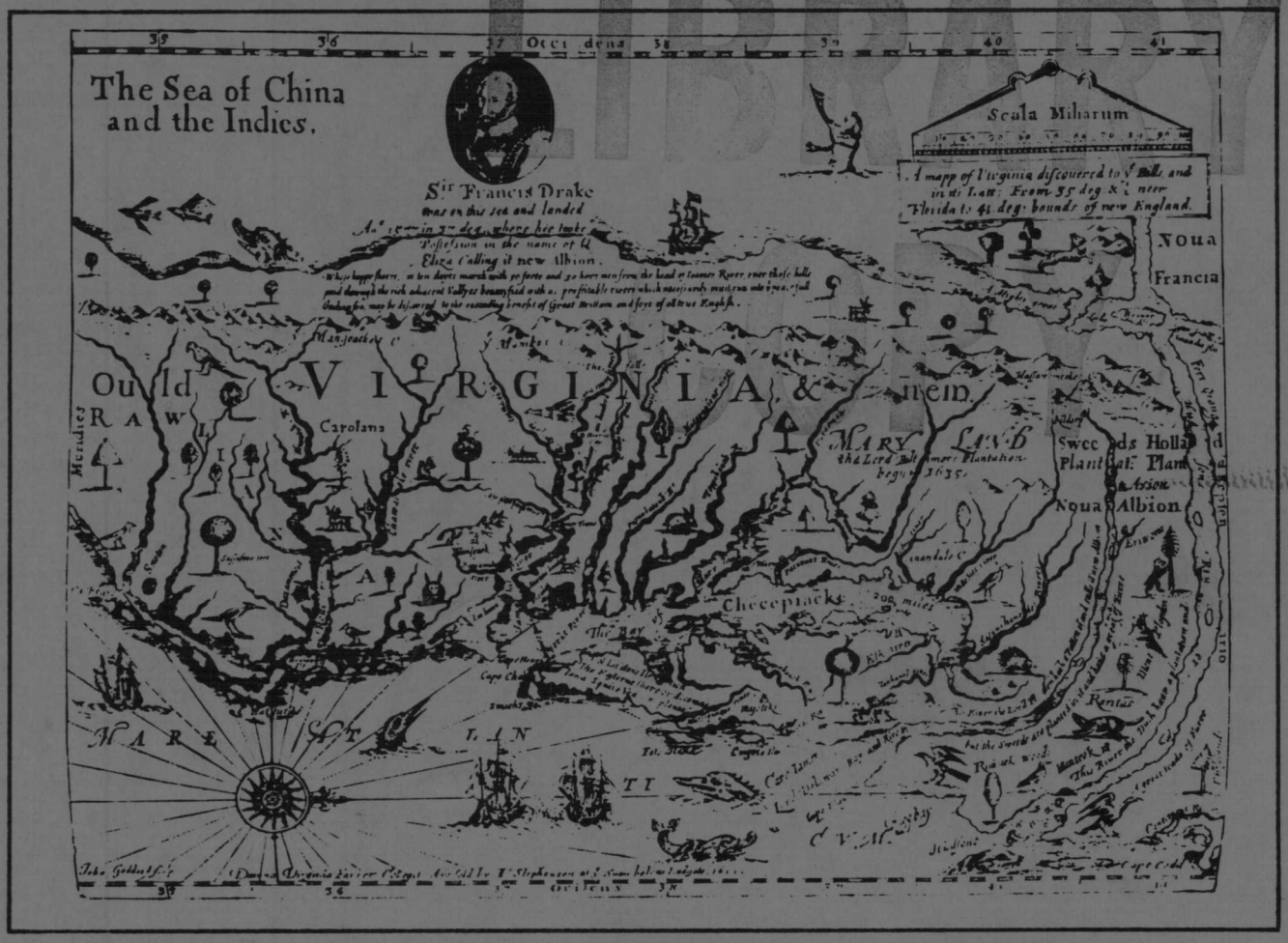
# Summary and Analysis of Cultural Resource Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras

## FINAL REPORT

# Volume III – Historic Shipping






prepared by

**Institute for Conservation Archaeology**

Peabody Museum

Harvard University

for the Bureau of Land Management under contract number AA 551-CT8-18

# A SUMMARY AND ANALYSIS OF CULTURAL RESOURCE INFORMATION ON THE CONTINENTAL SHELF FROM THE BAY OF FUNDY TO CAPE HATTERAS

FINAL REPORT

Volume III - Historic Shipping

This study was funded by the New York Outer Continental Shelf Office of the Bureau of Land Management, Department of the Interior, under contract number AA 551-CT8-18.

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# PREFACE

This is the third in a series of four volumes entitled "Summary and Analysis of Cultural Resource Information on the Continental Shelf (CS) from the Bay of Fundy to Cape Hatteras" which were prepared for the Bureau of Land Management (BLM) by the Institute for Conservation Archaeology (ICA) of the Peabody Museum at Harvard University. These four volumes, their accompanying chart sets, a computer-compatible tape documenting the accumulated inventories, and a set of large-scale (1:125,000) maps showing the inventory and the results of our analysis constitute the final report for the project, performed under contract #AA551-CT8-18 for the BLM. The purpose of this project is to provide the BLM with information about the existence of known or expected prehistoric sites and historically important sunken ships, as well as appropriate methods for locating the same, and planning recommendations for both offshore and onshore land use.

Archaeologists and historians generally agree that, given the length of time the CS was above sea level (about 15,000 years), and the intensity of European and other shipping along the northeastern coast of the U.S., in the period after the CS was inundated, there is probably no area on the Shelf that does not have the possibility for containing remains of either prehistoric peoples or sunken shipping. All other things being equal, this would mean that whenever federal funds are involved in land-modifying projects anywhere on the CS, federal antiquities legislation would apply to these activities (see 36 CFR 800 for a summary of the necessary procedures). On the other hand, the cost of looking for and recovering data from any possible properties which might be impacted could in many cases exceed the value of the resources that are considered necessary for the economic well-being of the nation. It is at this point that decisions about early planning with respect to possible cultural resources on the CS will assist land users not only to meet their legal responsibilities in terms of historic preservation but to use cost-effectively different levels of survey intensity to locate those sites or wrecks which may be endangered by land use.

It is important to stipulate here that, using the data presently available, nobody in the historic preservation community could, in good conscience, ever entirely eliminate any area from consideration for further work. This study attempts to give guidance to resource managers and those having jurisdiction over the use of resources on the CS from the Bay of Fundy to Cape Hatteras.

Volume III, "Historic Shipping," discusses a predictive modeling process that makes possible the identification of those areas which have a probability for containing sunken ships classifiable as significant cultural resources. This task has been approached in several different

ways, depending on the types and quality of data available for the different periods. We have attempted to identify and use the most comprehensive and reliable data source for each period. As will be shown, our expectations have not always been met. However, we feel comfortable in defining various zones of shipwreck density. The existence of these zones may be tested by means of pilot studies to be discussed in Volume IV of this report.

In general, this study was conducted for the purpose of assessing the expected density of historic shipping in the study area, dating from the period of the Norse explorers to the end of World War II. Where history, and that of related subjects, was the only information available, it was presented in detail in appendices. Actual wreck data were available from newspapers and government records for the period after 1800. This information was sampled and analyzed; extraction of all available data was not within the scope of this study. For periods when hard data were available, the history of shipping in the area was presented only to explain results indicated by the data.

Distribution of known and suspected losses was presented. The approximate locations of wrecks considered to be particularly significant were presented on charts.

We would like to acknowledge the following people who have made significant contributions to the production of this volume: Dr. Bruce Bourque, Dr. Edwin Churchill, Mr. Warren Riess, and especially Ms. Evelyn Garnett, all of the Maine State Museum; consultant Dr. Robert Albion, Mr. William A. Baker, Dr. Einar Haugen, and Dr. John Parry; the production staff of the ICA and the Peabody Museum, specifically Janet Johnson, Mary Beth Zickefoose, Georgess McHargue, Lynne Perrotte, Whitney Powell, and Elizabeth Wahle; and finally, all the museums and historical societies throughout the study area who gave of their time and information which was essential to the completion of this task of the project.

Michael Roberts
Project Manager

# 1.0 INTRODUCTION

This report presents a predictive model for the distribution and density of submerged Historic Period shipping remains on the Continental Shelf between the Canada/United States boundary and Cape Hatteras, NC. The model has been divided into four sections covering four chronological periods between the eleventh century and the end of World War II.

The quantity and quality of historic data relating to vessel losses during this temporal span vary dramatically through time and among geographic subdivisions of the study area. Therefore, the predictive statements presented in each section are based upon different research strategies, each designed to suit the data available for a given period.

Because few vessel-loss data are available for the period before 1800, known wreck distributions were not considered reliable indicators of vessel remains of the period generally. Therefore, the section dealing with pre-1630 wrecks is based upon our analyses of exploration voyages and early settlement patterns. However, since the importance of any vessel remains from this period is considered high, data on known wrecks are presented and an effort has been made to pinpoint areas where shipping was active.

For the period between 1630 and 1800, unquantified estimates of wreck distribution are based upon known figures concerning colonial population, shipping and trade. While many studies of these topics have been made in the past, none has directly considered the distribution of vessel remains on the Continental Shelf. Since vessel remains of this period are regarded as archaeologically important, we have also presented known-wreck data obtained during our research.

After 1800, vessel-loss data rapidly became too extensive to deal with exhaustively in a study of this nature. Therefore, the available data were sampled in order to arrive at estimates of the number and distribution of wrecks between 1800 and 1880 and between 1880 and 1945. Data for the period 1800 to 1880 were collected from four Atlantic port newspapers, while United States government lists were used to arrive at casualty figures between 1880 and 1945.

# 2.0 METHODS AND MATERIALS

## 2.1 The Model and Its Subdivisions

The predictive model has been developed in four parts, each derived from a different set of methods and materials. The periods into which the model has been subdivided (pre-1630, 1630-1880, 1800-1880, and 1880-1945), and the selections of methods and materials were determined by developments in the maritime history of the study area, and by the availability of reliable, comprehensive sources of known-shipwreck data.

Section 3.1, including Charts III-1a,b and III-2b, considers the early period of exploration and settlement in the study area pre-1630. Maritime activity in the area was at first sporadic and patterns of shipping developed slowly. Norse explorers traveled westward from Greenland in the eleventh century. That they settled temporarily in present-day Newfoundland, Canada and explored the northern coast of present-day United States is almost certain. But the Norsemen did not stay in the New World permanently. Further European activity in the area is not reported again until the fifteenth century. The voyage of John Cabot in 1497, particularly, inspired the European nations to further exploration, and led eventually to the area's use as a fishing ground in the early seventeenth century. A number of fishing settlements, trading posts, and agricultural settlements were established along the coast, and these became centers of limited maritime activity. By 1630, regular transoceanic and coastal shipping routes had developed for the purpose of supplying and carrying away the trade goods of the settlments. These routes were the basis for the well-developed shipping patterns which emerged during the colonial period.

There are few recorded instances of pre-1630 shipwrecks in the study area; therefore Section 3.1 of the model is based entirely upon consideration of exploration voyages and the early shipping routes to and from the settlements. Areas where shipwrecks of this period are to be found presumably coincide with the sea routes traveled by the explorers and settlers.

Section 3.2, with Charts III-2a, III-3 and III-4) covers the colonial period from 1630 to 1800. During this time, permanent colonies were established in all parts of the study area, and coastal shipping grew rapidly as the primary means of transportation. Land travel was minimal since few good roads existed. As population and volume of trade increased, entrepots (centers of trade and transshipment) developed in those coastal cities that possessed good harbors. By the beginning of the nineteenth century, a few cities handled most of the transoceanic cargo.

Data on known shipwrecks of the Colonial Period were collected from both primary and secondary sources (see Bibliographies B and C). However, none of these sources, alone or in combination, provided comprehensive treatment of the study area for the entire period. Therefore, these data were not used as a base for the predictive model. Instead, the second part of the model is based upon developments in the maritime history of the area during the Colonial Period. Analysis of population concentrations and shipping growth, of established trade routes and shipping patterns, and of navigational hazards determined probable areas where shipwreck sites may be concentrated. A brief analysis of data on known shipwrecks of the period is included as a supplement to the model.

Section 3.3 treats the period from 1800 to 1880 and includes the "golden age" of American shipping. Between the War of 1812 and the Civil War, American ships were trading around the world in ever-increasing numbers. The opening of many Far-Eastern ports, the California gold rush, the upswing of the land-bound economy, and the development of regular packet lines all helped to spur maritime activity along the coast. Whaling reached its peak during this period, and fishing continually increased to meet the demand of inland markets opened by the new railroad lines. After the Civil War, steam-powered vessels became more common on the ocean whereas earlier, most steam vessels had operated on rivers and in harbors. Steam, at first used only near shore or when becalmed, soon became an additional means of propulsion on ocean-sailing ships. By the year 1880 sail- and steam-powered vessels were about equally represented in the study area. Another major development of the last half of the nineteenth century was the steel hull, which allowed for construction of larger and therefore more economical ships.

Reports of known shipwrecks of the 1800-1880 period were collected from coastal newspapers sampled at 20-year intervals. From 1800 on, daily newspapers were published in all of the major ports of the study area. Preserved on micro-film, many of these early papers are valuable sources of contemporary accounts of shipwrecks. Shipwreck data collected from the newspaper sample were considered relatively unbiased and representative of the entire study area. This part (section 3.3) of the model was therefore based entirely upon the data collected from the newspaper sample.

The fourth part of the model (section 3.4) covers the years 1880 to 1945, a period of rapid and significant changes in the history of shipping. By the turn of the century, most steam ships had shed their sail rigging. The major exceptions of steam power were "downeasters," the highest development of the wooden square-rigger. Steam and diesel power became the norm and by 1910 the majority of vessels registered in the United States were of steel-hull construction. Transoceanic shipped tonnage increased, but the increase in size of the vessels kept the number of ships almost static. The use of short-wave radios and electronic aids to navigation helped these large ships to become safer in many respects. Wide-range weather forecasting became available; and distressed vessels could communicate with other vessels out of sight but

within radio range, thus making it possible to render aid before these vessels became total losses.

During this period (1880-1945), the livelihood of coasters was protected by a law which required that all sea-borne trade between American ports be conducted by American vessels. Another boon to the coastal traders was the opening of the Cape Cod Canal in 1914, which saved time for the steam-powered coasters and allowed them to avoid the extremely hazardous Nantucket Shoals. But the Depression and the development of coastal highways and efficient trucking greatly reduced the number of coasters in all but the bulk cargo trade.

Data on the known shipwrecks of this final model period were collected from the government records sampled at 10-year intervals. By 1880 the United States Life-Saving Service (USLSS) had established stations in 134 locations from Maine to Cape Hatteras, and was publishing in its annual report lists of casualties within the fields of their operations. By 1910, an additional list of vessels lost was also included in Merchant Vessels of the United States (Bibliography D.54), an annual record of registered vessels published by various branches of the U.S. government. By 1915 the functions of the USLSS had been assumed by the new United States Coast Guard, which also published annual reports of casualties and assistance. The final part of the model is based upon data collected from these government records.

## 2.2 Shipwreck Data—General Discussion

### 2.2.1 Known wrecks, pre-1800

Available sources were reviewed for possible use as a data base for the pre-1800 sections of the predictive model. No comprehensive set of governmental vessel-loss records, British or American, was identified or readily available for the pre-1800 period. Therefore, it was necessary to rely heavily upon the historic record of maritime activity in developing sections of the model dealing with the periods before 1630 and between 1630 and 1800.

Newspapers were then considered as a possible source. A list was compiled from the U.S. Library of Congress Directory of Newspapers Available on Microfilm. This list identified newspapers published in each of the major ports of the study area at 10-year intervals from 1700 to 1800 (Fig. III-1). No newspapers were available for the year 1700, and a complete selection for all of the ports was not possible until 1740.

The "Boston Gazette" and the "Boston Newsletter" were selected for initial viewing because Boston was the first of the ports to establish and maintain newspapers, and therefore the most likely to provide

consistent reporting for all years of the model period. The "Gazette" and the "Newsletter" were reviewed for the years 1720, 1740, 1760, and 1770. From these, a total of only 18 reports of vessels lost was collected. Half of the reports were from the year 1770. Eight of the 18 reports were of losses from the Maine-Massachusetts area; the remainder were of losses from other parts of the study area from New York to North Carolina. Although these papers demonstrated interest in reporting shipwreck news from all parts of the study area, the total number of reports was judged to be too small, particularly before about 1760, to warrant the time required to procure the microfilms and collect the data from them. The quality of the reports was also judged to be poor, generally lacking sufficient detail to identify adequately the vessels involved or the locations of the wrecks. Therefore, the collection of additional eighteenth-century newspaper data was not pursued.

Other sources were also considered for possible use as the basis for a model. Treasure maps, adventurer's guides to sunken ships, and sensational narrative accounts of disasters at sea were not used due to their inability to provide a large reliable data base. Sources which were mainly concerned with the objective presentation of known-shipwreck data were preferred, and those which presented the data in simple list form were chosen first.

Three types of sources were identified: encyclopedic, regional, and local. Of the encyclopedic sources, only one, Shipwrecks of the Western Hemisphere, 1492-1825, by Robert Marx (1971, Bibliography C), presented a concentration of pre-1800 reports; the remaining encyclopedic sources contributed only a few additional wrecks. However, Marx was particularly biased toward reports of treasure ships, which generally were lost in the southern portion of the study area. A selection of regional sources provided coverage of the areas most often associated with wrecks: the heavily-trafficked New York-New Jersey area, and the particularly hazardous Cape Cod and Cape Hatteras regions. Some of the regional sources presented the accounts of shipwrecks in short narrative form and these were skimmed to extract the objective data. In one instance, the full narrative text of Great Storms and Famous Shipwrecks of the New England Coast, by Edward R. Snow (1943, Bibliography C), was skimmed and the data collected. However, the time involved in collecting data from such longer narratives was prohibitive, and other similar possible sources were not treated in this manner.

The set of local sources included histories of coastal cities and towns, such as Boston and Hull, MA, Cape Elizabeth, ME, and Westerly, RI. The local histories included lists of vessels lost in the neighborhood as well as lists of home-fleet vessels lost in other parts of the study area. Other local sources were reports prepared for public and private special interest groups, such as The Boston Sea Rovers Divers' Club (Bibliography C: Luther & Weeks 1967) and the New Jersey Coast Committee (Bibliography C). All of the local sources were recommended by coastal museums, libraries and historical societies and were used in the project as they became available. The coastal museums and socie_ies

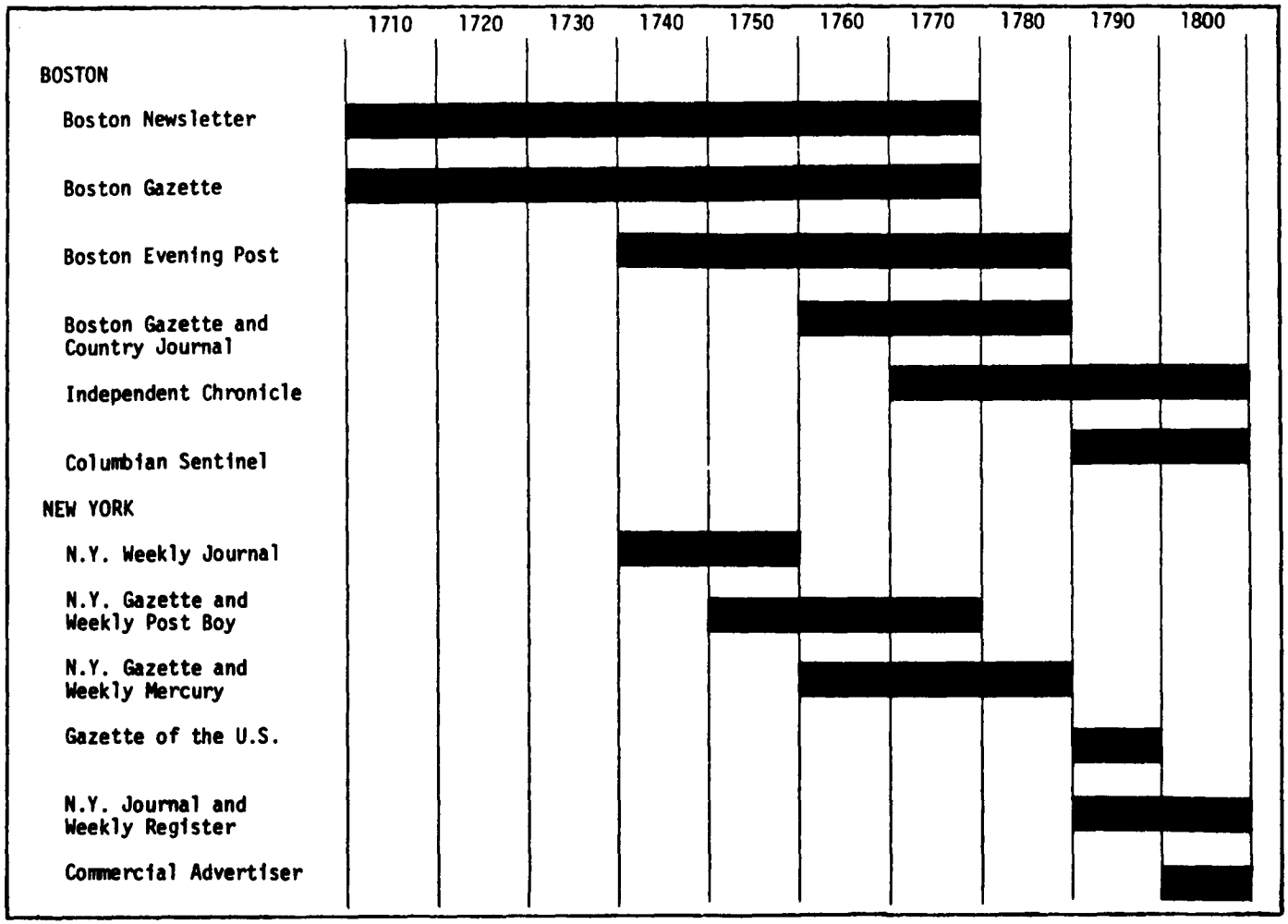



Fig. III-1
Temporal coverage of 18th-century newspapers available on microfilm and identified as possible sources of known-shipwreck data.

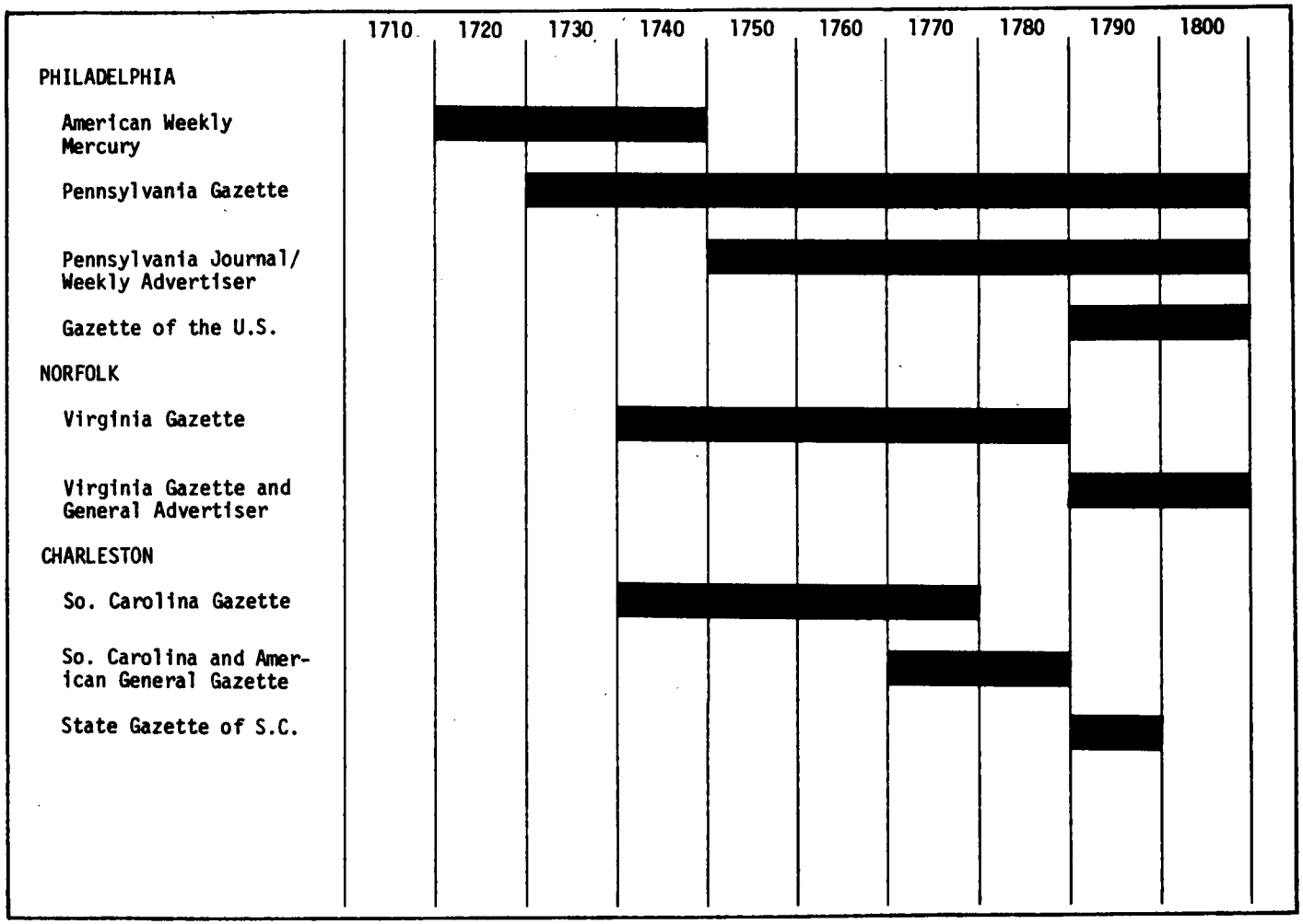



Fig. III-1
continued

also responded to the project's request for data with lists of known-shipwreck sites in their areas. Many of the lists were compiled specifically for this project; others were the results of either previous or on-going research projects undertaken by those organizations.

Most of the regional sources and all of the local sources represented reports of vessels lost in the northern half of the study area, roughly from Maine to New York. No regional or local sources were identified for the Delaware-Maryland-Virginia area, although the search for these materials was conducted in the same manner as for all other parts of the study area. The total number of reports derived from the regional and local sources was about equal to the number collected from Marx (1971).

These three types of sources, encyclopedic, regional, and local, all had biases and limitations—either spatial or temporal. Most of the study area was covered by one source or another (Fig. III-2). However, the time periods covered by each source varied greatly, and the total did not represent a comprehensive coverage for all years before 1800. These sources, then, could not be used as a data base for a reliable predictive model.

Nevertheless, known-shipwreck data were collected for the pre-1800 period from these various sources for the following two reasons. First, that any site of shipwreck remains pre-dating the year 1800 might be considered historically or culturally significant by virtue of age alone, and therefore should be included in the results of this report; and second, that an evaluation and discussion of the number, vessel type, and site distribution of any pre-1800 known shipwrecks would be a useful supplement to the first two parts of the model. Therefore, these data were collected and synthesized in the manner described in the next section of this report. The locations of the wrecks were plotted on lease block maps at 1:125,000 scale and the distribution of sites was evaluated in relation to the predictive model.

### 2.2.2 Collection and synthesis of known-shipwreck data

The following is a description of the collection and synthesis of all the known-shipwreck data. The procedures described were applied to the pre-1800 data as well as to the nineteenth- and twentieth-century data.

A data sheet was prepared so that the following information could be recorded for each wreck:

| | |
|---|---|
| name of vessel | port of origin |
| name of captain/master | port of destination |
| reported location | cargo |
| date of wreck | cause of wreck |
| type of vessel | other comment |
| size of vessel | source |
| nationality | lease-block assignment |

Where possible, all of the above information was collected for each of the reported wrecks. Few of the selected sources presented data in all of the categories. The data collected were intended to fulfill two goals of the project: 1) a clear identification of the vessel and the location of its loss, and 2) an indication of the possible cultural and historical significance of the vessel's remains, should they in fact be encountered. A discussion of the rationale for methods of recording and storage of data in each of the categories is included in the section of this report describing computer storage of the known-shipwreck data (Appendix D).

In order to check for multiple reports of a single wreck, all data sheets from all sources were put in order by year of wreck. Then for each year or group of years, sheets from all sources were alphabetized by name of vessel. Obvious multiple reports were recognized and temporarily stapled together, and a composite sheet later made for each such vessel. All sources were matched with reports of "known" vessels in other sources. This could generally be accomplished by re-sorting the sheets by date and by reported location of wreck. There may in fact still be a few undetected multiple reports of vessels. However, the actual number of undetected multiple reports is presumed to be small.

The multiple reports having thus been accounted for, the data sheets were next organized by location of wreck. Most of the reported vessels were lost "on shore" rather than "at sea." Nearly all of the reports gave location with respect to a landmark, rather than a latitude-longitude reading. Each sheet or set of sheets representing a single vessel was then assigned as nearly as possible to one of the 11 states in the study area. Working with one "state" group at a time, reported wreck locations in each state were found on reference maps, which included road maps, a complete set of U.S. Coast & Geodetic Survey marine charts at a scale of 1:80,000, and a few miscellaneous charts at other larger and smaller scales. Atlases, gazetteers, and lists of coastal landmarks published by the United States Life-Saving Service and the United States Coast Guard were particularly helpful in the identification of little-known landmarks not readily recognized by the researchers.

Each wreck site which could be located on the reference maps was then located at a corresponding point on the project lease-block maps of the CS (see Map Set ICA-88-1 through -41). The map number and lease-block number of all blocks (up to six) in which the vessel may have sunk were recorded on the data sheet. Most sites could not be located within, or assigned to, a single lease block. Specific locations often fell within two or more blocks; for example, Barnegat Inlet, NJ, is touched by four blocks; Block Island, RI, encompasses six blocks; and Cape Charles, VA, nine blocks. Locations reported as "off" or "near" a known landmark, or "on" a landmark too large to be described by six or less blocks, were assigned to six arbitrarily chosen blocks near that landmark and within a depth line appropriate for the period, that is, five fathoms up to 1880, and ten fathoms from 1880-1945. Sheets were set aside if the location was found to be out of the study area.

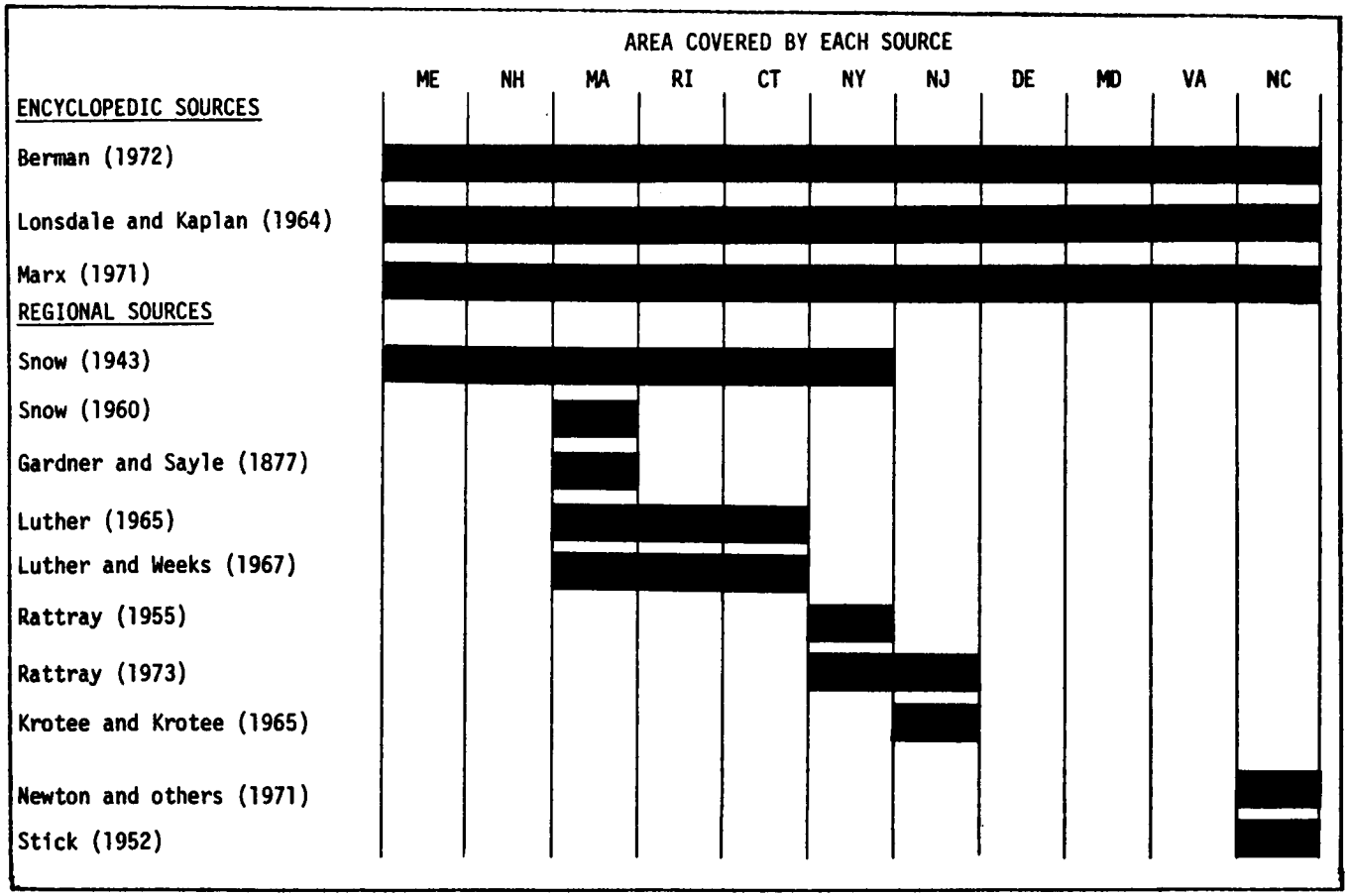



Fig. III-2
Encyclopedic, regional and local sources of pre-1800 known-shipwreck data, and the areas covered by each source. Note that although these sources combined cover the entire study area, they do not comprehensively cover all the years before 1800.

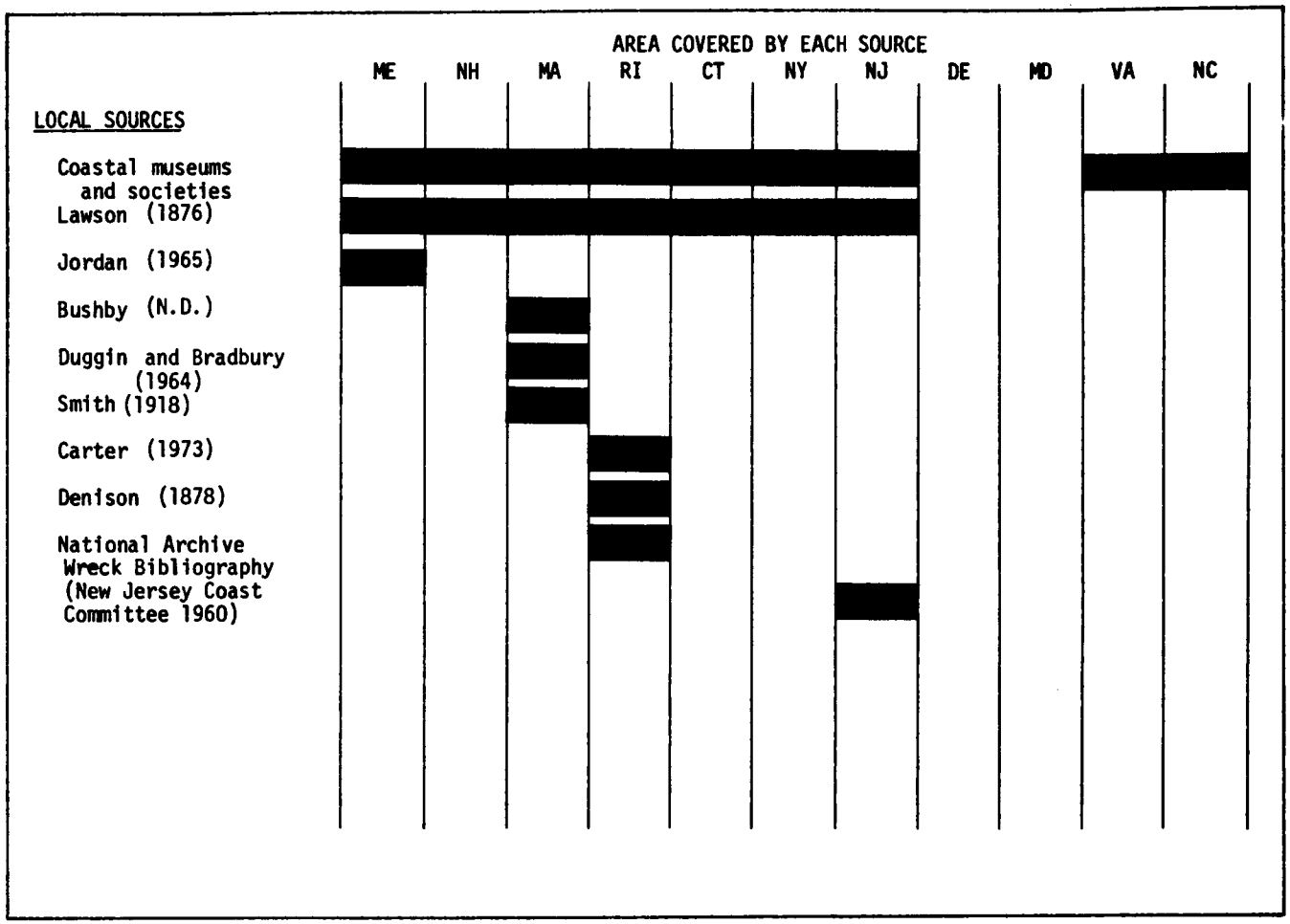



Fig. III-2
continued

In order to evaluate the number and distribution of the known-shipwreck sites, the assigned locations of the wrecks were then plotted on the lease-block maps at the scale of 1:125,000. A different set of maps was used to display the wreck sites for each of the model periods, pre-1800, 1800-1880, and 1880-1945. For each wreck assigned to six or fewer blocks, a mark was entered in each of the possible blocks on the appropriate set of maps, with a notation to indicate the likelihood of location, whether in the one block alone, or with an equal chance of location in a number of other blocks. Vessels which could not be assigned to six blocks or fewer, were grouped by area location, such as "off Cape Cod." The area of probable location of these casualties, around a given landmark such as Cape Cod, was determined by known navigational hazards in the area, and by consideration of the average depth of draft of vessels of the period. Vessels assigned to arbitrary six-block areas are noted as 6x on the data sheet and on working sets of lease block maps (Map Set ICA-88). Vessels for which the reported location was too general even for an arbitrary 6 x block assignment (for instance, "lost between New York and Philadelphia") were simply counted in the total number of vessels lost in the study area, but not considered in the evaluations of the site distributions.

Evaluations of the numbers of vessels reported lost and distributions of the known-shipwreck sites which were plotted on the lease-block maps are presented with sections 3.2 through 3.4 of the predictive model.

## 2.3 Detailed Discussion

### 2.3.1 Pre-1630

This period differs from later ones in that the historic literature relating to it is very limited. While this circumstance facilitates a review of most extant materials, it also makes clear that the resulting record is marred by many substantial chronological and geographic gaps. Many authors, in efforts to deal with such gaps, have developed theories regarding early exploration and settlement by a wide variety of Old World ethnic groups. Our review of these theories suggests that some are plausible, others less so. In any case, none is supported by substantial historic or archaeological evidence.

Information on Norse exploration and colonization of North America comes largely from three major sources. The first is the sagas and their various interpretations; the second, the reports on the L'Anse aux Meadows site in northern Newfoundland, and the third, the small number of authenticated Norse artifacts located on the eastern shore of Hudson Bay, on Baffin Island, and at Brookline, Maine.

Standard historical sources on European political, economic and maritime history were consulted for the period between the Norse voyages and the Columbian explorations, as were accounts of pre-Columbian trans-Atlantic

adventures. The research revealed nothing that could be reasonably advanced as evidence of European visitation to the Atlantic coast. At best, some scholars, especially David Quinn (1974, Bibliography A), provide data indicating there was European activity off Newfoundland in the late 1480's or early 1490's.

The age of western exploration ushered in by Columbus brought with it a substantial number of travel reports and other related documentation. The travel reports have all been published a number of times and the activities of the adventurers carefully analyzed by Bernard Hoffman (1961), Samuel Morison (1971), John Parry (1964), David Quinn (1974), Justin Windsor (1884-89), and others (see Bibliography A).

For information on the period of early settlement, we depended first and foremost on Windsor (1884-89) and then on local studies relating to each of the states from North Carolina to Maine, as well as specialized studies on the fur trade and the fisheries.

Data about the various maritime activities, settlement sites, etc. as well as evidence from contemporary cartographic sources relating to the period of exploration and settlement were then analyzed, arranged and marked on 1:1,000,000 charts of the region (Charts III-1a, III-1b, and III-2b). Included was information on explorers' routes, commercial routes, fishing areas, settlement sites, and spheres of influence.

