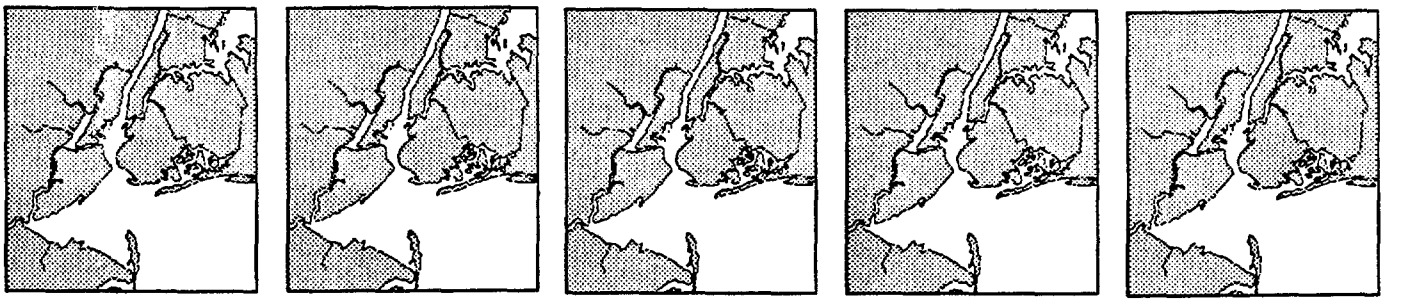
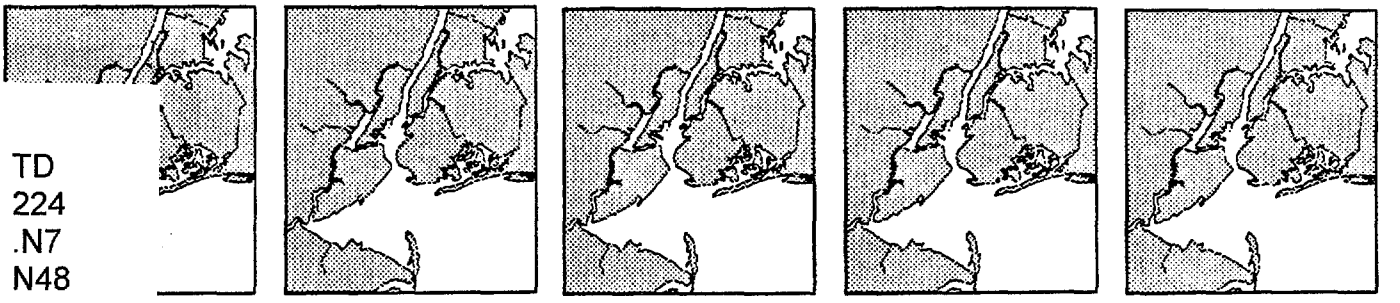


NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY

PREPARED BY

THE NEW YORK CITY DEPARTMENT OF CITY PLANNING
WATERFRONT AND OPEN SPACE DIVISION
&
THE NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION
DIVISION OF COASTAL RESOURCES

FEBRUARY, 1991



NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY

A STUDY TO:

- ★ ASSESS THE CURRENT LEVEL OF ACTIVITY ON THE WATERWAYS OF THE NEW YORK/NEW JERSEY HARBOR ESTUARY
- ★ PROJECT FUTURE LEVELS AND PATTERNS OF ACTIVITY WITHIN THE ESTUARY
- ★ IDENTIFY WAYS OF REDUCING THE POTENTIAL FOR CONFLICT AMONG THE VARIOUS VESSEL TYPES USING THE WATERWAYS OF THE ESTUARY

PREPARED BY

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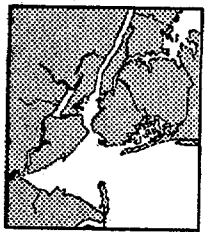

THIS STUDY WAS FUNDED BY THE
UNITED STATES DEPARTMENT OF COMMERCE,
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
GRANT NUMBER: NA 89AA-D-C2137

FOR NEIL BAUMLER, WHO TAUGHT US SO MUCH, AND WHOSE LOVE OF THE HARBOR AND APPRECIATION OF THE PEOPLE WHO ARE PART OF IT, INSPIRED THIS REPORT.

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CHAPTER 1 - INTRODUCTION

Over 150 square miles of water bordering some 750 linear miles of shoreline lie within New York-New Jersey Harbor. The Port of New York and New Jersey is one of the largest and most active in the world. Boasting a natural deepwater harbor, the region has been a center of national and international commerce since the Dutch first established a trading post at the mouth of the Hudson in 1616.

Today, the 17-county area of the Port of New York and New Jersey is home to 15 million people who live and work in the region, with almost 200,000 directly employed in the maritime industry. Millions more rely on the Port for the daily movement of goods, food and fuel. The infrastructure of the Port includes container terminals, break-bulk piers, shipyards, rail lines, tug boats, barges and docking facilities, all working daily to generate $18 billion this year in economic activity.

The waterfront area encompassing the Port of New York and New Jersey accommodates a wide variety of other uses as well. In addition to port activities on the waterfront, there are manufacturing and industrial firms, commercial and recreational marinas, parks and open space, housing, restaurants and a number of municipal facilities such as solid waste transfer stations and sewage treatment plants. They have collectively created water uses

which are sometimes compatible and sometimes conflict.

Resolving conflicts between competing land uses is the traditional role of zoning. New York City and municipalities along the New Jersey shoreline have adopted detailed zoning ordinances to define appropriate uses at assigned locations. However, many of these uses include not only upland activity, but are active users of the waterways as well.

Certain uses require a waterfront location for their operation, such as water dependent industrial uses, sewage treatment plants or marinas, while others are attracted by views or types of activity on the waterways in the New York-New Jersey Harbor area. Traditional zoning methods are inadequate for dealing with the varied uses of the waterways or to plan effectively for their continued growth.

Both states have established successful state or local Coastal Zone Management Programs. The New York City Waterfront Revitalization Program, which is administered by the Department of City Planning, a component of the New York State Coastal Management Program administered by the New York Department of State and the New Jersey State program administered by the New Jersey Department of Environmental Protection. Both entities have completed major studies related to public access, economic development and natural resource protection.

In order to assess the current level of activity on

the waterways of New York-New Jersey Harbor, predict and project future levels of activity, and plan to avoid potential conflicts among the variety of diverse uses of the waterways, the New York City Department of City Planning and the New Jersey Department of Environmental Protection have undertaken this study. This report constitutes a cooperative planning effort between the two Coastal Zone Management Programs to solve shared problems related to waterway use in the Estuary. Funding for this study comes from the Office of Ocean and Coastal Management, National Oceanic and Atmospheric Administration (NOAA) of the United States Department of Commerce. Section 309 of the Federal Coastal Zone Management Act provides funding for contiguous coastal states to work cooperatively to address common issues and implement unified coastal zone policies in adjoining areas.

The Study Area

The Harbor is divided into the Lower Bay (Outer Harbor) and Upper Bay (Inner Harbor) at the Narrows which is spanned by the Verrazano Narrows Bridge.[1] The Lower Bay is the part of New York Harbor, approximately 9 miles measured from the Narrows into the Atlantic Ocean, that extends from Sandy Hook westward to the Raritan River, northward to the Narrows and eastward through Jamaica Bay. Ambrose Channel in the Lower Bay, provides the principal entrance to New York Harbor, extending from the sea for a distance of 10.2 miles to a point south of the Narrows where it meets Anchorage Channel into the Upper Bay.

The Upper Bay consists of the waters north of the Verrazano Bridge and south of the Battery. To the north of the Upper Bay lies the Hudson, Harlem and East Rivers, and Long Island Sound and tributary waters. To the east, the tributary waterways include Gowanus, Flushing Bay and Creek, and the Bronx and Hutchinson Rivers; and to the west, tributaries include the Kill Van Kull, Arthur Kill, Newark Bay, and the Passaic and Hackensack Rivers.[2] Due to the length and changing characteristics of the East River, it has been divided into three segments; the Upper East River, Hells Gate and the Lower East River.(See Figure 1.1, Appendix 1.1 for further detail on Waterbody Characteristics[3])

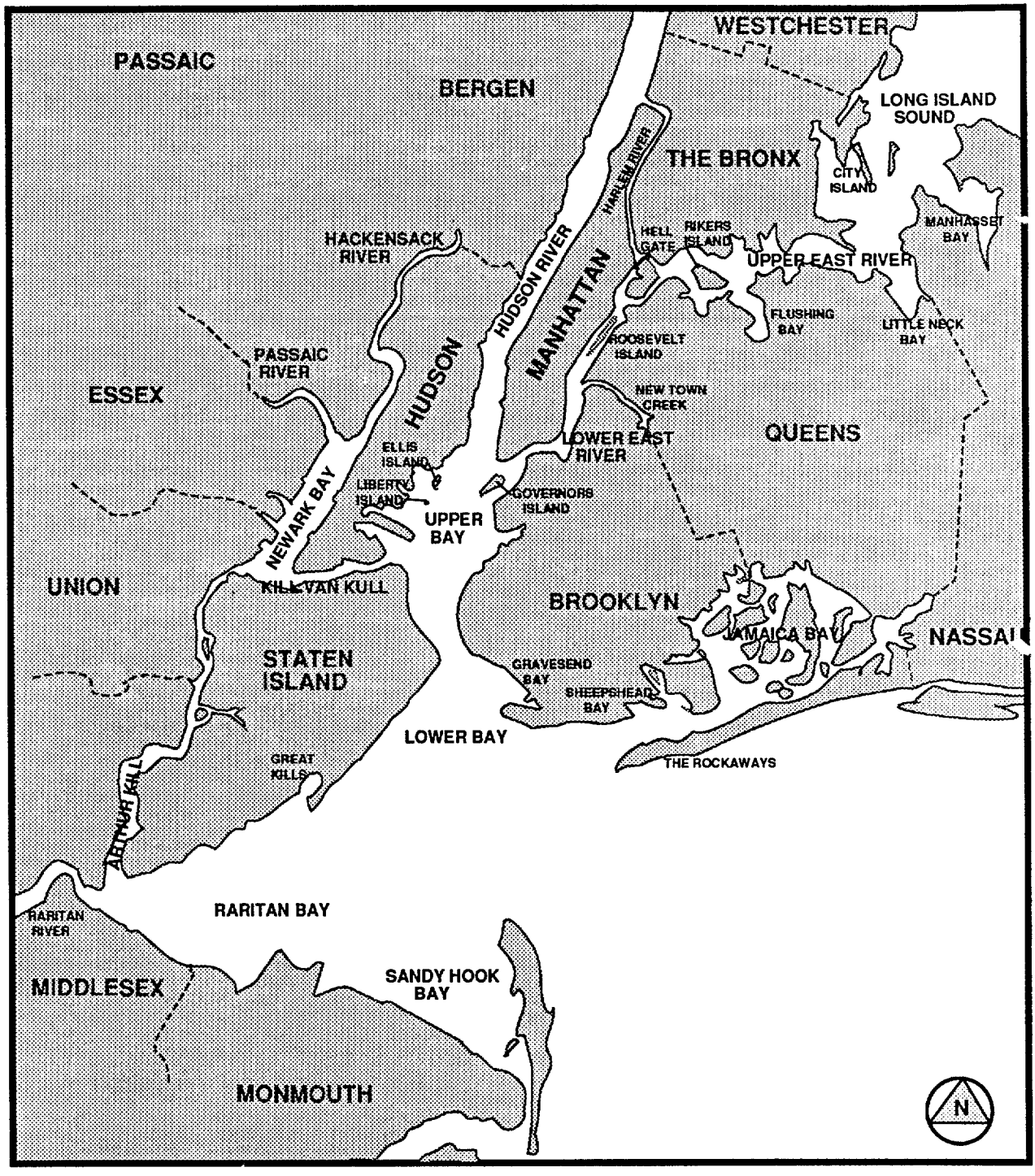
STUDY NEED

As redevelopment in both states creates new or revitalized waterfront uses, water uses on the shared estuary are increasing rapidly both in type and quantity. This increase is taking the following forms:

* Port activity is predicted to remain steady or increase in the New York Harbor area.

* Maritime support services will remain steady or increase to match the change in port activity.

* Commuter ferries, for many years limited to the Staten Island Ferry (and with restricted access, the Governor's Island Ferry), have multiplied in the last few years to 11 different routes and are projected to continue to expand.



CHAPTER 1 FIGURE 1.1

NEW YORK/NEW JERSEY HARBOR ESTUARY STUDY AREA

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

* Commercial boating activity, which includes vacation cruises, excursion, sightseeing and similar activities and commercial sport fishing, has experienced a dramatic increase especially relating to chartered vessels over the last decade, a trend which is expected to continue.

* Cultural/educational water related activities including Harbor Park, consisting of five waterfront parks in New York City as well as other parks proposed to be connected by water links, will increase activity in the harbor.

* Recreational boating, until recently absent or limited in the Estuary, is reestablishing itself, with new slips, moorings, and other facilities being built within the study area and many more proposed as part of new developments.

* Marina support services, while still limited, are expected to increase to meet demand as the number of slips increase.

Bi-state harbor activity, therefore, has increased dramatically within the last few years as a result of market forces, a strong regional economy, special events such as the Mayor's Cup, and active promotion by the two state's Coastal Management Programs. All recent planning and transportation studies in each state predict and encourage additional water dependent uses.

This increase in activity has led and will increasingly lead to water use conflicts between widely varying types of uses such as sailboats, freighters, speed boats and ferries. Conflicts among these uses can take a number of forms such as wake action, route crossings, speed differentials, maneuverability problems and harbor drift issues. There is a clear need for a comprehensive approach to the management of water uses in the New York/New Jersey Harbor to minimize these conflicts.

Goals and Objectives

The goal of this study, therefore, is to formulate recommendations to minimize water use conflicts without discouraging harbor activity.

The objective of this project is to understand the nature and feasibility of present and potential future water uses in the Estuary, predict and encourage their growth in the future, determine the areas and types of current and future water use conflict, and determine an implementation strategy to minimize and control that conflict.

PROJECT DESCRIPTION

The New York-New Jersey Harbor Estuary Water Use Management Study looks at present and potential future water use trends for four separate water uses - maritime and industrial, ferry, commercial and recreational boating. These uses have the largest potential for causing congestion or conflict in the Estuary. Using projections of future routes and frequencies, potential conflicts have been identified and recommendations devised to

minimize, regulate or eliminate those conflicts. New or expanded water uses may then be encouraged at appropriate locations.

1) Port and Maritime Trends. An important component of water uses on the harbor include port and municipal services activity and the maritime support services industry such as tugboats and towboats. To the extent possible, this task estimated locations, routes and frequency of port activity. The sub-tasks included:

* **Estimation of existing Port and Maritime Use.** Based on the bi-state Maritime Support Services Study, the Harris Report, existing literature and discussions with private terminal operators and appropriate agencies including the Port Authority of New York and New Jersey, an analysis of present and potential port industry activity was conducted including cargo and navy shipping, maritime support services, municipal services including sludge hauling, marine transfer, etc., enforcement activities, and Coast Guard activity.

* **Determination of Future Maritime Routes and Estimation of Frequency of Port Activity.** Maritime routes are primarily determined by the location of marine terminals. As no new terminals are proposed, the maritime routes are expected to remain the same. Maritime and maritime support vessel movements function at a generally constant volume throughout the

year. Most vessel types are active daily, unaffected by weather. The intra-port movements of deep draft vessels are subject to tides. Each type of water dependent use has a vessel movement frequency based on their specific needs. Sludge and solid waste barge movements occur on a regularly scheduled basis. With the cessation of ocean dumping and the closing of landfills the routes of these barges will change. Industrial users set deliveries at certain intervals, e.g. monthly deliveries. The possible introduction of high-speed, time sensitive freight services, linking the airports to the regional core are the only new routes envisioned.

* **Recommendations.** Based on the above analyses, regulatory or other mechanisms for port industry activity are suggested.

2) <u>Waterborne Transportation Trends</u>. While fixed route ferries and other large scale waterborne passenger transportation have shown rapid growth over the last few years, recent studies have identified landing sites or markets for future landing sites. This task sought to determine, to the maximum extent practical, given the dynamic nature of the industry, probable future routes, scheduling frequency and interstate mechanisms for regulation. The sub-tasks included:

* **Estimation of Existing Waterborne Transportation Frequency.** Not surprisingly, there is a concentration of intense activity

around rush hours. The major connections to Staten Island and New Jersey may grow; the others have yet to broaden their ridership.

* **Determination of Future Waterborne Transportation Routes.** This sub-task determined present and projected waterborne transportation routes based on discussions with the Port Authority of New York and New Jersey, the New Jersey Department of Transportation, the New York City Department of Transportation and other appropriate agencies and a review of existing literature related to marketing, landside access and possible mass transit connections and alternatives.

* **Analysis of Probable Waterborne Designs.** Different boat types such as hydrofoil, crew boat, catamaran, hovercraft, etc. and sizes of boats can have different water use impacts in terms of wake, speed etc. To determine the areas of potential water use conflicts, an analysis was completed of future waterborne passenger transportation designs most likely to be used in the harbor.

* **Implementation Strategy.** Based on the above, this sub-task determined the types of interstate regulation and/or coordination necessary to address the needs or conflicts of this growing industry, and recommend ways to implement those regulations.

* **Water Taxi Feasibility.** Waterborne transportation has been increasing over the last few years in the Hudson River Estuary but this renewed interest has tended to focus on ferry services. In many cases, however, such larger scale services have been shown to be financially difficult to operate. Water taxi services require a much lower capital investment, smaller vessels and fewer employees than large scale ferries, while providing greater flexibility to more locations with minimal terminal facilities.

  When researching water taxi location and use, little comparable experience in American urban areas could be found. However, water taxi service does exist in resort areas such as Cape Cod and Fire Island. There are currently no applications or moves toward water taxis in the bi-state port. Furthermore, there is no concrete understanding of how this mode of transportation would function. At best, speculation would focus operations on the metropolitan business core, i.e. around Manhattan's central business district. Those caveats aside, a brief discussion of water taxis has been incorporated in Chapter 4 on ferries as they are subject to similar issues. It is not anticipated that water taxi service will be active in the Harbor in the near future.

3) <u>Commercial Boating Trends</u>. The commercial boating industry which includes vacation cruises, sightseeing, excursion and similar

activities, commercial sport fishing and cultural/educational waterborne activities represents a growing segment of activity in the harbor. The study assesses the last decade of growth in the industry, estimates future trends including docking location and the destination and overall industry growth.

* **Estimate of Existing Commercial Boating Use.** A number of studies were consulted concerning trends in the industry as well as regional trends. In addition, a survey mailed to vessel operators in the New York/New Jersey area and telephone interviews with representative vessel operators were conducted.

* **Determination of future docking sites, routes/destinations and amount of activity.** Based on data gathered, maps were prepared to assess the most likely areas of growth and vessel concentration. These often coincide with proposed waterfront development along the Hudson River where docking sites for excursion vessels are frequently included in development proposals. When coupled with industry trends, growth was projected to be most notable in the Hudson River and Upper Bay.

* **Assessment of Waterborne Transportation Links Connecting Waterfront Parks.** Building on the success of the New York State Urban Cultural Parks' Harbor Park, this task expanded the concept of linking waterfront parks in the entire estuary by water. While Harbor Park has as its theme, immigration and maritime trade,

this task recognized that other recreational areas can be connected as well, and highlights probable routes.

Existing literature and discussions with appropriate agencies found that the New York City Department of Parks and Recreation had identified ten routes linking New York City Parks, a concept that could easily be expanded to include waterfront parks in New Jersey as well. Implementation would likely be a function of the Department of Parks and Recreation's Waterfront Management Plan.

* **Recommendations.** Based on the above analyses, mechanisms for reducing conflict between commercial vessels as well as other vessel types were recommended. These include operator safety measures as well as facilities siting recommendations.

4) Recreational Boating Trends. Recreational boating has shown enormous growth in the past decade. A wide range of recreational activity including motorboating, fishing, sailing, rowing, canoeing and kayaking takes place in the harbor. There are proposals for over 12,000 new slips as well as other new boating facilities. This task sought to determine current locations, amount and characteristics of recreational boating activity. To the extent feasible future demand and locations were projected. Existing problems and conflicts were analyzed and projections were made on where they are most likely to occur in

the future. The subtasks included:

* **Existing Recreational Boating Facilities Survey.** Building on current studies, surveying land use and industry sources, this task tallied boating facilities in the study area.

* **Recreational Boating Areas Survey.** Based on the above and discussions with recreational boating representatives, areas, times and types of recreational boating activity in the Harbor were broadly determined. Analysis was made of problems and conflicts that occur in these areas.

* **Recreational Boating Future Trends Analysis.** Based on existing analyses of regional demand for slip space and potential development sites, tempered by the recent economic downturn and real estate development slowdown, the aggregate future number of slips and other recreational facilities in the Estuary was estimated. Future areas of use and potential conflicts were analyzed.

* **Recommendations.** Based on the above, areas most appropriate for new marina or other boating activities were recommended as well as other methods to reduce potential future conflicts.

