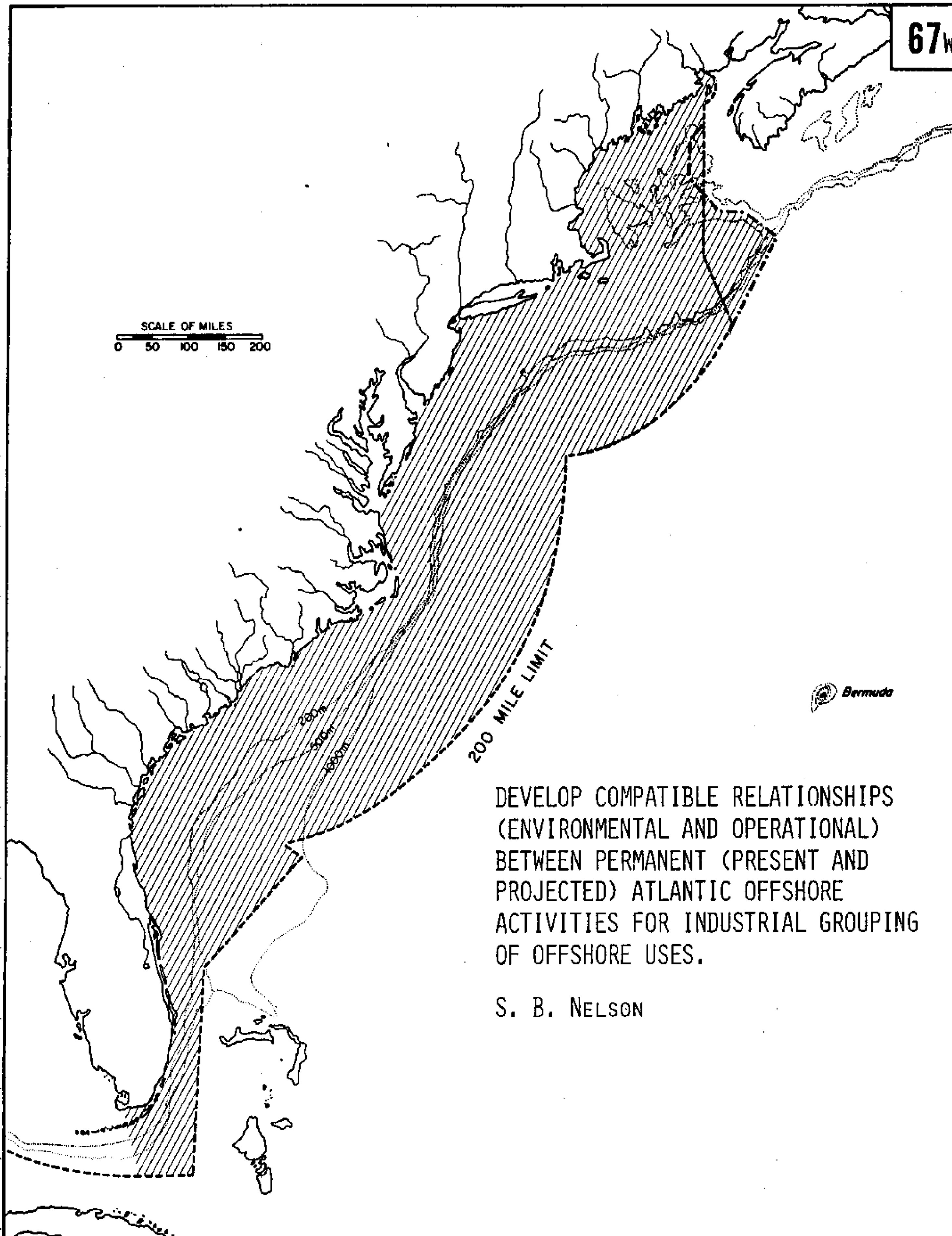
The Atlantic offshore area is subject to a host of on-going and projected permanent ocean activities. These include: waste material disposal, offshore drilling, ship traffic, fixed offshore structures, commercial fishing, floating nuclear power plants, offshore pipelines, submarine cables, artificial fishing reefs, aggregate exploitation, ocean energy systems, military ranges, etc.

Each activity can be characterized by a particular environmental and operational envelope. Recognizing that we are dealing with a finite areal space, attention should be given to identifying compatible ocean uses with the intent of grouping complementary activities.

Currently, commercial uses of the oceans are being evaluated on an individual basis whereas mutual benefits may accrue if the evaluation is expanded to include other compatible uses within a specific geographic area.

COMMERCIAL SIGNIFICANCE:

The grouping of compatible commercial ocean uses (equivalent to onshore industrial park zones) may enhance (1) the allocation of ocean space, (2) the efficiency of onshore support systems, and (3) the general management and conduct of offshore operation.



DEVELOP COMPATIBLE RELATIONSHIPS (ENVIRONMENTAL AND OPERATIONAL) BETWEEN PERMANENT (PRESENT AND PROJECTED) ATLANTIC OFFSHORE ACTIVITIES FOR INDUSTRIAL GROUPING OF OFFSHORE USES.

S. B. NELSON

73 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #31)

Title: Need for Better Methods to Maintain a Sand Supply to Recreational Beaches

Proposed by: Ralph F. Williams, Jr.

PROBLEM DESCRIPTION:

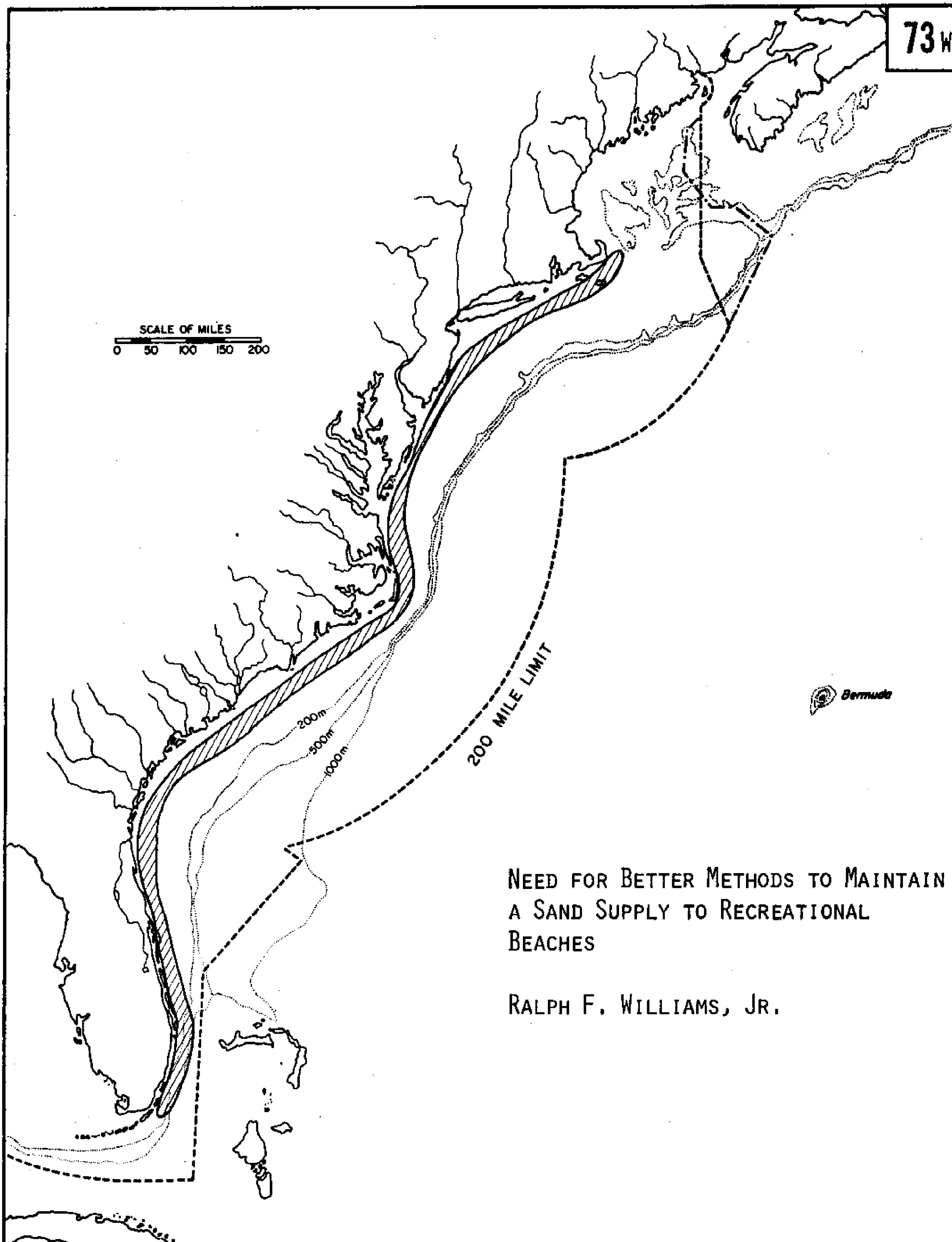
Based on scientific evidence, the Atlantic seaboard has been nibbling away at the real estate at a constant rate.