2.3.2 1630-1800

2.3.2.1 Introduction. The model of shipwreck locations for the period 1630-1800 within the study area is based upon two assumptions. First, the density of such remains is assumed to increase in areas where hazards to navigation are present. Second, the density of wrecks is assumed to be a function of shipping volume over that area during the period. Areas where shipping traffic was heavy were estimated on the basis of two independent sets of data: coastal and oceanic routes employed by sailing vessels (Chart III-2a) and the volume of shipping into and out of colonial ports (see Appendix B and Figs. III-3 through -8). As presented graphically on Charts III-3 and -4, these data suggest areas where shipwrecks could occur and, therefore, where vessel remains can be expected to cluster. In order to delimit these areas more precisely, heavily traveled routes and areas where submerged hazards to navigation occur were located on Figs. III-17 through -26. These criteria were then used to define two types of areas where shipping remains are expected to occur frequently: those where popular routes passed through hazardous waters, and those where either hazardous waters or heavy traffic alone probably led to significant numbers of wrecks. A third category, deep-water areas where vessels are known to have been lost occasionally, has also been defined (Figs. III-17 through -26).

2.3.2.2. Definition of shipping routes. Information on routes employed by sailing vessels in coastal and oceanic navigation can be obtained from three sources of information: published volumes of instructions for navigation along the Atlantic coast (called Coastal Pilots); charts showing generalized navigation routes, currents and prevailing winds; and

data on actual voyages contained in ships' logs. Of the three, summary charts (such as Findlay 1858, London Times Atlas 1967; Maury 1855, Bibliography A) and data on actual voyages (Maury 1855) proved most useful. Coastal Pilots and navigation charts (such as Blunt 1813; Carleton 1791; Moore 1796; Smith N.D., Bibliography A) proved least useful because they provide instructions for navigation to and from points along the Atlantic coast where navigation is merely possible, without indicating which routes were those frequently used. Coastal Pilots do provide some information on draft limitation of some routes, and define some hazards. However, these data are generally far more detailed than can be dealt with in a study of this scope. Chart III-2a identifies routes used by sailing vessels during the period under consideration.

2.3.2.3 Estimates of shipping volume. Statistical information available in published sources on the volume of colonial shipping is commonly presented in one of three modes: the monetary values of imports and exports from specific ports in specific years; tonnage of imports and exports from specific ports in specific years; and the number of vessels entering and clearing specific ports in specific years. For purposes of establishing spatial and temporal patterns of shipping between 1630 and 1800, these data have two shortcomings. First, the three standards of measurement are difficult to integrate. Second, few statistics of any sort are available for ports within the study area prior to about 1730.

Therefore in order to determine shipping patterns within the study area and their variation between 1630 and 1800, the available statistics were graphically compared to more comprehensive colonial population statistics, in order to determine whether population constitutes a useful index of shipping volume. Trial plots of monetary value, tonnage, and entries and clearances were made for Portsmouth, NH, Boston, MA, New York, NY, Philadelphia, PA, Hampton, VA, and Charleston, SC. The latter five ports were included because each became a major commercial center and entrepôt during the period under consideration. Portsmouth, NH was included in order to represent significant but secondary New England ports such as Salem, MA, Gloucester, MA and Falmouth, ME, and because shipping data for that port are well reported (Van Deventer 1976, Bibliography A). Each plot was then compared to population curves for the areas serviced primarily by those ports, that is New Hampshire, Massachusetts, New Amsterdam, New York, Pennsylvania, Virginia and the Carolinas respectively. Data on vessel entries and clearances were determined to be most useful to this study for three reasons:

1. They probably indicate frequencies of vessel loss more accurately than monetary value or tonnage;
2. They are somewhat more comprehensive than statistics on monetary value and tonnage;
3. They appear to be closely dependent upon population size.

Therefore, only entry and clearance data have been presented in comparison to population in Figs. III-3 through -8.

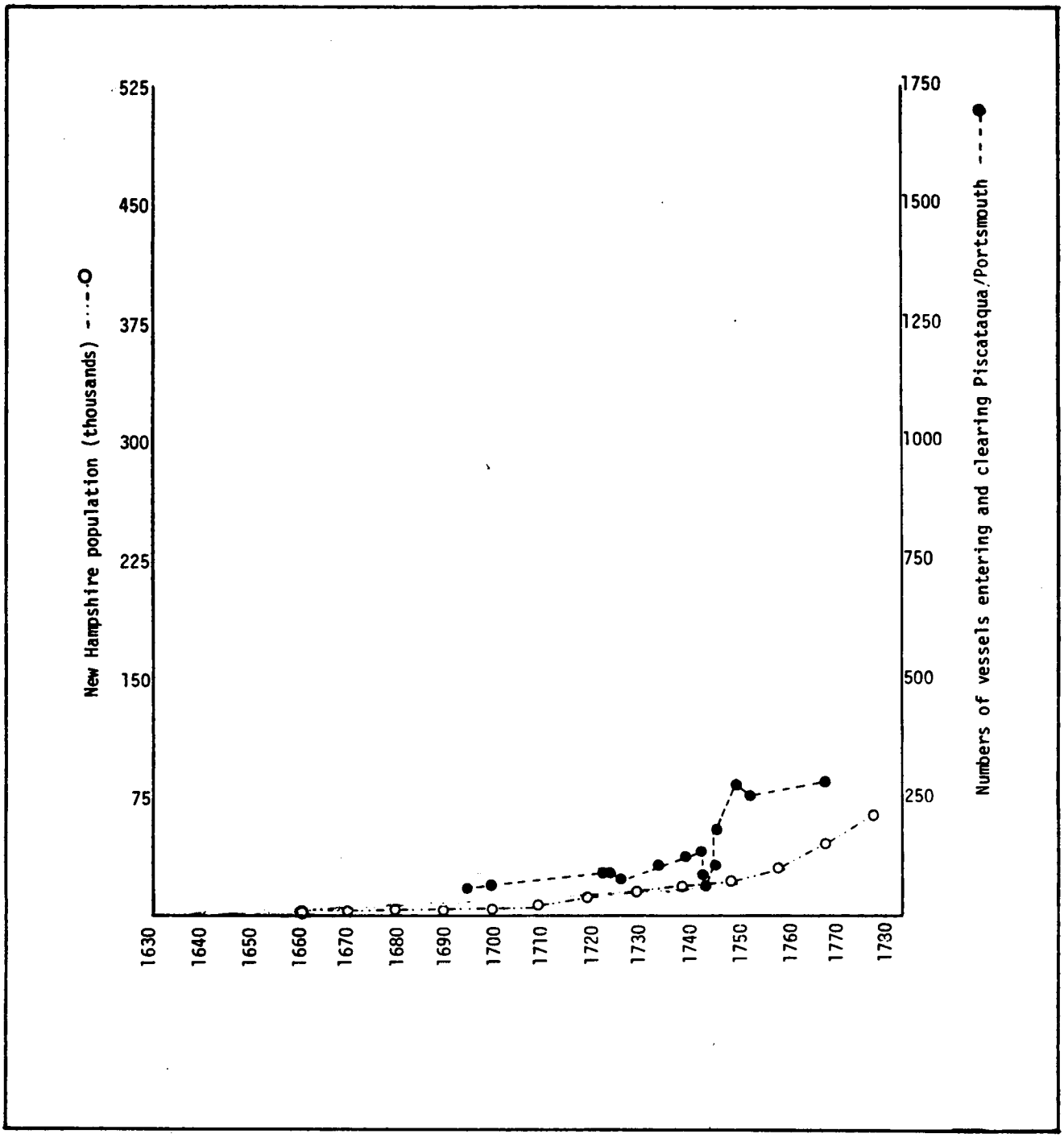



Fig. III-3
Comparison of New Hampshire population and numbers of vessels entering and clearing Piscataqua/Portsmouth (based on Van Deventer).

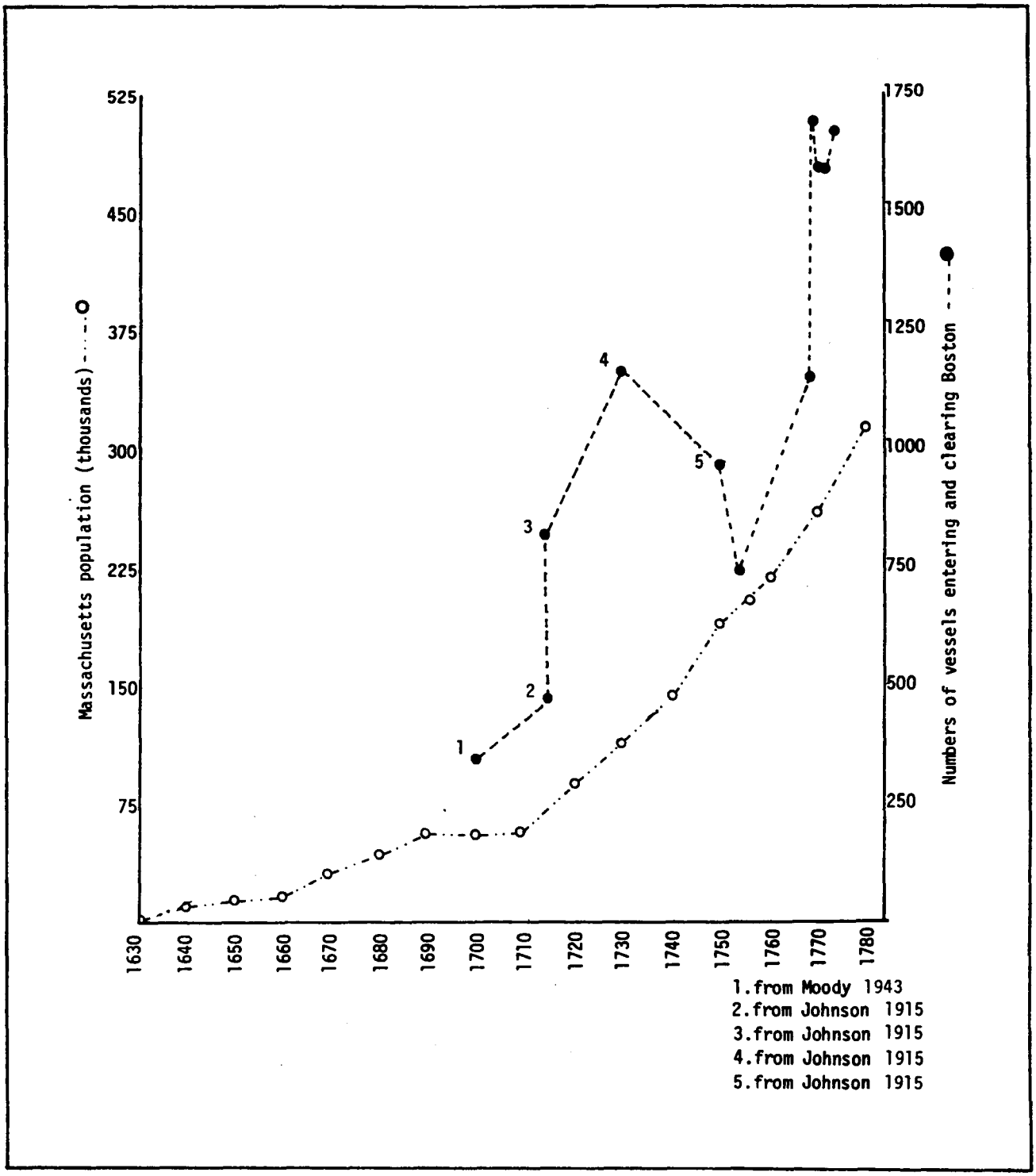
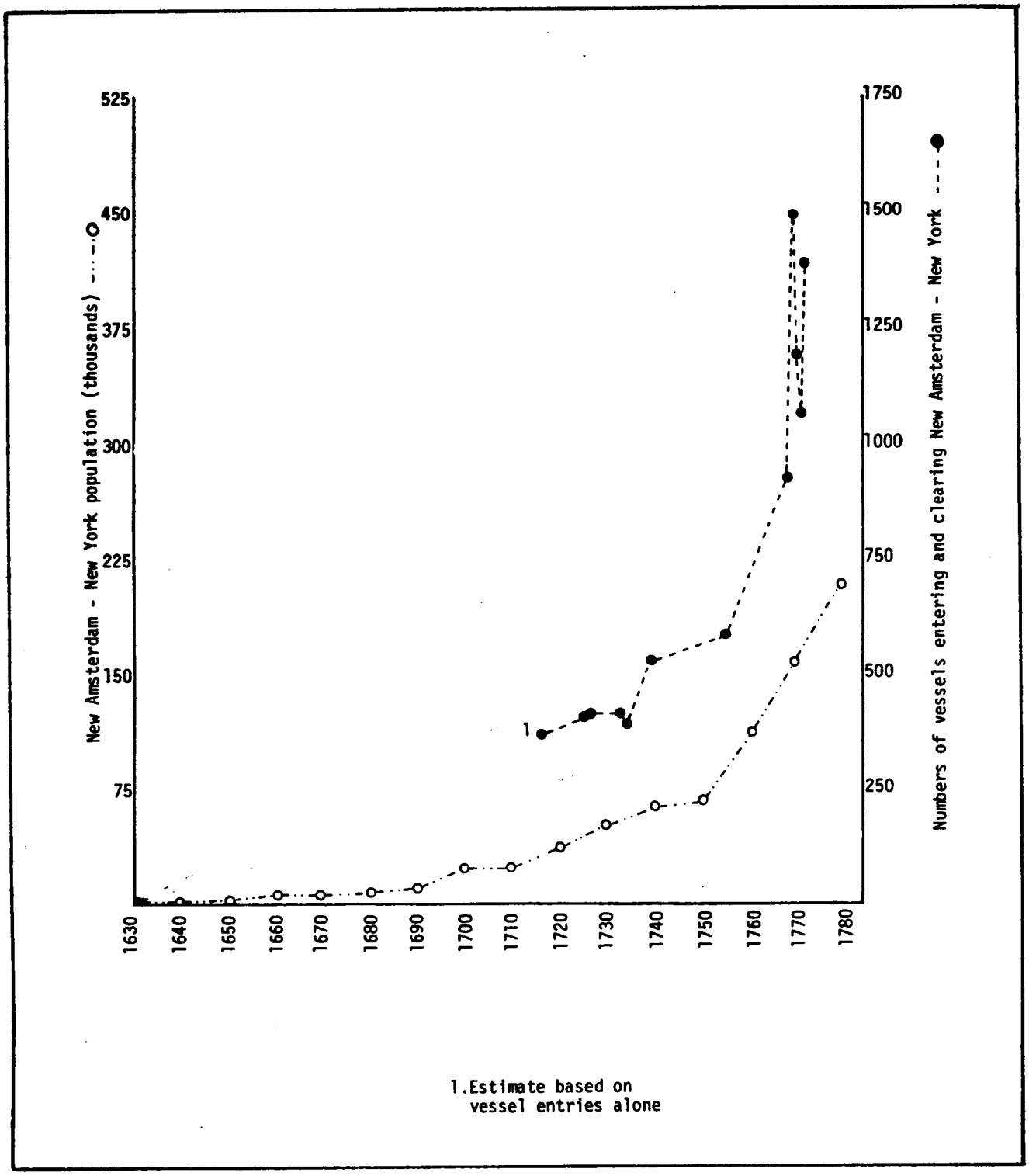



Fig. III-4

Comparison of Massachusetts population and numbers of vessels entering and clearing Boston (based on S.H.U.S. 756 and 759).




1.Estimate based on vessel entries alone

Fig. III-5

Comparison of New Amsterdam - New York population and numbers of vessels entering and clearing New Amsterdam - New York port ( based on S.H.U.S. 756 and 759).

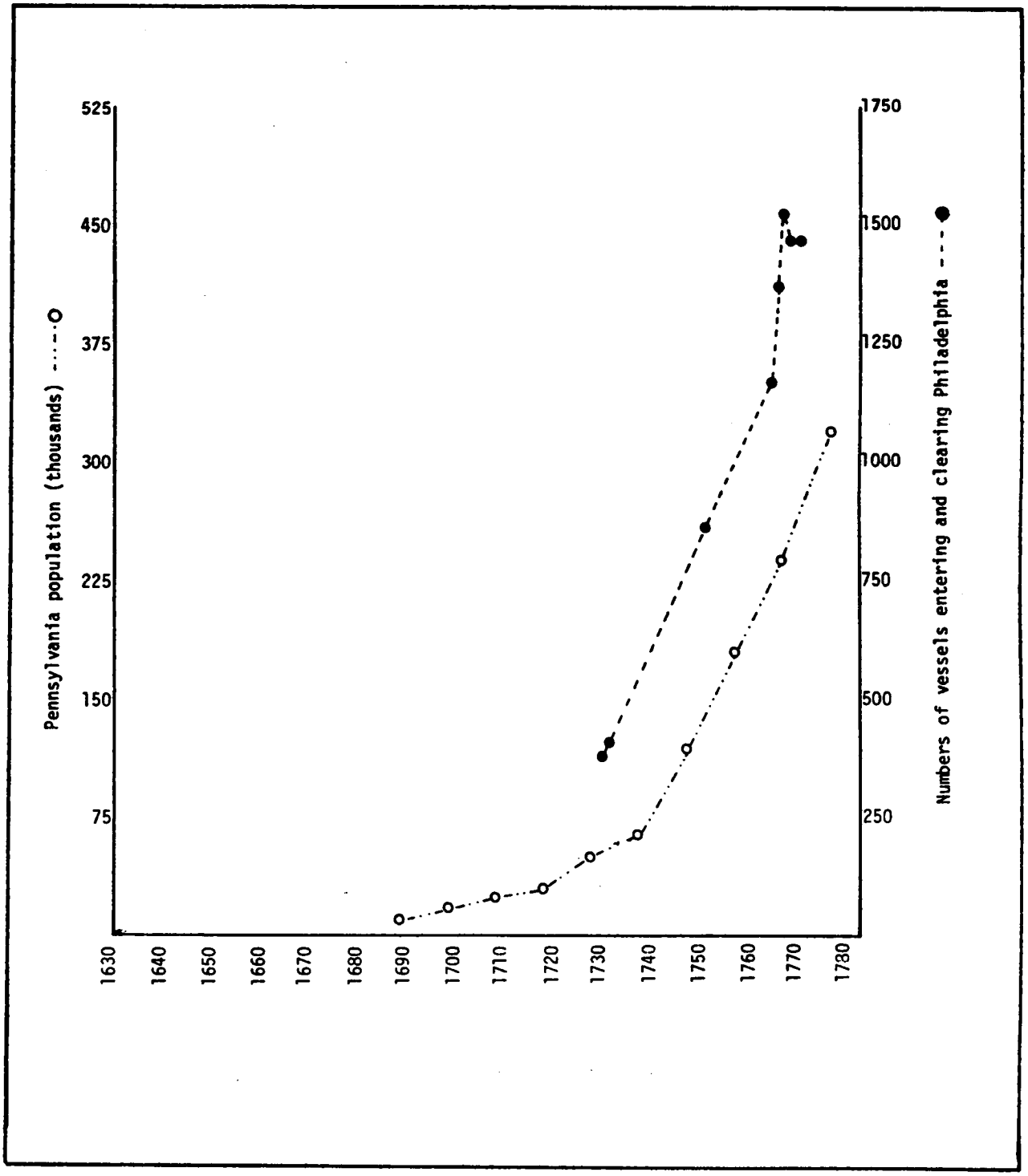



Fig. III-6
Comparison of Pennsylvania population and numbers of vessels entering and clearing Philadelphia (based on S.H.U.S. 756 and 760).

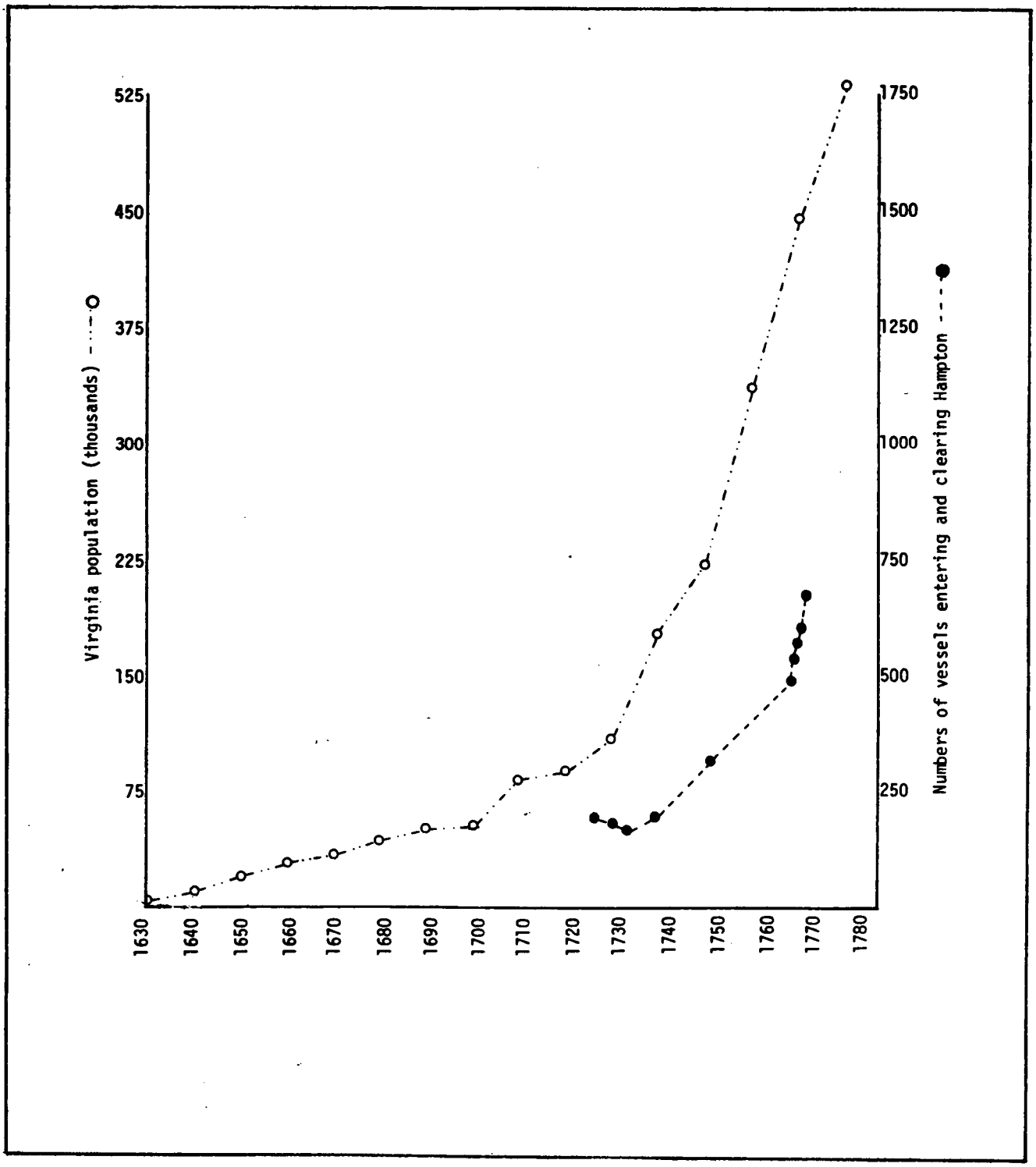



Fig. III-7

Comparison of Virginia population and numbers of vessels entering and clearing Hampton (based on S.H.U.S. 756 and 760).

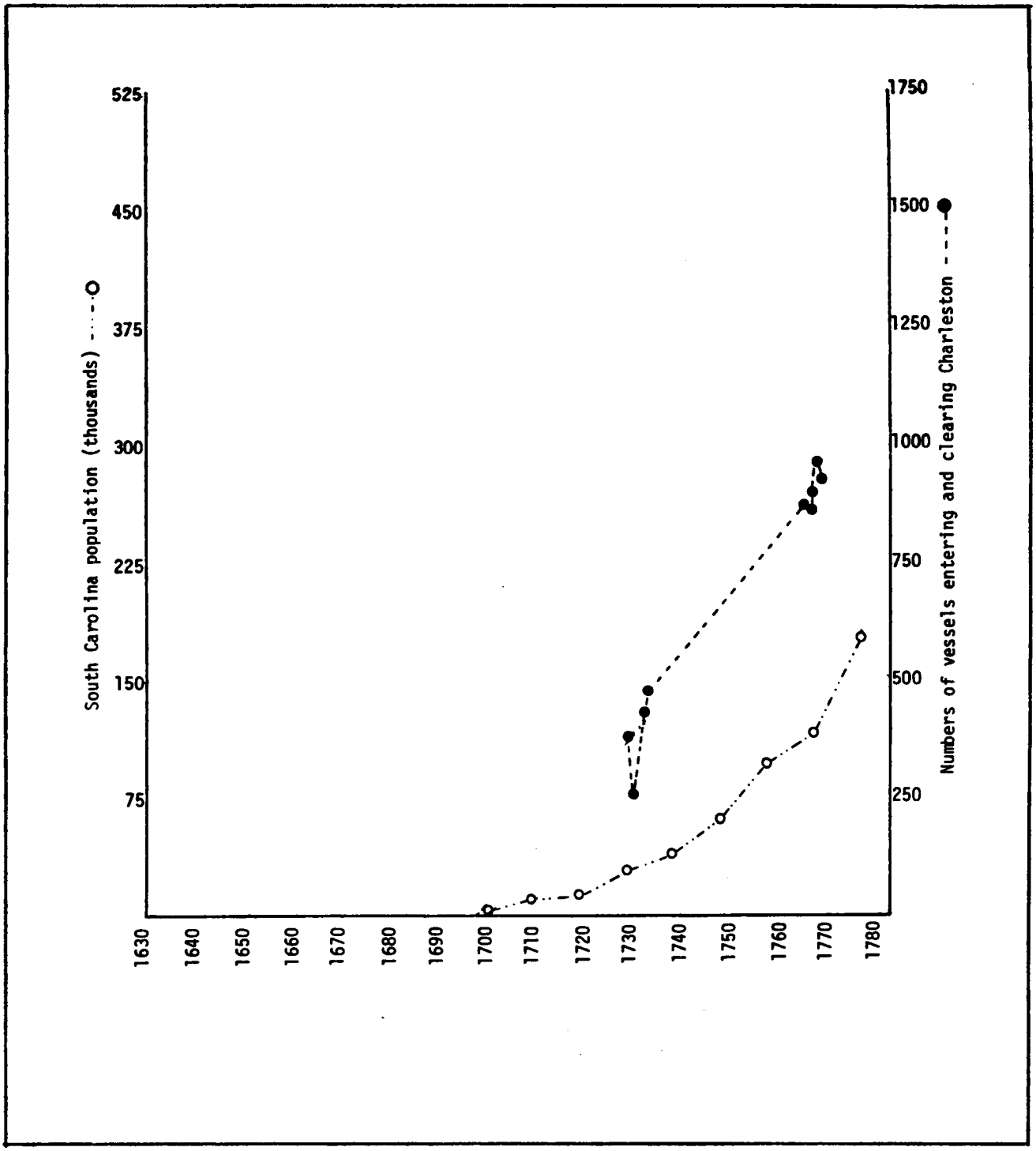



Fig. III-8

Comparison of South Carolina population and numbers of vessels entering and clearing Charleston (based on S.H.U.S. 756 and 760).

2.3.2.4 Shipping changes between 1630 and 1770. As colonial economies developed, their shipping patterns changed. On the basis of extrapolations from population data, most colonies appear to have increased their shipping slowly between their founding and about 1730-1750. Following that period, growth rates accelerated until the Revolutionary War. In order to take these changes into account in defining areas where shipwreck remains are expected to be concentrated, the entry and clearance data presented in Appendix B for 1730 and 1770 were graphically superimposed upon shipping routes indicated on Charts III-3 and -4. These dates reflect significant trends indicated on Figs. III-3 through -8. By 1730, all ports which were to play an important role in shipping prior to the Revolutionary War had been established. This date also falls just before the period when shipping volume began to increase rapidly. By 1770, shipping had developed considerably at all ports, and did not change greatly until the Revolutionary War.

2.3.2.5 Definition of primary-potential areas. Areas where vessel remains of the period 1630-1800 are expected to be concentrated ("primary-potential areas") were defined on the basis of shipping-pattern data presented in Figs. III-3 through -8 and Charts III-3 and -4 for 1730 and 1770. When transferred to maps showing depth soundings and submerged hazards to navigation at a scale of 1:125,000, these patterns can be used to delimit primary-potential areas according to the following criteria:

1. Where major shipping routes pass close to shorelines or near or through submerged navigational hazards, such as rocks and shoals, wreck density is assumed to be a function of both navigational hazards and traffic volume along that route. Wrecks in these areas presumably occurred for two reasons. First, and most frequently, vessels struck submerged obstacles and sank. Second, vessels foundered in high seas. While primarily a function of weather and vessel condition, founderings may have been more common in exposed shoal areas because of increased wave height in those areas during storms (William Baker, personal communication). In applying these criteria to Charts III-3 and -4, a depth of five fathoms has been used as the outer limit because few vessels of the period had drafts of more than about 25 ft (Albion 1939, Appendix A) and few would have struck objects deeper than 30 ft even in high seas.

2. In coastal and shoal areas, where shipping was less frequent, but where submerged hazards and lee shores remained dangerous, wreck density is expected to remain relatively high. Therefore, these areas constitute a large portion of secondary-potential zones.

3. In deep-water areas, wreck density is assumed to be a function primarily of traffic density. Wrecks in these areas probably occurred by foundering and less often as a result of other factors such as fire, scuttling, etc. For these reasons, vessel remains could be encountered

frequently anywhere along heavily traveled routes. Such areas constitute the balance of secondary-potential zones.

4. In deep-water areas outside major shipping channels, wrecks probably occurred in proportion to shipping frequency as well as the frequency of sinking of derelict vessels. The number of losses falling into the latter category are difficult to estimate, and are probably relatively small for any given area. These areas are considered tertiary-potential zones.

2.3.3. 1800-1880

The third part of the predictive model (1800-1880) is based upon known-shipwreck data collected from newspapers published in the major ports of the study area in the years 1800, 1820, 1840, and 1860. Secondary sources and government records did not provide uniform coverage of all parts of the study area for all years from 1800 to 1880; therefore data from these sources were not considered in the development of the model.

A list of possible newspaper sources was compiled from the U.S. Library of Congress' Directory of Newspapers Available on Microfilm. Newspapers were identified for all of the major ports in each of the sample years, with the exception that no paper was identified for either Norfolk or Charleston for the year 1800 (Fig. III-9). Initial selection of papers to be viewed was made on the basis of accessibility. Films which were readily available to the research team were chosen first; as needed, additional films were obtained from more distant microfilm repositories.

Three or more newspapers were viewed for each of the sample years. All reports of vessels lost in the study area were recorded on data sheets. Multiple reports of vessels lost were identified and combined (see section 2.2.2 "Collection and synthesis of known shipwreck data"). Each of the various newspapers provided a significantly different percentage of coverage—some rarely reported even local disasters. Therefore, the use of data from papers which reported very few wrecks would have given an inaccurate impression that the region had been adequately covered. However, as we studied the films, it became apparent that in each of the sample years 1800, 1820, and 1840 at least one newspaper was available which was not limited by local or regional bias, but rather included reports of vessels lost in all parts of the study area. These various papers are referred to as "high-interest" papers. For the year 1860, it was necessary to use two "high-interest" newspapers whose complementary coverage included all of the study area. Table III-1 represents a summary of the number and approximate geographic locations of all wreck reports collected from the sample-year newspapers; the "high-interest" paper(s) for each year are indicated by an asterisk.

The predicted number of vessels actually lost in the study area from 1800 to 1880 is based upon the number of reports collected from the "high-interest" newspapers. In order to assess the level of coverage and test the percentage of reporting by the "high-interest" papers, a comparison was made of reports collected from the "high-interest" paper

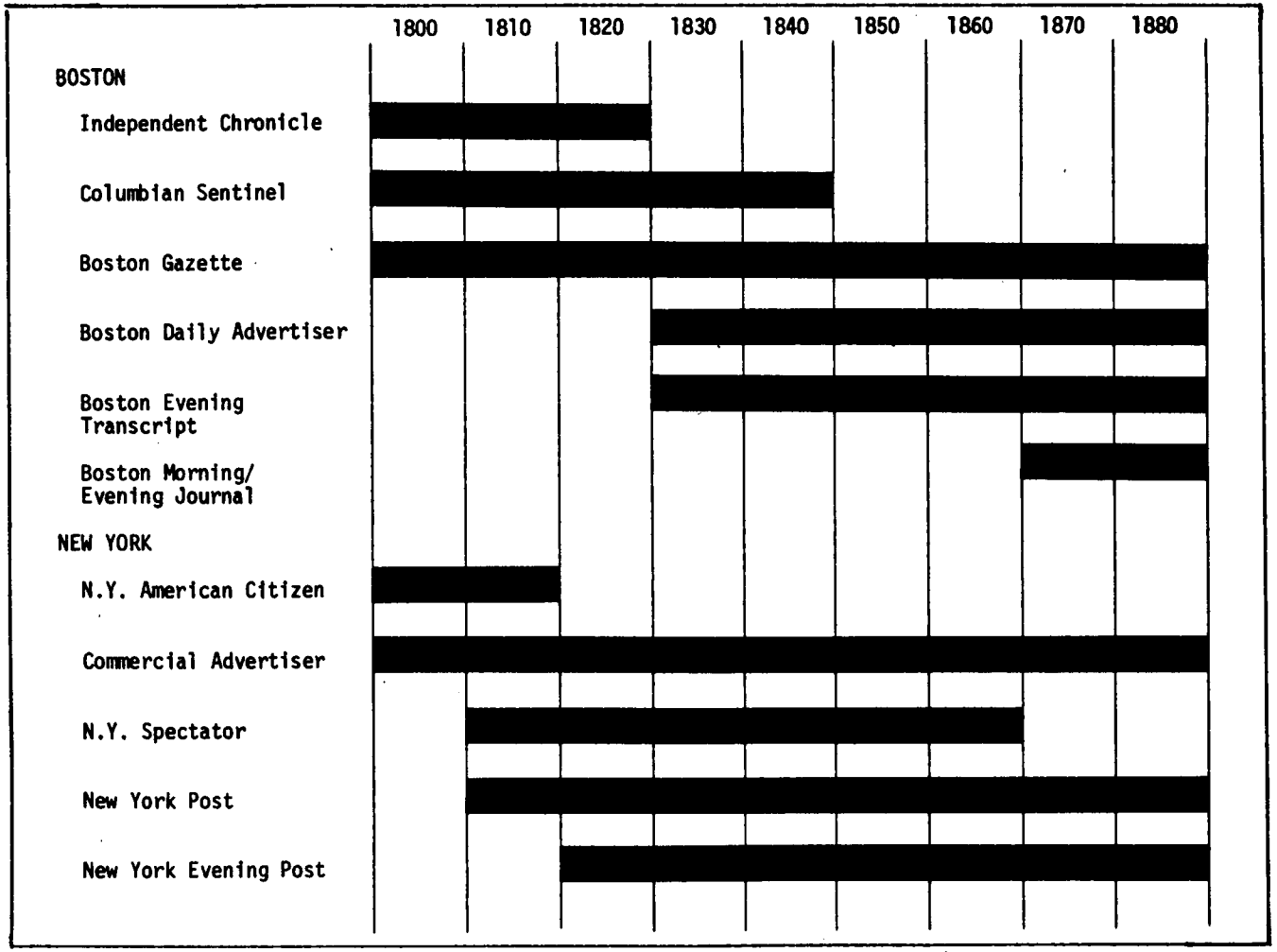



Fig. III-9
Temporal coverage of 19th-century newspapers identified as possible sources of known-shipwreck data.

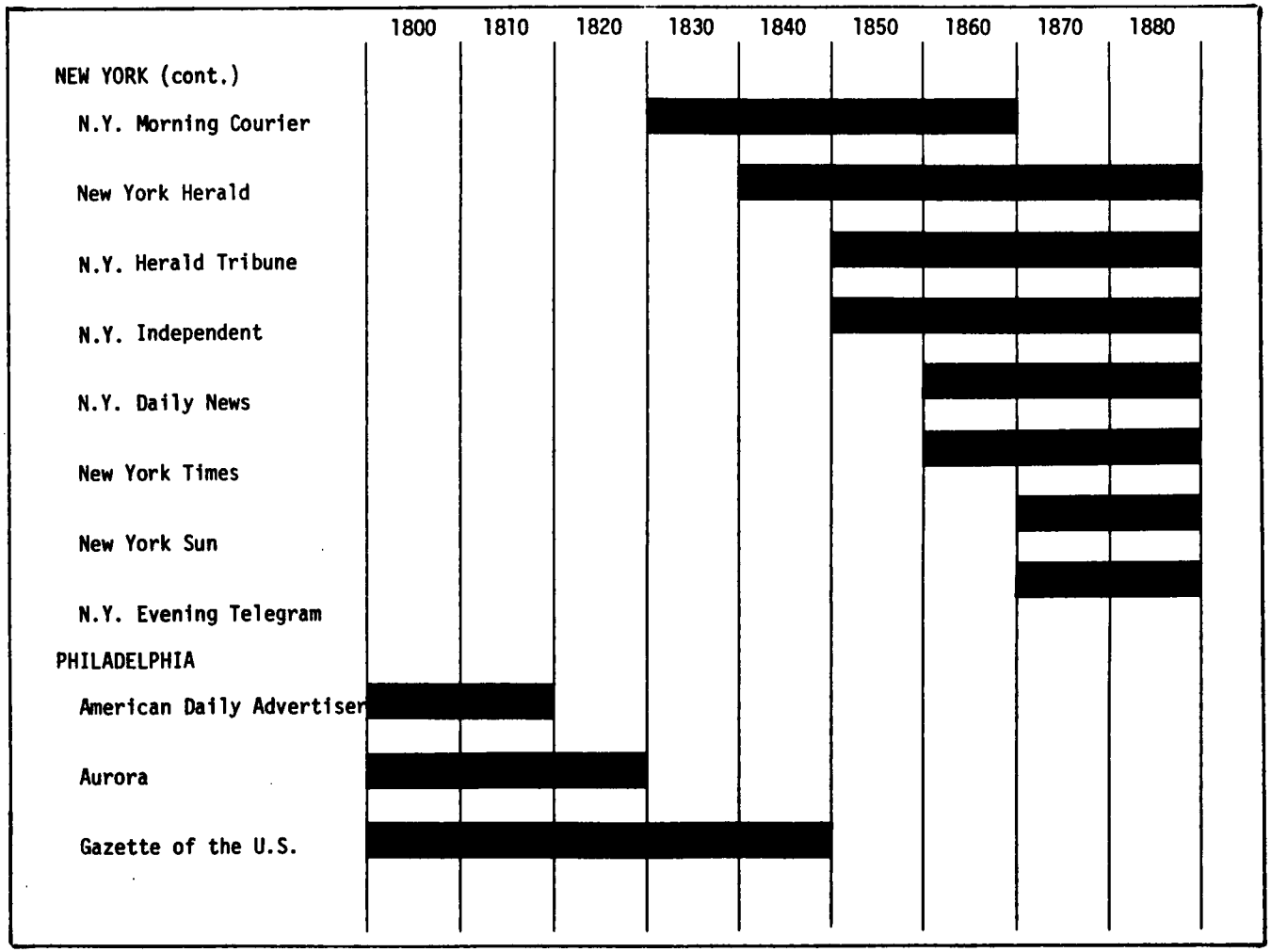



Fig. III-9
continued

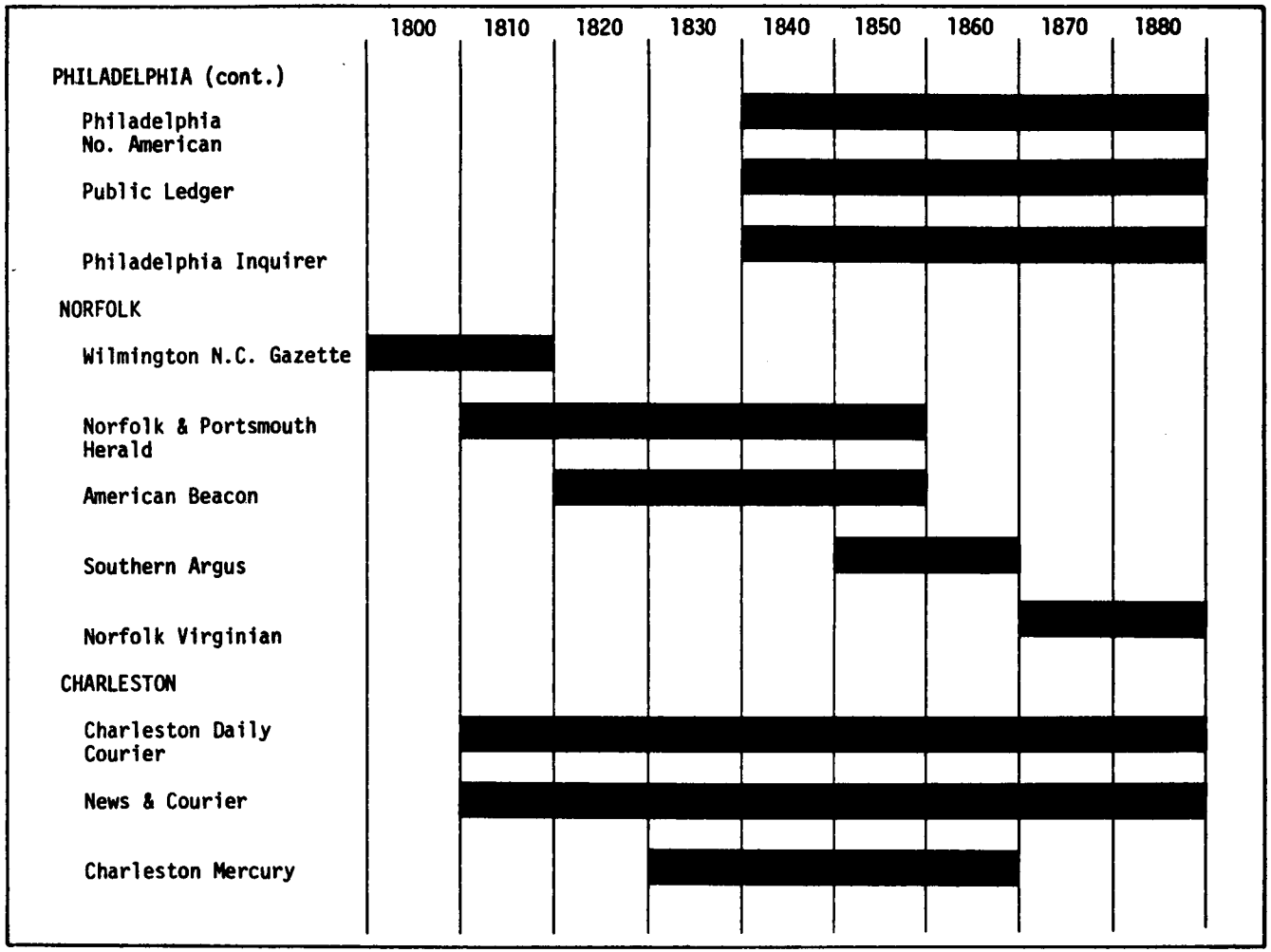



Fig. III-9
continued

Table III-1. Summary of number and approximate geographic locations of all wreck reports collected from sample-year newspapers.

| 1800 | ME | NH | MA | RI | CT | NY | NJ | DEL PA MD | VA | NC | TOO GEN'L | TOT'L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Claypoole-Poulson* American Daily Advertiser | 2 | 1 | 9 | | 2 | 10 | 4 | 4 | 3 | 3 | 10 | 48 |
| Boston Gazette (Oct.-Dec.) | | | 2 | | | 1 | | | | | | 3 |
| New York American Citizen (Jan.-June) | | | | | | | | | | | 1 | 1 |
| | | | TOTAL: 52 - 2 repeats = 50 | | | | | | | | | |
| 1820 | | | | | | | | | | | | |
| Poulson's American* Daily Advertiser | 1 | 1 | 9 | 1 | | 6 | 15 | 3 | 1 | 5 | 9 | 51 |
| Boston Gazette | 5 | 1 | 4 | | | 1 | 1 | | | | 5 | 7 |
| Charleston Courier (Jan.-Feb.) | | 1 | 3 | | | 1 | 8 | | 1 | | 1 | 15 |
| | | | TOTAL: 83 - 14 repeats = 69 | | | | | | | | | |
| 1840 | | | | | | | | | | | | |
| Boston Daily* Advertiser | 4 | 3 | 20 | 8 | 1 | 10 | 14 | 5 | 3 | 9 | 19 | 96 |

Table III-1. continued

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N.Y. Morning Herald (Jan.-Sept.) | 3 | | | 1 | | 3 | 2 | 1 | 1 | 4 | 3 | 18 |
| Philadelphia North American | 2 | 2 | 6 | 2 | | 3 | 11 | 7 | 1 | 4 | 8 | 46 |
| Charleston Mercury | | | | | | | | | 3 | 1 | 1 | 5 |

TOTAL: 165 - 38 repeats = 127

1860

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston Evening* Transcript | 10 | | 16 | 2 | 1 | 6 | 3 | 2 | 3 | | 9 | 52 |
| Portland Eastern* Argus | 9 | 1 | 10 | 6 | | 3 | 8 | 5 | 7 | 1 | 19 | 69 |

SUB-TOTAL: 121 - 13 repeats = 108

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Portland Transcript | | | 5 | 1 | | | | | | | 4 | 10 |
| N.Y. Herald Tribune | 2 | | 3 | | | 9 | 4 | 1 | 2 | 2 | 9 | 32 |
| Philadelphia Inquirer (Nov.-Dec.) | 2 | | 7 | 1 | | 3 | 4 | 1 | 1 | | 2 | 21 |
| Philadelphia North American | 1 | | 2 | 1 | | | 1 | 1 | 1 | | 1 | 8 |
| Charleston Mercury | | | 3 | | | 1 | 1 | | 1 | | 8 | 14 |

TOTAL: 206 - 42 repeats = 164

*high-interest newspapers

viewed for the year 1800 ("Claypoole-Poulson's American Daily Advertiser"), and reports of wrecks in 1800 which were collected from other "check" sources. The other "check" sources were those secondary sources and manuscripts which had been assembled and reviewed for possible use in the development of the pre-1800 sections of the predictive model, and which have been described in detail in section 2.2.1. Of the total number of wrecks reported by all sources considered in the test, 48 out of 72 or 67% were reported by the newspaper, and 29 out of 72 or 40% were reported by the "check" sources (see Table III-2).