5) Water Use Conflict Identification. Based on Tasks 1 through 4 above, this task analyzed a range of scenarios regarding the locations,

routes and scheduling of potential water users in the Estuary in order to identify existing or potential areas of conflict. Augmented by surveys and interviews of harbor ship captains, tug boat operators, harbor police, recreational boaters and others with extensive experience on the water, the significant problems were noted and possible solutions sought. Potential problems or issues examined included, dredging of shipping channels, anchorage areas or shoreside land use conflicts and waterway congestion.

6) Implementation Strategy. In consultation with the U.S. Coast Guard and other appropriate local, state or federal agencies, recommendations were made for alternatives and implementation mechanisms to minimize or regulate conflicts between identified water uses.

CONFORMANCE WITH 309 GUIDELINES

The New York-New Jersey Harbor Estuary Water Use Management Plan addresses an important interstate need and, would greatly improve the coordination and cooperation between New York and New Jersey. This proposal conforms with 309 guidelines in the following ways:

* Builds on present Coastal Zone Management efforts;
* Addresses an interstate problem and provides an interstate solution;
* Implementation is a priority and a likelihood

because the agencies conducting the studies are empowered with permitting and land use authority;

* Consistent with approved 309 programs;
* Consistent with goals of New York-New Jersey Harbor Estuary Program;
* State-federal consultation process.

Chapter 1 - Endnotes

1. U.S Army Corps of Engineers, "The Port of New York, NY & NJ (Washington D.C. 1988), pg. 1.

2. Ibid pg. 1-2.

3. **Appendix 1.1: Waterbody Characteristics,** describes the different types of characteristics of each of the waterbodies in the harbor. The chart is organized by waterbody with the main waterbodies in bold and associated tributaries and bays following.

The chart includes currents, mainly tidal in the study area; mean tidal ranges; length, width and depth where applicable; anchorage areas and important environmental considerations. Under the headings, "obstructions" and "constraints/attributes," additional information on the waterway that may effect vessel use has been provided.

The chart does not attempt to be all inclusive, but instead to highlight important features that may make a particular waterbody favorable or unfavorable to vessel activity. The effect that any one of these characteristics may have on a particular vessel is dependent on the type, size and activity of the vessel and therefore will be described under specific vessel categories in latter chapters where applicable.

CHAPTER 2: JURISDICTION AND REGULATIONS

Rules Of The Roads

Vessel operators of all types are governed by a set of principles, known as the "Rules of the Road", which regulate movement of all vessel types with regard to safety on the waterways. While these rules attempt to define, as specifically as possible, the appropriate action in a given situation, they do not establish geographically specific rules or regulations, such as speed limits or no-access areas. The "Rules of the Road" - include the following principles:

Lookout - Every vessel shall at all times maintain a proper lookout and attention to sounds, so as to make a full appraisal of the risk of collision.

Safe Speed - Every vessel shall, at all times, proceed at a safe speed, to be determined by specific conditions or circumstances including visibility, traffic density, vessel maneuverability, background lights at night, wind, sea, current conditions, and navigational hazards.

Collision - Every vessel shall use all available means appropriate to the prevailing circumstances and conditions to determine if risk of collision exists. If there is any doubt, such risk shall be deemed to exist.

Action To Avoid Collision - Any action taken to avoid collision shall, if the circumstances of the case allow, be positive, made in ample time and

with due regard to the observance of good seamanship. If necessary, to avoid collision or allow more time to assess the situation, a vessel shall slow down or `take the way off' by stopping or reversing her means of propulsion.

Narrow Channels - A vessel proceeding along the course of a narrow channel must keep to the right (starboard) and as close to the outer limit of the channel as is safe and practicable.

Head on Situation - When two power-driven vessels are meeting on reciprocal or nearly reciprocal courses which may involve risk of collision, each shall alter its course to starboard so that each shall pass on the port side of the other. Neither vessel has the right-of-way.

Crossing Situation - When two power-driven vessels are crossing, so as to involve risk of collision, the vessel which has the other on her starboard side shall keep out of the way and shall, if circumstances allow, avoid crossing ahead of the other vessel. Although not officially stated in the rules of the road, an unofficial danger zone has been established.

Overtaking - When one power vessel is overtaking another and is within a certain distance so as to risk collision, the overtaking vessel must yield to the slower vessel. Once a vessel has overtaking status, it remains an overtaking boat until clear of the other vessel. No subsequent alteration of the bearing between the two vessels will make the overtaking vessel a crossing vessel. Therefore, an

overtaking vessel on the starboard side does not have the right-of-way as in a crossing situation.

Don't Impede Other Vessels - A power vessel or sailing vessel less than 20 meters (65.6 feet) must not impede the passage of any other vessel navigating within a narrow channel or fairway. This includes crossing so as not to impede the progress of a vessel that must stay within that channel.

Vessel Hierarchy - Except for vessels otherwise specifically designated, such as vessels in narrow channels and those overtaking, vessels may be "ranked" for right-of-way as follows: (1) vessels not under command (such as with a disabled engine), (2) vessels restricted in ability to maneuver, (3) vessels engaged in fishing (does not include trolling lines or drift fishing or hand rods and lines), (4) sailing vessels, and (5) power-driven vessels. Each type of vessel in this list must yield right-of-way to vessels listed higher, and will be privileged with respect to those lower on the list.[1] (A chart specifically addressing regulations for recreational boating can be found in Appendix 2.1.)

The waters of the New York-New Jersey Harbor are subject to four jurisdictions: Federal, State of New Jersey, State of New York, and City of New York.

FEDERAL JURISDICTION

The Coast Guard

There are four Coast Guard stations in the New York-New Jersey Harbor, the largest of which is on Governors Island in the Upper Bay. Other stations are at Fort Totten on Long Island Sound in Queens, Rockaway Station in Jamaica Bay in southern Queens, and at Sandy Hook in Monmouth County, New Jersey.

At the federal level, the Coast Guard, a part of the Department of Transportation, enforces all applicable federal laws pertaining to water and vessel safety. Federal jurisdiction within the study area includes all navigable waters within the Harbor, thus placing all navigable tributaries, rivers, bays, and streams under Coast Guard jurisdiction. Enforcement and regulation within the Port is done through the "Captain of the Port". The Coast Guard has, among other responsibilities, the power to:

a) establish, operate, and maintain vessel traffic services and systems for ports, harbors and other waters subject to congested vessel traffic;

b) control vessel traffic in areas which are determined to be especially hazardous, or under conditions of reduced visibility, adverse weather, vessel congestion, or other hazardous circumstances by:

   1) specifying times of entry, movement or departure to, from, within or through ports, harbors, or other waters;

2) establishing vessel traffic routing schemes;

3) establishing vessel size and speed limitations and vessel operating conditions; and

4) restricting vessel operation in a hazardous area or under hazardous conditions to vessels which have particular operating characteristics and capabilities considered necessary for safe operation under the circumstances;

c) dispatch rescue boats in response to vessel distress calls and lend assistance or perform rescues when vessel rescue is not possible;

d) conduct a national boating safety program encompassing research and development of safer boating practices, enforcement of industrial and on-the-water safety standards and an educational program for the boating public;

e) operate, maintain, and set standards for aids to navigation, including lighthouses, buoys, off-shore towers, and electronic aids;

f) establish and enforce regulations dealing with marine environmental protection, including oil spill prevention and cleanup and the regulation of the transportation of hazardous cargoes; and

g) designate and regulate anchorage areas in the harbor.[2]

Enforcement

The Coast Guard is not responsible for the enforcement of any state or local laws pertaining to waterways whether or not they also have jurisdiction over those navigable waters. However, municipal harbor police units and state police are responsible for the enforcement of municipal, state, and those federal laws where authority has been delegated to them. As discussed in Appendix 2.1, most of the state and local regulations tend to mirror the federal regulations, so in effect the state and local enforcement officers are enforcing many of the same laws as the federal.

Conversations with Coast Guard representatives in the New York-New Jersey region indicate a "chronic shortage" of personnel for the enforcement of federal regulations. The situation is particularly serious now due to recent personnel cuts resulting from federal budget deficits. Enforcement personnel have also been reassigned recently to address the high number of oil spills in the Harbor. Cleanup is a very labor-intensive activity. The number of enforcement personnel at the four Coast Guard stations in the harbor is approximately: 50 to 60 at Governors Island, 40 to 50 at Sandy Hook, 30 to 40 at Rockaway Station, 20 to 30 at Fort Totten.[3]

Vessel Traffic Service

In the past, the Coast Guard operated a Vessel Traffic Service (VTS) in the New York-New Jersey Harbor to monitor vessel movement via radar at a central command post. Due to federal budget cuts, the system was discontinued in 1988. Partly in

response to the oil spill of the Exxon Valdez in Alaska and a series of smaller spills in the New York-New Jersey Harbor in 1990, the U.S. Congress has appropriated monies for the reactivation of the Vessel Traffic Service (VTS) in the New York-New Jersey Harbor. Administered by the Coast Guard, VTS monitors all vessels over 300 gross tons or passenger ferries over 100 gross tons. Monitoring includes radio, radar and TV observation, checking upon vessel movement, reports on vessel traffic, anchorage, bridge, weather information and emergency situations.

While the main impetus for the reactivation was the response to oil spills and the associated environmental risks, such a service will help to minimize conflicts between large vessels in the Harbor. The Coast Guard currently also operates traffic surveillance in the Houston-Galveston shipping channel, Puget Sound, San Francisco Bay, Louisiana's Berwick Bay, and in Prince William Sound in Alaska.

The VTS will be reactivated in three stages, with surveillance first covering the Upper Bay, Newark Bay and the Kill Van Kull by January 1991. By the summer of 1991 the service will be extended to include a larger portion of Newark Bay and the Hudson and East Rivers will be included within the system by 1992. Approximately 35 people are employed under VTS.

Special Events Special events attract all types of vessels, from maritime support craft, such as the "Tug Boat Beauty Contest" held last year in Jersey City, to

recreational and commercial vessels participating in the "Mayor's Cup." Special events affect the operation of all types of vessels by increasing activity in an already busy harbor. Last year, the New York/New Jersey Harbor played host to over 75 special events, ranging from windsurfing races in the Hudson River and Upper Bay to "Fleet Week," during which American military ships called on the port. Many of these activities call for heightened patrol and/or readiness on the part of the Coast Guard as well as Harbor Police and there is some increase in distress calls and breakdowns. However, no major increase in reported accidents has occurred during these special events.

To stage a special event, the sponsor is required to submit an application to the U.S. Coast Guard at least 30 days prior to the event. The Coast Guard reviews the scope and location of the event and may modify or move it either for reasons of conflict or safety. The vast majority of events, with the exception of "Fleet Week" and the "4th of July" fireworks display, do not require closing major portions of the Harbor. The Coast Guard alerts the maritime community of the date, location and type of event enabling them to take necessary precautions. It is the responsibility, however, of the event participants to stay out of the way of regular commercial traffic. The vast majority of events occur in the warmer months from May to September. One of the most popular sites for many of these events is the area around the Battery/Statue of Liberty in the Upper Bay, because of its aesthetic quality and because its width at this point makes it optimal for racing. In recent

years there has been a marked increase in the number of special events, a trend which is expected to continue.

Coast Guard Auxiliary

The Coast Guard is assisted by the Coast Guard Auxiliary, a civilian volunteer organization which provides education and free boating safety examination to the public and assists the Coast Guard in search and rescue, but does not have enforcement powers.

U.S. Army Corps of Engineers

The Army Corps has many and varied responsibilities relating to coastal and harbor management, including regulation of any permanent or temporary structures below Mean High Water, regulation of dredging or filling of wetlands and navigable waters, and maintenance of the existing federal channel and anchorage areas. Most Corps regulatory authority originates from Section 10 and 11 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972.

Under Section 10 of the Rivers and Harbor Act of 1899, the Corps regulates structures in, or affecting, navigable waters of the U.S. as well as excavation or deposition of materials (e.g. dredging or filling) in navigable waters. The shoreward limit of Corps jurisdiction in coastal waters "extends to the line on the shore reached by the plane of the mean (average) high water."

Section 11 of the Rivers and Harbor Act authorized the Corps to establish harbor lines, channelward of which no piers, wharves, bulkheads, or other works

may be extended or deposits made without a permit. Prior to 1970, work shoreward of established harbor lines could be undertaken without a Corps permit. Currently, however, activities shoreward of established harbor lines are required to receive permits under Section 10 of the Rivers and Harbors Acts and Section 404 of the Clean Water Act (if applicable).

Under Section 404 of the Federal Water Pollution Control Act Amendments (Clean Water Act of 1977), the Corps is responsible for evaluating applications for permits for any activities that involve the placement of dredged or fill materials into waters of the United States including adjacent wetlands. In tidal waters, the landward limits of Corps jurisdiction extends to the high tide line. "High tide line" is defined as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide."

Under Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, the Corps regulates ocean transport and disposal of dredged material.

Permits

The Corps may issue two types of permits for structures and work subject to the Section 10 and 404 regulatory programs: individual permits and general permits.

An **individual permit** is issued following evaluation of a specific proposal and involves public notice of the proposed activity, review of comments and, if necessary, a public hearing. In general, an

individual permit must be received from the Corps for most activities that involve:

- filling of wetlands and navigable waters;
- placement of structures in navigable waters, including docks, piers, pilings, and bulkheads; and
- dredging and disposal of dredged material including maintenance dredging and beach restoration.

Where dredging is proposed, the applicant must include results of tests relating to heavy metals, hydrocarbons, petroleum and organic compounds that may be found in the dredge material.

A **general permit** is an authorization issued for categories of activities that are judged to be substantially similar in nature and to cause only minimal individual and cumulative adverse environmental impacts. General permits, which may be issued on either a state, regional, or nationwide basis, may be modified or revoked if the permitted activities are found to have an unacceptable adverse impact or it becomes otherwise evident that the activities are more appropriately regulated by individual permits. Issuance of state or regional general permits requires a Coastal Zone consistency determination. Nationwide permits are exempted. Existing authorized structures or fill may be repaired, rehabilitated or replaced under a nationwide permit. However, if the structure or fill has been put to any use different from uses

specified in any permit authorizing original construction, an individual permit will be required.

Examples of activities permitted (subject to various conditions and restrictions) under the nationwide permit include: aids to navigation authorized by the Coast Guard; non-commercial single-boat mooring buoys; temporary buoys and markers placed for recreational use such as water skiing and boat racing; lobster traps, duck blinds and other types of fish and wildlife harvesting devices and activities; outfall structures where a National Pollutant Discharge Elimination System program permit has been obtained; and repair, rehabilitation, or replacement of any previously authorized, currently serviceable, structure of fill.

Harbor Drift

Harbor drift is defined as anything floating freely in the harbor that threatens the safety of vessels traversing the harbor. It comes from several sources including the decay of wooden piers and derelict boats. Drift from decaying piers has become an increasing problem as the quality of the water has improved, allowing the survival of marine worm bores which eat away at the piers and accelerate their decay.

Derelict boats are usually abandoned by their owners. Recently the Harbor Unit of the New York City Police has begun a program towing derelict boats to the Rockaway Coast Guard Station for pickup by the Army Corps of Engineers. Jamaica Bay appears to suffer from this problem more than other

areas in the harbor. Hundreds of boats clutter the shoreline or drift in the waters. During a full moon, with its accompanying high tides, abandoned boats are pulled into the water. Theories of why boats are abandoned include insurance fraud and avoidance of high winter storage costs.

The U.S. Army Corps of Engineers is responsible for the removal of this debris, as well as its sources, through the Harbor Drift Program. There are two separate programs to accomplish this mission, one to pick up floating debris and a second, the U.S. Army Corp Demolition Program, to remove the sources of debris.

For administrative purposes, the Army Corps has divided the harbor in sectors. The Corps had completed the section from The Battery to 90th Street on the East River by 1982; Stapleton, the east shore of Staten Island by 1985; and Manhattan Bridge to Gowanus Canal in Brooklyn by 1988.[4] Work will soon begin on the New Jersey side of the Kill Van Kull.

The Corps operates three specially designed vessels for the removal of floating debris. Their demolition program removes derelict piers, pilings and boats. The Corps does review and contracting for projects to remove decaying waterfront structures.

The Corps estimates that 23.5 million cubic feet of timber from 2230 derelict vessels, 100 deteriorated piers, wharves, shore debris and other non-repairable structures will need to be removed. The

demolition program intends to repair 160 piers, wharves and other shore structures in the future.

Currently, the Corps has permission from the EPA to burn wood debris 18 nautical miles off Point Pleasant Beach, New Jersey. The resulting ash then goes to a landfill. The Corps of Engineers has experimented with alternative methods for disposal such as shipping wood to incinerators or converting it to mulch. These alternatives are three to five times more expensive than burning at sea. The deadline for ceasing open burning of debris at sea is December 31, 1993 in order to find an acceptable alternative. The EPA requires that a person accompany all barges to oversee the burning operation and to ensure that timbers are not allowed to fall overboard and become a hazard to navigation during transit to burning locations.

Unfortunately, funding for the Harbor Drift Program has recently been reduced and is not likely to expand in the near future. This has contributed to an increase in the amount of material floating in the Harbor. Furthermore, while funding for the Harbor Drift Program shrinks, the cost of disposing all the collected material has become more expensive. The Army Corps hopes to reduce the cost of disposal of derelict boats and is currently negotiating an agreement with the New York City Department of Sanitation whereby the Corps would transport derelict boats directly to a landfill, thus eliminating the need to first break them up with a bulldozer and then pay to have them placed in a landfill. In return, the Army Corp would

remove abandoned submerged cars which have been dropped off of piers.[5]

Dredging

There are three categories of dredge material: Category I consists of clean material suitable for unrestricted disposal. Category II materials contain low levels of pollutants that are not considered to pose an environmental threat under current methods of disposal. Category II materials are disposed in the ocean and covered with a thick cap of clean dredge material. Category III's materials are considered to be too contaminated for ocean disposal. This category represents less than 5% of the total amount of dredged material. This material is only suitable for disposal in confined facilities.

The Army Corps is responsible for dredging the federal navigable channels; however, the Corps does not dredge private facilities such as commercial dockage marinas or yacht clubs. In order for individual facilities to dredge they must submit a permit application to the Army Corps of Engineers. Testing for heavy metals, hydrocarbons, petroleum and organic compounds such as PCBs must be done as part of the application process. Contaminant locating is unpredictable, although more likely in areas of previous heavy industrial use or adjacent industrial use. Testing can be expensive and, if contaminants are found, the identification of appropriate disposal sites is often difficult. If no disposal site appropriate to the category of the dredge material can be located, the Army Corps will not grant the dredging permit. The Army Corps itself must identify disposal sites for the

contaminated material from their maintenance dredging of federal navigable channels. Currently, the Corps is finalizing its analysis of subaqueous borrow pits (underwater sand and gravel pits that would be capped) for the disposal of contaminated dredged sediment.

In the Harbor, dredging is used to remove sediment from the ocean or river floor in order to maintain access to channels or in-water facilities. Without dredging, the average controlling water depth in the Harbor would only be about 19 feet at mean low water. As many of the newer containerships draw up to 40 feet, the Port of New York and New Jersey would be unable to function.

The Army Corps is presently preparing to dredge the navigation channel to 40 feet in the Kill Van Kull, extending from the Upper Bay to Newark Bay. Work will be conducted in 3 phases and is expected to take 57 months beginning in 1991. Vessel movements in the Kill will be closely regulated during this time under the Vessel Traffic System.

STATE JURISDICTION

State of New York

The Compact of 1834 gives New York State (NYS) exclusive jurisdiction over all the waters of the Hudson River lying west of Manhattan Island and the south of Spuyten Duyvel. The State also has exclusive jurisdiction over all waters in New York Harbor and also Ellis and Bedloes (Liberty) Islands. In the Kill Van Kull, NYS has jurisdiction to the westernmost end of Shooters Island, and in the Arthur Kill, from Shooters

Island to Woodbridge Creek. The enforcement of NYS laws in the Harbor is done by the NYC police.

The State of New York regulates construction dredging, and development within the designated coastal zone area for compliance with New York State Coastal Zone Program. The NYS Department of Environmental Conservation administers water quality standards and regulates development in erosion or flood hazard areas, and regulates impacts to environment and wildlife of tidal and freshwater wetlands.

State of New Jersey

The New Jersey Department of Law and Public Safety, through the Division of State Police Marine Law Enforcement Bureau, is responsible for enforcing all state and federal laws, rules, and regulations on the waters and waterways of the State of New Jersey, including up to three miles off-shore. New Jersey has adopted the Navigational International - Inland Rules and the Code of Federal Regulations as the standards for vessel equipment and operation.[6]

The New Jersey State Police Marine Law Enforcement Bureau operates only one station within the Study Area, located in Port Newark. Another station, in Monmouth County, is located just outside the Study Area, but the jurisdictional area of that station includes a portion of the Study Area.

The State of New Jersey exercises jurisdiction over construction and dredging activities in tidal waters of the state pursuant to the New Jersey Waterfront Development Laws. In addition, the State also regulates an upland area between 100 and 500

feet adjacent to tidal waters under the authority of this statute. These regulations are intended to protect navigation, commerce and the environment.