What can be done to prevent this problem? Many suggestions have been made One is to replenish the beaches with additional sand, and another is the construction of barriers such as seawalls, jetties, breakwaters, etc.

However, it appears certain that the problem rests with coastal planners, and they must take into account the long term geological effects of relative sea level change as well as short term effects of the erosion and the land mass buildings along our coastal areas.

COMMERCIAL SIGNIFICANCE:

This problem has generated many techniques to combat erosion, but with proper management and planning, we could reduce the cost and at the same time assure a recreational area that can produce revenue.



Need for Better Methods to Maintain a Sand Supply to Recreational Beaches

Ralph F. Williams, Jr.

81 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #41)

Title: Ecological significance of macrotopographic swales on the Atlantic continental shelf.

Proposed by: Donald F. Boesch, Virginia Institute of Marine Science, Gloucester Point, Virginia 23062 (Hargis)

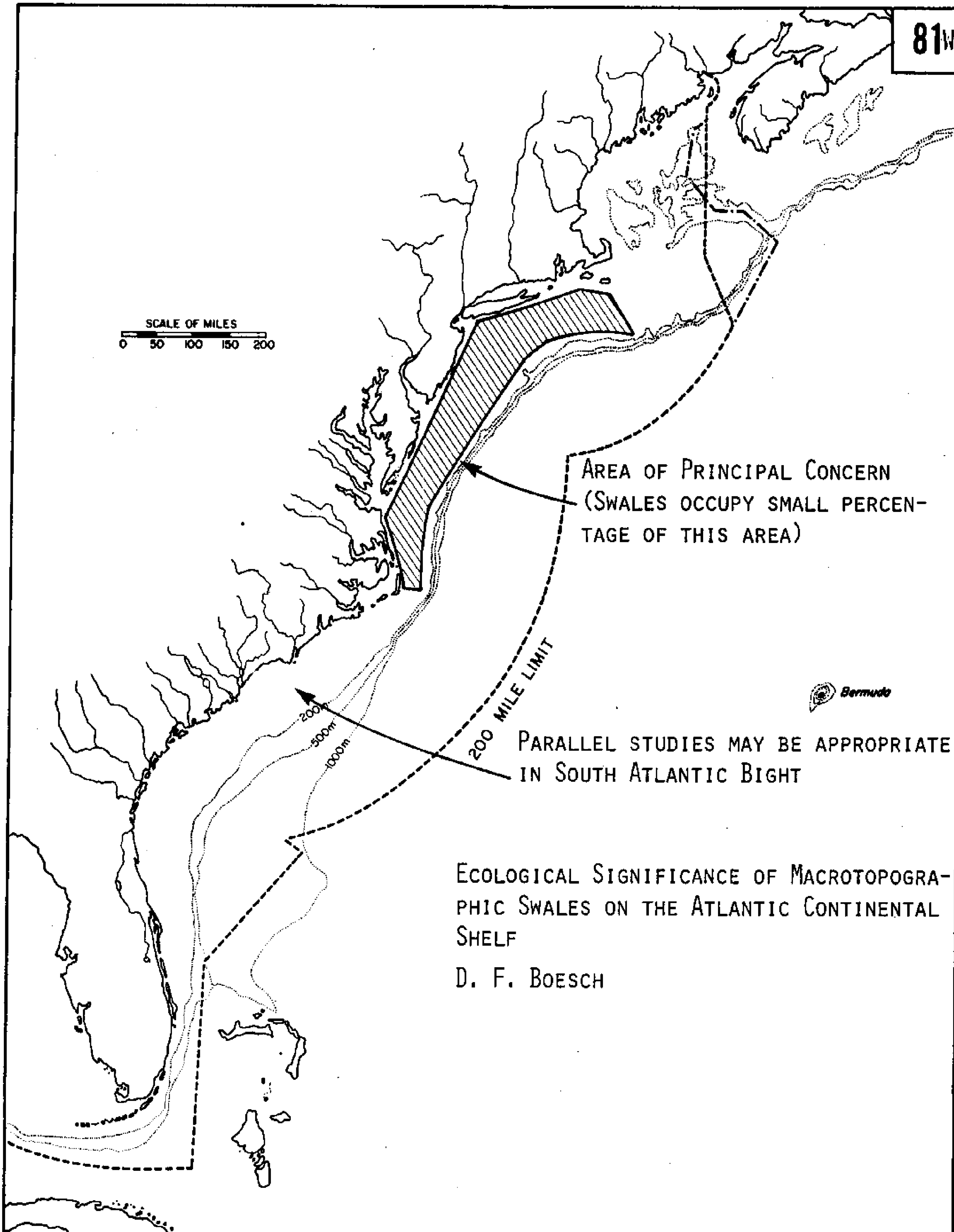
PROBLEM DESCRIPTION:

Ongoing survey work has demonstrated that topographic depressions related to the ridge and swale topography of the Middle Atlantic shelf are habitats of inordinate biological significance. These environments are rather large (order of magnitude 10-100 km^2), well defined and persistent features. Abundance, biomass and diversity of benthos are higher in swales than in surrounding areas. Also, utilization of swale habitats by motile species such as demersal fishes has been shown to be greater in terms of distribution and foraging. Swales are also the most likely locations for deposition of pollutants as they are the only sites on the shelf where there is appreciable deposition of fine sediments. A case in point is the "sludge blanket" sitting in a swale at the Philadelphia dump site. In short, swale environments are biological "hot spots" on the continental shelf where environmental impacts are most likely to conflict with resource protection.

Research is needed on basic biological processes important to productivity of swales. In particular, trophic transfers and cycling of materials (carbon, oxygen, nutrients, pollutants) need to be better understood. Coupled with this central ecological focus should be supporting physical, chemical and geological studies, for example on storm flow regime, sediment transport and chemical diagenesis. This might also include the ridge and swale development in ocean mining.

COMMERCIAL SIGNIFICANCE:

The building evidence circumstantially indicates that shelf swales are of inordinate significance to marine resources. Demersal fishes of commercial value selectively inhabit and feed in these environments. Many swales are the sites of dense beds of ocean quahog (*Arctica islandica*). At the same time, sedimentary processes suggest that swales may be impacted most directly by pollutants resulting from ocean dumping, oil and gas development and even estuarine discharge.