For modeling purposes, it is assumed that in 1800 the "high-interest" paper reported 67% of all vessels actually lost in the study area in that year, and that for all other sample years the "high-interest" paper(s) also reported 67% of the total number of vessels lost in those years. It was further assumed that the predicted number of vessels actually lost in the sample years also represent average peacetime yearly numbers of vessels lost in each of the 20-year segments from 1800 to 1880. However, since the model is based entirely upon reports of vessels lost during peacetime years, such an assumption may not properly be applied to the war years 1812-1815 and 1861-1865 inclusive.

Of the total number of reports of shipwrecks in the study area collected from the newspaper sources, approximately 78% have been assigned to lease blocks and recorded on Map Set ICA-88 in the manner described in "Collection and synthesis of known shipwreck data." Either the locations of the remaining 22% were too general to be assigned to lease blocks, or the location as given could not be found on the resource maps. Predicted sites of all vessels actually lost in the study area between 1800 and 1880 are assumed to coincide with the sites identified for vessels reported lost by the newspapers. All sites have been assigned to six lease blocks or less. Those for which the location is reported as "off" or "near" a known landmark, have been assigned to an arbitrarily selected six-block area near the landmark and within the five-fathom depth line near the landmark.

### 2.3.4 1880-1945

The fourth part of the predictive model (1880-1945) is based upon data collected from the annual reports of the United States Life-Saving Service (USLSS) and the United States Coast Guard, and the "Vessels Lost" list of Merchant Vessels of the United States (see sources .54, .58, and .64-.67 in Bibliography D). Secondary sources of known-shipwreck data were not used because these did not provide uniform coverage of all parts of the study area for all years from 1880 to 1945. Newspapers, although available and potentially a source of comprehensive coverage, would have required an excessive amount of time to acquire and scan for reports. Government records, on the other hand, were 1) readily available; 2) comprehensive in coverage, reporting systematically from all parts of the study area and in all years from 1880 to 1945; and 3) objective, presenting data in list form. Since the data could be easily collected, these sources were sampled at 10- rather than 20-year intervals.

Table III-2. Summary of reports of vessels lost in 1800.

| | |
|---|---|
| Number of reports collected from "check" sources..... | 31 |
| Less number reported by 2 or more "check" sources..... | 2 |
| True number of wrecks reported by "check" sources..... | 29 |
| Plus number reported by "high-interest" newspaper..... | 48 |
| Gross number reported by both newspaper and other..... | 77 |
| Less number of wrecks reported by both of the above..... | 5 |
| True number of wrecks reported by both sources combined..... | 72 |

Reports of vessels lost in the years 1880, 1890, and 1900 were collected from the Annual Report(s) of Vessels Lost List of the United States Life-Saving Service. In order to assess the percentage of reporting by the Life-Saving Service, a comparison was made of casualties reported by the USLSS in the year 1880, and casualties reported in the same year by other "check" sources. Of the total number of vessels reported lost in 1880 by all sources considered, 30 out of 74, or 41%, were reported by the USLSS and 58 out of 74, or 78%, were reported by the "check" sources (Table III-3).

It is assumed that for each of the sample years 1880, 1890, and 1900 the number of wrecks reported by the USLSS represents 41% of the total number of all vessels lost in the study area in that year. It is further assumed that the predicted numbers of vessels lost in the sample years represent yearly peacetime averages for each of 10-year segments from 1880 to 1900.

For the sample year 1910, reports of wrecks were collected from the USLSS annual report. By 1920, the functions of the USLSS had been assumed by the United States Coast Guard (USCG), which continued to publish the annual "Casualty and Wreck Reports" as well as the more general "Reports of Assistance." For sample years 1910, 1920, and 1930 these sources are supplemented by another government record, the "Vessels Lost" list in the Merchant Vessels of the United States (MVUS), which recorded all reported losses of registered vessels in all parts of the study area both on- and offshore. For these years, the predicted number of vessels lost is based upon a true number (after matching for duplicates) of wrecks reported by combined government sources, USLSS/USCG and MVUS. In order to assess the percentage of reporting by these sources, a comparison was made of the true number of reports of wrecks collected from the combined government sources, and of reports collected from the "check" sources. Of the total number reported by all sources considered, 95 out of 107, or 89%, were reported by the combined government sources (Table III-4).

It is assumed that for each of the sample years 1910, 1920, and 1930, the true number of vessels reported lost by the combined government sources represents 89% of the actual number of all vessels lost in the study area in each of those years. It is further assumed that the predicted number of vessels lost in each of the sample years represents an average number of vessels lost yearly in each of the 10-year segments from 1910 to 1940, war years notwithstanding.

The 1940 USCG "Wreck and Casualty Reports" are not available on microfilm, and the "Reports of Assistance," though available, were considered to be too cumbersome to process. Therefore, reports of vessels lost in the year 1940 have been collected from only one government source, the MVUS. To arrive at a proper correction factor for the number of wrecks reported by the MVUS, we compared the number of vessels listed by the MVUS for 1910 to the number of vessels reported lost for that year from all other available sources. We found that the MVUS reported 81 out of 107, or 76%, of all vessels lost in 1910.

Table III-3. Summary of reports of vessels lost in 1880.

| | |
|---|---|
| Number of reports collected from "check" sources..... | 94 |
| Less number reported by 2 or more "check" sources..... | 36 |
| True number of wrecks reported by "check" sources..... | 58 |
| Plus number reported by USLSS..... | 30 |
| Gross number reported by both USLSS and "check" sources..... | 88 |
| Less number reported by both of the above..... | 14 |
| True number of wrecks reported..... | 74 |

Table III-4. Summary of reports of vessels lost in 1910.

| | |
|---|---|
| Number of reports collected from the USLSS..... | 29 |
| Plus number collected from the MVUS "lost list"..... | 81 |
| Gross number reported by USLSS and MVUS "lost list"..... | 110 |
| Less number reported by both of the above..... | 15 |
| True number of vessels reported lost by USLSS and MVUS..... | 95 |
| | |
| Number of reports collected from the "check" sources..... | 93 |
| Less number of vessels reported by 2 or more "check" sources | 21 |
| True number of reports collected from "check" sources..... | 72 |
| | |
| Number of vessels reported lost by combined govt. sources... | 95 |
| Plus number of vessels reported by the "check" sources..... | 72 |
| Gross number of vessels reported by govt. sources and "check" sources..... | 167 |
| Less number reported by both govt. and "check" sources..... | 60 |
| True number of vessels reported lost in 1910..... | 107 |

Approximately 416 total losses were collected from all government sources; of these, 403 have been assigned to six or fewer lease blocks or designated "6x" (general location known, but not to within six blocks). The remaining 13 were known to be in the study area but could only be located within a general region. Predicted sites of all vessels actually lost in the study area between 1880 and 1945 are assumed to coincide with sites identified as locations of known shipwrecks. The latitudinal and longitudinal locations of the USLSS stations (which later became the USCG stations), as given in the 1900 USLSS Annual Report, have been plotted on the 1880-1940 map set.

# 3.0 THE PREDICTIVE MODEL

## 3.1 Pre-1630

### 3.1.1 History of exploration and settlement

Beginning with the Norse in the eleventh century, Europeans began to explore the Atlantic coast of North America. North of Cape Hatteras, these activities culminated in the founding of fishing stations and ultimately in lasting settlements, beginning at Jamestown in 1607. By 1630, small colonies were to be found scattered up the coast as far as the Gulf of St. Lawrence. A detailed summary of these developments is presented in Appendix A. Their net effect on the distribution of vessel remains in the study area is expected to be minimal. However, in our opinion, the significance of any such remains from this period would be high, and the following sections discuss their probable distribution in some detail.

### 3.1.2. Known wrecks

Because of the small volume of shipping during and limited documentation about the period, there are few known pre-1630 wrecks within the study area. Three which have been identified are the following:

1. The Tiger, Adriaen Block's ship which was sunk in the New York-Brooklyn area in 1614, and reportedly discovered in filled land beneath the World Trade Center;
2. An unknown Dutch ship which wrecked at Sandy Hook in 1620;
3. An English ship commanded by a Master Johnson which struck the southern coast of Cape Cod in 1626.

Possibly local researchers could pinpoint a small number of other pre-1630's wrecks in the study area.

### 3.1.3 Prediction of potential wreck sites

3.1.3.1 The 1500's. The region from Cape Hatteras to the entrance of Chesapeake Bay has the highest potential for containing sixteenth-century wrecks. Besides major explorers such as Verrazano, Gomez, and Ayllón, Jesuits were active in the area (even establishing a mission in the Chesapeake area during the 1570's). Also, the Spanish are known to have explored just south of the region and the French attempted settlements at Cape Fear and in the area just below it. With this quantity of known activity in or near the Hatteras-to-Chesapeake region, there is a possibility of unknown traffic and perhaps of some wrecks within the zone. Furthermore, there is evidence that some off-course Spanish vessels met their ends on the Cape around the middle of the century.

Toward the latter part of the century, the English were fairly active in the area, attempting settlements at Roanoke. However, there were no known wrecks involved in these efforts and little evidence of maritime activity in the area other than that associated with and known by those involved in the Roanoke colonies. If there were any wrecks in the latter part of the century, they would have been few in number.

In the north, there is little evidence of activity below Cape Breton before mid-century at the earliest. By the late 1570's, the French were apparently sending at least a few vessels around Nova Scotia to the coast of Maine (especially northeast of the Penobscot) and perhaps infrequently as far south as Massachusetts. These were fur traders. Engaged in coasting, they would probably have been operating fairly small vessels. Again, excepting exploration, this seems to be the only maritime activity in the northern part of the study region.

While there was little activity in the north and south during the 1500's the central portions of the east coast were even less active. Verrazano, Gomez, and Rut make up most of the Europeans to visit the region. In fact, when Henry Hudson and Adriaen Block visited the middle coast in the early 1600's, they found no evidence of prior or contemporary European activity other than their own. To give an idea of how seldom the region was visited, it was not even known that Long Island was an island prior to 1614. In contrast, it had been discovered in 1540 that southern California was not an island (as originally thought) and the fact was so indicated on maps by 1570. If a sixteenth-century wreck were to be found between Rhode Island and the Chesapeake Bay, it would be a great surprise. Support for this position is provided in Appendix C.

3.1.3.2 1600-1630. The first three decades of the seventeenth century saw major changes in maritime patterns. Virginia was founded in 1607 and soon the James River became a focal point for shuttle voyages from England. Sailing either straight across to America or round-about through the West Indies, many incoming vessels would undoubtedly arrive off or sail by the Hatteras region. The known dangers of the Cape would suggest the real possibility that there are early seventeenth-century English wrecks along the coast. Outgoing vessels probably struck out more directly into the Atlantic; still, by hitting the Chesapeake entrance in time of foul weather, they too could have been driven back on the outer shores.

Beside this trade with England, the Virginians were involved in some coasting activity. By the 1610's, a small number of vessels were sailing for New England and Newfoundland to do some fishing and there are instances of others heading to Bermuda and the West Indies for food. This admittedly did not represent a great deal of traffic, but wrecks of early coasters may still exist from Hatteras to New England.

A second area to experience new activity was the region between the Delaware River and Narragansett Bay. After Adriaen Block and Cornelis May surveyed the region in the mid-1610's, a fur-trade network which included the mainland coastline, Long Island, and Delaware, Hudson and

Connecticut Rivers was established between the two above-mentioned points. This coasting activity might easily have left small-vessel wrecks throughout the area. There was also major shuttle activity between New Netherland and the Dutch Republic, with most vessels sailing into New York Harbor, although a few may have gone to the Delaware. This traffic probably consisted of three to six ships a year in the 1620's. Vessels could have been lost along southern Long Island, in New York Harbor or between Sandy Hook and Delaware Bay.

The northern portion of the study area probably received more new traffic than any other region. The early explorers clearly delineated the coastline and shortly thereafter fishermen and fur traders invaded the area. Focusing on the mid-Maine coast at first, the fishermen (mostly English) were working as far south as Cape Cod by the 1620's. They came over in large vessels which served as floating supply stations and fishing platforms during the fishing season. The fishermen also used small shallops. Some simply left their shallops on the beach when they returned to England; others brought the small craft along (either in tow or broken down to be refabricated upon reaching the fishing site). Meanwhile, fur trading was being carried on, both as an adjunct to fishing and as an independent activity. Trading vessels were probably fairly small. Needless to say, because of the highly mobile nature of the two industries, wrecks of early fishing and trading vessels might be found anywhere along the New England coast. However, there were centers of fishing activity (such as Pemaquid, Damariscover, Isle of Shoals, Monhegan) and of fur trade (such as the Penobscot and Kennebec rivers) and wrecks of vessels involved would probably be more frequently found in these areas of greater activity.

A shift in this pattern occurred with the establishment of fishing stations. This development began to pattern maritime activities, providing specific locations to which English shuttle-ships would aim. Also, fishing craft working off the coast were involved largely in dry fishing and could not afford to go much more than a half-day's sail from the fishing station and get in any fishing time. (One- to two-day trips seem typical for the early dry-fishing operations on the New England coast.) This restricts considerably the locales where early craft from fishing stations should be found and also increases the possibility of finding larger vessels near established centers. Fishing ships continued to come over from England in the latter part of the 1620's, so that the earlier pattern still persisted although it was declining with the advent of the new stations.

Meantime, the first permanent settlements were being established along the New England coast. Almost immediately, specific communitites began serving as entrepôts for the surrounding region. The Piscataqua region was already filling the role by the late 1620's, and Boston would soon pick it up in the 1630's. Increasingly, trans-oceanic traffic would funnel into these ports and as they grew, the coasting trade would develop. Coasters not only brought goods for trans-shipment and obtained needed imports, but also found a new market in the commercial

centers themselves. It took lumber to build houses, firewood to heat them, and food to feed the growing populations. As this trade began to develop, the maritime story began to shift from the erratic patterns of the early period to those of a more mature and sophisticated colonial maritime system.

Not surprisingly, as Europeans reached new areas on the American coast, knowledge about those areas increased quickly. Again, this is dramatically demonstrated through maps of the period. While the southern coast had become well known by the late 1500's, it was the map that Captain John Smith developed while he was in Jamestown that clearly delineated the Virginias and the Chesapeake Bay area for the first time (Fig. III-10).

Likewise, in the north, the early seventeenth-century explorers, operating at a time when the first settlement efforts were in progress and fishermen and traders were moving into the area were able to produce excellent maps of the region. Lescarbot's map of 1609 and, even more stunningly, Champlain's map of 1613 (Fig. III-11) provide a useable image of New England. Captain John Smith's map of 1616 (Fig. III-12) is a superb representation of the coast between Cape Cod and the Penobscot River.

For the central coast, a 1616 map provided an excellent portrait of the region. Developed from the exploration of Block and May, it revealed in one step and in great detail the previously little-known geography of the mid-Atlantic coast of North America (Fig. III-13).

## 3.2 1630-1800

### 3.2.1 History of shipping

After 1630, colonial shipping began to develop new patterns. Prior to that time, attempts at colonization were supported largely by shipping direct from the mother country. However, as new settlements joined the first successful colonies at Plymouth, Boston, New Amsterdam and Jamestown, these older ports tended to become entrepôts for smaller colonies, collecting commodities for export to England and Holland and redistributing imports from Europe. By 1640, intercolonial trade had become a regular feature of colonial commerce, with import and export focused at Boston, New Amsterdam and Virginia (Jamestown). With the addition of Philadelphia and Charleston around 1700, these major ports continued to expand their export and import commerce until the Revolutionary Period (Johnson and others 1915, Bibliography A). While New England, particularly Boston, led in shipping growth during the period, it did not dominate all aspects of marine commerce. Noteworthy regional trends are discussed in Appendix B.

By 1700, when colonial population stood at about 300,000 (U.S. Bureau of the Census 1965) coastal shipping ranked third in value behind

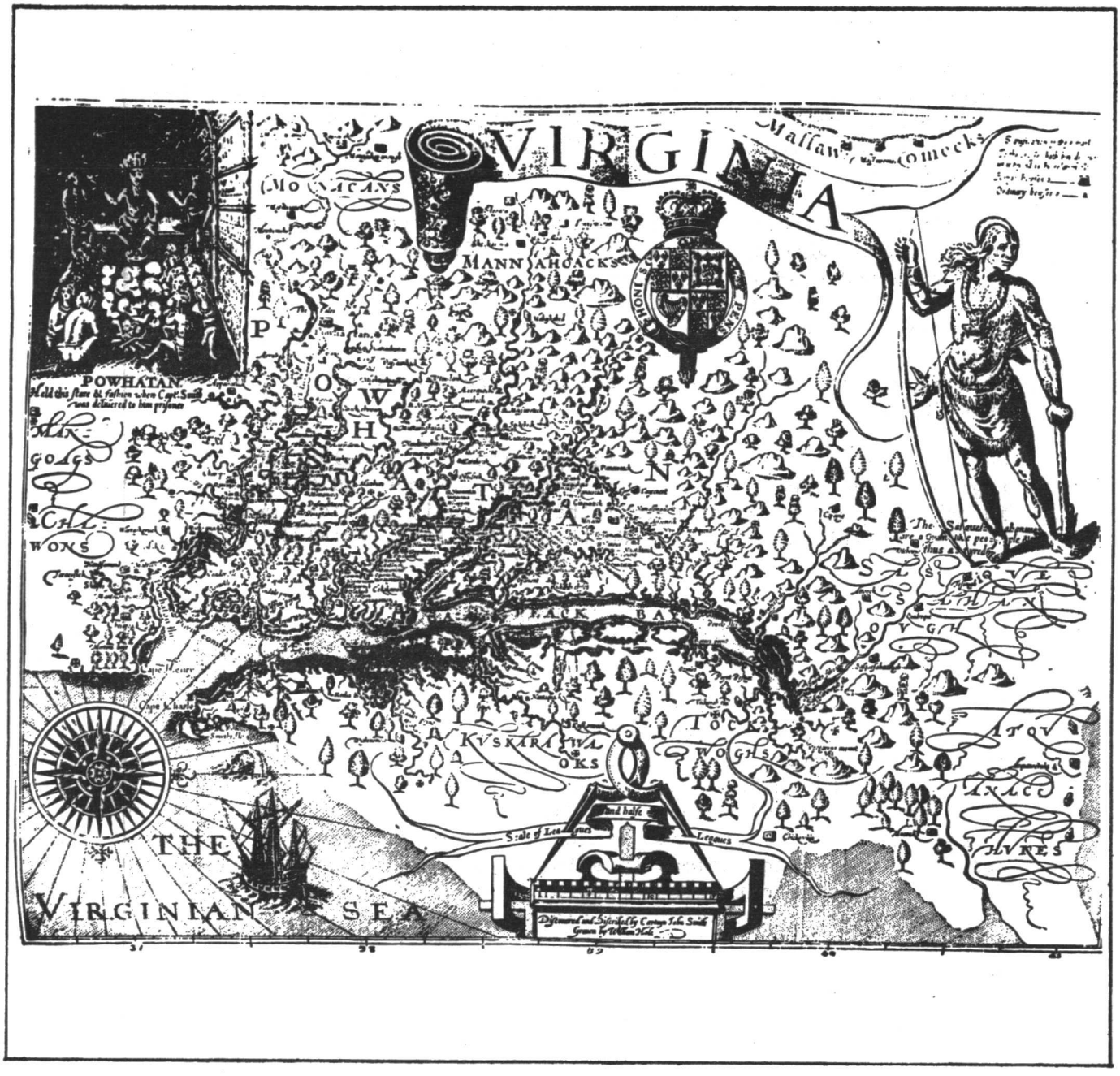



Fig. III-10
John Smith's map (about 1610) which clearly delineated the Virginias and the Chesapeake Bay area for the first time (reprinted from Winsor 1884).

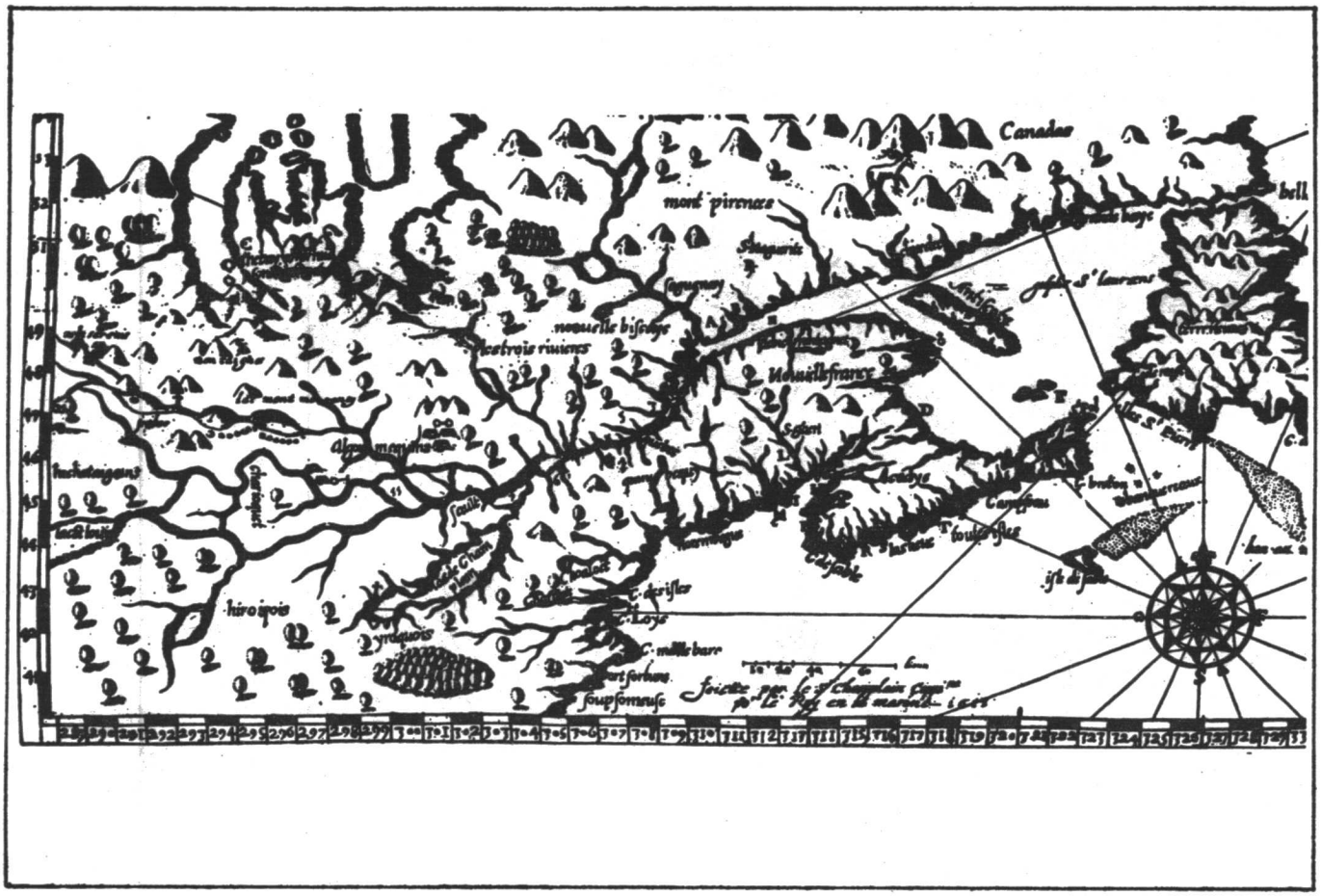



Fig. III-11
Part of Champlain's 1613 map (reprinted from Winsor 1885). This was the first map that accurately described New England.

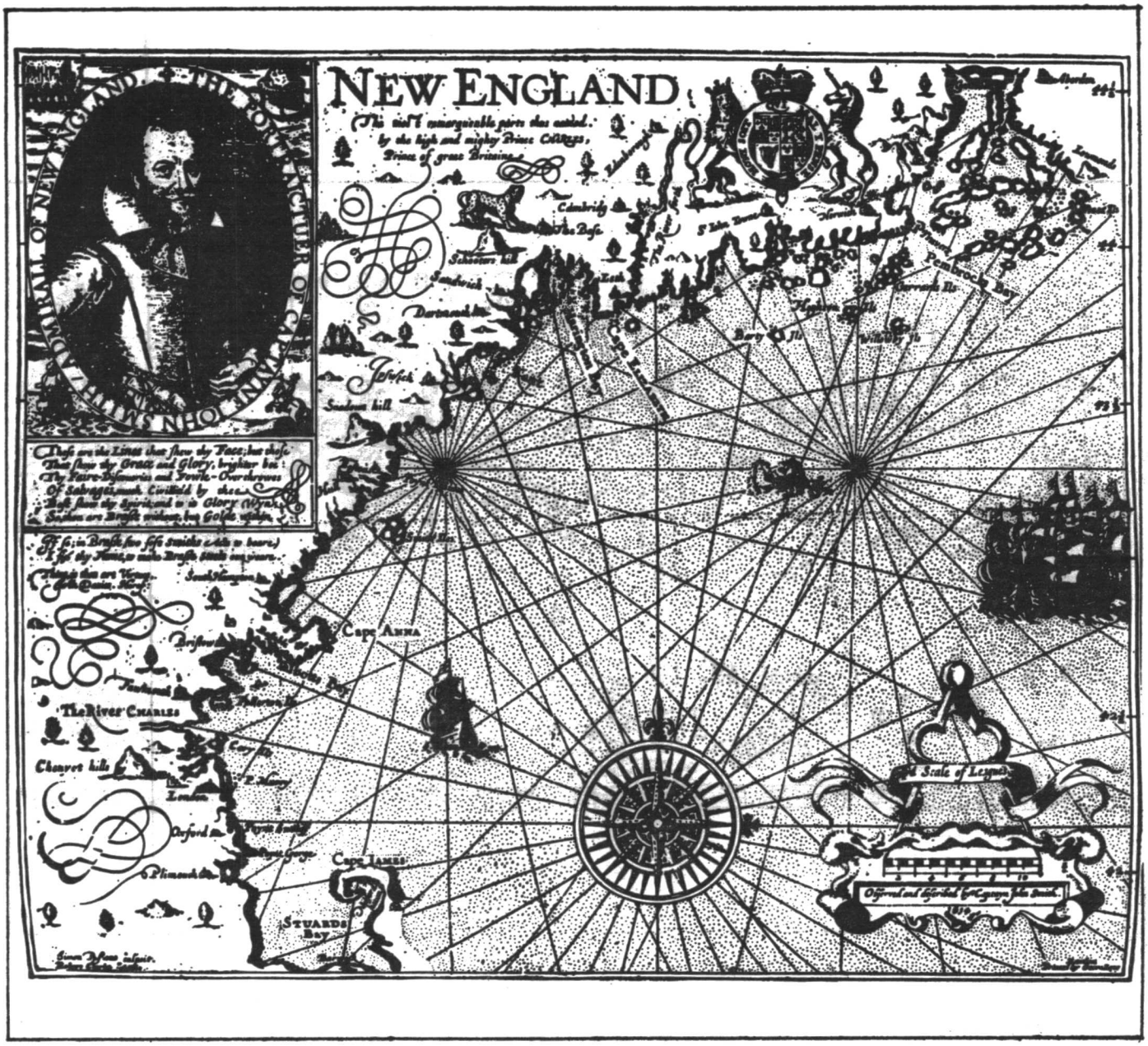



Fig. III-12
Map by Captain John Smith (reprinted from Winsor 1884). This is a very good representation of the coast between Cape Cod and the Penobscot River.

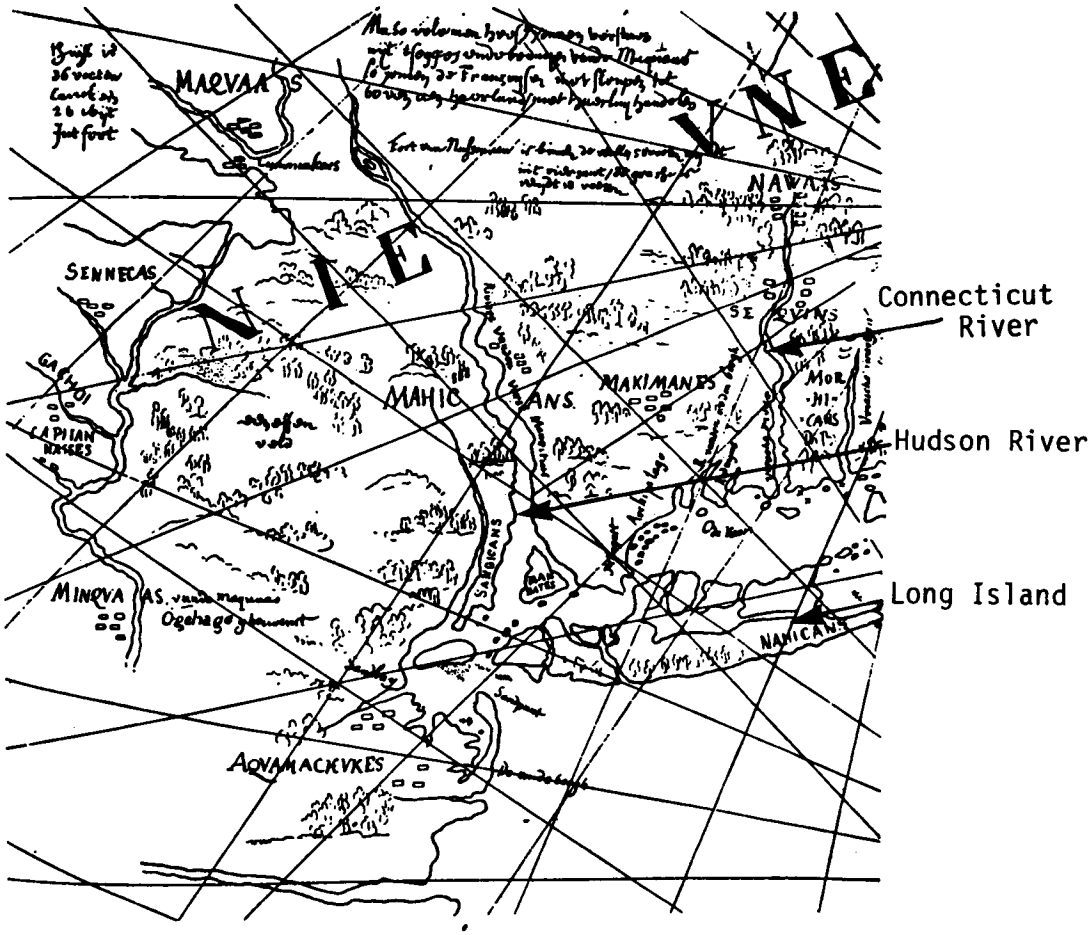



Fig. III-13
1616 map developed from the exploration of Block and May (reprinted from Winsor 1885). This very detailed map reveals the previously little-known geography of the New York Bight.

**European shipping and the West Indies trade (Johnson and others 1915). In the northern colonies, coastal trade amounted to as much as half the overall value of shipping at some major ports, while in southern colonies the figure was about one-fifth. In the north, few minor ports engaged in direct exportation to Europe. They relied instead upon Boston, New Amsterdam/New York and Philadelphia for European commerce. In the south, however, where tobacco formed the major commodity for export, direct exportation to Great Britain predominated.**

Commerce expanded rapidly during the period 1700-1776, generally following the coastal shipping-entrepôt pattern. Major factors leading to this growth include population increases (1,600,000 by 1760; 2,780,000 by 1780), increased importation of slaves via the West Indies after 1713, and the development of local surplusses of agricultural products, fish, and timber for export. Warfare and increasingly stringent British laws regulating maritime commerce in the colonies hampered growth for short periods but did not drastically interrupt the upward trend. Localized impacts of these factors are considered in more detail below.

Despite the continuous growth of maritime commerce through 1775, British legislation following 1760 was thought unfair and overly restrictive of colonial interests. Resentment against it contributed significantly to the outbreak of the Revolution, which severely damaged colonial maritime commerce. However, the net reduction of shipping during the Revolution was not as severe as might initially be assumed. Coastal commerce and fishing were hardest hit, though not entirely stopped. However, British imports were increased during the war, and even coastal trade, often rerouted through Nova Scotia and the West Indies, was substantial. Furthermore, the activities of ports controlled by the British (primarily in New York, Carolina and Georgia) remained high.

After the war, colonial maritime commerce enjoyed a brief boom encouraged by wartime shortages and the presence of currency reserves generated by British cash payments for supplies purchased in the colonies during the conflict. England remained the dominant focus of the export trade, basically because it constituted a logical entrepot for other European markets and continued to favor its former colonies in some aspects of trade.

However, by 1785, imbalances in payment and the poorly developed commercial policies of the newly independent nation led to a severe though short-lived depression in America. The impact of this depression upon maritime commerce is indicated in Table III-5 (Johnson and others 1915). Recovery from this depression was rapid after 1789, as United States currency problems were overcome and as the states began to recognize the value of a coordinated national commercial policy. Most established aspects of American shipping attained or exceeded their pre-war levels by the close of the eighteenth century. In addition, trade with the Far East was initiated during the 1780's while Eli Whitney's invention of the cotton gin and the founding of the William Slater textile mill in Rhode Island were auguries of great change and commercial prosperity to come.

Table III-5. Impact of the 1785 depression upon maritime commerce.

| | U.S. Exports to England | U.S. Imports from England |
|---|---|---|
| 1769-74 av./yr. | £ 1,752,142 | £ 2,732,036 |
| 1784-89 av./yr. | £ 908,636 | £ 2,333,643 |
| Difference | £ 843,506 | £ 398,393 |

### 3.2.2 Known wrecks

**About 500 reports of vessels lost in the study area between 1630 and 1800 were collected during the course of this project. These data were not directly employed in developing a general model for wreck distribution during the period for reasons stated in section 2.1. However, vessel remains of this period are regarded as being of high archaeological significance, and the available data have therefore been plotted as precisely as possible on Map Set ICA-88. Virtually all known wrecks fall within Zones 1 and 2, and the majority fall within Zone 1.** While this coincidence seems to support the model, it should be noted that those wrecks falling within Zone 2 are not evenly distributed within it. Rather, the majority of wrecks falling within Zone 2 seem to have occurred in shallow waters, not in deeper, less traveled waters. The available data are not adequate to indicate the reasons for this discrepancy, but two possible explanations can be suggested:

1. Wrecks near shore are more likely to be reported, because of the presence of witnesses on shore and/or the increased likelihood of survivors.
2. Wrecks due to foundering, fire, explosion, etc. were not as common, even in heavily traveled offshore areas, as predicted by our model.

However, with regard to the second possible explanation offered above, it should be noted that many offshore accidents may not have resulted in immediate sinkings. Rather, it is likely that after filling to the gunwhale, ships would have drifted for a while, often coming to rest in waters classified as Zone 1 areas in this model (William Baker, personal communication).

Again, with regard to wrecks of the Revolutionary War period (about 100 reported) the available data are not regarded as adequate to predict the distribution of other such wrecks in the study area. However, such data as are available suggest interesting patterns. Reported Revolutionary wrecks appear to cluster near New York. While the explanation for this apparent distribution cannot be derived from the available data, it is possible that British control of New York during the Revolution led to increased maritime traffic and/or naval combat in that area, and thus to an unusually large number of vessel losses.

A large number (39) of colonial war vessels were lost in the Penobscot (ME) estuary between April 14 and 16, 1779 while trying to capture Castine from the British. This naval disaster was unprecedented in scale and is considered truly anomalous.

### 3.2.3 Prediction of wreck sites

On the basis of the criteria outlined in Section 2.0 (Methods and Materials), we defined areas regarded as likely to contain shipwreck remains

dating between 1630 and 1800 and designated their probable densities as high, medium, and low.

3.2.3.1 Areas of highest density. These areas include those where heavily traveled shipping routes of the period passed over or adjacent to hazardous waters, defined as waters with depths of five fathoms or less. These highest-density areas extend southward from Boston Harbor to Cape Hatteras, including all coastal and other shoal areas except the following: Cape Cod Bay (MA), western portions of Nantucket Sound (MA), and Buzzard's Bay (MA); Narragansett Bay (RI); Block Island Sound (NY), Long Island Sound (NY); inlets of the eastern shore of the Delmarva Peninsula (DE, MD, VA); and Currituck, Albemarle and Pamlico Sounds (VA, NC).

3.2.3.2 Areas of medium density. These areas include those of two types: first, areas bypassed by the most heavily traveled routes but including shallow waters (less than five fathoms); second, areas traversed by major routes but including waters of depths greater than five fathoms. Thus this area includes all coastal and shoal areas not listed as having highest density, as well as the seaward portions of major sea-routes (that is, those passing in and out of Boston, New York, Philadelphia, Hampton and Charleston).

3.2.3.3 Areas of relatively low density. These small areas include regions of deep water for which our data indicate little likelihood of heavy maritime traffic. Idealized routes suggest that such areas might be quite large. Evidence from navigation charts showing actual voyages, however, clearly indicates that sailing vessels did not cleave exactly to idealized routes, but rather approximated them. When superimposed on our charts, these data indicate that the great majority of the study area was frequently traversed by traffic to and from major ports.

## 3.3 1800-1880: Analysis of Known-Wreck Data and Predicted Numbers

The derivation of the following predictive model has been explained in section 2.0 (Methods and Materials) of this volume.

### 3.3.1 Predicted number of vessels lost in sample years

| Total number reports collected from "high-interest" paper(s) | | | Multiplied X 1/0.67 | | Predicted number of wrecks |
|---|---|---|---|---|---|
| 1800 - Claypoole-Poulson's American Daily Advertiser | : | 48 | X 1/0.67 | = | 72 |
| 1820 - Poulson's American Daily Advertiser | : | 51 | X 1/0.67 | = | 76 |
| 1840 - Boston Daily Advertiser | : | 96 | X 1/0.67 | = | 143 |
| 1860 - Boston Evening Transcript & Portland Eastern Argus | : | 106 | X 1/0.67 | = | 161 |

Figure III-14 graphically presents these data.