LOCAL JURISDICTION

New Jersey In New Jersey, waterways management is, for the most part, under state control. The State of New Jersey regulates all activity within its navigable tidal waters under the Waterfront Development Law of 1914. Municipalities and local authorities within New Jersey have also been given jurisdiction to enact local ordinances that are identical to the provisions of state law or have been approved by the state. Under the Compact of 1834, New Jersey has jurisdiction over the waters of the Arthur Kill up to the low water mark in Staten Island.

New York City In New York City waterways management is within the purview of the municipality. The City of New York has jurisdiction over all waters within the City of New York, generally demarcated as the center line of shared rivers. In addition, the Compact of 1834 gave New York City jurisdiction up to the low water mark on the New Jersey side of the Hudson River. The state of New Jersey retains the exclusive right of property in and to the underwater land lying west of the middle of the Upper Bay and west of the middle of that part of the Hudson River which lies between Manhattan Island and New Jersey. The State of New Jersey also retains the exclusive jurisdiction of and over the wharves, docks and improvements made, and to be made, on the shore of the said state, and of and over all vessels aground on said shore, or fastened to any such wharf or

docks; except that the said vessels shall be subject to the quarantine of health laws. The Compact of 1834 results in several waterways with police jurisdictions that extend beyond the municipal boundaries between New York City and New Jersey. Those waterways include the Arthur Kill, and the Kill Van Kull and a portion of the Inner Harbor and the Hudson River.[7] (See Appendix 2.2).

The majority of regulations locally promulgated contain the body of NYS Navigation Law, plus local additions over and above NYS law. Local laws are subject to approval by the NYS Office of Parks, Recreation and Historic Preservation. All New York City local laws pertaining to the water apply within 1,500 feet or to municipal limits whichever is greater from shore.

Harbor Police stations are located throughout the City, including an administrative center in the Bronx, and stations at Randall's Island, Manhattan, College Point, Shell Bank Basin in Queens, and on the Inner Harbor in Brooklyn. Substations, open for the summer only, are located in Great Kills Harbor in Staten Island and Kingsborough Community College on Sheepshead Bay in Brooklyn. Sources have indicated that there is a large personnel shortage, which is not expected to change in the near future.

The New York City Waterfront Revitalization Program reviews construction, dredging, and development projects for consistency with Coastal Zone policies and advises the New York State Department of State, the New York State Department of Environmental

Conservation and other State agencies as to their findings. Development in New York City is controlled by the N.Y.C. Zoning Resolution and by the N.Y.C. Building Code, which is enforced on the waterfront by the N.Y.C. Department of Ports and Trade for commercial developments and NYC Department of Buildings for residential developments.

CHAPTER 2 - ENDNOTES

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CHAPTER 3: MARITIME AND INDUSTRIAL ACTIVITIES

New York Harbor has long been one of the world's busiest commercial seaports. While total port activity has increased steadily over time, its new competitive position nationally has somewhat declined. Today, the Port of New York and New Jersey has the 3rd largest number of ship arrivals of United States ports with 4,816 ship arrivals in 1989, and carries the 2nd largest tonnage after the Port of Los Angeles.[1] Although stable or increasing slightly in total size, the physical nature of operations in the Port of New York and New Jersey has changed considerably in past decades, as many smaller facilities in New York have closed and larger operations have consolidated in New Jersey. In this chapter, discussion of vessel activities will focus on three major categories, cargo vessels, maritime support services vessels, and industrial or municipal water dependent uses.

CATEGORIES OF MARITIME AND INDUSTRIAL ACTIVITIES

Cargo Vessels Cargo vessels transport cargo between both international and domestic ports, either for import and/or export. There are three basic types of cargo vessels.

Containerships are large vessels designed so that goods loaded into metal containers are directly loaded and unloaded onto and off the ships. They are unpacked only on reaching the consumer or

market. Containerships vary in size from 450 feet to over 1000 feet in length, have a large beam size and can draw up to 42 feet of water.

General dry cargo vessels carry break-bulk cargo which is loaded into the vessels, either in crates or bags, and unloaded from the ships at terminal piers and then repacked for shipment or transport. The coffee and cocoa beans shipped to 23rd Street and South Brooklyn Marine Terminals in Brooklyn are examples of the type of cargo handled.

General liquid cargo vessels are tankers designed to carry liquid cargo such as oil. Their contents are loaded directly into the vessels and subsequently piped directly into storage or transportation facilities at the destination ports.

Maritime Support Service Vessels

Maritime Support Service Vessels are the tug boats, barges and ship service vessels that are intrinsic to the operation of the port and to certain water dependent industries. They are used to move cargo locally and within the Port and to service the ocean going vessels that call at the Port.

Industrial & Municipal Water Dependent Uses

Water Dependent Uses are a category of uses which, dependent by their physical nature or operation, require direct access to, or location in marine or tidal waters for their continued viability and which therefore cannot be reasonably located inland. These "water dependent" uses are primarily industrial or commercial and are located throughout the Study Area.

Although both Port cargo and maritime support services make up a large portion of the water dependent use activities, there are also a number of other types of water dependent use facilities located in the Harbor.

Bulk goods and cargos encompass specialized installations for industrial oil, construction materials and other commodities. The first sub-category includes petroleum products handling and bunkering facilities used for the receipt of fuel oil for private consumption (including public utilities), facilities adjacent to airports to receive aviation gasoline, and facilities which handle petroleum products for regional distribution. Facilities within the second sub-category include those used for loading and offloading of sand, concrete, cement, asphalt and cement-related products. The third sub-category consists of facilities specifically geared to rope, lumber or newsprint; metal products, scrap metal or chemicals; food products; fish; and general or local cargo or heavy equipment. This last group includes break-bulk facilities not involved with port activity.

Government Uses/Services embrace vessels and facilities for safety and environmental needs, municipal and federal government vessels and facilities such as harbor police and fire units or Coast Guard; sludge and refuse or garbage transfer facilities. Sludge, the end product of sewage treatment plants after treatment and dewatering, is barged to and dumped at the Ocean Dump Site, 106 miles offshore. Water dependent refuse or garbage

facilities include marine transfer stations, the Fresh Kills landfill, private carting companies and junk haulers.

Two other sub-categories must be noted. These are car floats-barges that transport railroad equipment, and moorings including layovers for all types of vessels that need docking or mooring but do not require upland facilities.

HISTORY

Throughout its history, the waterfront has played an important part in New York City's economy and physical development. Situated along one of the North Atlantic's best natural harbors, the New York/New Jersey Region's growth paralleled that of its port. By the mid 1800's, the Port of New York had become the United States' largest port, and New York City had risen to the status of the nation's leading city. The waterways served as the entry point for maritime commerce and also for the waves of new immigrants that came to the United States in the 19th and early 20th centuries. New York City's large expanse of shoreline offered tremendous growth potential for maritime and industrial activities. Manufacturing facilities were attracted by the possibility both of receiving incoming raw materials and fabricating the products that were shipped out as exports. By 1870 the Port of New York was handling 57% of the nation's trade. Ferries provided access to the future boroughs and New Jersey, carrying workers as well as goods. New York's harbor was bustling with maritime activity. Piers and port facilities were built along much of

the shoreline. Most of lower Manhattan and areas extending from the Upper Harbor north along the Hudson River in New Jersey and New York were densely developed with piers and with the upland wharfs and marginal streets that provided access to them.

With the population growth at the turn of the century the Port expanded beyond Manhattan. By 1920, the Port included hundreds of miles of developed facilities serving thousands of vessels - tugs, barges, ferries, passenger boats and freighters among them. New Jersey's Hudson River cities of Hoboken and Jersey City became active maritime and industrial centers. In Brooklyn, the area from Owls Head north to and including Newtown Creek, was developed with piers backed by upland warehouses and large industrial zones. In addition to the cargo operations, many individual industries received their raw materials directly by ship. Although shipping activity was less intense along the East River further north, a number of piers and wharfs were built to ferry goods and passengers between Manhattan and Queens. Many of the industries that developed on the western shore of Queens received materials by ship.[2]

Car floats for transporting rail cars across the harbor were introduced in the mid 1800's and by the 1860's were a major activity crossing the harbor from facilities in all the boroughs but Staten Island. Cars rolling off transfer car floats in the various boroughs of the city entered self-contained freight terminals made up of tracks, loading platforms, and warehouses. All the terminals on

Manhattan's west side belonged to individual railroads, and several lines also had such facilities on the Bronx side of the Harlem River. In Brooklyn, the Pennsylvania Railroad had a terminal at 4th Street in Williamsburgh, and the Lackawanna had a terminal at 25th Street in Gowanus. Most of Brooklyn's terminal activity was handled by four independent firms. The Brooklyn Eastern District Terminal Company had facilities on the waterfront of Williamsburgh and Queens. The Jay Street Terminal Company was located between the Navy Yard and the Manhattan Bridge; the New York Dock Company had piers from Brooklyn Heights to Atlantic Basin; and Bush Terminals occupied most of the developed shoreline between Gowanus and Bay Ridge. To move freight carts within its terminal, each independent terminal company established its own railroad.

The history of water dependent uses is similar to the history of commercial and maritime uses in the port. In the 1860's, the construction of railroads from the west to New Jersey signaled the beginning of waterborne trade throughout the area. The Hudson River provided not only a link to New Jersey but a gateway to New England and the Great Lakes.[3] The use of the waterways expanded during the intense industrialization of the early 1900's in what was one of the world's fastest growing urban regions. The geography of the metropolitan area magnified this dependence. Because the population centers of the New York/New Jersey Region are separated by water, the waterways became important connections, and the Hudson River became the vital link between eastward and westward movement of

goods. Both sides of the Hudson developed as highly industrialized areas connected by water.

The history of fishing in the harbor dates back to the time Native Americans first inhabited this area. The Dutch settlers continued the fishing tradition, which experienced its greatest expansion with the arrival of immigrants in the mid-1800's. A wide variety of fish and shell fish were found in the Harbor ranging from cod and mackerel in the Upper Bay to shad and sturgeon in the Hudson. The port and its banks also served as a processing and distribution center for the fish caught both in the harbor and at sea. The majority of the fishing fleet operated out of Manhattan's Fulton Market on the lower East River.

Vessels used for fishing changed as the industrial revolution progressed, moving away from sail craft powered by the wind to steam power. In 1927, New York's fleet consisted of 175 vessels. A sizable number landed their catch at the Fulton Fish Market in lower Manhattan through World War II and into the 1950's.

Over the last 50 years, the pattern of waterfront and port use has changed dramatically. With the development of a highway system and the consequent growth in trucking, the importance of the waterways for transporting goods diminished. The construction of the bridges and tunnels linking the boroughs together and the City with New Jersey brought about a sharp decline in the need for ferries. By the end of World War II, trucks dominated local commerce, displacing the previous dependency upon

ships for movement of goods into and within the metropolitan area. This movement to trucking particularly affected the predominantly intraport and coastwise water dependent industries. The decline in manufacturing activities in the Port region that was characteristic of the 1970's and 1980's led to a parallel drop in the number of vessels that were needed for both goods delivery and export.

Perhaps most important were the substantial changes in maritime technology itself. General cargo, historically shipped by "break-bulk," was now being containerized. "Break-bulk" referred to the way in which individual packages or pieces of cargo were unloaded from the ship and then repacked for transport to the final consumers. With containerization, goods were initially packed into the large standardized metal containers and were only unpacked once the container reached the consumer. The containers were thus unloaded directly from the ship onto either a railbed or a truck frame. To accommodate these containers, new larger vessels have been built that carry numerous containers at once. In this way the same volume of cargo can be carried by fewer ships.[4]

The effects of this change on land use in the Port were significant. Cargo handling operations have shifted to the origination points and transportation nodes away from the population centers, such as New York City, that are the consumers of the products. Containerization requires extensive upland area. The use of mechanical cranes allows the containers to be

unloaded from the ship much faster than break-bulk. They are stacked at a container terminal awaiting pickup by trucks. Since the areas of Manhattan and many of those in Brooklyn lacked the needed upland storage space they were determined to be unsuitable for containerized shipping. Also, since fewer vessels are required to carry the same amount of cargo, fewer but longer piers are needed. As a result, by the mid 1960's, most of the operations in the Port were transferred to Staten Island and New Jersey. The shift from break-bulk to containerization, for the most part, did not effect the various subcategories of water dependent industries which required specialized vessels dedicated to the transport of specific raw materials or goods integral to the very operation of these water dependent industries. Two notable exceptions are car floats and general cargo.

By the early 1970's, the Port Authority of New York and New Jersey had focused most of its efforts on the development of the 2,100 acre container facilities at Port Newark/Elizabeth in New Jersey. Across Newark Bay, Howland Hook on Staten Island was developed as the premier containerport for New York City. With 187 acres of upland it met the storage and highway access requirements of the new maritime technology. Even though Port Authority and the City of New York had spent millions of dollars in the 1970's improving the break-bulk piers on Manhattan's West Side, Piers 36 and 42 on the East River, and Brooklyn Heights Piers 1-6, the piers in New York City that had been active break-bulk piers were generally no longer needed by the maritime industry. By the mid 1970's many of these

piers were unused and deteriorating. The bulk of cargo operations shifted away from the New York sections of the Harbor and the need for car floats for the westward movement of goods became unnecessary. In 1986, after the Port Authority spent considerable funds upgrading Howland Hook, the principal tenant went bankrupt and the facilities were left empty.

The advances in steel shipbuilding increased the size of barges for transporting raw materials, such as oil, coal, gravel, sand and cement to industries and thus also reduced the number of piers and wharfs needed. Many industries that had received materials by barge or ship now relied on truck or pipeline delivery. As a result, while many of the industrial areas that had developed adjacent to the waterfront continued to prosper, their use of the water diminished. As the number of vessels and the amount of cargo handling decreased, so have the number of maritime support vessels such as tugs, barges, and ship service and repair as well as space requirements for docking.[5]

In the past few decades, commercial fishing activities in the Port have declined. Fish are being landed closer to fishing grounds like Cape May in southern New Jersey and Greenport on eastern Long Island's North Fork. Furthermore, the catch is delivered in refrigerated trucks to market. Combined with the reduction in water quality due to pollution, competition from foreign ships and the general decline in number of fish due to over fishing, the Fulton Market Fleet had declined to 2 or 3 vessels by 1970. In 1980 only one ship, the

Brooklyn built Felicia, was still calling on the market regularly. The Fulton Fish Market is still active but its catch is all delivered by refrigerated truck or rail car. Fishport, a centralized facility opened by the Port Authority in 1985 to serve as a major fish processing and distribution facility for the region, closed in 1989 due to insufficient tenancy.

PRESENT CONDITIONS

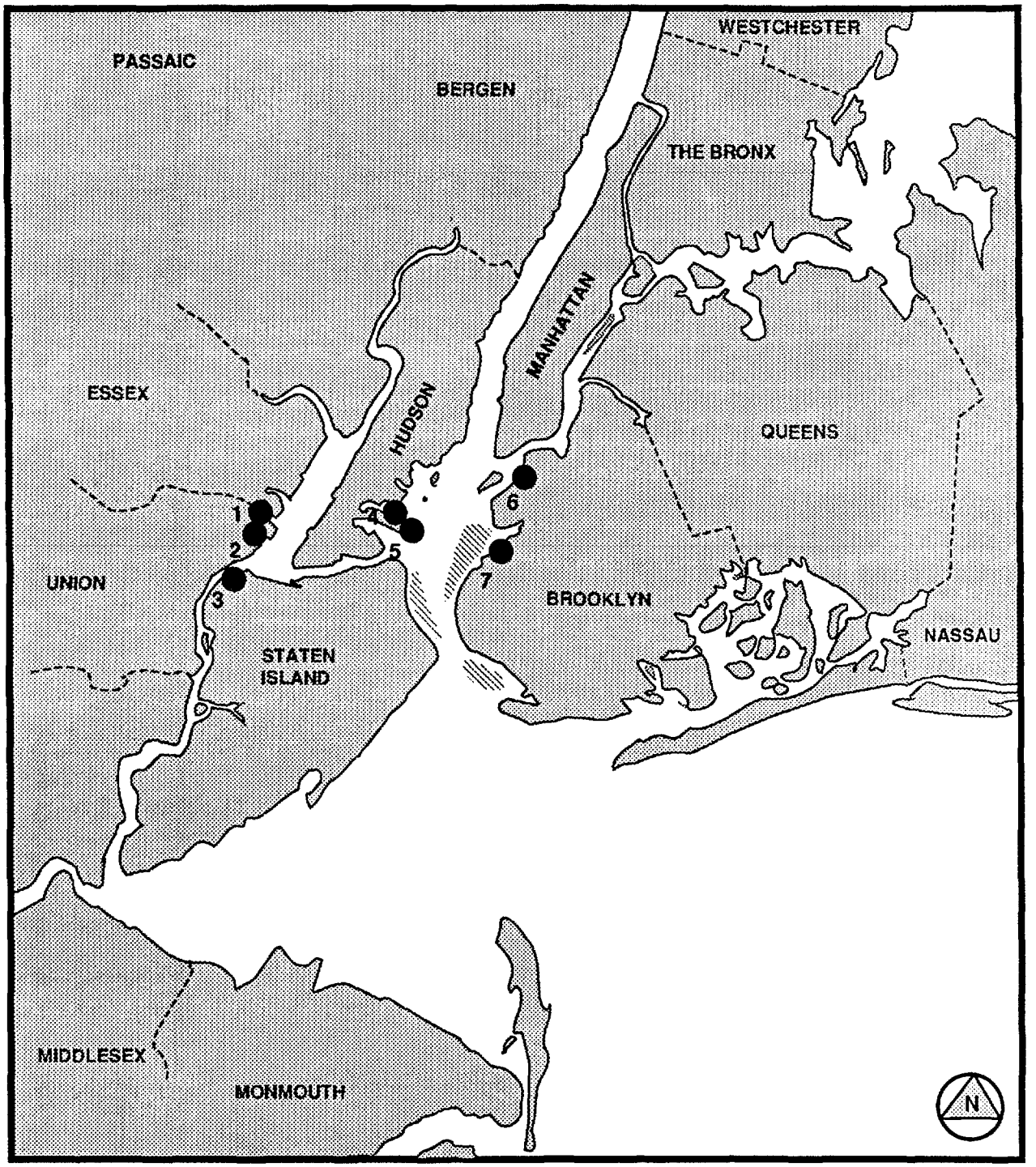
In the 1990's, the region's waterfront finds itself in a radically different position than it was 40 or 50 years ago. Many areas that once served as critical staging points for ocean, coastwise and internal harbor traffic are no longer needed for such purposes and now serve or are projected to serve different uses.

Cargo Industry

In the past decade, the maritime industry in New York Harbor has declined sharply. The Port's share of the nation's cargo as well as New York City's share of the Port's activity have dropped significantly. The Port, however, is still a major contributor to the New York regional economy, representing $18 billion in economic activity and 191,600 jobs. An additional 88,500 jobs can be seen as indirectly linked to the Port.[6] Figure 3.1 and Figure 3.2 show existing locations and routes of cargo facilities. Utilization of these facilities is described in Table 3.1.