ECOLOGICAL SIGNIFICANCE OF MACROTOPOGRAPHIC SWALES ON THE ATLANTIC CONTINENTAL SHELF

D. F. BOESCH

84W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #45a)

Title: Methods of Pipeline Installation for Southeast Atlantic OCS

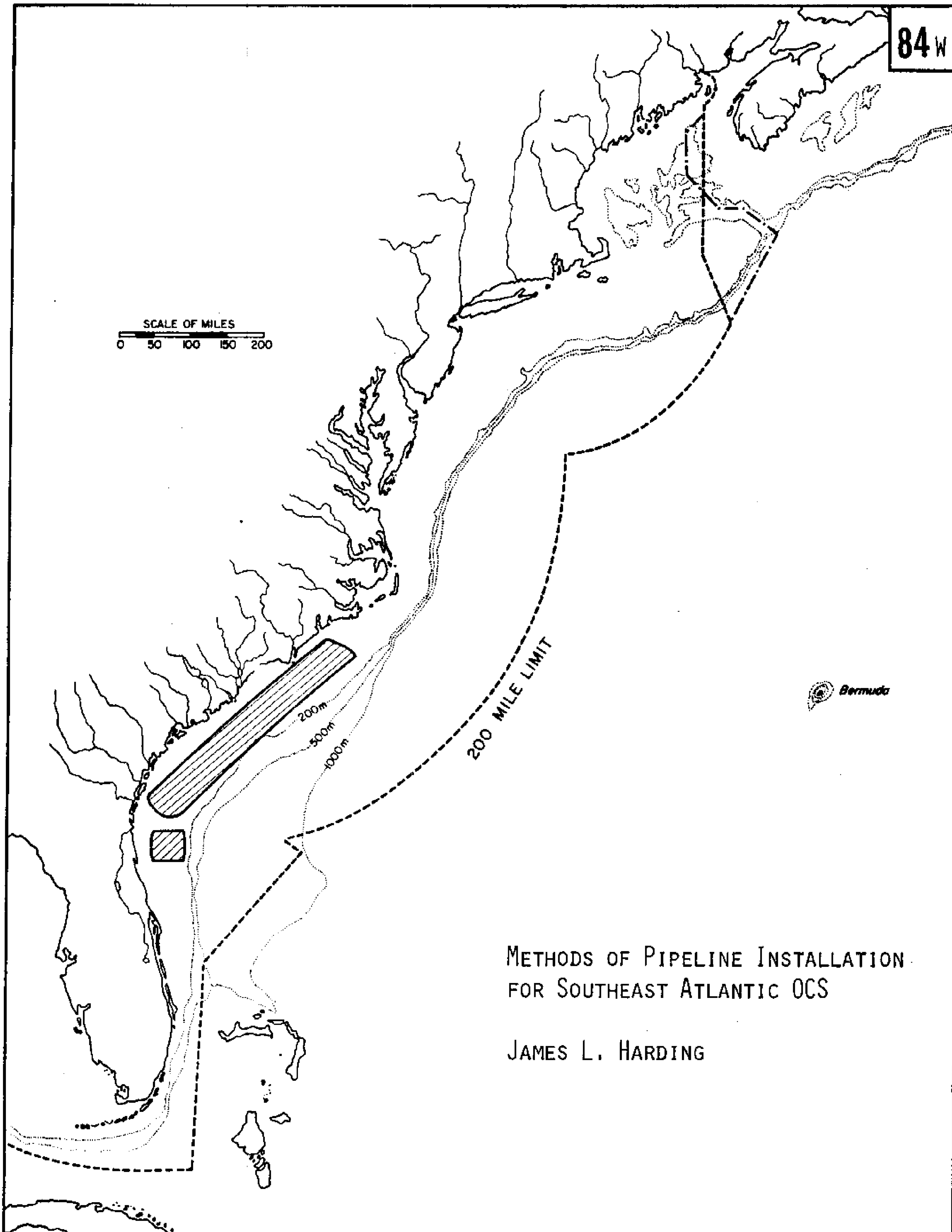
Proposed by: James L. Harding (Machemehl)

PROBLEM DESCRIPTION:

Oil and gas leasing of the Southeast Atlantic OCS is slated by the Bureau of Land Management, U. S. Department of Interior for the near future. One of the stipulations will doubtless call for the burial of all pipelines resulting from any production. Current practice is to bury all pipelines in water depths of 200 feet or less. In the Gulf of Mexico, this is readily accomplished by jetting the trench along a pre-layed line. There, however, the sediments consist of sands, silts and clays of sufficient thickness to accomodate burial. On the SE Atlantic OCS, there are many areas where the sediment veneer is either very thin or non existent. Pipeline burial and/or anchoring techniques will have to be developed to insure the stability of the pipelines over hard and broken (rough topography) bottoms in water depths up to 200 feet.

COMMERCIAL SIGNIFICANCE:

Pipeline transport has proven to be the safest way to deliver pertoleum production to shore. The alternative is tanker transport, which may be environmentally unacceptable.



Methods of Pipeline Installation for Southeast Atlantic OCS

James L. Harding

87 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #1)

Title: Evaluation of Use of Deep, Dredged Holes as Near-In Disposal Sites for Waste

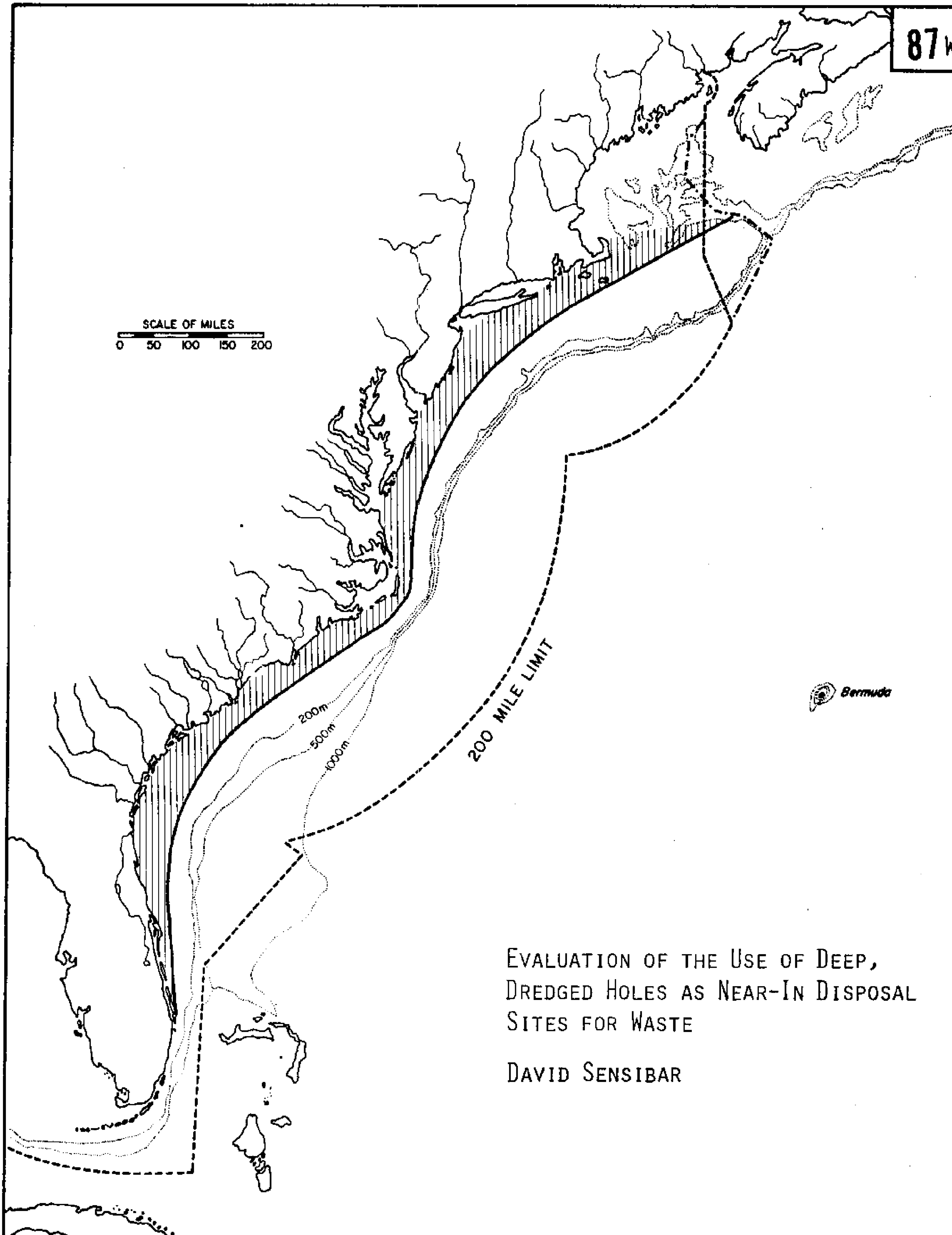
Proposed by: David Sensibar

PROBLEM DESCRIPTION:

Ocean dumping of various waste materials has led to environmental damage which might be limited by using existing or built for the purpose deep dredged depressions in the ocean bottom. This would concentrate waste in isolated locations and prevent its migration. Since only the interface between waste and water is thought to be active, total environmental damage might be decreased. This potential should be the subject of a properly monitored study.