### 3.3.2 Actual and predicted locations of vessels lost 1800-1880

Of the total number of reports collected from all of the sampled newspapers, (295 from the "high-interest" papers plus an additional 117 from the remaining papers), approximately 322 (78%) have been plotted on the BLM lease block maps at the scale of 1:125,000. The locations of the remaining 22% were not sufficiently and accurately known to permit plotting.

Shipwrecks were concentrated along the coast and islands, with a small percentage sinking in water deeper than 20 feet. Clusters occurred near major ports and hazards to navigation, especially Cape Ann, Boston, Cape Cod, Nantucket, New York, the mouths of Chesapeake Bay and Delaware Bay, and Cape Hatteras. The change from sail to steam power during the latter part of this period appeared to have little effect on the location of shipwrecks. The one exception is Cape Cod, where a minor shift may be indicated for the mid-nineteenth century after the opening of the Cape Cod Canal.

## 3.4 1880-1945: Analysis of Known-Wreck Data and Predicted Numbers

The derivation of the following predictive model has been explained in section 2.0 (Methods and Materials) of this volume.

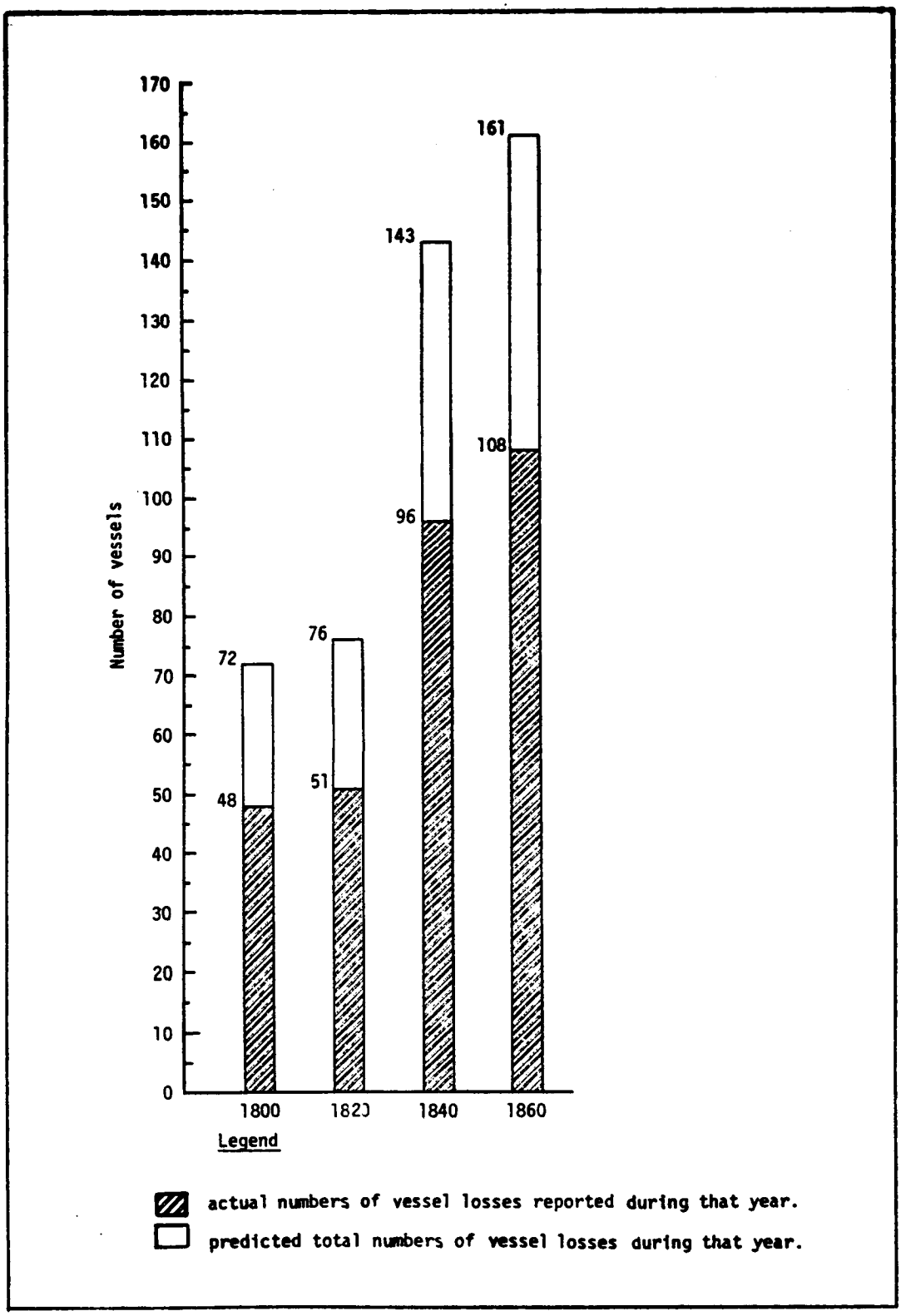



Fig. III-14
Vessel losses actually reported and predicted, 1800-1860.

### 3.4.1 The predictive model

| Government source | Number of reports | Multiplied by factor | | | Predicted number of wrecks |
|---|---|---|---|---|---|
| 1880 (USLSS) | 31 | X | 1/0.41 | = | 76 |
| 1890 (USLSS) | 41 | X | 1/0.41 | = | 100 |
| 1900 (USLSS) | 49 | X | 1/0.41 | = | 120 |
| 1910 (USLSS & MVUS) | 95 | X | 1/0.89 | = | 107 |
| 1920 (USCG & MVUS) | 92 | X | 1/0.89 | = | 103 |
| 1930 (USCG & MVUS) | 76 | X | 1/0.89 | = | 85 |
| 1940 (MVUS) | 32 | X | 1/0.76 | = | 42 |

Figure III-15 illustrates the above data graphically.

### 3.4.2 Locations of vessels lost 1880-1945

A total of 416 reports were collected from the government sources and of these 403, or 97%, have been assigned to lease blocks and plotted on the 1:125,000 map set. The remaining 3% could not be located accurately enough for plotting. Most wreck locations were reported with respect to known positions of the USLSS/USCG stations and could generally be plotted in fewer than three blocks. Those vessels that could not be assigned to fewer than six blocks (reported as "off" a known landmark) have been assigned to an arbitrarily selected six-block area near that landmark and within the 10-fathom line.

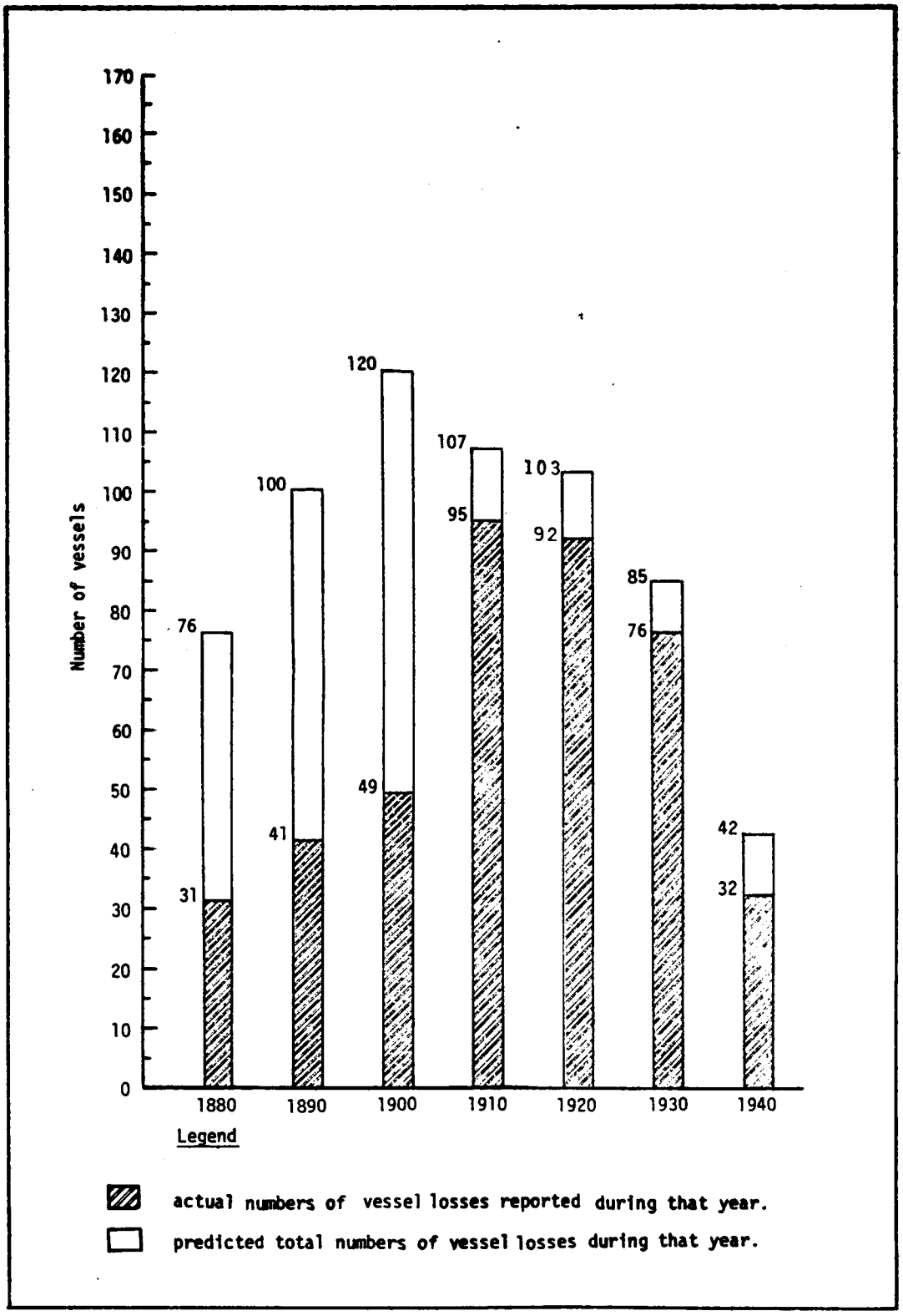



Fig. III-15
Vessel losses actually reported and predicted,1880-1940.

# 4.0 DATA LIMITATIONS

## 4.1 Limitations of Known-Shipwreck Data

All sources of known-shipwreck data were biased in one respect or another, and no source was identified which provided comprehensive coverage of all parts of the study area both on- and offshore.

The government records were primarily concerned with reports of vessels lost in onshore areas (within the fields of operation of the USLSS and USCG stations), or with losses of American-registered vessels only (MVUS). The secondary sources and manuscripts were biased in favor of onshore wrecks of local or regional historical interest.

Newspapers demonstrated the highest potential for relatively unbiased comprehensive coverage; however, these proved to be the most awkward and time-consuming of the sources used. Since the possible newspaper sources were not indexed for the topic, many worker-hours were expended in simply identifying the "high-interest" papers. Further, each had its own format and manner of reporting vessel losses, with more or less consistency than others. Although the "high-interest" papers which have been identified and used for this report did include vessel losses from all parts of the study area, none of the papers appeared to have established regular communication with out-of-town correspondents. Given an extensive amount of research time for investigation of all possible newspaper sources, it is possible that one "high-interest" paper might be identified for each of the major ports for each of the sample years, and that the body of data collected from these papers would represent a more comprehensive sample upon which to base prediction.

The sources having been selected, the following general problems were encountered with all of the sources of known-shipwreck data:

1. Establishing that a wreck has occurred. A wreck may be any vessel reported as ashore, stranded, cast away, abandoned, foundered, burned, exploded, lost, or sunk. Any of the above were assumed to be totally lost. Occasionally a later report from the same source or perhaps another source described the vessel as having been re-floated or otherwise salvaged. The vessel was then removed from the sample.

2. Identifying each individual wreck. Sufficient identifying data had to be collected in order, first, to distinguish each individual wreck from all other wrecks reported; and then to recognize multiple reports of the same wreck to avoid multiple listing in our sample and repeated plotting of the sites onto the lease-block maps. All reports were cross-referenced by name of vessel or, in the absence of that information, by date

of wreck, or reported location, or any/all other possible identifying data.

3. Coping with human error. All sources of known-shipwreck data, and especially those presenting large bodies of data have a high potential for reporting and recording error. The digits in the date of a wreck may be transposed; the location may be inaccurately reported as Portsmouth, NH instead of Portsmouth, NC; the name of vessels may be inaccurately or incompletely reported (for example, the Emma C. Babcock may be reported as the E.C. Babcock, the Emma, the Babcock, or as an "unknown"——unnamed vessel), any of which possibilities would place the vessel in a different position in the alphabetization of vessel names. Nineteenth-century newspapers were particularly vague, frequently omitting identifying details, such as name of wreck or location of the loss.

## 4.2 Limitations of "Peacetime" Model and Collection of "War-Year" Data

The model which has been developed for the late nineteenth and twentieth centuries (1880-1945) is considered valid for the prediction of average yearly numbers and distributions of vessels lost in peacetime years only. Known-shipwreck data collected from non-war sample years may not properly be applied to predictions of war-year losses.

Three assumptions are made regarding war-year losses: 1) that the nineteenth- and twentieth-century wars affected the national economy in general, and shipping volume and patterns in particular; 2) that the number of vessels lost in any given year is directly related to the volume of shipping in that year; and 3) that some wartime vessel losses, both civilian and military, probably occurred in areas other than those predicted for average peacetime losses, as a result of acts of war or of altered shipping patterns. The present sample of known-shipwreck data is too small to reflect the effects of war (or depression) on numbers and distributions of vessel losses in those years; and we have not attempted to find or analyze shipping statistics that would determine the long- and short-term effects of war (or depression) upon the volume or patterns of commercial shipping.

In an effort to identify specific war-year losses, known-shipwreck data were collected from the following sources:

1. War of 1812 (1912-1815). All secondary sources and manuscripts which were reviewed for possible use in development of the pre-1800 sections of the model, and described in "Methods and Materials; pre-1800 Known-Shipwreck Data" (including secondary sources .23 through .45—excluding .38 and .41 in Bibliography C; and all manuscripts .70 through .91 in Bibliography E).

2. Civil War (1861-1865). Same as above, plus sources .38, .41, and .52.

3. World War I (1917 and 1918). One source only, number .69.

4. World War II (1942-1945). Sources .61, .63, and .68.

Data collected from these sources were partially processed (that is, matched for duplicates, and tentatively assigned to up to 10 possible lease-blocks). Completion of the process would require 1) review of tentative assignments, correcting those assigned to more than six blocks to a maximum of six, with necessary X-code; 2) continued efforts to locate sites tentatively labeled "cannot locate"; and 3) assignment of those sites which were tentatively labeled "too general" to 6x blocks, if location had been reported as "on" a landmark too large to be described by six blocks (for example, Mt. Desert Island, Maine), or as "off" or "near" a known landmark such as Cape Cod or Cape Hatteras.

Complete processing of war-year data has not been pursued because 1) priority was awarded to the complete processing of the sample-year data; and 2) we concluded that, as a result of limitations of the sources selected, the war-year data are inconclusive and do not constitute a reliable basis for prediction of numbers and distributions of war-year losses. Each source (or set of sources) had its own bias, particularly with respect to types of vessel and nature of losses reported. Some sources reported only losses directly related to acts of war; others reported all losses with no differentiation between those due to acts of war and those due to other causes (stranded, foundered, burned, etc.), in which case it was difficult or impossible to determine whether the real or adjusted number and distribution of reported war-year losses would properly be considered as a substitution for average yearly peacetime losses, or as an addition to average yearly war-time losses.

The secondary sources and manuscripts from which reports of losses during the War of 1812 were collected were heavily biased toward onshore wrecks of local or regional interest. It may have been valid to assume that since these same sources had reported 40% of the true number of losses reported in 1800 by all sources considered, they might also have reported 40% of the total number of war-year losses. However, the "check" was made with respect to data collected in a non-war year when the losses may have been less important.

It may also have been valid to assume that these same sources, plus the National Archives List, plus the two published sources directly concerned with reporting of Civil War losses, may have combined to represent 100% reporting of all losses due to all causes during the Civil War period. However, it is not possible to "check" the percentage of reporting of the special sources.

The single source of reports of World War I vessel losses relates only to vessels lost as a direct result of acts of war. The number and distribution of these losses should properly be considered as an addition

to an average number of losses and distribution losses and distribution of peacetime wrecks for the years 1917 and 1918. However, World War II loss records are comprehensive, covering both natural and war-related disasters.

Data collected on vessels lost during the Revolutionary War period were fully processed, as were all data on pre-1800 vessel losses. No predictions have been made on the basis of these data, because of the limitations of the sources, as discussed in "Methods and Materials—pre-1800 section 2.2.1. The number and locations of all pre-1800 losses are presented only as a supplement to the model based upon statistics of shipping volume, route patterns, and navigational hazards. The number of ship disasters in each case represents a minimum probable number. Many wrecks would not have been found in any available records. This observation is especially true of foreign vessels which wrecked unobserved on American shores and to fishing vessels, which were most often not reported in major newspapers or government lists, unless they wrecked near a life-saving station. An attempt was made to arrive at some reasonable figures for these two categories, but no representative data were located.

# 5.0 RESULTS

## 5.1 General

The results of this project have been presented in four sections dealing with vessel remains dating before 1630, 1630-1800, 1800-1880, and 1880-1945. As described in "Methods and Materials," the research strategies employed varied for each period, depending on the nature of vessel-loss data available.

Predictions of pre-1630 wreck distributions are based primarily upon two data sources: descriptions of exploration voyages and early colonial settlement patterns. These sources suggest that relatively small numbers of vessel remains may be expected along exploration routes, in the vicinities of early settlements and along sea routes used by vessels traveling to and from these settlements. Pre-1630 wrecks, like those of later periods, are further predicted to cluster in shallow water areas where hazards to navigation occur. This prediction is supported by the distribution of the four pre-1630 wrecks identified during this project. See Charts III-1a and b and III-2b for illustration of early occupation and exploration patterns.

Incidence of wrecks dating between 1630 and 1800 is predicted to increase rapidly throughout the period, as a result of increased colonial populations and concommitant maritime activity. Analyses of maritime historic sources indicate that the rise of major commercial ports at Boston, MA, New York, NY, Philadelphia, PA, Hampton, VA and Charleston, SC during this period focused maritime traffic on sea lanes connecting them to their major domestic and foreign markets. Charts III-2a, III-3 and III-4 illustrate these lanes. As a result, wrecks of this period should cluster along these lanes, especially in shallow areas (five fathoms or less) where they could go aground or strike submerged objects. Within the study area, such clusters should be encountered frequently along the immediate coast between Boston Harbor and Cape Hatteras, excepting some less-traveled areas such as Long Island Sound and inlets of the Middle Atlantic coast.

However, because of the greatly increased volume of marine traffic during this period, relatively large numbers of vessel remains are expected to occur even in deeper areas of heavily traveled routes, where ships occasionally foundered or sank for other reasons. As indicated on Figs. III-17 to III-26 (in section 5.2), these areas occupy a large proportion of the submerged Continental Shelf.

For the period following 1800, our predictions regarding distribution of vessel remains are based largely upon explicit vessel-loss reports rather

than on deductions derived from commercial and navigational practices. For the period between 1800 and 1880, selected newspapers were sampled at 20-year intervals. Vessel losses reported by this sample were plotted on the 1:125,000 map set. These maps indicate that vessel remains for this period cluster near and in major harbors such as Boston, New York, Philadelphia, and Hampton, as well as in shallow-water areas (around five fathoms) such as the Nantucket Shoals, Cape Cod and Cape Hatteras that lie near major sea lanes. Clusters of lower density are expected to occur in hazardous areas adjacent to less popular shipping routes, for example, along the northern New England Coast and in inlets of the Middle Atlantic coast.

Shipping was active between 1800 and 1880, and modern aids to navigation began to appear only toward the end of this period. These factors suggest that yearly vessel losses peaked during this period. Comparisons of statistics for 1800-1880 (Fig. III-14) with those for 1880-1945 (Fig. III-15) confirm this supposition.

After 1880, United States governmental statistics on vessel losses became more comprehensive than those from other contemporary sources, and were therefore employed exclusively for the 1880-1945 period model. Sampled at 10-year intervals and plotted, these data indicate that while vessels lost were fewer in number and deeper in average draft, they appear to cluster in the same areas as between 1800 and 1880.

While the methods and materials employed by this project were carefully considered and selected, we wish to emphasize that our results are only preliminary approximations of the true density and distribution of submerged vessel remains in the study area. Their proper role is simply to suggest research strategies by which they can be tested on new data, and improved, modified or rejected. Significant increases in predictive power can, no doubt, be attained through further archival research, both for the relatively rare but highly significant early wrecks and for more numerous but better-documented later ones. Ultimately, however, these sources cannot help with many important factors which also affect the nautical archaeological record, such as burial and preservation. The final test of any historic model must lie in systematic field survey.

## 5.2 Detailed Results

The previous section has discussed in general terms the expected locations of lost shipping by period. This section is designed to be used in conjunction with the 1:125,000 map set, but can stand by itself when used with Figs. III-17 through -26, which locate generally those zones described in Table III-6. We have identified and described 57 separate historic shipping zones, their expected contents, the amount of wrecks known to be located in them, and what density of lost shipping of all periods they are predicted to contain. These zones were identified on the basis of several variables. These are:

1. Bathymetry and the predictions made by the various models regarding depths of shipping concentrations lost before and after 1880.

2. The groups involved in shipping at different time periods, such as the Dutch, the English, etc.

3. The incidence of early (pre-1630) exploration.

4. Location of major and minor shipping lanes after 1630.

5. Direction of currents into and out of heavily traveled shipping lanes.

6. The known inventory as developed in this project, sometimes separated by time period.

7. The expected density, based on a combination of factors (see Fig. III-16).

Figures III-17 through -26 illustrate the various zones which are described in Table III-6. A detailed presentation of the locations of the wrecks inventoried is presented on the 1:125,000 scale maps (Map Set ICA-88). The zones described on the 1:125,000 scale map set combine the expected historic shipping with the expected preserved archaeology, and are called Cultural Resource Zones.

Definition of the terms used in the columns identified as "Known Inventory" and "Predicted Density" (Table III-6) have in general been derived from the subjective evaluation of the existing record of known sites and past shipping densities. For the purposes of this report the following definitions of these terms are used:

1. None. In the case of known inventory this means that no wrecks were identified in this zone in the course of this study. In the case of predicted density it means that we know of no wrecks and due to factors such as depth, scour, etc. we expect none to exist.

2. Very light. In the case of known inventory this generally means that we know of one to two ships from all time periods which may be in six or more lease blocks in the zone. In the case of predicted density it implies a very small and random distribution of lost shipping.

3. Light. This term generally means the existence of prediction of several ships of all time periods known to six or more lease blocks in the zone.

4. Moderately light. Both for known and predicted, this term means that not only are several ships known to six or more lease blocks but that a small number (between one and five) are known to between three and six lease blocks (33% to 17% probability per lease block). Predicted density is similar even though known density may be less.

5. Moderately heavy. For known and predicted, the term means

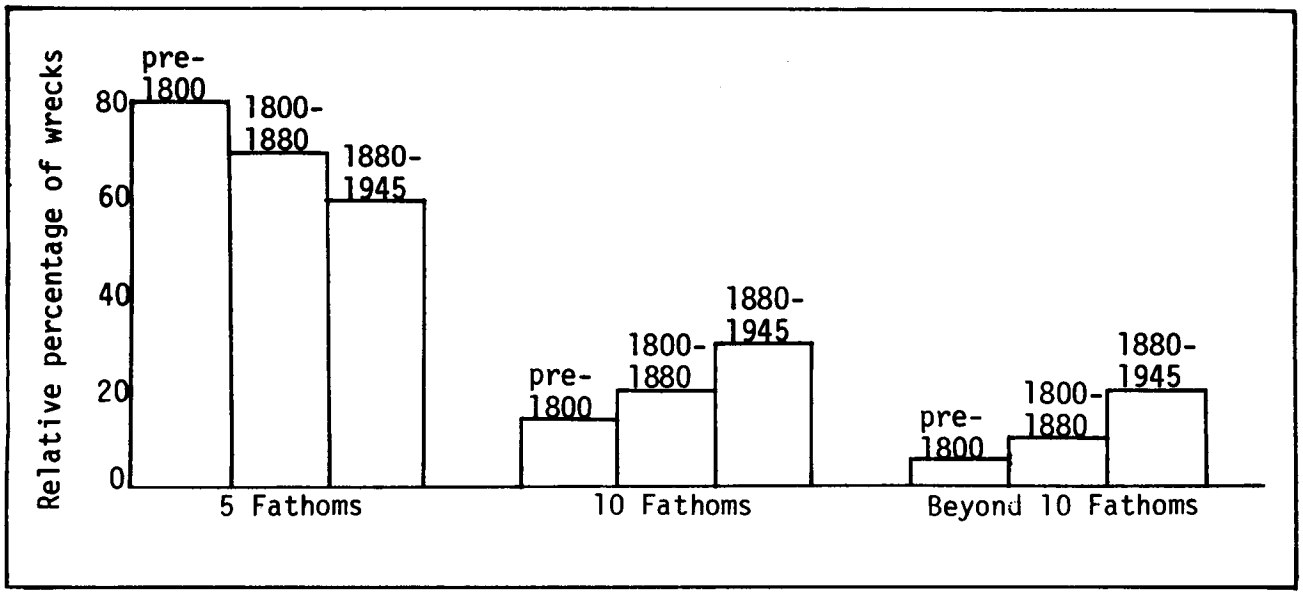



Fig. III-16: Relative wreck densities for the three time periods studied.

that more than five ships are known to exist within the zone in more than six blocks. At the same time several ships may be known to a lease block or to within two to three blocks (50% to 33% probability per block), while more will be known to within four and six blocks (25% to 17% per block).

6. Heavy. A large number of ships have been identified to exist in the zone within six or more blocks, while several ships are known to exist within each block and many more are known to exist within two to six blocks.

7. Very Heavy. Many ships known to be in individual lease blocks, with more identified to two to six blocks, and very many (up to 30) known to within six blocks.

Where predicted density differs from known inventory we have relied on an evaluation of the history of exploration, shipping, and population growth to assess the difference between known and expected densities. In general, an area in which predicted densities are greater than known densities is an area for which little data is available, but whose histories indicate that the inventory should be greater than that known.

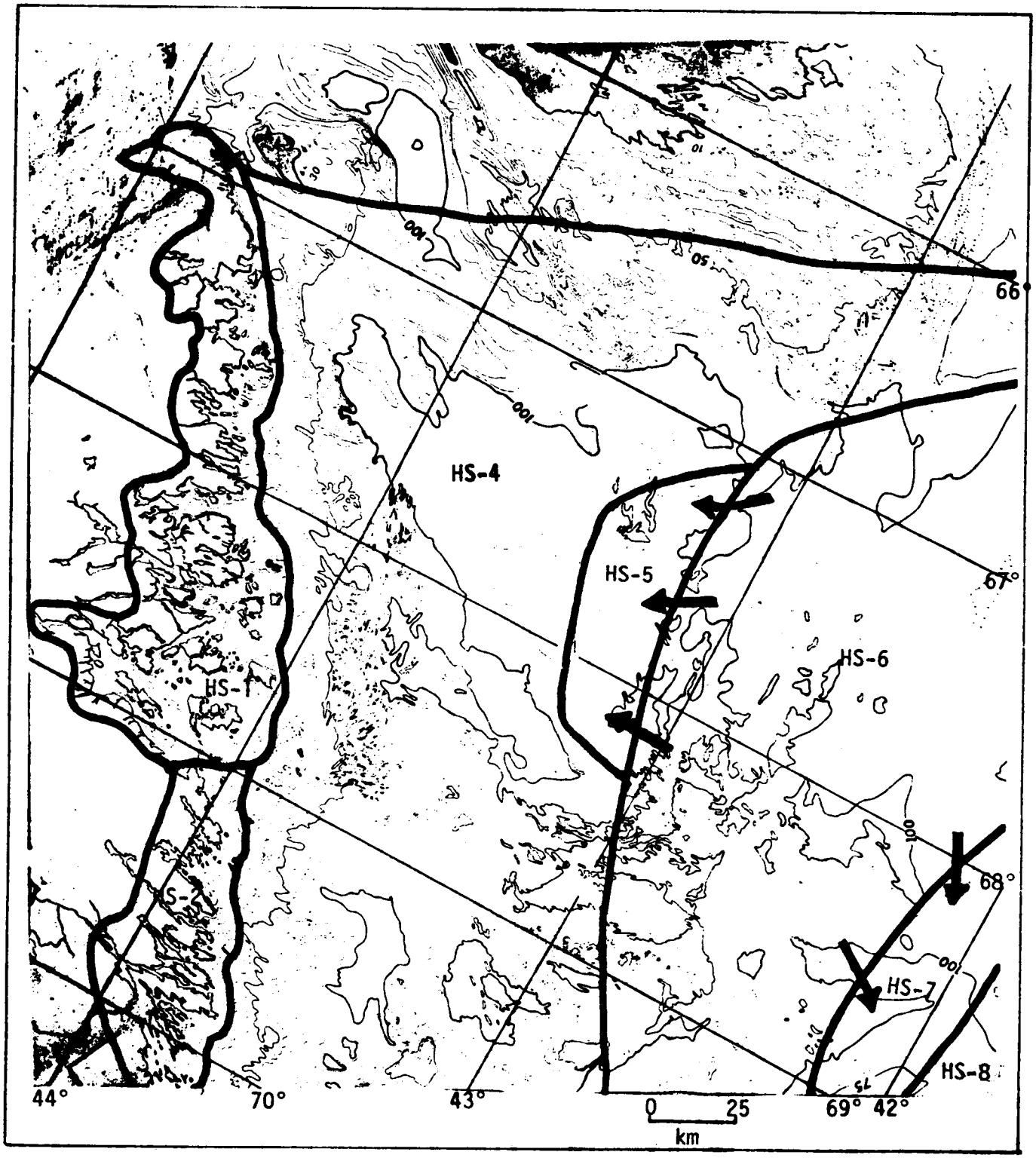



Fig. III-17

Historic shipping zones: HS-1,-2,-4,-5,-6,-7,-8. Arrows indicate direction ships may have drifted out of the major inbound shipping lanes. (northern Gulf of Maine).

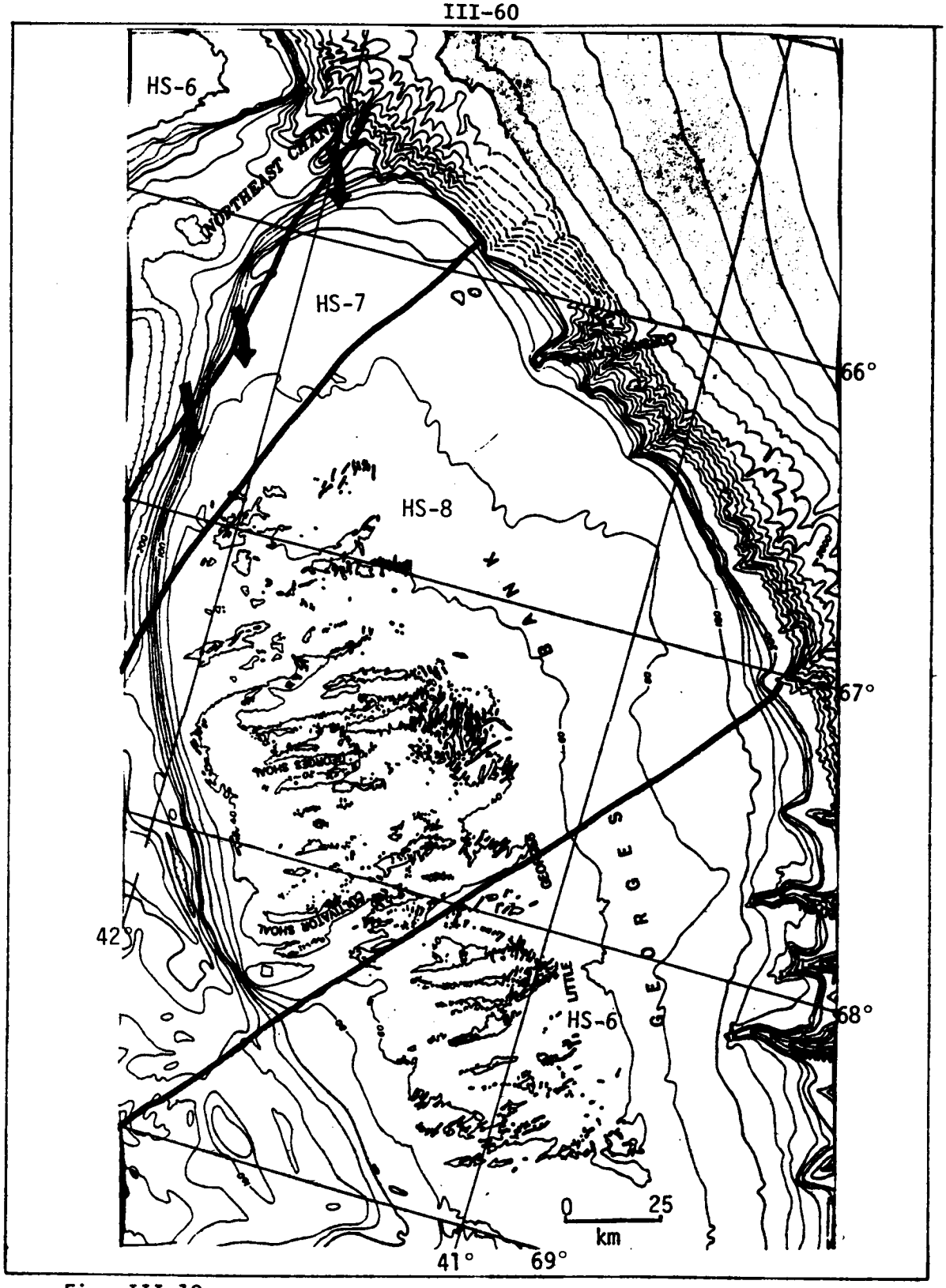



Fig. III-18

Historic shipping zones: HS-6,-7,-8. Arrows indicate direction ships may have drifted out of the major trade route zone of inbound shipping. (Georges Bank).

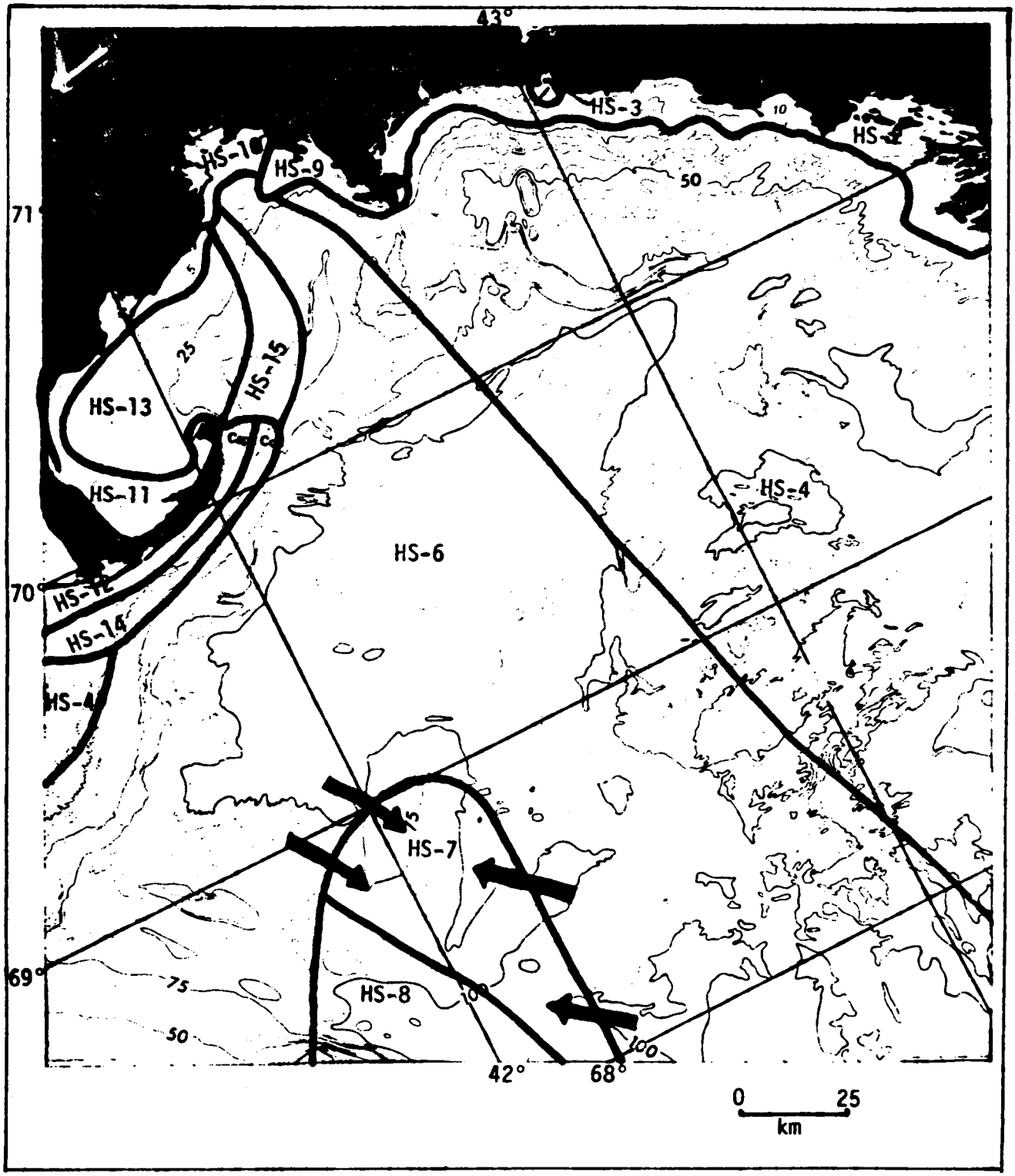



Fig. III-19
Historic shipping zones: HS-2,-3,-4,-6,-7,-8,-9,-10,-11,-12,-13, -14,-15. Arrows indicate direction ships may have drifted out of the major zone of inbound shipping. (southern Gulf of Maine).

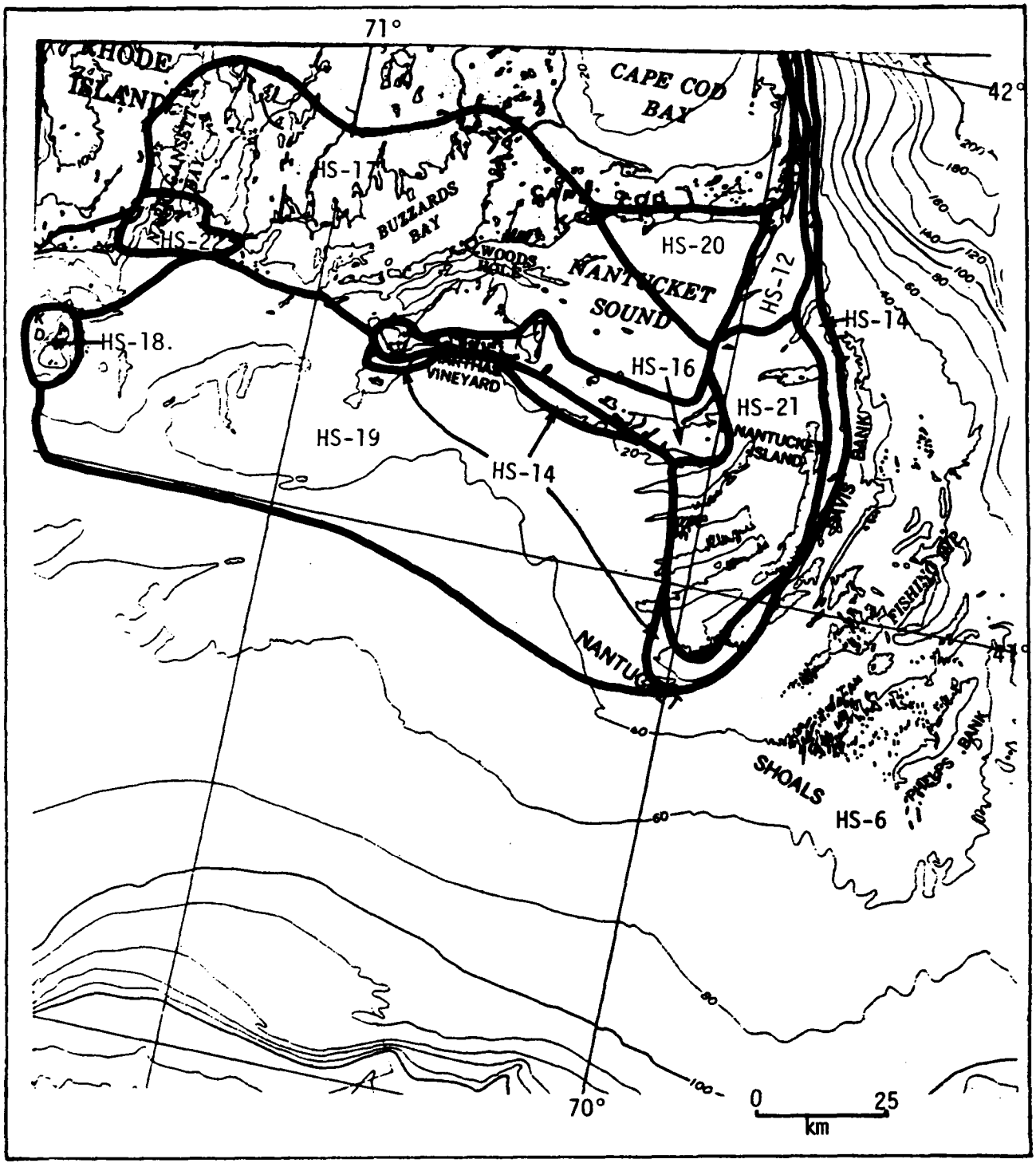



Fig. III-20
Historic shipping zones: HS-6,-12,-14,-16,-18,-19,-20,-21,-22,-17. (southeastern New England shelf).