New York City Cargo Facilities

Currently the most active container operations doing business in New York City are in Brooklyn. After a few years of difficulty in attracting business, Red



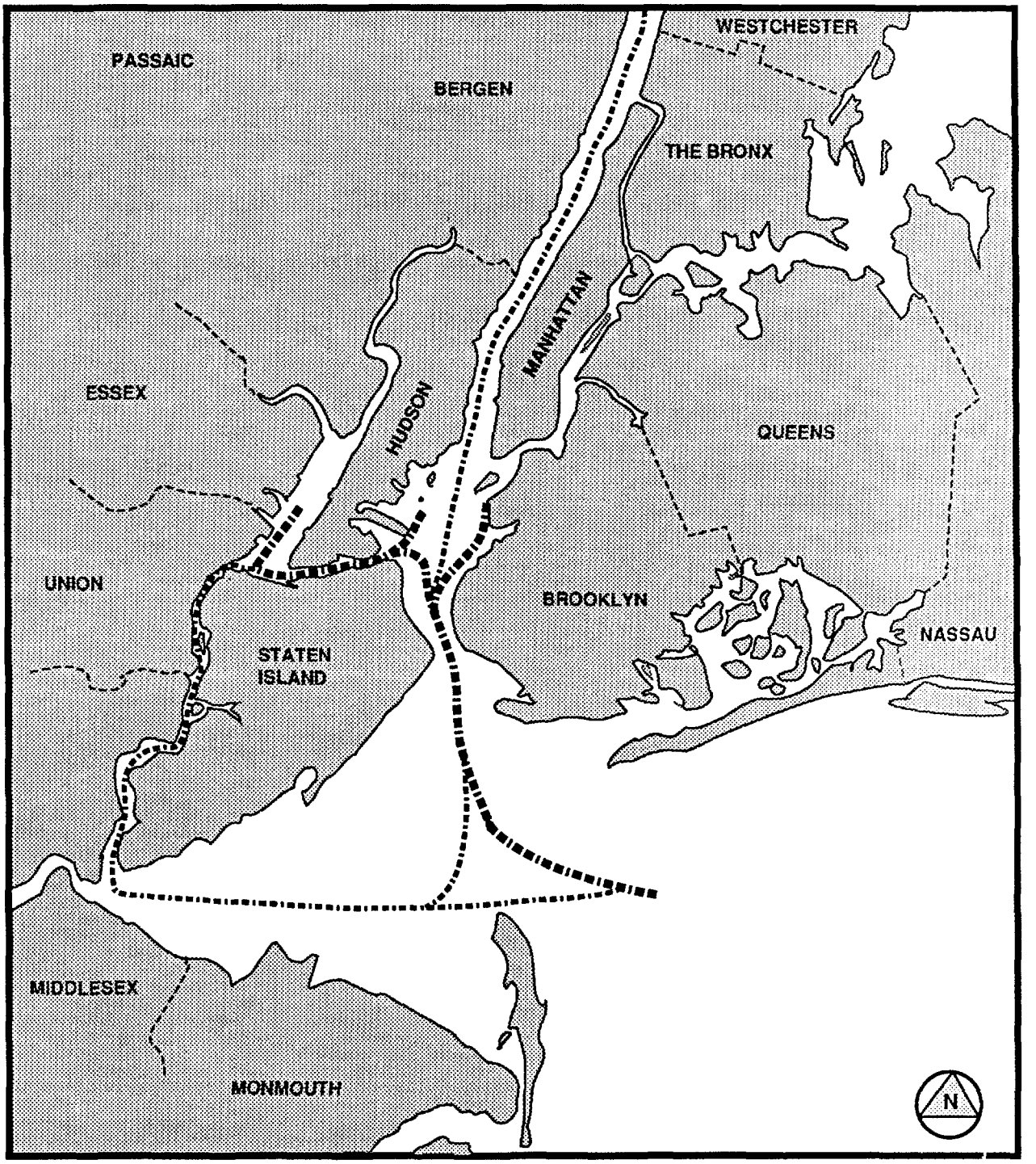
MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 1

● PORT CARGO OPERATIONS: EXISTING FACILITIES

1. PORT NEWARK
2. PORT ELIZABETH
3. HOWLAND HOOK MARINE TERMINAL
4. GLOBAL MARINE TERMINAL
5. PORT AUTHORITY AUTO MARINE TERMINAL
6. RED HOOK CONTAINER TERMINAL
7. SOUTH BROOKLYN MARINE TERMINAL

▨ ANCHORAGE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 2

PORT CARGO ROUTES: EXISTING

- HEAVY USE
- MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

TABLE 3.1

UTILIZATION CHART - 1989

	VESSELS	GROSS TONS
Anchorage only	119	3,246,367
NEW YORK		
Red Hook	304	3,948,584
Howland Hook	41	562,217
SBMT	3	16,358
23rd Street	4	23,824
New York Sub Total	352	
NEW JERSEY		
Port Elizabeth	1,359	38,355,096
Port Newark	776	19,326,307
Global Terminal	209	5,177,524
Auto port	37 (May - Dec)	
New Jersey Sub Total	2,381	
PORT TOTAL	2,850	

Source: Maritime Association of New York/New Jersey, "Statistics" for the Port of New York/New Jersey," 1989

Hook Marine Terminal, located on 118 acres, has developed as a thriving container port and is now in need of expansion space. The facility serves a New York City consumer market including imports such as edibles, furniture and clothes, and such exports as waste paper, chemicals and industrial goods. Smaller shipping lines serving Southern Europe and developing countries use Red Hook. Currently, 304 vessels call annually.

The 110 acre **South Brooklyn Marine Terminal (SBMT)** in Sunset Park, Brooklyn although equipped with container handling facilities, is currently being used as a break-bulk terminal for cocoa. In 1988, 39th Street became the break-bulk import center for cocoa and is now the nation's second largest port-of-entry for this commodity. By identifying these "niche" markets where break-bulk facilities are still needed, New York was able to reutilize these maritime facilities. Although these break-bulk operations appear to be growing, they do not, at this time, fully utilize the available terminal space.

The **23rd Street Marine Terminal** in Sunset Park north of SBMT is a 16 acre break-bulk terminal used for the warehousing of coffee and cocoa. In 1986 New York City granted a lease for the 23rd Street Marine Terminal and it now handles over 35% of all U.S. coffee imports.

Although the U.S. Line's bankruptcy had left the **Howland Hook** facility in Staten Island empty in 1986, in 1988 a new tenant engaged in a smaller container and lumber operation was brought into

Howland Hook and the utilization of this facility has increased to 41 ship arrivals in recent years. These operations, however, presently utilize less than one-third of the available 187 acres. Lease negotiations between the City of New York and the Port Authority have recently been finalized and the Port Authority expects to bring Howland Hook back to full utilization as a container port.[7]

New Jersey Cargo Facilities

The situation in New Jersey is dramatically different from New York. **Port Newark and Port Elizabeth** underwent tremendous growth over the past several decades and currently account for over 2,000 ship arrivals and 80% of the general cargo activities in the Port of New York and New Jersey in 1989. The Port Authority's 2,100 acre Port Newark/Elizabeth Marine Terminal connects to inland destinations via two interchanges on the New Jersey Turnpike (Interstate 95) and numerous railroads -- Conrail, CSX and numerous regional railroads. Portside International Rail Container Terminal is one of the East Coast's largest intermodal facilities for handling containers and is part of the complex. All 2,100 acres are a Foreign Trade Zone. The facility handles a wide variety of commodities ranging from automobiles to orange juice to copper. It has advanced cargo handling equipment and millions of square feet of warehousing and distribution space.

The largest privately owned marine facility in the Port of New York and New Jersey is **Global Marine Terminal.** It is located on the Bayonne/Jersey City Peninsula and encompasses 100 acres. In 1989 Global Maritime Terminal had 209 ship arrivals. In

addition, in May 1989 the Port Authority opened the 128 acre **Port Authority Auto Marine Terminal** in the Greenville Rail Yards adjacent to Global Marine. There were 37 ship arrivals in 1989. This facility is expected to eventually increase in activity to account for 20% of all cars imported into the United States.[8]

Maritime Support Services

The maritime support services are critical to the operation of the Port. They provide necessary services to ocean going ships; or transport goods from large distribution centers to satellite centers or end users; use the Port as their home port; operate shallow draft vessels; and require a waterfront location to operate.

There are six industry segments: towing, barge, ship service, contractor, shipyards, and government agencies. These industry segments serve the following activities: shipping, petroleum distribution, sand and gravel receipt, waste movement, and receipt of fuel. Over 100 million tons of cargo are transported locally and coastwise by maritime support service industries. There are more than 260 firms in the Port employing over 4,200 people and generating up to $90 million in wages. The maritime support services range from firms employing under ten workers to those with hundreds of employees. The companies aggregate over 700 large vessels and at any given time 100-300 pieces of floating construction and lifting equipment based in the Port.[9]

The maritime support services have very specific siting needs that are critical to their viability.

These needs can be grouped into three major categories: location, zoning, and hydrographic conditions. Since high travel costs can make a company unprofitable, most of the maritime support services need to be located near their particular center of activity. In addition, because of the noxious and noisy character of many of these industries, they should be located in manufacturing areas, preferably in traditional maritime areas where secondary industrial links still exist. Finally, maritime support services must consider certain hydrographic conditions such as high waves, exposure to strong currents, and water depth at all tide levels in deciding upon the suitability of a site.[10]

Currently, there are several specific areas where maritime support service activities tend to cluster. They are the New York and New Jersey shores of the Arthur Kill and the Kill Van Kull; the New Jersey shore of the Upper Bay south of Caven Point; the Upper Bay, Gowanus Bay, Brooklyn Piers 7 & 8 and Wallabout Bay Basin in Brooklyn; Newtown Creek between Brooklyn and Queens; and Flushing Bay in Queens.[11] Figure 3.3 and figure 3.4 show existing locations and routes of Maritime Support Services.

Industrial and Municipal Water Uses

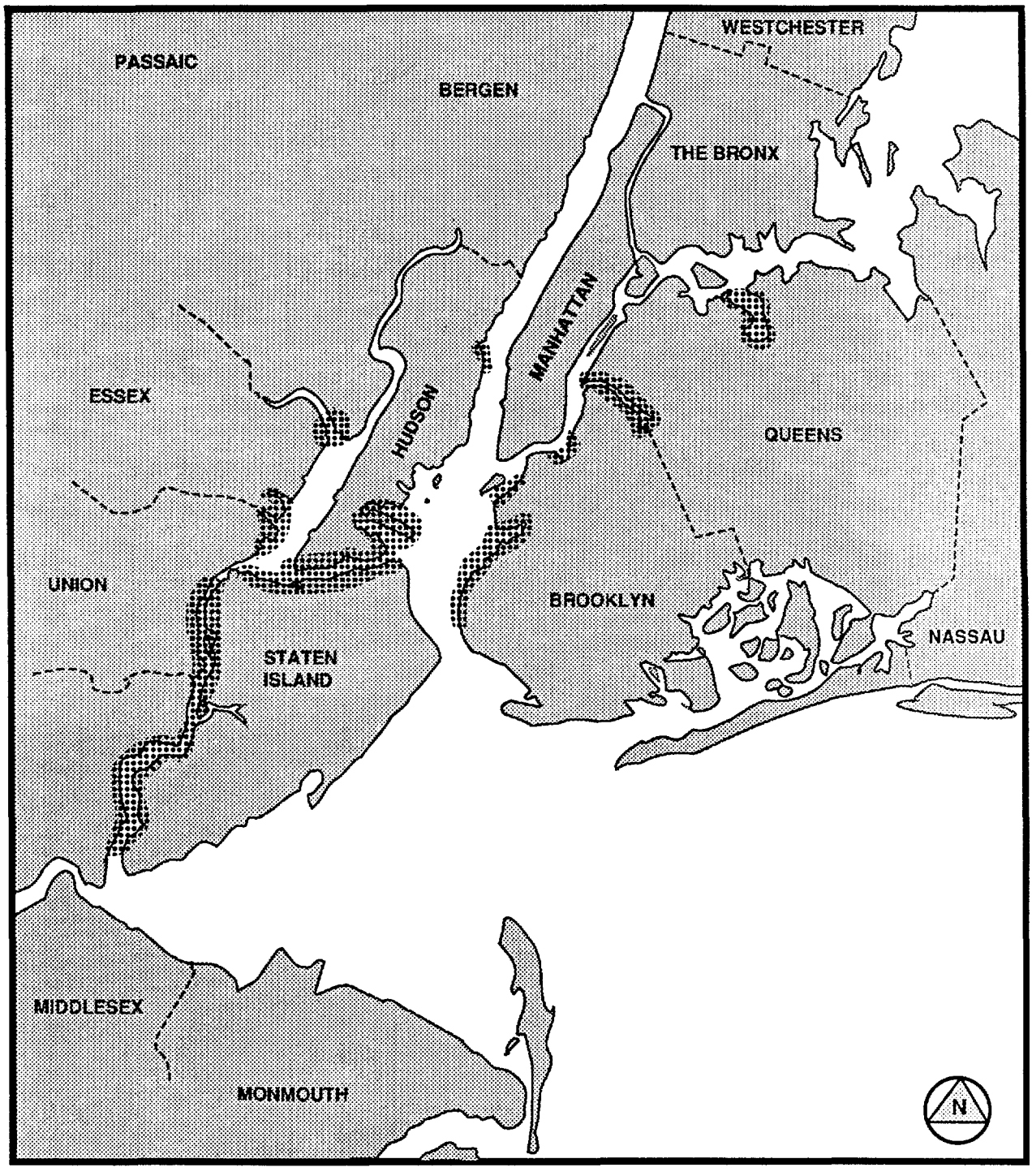
The overall drop in water dependent uses continued into the 1980's reflecting the decline in manufacturing in the Port region. Despite this general trend, certain water dependent subcategories have increased in terms of number of facilities. These subcategories include moorings and municipal uses, (in particular, sludge and

TABLE 3.2

New York City
Water-Dependent Facilities

USE	1965	1978	1988	PERCENT CHANGE 1978-1988
Industrial Oil	118	83	65	-22
General/Local Cargo/Heavy Equip.	110	42	21	-50
Mooring	64	35	49	+23
Food Products	14	13	4	-69
Metal Products/ Scrap Metal/ Chemicals	13	10	8	-20
Car Floats	49	10	4	-60
Fish	6	5	3	-40
Municipal Uses	23	18	24	+33
Sludge	11	10	11	+10
Rope/Lumber Newsprint	12	4	1	-75
Refuse/Garbage	15	12	18	+50
Sand/Cement, etc.	60	34	31	-9
TOTAL	495	276	239	-13

Source: U.S. Army Corps of Engineers, the Port of New York and New Jersey Boating Almanac Co., Inc., The Boating Almanac: Volumes 2 and 3.



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 3

CONCENTRATIONS OF MARITIME SUPPORT SERVICES: EXISTING FACILITY LOCATIONS

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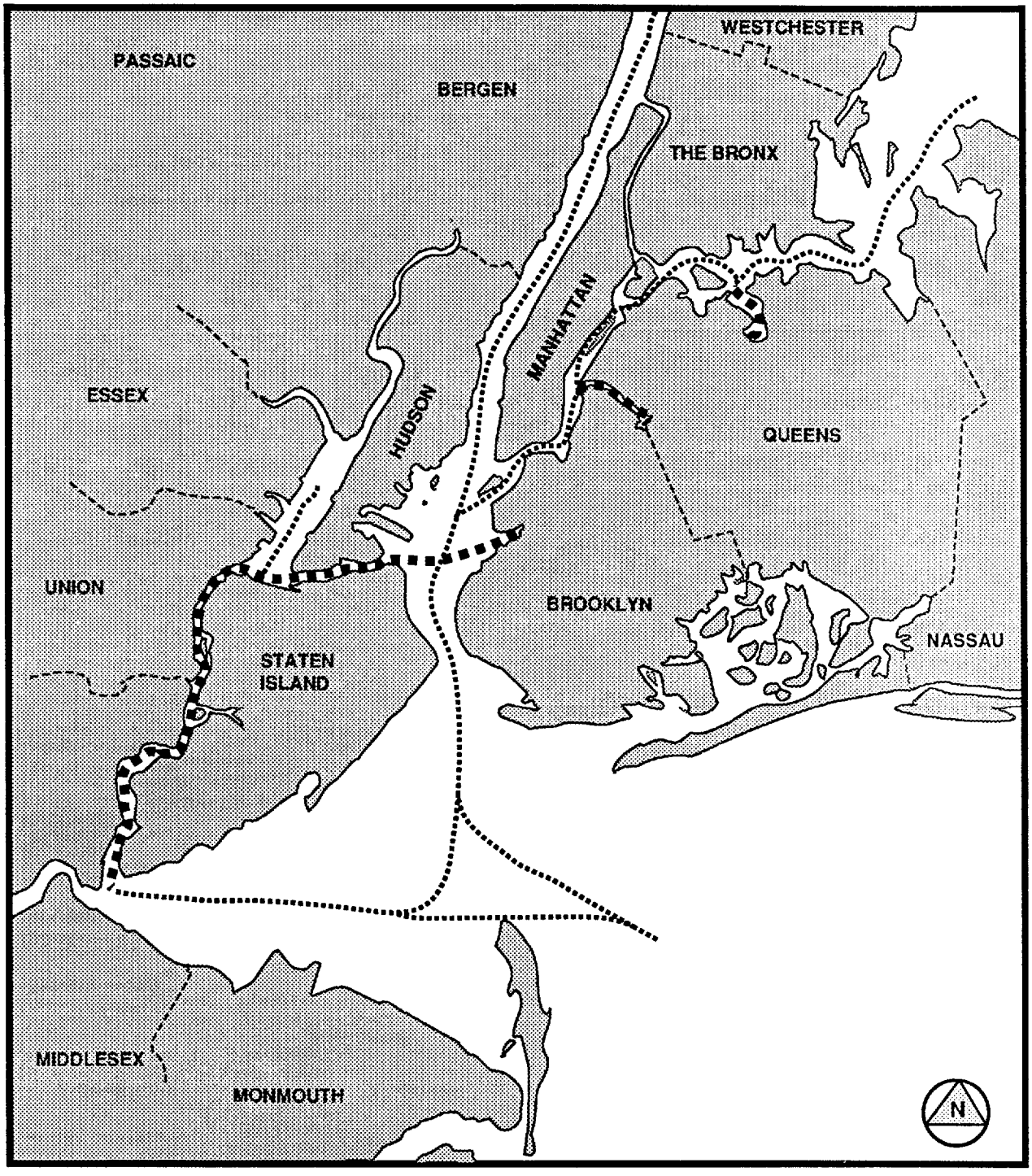
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 4

MARITIME SUPPORT SERVICES: EXISTING ROUTES

■ ■ ■ HEAVY USE

····· MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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solid waste).[12] Table 3.2 describes the change in number of New York City Water Dependent Use Facilities from 1965 - 1988.

Since water dependent uses are largely industrial, and frequently noxious they are most often concentrated in those areas which allow heavy manufacturing.

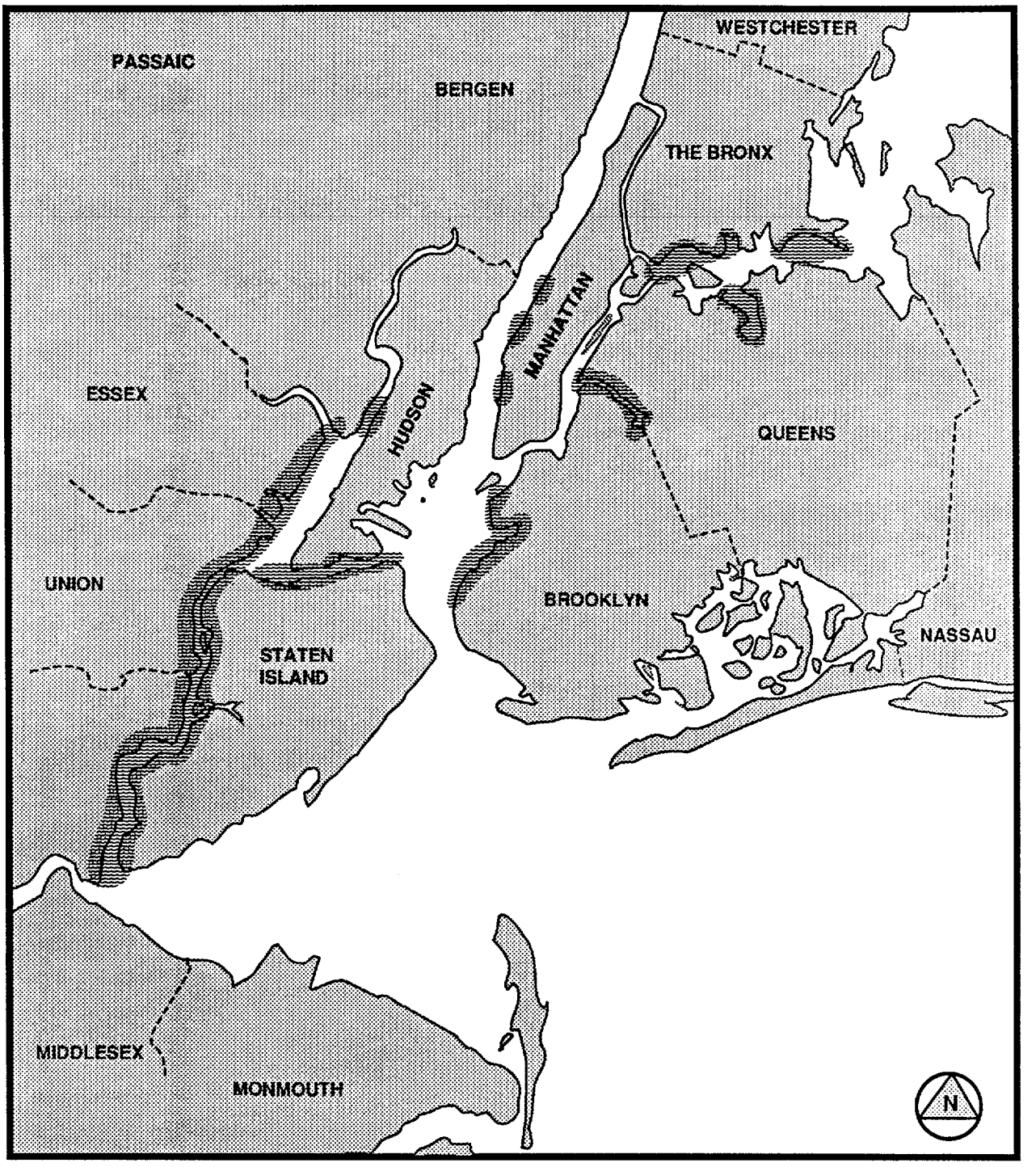
In New York City, the major geographic concentrations of water dependent uses include Red Hook, the Gowanus Canal, and the Sunset Park waterfront extending south from Erie Basin to Owls Head in Brooklyn. Newtown Creek, separating Brooklyn and Queens, is also a major center for water dependent uses. The other concentration in Queens is located along the Flushing Creek. In the Bronx, the waterfront along the south shore, in the Hunts Point/Morris Point area, has a sizable number of water dependent uses and there are also several water dependent uses dispersed along the Bronx side of the Harlem River. Although few in number, most water dependent uses in Manhattan are located along the Hudson River south of 59th Street. In Staten Island, the largest concentration of uses are found, alongside the maritime support services, on the Kill Van Kull and along the Arthur Kill.