COMMERCIAL SIGNIFICANCE:

The cost of ocean dumping relates directly to the distance from source to the dump. Annual savings in the millions of dollars could accrue if near-in dump sites are environmentally acceptable.



Evaluation of the Use of Deep, Dredged Holes as Near-In Disposal Sites for Waste

David Sensibar

90W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #3)

Title: Need for Valid Offshore Wave Regime Data

Proposed by: Harris B. Stewart, Jr., NOAA-AOML, Miami, Florida (Barker)

PROBLEM DESCRIPTION:

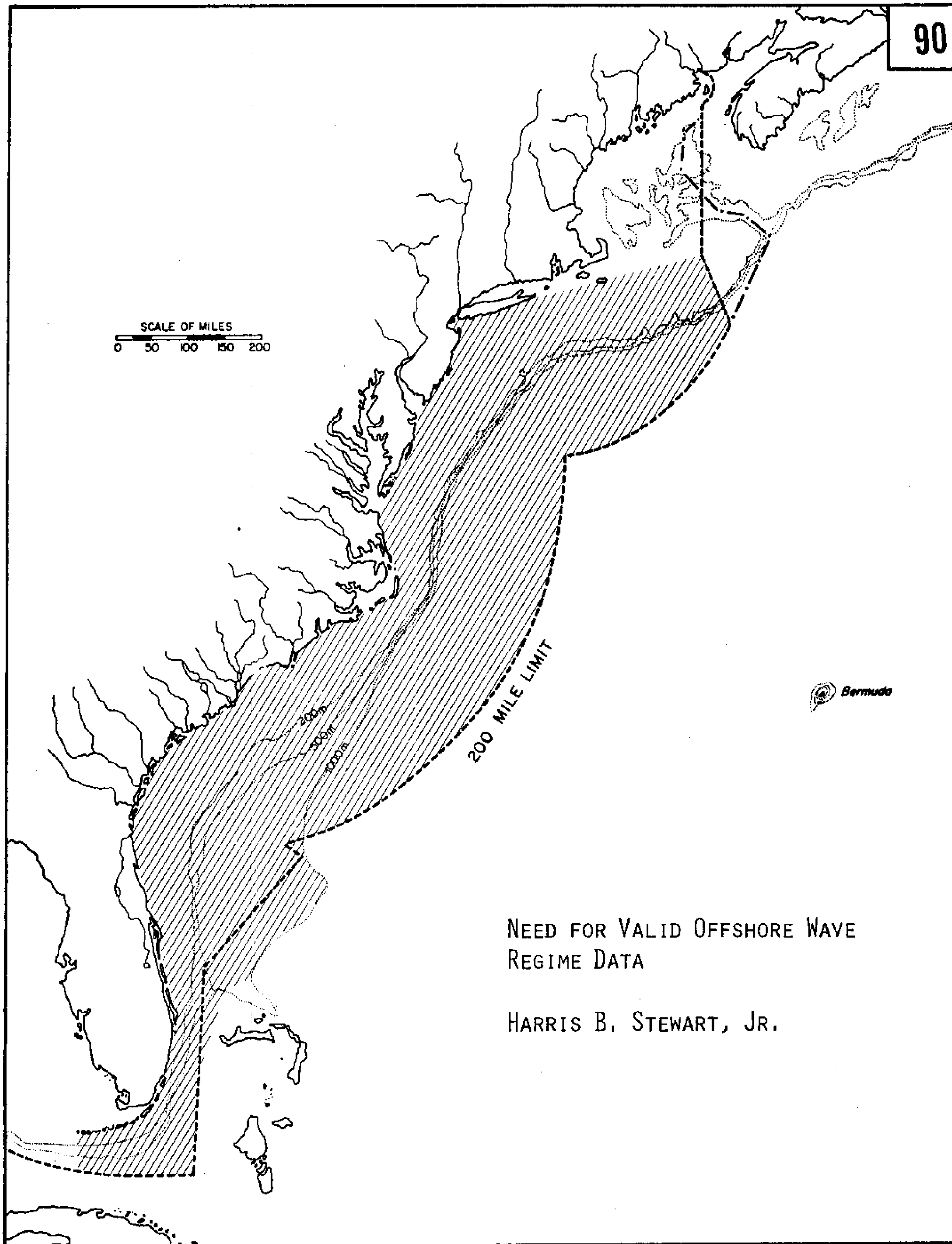
To date there is no valid wave climatology for the Atlantic coast. There are only scattered and sporadic wave measurements available to those who are concerned with wave-sensitive operations on the Atlantic continental shelf. The federal government should be - but is not - providing this service to the commercial community. The University of Virginia, NOAA, and others have made preliminary attacks on this problem, but there are still no reliable atlases of the wave climatology for the operators on the continental shelf.

A two-fold attack is needed. Firstly, there must be instituted a wave monitoring program along the Atlantic coast. Probably this should be a joint operation between the Corps of Engineers and NOAA. Secondly, the problem should be attacked from the hindcast point of view. NOAA (AOML) and CUNY have validated models for the waves in severe storms. Using these models, it is possible to hindcast the waves related to historically severe storms. There should be undertaken immediately a study of the waves associated with past storms utilizing these models so that we can for the first time have some feel for the wave climatology of the Atlantic coast.

COMMERCIAL SIGNIFICANCE:

Whether it is the design of offshore structures or the problems of beach erosion, it is essential that the planners and designers have a much better feel than is now possible for the waves that might have significant impact. The Maritime Administration has long believed that ships can be designed for specific routes as a function of the waves to be encountered along that route, yet they still have not been able to obtain the appropriate wave data. The commercial consequences of this particular study more than justify the relatively small cost.

90 W



NEED FOR VALID OFFSHORE WAVE REGIME DATA

HARRIS B. STEWART, JR.