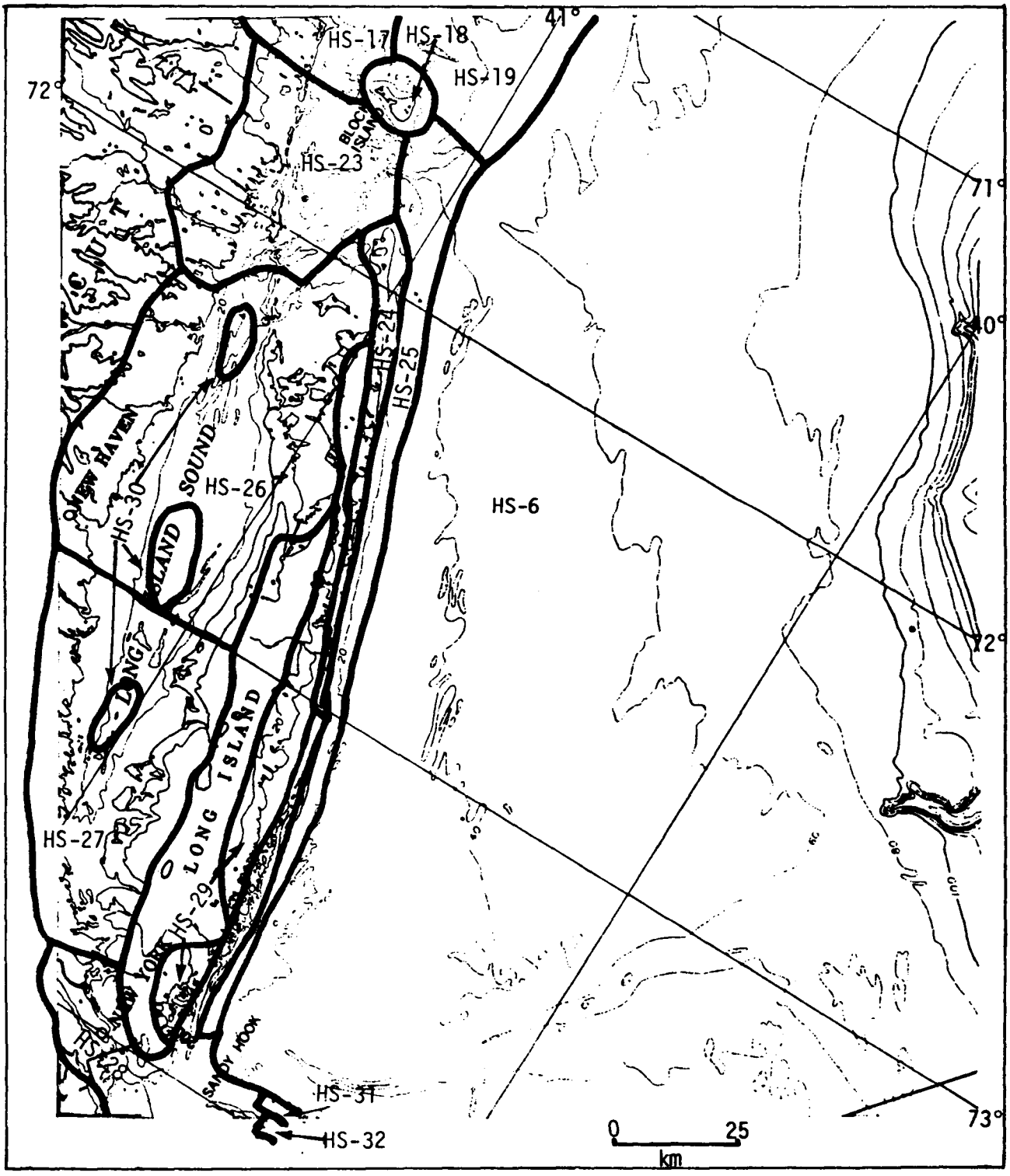



Fig. III-21
Historic shipping zones: HS-17,-18,-19,-23,-24,-25,-26,-27,-28,-29, -30,-31,-32. (Long Island Sound).

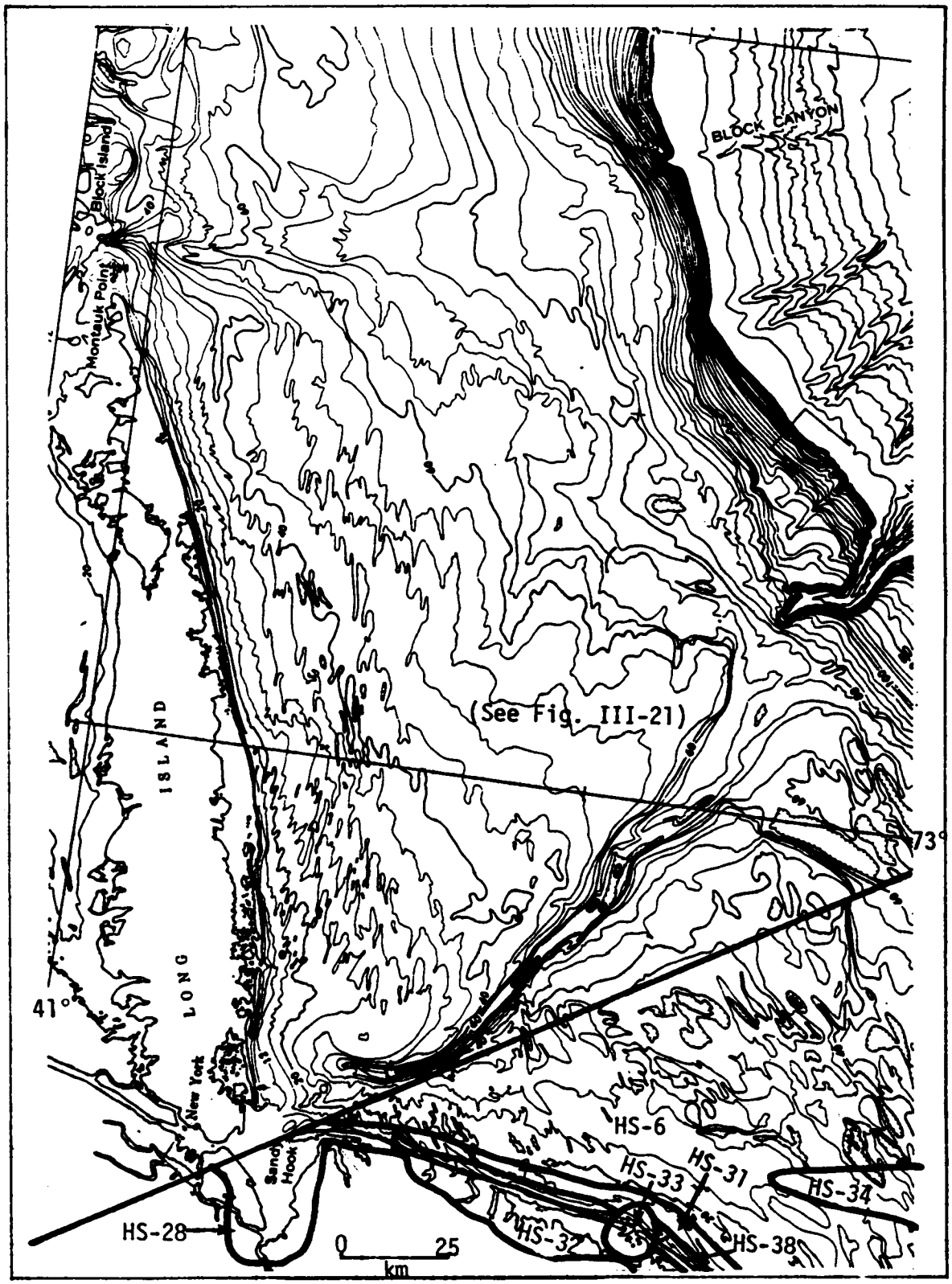



Fig. III-22
Historic shipping zones: HS-6,-28,-31,-32,-33,-34,-38.
(Long Island shelf)

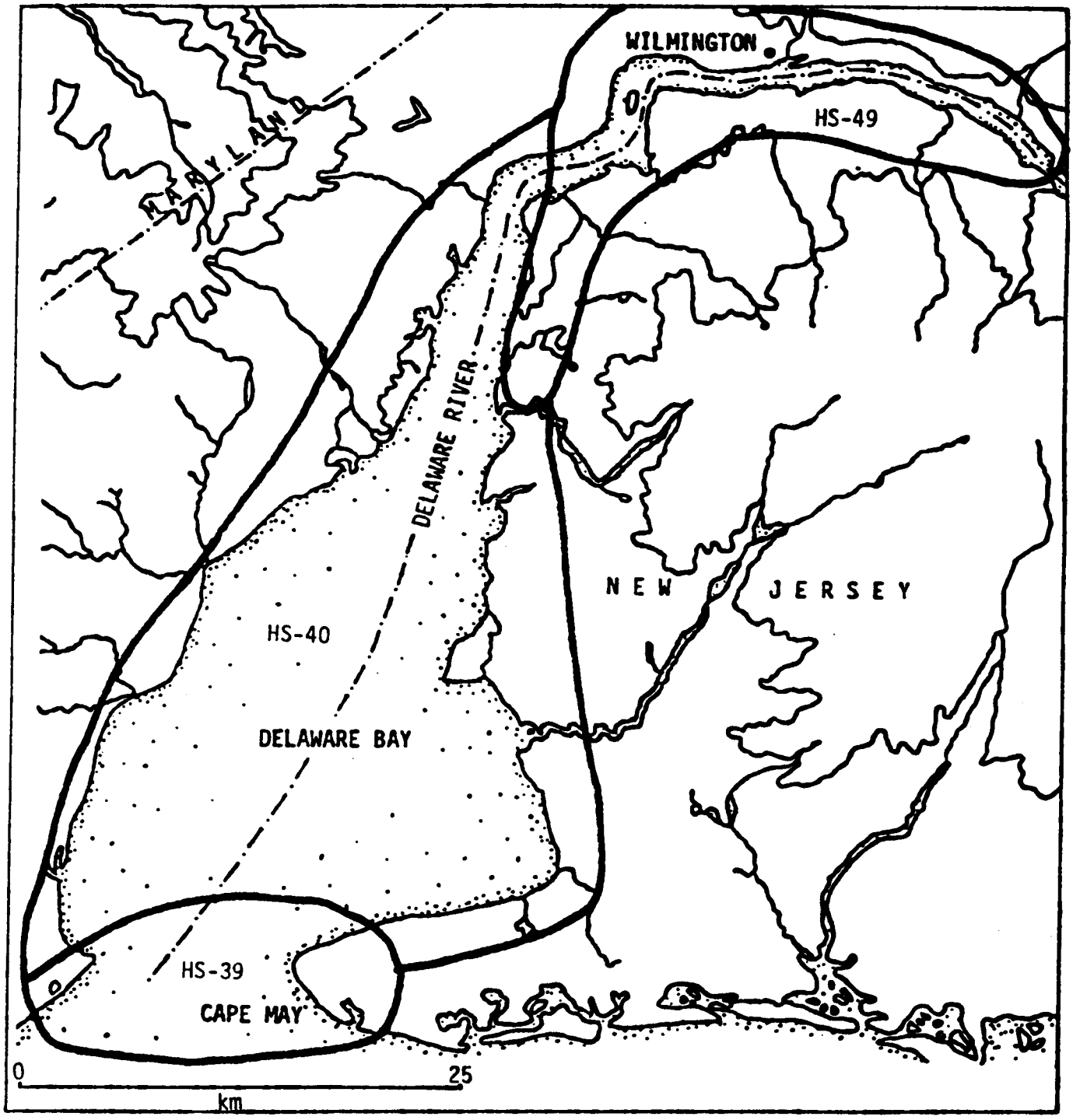



Fig. III-23
Historic shipping zones: HS-39,-40,-49. (Delaware Bay).

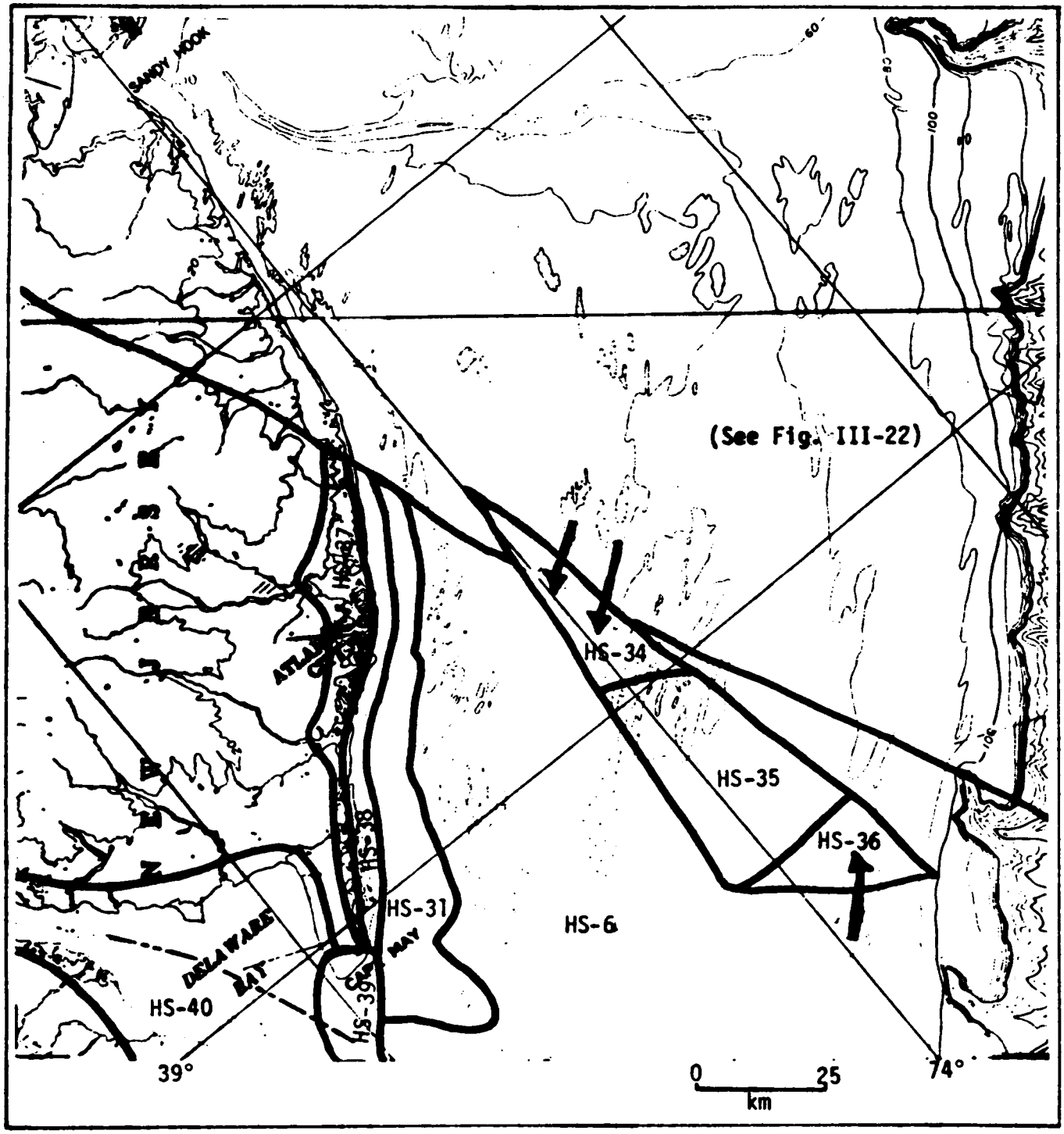



Fig. III-24
Historic shipping zones: HS-6,-31,-34,-35,-36,-37,-38,-39,-40. Arrows indicate direction ships may have drifted out of the trade route zone. (New Jersey shelf).

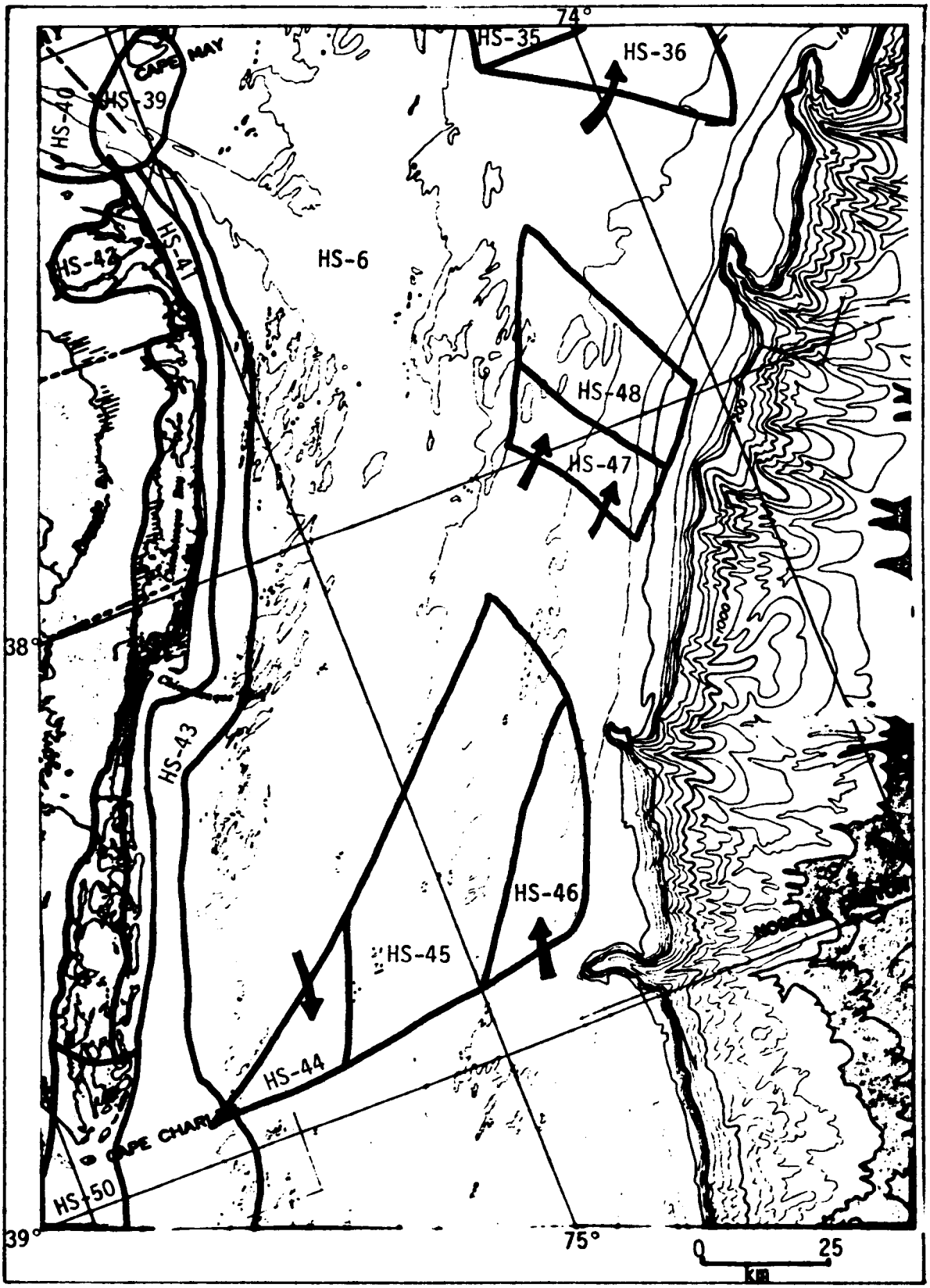



Fig. III-25

Historic shipping zones: HS-35,-36,-39,-40,-41,-42,-43,-44,-45,-47, -48,-50. Arrows indicate direction ships may have drifted out of the major shipping zones. (Delmarva shelf).

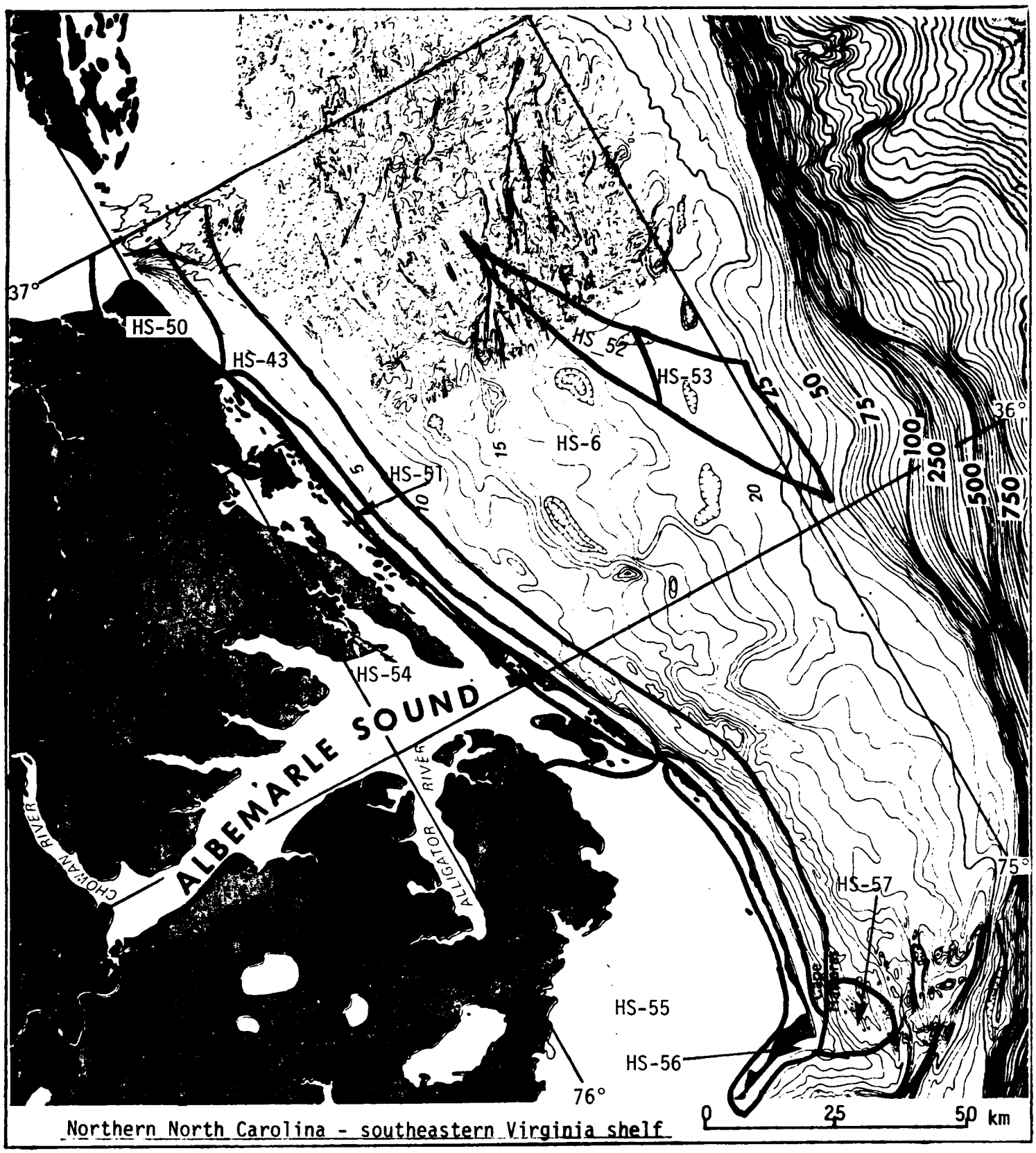



Fig. III-26
Historic shipping zones: HS-6,-43,-50,-51,-52,-53,-54,-55,-56,-57.

Table III-6. Detailed description of historic shipping zones with distribution and density of known and expected remains. See Figs. III-17 through III-26 for the location of zones.

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-1: Inside the 20-fathom line from the St. Croix River to a point south of Vinalhaven Island, and inland to mean high tide influence. | pre-1630: Light shipping associated with French trade. Some evidence of early exploration.<br><br>1630-1945: Light shipping associated with coastal trade and fishing. | Light distribution, but generally more accurately known than other zones. Majority in and around major bays. | Light. |
| HS-2: Inside the 20-fathom line from south of Vinalhaven to Essex bay just north of Cape Ann; excludes HS-3 around Portsmouth, NH inland to mean high tide influence. | pre-1630: Light shipping associated with early fishing and English settlement. May contain evidence of early exploration<br><br>1630-1800: Evidence of shipping from minor trade routes; English and American occupation and conflict; French and English conflict.<br><br>1800-1945: Light shipping associated with coastal trade, recreation, and fishing. | Light. | Light. |
| HS-3: Area in and around Portsmouth Harbor inside the 10-fathom line from Cape Neddick to approximately Rye Beach. | pre-1800: Heavy shipping of all types and some evidence of early exploration.<br><br>1800-1945: Moderately heavy shipping of all types. | Moderately heavy distribution with a concentration on pre-1800 wrecks. | Heavy. |
| HS-4: Waters deeper than 20 fathoms and outside major trade routes (HS-6) and drift zone (HS-5). | Randomly distributed shipping of all periods. | Very light. | Very light. |
| HS-5: Waters deeper than 20 fathoms to westward of HS-6. In the drift zone of the Labrador Current, out of the major sea lanes of principally inbound shipping. | Randomly distributed wrecks. The greater number should be of ocean-going class, but light in tonnage, i.e., those of 1800-1880. | None. | Light. |
| HS-6: This zone is the largest in the study area. It includes the major shipping lanes outside those zones of highest expected density, i.e., inside the 10-fathom line. This zone includes inbound, outbound, and coastwise major sea lanes. See Chart III-2a for a generalized view of these lanes. | 1630-1945: Randomly distributed wrecks of this period. Later wrecks will be localized inside this zone because later lanes were most restricted. However, drift from these zones will fall into these wider areas. | Moderately heavy distribution of shipping of the periods after 1630 randomly distributed in this zone. | Moderately heavy, random distribution of post-1630 shipping. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-7: Waters deeper than 20 fathoms to eastward and east-southeast of HS-6 in the area north of 41° north in the drift zone of the Labrador Current out of this major trade route zone of principally inbound shipping. At the far western end may be discovered drift from outward-bound shipping drifted in from the south. | Randomly distributed wrecks. These greater numbers should be of oceangoing class, but light in tonnage, i.e., those of 1800-1830. | None. | Light. |
| HS-8: Eastward of HS-7. This is not included in the inbound/outbound coastwise major shipping lane north of 40°. | Occasional wrecks of all periods, with more emphasis on evidence of early through modern fishing. | None. | Very light. |
| HS-9: Cape Ann from Essex Bay to Swampscott inside the 20-fathom line to mean high tide influence. | pre-1630: Reasonably dense evidence of early exploration (pre-1614) (English settlements).<br><br>1630-1800: Minor trade activities and from the Penobscot (English settlement activity).<br><br>1800-1945: Local trading and fishing activity. | Moderately heavy distribution clustering around Cape Ann and Beverly. Beverly distribution tending to be pre-1800 while Cape Ann distribution almost equally over all time periods. | Moderately heavy. |
| HS-10: Boston Bay and outer islands from a line drawn roughly from Nahant to Strawberry Point. Mean high tide defining inner bounds. | A high density of shipping from all periods. A large percentage from pre-1800. Evidence of early exploration and English occupation. | Heavy distribution, with a large percentage from before 1800. | Heavy. |
| HS-11: Boston Bay inside the 10-fathom line from Scituate to Provincetown (Race Point). | A distribution of shipping of all periods with clusters close to established points. | Moderately heavy concentrations representing all time periods at Scituate, Plymouth Bay, and Provincetown. Barnstable Harbor concentrating in the years 1800-1880. | Moderately heavy. |
| HS-12: Heavily traveled zone seaward of Cape Cod inside 5-fathom line from Provincetown to just south of Monomoy Point. | Ships of all periods evenly distributed throughout. Possible strong evidence of early exploration, as almost all exploratory voyages passed close to this zone. | Moderately heavy density of ships of all periods. | Very heavy density of ships of all periods. |
| HS-13: In Cape Cod, outside the 10-fathom line, and major shipping lanes. | pre-1800: Evidence of early exploration and trade.<br><br>1800-1945: Light evidence of shipping related to trade and fishing. | One possible later-period wreck. | Light. |
| HS-14: A discontinuous zone between the seaward 5- and 10-fathom lines from Martha's Vineyard to Provincetown. | Randomly distributed shipping concentrated in the period 1880-1945. | Light. | Moderately heavy density of post-1880 shipping. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-15: Off Scituate and Strawberry Point, outside zones HS-11 and 13, southeasterly to Provincetown. | Lightly distributed shipping of all periods; some possible evidence of earliest exploration. | Very Light. | Moderately heavy. |
| HS-16: Inside the 5-fathom line around Nantucket Island, to Martha's Vineyard, and the seaward side of Martha's Vineyard. | High density of shipping of all periods, with clusters of earlier shipping around points off Martha's Vineyard and Nantucket. | Heavy distribution, with the majority in the pre-1800 period and that from 1800 to 1880; pre-1800 wrecks around points of islands. | Heavy. |
| HS-17: Landward from Nantucket, Martha's Vineyard, and Block Island. Generally inside the 10-fathom line to mean high tide, excluding a limited zone around the mouth of Narragansett Bay. | pre-1630: Evidence of early exploration, Dutch settlement and coastal trading and exploration.<br><br>post-1630: Evidence of minor coastal trading with some random distribution of ships carried into eastern end by Labrador Current. | A moderately light distribution of ships of all periods, with concentrations of post-1800 shipping between Martha's Vineyard and Cape Cod and in Upper Narragansett Bay. | Light with some clustering in the Cape Cod-Martha's Vineyard region. |
| HS-18: Inside the 5-fathom line around Block Island. | pre-1630: Light evidence of early exploration; some evidence of the Dutch occupation period.<br><br>post-1630: Moderately high distribution of shipping related to minor coastal trade routes. | Moderately heavy for shipping of all periods. | Heavy. |
| HS-19: Landward of major shipping routes from Nanatucket Shoals west to Block Island, bounded by other zones to landward (north). | All periods: Very low, random distribution of wrecks of all periods. | Very light distribution of post-1880 shipping clustering off Martha's Vineyard. | Very light. |
| HS-20: West of Monomoy Point to Osterville on Cape Cod, inside the 5-fathom line. | Some evidence of early exploration. Early coastal trading vessels of all periods. | Light. | Light. |
| HS-21: Eastward of Nantucket Island and southward of Monomoy Point, and including portions of the Nantucket Shoals of less than 5-fathoms' depth. | Some small evidence of historic exploration and early Dutch occupation; also randomly distributed shipping of the post-1800 period, carried into this zone from HS-6 by the Labrador Current. | Light distribution of post-1880's shipping. | Moderately heavy distribution of shipping of all periods. |
| HS-22: Around the mouth of Narragansett Bay. | pre-1630: Evidence of Dutch occupation and coastal activities, possibly light random evidence of early exploration.<br><br>post-1630: Evidence of coastal trade with increasing but still light coastal and transoceanic commercial shipping bound for Providence. | Moderately heavy for all time periods. | Moderately heavy for all time periods. |
| HS-23: Between Block Island and Long Island Sound from points deeper than 10 fathoms to mean high tide. | pre-1630: Light evidence of Dutch occupation.<br><br>post-1630: Evidence of minor coastal trade routes. | Light distribution of pre-1880 shipping along coastline and around Fishers Island. | Light but emphasizing early shipping. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-24: Inside the 5-fathom line on the south shore of Long Island from Montauk Point to the 73rd parallel. | pre-1630: Reasonably dense evidence of early exploration and Dutch occupation.<br><br>post-1630: High density of all types of shipping associated with coastal trade northeast of New York City.<br><br>post-1800: Recreational shipping. | Moderately heavy density clustering around Montauk Point, with pre-1880 ships concentrated around bay entrances. | Moderately heavy for all periods. |
| HS-25: A discontinuous zone running from Block Island along the south shore of Long Island to just off Fort Tilden (L.I.), between the 10- and 5- fathom lines. | Moderate distribution of post-1880 shipping. | Moderately heavy distribution of post-1880 shipping. | Moderately heavy distribution of post-1880 shipping; light random distribution of earlier shipping. |
| HS-26: Long Island Sound from Orient Point to the 73rd parallel, including Peconic Bay and Gardiners Bay and excluding depths greater than 10 fathoms. | pre-1630: Evidence of early Dutch occupation.<br><br>post-1630: Evidence of minor shipping lanes.<br><br>post-1800: Pleasure boating. | Light distribution of shipping, concentrated from 1800 to 1880, predominantly in bays. Light density throughout, 1880-1945. | Light, post-1880. Very little prior to 1880 due to navigation hazards for wind-powered vessels. |
| HS-27: All of Long Island from the 73rd parallel to Flushing Bay, excluding depths over 10 fathoms. | pre-1630: Evidence of early Dutch occupation and early exploration.<br><br>post-1630: Shipping associated with minor trade routes.<br><br>post-1800: Recreational shipping. | Moderately heavy density of randomly distributed ships of all periods. Ships of pre-1800 period cluster toward west end of Sound. | Maybe moderately heavy in western end of zone pre-1800. Light, post-1800. Very little 1800-1880 due to navigation hazards for wind-powered vessels. |
| HS-28: Inside the 10-fathom line from the 73rd parallel west to junction of Ambrose and Sandy Hook Channels, and south to Long Beach, NJ, including all of New York Harbor and Raritan Bay. | High densities of ships of all periods, clustering in upper and lower New York Bay and around Sandy Hook and the south shore of Long Island. Considerable evidence of early exploration, Dutch and English occupation. | Heavy density of ships of all periods; very heavy density of pre-1800 shipping. | Very light. |
| HS-29: A discontinuous zone of southern Long Island inside the outer beaches and including the landward side of most bays east to the 73rd parallel. | pre-1630: Evidence of early Dutch occupation.<br><br>post-1630: Evidence of early colonial occupation and coastal trade.<br><br>post-1800: Recreational. | Light distribution of ships of all periods. | Light. |
| HS-30: A discontinuous zone in Long Island Sound Sound containing areas deeper than 10 fathoms. | Very light, randomly distributed shipping of all periods. | Very light, 1800-1880. | Very light. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-31: From Long Beach, NJ south to south of Cape May between the 5- and 10-fathom lines, with a satellite subzone at approximately 73°45' and 39°45'. | post-1880: Shipping associated with coastwise trade, recreation, and fishing. | Very light distribution of post-1800 shipping, clustered at far northern end. | Light distribution of post-1880 shipping. |
| HS-32: Inside the 5-fathom line from Long Beach, NJ to just north of Barnegat Inlet. | pre-1630: Evidence of early exploration and Dutch occupation.<br><br>post-1630: Remains of shipping along major trade routes southbound from or northbound to New York City. | Moderately heavy distribution of ships of all periods, concentrated after 1800. | Moderately heavy. |
| HS-33: In and around Barnegat Inlet. | pre-1630: Evidence of early explpration and Dutch occupation.<br><br>post-1630: Remains of shipping along major trade routes southbound from or northbound to New York City. | Moderately heavy density of ships of all periods, clustering before 1880. | Heavy. |
| HS-34: Part of a north-south-trending zone between major shipping lanes, possibly containing shipping, both inbound and outbound, that was carried into it by the Labrador Current. | Very light random distribution of post-1630 shipping. | None. | Very light. |
| HS-35: The central section of a north-south-trending zone with its northern bounding at 74° west, 39° north. | Negligible. | None. | Very light. |
| HS-36: Southern section of a north-south-trending zone with its southern limit at 73° 45' west, 38° 30' north. Possible contains outbound shipping carried northward into it by the Labrador Current. | Very light random distribution of post-1630 shipping. | None. | Very light. |
| HS-37: Landward from the outer islands of New Jersey, from approximately Mill Creek to approximately Marmora, NJ. | pre-1630: Light evidence of early exploration and Dutch occupation.<br><br>post-1880: Recreational and commercial shipping. | Light distribution of shipping of all periods. | Light. |
| HS-38: Along the outer coast of NJ, inside the 5-fathom line from south of Barnegat Inlet to just north of Cape May. | pre-1630: Evidence of early exploration and Dutch occupation.<br><br>post-1630: Shipping associated with major coastwise shipping routes. | Moderately heavy density of ships of all time periods. | Heavy. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-39: Inside the 5-fathom line from Cape May to Rehoboth Beach, including Henlopen but excluding the interior of Delaware Bay. | pre-1630: Evidence of early exploration and Dutch occupation.<br><br>1630-1700: Evidence of Swedish exploration and Swedish-Dutch conflict.<br><br>post-1700: Shipping associated with major coastwise trade routes, including commercial and pleasure craft bound from Philadelphia to both northern and southern ports. | Very heavy density of ships dating before 1800 clustering around Cape Henlopen. Heavy density from post-1800 period, clustering around Cape May. | Very heavy especially around Cape Henlopen. |
| HS-40: Interior of Delaware Bay, excepting the upper reaches. | pre-1630: Evidence of Dutch occupation, possibly very light evidence of Dutch-Swedish conflict.<br><br>post-1630: Evidence of commercial vessels in- and outbound from Philadelphia, and fishing and recreational craft from Philadelphia and other local ports. | Light distribution of shipping from before 1880. | Moderately heavy. |
| HS-41: Inside the 5-fathom line from Rehoboth Beach to just south of Hog Island Bay. | pre-1630: Evidence of early exploration and Dutch activities.<br><br>post-1630: Evidence of shipping in major sea lanes coastwise in both directions. | Moderately heavy distributions of ships of all periods, somewhat more dense in the pre-1800 period around the inlet to Hog Island Bay. | Moderately heavy. |
| HS-42: A discontinuous zone comprising the inland portions of bays from Rehoboth Beach to Hog Island Bay. | pre-1630: Evidence of Dutch activities.<br><br>post-1630: Evidence of local fishing, commercial, and pleasure craft. | Very light distribution post-1880. | Very light. |
| HS-43: Between the 10- and 5-fathom lines from Rehoboth Beach to just north of Cape Hatteras, including one satellite subzone east of Hog Island Bay. | post-1880: Shipping associated with major sea lanes. | None. | Moderately heavy. |
| HS-44: The western portion of an east-west-trending zone between major shipping lanes. Likely to contain remains of wrecks carried into the zone by the Labrador Current. | post-1630: Shipping associated with major coastal sea lanes. | Very light, 1800-1880. | Very light. |
| HS-45: Central portion of east-west-trending zone between major shipping lanes. | post-1630: Shipping associated with major coastal sea lanes. | Very light distribution, 1800-1880. | Very light. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-46: The eastern portion of an east-west-trending zone between major shipping lanes. Likely to contain remains of outward-bound shipping carried northward into the zone by the Labrador Current. | post-1630: Outward-bound shipping associated with major sea lanes. | None. | Very light. |
| HS-47: The southwestern portion of a rectangular zone between major shipping lanes, off Delaware Bay. Likely to contain wrecks carried into the zone from the south by the Labrador Current. | post-1630: Evidence of inbound shipping associated with major sea lanes. | None. | Very light. |
| HS-48: The northwestern section of a rectangular zone between major shipping lanes, off Delaware Bay. | post-1630: Very light distribution of commercial shipping associated with adjacent sea lanes. | None. | Very light. |
| HS-49: The upper reaches of Delaware Bay extending into the Delaware River. | pre-1630: Evidence of Dutch occupation.<br><br>1630-1700: Evidence of Swedish occupation and Swedish-Dutch conflict.<br><br>post-1700: Evidence of commercial vessels in- and outbound from Philadelphia, and of fishing and recreational craft from Philadelphia and other local ports. | Moderately heavy distribution overall, with a somewhat heavier distribution of ships of all time periods around Philadelphia, and a concentration in the lower reaches of the Delaware River of ships of the period 1800-1880. | Moderately heavy. |
| HS-50: Inside the 5-fathom line from just south of Hog Island to Virginia Beach, including Cape Charles and Cape Henry. | pre-1630: Evidence of early exploration and occupation by the London Company.<br><br>post-1630: Shipping associated with major sea lanes, both inbound and outbound, in Chesapeake Bay. | Heavy distribution of ships of all periods with ships of the pre-1800 period clustered around Cape Henry. | Heavy. |
| HS-51: Inside the 5-fathom line from Virginia Beach to Oregon Inlet, not including the inland portions of bays. | pre-1630: Evidence of early exploration, including Spanish, and possible the Roanoke colony.<br><br>post-1630: Shipping associated with major sea lanes in- and outbound. | Moderately heavy distribution of ships of all periods, with ships of the pre-1800 period clustered in the northern portion. | Moderately heavy. |

# Table III-6 (continued)

| Description | Expected to Contain | Known Inventory | Predicted Density |
|---|---|---|---|
| HS-52: the northern half of a north-south-trending zone between shipping lanes. The rough center of this zone lies at 75° 15' west, 36° 30' north. | post-1630: Shipping associated with major outbound sea lanes and carried in from the north by the Labrador Current. | None. | Very light. |
| HS-53: Southern portion of a north-south-trending zone between sea lanes. The southern tip of this zone lies approximately 74° 5' west, 36° north. | post-1630: Shipping associated with major sea lanes, both in- and outbound, and carried into the zone from the south by the Labrador Current. | None. | Very light. |
| HS-54: Albemarle Sound and that part of Currituck Sound north of Oregon Inlet, including the Alligator River. | pre-1630: Possible evidence of exploration by the Roanoke colony.<br><br>post-1630: Local fishing and commercial shipping. | Very light distribution post-1880. | Moderately heavy. |
| HS-55: Southern Croatan Sound and all of Pamlico Sound, including cakes and marsh areas. | post-1630: Evidence of fishing activities.<br><br>post-1880: Recreational activity added to the above. | None. | Moderately heavy. |
| HS-56: Inside the 5-fathom line from Oregon Inlet to Hatteras Inlet, including the 5-fathom portions of Diamond Shoals. | pre-1630: Evidence of early exploration, including Spanish.<br><br>post-1630: Moderate distribution of wrecks associated with in- and outbound traffic, clustered especially around Diamond Shoals. | Heavy distribution of ships of all periods, with ships from before 1880 clustering around Hatteras and Diamond Shoals. | Very heavy. |
| HS-57: Between the 5- and 10- fathom lines of Diamond Shoals off Cape Hatteras. | post-1880: Shipping associated with major coastwise sea lanes. | Moderately heavy distribution, clustering between 1800 and 1880. | Heavy. |

# APPENDIX A

## HISTORY OF EXPLORATION AND SETTLEMENT PRIOR TO 1630

### A.1 Introduction

In this study our predictive models for the period before 1630 rely heavily on the history of maritime use, exploration, and settlement of the study area. The known wrecks for this period are too few to constitute reliable predictors for others. While a detailed history of exploration and settlement is not necessarily appropriate for the main body of the text, this appendix, recounting the research team's evaluation of the history of the study area, is presented as supporting evidence for our conclusions about the potential location and density of ships lost in this period. (All citations refer to sources found in Bibliography A.)