In **New Jersey,** major concentrations of water dependent uses are located along both the Arthur Kill and the Kill Van Kull. Smaller concentrations can be found in Newark and Raritan Bays and along the Hackensack and Passaic Rivers.[13] The various subcategories of water dependent uses, are concentrated within different areas of the Harbor

in accordance with their locational needs. Each of the following sub-categories has particular locational requirements that determine the siting of facilities. Figure 3.5 and Figure 3.6 show existing concentrations and routes of Water Dependent Uses.

Nearly 44 million gallons of oil move through New York Harbor daily. While located in several different areas throughout the Harbor, **oil terminals** do have general areas of concentration. The largest concentration is the complex of refineries, pipelines, storage facilities and marine terminals on the Kill Van Kull and the Arthur Kill along both the New York and New Jersey shores. Seventy-five percent of the port's oil traffic is on these waterways. The next largest concentration (and the largest within New York City) is along both sides of Newtown Creek. Smaller concentrations can be found along Mill Basin and Sunset Park in Brooklyn, Flushing Creek in Queens, the south shore of the Bronx at Westchester Creek and the East River, and along the Passaic and Hackensack Rivers in New Jersey. In addition, many utilities are dependent upon waterborne delivery of oil. These facilities, however, are dispersed throughout the Harbor.

Although **construction materials facilities** can be found in several locations throughout the Harbor they tend to be concentrated in areas that are near the point of origin of the raw materials. Much of the sand and gravel is barged into the Port of New York and New Jersey from Long Island Sound or from the lower Harbor and Raritan Bay. There facilities



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 5

▒ **CONCENTRATIONS OF WATER DEPENDENT USES: EXISTING FACILITY LOCATIONS**

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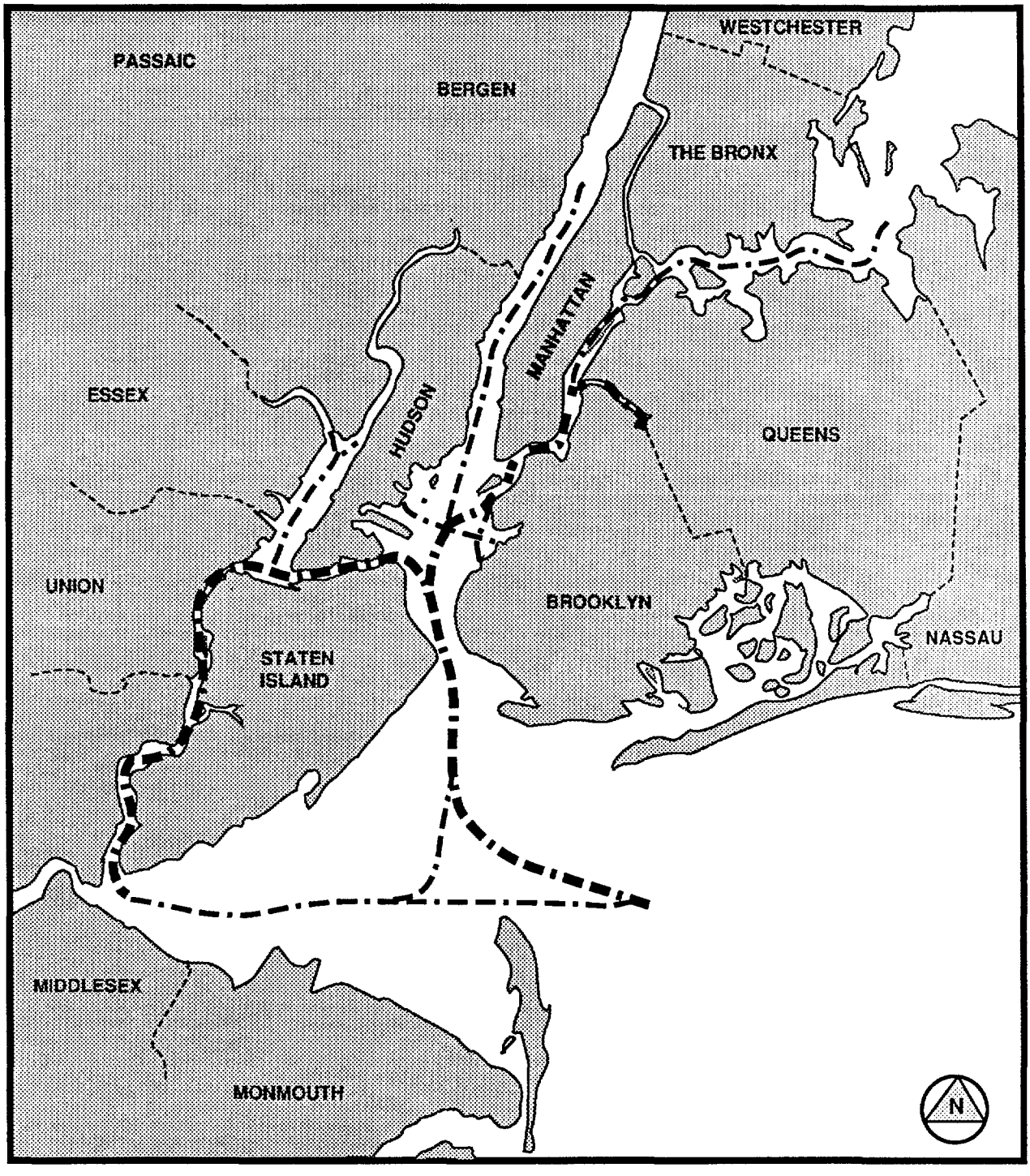

MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 6

WATER DEPENDENT USES: EXISTING ROUTES

HEAVY USE

MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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can be found clustered in areas near the supply, such as Flushing Creek and along the Raritan River.

There are very few **rope, lumber, or newsprint facilities** that remain water dependent. Although newsprint was once delivered by barge in New York City, it is no longer delivered by water. There remain, however, two major lumber operations, one in Greenpoint, Brooklyn, and the other at Port Newark, New Jersey.

Metal Products, Scrap Metal Chemicals/Local and Cargo/Heavy Equipment uses are clustered around the industrial sections of Brooklyn and Staten Island with very few located in the Bronx, Queens or Manhattan. In New Jersey these facilities also tend to locate near areas with industrial upland (i.e., the mouths of the Hackensack, Passaic and Raritan rivers). There is a major scrap metal exporter located at Caven Point in Jersey City.

Food products and fish were both originally delivered to the Port of New York and New Jersey by vessel. With the increase in refrigerated trucks most of these commodities are now brought in by truck. Even the Fulton Fish Market, New York City's premier wholesale fish market, receives most of its fish in this way. Two commercial fishing ports are active in the study area, both in New Jersey. The Menhaden catch at Belford in New Jersey accounts for over half of the state's commercial landings. Menhaden are usually caught within the Raritan-Sandy Hook Bay and in the ocean within three miles of shore. The second commercial fishing port is located at Highlands, New Jersey.

The Highlands port is actually located in the protected mouth of the Shrewsbury River, but all traffic to and from the port must pass through Sandy Hook Bay which is in the study area. There are approximately 30 vessels berthed at the Sandy Hook Bay area. Recently proposals have been made for the construction of a new depuration facility on Sandy Hook Bay to allow the fish industry to continue to grow. In New York State, there is commercial lobstering in Long Island Sound off the eastern shore of the Bronx, the north shore of Queens and in the Upper and Lower Bays of New York Harbor. Commercial Crabbing can be found in the Hudson River, Jamaica Bay, the Upper and Lower Bays, and in the Long Island Sound. A few **food products facilities**, such as AMSTAR Sugar in Williamsburg, Brooklyn, still receive their raw materials by ship. These remaining food-related water dependent activities, however, are spread throughout the Harbor with no specific areas of concentration.

While representing a sizable number of vessel movements, **government services activities** are also scattered throughout the Harbor. Operations such as the Harbor Police and the Marine Fire Unit have specific geographic districts of the Harbor for which they are responsible. The Coast Guard, which is located at Governor's Island and at three other locations within the Harbor, has specific patrol routes which take its vessels to all parts of the Harbor.

Sludge and solid waste facilities are dispersed throughout the Harbor according to service

catchment areas. In New York City, the sludge facilities are located alongside the wastewater treatment facilities which can be found in all five boroughs. Currently all of the sludge barges travel to the Ocean Dump Site located 106 miles offshore to dispose of the sludge. Six northern New Jersey sewerage authorities transport sewage sludge by barge to the 106 mile sludge dump as well. They are: Middlesex, Linden, Roselle, Essex-Union, Passaic Valley, Rahway and Bergen County. Because of federal legislation, this practice will end in the near future.

The New York City Department of Sanitation marine transfer stations relate to sanitation districts and are also located in all boroughs. The one point of concentration of solid waste vessel movements is the landfill at Fresh Creek along the Arthur Kill in Staten Island, where all New York City solid waste barges dispose of their cargo. Although there are also private solid waste carters, most of these do not currently use barges to transport solid waste. Currently no solid waste in New Jersey is transported by barge.

The only remaining **car float operation** connects the 65th Street Rail Yard in Sunset Park, Brooklyn with the Greenville Yard in Jersey City, New Jersey. The private operator-Cross Harbor-has seen a slow but steady increase in railcar movements in the years 1984-1990.

Commercial Moorings are the most widely scattered water dependent use in the Harbor, with many waterfront industrial areas having mooring

facilities. Often the areas between piers, which were once used for break-bulk docking and offloading, are now used for vessel mooring.[14]

ROUTES AND AREAS OF USE

Cargo

The routes of cargo vessels are quite specific and consistent because they are dependent upon the existence of adequately dredged navigation channels. Most of the Port of New York and New Jersey terminals, both container and break-bulk, are located off of Upper New York Harbor or Newark Bay. The common route for cargo vessels is to travel from the Lower Harbor through the Narrows to the Upper Harbor and then proceed either via the Kill Van Kull to Port Newark, Port Elizabeth, or Howland Hook, or to go directly from the Upper Harbor to Global Marine in New Jersey or Red Hook, 23rd Street or SBMT in Brooklyn. In each case the vessels are restricted to the navigable channels. Many vessels, however, need to tie up in anchorage areas in the Upper Bay while awaiting available space at their terminal. Some vessels also tie up at the anchorage area in order to "lighter" (off load) some of the cargo in order to shorten their draft and allow safe navigation through the channel. All vessels travelling from a foreign port, or vessels sailing under foreign registry are required, upon entering the Harbor to have a pilot licensed by New York or New Jersey to assume responsibility for taking the vessel through the Harbor. In addition to the vessels headed for the Port of New York and New Jersey, there are also up to 80 vessels annually that travel up the Hudson to

Albany and approximately 100 vessels that travel to points north along the Hudson.[15] (See Figure 3.1)

Maritime Support

The maritime support services have routes that are based on the point of origin of materials they transport, their destinations, and their own upland operating sites. As a result, although the service industries themselves are generally concentrated in specific areas, their activities can take them to all parts of the Harbor from the Hudson and East Rivers to Long Island Sound or to Jamaica Bay (see Figure 3.4).

Water Dependent Uses

Similar to maritime support services vessels, water dependent use vessel routes are based on the point of origin of the materials they transport, the areas of concentration of landside water dependent uses, and their destinations. These destinations are often intraport with vessels crossing through the Harbor. For this reason, many of the water dependent use routes are difficult to identify, although landside uses are concentrated in the Inner Harbor, the Kill Van Kull and Arthur Kill, Newark Bay and the East River up to Newtown Creek.[16] (See Figure 3.6)

Some of the subcategories of water dependent uses do cluster in certain areas. The areas of concentration of oil facilities, and thus, tanker movements, for example, can be identified and have recently been responsible for the most serious problems associated with Harbor use conflicts. The Arthur Kill and the Kill Van Kull are the areas with the greatest number of oil facilities. The number of oil spills in the region has increased

substantially in the past few years, from 257 spills in 1987 to 368 spills in 1989. The most significant spill occurred in January of 1990, when 571,000 gallons of fuel oil was spilled in the Arthur Kill. Oil spills have become a real threat to the effective functioning of these waterways. In addition to the damage done to the natural environment, the oil spills often result in the closing of the entire waterway to vessel movements until the spills are cleaned.[17]

In studying the problems that have resulted from the 12 major oil spills that have occurred in the Arthur Kill/Kill Van Kull area in the first six months of 1990, the U.S. Coast Guard identified a series of actions that should be considered in order to reduce the potential for future oil spills. Since the navigation channels are narrow and the oil tankers are both deep and long, the chances of groundings are increased under conditions which include vessel congestion of the waterways. As previously mentioned. The Coast Guard has reestablished a mandatory Vessel Traffic Service (VTS) in New York Harbor to monitor vessel movement and avoid conflicts and congestion. The VTS has been approved and is being implemented in three phases.[18]

The sludge routes, while starting at different points of origin, are all destined for the 106 mile Ocean Dump Site. Thus, their routes tend to coincide in the Lower Harbor. The same type of convergence can be seen with the solid waste/garbage barges which depart from different

sites throughout the Harbor but all travel to the Fresh Kills Landfill.[19]

PROBLEMS & CONSTRAINTS

Maritime cargo and support service vessels are the largest and most powerful ships using the waterways of the Harbor. Their size, in terms of length, width, and draft, presents several problems. First, it serves to constrain the areas in which these vessels can safely operate. Water depth in the navigable channels of a majority of these waterways depends on maintenance dredging which can be complicated by funding and environmental constraints. In addition, the very maneuverability of the vessels themselves is often quite limited. For example, a barge under tow is not only restricted to areas with adequate water depth, but is also unable to respond quickly to alter its route or speed should another vessel come into its path. Indeed, containerships, freighters, tankers and tugs, when on their own power, must generally keep a minimum speed of approximately 4 knots in order to maintain proper control. Another problem resulting from the size of these vessels is the wake they create. A maritime cargo or support vessel often creates a large wake which affects, not only other passing vessels, but landside docking facilities such as marinas which require sufficient breakwaters. These wakes are the source of a great number of conflicts between these vessels and other commercial and recreational boats.

Nevertheless, because of their size, demanding locational and navigational needs, and substantial contribution to the region's economy, the maritime cargo and support services must be considered as priority uses to which the other water use activities must ultimately accommodate. Improvements in operations and certain siting guidelines should, of course, be analyzed. Yet it is important to realize that both the cargo operations and the maritime support services function within relatively rigid parameters.

Cargo activities are confined to only a small portion of the waterways around New York and New Jersey. With the implementation of the VTS by the Coast Guard, the careful siting of facilities, appropriate marina design, training and education of recreational and commercial vessel operators, water use conflicts with cargo and maritime activities can be minimized. (See Figure 3.1)

The maritime support services are also concentrated in a limited number of areas including the Kill Van Kull, Red Hook/Erie Basin, the Gowanus/Sunset Park waterfront, Brooklyn Navy Yard and Newtown Creek in New York City; and Caven Point, the Kill Van Kull, and the Arthur Kill in New Jersey. (See Figure 3.3)

While the VTS system will improve the situation in the Upper and Lower Harbor and along the Kill Van Kull, this system will relate only to larger vessels. Since the Kill Van Kull is an area of intense cargo and maritime activity, recreational or other commercial vessels should be discouraged from using this waterway. Areas from Red Hook

Marine Terminal to SBMT in Brooklyn should also be analyzed carefully before other uses are sited along this waterfront. Newtown Creek, while currently unappealing for recreational activity, should also be maintained for existing and future cargo and maritime support vessels. The Arthur Kill area, especially in New Jersey, north of the Outer Port Mobil is an area of intense water dependent, as well as maritime support service use. Because the channel is narrow, other vessels should not be encouraged to recreate along this waterway other than in transit from existing marinas or from areas along the Hackensack and Passaic Rivers or Newark Bay to the Lower Harbor.

FUTURE CONDITIONS

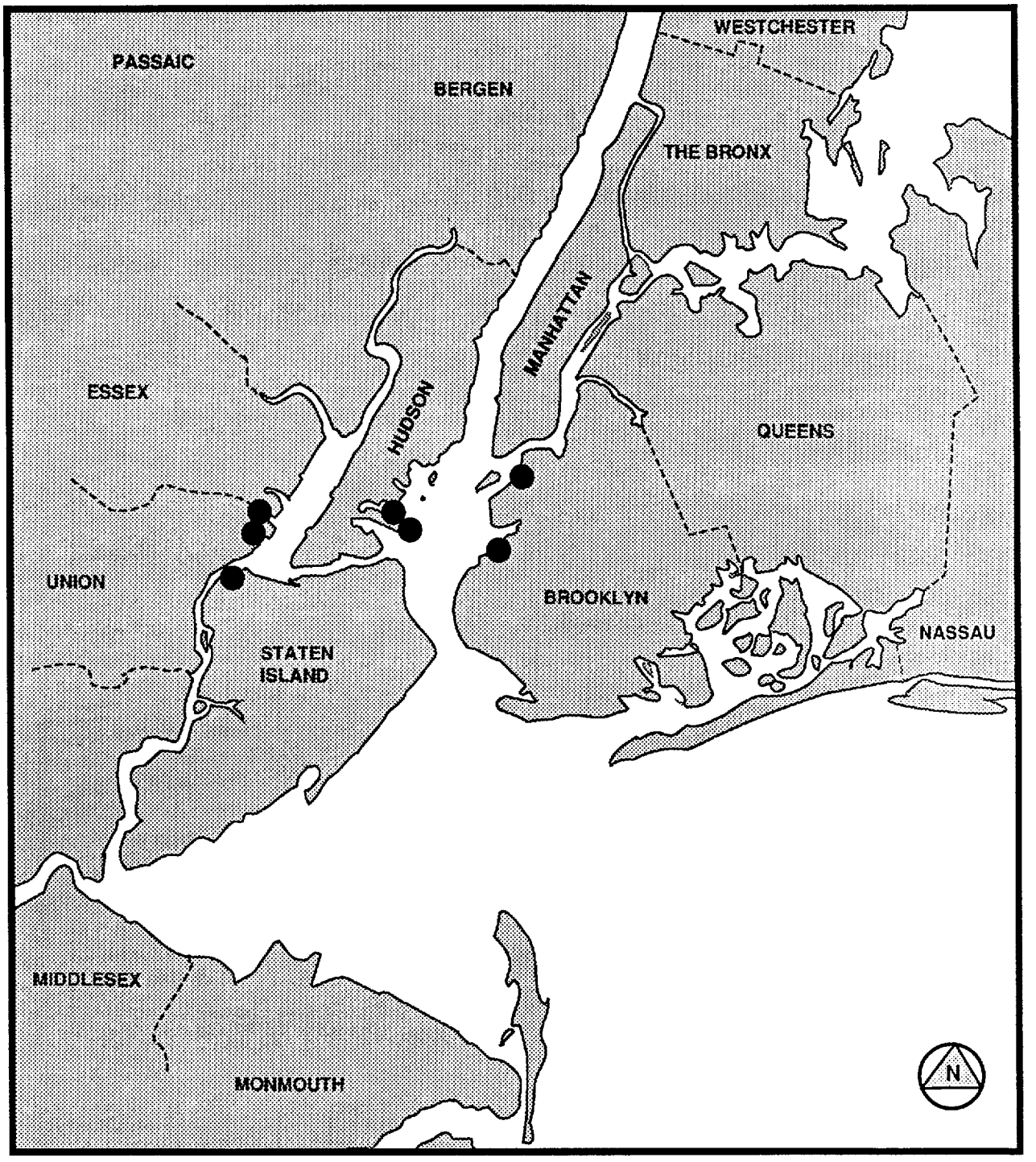
Cargo Industry Although the Port of New York and New Jersey is no longer America's largest port, it has still grown in actual tonnage in recent years and is projected to continue this growth over the next twenty years. No new containership facilities are planned for the next 20 years, but, greater utilization of existing facilities is anticipated. Vessels calling at the Port are expected to be the newest generation of larger containerships that are projected as the future in cargo shipping.[20] Figure 3.7 and Figure 3.8 illustrate future locations and routes of Cargo Facilities.