92W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #9)

Title: Geologic Hazards in Potential Pipeline Corridors

Proposed by: Robert E. Sheridan, Coordinator, Marine Geology Program

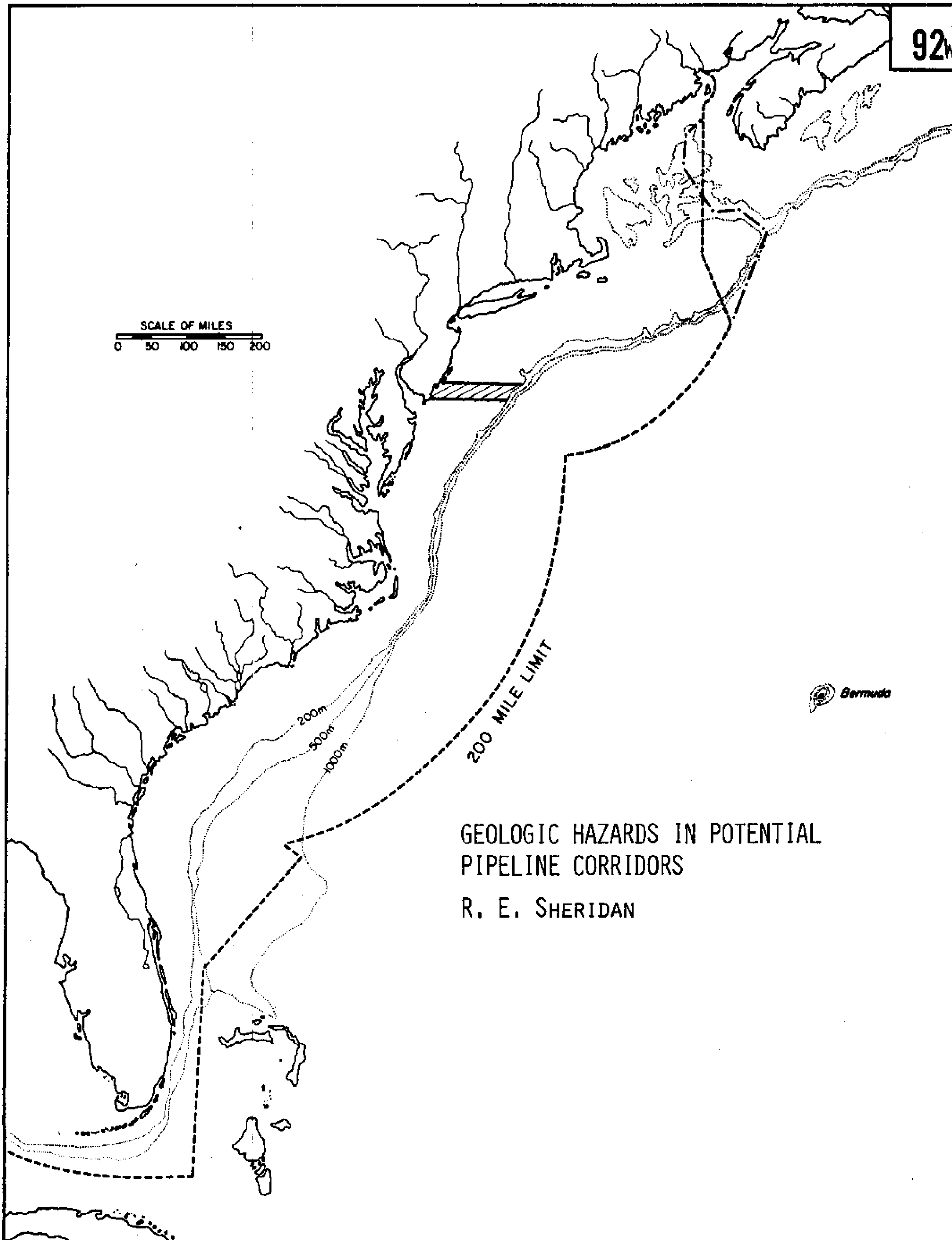
PROBLEM DESCRIPTION:

Over the past few years our geological exploration of the continental shelf has recovered sediments of various kinds. It is clear that there are lagoonal sediments, mostly clayey muds, under the inner shelf as well as farther out near the shelf break. These deposits formed during the last transgression of the sea across the shelf and were retained in patches where the ancient lagoons were deepest. These lagoonal muds contrast markedly with the coarse sands typical of the present shelf hydraulic regime. These lithologic contrasts control the engineering behavior of these markedly different sediments.

Pipeline excavation across the shelf will invariably encounter these very different kinds of sediments. The difference in compaction and settling of the pipe structure in the laterally varying sediments presents engineering hazards. Reconnaissance exploration in potential pipeline corridors is needed to assess these hazards.

COMMERCIAL SIGNIFICANCE:

Engineering techniques are available to obviate such geologic hazards, but the extent of the hazard must be anticipated to weigh these costs. Literally millions of dollars of potential costs are involved.



GEOLOGIC HAZARDS IN POTENTIAL PIPELINE CORRIDORS

R. E. SHERIDAN

100 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

(incorporated into #18)

Title: Data to Develop Stock Abundance for Shelf Fishery Management

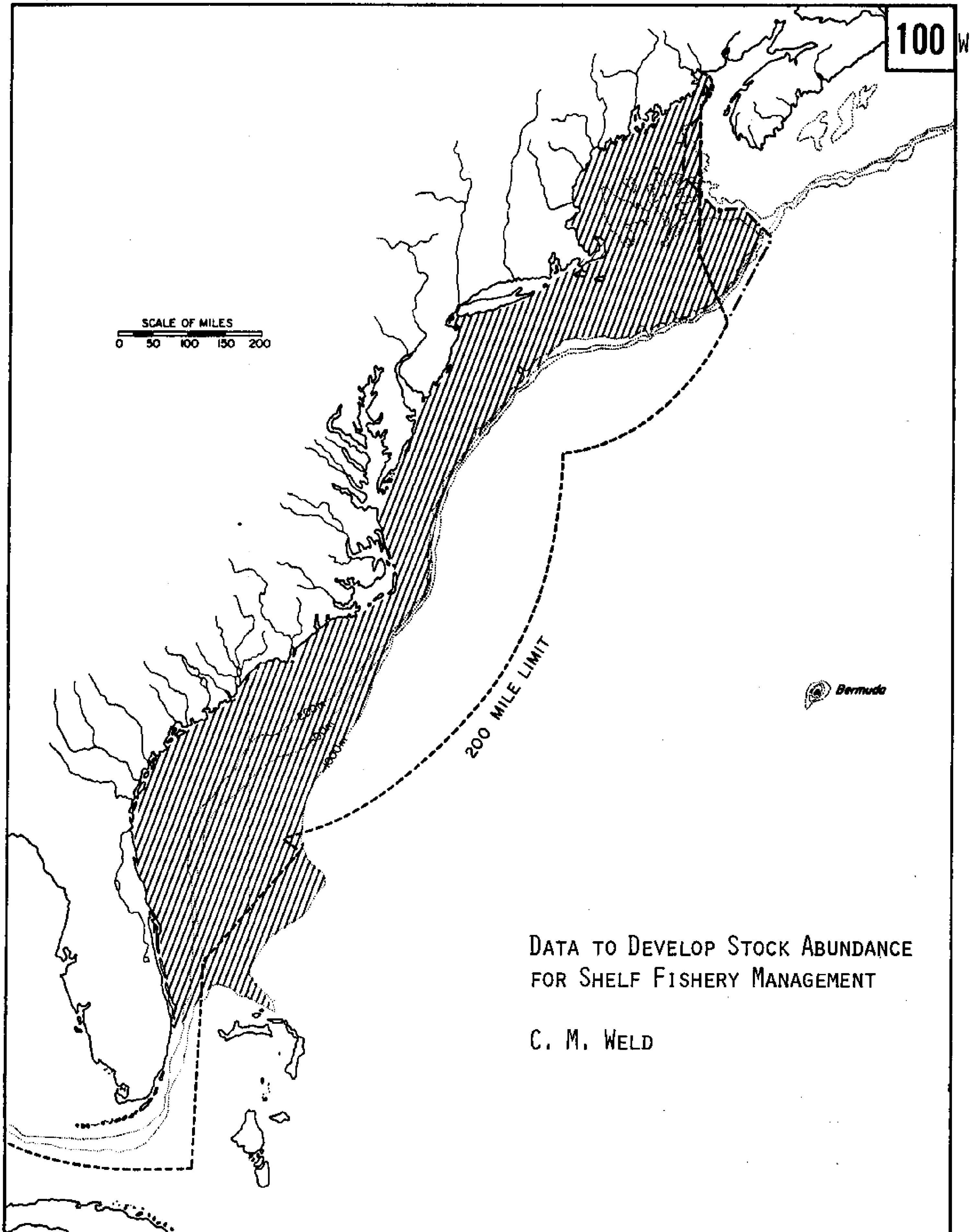
Proposed by: C. M. Weld, National Coalition for Marine Conservation, Inc.