Chart III-5 shows in silhouette form the types of ships that are known to have been used in the study area and contains information on the periods with which they are associated.

### A.2 History

In recent years there have been numerous hypotheses concerning very early European or African contacts with eastern North America. However, because no reliable evidence is available to substantiate these conjectures, they will be excluded from this history.

Norse explorers are believed with considerable certainty to have reached some part of mainland America in the early part of the eleventh century A.D. The sources are primarily Icelandic manuscripts probably written in the thirteenth century, but mostly preserved in copies from the fourteenth. They include historical and annalistic references, but the voyages are most fully reported in sagas which narrate the story of discovery and exploration in semifictional form. Earlier than any of these is a brief statement in the "History of the Bishopric of Hamburg" from about 1060 by Adam of Bremen, who had spoken with Icelandic travelers at the Danish court. The sources agree that voyages of exploration and settlement were made from bases in Norway, Iceland, and Greeland, and that the countries reached lay to the south and west of Greeland, becoming more fruitful as the explorers proceeded southward. In the southernmost area wheat-like fields and grapes were encountered, which led to the area's being called Vinland (a term that may mean either "vine" or "wine" land).

Although there is extensive information in the sagas, it is in part contradictory and unclear, since the Norsemen did not sail by charts, and the information was transmitted orally for a rather long period. Over the past 150 years many attempts have been made to localize their references, with wide disagreement among scholars. New England has been a favorite candidate, in part on account of the grapes, but so far the

evidence is not conclusive (Haugen 1942, 1971, 1974, 1977; Hovgaard 1914; Jones 1964; Morison 1971). Over the past ten years excavations have been made at a site on Cap Bauld on Newfoundland by Helge and Anne Ingstad which have convinced most students of the subject that L'Anse aux Meadows was in the eleventh century occupied and inhabited (at least for a few years) by Norse explorers (Ingstad 1970, 1977). Carbon dating and other tests suggest that these facts dovetail well with the sagas, but this site (which lies immediately opposite the Norse settlements in Greenland) can hardly represent the full extent of Norse exploration. The descriptions in the sagas suggest a more extensive skirting of the coast at least as far as New England.

In spite of strong claims made by some amateur scholars, the Norse artifacts said to have been found elsewhere have not been scientifically validated. One example of many is the find of three stones made at Spirit Pond near Popham Beach, ME. Although these do contain inscriptions in the runic alphabet as used by the Norsemen, they have been shown to be of modern manufacture (Haugen 1972; Wallace 1971). More convincing is a small carved, hooded figurine recovered from a Baffin Island Eskimo site in 1974. Thought to be an Eskimo representation of a man in medieval Norse dress, this figurine may well indicate some form of contact between the two groups (Stephen Cox: personal communication). Finally, a Norse coin was discovered on the central coast of Maine in an Indian archaeological site, but although this find seems to be geniune, it will be hard to localize because of widespread aboriginal exchange along the eastern seaboard (Bruce Bourque; Peter Seaby: personal communication).

The types of ships in which the explorations and attempted settlements of the Norsemen were made are well-known, thanks to excavations made in Norway and Denmark, and their remains are now visible in the museums of Oslo and Roskilde. They were capable of holding 30 to 40 men, excellently built of wooden planks to withstand the buffeting of northern seas, and quite capable of sailing across the North Atlantic. (This was proved in 1893 by the sailing of a modern replica of the Gokstad ship to the Columbian Exposition in Chicago. The ship is still on view in Lincoln Park.) It is known from the sagas that a number of ships were lost on the expeditions to the American coast (Einar Haugen: personal communication). Chart III-5 shows a silhouette of a typical ship of this class.

We do not know how much information on Norse voyages reached the peoples of western Europe. The Vatican was well informed on Greenland and the bishopric there as late as 1492; how much they had heard of Vinland is unknown. The so-called "Vinland Map" published in 1965 and tentatively ascribed to the year 1490, has been shown to be a modern fake. However, Adam of Bremen's work (1060) must have been well known. According to Columbus' son Ferdinand, the explorer made a voyage "north of Thule" before setting out for America; but any claims that Columbus learned about the Vinland voyages on this journey are at best speculative (Einar Haugen: personal communication).

In any case, Europeans were not ready to colonize the Americas in the eleventh century or for several centuries thereafter. The medieval world was too underdeveloped economically, and fragmented politically, to follow up on the Norse exploits, even if it had so desired. The conservatism and traditionalism of the social structure and the church further diminished any such possibilities. It was not until the fifteenth century, when these impediments were overcome, that western Europe was ready to expand aggressively outward, probing into previously unknown reaches to the west. Economic dreams and religious zeal provided the main impetus for such excursions (Parry 1964).

Despite growing pressures to explore westward, long oceanic voyages would not have been possible but for contemporary improvements in ship design and navigational instrumentation. The sixteenth-century explorer's ship combined the seaworthy qualities of the traditional North Atlantic vessel with the speed and maneuverability of Mediterranean coasting vessels. At the same time, astronomical instruments were adapted for navigation; the result was a vessel type capable of oceanic crossings and equipped with primitive but adequate navigational aids to keep it on course.

Such was the situation in 1492, when Columbus sailed west in search of a route to China and India. His successful return encouraged other nations to try to reach the East by sailing west. John Cabot sailed from Bristol, England in 1497 in the Mathew, and explored a rugged coast, usually identified as somewhere between Newfoundland and Massachusetts. His second, more ambitious voyage in 1498 was an almost total failure, and nothing is certainly known of his end (Hoffman 1961; Morison 1971; Quinn 1974; Williamson 1962).

The first European known to have visited the study area arrived in 1524. He was the Italian Giovanni da Verrazano, who sailed early that year under French colors in search of a route to the Orient. He made landfall near Cape Fear, North Carolina and proceeded to coast northward, finally reaching Maine somewhere around Penobscot Bay (Hoffman 1961; Morison 1971; Wroth 1970). As Verrazano sailed along the Maine coast, he narrowly missed meeting Portuguese João Alvares Fagundes, who had been in the area for three or four years. Having attempted to establish a fishing station at Cape Breton in 1521, Fagundes, according to some evidence, explored southward to Penobscot Bay (Morison 1971).

In February 1525, Estévan Gomez, also Portuguese, but sailing for Spain, arrived at the Gulf of St. Lawrence near the site of Fagundes' station. From Cape Breton, Gomez sailed down the coast of Nova Scotia, crossed over to the Maine shore and slowly threaded his way south along the coast. He ran up the Penobscot River, after which he sailed slowly to Cape Cod, carefully observing the coast. It is uncertain where he then went, although he may have gone on to the West Indies or simply have continued on to Spain (Hoffman 1961).

Between 1524 and 1566, known European visits to the study area were

confined to those of the Spaniard Vásquez de Ayllón in 1526, and the Englishman John Rut in 1526 (Hoffman 1961; Morison 1971; Winsor 1884-89). As no explorers of this early period succeeded in finding a route to the Orient by sailing northwest, this first major stab into the western unknown ended. Its abandonment was hastened in part by Magellan's circumnavigation of the globe, which suddenly brought home the immense distance that must be traveled to reach the Orient by any westward route. In addition, the Portuguese had succeeded in reaching India by an easier and safer route round the Cape of Good Hope. There would be further attempts to find the elusive passage to the Orient by sailing west, but the focus would no longer include the mid-American coast.

By the mid-sixteenth century, the mid-American coast was left to the English and French, and even they showed little interest until the late sixteenth, early seventeenth centuries. English attention between 1500 and 1570 was concentrated on European political and military affairs (Parry 1964; Rowse 1959; Wright 1970). France during that period was sporadically present in the New World, but was troubled at home by religious and civil wars. Such French exploration as occurred focused on the St. Lawrence region (Bishop 1948; Morison 1971; Thwaites 1905).

One region which did see European activity between 1500 and 1600 was the coast along North Carolina and Virginia. In 1566, a small contingent of Spaniards visited Currituck Island in North Carolina, but left without attempting settlement. Four years later, a Spanish Jesuit mission was attempted in Chesapeake Bay. Following a massacre there by Indians, Pedro Mendez sailed into the area on a voyage of revenge. After Mendez, the only Spanish visitors to the area were vessels which, sailing too far north, were wrecked off Cape Hatteras (Lefler and Powell 1973; Roberts 1958; Winsor 1884-89).

When the English and French renewed their New World activities in the late-sixteenth and early-seventeenth centuries, the nature of expansion had changed greatly. One of the most obvious changes was the withdrawal of direct crown participation in the ventures. A second change was a shift in focus to the New World itself. Attempts to reach the Orient by sailing through or around the Americas having failed, colonization seemed an obvious alternative, for if a settled population from the mother country was established in the region, the potential wealth of the New World might be extracted (Parry 1964; Vierech 1967; Wright 1964).

The English initiated this new phase when Sir Humphrey Gilbert sent Simon Ferdinando and John Walker to the Maine coast in 1579 and 1580, respectively. They were to explore the Penobscot region in search of a place for colonization and to look for Norumbega, a fabled city of great productivity and wealth. Little is known about Ferdinando's voyage; however, Walker, who landed near present-day Camden, ME, procured some 400 hides from the natives there and returned with a favorable description of the locality (Diamond 1951; Hoffman 1961; Morison 1971; Winsor 1884-89).

Gilbert was sufficiently impressed to attempt a colony in the region in 1583. After sailing to Newfoundland, which he claimed for the Queen, he continued westward to Nova Scotia where his ship, the Delight, went aground and broke up. Forced to turn back, Gilbert himself was lost when his small pinnace foundered (Morison 1971).

Gilbert's half-brother, Sir Walter Raleigh, carrying on the effort, obtained a charter for exploration and colonization in March, 1584 and immediately sent out an expedition piloted by Simon Ferdinando. He also induced Richard Hakluyt to write a Discourse on Western Planting, promoting the colonization of Norumbega (the lower Penobscot River area in Maine) to be presented to Queen Elizabeth. When Raleigh's reconnaissance vessels returned, he was persuaded by their reports to make an attempt further south. In June, 1585, an expedition of five vessels under the command of Richard Grenville reached the Carolina Banks. After a difficult passage into Pamlico Sound, the fleet moved on to Roanoke Island where Raleigh's colony was set up. Grenville soon headed back to England. Throughout the next year, the Roanoke settlers sent out exploratory forays, especially to the north. The colony waited anxiously for a supply fleet from England, and in early June joyously sighted sails on the horizon. The vessels turned out to be a large fleet under the command of Sir Francis Drake, fresh from raiding in the West Indies. Drake relinquished some supplies and a 70-ton ship for exploration of the region. Then on June 13 a storm hit; the promised ship was lost and spirits dropped. A week later, Drake left with the colonists. Less than a month later, Grenville arrived with the supply fleet. After some shore exploratory forays in the area, he returned to England, leaving fewer than 20 men to manage the settlement through the following year.

A second party was sent out in 1587, with instructions to sail on to the Chesapeake, but Simon Ferdinando decided instead to head south in search of Spanish shipping, leaving the settlers at Roanoke. War with Spain disrupted resupply efforts and not until 1590 was Raleigh able to send the Hopewell to America. When the vessel reached Roanoke, the settlement was deserted; a cryptic message carved on a tree indicated the party had moved inland. In 1602, another ship was dispatched to the area, but after gathering some sassafras it headed back to England without checking for the lost colonists. Later (early 1600's) reports indicated that the last Roanoke settlers have been wiped out by local natives (Hakluyt 1877; Lefler and Powell 1973; Morison 1971; Winsor 1884-89).

Not until the early seventeeth century, as the war with Spain ground to a halt, did English adventurers turn again to America. In 1602, Bartholomew Gosnold was sent by the Early of Southampton to establish a settlement in the northern portion of America. Sailing from Falmouth on March 25, 1602, Gosnold reached the American coast on May 14, probably somewhere between Cape Porpoise and Cape Neddick, ME. Proceeding southwest, and finally anchoring near present Cuttyhunk Island, MA, the party erected a storehouse and fort and loaded the vessel with sassafras, cedar, and furs obtained from the Indians. However, when

Gosnold decided to return to England, 12 men who were to stay at the settlement refused, and the little colony was abandoned. Gosnold sailed for home, reaching England on July 23. Though the settlement effort had failed, the reports and goods brought back breathed life into adventurous schemes for the region. Furthermore, the explorers carried with them the first known account of the excellent fishing along the New England coast, a report with important implications concerning the region's future (Burrage 1914; Levermore 1912; Winsor 1884-89).

Raleigh and Hakluyt immediately published a report of the expeditions and spent the winter developing further projects. However, by the next summer, James the First had succeeded to the throne after the death of Queen Elizabeth and one of his first actions was to imprison Raleigh. Hakluyt and a number of merchants did send out two vessels, the Discoverer and the Speedwell, to the New World under the command of Martin Pring. However, Pring's purpose was solely economic: to obtain sassafras and trade with the Indians. There was no mention of colonization. Pring struck the Maine coast somewhere near where Gosnold had, ranged about a half degree northeast and then turned southwest, sailing along western Maine and into Massachusetts Bay. He probably landed at Plymouth or Provincetown. First setting up some sort of building with a palisade, Pring then loaded a substantial cargo of sassafras on the Discoverer and sent it to England. After a brief inspection of the country, he headed back in the Speedwell with glowing descriptions of the agricultural potential, large trees, numerous fur-bearing animals, and bountiful fish (Burrage 1914; Levermore 1912; Winsor 1884-89).

Though nothing very significant had come from Pring's voyage, the following year the Earl of Southampton developed a plan for a potential New World home for discontented Catholics in England. By the spring of 1605, he and his son-in-law Sir Thomas Arundell, a Catholic, were preparing for a reconnaissance voyage to America, selecting the experienced explorer George Weymouth to captain the vessel Archangel on the expedition.

The Archangel left London on March 5 and raised land in the vicinity of Nantucket Island on May 14, south of which it was planned to establish the settlement. Quickly turning back to sea to avoid shoals, Weymouth tried to sail south but found himself driven northward by strong winds and did not sight land again until late afternoon on May 17. The following day he moved closer and, discovering the land to be an island, named it St. George's Island, although it was later to be known as Monhegan, ME. The next day he sailed to what are known today as St. George's Islands and anchored among them in Pentecost Harbor.

For the next few days, he explored the nearby mainland shores and the lower reaches of the St. George's River. During this period, Weymouth kidnapped five Indians. On June 11, he sailed up the St. George's River near the site of the present ruins of Fort St. George's where he anchored the Archangel. The next day, they sailed further up the river in a shallop and on the way back erected a cross (probably near

Thomaston). The party returned to the Archangel, sailed back to Pentecost Harbor, and on June 16 sailed for England. On July 18, Weymouth reached Dartmouth Haven (Burrage 1914; Levermore 1912; Winsor 1884-89).

On his return, Weymouth visited Sir John Popham, Lord Chief Justice of England, and Sir Ferdinando Gorges, commander of Plymouth fort, Plymouth, England, giving the former two Indians and the latter three. Their interest, stirred by the Indians in their custody and reports on the New World, induced a group of their friends to petition for a royal charter to colonize. The charter was granted on April 10, 1606, incorporating two companies for the purpose of colonizing "in that part of America commonly called 'Virginia'," an area along the eastern seaboard from 34 to 45 degrees north latitude. One group, the London Company, was to colonize in the region between 34 and 41 degrees; the other, the Plymouth Company, was to operate between 38 and 45 degrees. Either could establish settlements between 38 and 41 degrees, but not closer than 150 miles from each other (Burrage 1914; Preston 1953).

Gorges and Popham were both interested in the northern region, and agreed that each would send a vessel during the summer of 1606 to reconnoitre the coast in preparation for a full-scale colonizing attempt. In August, Gorges sent Henry Challons in the Richard with explicit instructions to sail by a northerly route. However, Challons promptly sailed south and after becoming sick, landed in Puerto Rico to recover. Popham had better fortune, sending out Martin Pring and Thomas Hanham. They sailed directly to the coast of Maine and, not finding Challons there as they had expected, proceeded to survey the coast systematically. They were able to bring back a great deal of information, providing what Gorges described as "the most exact discovery of that coast that ever came into my hands since." The stage had been set; the next step was settlement (Burrage 1914; Preston 1953).

Even as Pring and Hanham carried out their survey for Gorges and Popham, the London Company, largely directed by Sir Thomas Smythe, was preparing an expedition to its territory. On December 20, 1606, three ships, the Susan Constant (100 tons), the Goodspeed (40 tons), and the Discovery (20 tons), headed south to the Canaries and then to the West Indies on their way to Virginia with their cargo of 105 settlers. This small group arrived in Virginia in late April to establish what was to be the first permanent English settlement in America. Between that date and 1625, 7,549 additional immigrants arrived at the colony. However, their ranks were constantly thinned by food shortages, disease and, in 1622, an Indian massacre; in 1625 the colony's population stood at only 1,095.

The colony finally began to find its salvation in growing tobacco, all of which was directly exported to England. Starting from John Rolfe's experimental planting in 1612, 20,000 pounds were shipped out in 1618 and 500,000 pounds in 1630. The colony experienced significant growth after the mid-1620's; by 1634, it had established four new communities and a year later reported a population of nearly 5,000.

Trade was almost wholly with England, the tobacco all being sent to the mother country for use or re-export. Likewise, livestock, foodstuffs, and other needed supplies were shipped out from England. A few ships set out from the colony each year to New England and Newfoundland for fish, and there are references to vessels' sailing to the West Indies for food. Still, these were but a small part of the overall pattern (Andrews 1934; Dabney 1917; Doyle 1889; Winsor 1884-89).

Meantime, growth in the north was more halting and differently patterned. In late 1606, as the three small ships sailed for southern Virginia, Popham and Gorges were busily making preparations for their own expedition to northern Virginia. On May 31, 1607, the Gift of God, commanded by George Popham, nephew of the Chief Justice, and the Mary and John, commanded by Raleigh Gilbert, son of Sir Humphrey Gilbert, left Plymouth, England. Though the vessels lost contact during the voyage, both arrived at the St. George's Islands on the Maine coast in early August.

With summer slipping away, the party headed to the Kennebec area to settle in for the winter. Locating a spot near the mouth of the river, men were set to work constructing fortifications and buildings. Meanwhile, Popham and Gilbert explored up the Kennebec River, west to Cape Elizabeth and east beyond the Pemaquid peninsula. An uncomfortable winter was spent by men not used to such severe cold. That, plus deteriorating Indian relations and the untimely death of the colony's president, George Popham, and two key sponsors in England, brought the project to a close the next summer. When the new commander, Raleigh Gilbert, boarded the recently arrived relief ship to return to England, everyone else crowded aboard, leaving a small settlement deserted (Burrage 1914; Levermore 1912; Preston 1953).

Even as the abortive Popham colony was being planned and attempted, the French were involved in a similar project less than 200 miles to the northeast. On November 8, 1603 King Henry IV of France granted Sieur de Monts a charter with trading and seignorial rights in America between the fortieth and forty-sixth parallels; that is, from Philadelphia, PA. to St. John's, Newfoundland. A French nobleman, de Monts wanted a New World colony: first, as a personal estate; second, for a trading base with the Indians; and third, as a possible jumping-off place in the search for a passage to the Orient. He also brought along Samuel de Champlain, explorer and geographer, to investigate, record and map the coast. The expedition left France on April 7, 1604, in two ships, and entered the Bay of Fundy in May. The party then skirted the shores of the Bay, arriving at Passamaquoddy Bay in late June. Moving up the broad river (the present day St. Croix) that emptied into the Bay, the leaders selected an island in the middle for their settlement. The summer was spent preparing the station. Finally, in September, Champlain and a small party explored west along the coast. Sailing close to land he passed between Mount Desert and the mainland, after which he ascended the Penobscot as high as Kenduskeag Stream. He then descended to the coast, sailed west to the mouth of the Kennebec, and returned to St. Croix Island for the winter. The winter proved

disastrous. Frigid weather, bad location, and supply shortages left a third of the party dead and another third with varying degrees of disabilities.

The following summer, Champlain and de Monts coasted all the way to Massachusetts Bay in search of a better site; however, not satisfied with what they saw, they returned to St. Croix, packed up their house frames and provisions and sailed for Port Royal, Nova Scotia. There they re-established their settlement, although at the end of the summer season Chaplain and de Monts sailed back to France. The little colony lasted until 1607, when it was deserted (Bishop 1948; Burrage 1914; Winsor 1884-89).

Three years later, the settlement was revived. In June, 1610, the Sieur de Pourtrincourt arrived with a contingent of settlers. He was joined at Port Royal on June 22, 1611, by two Jesuits, Pierre Biard and Enemond Massé. Shortly thereafter, Biencourt (Pourtrincourt's son), accompanied by Biard, proceeded southwest along the Maine coast on an exploration trip. The party sailed to the Kennebec, arriving about the end of October. After a brief survey of the area and conversations with local Indians, they headed back to Port Royal, visiting a large assemblage of Indians at Pentagoet and stopping at de Mont's deserted settlement at St. Croix en route.

Back at Port Royal, relations between the Jesuits and the other settlers deteriorated drastically through the winter. Shortly thereafter, the Jesuits appealed to Madame de Guercheville, lady of honor to the Queen of France, asking to be posted somewhere else, as their original aim of Christianizing the natives was being hampered. She fitted out a vessel which she sent to the colony "to take the Jesuits away from Port Royal, and to found a new French settlement in a more suitable place." The vessel arrived in midsummer, 1613, carrying a company of 48 persons including Jesuits Father Quentin and Lay Brother Gilbert du Thet, along with a year's provisions. After a few days, all arrangements were made. Biard and Massé were on board, and the party sailed for the Kennebec.

After being lost in fog for two days, the party found themselves opposite Mount Desert. After some persuasion from local Indians, they decided to set down there and so began their mission at Sommes Sound. Soon after, all plans were dashed, when there arrived on the scene the Englishman Capt. Samuel Argall, up from Virginia on a fishing voyage. Catching the Jesuit company completely by surprise, Argall stormed their little complex and inflicted quick, complete defeat. He sacked the post, sent most of the Frenchmen east along the coast to find passage back to their motherland in French vessels, and carried the Jesuits and other leaders with him to Virginia. He then immediately returned to the north coast, leveled the remains of St. Croix and plundered the French settlement at Port Royal. Though French traders were busy in the area the following year, the French did not again play a major role in the region until the mid-1630's (Burrage 1914; Winsor 1884-89).

Even as Argall crushed the French endeavors in the Gulf of Maine, Capt. John Smith was doing much to overcome the prejudice which Englishmen had felt toward the area since the Popham debacle. Smith visited New England in 1614, arriving there in the early summer. After an uneventful voyage, he made his first landfall at Monhegan Island. Sponsored by four London merchants, he was to hunt whales and look for gold and copper mines; however, if he was unsuccessful, "fish and furs was then our refuge." Not surprisingly, chasing whales and searching for precious metals quickly proved unproductive, so Smith set most of his crew to fishing around Monhegan while he and eight others ranged along the mainland, doing a little fur trading and charting the coast as they sailed along. Although both he and his fishermen did fairly well, he found that the best season for both trading and fishing had already passed. Although not wholly successful in his economic ventures, Smith was able to draft a surprisingly accurate map of northern New England. Deeply impressed with the country's potential, he sailed back to England determined to plant a colony on New England shores. As a result of several misadventures, Smith was never able to fulfill his ambition, but in 1616, he published his Description of New England, a thorough and convincingly laudatory account of his 1614 voyage to the territory of "New England: which included his excellent map. Its success was instantaneous. Fishermen soon began sailing to his "strangest fishpond I ever saw" and less than a decade later, fishing stations already dotted the coast (Barbour 1964; Burrage 1914).

In order to put Smith's accomplishment into perspective it is necessary to step back and survey the more informal conquest of New England, that which was carried out by fur traders and fishermen. As noted above, the Portuguese João Fagundes established a fishing station on the north coast of Cape Breton in the 1520's. Although his operation soon disappeared, by the 1530's, French fishermen and fur traders (certainly encouraged by Cartier's exploration) gradually moved westward into the Gulf of St. Lawrence. Although the fishermen seem not to have ventured south, traders were gradually moving down along the Nova Scotia and New England coasts. By 1600, there is evidence that they had visited much of New England and become fairly well established as far south as the Penobscot River. However, indications are that below that point, the contact must have been sporadic and infrequent. It was not long before English fishermen and seaborne traders began providing stiff competition. Their efforts to capture the market were greatly helped by Argall's raid, which severely reduced French activities until the mid-1630's.

In the 1620's, the newly-founded Plymouth Colony came quickly to dominate the fishing business. By 1630, the Pilgrims had trading posts on both the Kennebec and Penobscot Rivers, and through contacts with the Dutch at Buzzards Bay, secured wampum, a commodity in great demand among the northern Indians. The Pilgrims soon wrested much of the market from the seaborne traders and also proved more than a match for local competitors. For example Thomas Weston of Wessagusset was unable to survive commercially, and operators of trading stations

at Piscataqua and Richmond Island (in the mid-1630's) found themselves unable to penetrate the Plymouth trading sphere. The rascally Thomas Morton of Merrymount was one of the few who seems to have had some success. However, the competition he represented, plus the fact that he traded guns with Indians and favors with native women, prompted the Pilgrims to expel him. The only post that seemingly prospered was Walter Bagnall's stations on Richmond Island, ME. Setting up in 1628, he did a thriving business until 1631, when local Indians became so angry over his sharp trading practices that they killed him and burned his house down over him (Burrage 1914; Churchill 1978; Hart 1927; Moloney 1931; Roberts 1958).

One of the most dramatic developments along the New England coast in the early seventeenth century was the growth of the fishing industry. Started by Gosnold, Pring, and Weymouth, it began slowly. By 1610, the Virginia Company began sending a few vessels annually from the southern colony and possibly from its base in England. The French started some small-scale operations along the eastern shores of the region, and John Popham continued sending yearly fishing-trading expeditions to the Kennebec after the collapse of the Popham colony in 1608.

Though the French were wiped out in 1613 by Argall, the English fisheries did not began to flourish until 1615 when, according to Captain John Smith, six ships went to New England, where they may have been joined by a few vessels from Virginia. In 1616, the number had increased to eight. However, in the same year The Description of New England was published, and after that the number of ships sailing to New England increased dramatically. Smith reported that 37 vessels made the trip in 1622 and 45 in 1623. These figures are corroborated by other contemporary sources. By the mid-1620's, fishing was well-established on the New England coast (Churchill 1978).

As fishing became an important and continuous activity, year-round fishing stations were established along New England shores. One of the first was at Damariscove (ME) which "consist(ed) of some thirteen persons, who are to provide fish all the year with a couple shallops for most timely loading of a ship." The following year, stations were started at Cape Anne, Piscataqua (later Portsmouth), Cape Newagen, and Monhegan, and shortly afterward operations were begun at Pemaquid. A station started at Richmond Island in 1632 was a latecomer to the group.

These posts brought important economies to the fishing industry. Fishing could be pursued throughout the year, including January and February, the worst months in terms of weather but the best for fishing. With men already at the station, the ships coming over only needed a normal crew without having to transport extra men who would not be needed until the vessel reached the fishing ground. Furthermore, the efficiencies inherent in working from a land station, and the ability to use ships more for transportation and less as fishing platforms, made these stations attractive propositions. Not surprisingly, the

number of ships sent from England for the sole purpose of fishing in New England waters declined sharply. By 1635, the number of English West Country vessels fishing along the New England coast was down to 15, a dramatic drop from the 45 in 1623, and in 1661 the last West Country ship sailed to America on a fishing voyage.

It must be pointed out that these stations were not permanent settlements. They were posts established, provisioned, and administered by English proprietors. The men at the stations were employed for set terms, after which they could renew their agreements or leave the post. The situation was such that if the proprietors withdrew their support, the station was either deserted or drastically reduced. The former happened at Cape Anne in 1628 and Monhegan in 1625. At Cape Anne, when the station was broken up, the residents either sailed back to England or moved to Salem, where they established small farms. At Mongehan, the fishing-trading station was moved to the mainland because of trade advantages. In the process, the island was deserted, and so remained for over a decade before new settlements were begun. The Trelawny Station at Richmond Island was not deserted when English support was withdrawn, but it was reduced to a shadow of its former state.

Consideration of this discussion of year-round fishing posts leads to their comparison with better-known permanent settlements or plantations. The existence of the former continued at the pleasure of the English proprietor. The latter were settlements made up of people who had come to stay, and who viewed them, at least for a time, as their homes. The outlooks and purposes of communities of settlers were wholly different from those of the fishing stations, and their makeup was likewise radically different. Settlements were populated not by single men but by families, generally young or middle-aged and often with young children. Invariably, the bulk of the people were farmers (this pattern held true in Maine as well as in the more southern parts of New England). With the exception of Plymouth, founded in 1620, communities of settlers did not really begin to develop until the late '20's. Salem (about 1626), Charlestown (1628), Lynn (1629), Dover (about 1625-28), Piscataqua (1629), and Pemaquid (about 1625-28), probably make up most of such communities before 1630. In 1630, the first wave of Massachusetts Bay settlers arrived and to the east, York, Saco, and possibly Cape Porpoise were settled. From that point on, settlements multiplied throughout New England and by the end of the following decade appreciable settlement had occurred in all coastal New England states (Hart 1927; Van Deventer 1976).

In the early 1600's, the Dutch arrived on American shores. The Dutch Republic (the United Province of the Netherlands) had recently acquired its autonomy from the Hapsburg Empire after over 40 years of war. Economically aggressive, and ruled largely by Protestants, the new nation was at once a friend of and a threat to English aspirations in the New World.

In 1609 Henry Hudson, an Englishman sailing for the Dutch, made a first reconnaissance along the American coast. He sighted land at Penobscot Bay and Cape Cod and proceeded to the mouth of the Chesapeake. There he reversed direction and moved slowly up the coast. He first visited the Delaware Bay and River, after which he sailed into New York harbor and 150 miles up what would one day be known as the Hudson River. He then struck out for Europe to report his findings.

By 1613, private trading operations had been established on the Hudson, headquartered at Manhatten. The following year, a five-vessel fleet, including Captains Adriaen Block and Cornelis May, was sent to the new post. Block's ship burned near the mouth of the Hudson. He then constructed a new vessel, the Restless, in which he explored Long Island Sound, the Connecticut River, and Narragansett Bay. Meanwhile, Cornelis May explored the area between the south coast of Long Island and investigated Delaware Bay. Later, explorations were made well up the River. By the mid-1610's, much was known of this region and in 1614 the Dutch officially named it New Netherland. For the next several years, private fur-trading operations were carried on in the region, with traders working the area from the Delaware River to what is now Rhode Island, including the Hudson and Connecticut River valleys. Year-round posts were established near the mouth of the Hudson and just below Albany.

In 1623, the Dutch West India Company took over the New Netherland operation, upgrading the installation on the Hudson and establishing a new post on the Delaware River near present-day Gloucester, New Jersey. For the rest of the decade, New Netherland remained largely a series of trading stations. In 1630, there were only 30 males and a few dependents at Fort Orange, and a similar number at the mouth of the Hudson and at posts on the Delaware. Several ships were sent over each year (four in 1627) to bring supplies and carry off furs. All in all, the total operation was fairly small (O'Callaghan 1838; Winsor 1884-89).

# APPENDIX B

# HISTORY OF POPULATION CHANGE AND SHIPPING FROM 1630 TO 1800

## B.1 Introduction

The models developed in this study for this period draw heavily on an analysis of the change (mostly growth) of population in the study area. This, coupled with the history of shipping during the time period, helps us to estimate the density and distribution of lost shipping. As in the previous period, there are not enough explicit data on known wrecks to be used as accurate predictors for the locations of previously unknown wrecks. For this reason we will present in this Appendix the analysis of population change and shipping that was used by our researchers to predict the density and distribution of lost ships of this era. Through this presentation, biases in the analysis may be identified.

While the section on population will have a direct relationship to shipping density, the history of shipping will document the changing cargo content and destinations and thus the potential significance of specific vessels.

## B.2 History of Population (1630-1800)

Population statistics presented in the following discussion are derived from U.S. Bureau of the Census 1965:756. Information on individual colony and port development was derived from a series of local and regional histories which are listed in the bibliography.

In 1630, the American plantations made up a series of small settled regions separated by great expanses of unsettled territory. The most extensively settled region by this period was the eastern coast of New England from Massachusetts Bay to Pemaquid, Maine. Excepting Piscataqua (present-day Portsmouth, NH) and Boston, these were all small plantations involved in fishing and farming. Piscataqua was to develop into a modest-sized trading center and Boston was destined to become the major commercial port of the north. The total New England population in 1630 was approximately 2,000. On the mid-Atlantic coast, the Dutch had a trading center at Manhattan, two trading posts up the Hudson, and two establishments on the Delaware. The total Dutch population probably did not exceed 400. In the south, Virginia had acquired the largest population in the eastern colonies, about 2,500 inhabitants.

### B.2.1 1630-1700

The seventeenth century saw rapid population growth in the north. By 1660, there were 20,000 people in what is now Massachusetts and by 1700 the figure was 56,000, nearly a 300% increase. The heaviest concentration was near Boston, extending both north and south along the coast,

and roughly 50 miles westward into the interior. Only once, during King Philip's War in the late 1670's, did population growth halt and the area of settlement contract. By 1680, settlement again expanded into wilderness, although at a slower pace, as the colonists had to protect themselves from surprise Indian raids of the early French and Indian Wars.

To the north, a rather different situation prevailed. Growing slowly, what is now New Hampshire had only 5,000 inhabitants by 1660. In the next 40 years, the colony as a whole was twice ravaged by Indian Wars (King Philip's War, 1675-1676; King William's War, 1689-1696), and by 1700, New Hampshire had only grown to 8,000 people. Still, New Hampshire had grown faster than Maine. North of New Hampshire, the region could not be adequately protected by the Massachusetts government. The small northern communities between the Piscataqua and Pemaquid were probably populated by 4,000 to 5,000 settlers. By 1700, English settlers had moved south to Wells, ME. and the northern population had dropped to perhaps 1,000-2,000. The only other European group in Maine, the French, were established in small posts northeast from the Penobscot, with the largest operations at Castine and Passamaquoddy Bay. In all, there were not more than 100 Frenchmen in the region.

To the south, two New England colonies were founded in the 1630's. The first, Rhode Island, consisted of several small settlements around Narragansett Bay. These settlements had 1,500 people in 1660 and had increased to 6,000 by 1700. Their companion, Connecticut, far outstripped its neighbors. By 1660, there were 8,000 inhabitants, mostly concentrated on the Connecticut River, at New Haven, and along the south shores of the colony, and by 1700, 26,000 had settled within its borders.

Meanwhile, the middle colonies started more slowly and then began growing rapidly by the end of the seventeenth century. New Amsterdam gained population slowly. The emphasis on fur trade and the dampening influence of the patroon system discouraged any kind of mass immigration. By 1660, only 5,000 people populated the colony, most of them along the Hudson and near Manhattan. In 1664, the English captured New Amsterdam, renamed it New York, and introduced more favorable land policies. Growth was impeded by vicious political faction and indifferent commercial development, but by 1700 the colony had 19,000 inhabitants, which included both increases in previous settled regions and new English plantations on Long Island.

Just to the south, and sandwiched between the Hudson and Delaware Bay, was New Jersey. Politically fragmented, the region grew slowly as an agricultural hinterland to the two giant ports. By 1660, 5,000 people had settled within its borders and by 1700 the number had undergone a modest increase to 14,000.

Population in the Delaware Bay region also grew slowly. The Dutch had been in the area since the early seventeenth century and had trading posts as high as the Schuylkill River. The Swedes arrived in

1638, established Fort Casmir and other posts and soon were offering the Dutch substantial competition. In the 1640,s, some New Englanders established themselves on the New Jersey side of the Bay and, after an uneasy period, began cooperating with the Swedes. By the 1650's, the Swedish leaders felt strong enough militarily to challenge the Dutch and in 1654 captured the forts and trading posts of their adversaries. Stung by this action, Peter Stuyvesant, governor of New Amsterdam, sent a relief force in 1655 which retook the Dutch fort, captured Fort Casmir and reestablished Dutch supremacy in the area. Sweden attempted to reverse the situation, sending a small force to the Delaware area, bolstered by a body of Finns. The effort failed, however, except to introduce a new, Finnish group to the region. In 1664, with the English capture of New Amsterdam, Delaware Bay came under the new government. At the same time, there were perhaps 500 or 600 Dutch, Swedes, Finns, and New Englanders in the region. In the 1680's, William Penn established his Quaker colony at the head of the Bay and founded Philadelphia at the confluence of the Delaware and Schuylkill Rivers. The colony experienced a dramatic influx of settlers and by 1700, 18,000 people had found their way to Penn's New World grant.

In the south, there was substantial growth, especially in newly settled areas. Virginia, which was founded in 1607, contained 2,500 people in 1630, and 27,000 in 1660. After that date growth slowed somewhat and by 1700, 58,000 people made their homes in the colony. Virginia's neighbors, Maryland and North Carolina both emerged in the seventeenth century. Maryland was established in 1634 by Cecilius Calvert, the second Lord Baltimore, with 200-300 settlers. There was continued immigration from England as well as an increasing stream from Virginia. By 1660, 8,000 people had settled in the colony and by 1700, the number had grown to 30,000, making Maryland the third most populous province on the east coast. To the south of Virginia, North Carolina slowly struggled into being. A small number of individuals moved into the area by the 1650's and the colony grew to perhaps a 1,000 by 1660. Yet after this sporadic early development, North CArolina was well established by 1700. By that time, there were 11,000 people in the colony, many of whom were settled in the Albemalre area, and most of whom remained economically tied to Virginia.

B.2.2 1700-1780

Generally, the period from 1700 to 1750 was a time of phenomenal population growth. By 1750, every colony showed massive gains, with even the slowest-growing acquiring four times as many inhabitants as had been present at the turn of the century, and others such as Maine, Delaware, and Pennsylvania increasing their population tenfold or more. However, between 1750 and 1780, population growth took on a new pattern. Both lightly populated colonies (that is, Maine, New Hampshire, North Carolina) and those with considerable numbers of inhabitants such as New York, Pennsylvania, and Virginia showed substantial growth. Conversely, New England colonies (Massachusetts, Rhode Island, Connecticut) and colonies which were not serving as commercial marts (for example, New Jersey, Delaware, Maryland) did not experience so large an increase.

It is evident that, excepting Massachusetts, the major commercial colonies of New York, Pennsylvania and Virginia were attracting more people as their major ports (New York, Philadelphia, Hampton) attained entrepôt status, thereby gradually developing economic spheres of influence along the coast as well as breaking into the English, European, and West Indian trade. Adjoining colonies played a subordinate role, providing agricultural goods and miscellaneous other raw materials to the commercial centers. With no major urban population, these hinterlands grew slowly.

The southern colonies also showed substantial growth, even though their largest ports (except for Charleston, SC) were far smaller than the great marts to the north. However, much of this increase in population came with the introduction of the plantation system and the large-scale importation of slave labor.

As noted, Massachusetts did not show the same growth as New York, Pennsylvania, and Virginia from 1750 to 1780. Massachusetts, and especially Boston, had developed largely on the great carrying trade that its merchants had built. The major middle colony ports began to cut into the New England coasting trade not only in their own spheres, but in West Indian and English areas as well. The competition was keenly felt and as New York and Pennsylvania boomed, Boston stagnated. For a time, Rhode Island and Connecticut showed some appreciable gains in population as Newport, New Haven, and some lower Connecticut River communities cut into the Long Island Sound and West India trade, but these towns were badly hurt by the Revolution and would be affected by the general malaise that shrouded New England until industrial development began in the early nineteenth century.

Table B-1 lists the population of the colonies between 1700-1790.

## B.3 History of Shipping (1630-1800)

Information on regional shipping development in the following discussion is derived from the following sources: Albion 1939, Albion and Pope 1945, Bailyn 1955, Bailyn and Bailyn 1959, Cass 1976, Fairburn 1945, Jensen 1963, Johnson and others 1915, Morgan 1976, Ostrander 1973, Schultz 1976, Van Deventer 1976 and Wicker 1976.

### B.3.1 New England

In 1630, New England's leading port was Plymouth, where furs were collected from Connecticut, Long Island, and the Kennebec and Penobscot Rivers in Maine for export to England (Bailyn 1955). However, the fur trade through Plymough declined during the 1630's as furbearering animals were depleted and populations moved into the Connecticut, Merrimack, and other drainages to found their own settlements based initially upon revenues from furs. This process led to the use of other markets for furs. For example, Merrimack furs tended to gravitate to Boston while, by 1638, New Haven exported both furs and agricultural produce to New Amsterdam (Johnson and others 1915).