The segment of the Port market accommodated at **Red Hook**, Brooklyn is growing and the operator, Universal Terminals, has concluded that expansion is necessary at Red Hook to accommodate the projected annual increase of 1.4 million tons in

cargo. With a strong marketing commitment and with additional warehousing (particularly refrigerated) within the general area, Red Hook could capture new commodities such as fresh fruit, steel products, cocoa, coffee, paper and fresh and frozen meat. The needed expansion could be accommodated in several different ways, however, a consultant study (done for the Port Authority and the New York City Department of Ports and Trade by the firm of Frederick R. Harris) recommended the extension of Berths 1 and 2 by about 350 feet into the Atlantic Basin.[21] The construction of this extension is expected to be completed in 1991. In addition, the Harris study indicated that improvements in cargo and container handling and truck access are crucial to the future success of Red Hook.[22]

Regarding the future of the **South Brooklyn Marine Terminal**, the Harris study noted that, whereas SBMT has the advantage of greater storage areas, there does not appear to be adequate container demand in New York City to support both Red Hook and SBMT as container terminals. The Department of Ports and Trade continues to support the expansion of the cocoa facilities at SBMT. With the provision of additional storage facilities, a continual increase in cocoa operations volume and vessel movements is envisioned. The exact growth is expected to be about 30% in volume. Additional warehousing could help capture new commodities such as fresh fruit.[23]

Upon completion of lease negotiations with New York City, the Port Authority intends to have the 187 acre facility at **Howland Hook** return to full



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 7

PORT CARGO OPERATIONS

FUTURE: NO NEW FACILITIES PROPOSED

● EXISTING FACILITIES

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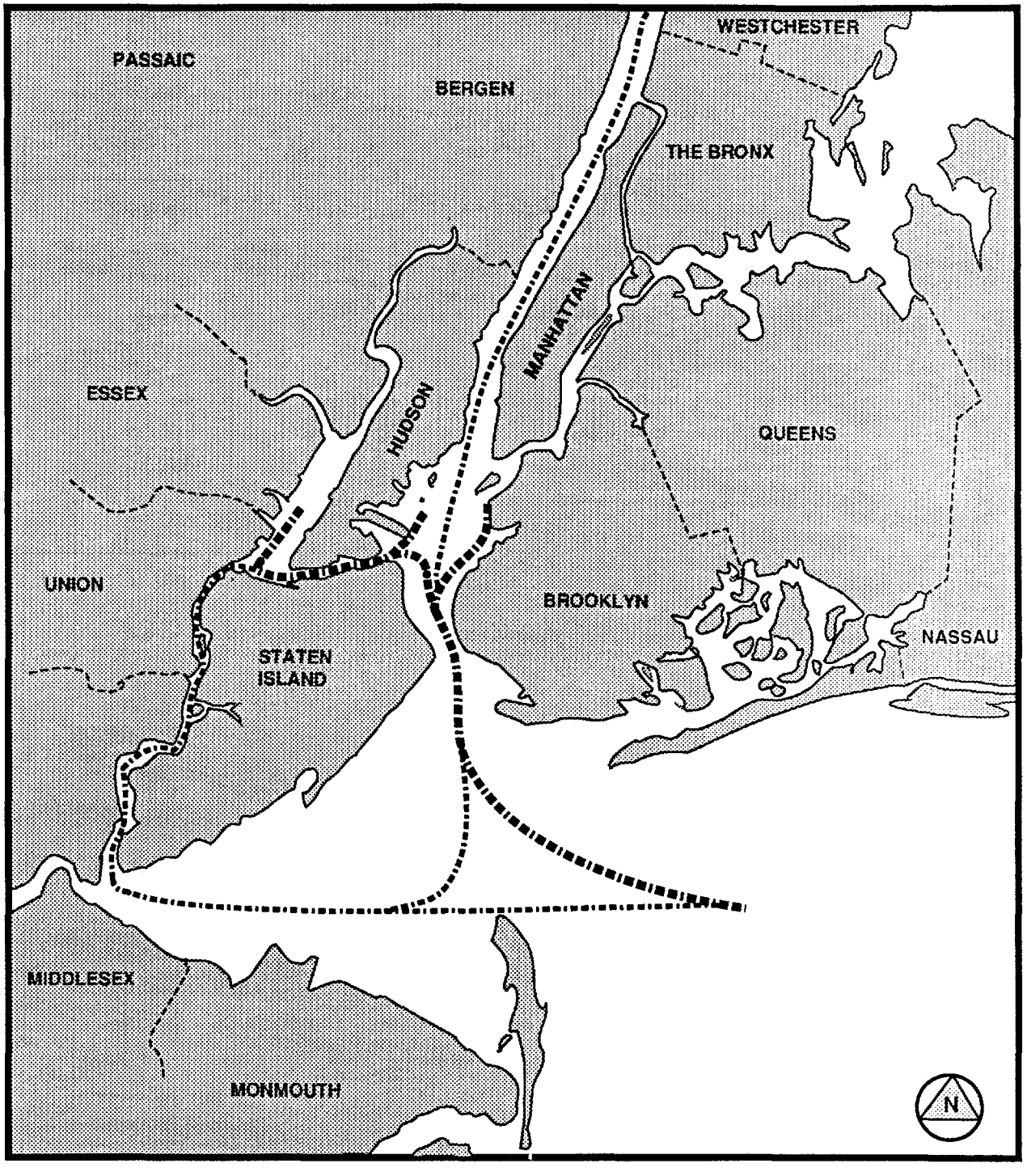


MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 8

PORT CARGO ROUTES
FUTURE: NO NEW ROUTES PROPOSED

EXISTING ROUTES:
- HEAVY USE
- MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

utilization as a containerport. When fully operating, the number of vessel movements are projected to increase from 41 to over 156 vessels yearly.[24]

According to Port Authority officials, the current level of tonnage handled at **Port Newark & Port Elizabeth** is anticipated to double over the next twenty years. The increase in vessel movements, however, will be less marked due to the introduction of larger containerships with greater tonnage capacity.[25]

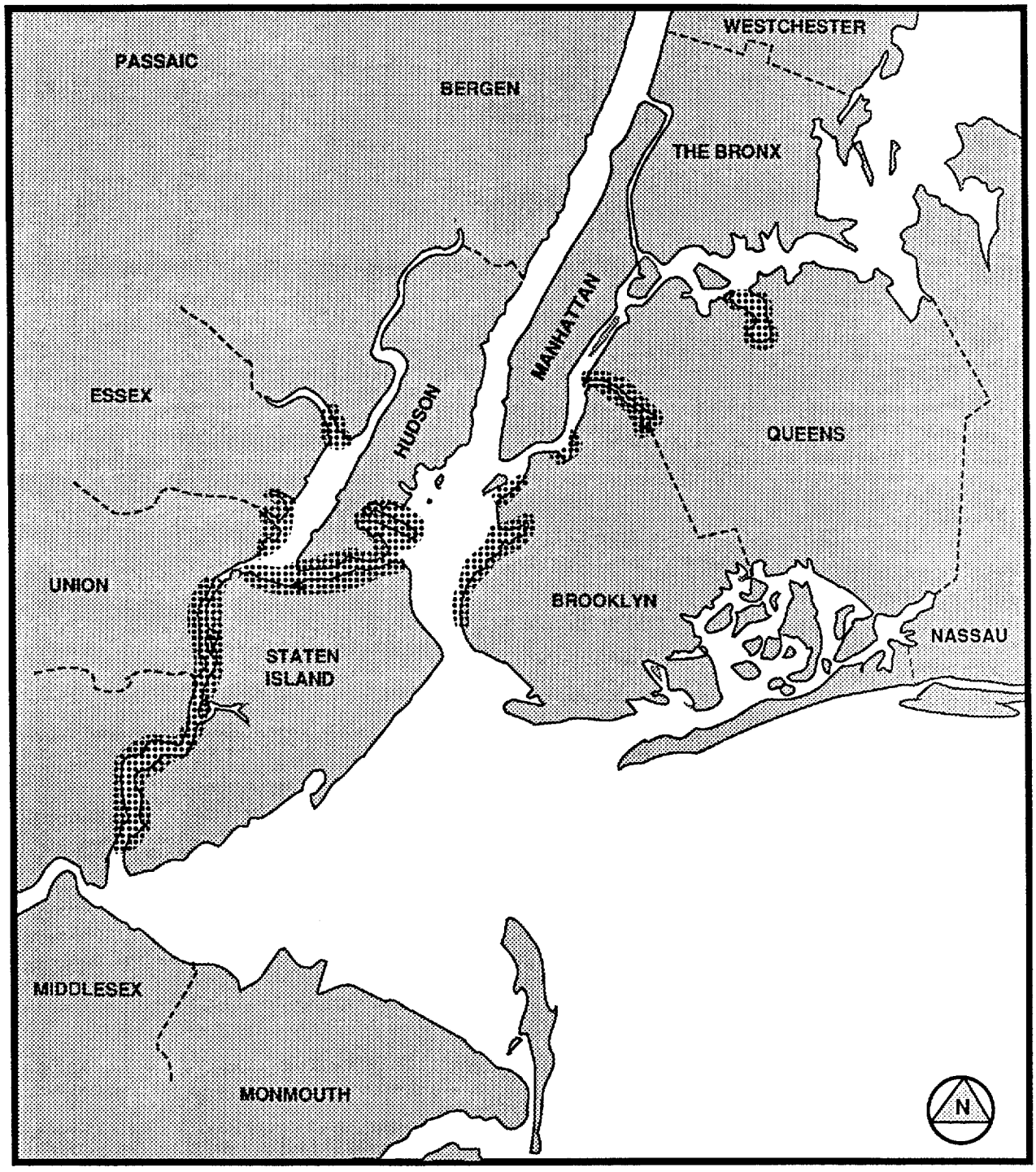
Global Marine at Caven Point, is anticipated to continue expanding in tonnage. In addition, the newly opened Port Authority Auto Marine Terminal is expected to be operating at capacity by 1992 and will provide for some increase in vessel movements.[26]

Maritime Support Service

After two decades of decline, the maritime support service industries are expected to experience some degree of growth. The economic factors and future trends that will affect the level of growth include: the expansion of international shipping, regional economic growth, new residential, commercial and infrastructure construction activity, changes in sludge and solid waste disposal, and the construction of the U.S. Navy Homeport in Staten Island. The industry is expected to expand by approximately 800 new jobs by the year 2000. To accommodate this projected growth, the Maritime Support Services Location Study Report (Dravo Van Houten, 1990), projects that the maritime support services will need not

only their existing facilities, but will require the addition of one nautical mile of berthing space and 40 upland acres. Large ship repair facilities are currently underutilized in the port and are expected to remain so through the year 2000. The number of shipyards may therefore be even further reduced. Although there appears to be sufficient shipyard and ship service space, tug companies, barge lines and construction companies will each need at least one new facility and the construction industries will also need 30 acres of upland for a precasting yard. Figures 3.9 and 3.10 show future locations and routes of Maritime Support Services. The Dravo Van Houten study identified **six geographic areas that are critical to the support services and must be retained for its future needs:**

1) The New Jersey side of **the Arthur Kill** currently has several maritime support industries and must be considered an important area to be retained for maritime support service growth.
2) The New York and New Jersey shores of **the Kill Van Kull,** collectively house 75% of the existing maritime support services in the Port and constitute the single most important area in the New York/New Jersey Harbor to be retained for future needs of the maritime support industry. Only a few vacant sites remain.
3) **Caven Point to Bergen Point in New Jersey** is also a significant resource for maritime support industry growth. Careful consideration should be given before allowing new non-maritime uses in this area.



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 9

CONCENTRATIONS OF MARITIME SUPPORT SERVICES

FUTURE: NO NEW AREAS OF CONCENTRATION PROPOSED

EXISTING AREAS OF CONCENTRATION

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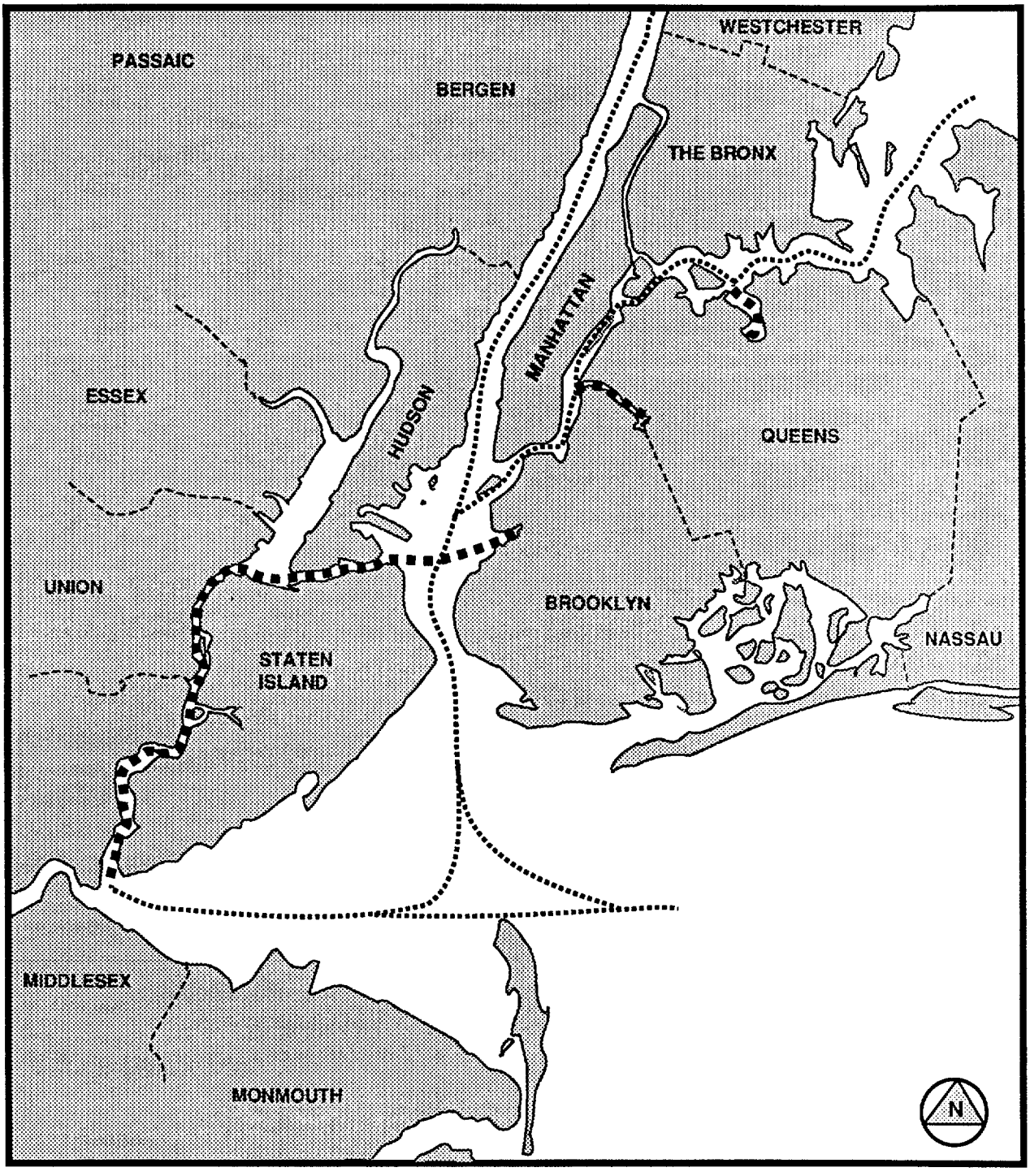
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 10
MARITIME SUPPORT SERVICES
FUTURE: NO NEW ROUTES PROPOSED

EXISTING ROUTES:

- ■■■ HEAVY USE
- ····· MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

4) **The Brooklyn shoreline from Owls Head to Erie Basin** is an area which is currently used by several support services and could, by itself, meet almost all the future expansion requirements of the maritime support services. The area is located at the center of the Upper Harbor with easy access to most of the centers of activity. It still has many of the secondary industrial links located in the adjacent industrial areas.

5) **The Brooklyn Navy Yard** already has two ship repair facilities, Westley Thomas Industries and G. Marine Diesel. Circle Line leased Pier C for vessel berthing in 1990, thus only Piers D, 6 and J remain available. Although there is little remaining industrial space, there is still some berthing space available along the piers. There are five (5) active drydocks and one (1) that is under repair.

6) **Newtown Creek**, on both the Brooklyn and Queens shorelines, is currently the location of a number of maritime support industries and, because of its industrial character, is an ideal location for new and/or expanding maritime support industries. Although there are several vacant parcels, the site preparation costs are very high (in some cases involving toxic waste clean up) making the area costly for maritime support industries.[27]

Water Dependent Uses

Between 1965 and 1978 the number of water dependent facilities **within New York City** showed declines in every facility category. However, between 1978 and 1988 the rate of decline

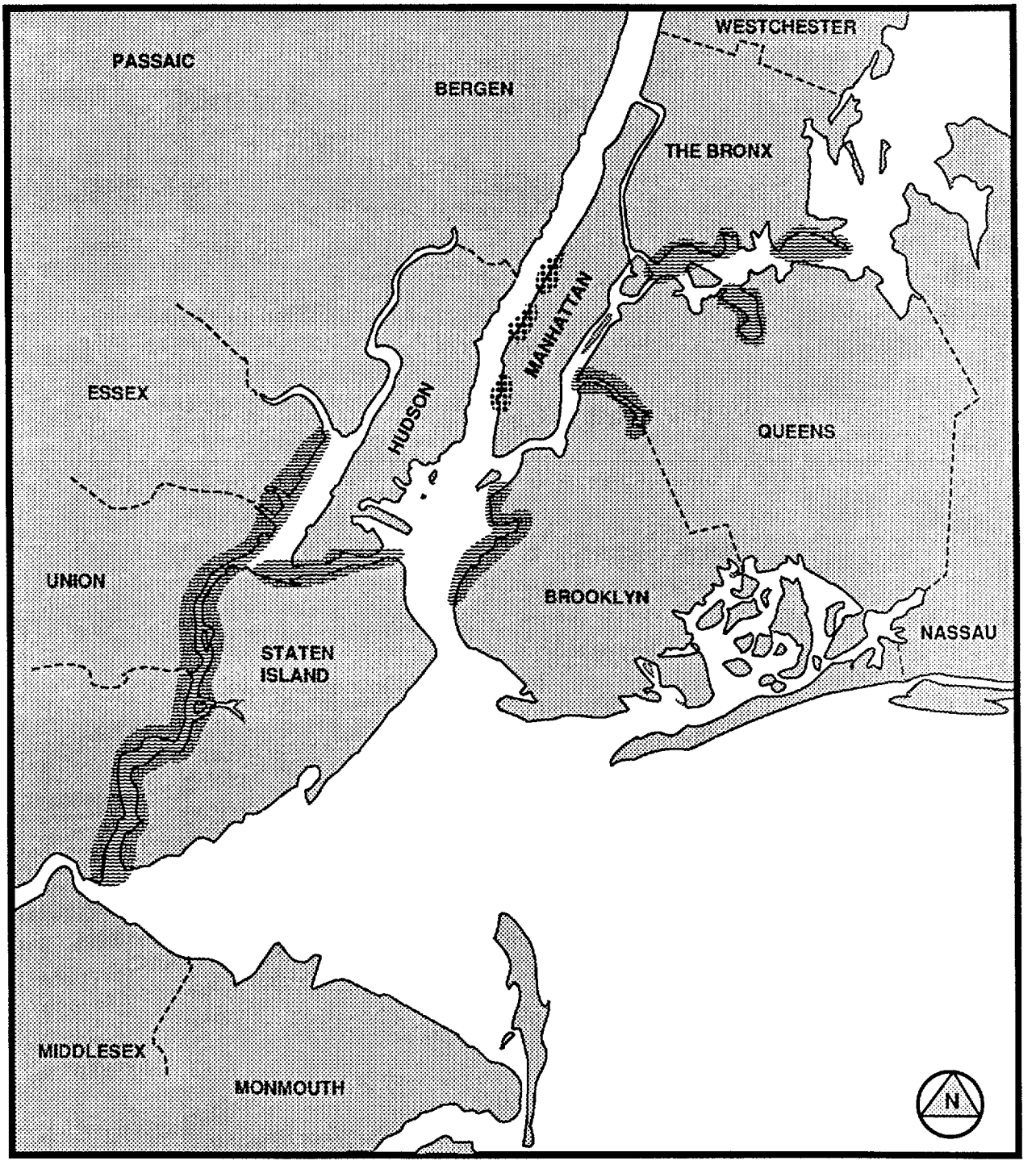
slowed with several categories actually showing increases in the number of facilities. (See Table 3.2) Within the last ten years, specific areas of strength and geographic concentration have evolved. Many new uses have opened in these areas while many of the discontinued uses have shut down outside these clusters. These areas of concentration include the Kill Van Kull in Staten Island; Port Morris, lower Westchester Creek and the lower Bronx River, in the Bronx; Flushing Creek in Queens; Newtown Creek between Queens and Brooklyn; the Buttermilk Channel area of Brooklyn; and the Brooklyn Army Terminal.[28]

New Jersey

In New Jersey, the redevelopment of a number of waterfronts, in particular along the Hudson River, has resulted in a substantial drop in water dependent uses. Although this decline may still continue in this area, it is likely that most other areas will remain in water dependent use. These areas are south of Caven Point on the Hudson waterfront, the eastern half of the Kill Van Kull (Constable Hook), the lower Hackensack River, Newark Bay, the lower Passaic River, the lower Raritan River, and the Arthur Kill.[29] Figures 3.11 and 3.12 show future locations and routes of Water Dependent Uses.