PROBLEM DESCRIPTION:

One of the most critical problems facing recreational and commercial fishing today is the lack of data available for fishery management purposes concerning the abundance of stocks and the factors influencing stock abundance. Such factors obviously include the rate of catch (fishing mortality), but they also include environmental factors affecting spawning success (which are incompletely understood), impingement of specific pollutants on spawning success, habitat condition and interactions with other species at various trophic levels. Until we have a better grasp of the impact of these factors, fishery management will be largely guesswork.

COMMERCIAL SIGNIFICANCE:

Productivity of the fishery resource supports a domestic coastal commercial fishery employing 80,000 fishermen who landed a catch valued at more than $600 million dockside and several times that amount processed and a recreational fishery involving 30 million anglers, the aggregate economic impacts of whose activities is estimated to exceed $3 billion (without quantifying the value of the recreational catch which is estimated to equal the commercial catch in pounds).



Data to Develop Stock Abundance for Shelf Fishery Management

C. M. Weld

103 W

ATLANTIC OFFSHORE
OCEANOGRAPHIC OR OCEANOGRAPHIC ENGINEERING PROBLEM

W
(incorporated into #12)

Title: Develop methods for determining the threshold of sediment motion on the Continental Shelf

Proposed by: R. G. Dean, University of Delaware

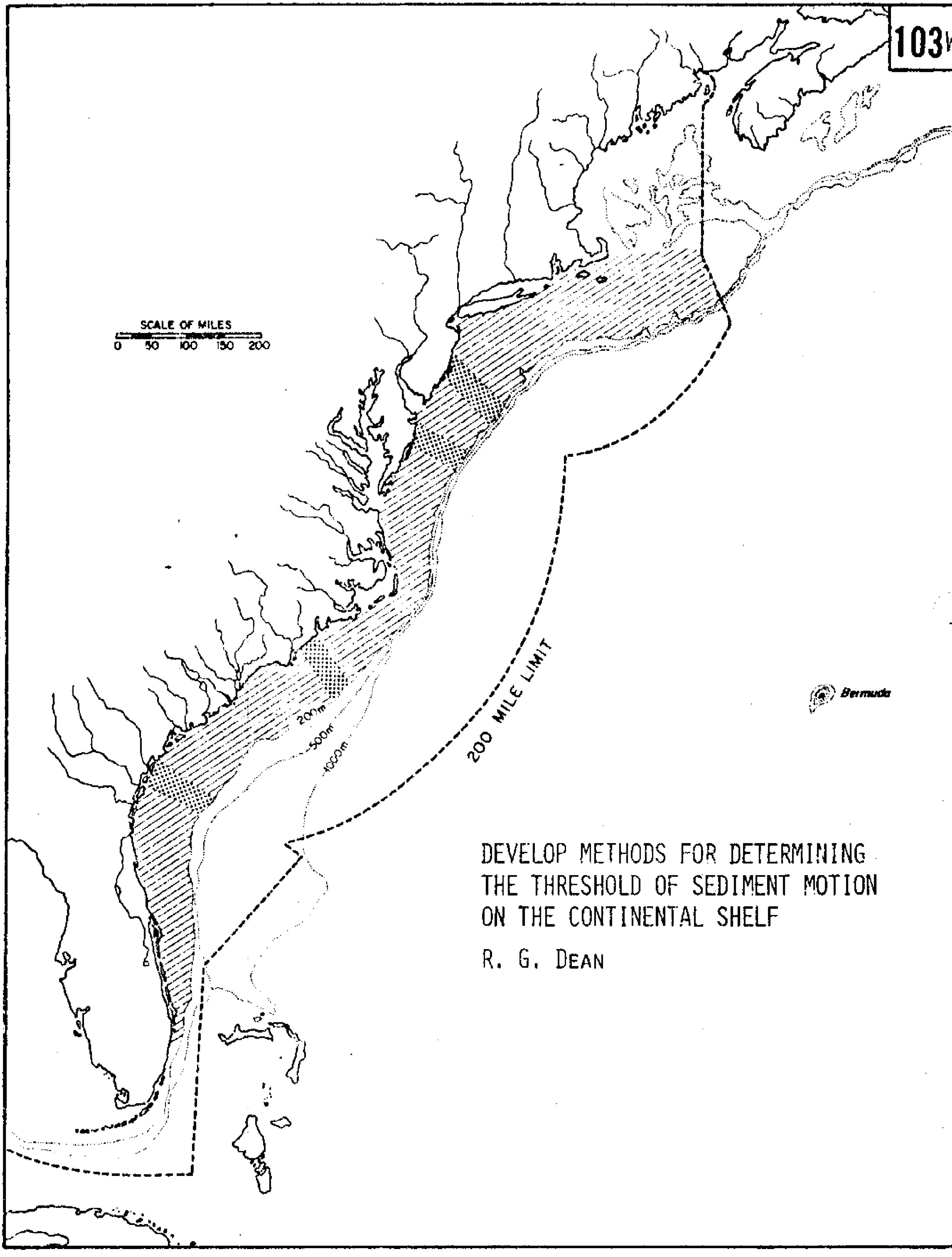
PROBLEM DESCRIPTION:

There are a number of engineering needs for improved information relating to the threshold of sediment motion on the continental shelf. First a common method for beach erosion mitigation is the placement of large quantities of material to advance the shorelines seaward. The cost effectiveness of this method depends on the seaward limit of redistribution of this material by the waves and currents. Secondly in the utilization of offshore sand and gravel resources, it is essential to know whether the borrow area depression will adversely affect stability of beaches or other adjacent areas. Finally the response of the bottom when perturbed by a structure depends on the threshold of motion of the material present.

One method of investigation would be to place and monitor "patches" of various sized material on the continental shelf and to monitor both wave and current velocities and motion of the material. The advantage of having material of various stability characteristics at one site is that the instrumentation needs would be less.

COMMERCIAL SIGNIFICANCE:

The effectiveness of beach nourishment could be evaluated more realistically including considerations of alternate sediment sizes. An improved basis for evaluating the effect of a borrow area would be provided. The ability to determine whether the wave and current conditions are significantly below or above the threshold level of sediment stability would be valuable in planning structure emplacement.



DEVELOP METHODS FOR DETERMINING THE THRESHOLD OF SEDIMENT MOTION ON THE CONTINENTAL SHELF

R. G. DEAN

APPENDIX 5

RAW SCORES OF RANKED PROBLEMS

RAW SCORES OF RANKED PROBLEMS

(1) Working Number of Problem*	(2) Total Points For Problems Ranked 1-15	(3) Total Participants Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (46-Nx16)	(5) Total Points (Col. 2 & 4)	(6) Rank**
1	92	9	592	684	38
3	67	9	592	659	27a
4	40	7	624	664	28
5	122	27	304	426	2
7	90	13	528	618	10
8	57	8	608	665	29
9	59	7	624	683	37
10	183	31	240	423	1
12	64	10	576	640	18
13	69	6	640	709	48
14	191	22	384	575	5
15	67	9	592	659	27b
16	85	11	560	645	21
17	88	11	560	648	22
18	59	6	640	699	43
19	140	26	320	460	4
20	0	0	736	736	65a
21	87	12	544	631	14
22	45	5	656	701	45a
24	36	3	688	724	58a
25	112	16	480	592	7
26	115	14	512	627	12
27	20	2	704	724	58b
28	155	27	304	459	3
29	159	19	432	591	6
30	66	8	608	674	33a
32	45	6	640	685	39a
33	100	12	544	644	20
34	136	15	496	632	15

* Indicates order of presentation at workshop
**Problems numbered "a, b, c" etc. indicate tie votes