Table B-1: Colonial population 1700-1800 (from U.S. Bureau of the Census 1965).

| States | 1700 | 1730 | 1750 | 1770 | 1780 | 1790 | 1800 |
|---|---|---|---|---|---|---|---|
| ME | 1,000 | 6,000 (approx.) | 20,000 (approx.) | 31,000 | 49,000 | 97,000 | |
| NH | 5,000 | 11,000 | 27,000 | 62,000 | 88,000 | 142,000 | |
| MA | 56,000 | 108,000 | 168,000 (approx.) | 235,000 | 269,000 | 379,000 | |
| RI | 6,000 | 17,000 | 33,000 | 58,000 | 53,000 | 69,000 | |
| CT | 26,000 | 76,000 | 111,000 | 184,000 | 207,000 | 238,000 | |
| NY | 19,000 | 49,000 | 77,000 | 163,000 | 211,000 | 340,000 | |
| NJ | 14,000 | 38,000 | 71,000 | 117,000 | 140,000 | 184,000 | |
| PA | 18,000 | 52,000 | 120,000 | 240,000 | 327,000 | 434,000 | |
| DE | 2,500 | 9,000 | 28,000 | 35,000 | 45,000 | 59,000 | |
| MD | 30,000 | 91,000 | 141,000 | 203,000 | 245,000 | 320,000 | |
| VA | 58,000 | 114,000 | 231,000 | 447,000 | 538,000 | 692,000 | |
| NC | 11,000 | 30,000 | 73,000 | 197,000 | 270,000 | 394,000 | |

As Plymouth's maritime trade was declining during the 1630's, other ports, and especially Boston, were growing. Significant profits were based upon the sale of British goods to large numbers of recent immigrants, most of whom had fled politically troubled England. However, by 1640 the flow of immigrants slowed drastically and a commercial depression resulted. As colonial products, with the exception of timber, were not readily saleable in England, New England shippers sought new markets.

During the following decade, the production of dried fish for export increased significantly. As early as 1641, Winthrop reported the export of 300,000 dried fish and in 1643 the first ship built in Boston, the Trial, sailed for Malaga and Bilbao with fish for trade. Four other ships also cleared New England ports for ocean voyages in 1643 (Bailyn 1955). Prior to 1650, New England fishing took the form of one to two day trips to local grounds, the catch being returned to port fresh for drying. Following 1650, however, the practice of "slack salting", or storing the catch on board in brine-filled barrels permitted New England fishermen to use larger vessels and to make long trips and return to port with much larger unspoiled catches. After being dried at port, the catch was exported by both colonial and British ships.

It is possible that some of the above-mentioned vessels embarked on ocean voyages in 1643 were bound for the West Indies, for by 1650, Boston's West Indies trade was established. Exports included timber, grain, cattle, butter and fish. Initially, imports were cotton and tobacco, though sugar and molasses soon became predominant.

The West Indies trade continued to grow in significance until 1776. Tobacco importation from Virginia also began about 1650 and continued through the Revolutionary period. Much of the tobacco was intended for re-export to non-English ports such as Holland and Southern Europe, but the bulk of colonial tobacco was carried directly to England on English ships.

The 1660's were prosperous for New England maritime commerce. Boston was home port for 192 vessels in 1665 (Johnson and others 1915), and Salem and Charlestown also had significant shipping capacity. These vessels collected commodities from smaller ports in New England and beyond or re-exported them to foreign markets. British vessels generally were not involved in coastal trade, though they were major carriers on oceanic voyages. Ports such as Plymouth, MA, and New Haven, CT, which had engaged in direct exportation during the early 1600's, had declined to provincial status, dependent upon the major entrepôts of Boston, Salem and Charlestown, MA. New Amsterdam/New York also played this role in southern New England. A major abberation in this pattern was the direct exportation of timber from northern New England ports. This bulky cargo was presumably produced in quantities capable of filling large vessels locally, and would have been inconvenient to reload at major ports. Falmouth, ME, was involved in direct timber exportation, and in 1670 Portsmouth exported 10 loads of masts to England

(Bailyn 1955). However, it is interesting to note that Falmouth captains normally returned via the larger market of Boston, where imported British cargoes were sold (Edwin Churchill, personal communication). Finally, other ports, especially those in southern New England, occasionally sent loads of produce to the West Indies, presumably when volume was sufficient to provide an entire cargo.

The New England fishing fleet made its first significant appearance on the Grand Banks during the 1670's (Johnson and others 1915). At the same time, fish purchased in Newfoundland began to flow to New England ports for re-export, together with notes of credit on British merchants. The latter were important to New Englanders in redressing the negative balance of payments built up by the import of large volumes of British manufactures. In return, Newfoundland fishermen bought New England rum. By this time New England markets for fish had become quite standardized, with top-quality cod going to southern Europe in return for manufactures, second-quality fish going to the Canaries for wine, and the poorest fish going to the West Indies as slave food in return largely for molasses, sugar and rum.

Both coastal and West Indies trade also increased during the 1670's. Local communities produced increasing surplusses which could be exchanged for British goods. The southern colonies continued to send tobacco to New England ports, primarily Boston, for re-export, and also supplied the region with British manufactures obtained from their direct commerce with the mother country. French manufactures began to appear in New England ports during this period, and the French West Indian ports were opened to colonial vessels.

In 1673, the British Navigation Act attempted to strengthen Royal Mercantile economic policy by prohibiting the re-export of southern tobacco on colonial vessels. However, Carolina, a new tobacco exporter, and ports in some other southern areas continued to evade the law, and New England merchants continued to export tobacco to non-English European ports.

Between 1700 and 1750, the entrepôt pattern, focused primarily on Boston, continued to grow, and coastal shipping volumes there were high. For example, Boston entries and clearances for coastal trade between 1714 and 1717 totaled 390, of 11,589 tons' burden. The tonnage figure is equal to that entered and cleared for Great Britain, and a third of that for the West Indies during the same period (Johnson and others 1915). In 1725, New Hampshire alone did 5,000 pounds worth of business with Boston. Finally, during one week in 1741, coastal trade brought to Boston the following (Johnson and others 1915)

6,650 bushels of corn
200 bushels of peas

524 barrels of flour
291 barrles of beef
278 barrels of pork
79 barrels of rice

Most of these supplies were probably bound for reshipment to the West Indies, along with such commodities as fish, timber, barrel staves and headings and manufactures. Return cargoes might also include rum as well as molasses, and slaves.

Direct trade with Europe during this period included timber and ships. The latter were often built new, loaded, and sold with cargo upon arrival. By 1700, over-trapping had reduced fur production to insignificant levels (Bailyn 1955).

Fishing continued to be a major industry between 1700 and 1750. There is also some indication that, during this period, fishermen made voyages southward during the winter months to "peddle" manufactures at small ports. The New England catch in 1731 (direct export) was 230,000 quintals (1288 tons) from ports including Marblehead, Gloucester, Plymouth, and Salem as well as Maine, New Hampshire and the Isles of Shoals (Johnson and others 1915). As before, cod dominated the industry, with mackerel, hake, pollock, herring, sturgeon, salmon and others being taken in significant amounts.

The early 1700's saw considerable growth in the whaling industry. Whaling from small boats was widespread by 1700. Nantucket had six sloops in its whaling fleet in 1715 and by 1730 had 25 whaling vessels. Provincetown in 1736 had 12 vessels, some of over 100 tons' burden, which hunted the Davis Strait, between Baffin Island and Greenland (Johnson and others 1915).

While the first half of the eighteenth century saw considerable growth in New England's maritime commerce, Boston's dominance was challenged in certain areas. Locally, fishing ports such as Gloucester, Marblehead, Salem and Plymouth began to export their products directly, and others, like Newport, RI, developed an independent West Indies trade. Finally, the ports of Philadelphia and New York were expanding rapidly, beginning to compete with Boston in both coastal and overseas trade. By 1750, these ports equalled or surpassed Boston in maritime commerce.

Between 1750 and the Revolution, British Parliament had passed three acts which interfered with New England's maritime commerce. In 1763, the Molasses Act restricted the importation of this commodity, used in the manufacture of rum. In 1764, the Sugar Act was passed. Since fish were frequently used to pay for West Indian molasses and sugar, the decline in these imports lowered the need for fish. Finally, in 1765, the Fishery Recovery Act, intended as a punitive measure to the colonies, had a further dampening effect on New England's fishing fleet. However, despite these impediments, commerce and the fishing industry in particular, held their own or expanded between 1765 and 1775. It

is estimated that during this period, New England had 665 vessels, of 25,630 tons' burden total (38.5 tons average) with 4,405 men engaged in cod fishery alone. The Maine fleet during this period included 360 vessels, totaling 1,000 tons' burden (16.7 tons average). Fish exportation was handled by some 360 New England vessels, some excedding 100 ton's burden, in addition to British carriers. Finally, by 1774, the region's whaling fleet had reached 360 vessels totaling 33,000 tons (91.7 tons average). Nantucket's whaling fleet had risen to 120 vessels; the Massachusetts total, including New Bedford, Provincetown, Edgartown and others was 300. The balance were based in Connecticut, Rhode Island and New York (Johnson and others 1915).

With the Revolution came a drastic decline in coastal trade and fishing. Significant shipping apparently linked New England, Nova Scotia, and the West Indies, though no figures on volume are available.

However, the War's impact on fishing was clearly severe. For example, Marblehead had fishing vessels totaling 12,000 tons in 1772; by 1789 tonnage had declined to 1,509. In 1774, Chatham, a relatively small port, had 13 fishing vessels in its fleet; only four or five remained in 1783 (Johnson and others 1915).

While New England felt the impact of the 1785 depression, it also participated in the nation's recovery from it a few years later. The West Indies trade had dropped tremendously in significance and the whaling industry was not to recover for 25 years following the war. However, the fishing fleet registered new highs by 1789. From 1784 onward, the Far East trade, based largely at Salem during its early years, grew rapidly. In 1912, Salem's fleet included 126 deep-sea vessels, and of these, 58 were Indiamen (Johnson and others 1915).

B.3.2 New Amsterdam/New York

In 1630, New Amsterdam was a major exporter of furs derived from the Hudson River region, and to some extent from the Delaware and the Connecticut Valleys. Between 1630 and 1664 (when the British took control of the port), it served as a redistribution center for Dutch imports to areas under Dutch control, including present-day New York and Delaware Bay. New Amsterdam was also involved in the importation and re-export to Holland of Virginia tobacco, though the volume of this trade is regarded as secondary to that of New England.

The port's growth was checked, after the British takeover, by political troubles. However, by 1700 it had become a significant entrepôt for agricultural products grown between the Connecticut River and eastern New Jersey (Albion 1939). It also engaged in some West Indies trade, though on the whole, it was to remain a relatively minor port for decades to come. By 1749, business had increased considerably. Imports included fish oil, blubber, whale fins, turpentine, seal skins, hops, cider, bricks, coal, lamp black, wrought iron, tin, brasury (sic), joinery, carriages and chairs. Exports included chocolate, lumber, and European and West Indian goods (Johnson and others 1915).

From Boston, New York received traditional exports of that port, such as beef, butter, timber, fish, and rum. The port continued in its role as entrepot for agricultural produce between the Connecticut River and eastern New Jersey.

Shipping in the Pennsylvania region was minimal until about 1680, when a small amount of maritime commerce with Europe is reported. The first reported agricultural surplus available for export occurred in 1683 and trade with the West Indies was initiated in 1685 (Johnson and others 1915).

Philadelphia grew rapidly after 1685, dominating shipping in the Delaware Bay and western New Jersey areas. By this time, substantial European and West Indian trade was underway, and coastal trade reached as far as Salem and Gloucester. As indicated above, Philadelphia rivaled Boston by 1750 and periodically surpassed it during the last half of the century.

B.3.3 Southern Colonies

It should be indicated at this point that between 1630 and 1800, the southern colonies, including Maryland and Virginia, devoted little effort to the development of their own shipping capabilities. Rather, they opted to rely upon European (mainly British) and New England vessels for both oceanic and coastal maritime commerce. However, the impact of this phenomenon upon the distribution of shipwrecks is not expected to be large.

Both Maryland and Virginia had begun to export tobacco to England by the 1630;s. Tobacco was also sent to New England shortly thereafter, although throughout colonial history, most of this product went directly to England on English ships, in return for British manufactures. By 1700, 80% of their crop was sent to England and fully half of the British manufactures imported to the colonies went to Maryland and Virginia (Johnson and others 1915). Thus the commerce of this region rapidly became large and valuable, though commercial patterns remained rather simple in comparison to those of New England. However, both Virginia and Maryland did engage in coastal trade and in the West Indies trade by the 1640's. The two exchanged agricultural products, and both sent tobacco and British manufactures to New England and, to a lesser extent, to New Amsterdam before 1664. The flow of tobacco to New England, destined for re-export to Holland and France, continued throughout the pre-Revolutionary Period and even, to a limited extent, during the Revolution. British Navigation Acts of 1660 and 1763 attempted to stem this trade, but generally failed because of inadequate enforcement.

New England and other northern vessels frequently stopped at southern ports on their way to and from the West Indies, thus conveying southern agricultural products (beef, port, grain) to the Indies and returning sugar and rum to the southern colonies in exchange for British manufactures.

While Charleston (established 1670) developed fairly late in comparison to Virginia and Maryland, after 1700 its export trade developed rapidly, being based largely upon tobacco. Again, most of its tobacco was sent to England. However, significant amounts went to Boston for re-export by 1673, in flagrant violation of the Navigation Act of that date. Indeed, by 1700 Charleston was the largest colonial port south of Philadelphia, with a very active New England and West Indies trade. The port received a further boost with the introduction of indigo in 1742, for by 1760, 75% of Britain's indigo supply came from Carolina (Johnson and others 1915).

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772.

| Destination or origin | Number | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| BOSTON | 1772 | 1771 | 1770 | 1769 | 1768 | 1755 | 1754 | 1714-17 |
| Outward bound (clearances) | 845 | 794 | 800 | 828 | 612 | 406 | 447 | 416 |
| Great Britain | 57 | 55 | 56 | 66 | 67 | 35 | 26 | 48 |
| Ireland | 1 | --- | --- | 1 | 2 | 2 | 3 | --- |
| Europe | 11 | 22 | 15 | 20 | 22 | 29 | 31 | 19 |
| Africa | 5 | 4 | 6 | 4 | --- | --- | 1 | --- |
| Bahama Islands | 8 | 12 | 5 | 6 | --- | 1 | 5 | 4 |
| Bermuda Islands | 1 | 1 | --- | 1 | --- | 3 | --- | 5 |
| Caribbean | 178 | 136 | 131 | 143 | 147 | 133 | 149 | 191 |
| Thirteen Colonies | 443 | 439 | 464 | 457 | 281 | 122 | 156 | 117 |
| Other American Colonies | 141 | 125 | 123 | 130 | 93 | 81 | 76 | 28 |
| Inward bound (entries) | 852 | 821 | 819 | 879 | 549 | 287 | 310 | not available |
| Great Britain | 93 | 72 | 74 | 75 | 69 | 32 | 43 | |
| Ireland | --- | --- | --- | 1 | 3 | 2 | 2 | |
| Europe | 20 | 17 | 23 | 31 | 22 | 27 | 37 | |
| Africa | --- | --- | --- | --- | --- | --- | --- | |
| Bahama Islands | 11 | 9 | 4 | 5 | --- | --- | 7 | |
| Bermuda Islands | 1 | 2 | 1 | 1 | --- | 2 | --- | |
| Caribbean | 204 | 196 | 188 | 172 | 160 | 48 | 71 | |
| Thirteen Colonies | 427 | 382 | 422 | 430 | 204 | 149 | 139 | |
| Other American Colonies | 96 | 143 | 107 | 164 | 91 | 28 | 11 | |

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772, cont.

| Destination or origin | Number | | | | |
|---|---|---|---|---|---|
| NEW YORK | 1772 | 1771 | 1770 | 1769 | 1768 |
| Outward bound (clearances) | 700 | 524 | 612 | 787 | 480 |
| Great Britain | 39 | 45 | 46 | 47 | 56 |
| Ireland | 19 | 27 | 29 | 30 | 30 |
| Europe | 48 | 40 | 58 | 78 | 45 |
| Africa | 9 | 4 | 2 | 5 | 2 |
| Bahama Islands | 5 | 7 | 8 | 2 | 4 |
| Bermuda Islands | 3 | 6 | 4 | 8 | 7 |
| Caribbean | 199 | 194 | 189 | 125 | 156 |
| Thirteen Colonies | 324 | 134 | 188 | 430 | 125 |
| Other American Colonies | 54 | 67 | 88 | 62 | 55 |
| Inward bound (entries) | 710 | 557 | 600 | 725 | 462 |
| Great Britain | 61 | 63 | 39 | 41 | 79 |
| Ireland | 11 | 13 | 19 | 18 | 15 |
| Europe | 38 | 27 | 44 | 39 | 31 |
| Africa | --- | --- | 4 | 1 | 2 |
| Bahama Islands | 11 | 9 | 11 | 4 | 9 |
| Bermuda Islands | 5 | 4 | 1 | 2 | 3 |
| Caribbean | 208 | 220 | 226 | 179 | 158 |
| Thirteen Colonies | 352 | 184 | 217 | 394 | 139 |
| Other American Colonies | 24 | 37 | 39 | 47 | 26 |

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772, cont.

| Destination or origin | Number | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NEW YORK- cont. | 1754 | 1739 | 1735 | 1734 | 1733 | 1727 | 1726 | 1715-18 |
| Outward bound (clearances) | 322 | 269 | 207 | 184 | 223 | 214 | 211 | 215 |
| Great Britain | 31 | 9 | 12 | 8 | 9 | 11 | 12 | 21 |
| Ireland | 23 | 16 | 3 | 2 | 5 | --- | --- | --- |
| Europe | 19 | 21 | 17 | 9 | 6 | 6 | 8 | 10 |
| Africa | 4 | --- | --- | 1 | --- | --- | --- | 1 |
| Bahama Islands | 3 | 1 | 3 | 1 | 4 | --- | --- | 3 |
| Bermuda Islands | 3 | 3 | 1 | 4 | 6 | 5 | 3 | 5 |
| Caribbean | 180 | 113 | 95 | 87 | 103 | 104 | 95 | 104 |
| Thirteen Colonies | 51 | 97 | 73 | 70 | 85 | 86 | 90 | 68 |
| Other American Colonies | 12 | 10 | 5 | 5 | 6 | 2 | 5 | 3 |
| Inward bound (entries) | 266 | 261 | 196 | 213 | 217 | 215 | 202 | not available |
| Great Britain | 28 | 27 | 26 | 18 | 24 | 17 | 31 | |
| Ireland | 10 | 4 | 3 | 4 | 3 | --- | 1 | |
| Europe | 25 | 22 | 25 | 24 | 12 | 7 | 10 | |
| Africa | 5 | --- | --- | --- | 1 | --- | 1 | |
| Bahama Islands | 6 | 1 | 2 | 6 | 3 | 2 | --- | |
| Bermuda Islands | 3 | 14 | 13 | 19 | 15 | 11 | 9 | |
| Caribbean | 177 | 105 | 83 | 78 | 97 | 95 | 85 | |
| Thirteen Colonies | 23 | 93 | 47 | 71 | 78 | 87 | 69 | |
| Other American Colonies | 7 | 11 | 5 | 5 | 6 | 3 | 5 | |

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772, cont.

| Destination or origin | Number | | | | | | |
|---|---|---|---|---|---|---|---|
| PHILADELPHIA | 1772 | 1771 | 1770 | 1769 | 1768 | 1734 | 1733 |
| Outward bound (clearances) | 759 | 741 | 769 | 678 | 641 | 191 | 185 |
| Great Britain | 23 | 27 | 25 | 37 | 40 | 21 | 12 |
| Ireland | 24 | 25 | 49 | 32 | 38 | 16 | 17 |
| Europe | 88 | 79 | 125 | 136 | 88 | 22 | 20 |
| Africa | 1 | 3 | --- | 1 | --- | --- | --- |
| Bahama Islands | 11 | 13 | 10 | --- | --- | --- | --- |
| Bermuda Islands | 4 | 3 | 2 | --- | 3 | 6 | 2 |
| Caribbean | 268 | 230 | 243 | 202 | 206 | 74 | 87 |
| Thirteen Colonies | 307 | 332 | 283 | 246 | 229 | 50 | 45 |
| Other American Colonies | 33 | 29 | 32 | 24 | 37 | 2 | 2 |
| Inward bound (entries) | 730 | 719 | 750 | 698 | 528 | 210 | 190 |
| Great Britain | 63 | 71 | 42 | 46 | 60 | 24 | 26 |
| Ireland | 12 | 16 | 26 | 32 | 15 | 11 | 8 |
| Europe | 88 | 69 | 154 | 108 | 63 | 17 | 16 |
| Africa | --- | --- | --- | --- | --- | --- | --- |
| Bahama Islands | 10 | 12 | 11 | --- | --- | --- | --- |
| Bermuda Islands | 2 | 6 | 1 | --- | 3 | 12 | 10 |
| Caribbean | 247 | 232 | 221 | 214 | 139 | 79 | 77 |
| Thirteen Colonies | 287 | 294 | 274 | 243 | 218 | 68 | 58 |
| Other American Colonies | 21 | 19 | 21 | 55 | 30 | --- | --- |

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772, cont.

| Destination or origin | Number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HAMPTON (VA) | 1772 | 1771 | 1770 | 1769 | 1768 | 1752 | 1739 | 1733 | 1731 | 1727 |
| Outward bound (clearances) | 356 | 301 | 244 | 266 | 246 | 156 | 98 | 82 | 101 | 104 |
| Great Britain | 36 | 34 | 27 | 29 | 33 | 20 | 6 | 11 | 16 | 22 |
| Ireland | --- | 3 | 2 | 1 | 1 | --- | --- | --- | --- | --- |
| Europe | 14 | 20 | 15 | 20 | 14 | 14 | 7 | 6 | 5 | 2 |
| Africa | --- | --- | --- | --- | --- | 1 | --- | --- | --- | --- |
| Bahama Islands | 3 | 3 | 3 | 6 | 5 | 1 | --- | --- | --- | --- |
| Bermuda Islands | 10 | 5 | 12 | 3 | 7 | 8 | 8 | 5 | 13 | 19 |
| Caribbean | 205 | 180 | 141 | 146 | 148 | 81 | 44 | 50 | 53 | 41 |
| Thirteen Colonies | 88 | 56 | 42 | 59 | 37 | 31 | 33 | 10 | 14 | 20 |
| Other American Colonies | --- | --- | 2 | 2 | 1 | --- | --- | --- | --- | --- |
| Inward bound (entries) | 332 | 317 | 282 | 281 | 254 | 169 | 102 | 87 | 88 | 94 |
| Great Britain | 62 | 62 | 56 | 59 | 55 | 37 | 21 | 19 | 21 | 18 |
| Ireland | 1 | 1 | 2 | 1 | --- | --- | --- | --- | --- | --- |
| Europe | 10 | 10 | 13 | 15 | 9 | 10 | 5 | 4 | 1 | 2 |
| Africa | 1 | --- | 1 | --- | --- | 2 | --- | 1 | --- | --- |
| Bahama Islands | 3 | 5 | 5 | 7 | 3 | 1 | --- | 2 | --- | 1 |
| Bermuda Islands | 7 | 6 | 8 | 9 | 3 | 4 | 9 | 5 | 5 | 16 |
| Caribbean | 158 | 156 | 132 | 134 | 134 | 78 | 40 | 50 | 46 | 37 |
| Thirteen Colonies | 88 | 77 | 64 | 50 | 50 | 37 | 29 | 10 | 15 | 20 |
| Other American Colonies | 2 | --- | 1 | 6 | --- | --- | --- | --- | --- | --- |

Table B-2. Number of ships outward and inward bound, by destination and origin: 1714 to 1772, cont.

| Destination or origin | Number | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CHARLESTON (S.C.) | 1772 | 1771 | 1770 | 1769 | 1768 | 1735 | 1734 | 1732 | 1731 |
| Outward bound (clearances) | 485 | 487 | 451 | 433 | 429 | 247 | 219 | 183 | 198 |
| Great Britain | 115 | 119 | 81 | 109 | 121 | 88 | 81 | 73 | 94 |
| Ireland | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Europe | 16 | 26 | 53 | 56 | 48 | 30 | 22 | 20 | 15 |
| Africa | 2 | 1 | --- | --- | --- | --- | --- | --- | --- |
| Bahama Islands | 25 | 25 | 21 | 16 | 22 | 41 | 28 | 22 | 23 |
| Bermuda Islands | 11 | 12 | 11 | 8 | 9 | --- | 1 | 2 | 1 |
| Caribbean | 129 | 163 | 163 | 113 | 113 | 22 | 28 | 33 | 34 |
| Thirteen Colonies | 166 | 124 | 98 | 106 | 83 | 65 | 59 | 33 | 31 |
| Other American Colonies | 21 | 17 | 24 | 25 | 33 | 1 | --- | --- | 1 |
| Inward bound (entries) | 452 | 489 | 455 | 433 | 448 | 232 | 226 | 174 | 191 |
| Great Britain | 79 | 79 | 61 | 115 | 139 | 57 | 53 | 43 | 55 |
| Ireland | 11 | 3 | 5 | --- | 11 | 4 | 7 | 3 | 1 |
| Europe | 24 | 21 | 20 | 13 | 18 | 38 | 17 | 12 | 10 |
| Africa | 25 | 11 | --- | 21 | --- | 9 | 7 | 5 | 9 |
| Bahama Islands | 22 | 29 | 22 | 20 | 21 | 27 | 30 | 21 | 18 |
| Bermuda Islands | 14 | 20 | 15 | 10 | 9 | 1 | 4 | 7 | 9 |
| Caribbean | 120 | 163 | 184 | 114 | 129 | 42 | 60 | 46 | 55 |
| Thirteen Colonies | 138 | 132 | 115 | 104 | 88 | 57 | 64 | 42 | 42 |
| Other American Colonies | 19 | 31 | 33 | 36 | 33 | 15 | 4 | 2 | 3 |

Table B-3. Piscataqua/Portsmouth, NH entries and clearances 1695-1754

| YEAR | ENTRIES | CLEARANCES |
|---|---|---|
| Sept. 1694-<br>Oct. 1695 | 23 | 34 |
| June 25, 1723-<br>June 25, 1724 | 36 | 58 |
| Dec. 25, 1724-<br>Dec. 25, 1725 | 31 | 63 |
| Dec. 25, 1726-<br>Dec. 25, 1727 | 33 | 52 |
| May 22, 1735-<br>April 23, 1736 | 48 | 64 |
| Jan. 1, 1741-<br>Jan. 1, 1742 | 34 | 62 |
| Dec. 25, 1741-<br>Dec. 25, 1742 | 61 | 78 |
| Dec. 25, 1742-<br>Dec. 25, 1743 | 65 | 77 |
| Dec. 25, 1743-<br>Dec. 25, 1744 | 43 | 48 |
| Dec. 25, 1744-<br>Dec. 25, 1745 | 28 | 44 |
| Dec. 25, 1745-<br>Dec. 25, 1746 | 37 | 76 |
| Dec. 25, 1746-<br>Dec. 25, 1747 | 69 | 114 |
| Dec. 25, 1751-<br>Dec. 25, 1752 | 118 | 157 |
| Dec. 25, 1753-<br>Dec. 25, 1754 | 115 | 139 |

# APPENDIX C

## DISCUSSION OF THE CHANGING CONCEPTIONS OF THE ATLANTIC COAST IN THE EARLY CENTURIES OF EXPLORATION

A description of early regional variations in maritime activity is graphically illustrated in the maps of the period (reprinted here from Winsor 1884, 1885, 1886). Figures C-1 through C-4 indicate the early development of information on the Gulf of Mexico, Florida, and, later, Carolina regions. Already generally understood in 1513 (Fig. C-1), this area was well known by 1529 (Fig. C-2). By the end of the century (Fig. C-3), detailed knowledge of the Florida region had been developed. Because it was on the northern boundary of Spanish activity, this was the best known and undoubtedly the most traveled region on the early American east coast. Figure C-4 (showing the Hatteras-Chesapeake area) was drawn by John White of the Roanoake colony. With this map, he made a dramatic addition to knowledge of the region.

In the north, one may witness the same pattern, with detailed cartographical knowledge of specific regions correlating directly with known maritime activity in those regions. Fishermen very quickly began sailing into the Gulf of Maine and evidence of that presence is clear in Ribero's map of 1529 (Fig. C-5). By 1546, partly because of Cartier's activities, but also because of those of fishermen and traders, the known area stretches well up the St. Lawrence. However, it is also clear that little is known about the region south of Cape Breton. The Bay of Fundy is not shown and Norumbega (or "Rio de Gamas" as it was also known) appears on the 1546 map of Henri II to be the same as it was 17 years earlier on Verrazano's 1529 map. This indicates that there had been little travel in that area south of Cape Breton during that time. By 1592, information on the area south of Cape Breton had clearly improved, no doubt in direct relation to increased French trade in the area. Although poorly formed, the Bay of Fundy appears, and the Penobscot River has begun to look somewhat less stylized (Fig. C-6). Still, it was not until the 1600's that the shape of the New England coast was generally understood.

Nor surprisingly, the middle coast was a mystery to sixteenth-century map makers. Maiollo's map of 1527 (Fig. C-7) provides little feeling for the actual conformation of the mid-Atlantic coastline. Very quickly one begins to see a stylized, often repeated coast with a lower coast bulge followed by a convex curve (the two divided by a river) and then toward the top a stylized Norumbega. These features are especially prominent on the French map of 1536 (Fig. C-8) and John Dee's map of 1580 (Fig. C-9) and still show to a substantial degree on the Quadus map of 1600 (Fig. C-10). Beside this pattern, other even more fanciful renditions of the mid-Atlantic coast appear in the mid-sixteenth century (see Figs. C-11 and C-12). Clearly, little was known about the region, probably because few Europeans ventured along that coast before 1600.

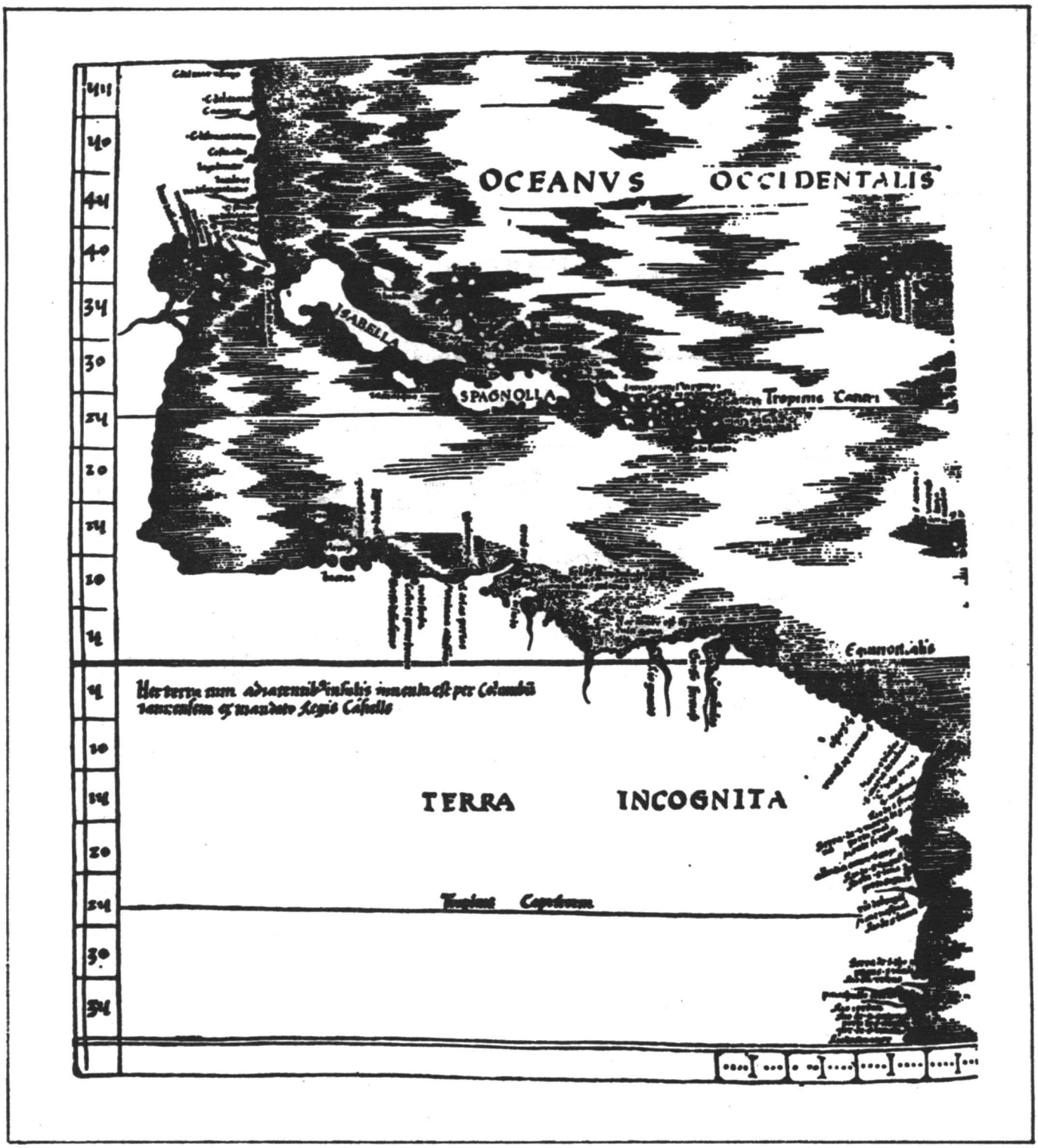



Fig. C-1
"The Admiral's map" (1513). This shows a general understanding of the geography of Florida, the Carolina regions, and the Gulf of Mexico.

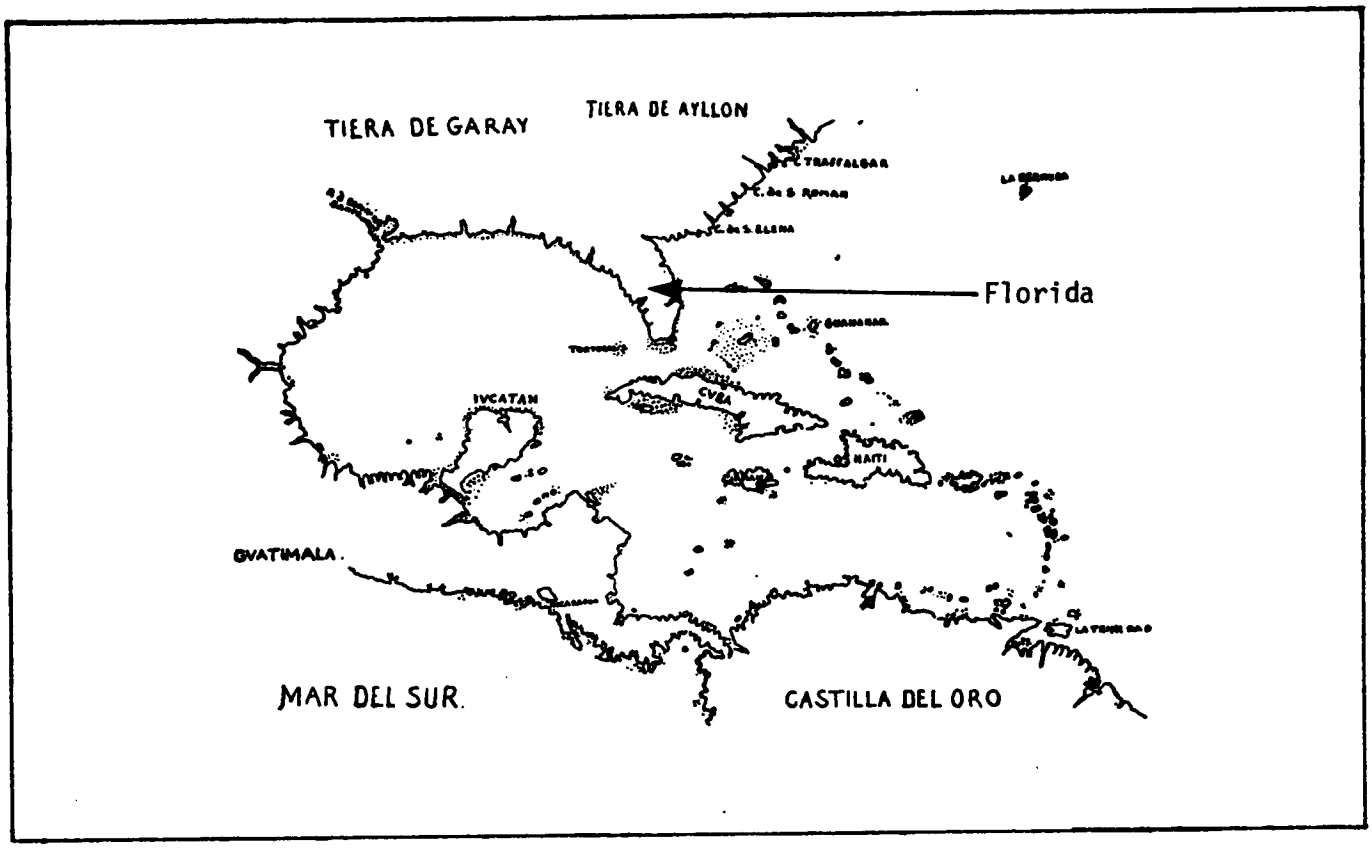



Fig. C-2
1529 map of Ribero (reprinted from Winsor 1886), showing that the area around Florida, the Gulf of Mexico, and the Carolinas had become well known.

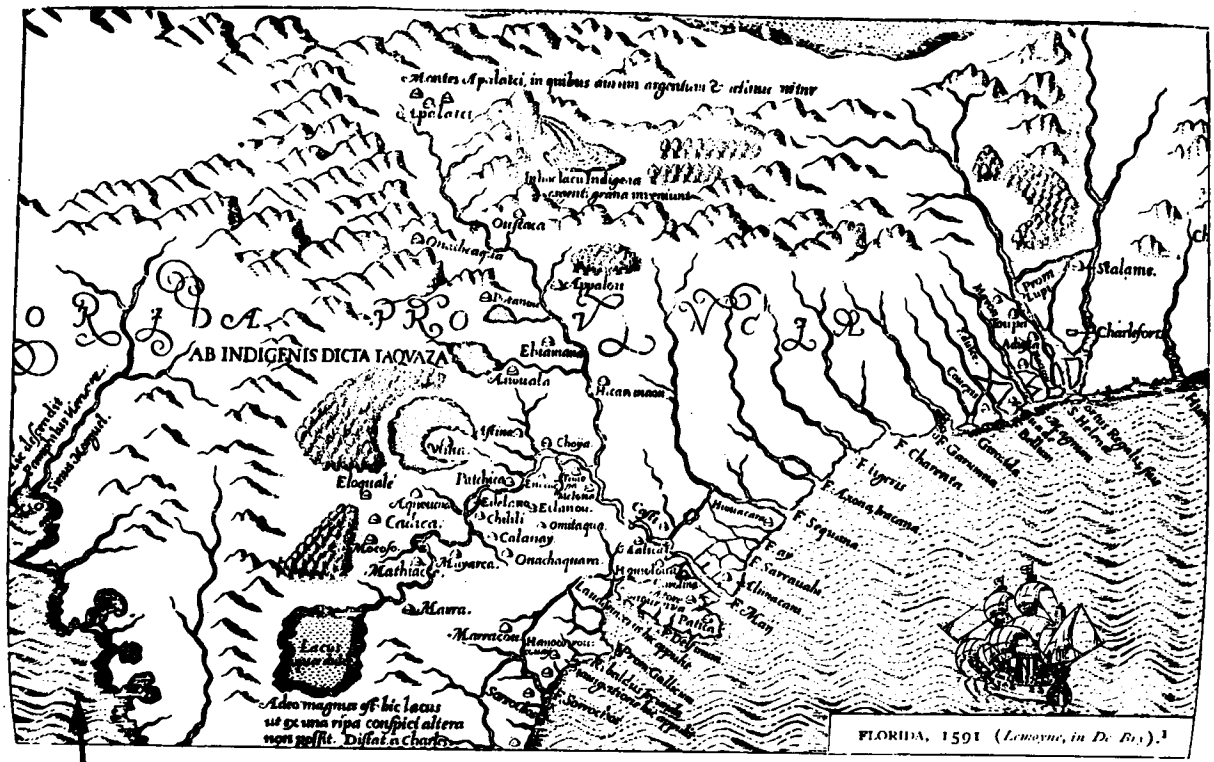



Fig. C-3
1591 map showing upper Florida and the Carolina coast (reprinted from Winsor 1886). This very detailed map indicates how much knowledge had been gained about the region through extensive travel.