Trends

Several major future events in the New York/New Jersey region will have important consequences for the future needs of water dependent industries. Examples of these events include changes in regulations and management of waste and dredge



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 11

CONCENTRATIONS OF WATER DEPENDENT USES

FUTURE: NO NEW AREAS OF CONCENTRATION PROJECTED

AREAS OF DECREASING ACTIVITY

EXISTING AREAS OF CONCENTRATION

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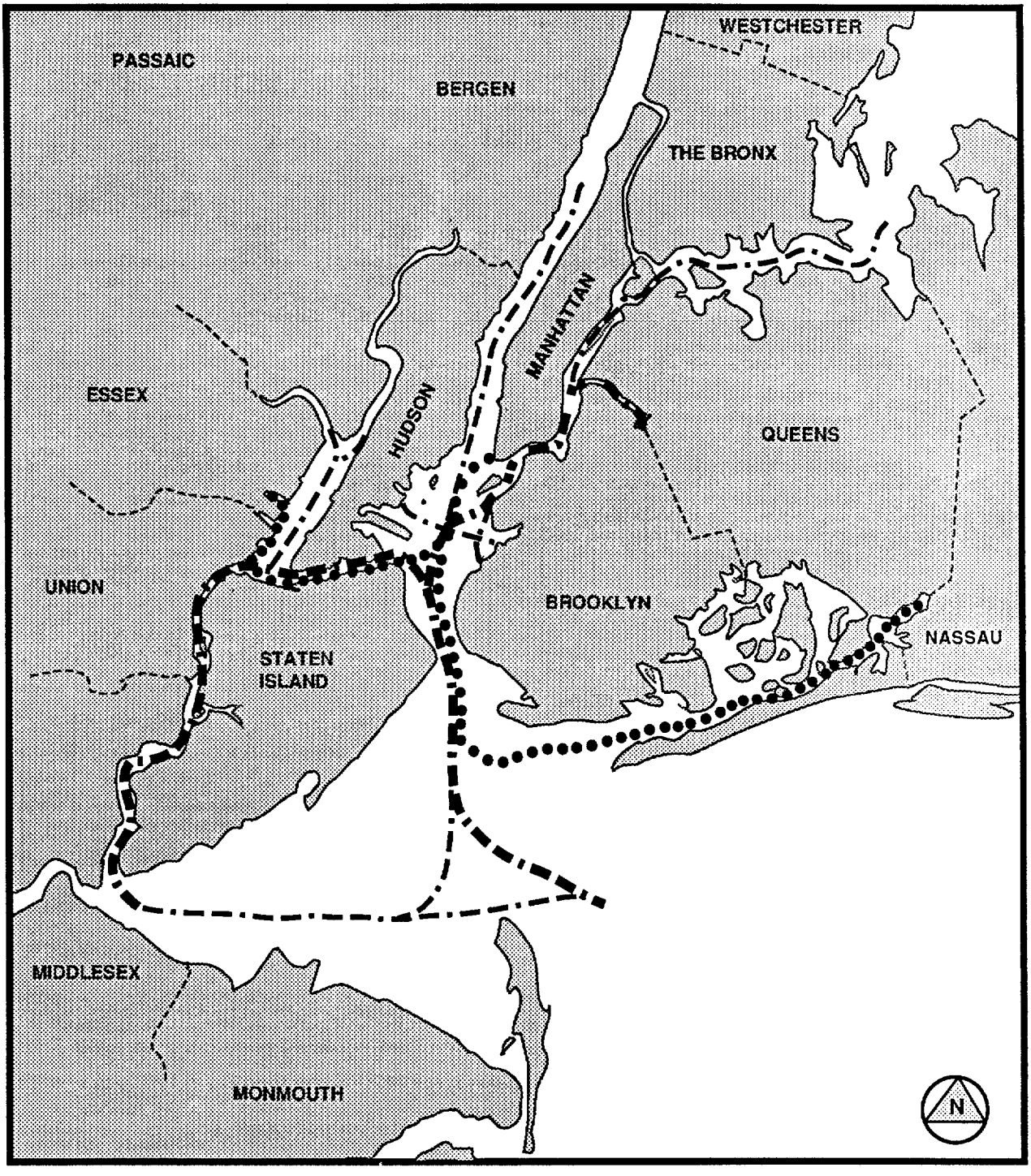
HARBOR ESTUARY
WATER USE MANAGEMENT
STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL
PROTECTION



MARITIME & INDUSTRIAL ACTIVITIES CHAPTER 3 FIG. 12

WATER DEPENDENT USE ROUTES

●●● FUTURE: POTENTIAL TIME SENSITIVE CARGO FERRY ROUTE

EXISTING ROUTES
▬▮▮ HEAVY USE
▬·· MODERATE USE

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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spoils; changes in the location and the federally mandated phasing out of the sludge dump; the closing of the Fresh Kills Landfill, the construction, operation and repair of vessels related to the Navy Homeport; the expansion of several waste water treatment plants; the construction and operation of the proposed resource recovery plants; the construction and rehabilitation of major roadways in both New York and New Jersey; and proposals for major new developments in both New York and New Jersey.[30] Projections for several facility categories are as follows:

Most of the subcategories of **industrial oil** such as crude petroleum, gasoline, jet fuel, kerosene and fuel oil are projected to increase only slightly by the year 2000. Most oil facilities are now located along the Arthur Kill, the west side of Newark Bay and along Newtown Creek. There is likely to be little change, in either New York or New Jersey, in the number of facilities in this category as the physical infrastructure commitment (i.e. tanks) of the oil facilities and the cost of their removal makes them less vulnerable to redevelopment pressures.

The location of a Petroleum Industry Center for oil spill clean up developed by the Petroleum Industry Response Organization (PIRO), while adding to the number of vessels stationed in the Harbor, may decrease the time waterways are currently closed during oil spill cleanup.

Government Uses

Government uses are expected to show a slight increase through the year 2000. The U.S. Navy Homeport proposes bringing seven war ships and approximately 10 service and shipyard craft into the port. Because of national security measures, waters around the Homeport will be closed to all other vessels. The waterborne Police and Fire units are not expected to increase. Some growth in Coast Guard personnel has been recommended in relation to the VTS program.

Sludge

While exhibiting a nearly 40% increase in the number of sludge facilities between 1978 and 1988, sludge hauling in both New York and New Jersey is likely to decrease dramatically by the mid-1990's as ocean disposal of sludge is prohibited. However, intra-Port sludge movement for sludge dewatering and sludge processing will require continued barge activity. As a result, it is likely that barge movements will remain constant into the near future. The location of sludge processing and disposal facilities is still undetermined.

Solid Waste

The current movement of solid waste from marine transfer stations in New York to the landfill at Fresh Kills on the Arthur Kill in Staten Island and Edgemere in Queens will change when these landfills are closed by about the year 2000. Some refuse is scheduled to be burned at waste-to-energy plants and barge movement of solid waste to and from waste-to-energy plants is likely. In addition, the new recycling mandates in the New York Metropolitan region will provide for the possible development of new transfer, processing, and remanufacturing

facilities. Locations have not yet been selected. Although the routes will change, much of the movement of materials to and/or from these facilities will be done by barge. It is, therefore estimated, that approximately the same number of barges currently used for solid waste movements to Fresh Kills will be used for inter-and intra-Port solid waste transport. In New Jersey solid waste is currently not moved by barge.

New Water Dependent Industries

In addition to changes in the number of facilities and land area needed for current water dependent industries, a number of new, water dependent industries are likely to require waterfront sites. While additional study is needed to determine exactly which new water dependent industries could locate in New York City, examples of two viable industries are as follows:

Time Sensitive Cargo Ferry

Waterborne overnight package delivery between the New York/New Jersey Region's office centers and airports could eliminate some highway transport uncertainties. High speed ships would require docking locations near business centers. These vessels, which depend on speed in order to be economically viable, would be traveling from Kennedy, La Guardia and Newark Airports through Jamaica Bay, the Upper East River, Newark Bay and the Kill Van Kull. These areas already experience a great deal of cargo movement and a considerable amount of recreational vessel use.

Newsprint Shipping

Recent reports suggest that water transportation could soon become a primary mode for newsprint imports if adequate sites are located and/or

preserved along the waterfront for newspaper printing facilities.[31]

In both instances, since the distribution terminals for these uses would require industrially zoned land, it is anticipated that the new facilities would be located in areas of already existing water dependent uses or industrial concentration.

FUTURE PROBLEMS AND CONFLICTS

Most current problems relating to cargo, maritime support and water dependent industry vessels will continue. Although tonnage handled by existing cargo terminals, both container and break-bulk is expected to increase, the number of vessels is projected to remain constant. The increased size of vessels will, however, present several new potential conflicts. 1) The larger ships will have even less maneuverability. 2) Ships will require higher speed to maintain steering capability. 3) The vessels will require a larger anchorage area in the Lower Harbor. 4) The deeper draft of these vessels will require that they lighter their materials more often than is currently required. 5) The dredging of the navigable channels that will be required to accommodate the larger vessels will in itself, congest these waterways.

The introduction of high speed, time sensitive cargo ferry operations may also result in new conflicts because of the importance of speed in making these vessels financially competitive. In addition, these high speed vessels may be docking

at locations near the business centers that are already congested with other vessel movements.

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CHAPTER 4: FERRIES

Passenger ferries have always been an important water use of the New York-New Jersey Harbor. While the number of routes and ridership have risen and fallen over the past two centuries, current and future trends point to an increasing number of ferries on the harbor. Understanding the operation of ferries is especially critical in addressing the large safety issues arising from vessels carrying up to several hundred passengers in a variety of weather conditions and sharing the Harbor with a number of other uses.

This chapter will focus solely on passenger carrying vessels. Freight, cargo and rail ferries are considered within the Maritime and Industrial Activity chapter.

FERRY HISTORY

Ferry service in New York dates back to the earliest European settlements in the area. Ferries often provided the sole connection for transportation and commerce, linking islands and crossing rivers. The first ferry in the region, in 1641, crossed the East River from lower Manhattan to Fulton Landing, Brooklyn. By the 1660's, ferry connections between Manhattan, New Jersey and Staten Island were established.

Many of these ferries established routes that were later to form the major corridors of the city's fixed transportation network. Bridges and tunnels constructed in later years traveled the paths of

original ferry routes. Examples include the Brooklyn and Williamsburg Bridges linking Manhattan and Brooklyn, the Whitestone Bridge linking the Bronx and Queens, and the Holland Tunnel linking Manhattan and New Jersey.

The early ferries were either sail or human powered. The introduction of steam power in the early 19th century allowed ferry travel to become more swift and reliable. During the first half of the 19th century ferry operators remained small and independent, with little revenue to expand or refurbish. Most ferries combined passenger movement and goods movement, creating a situation where pigs, cows and people all traveled together.

By the middle of the 19th century, the railroads, rapidly becoming large, successful businesses, discovered that ferries could be used as a part of an intermodal transportation service, thereby expanding rail distances. As railroads began to control ferry lines, investments were made in technology, passenger comfort and terminal design. Over the next few decades five major rail/ferry centers emerged at Hoboken, Weehawken, Jersey City and Pavonia. From them, passengers sailed to terminals in midtown and lower Manhattan, and Brooklyn. Although originally conceived as long distance freight carriers, within a decade of establishing rail/ferry connections, the railroads were carrying commuters via their ferry terminals into Manhattan.[1] Manhattan had at least twenty separate passenger ferry locations with connections to all of the future outer boroughs and New Jersey. Several hundred river crossings occurred daily.

Bridge construction signaled the slow decline of ferry use where bridges traversed the paths of early ferry routes. The 1883 opening of the Brooklyn Bridge allowed travelers to journey without changing transportation modes to and from Brooklyn and Manhattan, spurring an extraordinary construction and population boom in the former.

The most dramatic fall off in ferry ridership occurred in the 20th century. The subway tunnels linking Brooklyn, Queens and the Bronx with Manhattan displaced ferries as passengers selected more convenient modes of transport. The Trans-Hudson ferries witnessed sharp declines in ridership with the construction of the Hudson and Manhattan tubes (PATH) and Pennsylvania Railroad Tunnel, followed by the Holland Tunnel (1927), the George Washington Bridge (1931) and the Lincoln Tunnel (1937). By the end of World War II there were no East River ferries in operation and, in 1967, the last Hudson River ferry, from Hoboken to Barclay Street, stopped operating. From 1967 to 1986, the only ferries in New York Harbor were the Staten Island and Governor's Island Ferries.

FERRIES - PRESENT CONDITIONS

The return of private ferry service in New York began in 1986, with the issuance of the New York City Waterborne Transportation Policy Statement. Bridge and tunnel congestion, a resurgent interest in residential and commercial waterfront development, and operator interest due to the availability of offshore oil boats as inexpensive equipment, led the City's transportation planners

to reexamine the waterways. The goals and objectives contained within the Policy Statement reflect these changing conditions:

- transport passengers in a safe, reliable and efficient manner;
- facilitate access to and within the city, or to recreational areas;
- reduce the number of motor vehicles entering Manhattan;
- enhance the development of the city's waterfront;
-integrate easily into the existing transportation system.

The Waterborne Transportation Policy Statement encouraged private, unsubsidized ferry operations which would not compete with existing mass transit. The New York City Department of Transportation began issuing permits to private companies for ferry routes, both intra- and inter-state, usually with Manhattan as the final commuting destination. Additionally, the City also provided improved docking facilities for ferry landings.

Ferry Studies

The recent growth in the ferry industry has given rise to several publicly funded studies. Two of these studies have been conducted by the New York City Department of City Planning and relate to landside access at potential ferry stops. The first study, entitled Improving Landside Access for Ferry Services(1987), examined criteria for the establishment of a ferry terminus. The second report, Landside Opportunities for Expanded Ferry Service(1990), selected sites and described the feasibility of developing each. The objectives of

these studies complement the original Policy Statement. They identify opportunities for improving private ferry services that serve the travel needs of commuters and tourists;[2] and develop a framework for the establishment of additional privately operated ferry services.[3]

A third study being conducted by the New York City Department of Transportation, Bureau of Transit Operations, Private Ferries Operations, is entitled An Assessment of the Potential for Ferry Services in New York Harbor. This study follows upon other studies in analyzing the operational and financial viability of several new routes, with special attention to those that may capture a portion of the current auto commuter market.

The fourth study, produced for the New Jersey Department of Transportation, is entitled Hudson River Waterfront North-South Ferry Study(1990). The purpose of the study, given the large number of New Jersey waterfront developments, was to determine "whether, when, how and to what degree ferries might also play a role in satisfying intrastate waterfront oriented travel demand."[4]

These studies, several of which are federally funded, are expected to continue the public encouragement of private ferry operations.

As previously noted, contemporary operators were initially attracted to the ferry business by the availability of inexpensive crew boats resulting from the depression in the Texas oil industry. These boats were used by the industry to transport

work crews to offshore oil rigs. Retrofitting them for use as ferry boats was also relatively inexpensive.

Many developers regarded the ferries as a tremendous asset to their waterfront property. Among the first operators was Arthur Imperatore, president and owner of Arcorp, who incorporated ferry service as part of his plan to develop two miles of New Jersey waterfront across from Manhattan. His ferry run, linking Weehawken with West 38th Street, offers parking and connecting bus or van service to midtown. Walter Mihm, a real estate developer and owner of a 256 acre development in Port Monmouth, New Jersey, is another operator, connecting his site by ferry to Pier 11 near Wall Street.

While crew boats were inexpensive, they generally lacked comfort and speed. Maximum speed was approximately nineteen knots, making it difficult to provide long ferry runs. For this reason many of the newer entries to the ferry roster have used much more advanced transportation technology. Greatly improved conventional monohulls as well as twin-hulled catamarans are the latest additions to the Harbor. These ships travel at much higher speeds than the crew boats. Obtaining speeds of up to 50 mph, long ferry routes can become much more time efficient and provide a more comfortable ride. The former is not always the case. For example, last summer, an advertised run from East 34th Street in Manhattan to Ocean Bay Park on Fire Island hoped to transport passengers in under two hours. In reality the trip time actually took

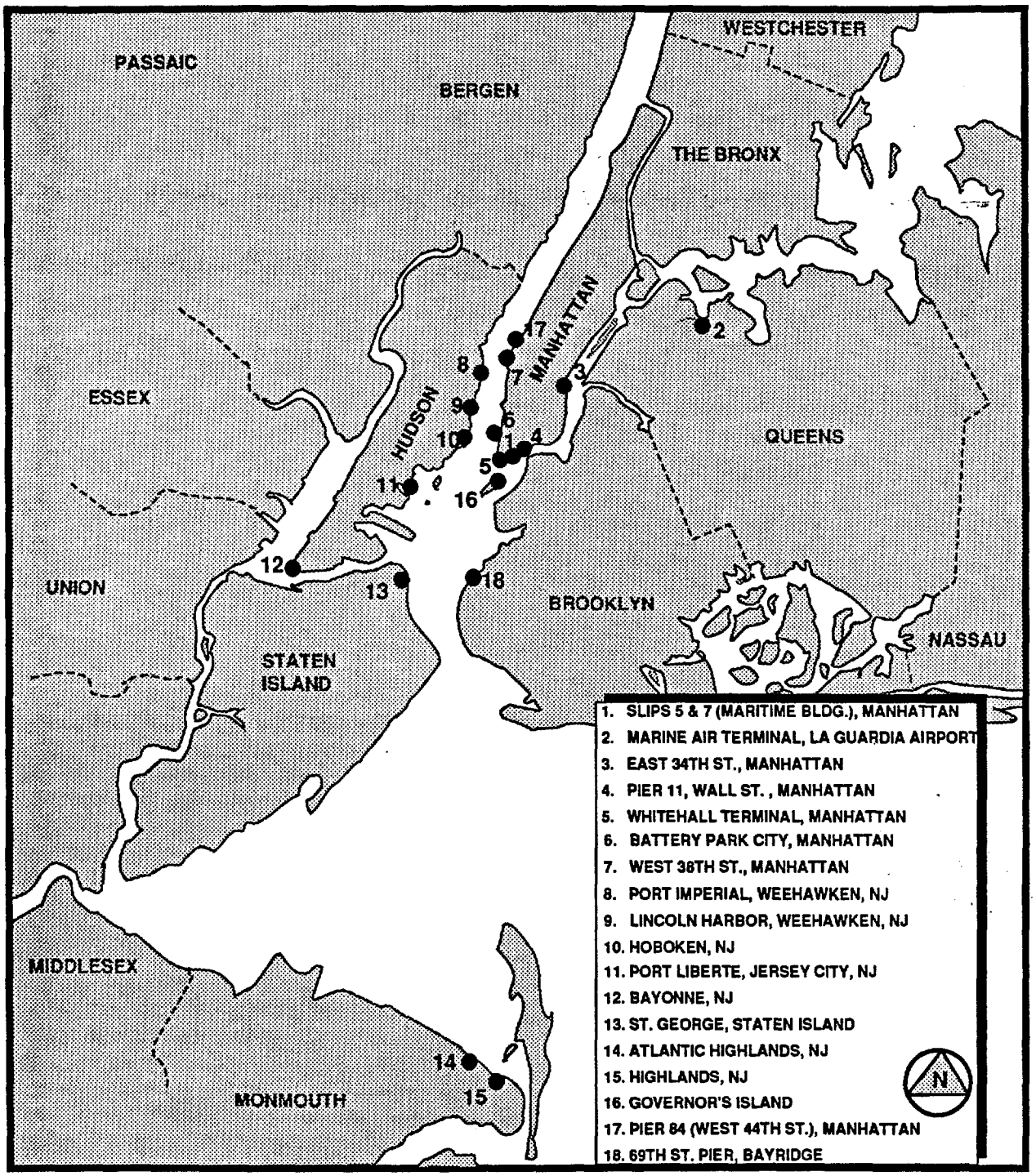
three hours. The real attraction was that the ferry provided a much more scenic trip and guaranteed the passengers would not be stuck in traffic. While alternative means of transportation for this trip may take a similar amount of time, most require mode changes, which the ferry does not.

The return of commuters is critical to the resurgence of ferries. Public encouragement of private operations must come simultaneously with an increase in demand. Given vehicular traffic congestion and the number of new waterfront developments along both the New Jersey and New York City waterfronts, a strong market has developed. For many of the routes the destination time may be comparable to other modes of transit or automobiles. However, at least in the case of automobiles, destination time can vary widely, whereas ferry times are much more predictable. The cost of ferries as a mode of transit is usually comparable with express buses, which have higher tariffs than non-express transit yet are still subject to congestion problems.

Existing Routes

There are currently 11 ferry routes within the New York/New Jersey Harbor, carrying an average daily weekday ridership of over 13,000 passengers.(See Fig 4.1 and Fig.4.2.) Table 1 shows the majority of existing routes connecting with Pier 11 at Wall Street (though this landing site does not necessarily receive the most passengers).