(1) Working Number of Problem*	(2) Total Points For Problems Ranked 1-15	(3) Total Participants Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (46-Nx16)	(5) Total Points (Col. 2 & 4)	(6) Rank**
35	99	14	512	611	9
36	97	11	560	657	26
37	45	5	656	701	45b
39	47	6	640	687	40
41	95	10	576	671	32
42	70	11	560	630	13a
48	88	9	592	680	35
49	90	9	592	682	36
50	122	14	512	634	16
51	12	2	704	716	53a
52	52	6	640	692	41
53	81	11	560	641	19
54	32	3	688	720	55
56	45	6	640	685	39b
57	73	7	624	697	42
59	48	5	656	704	46
60	98	10	576	674	33b
61	68	6	640	708	47a
62	62	9	592	654	24
63	14	2	704	718	54
65	11	2	704	715	52a
66	70	11	560	630	13b
68	13	1	720	733	64
69	22	2	704	726	59
70	76	7	624	700	44
71	27	3	688	715	52b
72	91	10	576	667	30
74	77	9	592	669	31
75	12	1	720	732	63
76	69	8	608	677	34

* Indicates order of presentation at workshop
** Problems numbered "a, b, c" etc. indicate tie votes

(1) Working Number of Problem*	(2) Total Points For Problems Ranked 1-15	(3) Total Participants Ranking Problems in Top 15 (N)	(4) Total Points For Unranked Problems (46-Nx16)	(5) Total Points (Col. 2 & 4)	(6) Rank**
77	0	0	736	736	65b
78	71	6	640	711	50a
79	38	4	672	710	49
80	113	14	512	625	11
82	8	1	720	728	61a
83	0	0	736	736	65c
85	47	8	608	655	25
86	0	0	736	736	65d
88	60	9	592	652	23
89	164	19	432	596	8
91	23	3	688	711	50b
93	10	1	720	730	62
94	7	1	720	727	60a
95	36	4	672	708	47b
96	18	2	704	722	56
97	40	4	672	712	51
98	24	2	704	728	61b
99	45	5	656	701	45c
101	7	1	720	727	60b
102	28	3	688	716	53b
104	3	1	720	723	57
105	111	13	528	639	17

* Indicates order of presentation at workshop
** Problems numbered "a, b, c" etc. indicate tie votes

APPENDIX 6

STATEMENT BY

U.S. Senator William V. Roth, Jr.

STATEMENT BY
WILLIAM V. ROTH, JR., U.S.S.
UNIVERSITY OF DELAWARE
MAY 19, 1977

On behalf of not only myself, but each of the many other Senators and Congressmen who asked you to attend this workshop, I would like to express my appreciation.

Each of you is an expert. That is why we asked you here. You possess special knowledge, which we want you to share with each other and with us. One of the reasons you are here is because, whether the Nation as a whole recognizes it yet or not, the United States has established a new frontier. This frontier begins at the beaches and stretches outward for 200 miles, encompassing vast new assets. We have laid claim to enormous new wealth.

But this frontier is literally an uncharted sea. We know too little about it, its resources, and its vulnerabilities. Our ignorance is partially because the oceanographic effort of the United States has historically emphasized blue water research. We have probed and analyzed the deep ocean areas, often neglecting the near shore environment. As a result, we know more about the Sargasso Sea than the New York Bight.

Frankly, this concerns me and I think it concerns a large number of other Senators and Congressmen. The demands which the Nation will place on these ocean areas are only just beginning. So if we intend to protect this resource; if we intend to preserve for our children; and if we plan to take full advantage of it, the planning must start today. I hope the planning will start here.

I do not wish to tell you your business. You, after all, are the experts. But let me tell you what frightens me as a layman and an elected public official whose duty is to protect my State and her interests.

During the summer and fall of 1976, an anoxic condition appeared and persisted along the New Jersey coast. At its greatest extent, it was 40 miles wide and 100 miles long, extending from Long Island to Cape Henlopen. The area affected was roughly one and one-half times the size of my State of Delaware.

The extensive size of this area instilled in me what I can only inadequately describe as grave concern. This led me to press for a Washington conference of 50 university, state, and federal scientists, sponsored by the National Science Foundation. Some of you probably participated or at least know the results.

As you might expect, the anoxic condition inflicted heavy damage on the local surf clam industry. What was more frightening, however, was the inability of this group of fifty research scientists to adequately explain why the anoxic condition appeared. They knew that there was a relative dearth of storm activity, that there were unusually warm sea surface temperatures, and that there was a massive algal bloom in the area. But no single one of these factors or combination of them could be fixed as the causative agent.

Perhaps more disturbing still was the inability of the assembled group to say whether the anoxic condition was abnormal. It could, in fact, be a perfectly normal and natural phenomenon. But because there is insufficient baseline data, nobody could say for sure.

Surprisingly, there was relatively little publicity given to the anoxic condition. But a great deal more attention was fixed on two other recent incidents, one at Long Island, the other off Massachusetts. As many of you recall, in mid-summer last year tampon inserts and a variety of other debris washed ashore at Jones Beach, forcing it to close. And in mid-winter, the Argo Merchant went aground off Massachusetts, spilling 7.5 million gallons of oil.

We think that the rich fishing grounds and the recreational industry were saved by the lucky stroke of a strong and persistent offshore wind. But we cannot be sure, because at present we simply know too little about the effects of oil in the marine environment.

There are other anomolies:

-- Red tides which require shellfish to be removed from the marketplace in order to protect the public health.

-- Mass beachings of false killer whales in the Southeast, which may or may not be caused by massive parasite infestations.

-- Yearly variations in Atlantic menhaden landings of up to 100 million pounds.

To a layman like myself, these incidents are persuasive evidence that, first, we know too little about the near ocean areas and their dynamics; second, that the actions of one ocean user impact directly--and sometimes immediately--on the ocean and other users; and, third, that in some areas the ocean may have reached or exceeded its assimilative capacity.

No single ocean use is likely to impose an intolerable burden on either the ocean or coastal environment, but combinations may. But no priorities now exist for uses of the oceans. No structure, legal or administrative, exists for resolving conflicts among users or for performing research on the long range and cumulative impacts of expanded ocean use.

Environmental impact statements and public hearings which are required for most ocean licensing provide a forum for identifying some conflicts among ocean uses, but they seldom identify hard choices among limited ocean resources and ocean uses.

The Atlantic's ocean waters have been used for fishing, military operations, and commercial shipping since colonial days. More recently, the ocean has been used for recreation, dump sites, communication lines, and weather stations.

Several other ocean uses have been proposed, either for the near or distant future. One proposal would install wind- or wave-powered generators at sea to generate electrical power. Research and development is underway on methods of using the ocean for controlled development of biological resources as a method to generate increased food and energy supplies. Mining of the Outer Continental Shelf for sand, gravel, and minerals is an existing activity that could be expanded. Several proposals exist for creating artificial islands for heavy industries that, on land, are regarded as "bad neighbors."

Meanwhile, use of the ocean and its beaches for recreation continues to grow, as do marine research, archeological exploration, and salvage operations.

Many conflicts in ocean use are not confined to U.S. territorial waters. Commercial fishing, shipping, and mining, for example, are international activities that often involve U.S. waters. The International Law of the Sea Conference is addressing many marine problems, although its primary mission is to resolve conflicts among nations rather than conflicts among individual users. Some industry organizations and a few international organizations, such as the Intergovernmental Maritime Consultative Organization (IMCO), were created to solve problems between specific ocean activities and other uses that conflict with those activities. IMCO deals primarily with commercial shipping activities. However, no single international group is responsible for an overall view of the potential for future problems.

Even under current conditions, there are conflicts between various uses. As uses multiply, the conflicts will become increasingly severe. Consider, for example, the potential conflicts between a traditional use--merchant shipping--and a probable future use--offshore oil and gas.