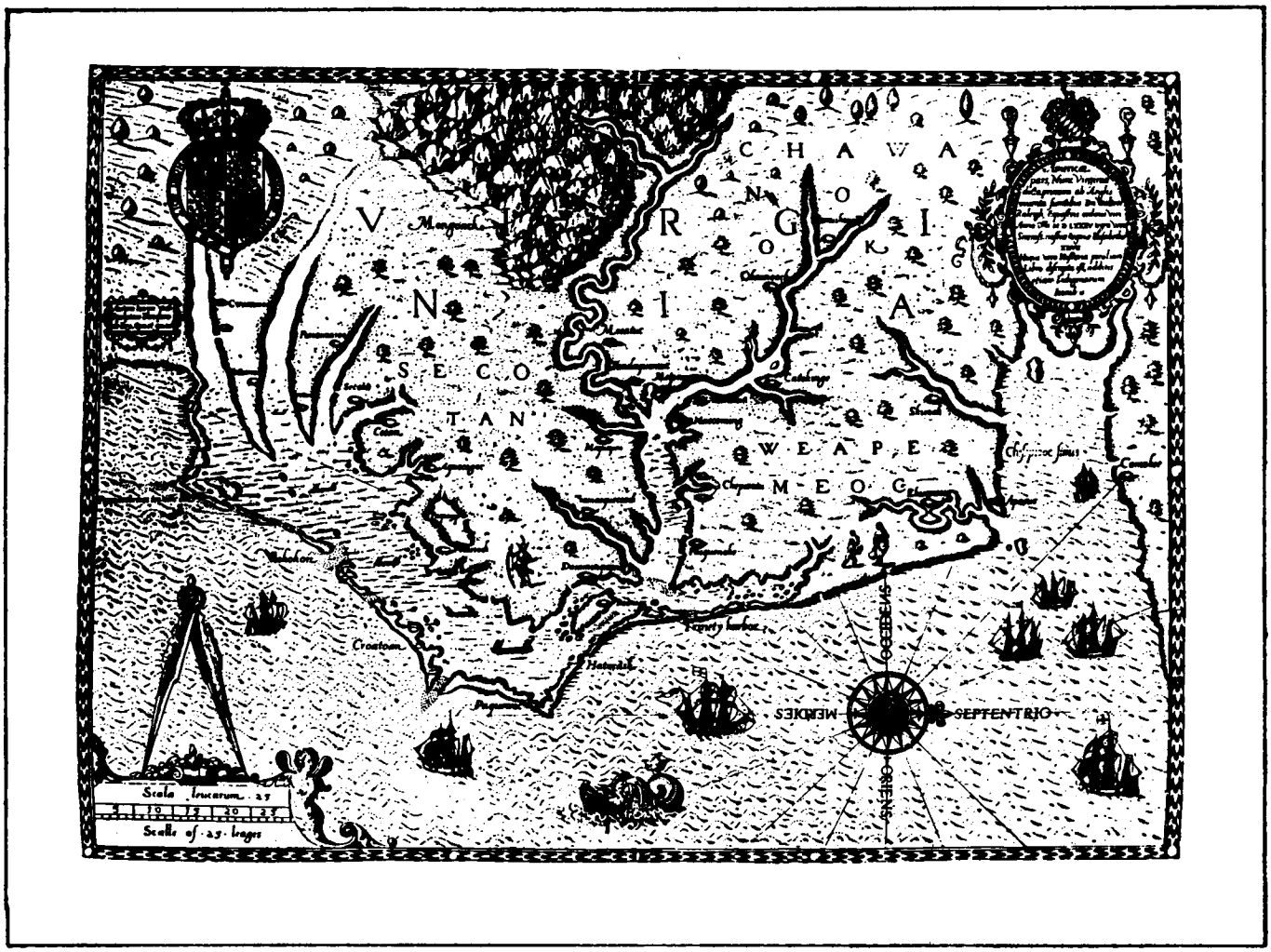



Fig. C-4
1587 map of the Hatteras - Chesapeake area, drawn by John White of Raleigh's group. The improved knowledge of this area's geography by the end of the century indicates increasing European contact.

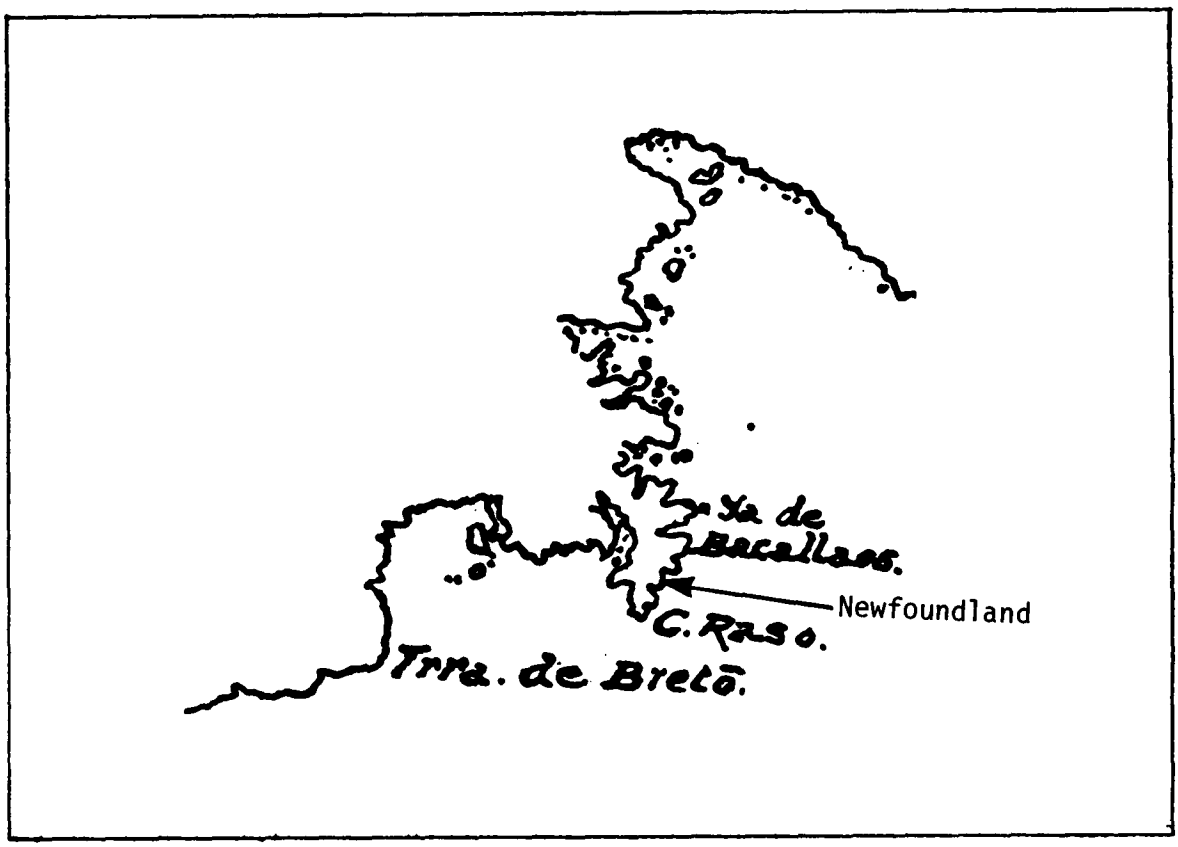



Fig. C-5
1529 map of Ribero (reprinted from Winsor 1884), indicating by its detail that the area was fairly well known by this time.

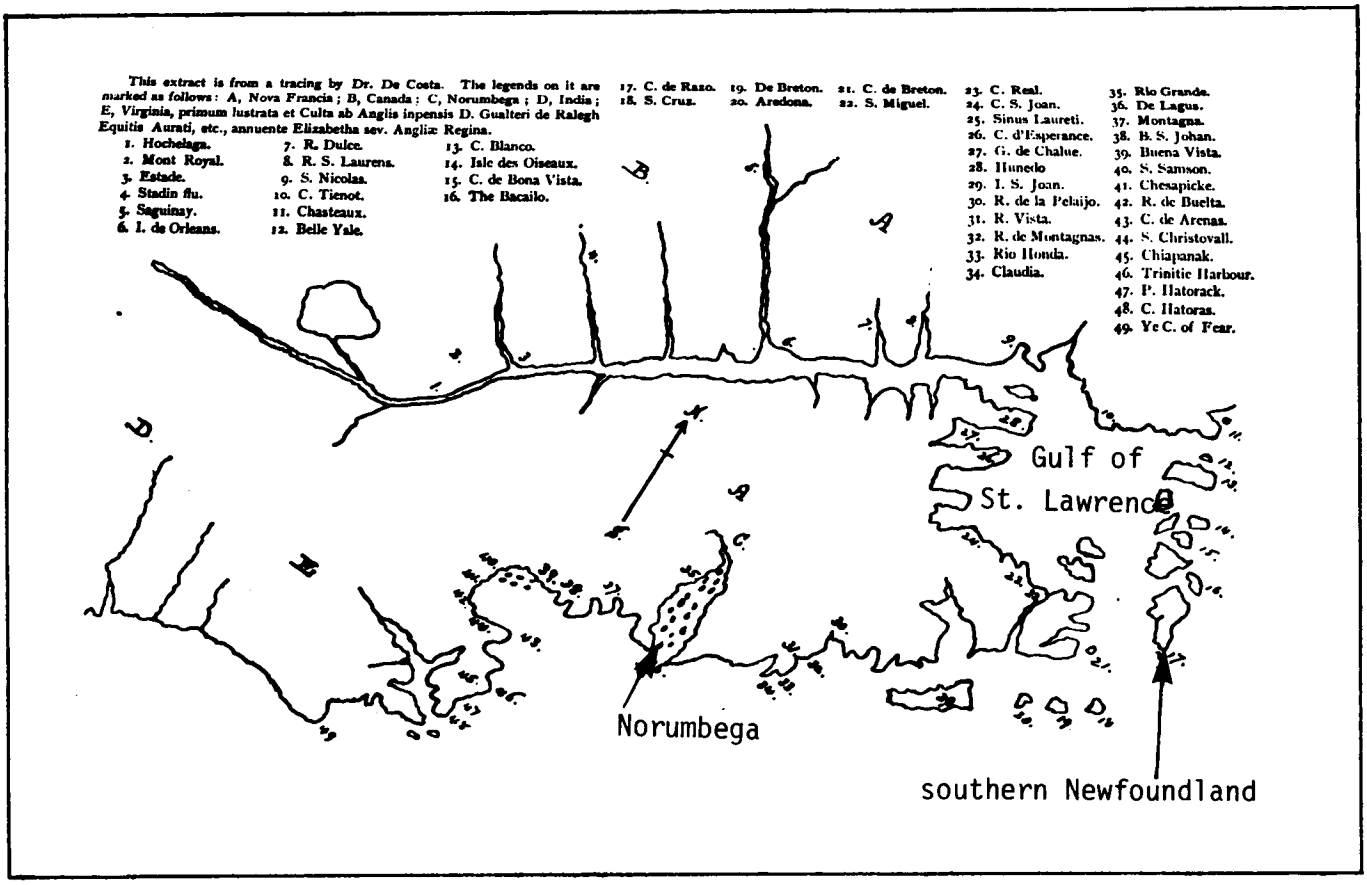



Fig. C-6
1592 map from the Molineaux Globe showing the Bay of Fundy and the Penobscot River (reprinted from Winsor 1884), showing an increased cartographical knowledge of the area south of Cape Breton due to increased travel in the area.

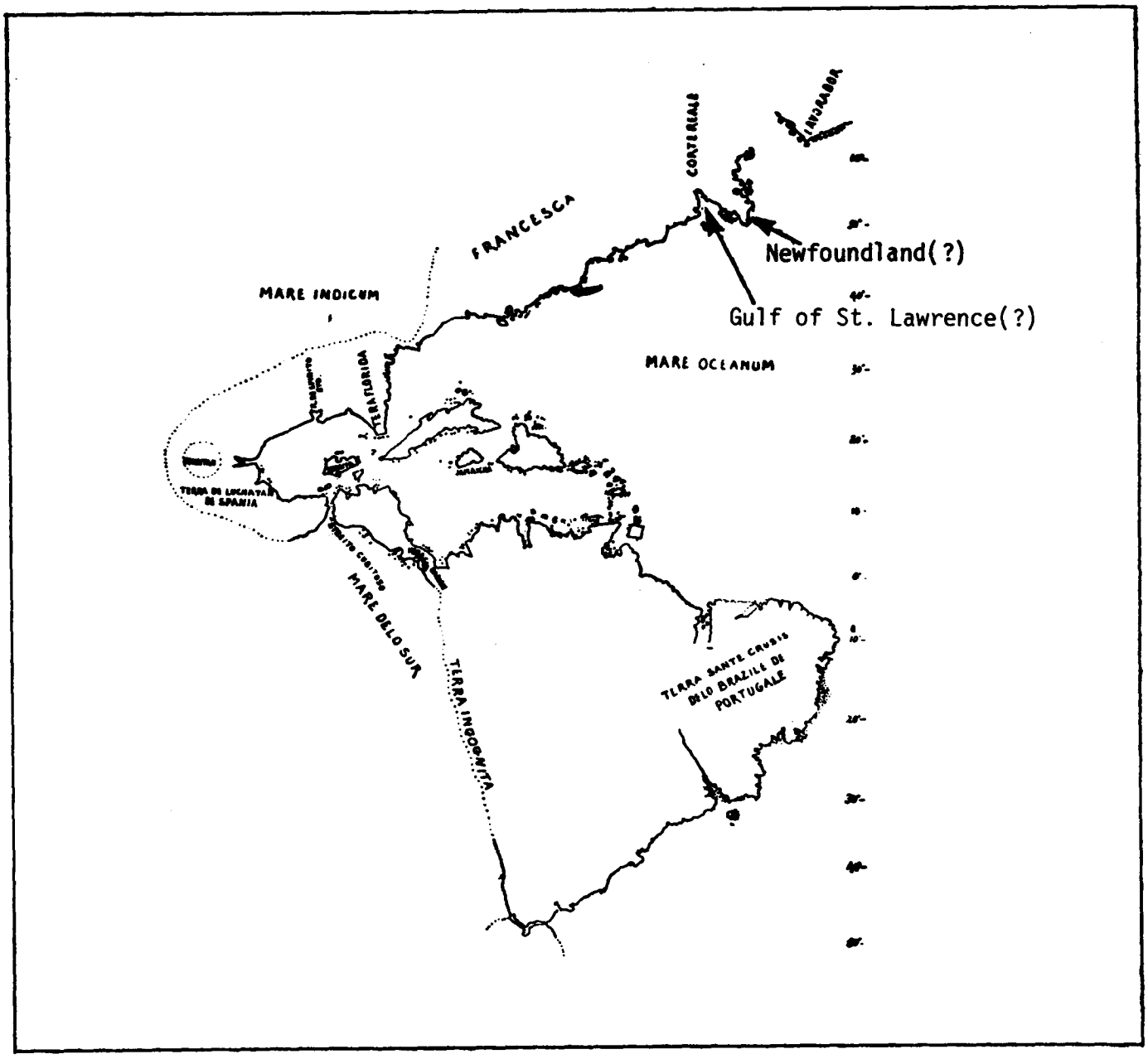



Fig. C-7
Maiollo's map of 1527 (reprinted from Winsor 1886), showing that 16th-century mapmakers had very little knowledge of the mid-Atlantic coastline.

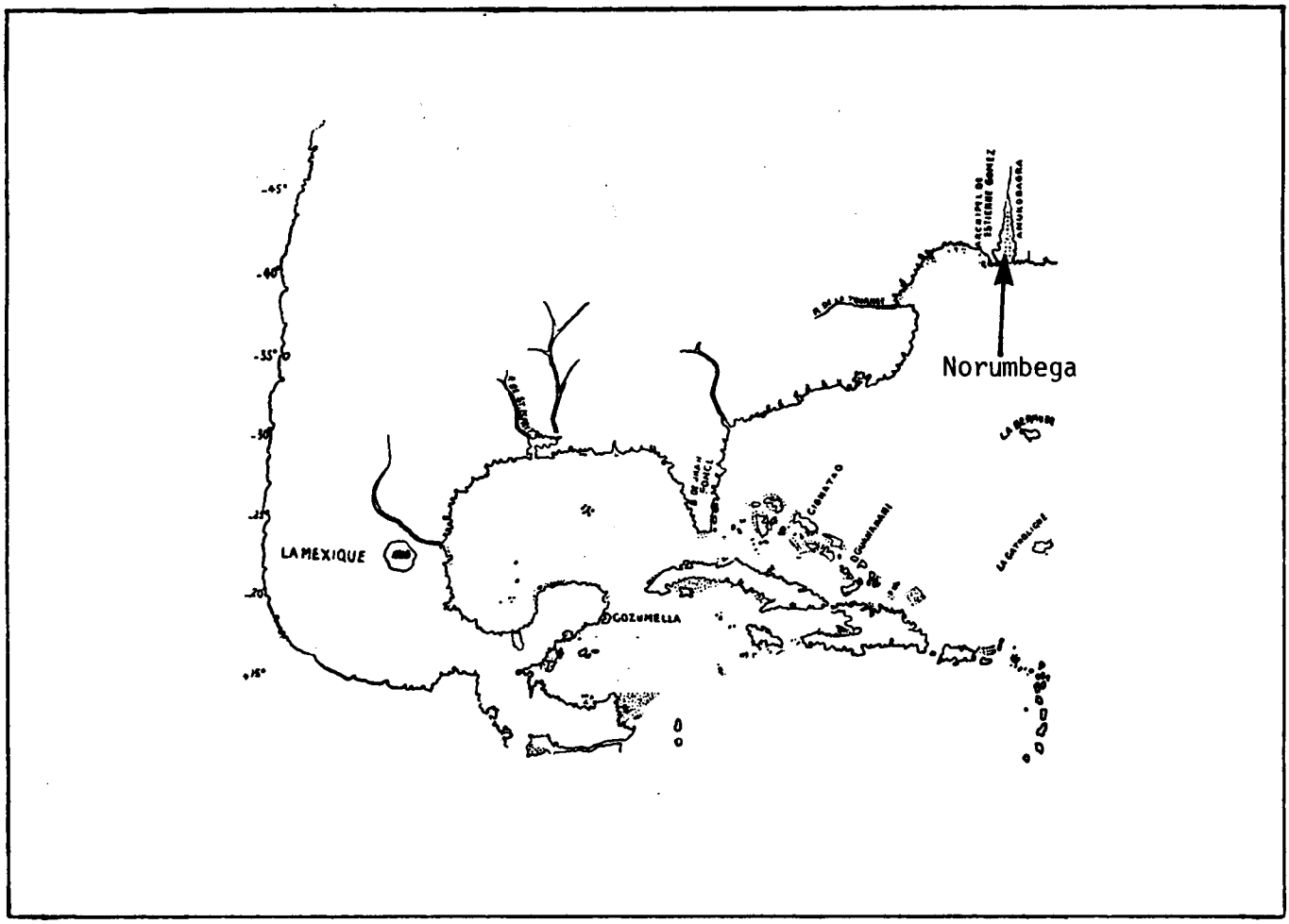



Fig. C-8
French map of 1536 (reprinted from Winsor 1886), showing a stylized mid-Atlantic coast.

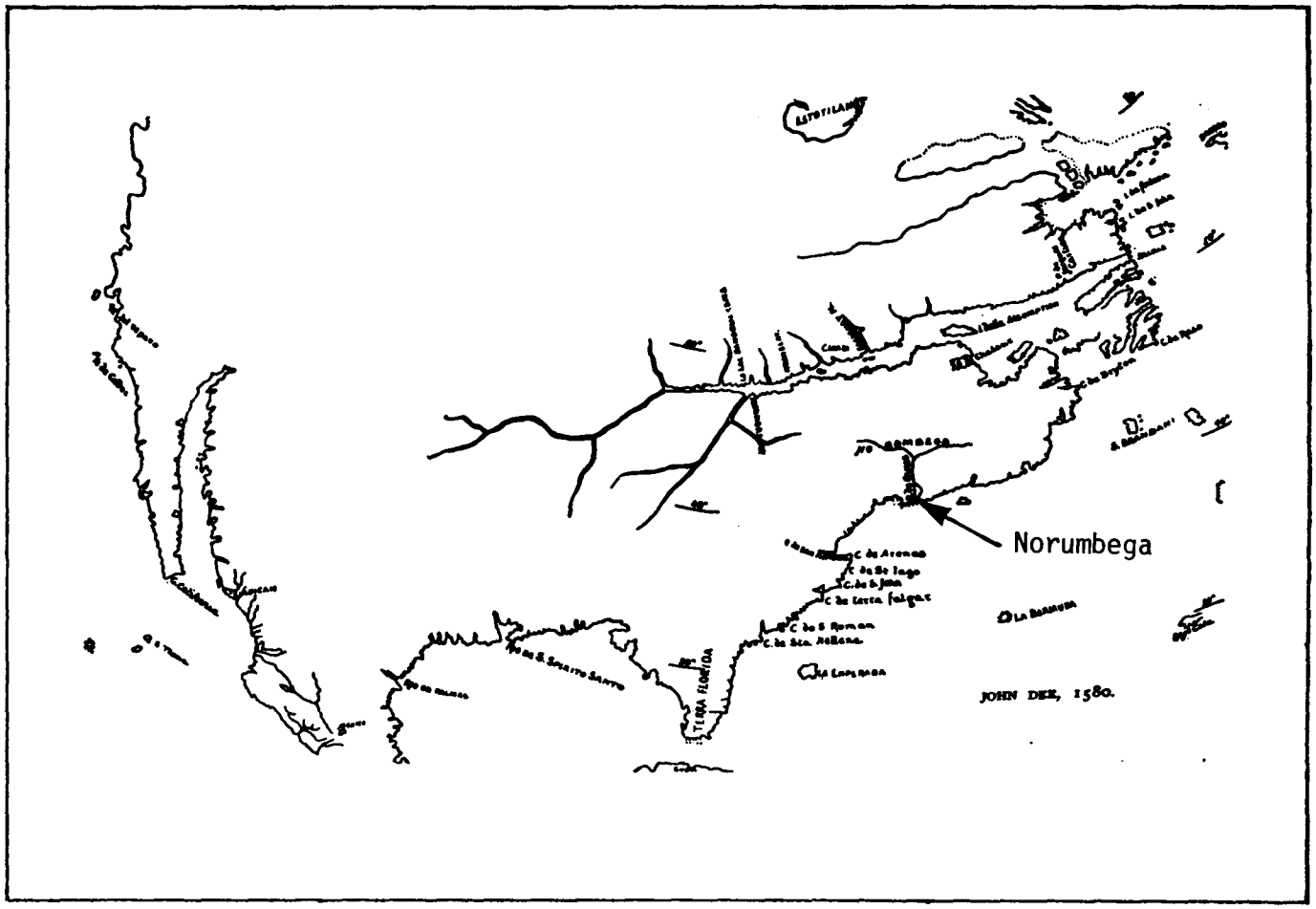



Fig. C-9
John Dee's map of 1580 (reprinted from Winsor 1885). Like the 1536 map (Fig. C-8) this map shows a stylized mid-Atlantic and Norumbega.

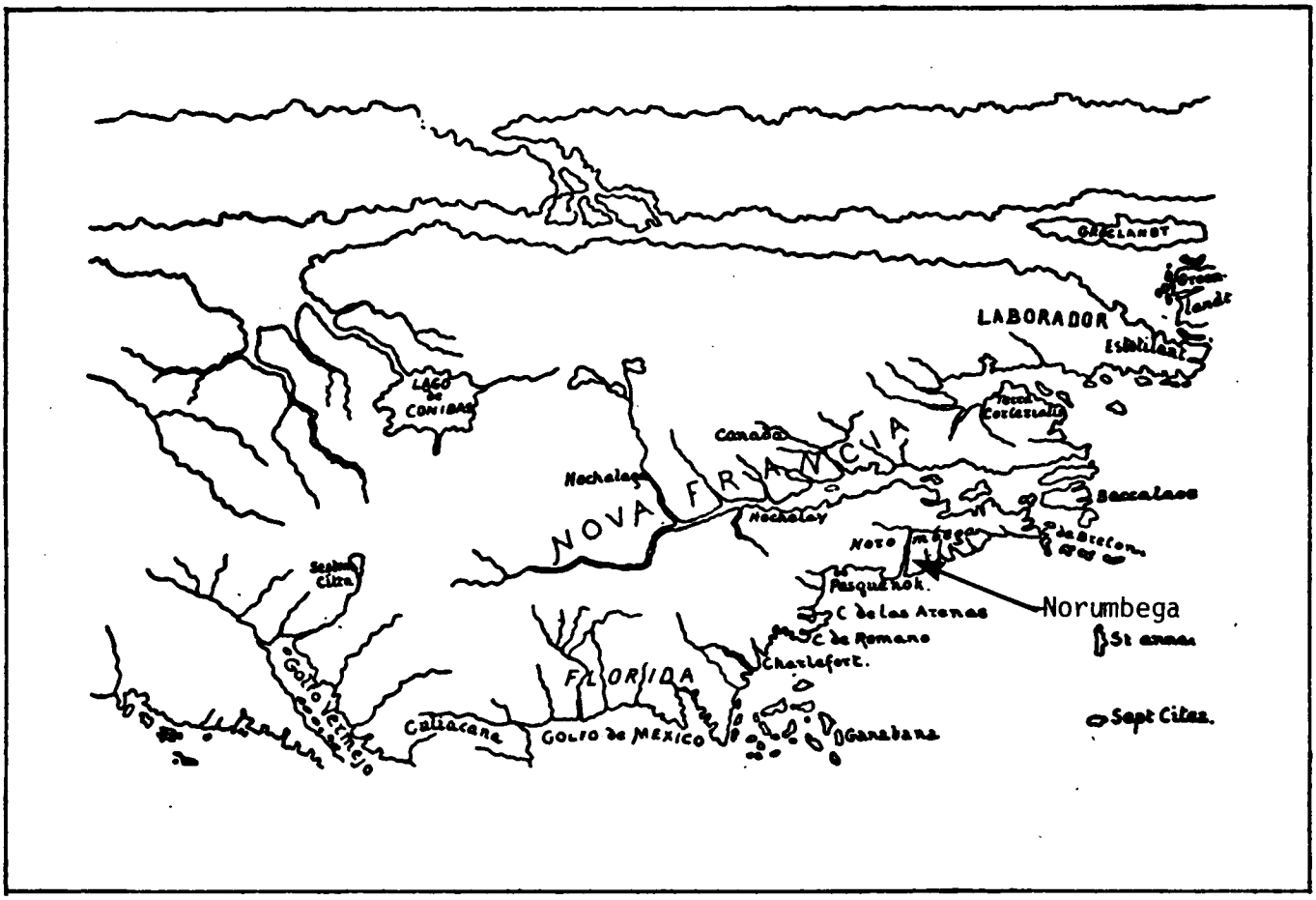



Fig. C-10
Quadus map of 1600 (reprinted from Winsor 1885). The typical 16th-century stylization of the mid-Atlantic coast, especially Norumbega, is still present.

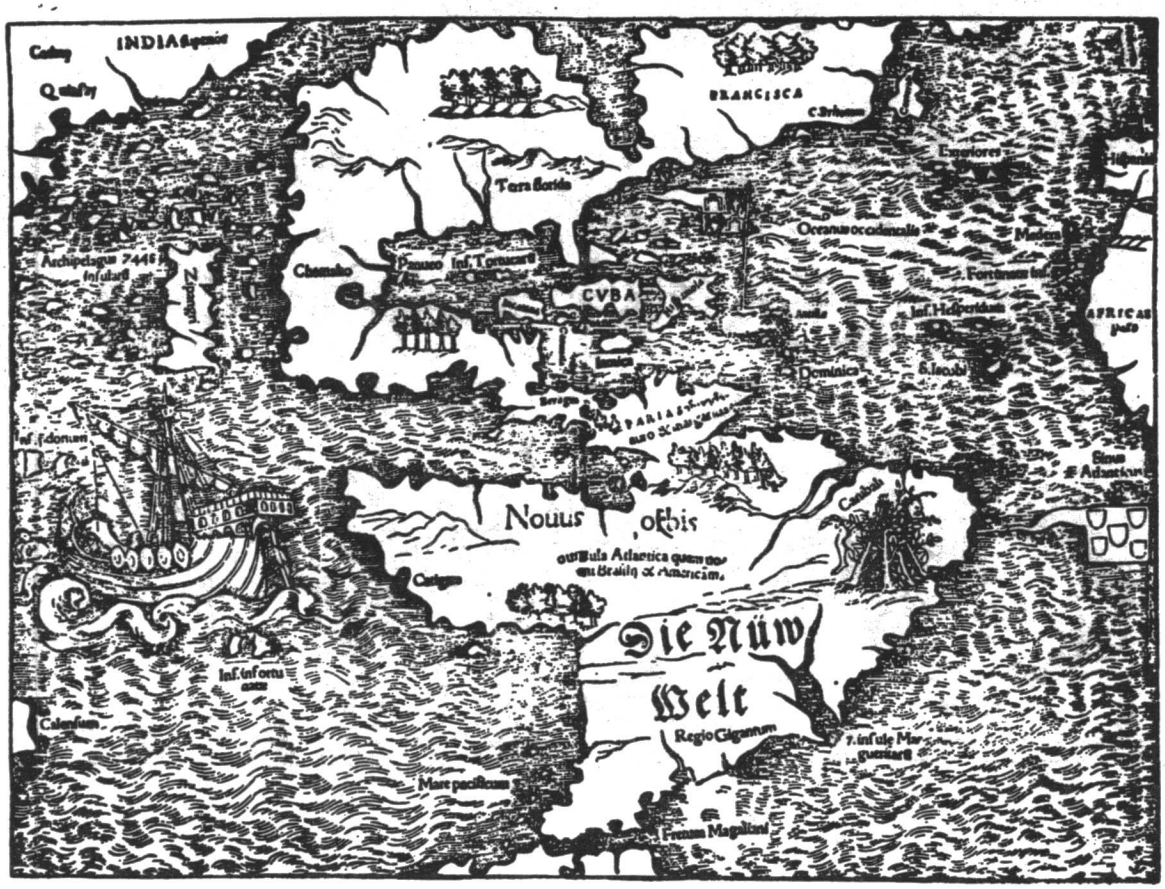



Fig. C-11.
1540 map of Münster (reprinted from Winsor 1885). This is one of the worst examples of 16th-century cartography.

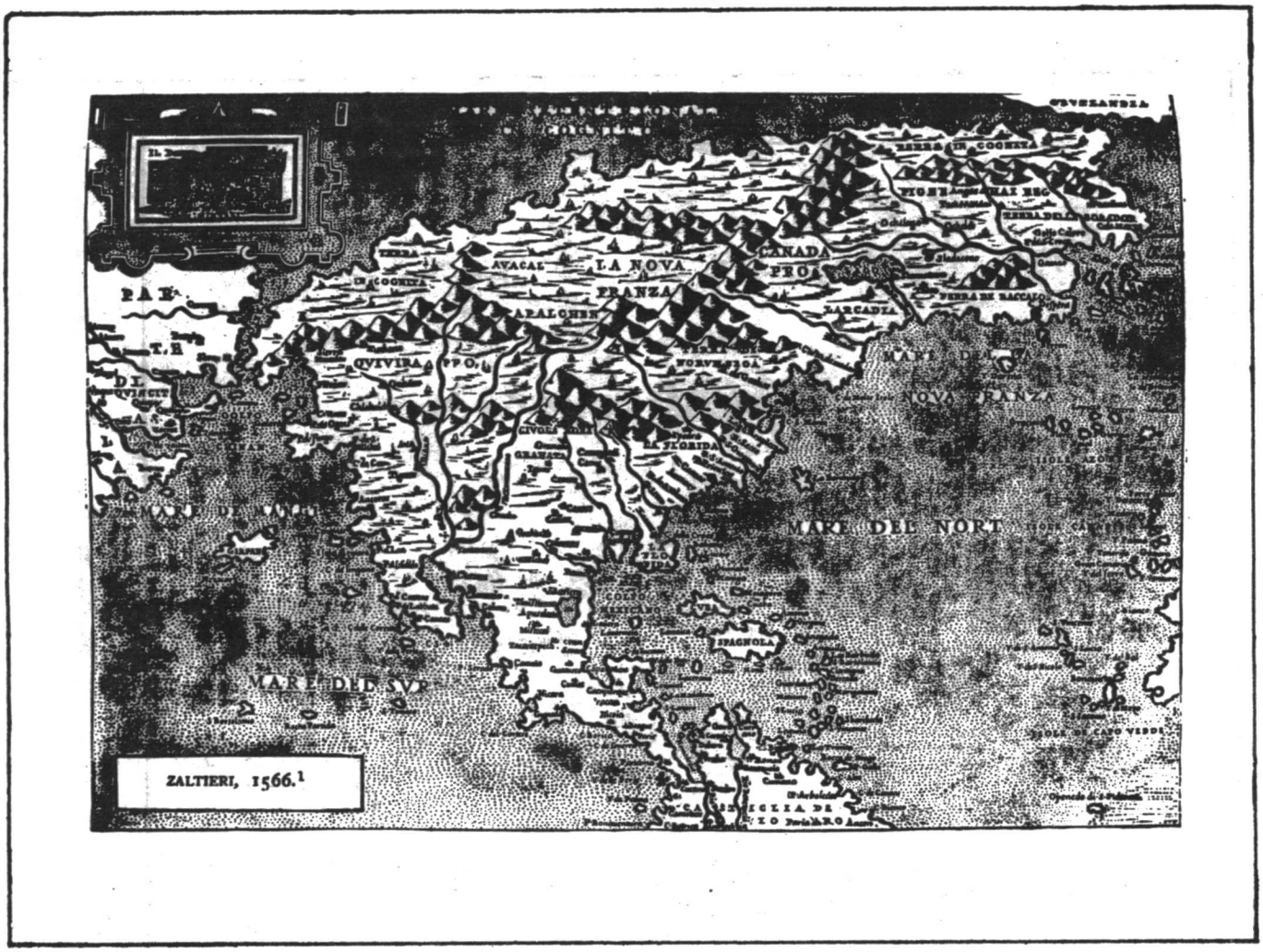



Fig. C-12
1566 map of Zaltieri (reprinted from Winsor 1886) showing a fanciful rendition of the mid-Atlantic coast.

# APPENDIX D

## COMPUTERIZED STORAGE OF KNOWN SHIPWRECK DATA

Known shipwreck data which have been collected and fully processed (that is, matched for duplicates, counted, and assigned to positions on lease-block maps) have been transferred to computer coding forms for storage (see Fig. D-1). Stored data may be utilized to: 1) distinguish all wrecks included in our sample from all other wrecks which may be identified by future studies; 2) record possible sites where remains of sample wrecks might be encountered; 3) aid in possible identification of such remains if in fact encountered; and 4) suggest possible significance of such encountered remains.

Categories of data stored:

Item 1: Name of vessel - full name of vessel as reported by source, preferably with no abbreviation; if entire name could not be recorded in 18 digits, letters at the end of the name have been dropped, to minimize effect upon placement of the name in correct position in alphabetical listing.

1a: Name of captain or master - may be substituted for name of vessel if latter is not given; with notation of "CM" before the name.

Item 2: Location of wreck - as given by source; whether by latitude - longitude coordinates, or place name of a landmark, or neither (if precise location is unknown).

Item 3: State - general assignment to a state area, may have been arbitrarily assigned if jurisdiction over the body of water in question is shared in the documentation by two or more states. For example, Delaware Bay, or Long Island Sound; Fishers Island may have been reported as "off RI" by one source and "off NY" by another.

Item 4: Vessel type

Item 5: Month

Item 6: Year of wreck

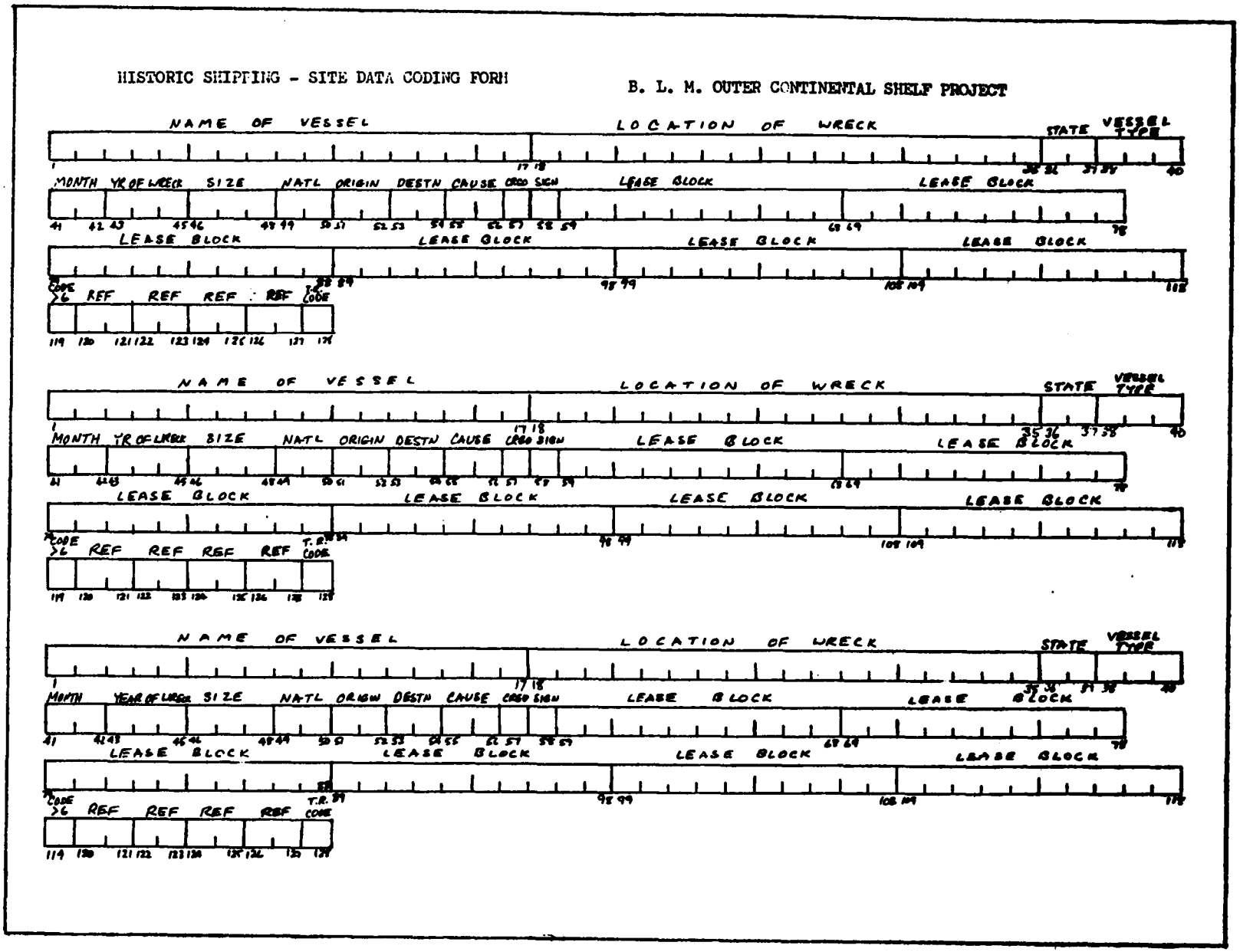



Fig. D-1
Computer coding form for storage of shipwreck data.

**Item 7: Size**

**Item 8: Nationality**

**Item 9: Port of origin**

**Item 10: Port of destination**

**Item 11: Cause of wreck**

Item 12: Cargo - a space if available for future coding of cargo, as yes/no of possible interest in determination of significance of vessel remains. (To be used if wreck encountered and evaluated.)

Item 13: Significance - space available for future coding yes/no of established high-priority (significant) remains. (To be used if wreck encountered and evaluated.)

Item 14: Lease block assignments, up to maximum of six.

Item 15: Code X to indicate possibly arbitrary assignment to six-block area - either location required more than six to describe such as Mt. Desert Island, Maine, or vessel reported as "off" or "near" a known landmark.

Item 16: Reference - space to indicate up to three sources.

# APPENDIX E

## SOURCES OF DATA FOR SAMPLE YEARS

The following "check" sources were scanned for reports of vessels lost in the years 1800, 1880, and 1910. (Numbers of sources refer to Known-Shipwreck Bibliography.)

1800

a) secondary sources .23 thru .45: excluding war year sources .38 and .41.
b) government document .48.
c) all manuscripts .70 thru .91.

1880

a) secondary sources .23 thru .45: excluding war year sources .38 and .41, and sources published prior to 1880: .26 and .31.
b) government documents .46 thru .51, plus .62.
c) all manuscripts .70 thru .91.

1910

a) secondary sources .23 thru .45: excluding war year sources .38 and .41, and sources published prior to 1910: .26 and .31.
b) government documents .46 thru .51: excluding .48 which reported losses prior to 1910 only.
c) all manuscripts .70 thru .91.

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## KNOWN SHIPWRECKS - NEWSPAPERS

(Note: Sources of known-shipwreck data are numbered for computer storage cards.)

### Eighteenth Century

Boston:

| | | |
|---|---|---|
| .01 | Boston Gazette | 1720 |
| .02 | Boston Gazette | 1740 |
| .03 | Boston Gazette | 1760 |
| .04 | Boston Newsletter | 1760 |
| .05 | Boston Newsletter | 1770 |

### Nineteenth Century

Portland-Boston:

| | | |
|---|---|---|
| .06 | Boston Daily Advertiser | 1840 |
| .07 | Boston Evening Transcript | 1860 |
| .08 | Boston Gazette | 1800 (Oct-Dec) |
| | Boston Gazette | 1810* |
| .09 | Boston Gazette | 1820 |
| .10 | Halifax Gazette | 1800 |
| | Portland Eastern Argus | 1830* |
| .11 | Portland Eastern Argus | 1860 |
| .12 | Portland Transcript | 1860 |

New York:

| | | |
|---|---|---|
| .13 | New York American Citizen | 1800 (Jan-Jun) |
| .14 | New York Herald Tribune | 1860 |
| | New York Herald Tribune | 1880*(Jan) |
| .15 | New York Morning Herald | 1840 |

Philadelphia:

| | | |
|---|---|---|
| .16 | Claypoole-Poulson's American Daily Advertiser | 1800 |
| .17 | Philadelphia Inquirer | 1860 (Nov-Dec) |
| .18 | Philadelphia North American | 1840 |
| .19 | Poulson's American Daily Advertiser | 1820 |

Norfolk-Charleston:

| | | |
|---|---|---|
| .20 | Charleston Courier | 1820 (Jan-Mar) |
| .21 | Charleston Mercury | 1840 |
| .22 | Charleston Mercury | 1860 (Jan-Apr) |

*Data collected from these newspapers were not included in the predictive model.

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