The shipping lanes off Delaware and New Jersey are ocean versions of interstate highways that link Mid-Atlantic metropolitan areas. There are two major two-way traffic lanes into the Delaware Bay, second in the region only to New York Harbor in total cargo handled.

The ports on the Delaware River and New York Harbor together are probably the most heavily utilized in the United States. They handle over one-third of all imported and domestic oil carried by tankers. Nearly 3,000 major tankers enter and leave each port per year. Total major ship traffic into Delaware Bay is more than 5,000 ships per year and into New York Harbor more than 8,000 per year. Almost 150 steamship liners operate out of the Port of New York alone. Many of these ships are foreign flag and traffic problems will undoubtedly increase as other offshore users enter the region. These new offshore users may very well include exploratory and production rigs for oil and gas.

As many as 10 exploratory rigs and 50 production platforms may be working off the Mid-Atlantic coast at one time, along with vessels engaged in exploration, crew transport, supply, platform and pipeline construction. As many as 30 vessels-supply boats, tugs, and crew boats-could be operating in the Baltimore Canyong region by 1980 in direct support of exploration rigs. When and if Baltimore Canyon oil and gas is discovered and activities hit their peak, the number of operating support vessels could increase to over 200 and include construction barges, pipelaying barges, and other varieties of workboats. These uses and resulting traffic will conflict with shipping, fishing, research, recreation, and other surface uses not only offshore, but in the already limited coastal harbors. Oil could be tankered or pipelined to shore from Outer Continental Shelf production rigs.

Potentially, there are hundreds of other conflicts:

-- Between commercial fishermen harvesting Atlantic menhaden and the creational fishermen, seeking bluefish which live on the menhaden.

-- Between those who dredge for offshore minerals and commercial shellfishermen whose harvesting sites are disrupted or destroyed.

The list can continue indefinitely, as each of you knows very well. I will not belabor this, other than to make one final comment: there are some use conflicts which either have been or will be resolved by Congressional mandate. One of these, in my opinion, is ocean dumping of sewage sludge. The days in which sludge dumping continued indiscriminately are gone. Congress resolved this conflict because of widespread public opposition to a practice that many people found unhealthy or at the very least objectionable.

I suspect that some of you may disagree with Congressional involvement in that kind of decision-making. But Congressional involvement is just beginning. In the past few year, Congress has enacted ocean dumping legislation; imposed a 200-mile limit; and regulated the taking of tuna and porpoise. Within the next few years, the Congress is likely to impose liability requirements on oil tankships; regulate deep seabed mining; and drastically revise the offshore leasing procedures.

In short, the Congress is already embarked on a program of allocating resources and responsibility among competing uses. Frankly, I doubt that many Congressmen or Senators would characterize their decisions in such a lofty manner. Most of them are probably like myself: they are motivated by a desire to protect the interests of their State and their constituents. This interest on the part of individual Congressmen and Senators is not likely to diminish. On the contrary, I think the Congress will play an increasing role in reconciling conflicts by assigning preference to the more beneficial uses.

Indeed, this conference is a manifestation of Congress' growing concern. You were invited here by a wide variety of Senators and Congressmen from Atlantic coast States. Most of them, like myself, do not serve on the Committees which have direct jurisdiction over the oceans and marine matters. We invited you here because we are genuinely concerned with what is happening to the Atlantic ocean particularly the Continental Shelf. Speaking for myself, I believe my concern reflects that of my constituents. The people of Delaware--and I suspect every other State from Maine to Florida--are becoming aware of the changing nature of the ocean uses and the ocean itself.

In assessing these changes, however, we in the Congress and the public at large are handicapped by our lack of knowledge. As I mentioned earlier, much of the Nation's oceanographic research effort has been concentrated on blue water oceans, not the continental shelf. This is so even though the ocean areas close to share are more heavily used, more productive, and more vulnerable to damage. What the public and Congress need is information. That is why you are here.

You have been selected for this conference because you represent business, government, or science. Some of you--in fact most of you--represent a commercial interest. You live and work in, on, or around the ocean to make a living. Others of you represent a second group: the government officials responsible for protecting and managing the ocean's resources.

Between business and government stands one third group: ocean scientists and engineers, one person from each Sea Grant institution on the East Coast. These Sea Grant representatives were the catalyst for this meeting, as they should be.

Because of their position as middlemen, the Sea Grant institutions understand both sides of a problem. Their grassroots knowledge of local and State needs, but in the context of a program based on management and conservation, is an invaluable resource. I regularly turn to the Sea Grant program at the University for help because the men and women here are trained professionals who understand the needs of Delaware, just as their counterparts from Maine to Florida understand the needs of those states.

The national Sea Grant program is uniquely situated to coordinate our efforts, because although we are dealing with national problems they have major implications for the States, cities and counties whose quality of life is at stake. To maximize the beneficial use of the ocean's resources, to preserve those resources for our children and grandchildren, and to minimize governmental involvement will require careful planning on a large scale.

A prerequisite to planning is knowlege. We know little about the interaction between estuaries and coastal ocean waters or between the coastal waters and the open ocean. Our knowledge of marine organisms is spotty and primitive. Our understanding of the chemical behavior of the coastal areas is inadequate. Frankly, the amount which we don't know is frightening.

But we can learn. We have fine universities and laboratories, gifted and dedicated men and women, both in the private and public sectors. All we require is strength of will. We can inventory and catalogue our resources, devise effective management and protection plans, and maintain the coastal region for the future if we merely set our minds to it.

We can do all of this without embracing a massive new bureaucracy, by utilizing the facilities of State and private universities as well as commercial enterprises. I see no reason why the enormously expensive facilities of the Sea

Grant institutions or of major private research laboratories should be replicated by the Federal government. We can learn more for less money and more quickly through a three way partnership than through a Federal monopoly.

What I am outlining is a large but important task. It is a task which we as a nation must realize is ncessary and must act to implement. As I said before, I see the results of this workshop as the first step in this process. I hope that you will approach the next two days with the full scope of this effort clearly in mind.

The next step beyond this workshop will be to decide how best to solve, or shed useful light, on the high priority problems which you identify. As you know, much work is already underway in special areas or on special problems. Four such efforts come immediately to mind. The oldest and most advanced and uniform is the service of the National Ocean Survey in providing us with "roadmaps of the sea." The second is the Marine Ecosystem Analysis (MESA) program of NOAA aimed at gaining a better understanding of the complex problems of the New York Bight area. The third effort in this Atlantic off-shore region is the three area effort of the Bureau of Land Management to define baseline conditions before offshore drilling begins in the South Atlantic, the Baltimore Canyon trough and Georges Bank. The fourth is the just beginning effort of the three regional fisheries management councils to first assess the stocks, and then to develop management plans for the several fisheries within the 200 mile zone. While other ongoing programs could be cited, these four illustrate the types of groups which will need to be involved in the next step of this process. Each is now contributing in some way to the solution or better understanding of the high priority problems which will result from this workshop.

The eventual goal of our efforts will be a comprehensive program aimed at gathering the necessary information to understand and quantify our offshore marine resources so that they can be wisely managed with minimum inefficiency. By planning the program at the outset as a comprehensive effort encompassing the entire Atlantic coastal and offshore areas I believe we will obtain the greatest understanding of significant problems in the shortest time and in the most cost-effective way. It will require the efforts of all of you here this evening and many others as well. I personally hope that we can continue to rely on our Sea Grant institutions to provide the foum for the steps which lie ahead. I also hope that we can count on the private business sector and the public sector to work shoulder to shoulder with our universities to complete this large and important task.

Thank you for taking the time from your busy schedules to prepare for this workshop and to be here. My Congressional colleagues and I are most interested in the results of this meeting and the important steps which need to follow.

APPENDIX 7

PEOPLE WHO PROPOSED PROBLEMS BUT DID NOT ATTEND WORKSHOP

People Who Proposed Problems But Did Not Participate in Workshop

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