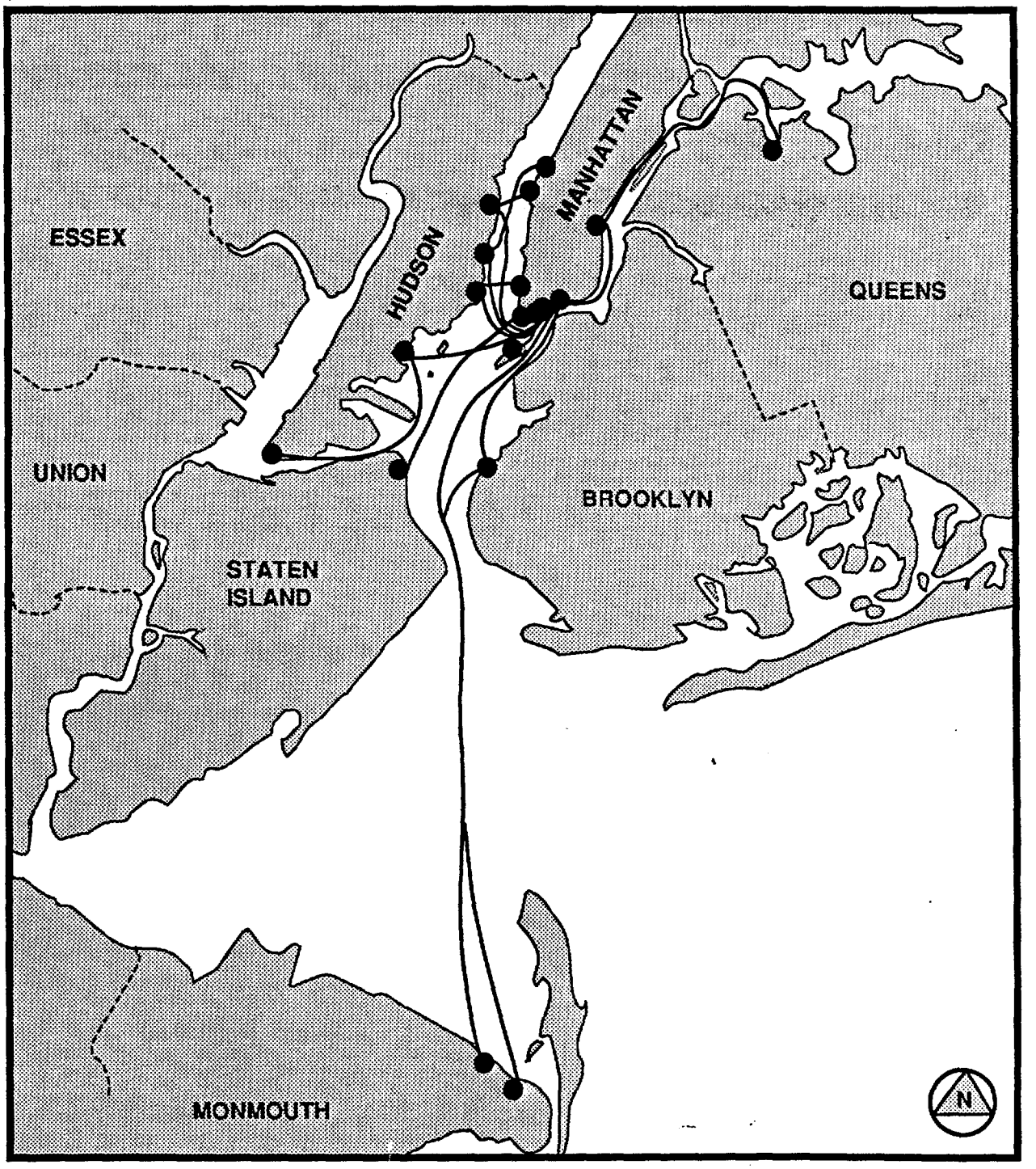
Quite naturally, most of these ferry runs are made during peak commuting hours in the A.M. with



FERRIES CHAPTER 4 FIG. 1

● COMMUTER FERRY DOCKING SITES: EXISTING

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



FERRIES CHAPTER 4 FIG. 2

COMMUTER FERRY ROUTES: EXISTING

NEW YORK / NEW JERSEY
HARBOR ESTUARY
WATER USE MANAGEMENT
STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL
PROTECTION

TABLE 4.1 DESTINATION FERRY ROUTES

ORIGIN	PIER 11, WALL STREET, MAN., NY	EAST 34TH STREET, MAN., NY	PIER 78 W. 38TH STREET, MAN., NY	SLIP 5,7 BATTERY MARITIME BLDG, MAN., NY	BATTERY PARK CITY, MAN., NY	WHITEHALL TERMINAL SOUTH FERRY, MAN.,NY	Pier 84 W.44th St. Man.,NY
69TH STREET PIER BAY RIDGE, BKLYN., NY	X						
MARINE AIR TERMINAL LAGUARDIA AIRPORT, QUEENS, NY	X	X					
HIGHLANDS, MONMOUTH, NJ	X						
ATLANTIC HIGHLANDS MONMOUTH, NJ	X						
PORT LIBERTE,HUDSON,NJ	X						
BAYONNE HUDSON, NJ	X						
PORT IMPERIAL WEEHAWKEN, HUDSON, NJ			X	X			
HOBOKEN,HUDSON, NJ					X		
GOVERNORS IS., NY				X			
ST. GEORGE, STATEN ISLAND, NY						X	
LINCOLN HARBOR, WEEHAWKEN, HUDSON, NJ				X			X

reverse runs in the P.M. For this reason, ferry use is very time sensitive, though a certain amount of ferry movement is done off peak. This latter movement comes in two forms, the movement of the vessels to their overnight or midday mooring locations, and the evening use of some of these boats for alternative activities, as harbor cruises, or private charter. These uses are discussed in detail within the commercial boating section of this report.

FUTURE CONDITIONS

The number of people using ferries to commute has been increasing.[5] (See Fig. 4.3.) In the future, more commuters will be choosing ferry service for several reasons: first, overall population growth in the region is expected to bring more commuters into Manhattan and between various parts of the harbor. Second, more reliable and more competitively priced service will be made available through technological improvements. Third, existing transportation infrastructure is at capacity, deteriorating, and not likely to expand. Finally, more ferry landing sites will probably become available for private ferry operators to provide service. Predictions concerning number of ferry routes can be inferred from analysis of factors encouraging demand for ferry service, routes and access.

Watertaxis

While the same conditions which make ferry service an attractive transportation option will also make watertaxis a possibility, they have not been investigated here. There has been no public demand

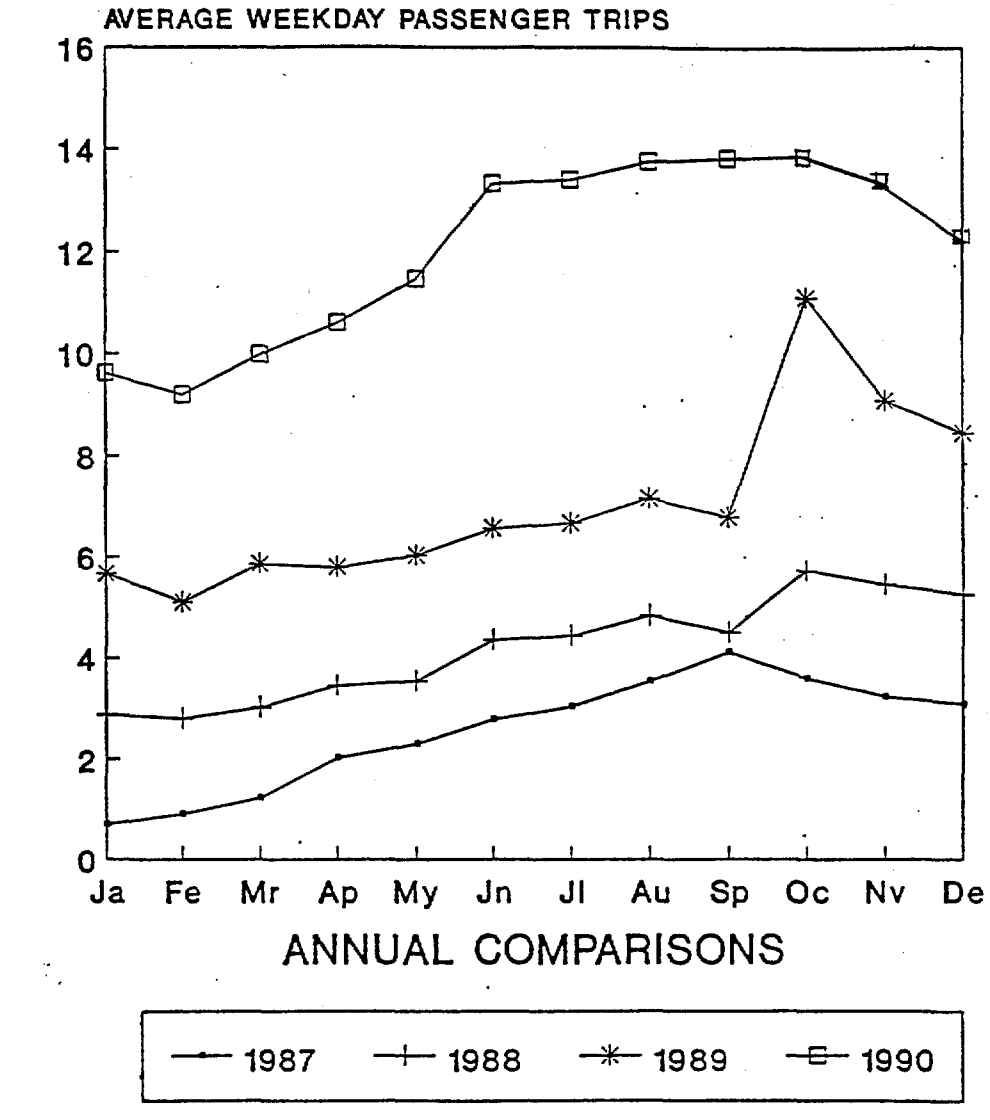


Fig. 3.

Source: Peter Hallock, New York City Department of Transportation, Bureau of Transit Operations, New York, 1990.

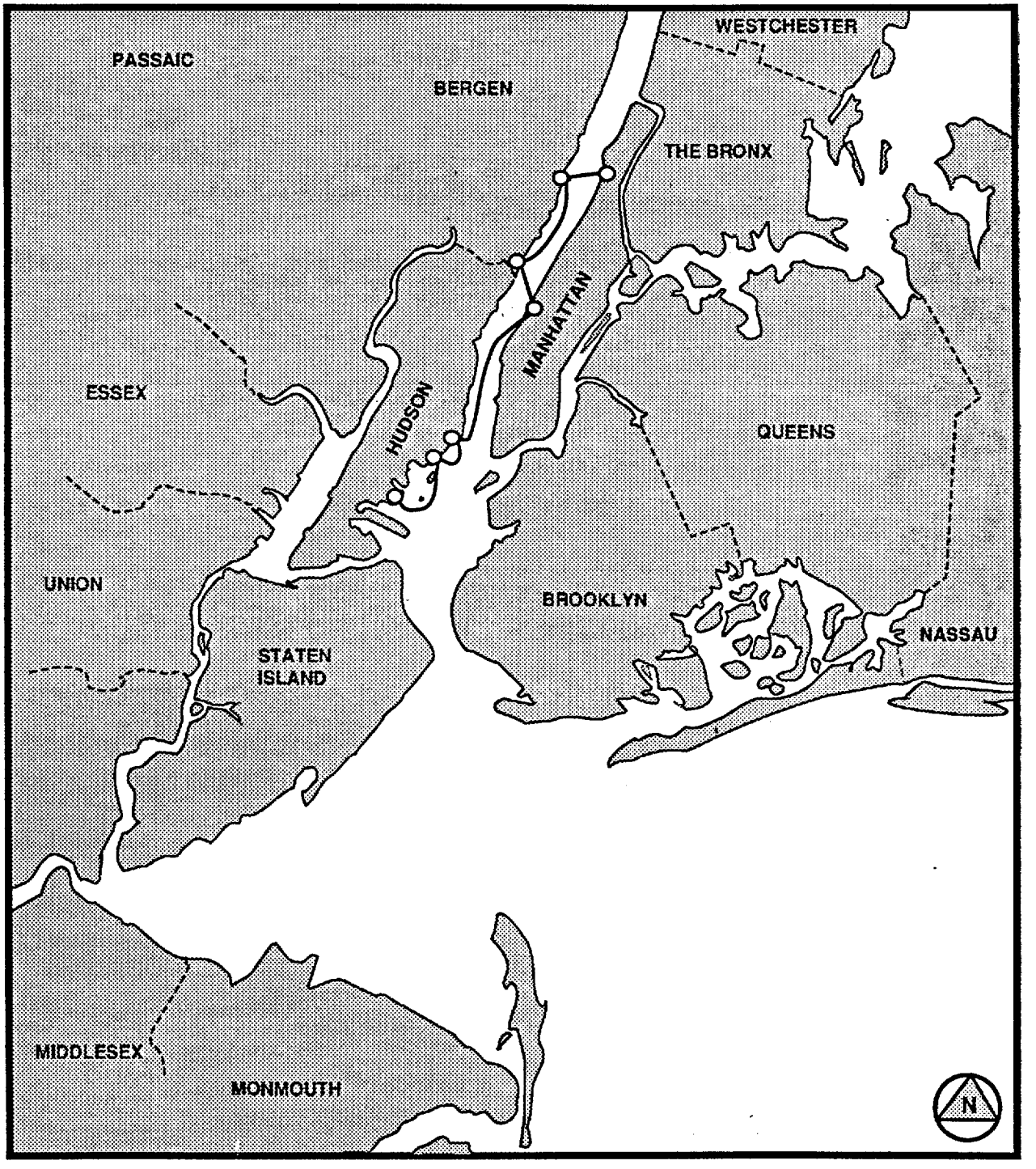
for this type of transportation nor has there been any private sector initiatives. The projected costs of operation has made it prohibitive. It is not considered to be a viable transportation option now or in the immediate future. For the majority of commuters, the high fares the watertaxi operator would have to charge would eliminate most of the public from using them. If watertaxi service overcomes these economic barriers, it will probably occur in waterfront areas which have not been cut off from populated areas by either highways or parks. Watertaxis would probably operate between mixed used developments proposed throughout the harbor, such as Hunters Point, Queens and the New Jersey side of the Hudson River.

While watertaxi services will not be prevalent use in this harbor, they have recently been considered by the New York Parks Department as a way to link waterfront parks.[6] These proposed watertaxis or water shuttles would utilize a smaller vessel carrying 12 to 30 people. Meanwhile, the use of hovercrafts in creating waterfront park linkages in New York-New Jersey Harbor, might allow immediate commencement of services. For example, the Gateway National Recreation Area Park in Jamaica Bay, Staten Island and Sandy Hook could be joined without disturbing the existing habitats and without any immediate infrastructure improvements. Finally, growth of ferry service may be affected either positively or negatively by the possible addition of watertaxis, especially the use of hovercrafts which appear to be an ideal vessel for use as watertaxis.

Increasing Commuters

The existing demand for ferry service is projected to increase. The rise in ferry commuters can be expected to be a function of the increase in the number of people residing in areas surrounding the harbor. National population growth predictions for the next 20 years conclude those counties with the largest gains in population will be primarily in suburbs of the largest cities. Consequently, the peripheries of transportation routes in New York are expected to be among the fastest growing areas. The city has experienced significant intercoastal growth. With increased population, there is also the expectation of continued suburban sprawl.[7] This sprawl will mean the existing transportation infrastructure will be further burdened with more commuters traveling not just to Manhattan for work but to various locations throughout the area. Wherever the region's waterways offer viable ferry transit alternatives, ferry service, spurred by development, will grow as a result of the increased number of commuters.

The numbers of commuters will be closely tied to projected population growth areas. While Manhattan will continue to have the largest number of jobs and therefore generate the most commuters, new developments in other areas of the harbor will emerge as destination and origin points for commuters. (See Fig. 4.4) Location and policy will encourage many of the proposed new developments to include ferry service as a logical means of transit and to mitigate the developments impact on the existing infrastructure. In addition, ferry routes will likely involve more than one stop during rush hours.



FERRIES CHAPTER 4 FIG. 4

POTENTIAL FERRY ROUTE CONNECTING NORTH/SOUTH POINTS

SOURCE: NEW JERSEY DEPARTMENT OF TRANSPORTATION
PREPARED BY PARSONS BRINKERHOFF

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

Existing Infrastructure

Even without the projected development along the shoreline and the expected increase in population, the condition of existing roads, bridges and public transportation is expected to continue to deteriorate. The New York City Department of Transportation (NYCDOT) found 56 percent of the 842 city owned bridges to be "structurally deficient"- no longer strong enough to carry loads for which they were designed. It appears that over the next ten years several bridges may have to be closed.[8] Mass transit systems throughout the region are near or at capacity. Subway commuters already encounter lines operating at capacity, especially in areas of Queens connecting to Manhattan. Meanwhile, those who use express buses or commute by automobile face severe highway congestion. Any new funds allocated for roads bridges and subways will probably be spent on repair and maintenance, not expansion.

The effective guidance and support of public agencies is mirrored in the successful establishment of new services. The level and concentration of services in turn may signal the potential for congestion and conflict and need for improved Harbor traffic control.

Regulations

While the demand for ferries will increase, the entry rate of new ferry operators will depend on the impact of government regulations and subsidies in fostering or inhibiting service. Presently, no direct subsidies are available. The indirect support now existing for some ferry landing sites represents those agencies controlling and developing their own piers.

The Port Authority of New York and New Jersey and the New York City Department of Ports and Trade own or operate many of the proposed ferry landing sites. As publicly owned piers are no longer needed for industrial uses, such agencies can make them available to private ferry operators. Unless ferry operators have sufficient capital to develop these sites, the growth of ferry service in several areas of the harbor will be limited by the fiscal ability of Ports and Trade and the Port Authority. Barring the need to offer emergency alternatives to infrastructure closures, as with the Williamsburg Bridge, it may be difficult to justify public investment in a ferry landing site that may not be profitable, especially during a weakened economy.

Ferry service is viewed as a way to attract automobile commuters out of their cars. Reducing the number of private automobiles in the city will help to be reduce air pollution and traffic congestion. Recent policy and structural changes in the transportation agencies seek to promote the integration of ferry service with the existing infrastructure. Whether these are as of yet being realized is unclear. In general, ferry service will not be competing with existing subway and train systems unless those systems are at capacity. Through their respective review and approval processes, both states encourage mass transit as the alternative for automobile commuters. New Jersey accomplished this goal via the State Department of Environmental Conservation's issuing of Waterfront Development Permits (WDP).[9] This is mirrored by the New York City Department of City Planning administered Waterfront Revitalization

Program (WRP). Through the continued aggressive use of the WRP approval process every major project along the shoreline in New York City will be reviewed for consistency with requirements concerning potential landing facilities.

Likewise in New Jersey, the waterfront development permits will be required for new ferry landing sites. Those areas where ferry service is appropriate will have to meet WRP and WDP policies advocating water dependent uses and public access. For example an applicant proposing a residential development or a marina development may also be encouraged to include a ferry landing site in the development plans when being reviewed for WRP consistency approval. (The New Jersey equivalent to New York City WRP approval process is in Chapter 7E of New Jersey Administrative Code entitled Coastal Resource and Development Policies.)

In addition, the United States Army Corps of Engineers provides an indirect support through their removal of dilapidated piers and obstructions and administering dredging permits, enabling once unstable waterfront spaces to function as ferry landing sites. While the Army Corps is not mandated to promote ferry service it does so by creating a better environment for all vessels, including ferries.

Operations

Besides the availability of adequate landing sites, ferry route permits require ferry operators to have contingency plans for vessel breakdowns. This is to insure that the ferry operator provides consistent service (and avoid unnecessary schedule

interruptions) critical to developing an adequate customer base. The more trips provided during peak commuting times the more likely an operator will attract the necessary numbers of passengers to become profitable.

An aspect of the NYCDOT ferry permit which could limit the growth of ferry service is the one year permit limitation. Presently, having made a substantial commitment of capital, a ferry operator has no guarantee that when their permit expires, the same route and access to certain piers at specific times will be renewed. An operator seeking a longer franchise period needs New York City Council approval. Expanding the length of the ferry permit thus becomes an important investment incentive.

Operators now have two options available to increase ferry ridership. They can operate their own bus or van service and not charge an additional fee for the bus or they can make a request to the Port Authority, the Metropolitan Transportation Authority(MTA) or New York City Department of Transportation(NYCDOT), for modification of an existing bus route or the creation of a new one. At this time, the MTA takes six months to a year to evaluate a request for change of service. For a new ferry service, this could be the deciding factor on whether the service is successful.

In New Jersey, the Port Authority is investigating development of an integrated fare system, enabling commuters to pay one fare for several types of mass transportation, thus eliminating their need to

purchase a ticket every time they change to a new transportation mode. For example, a commuter could easily switch from a ferry to a bus.

The recent reorganization of NYCDOT placing Private Ferry Operations under the direction of the Division of Surface Transit is expected to contribute to future ferry service success. This coordination could consist of changing an existing bus route to make an additional stop at a pier at a certain time or actually developing new bus service to specifically link new ferry service.

Technology

In the future, experts envision new high speed ferries becoming prevalent in the harbor. These high speed ferries will meet the demand of those commuters traveling longer distances necessitating faster, reliable, consistent trips. Through use of a catamaran type hull, these vessels can easily achieve speeds of 30 knots (where allowed in the study area), twice as fast as the converted crew boats currently used by the majority of ferry operators in the harbor. They can carry over 300 passengers and allow ferry operators to charge competitive fares with other modes of transportation. It is expected in areas such as Atlantic Highlands, New Jersey and Breezy Point, Queens will attract more of these long distance commuters because the existing ground transportation infrastructure is overloaded and involves long travel times.

Another significant improvement in ferry transportation which may be operating within the study area soon is the introduction of amphibious

hovercraft vessels into the harbor. While their unique features have not been considered in any recent studies concerning the suitability of a particular site as a hovercraft ferry landing site, one is scheduled to begin operating within the Harbor in 1991.

The hovercraft generates a cushion of air and is propelled by rear mounted fans behind it.(See Fig.4.5.) These features allow it to: travel above water (at 50 knots), onto land, over objects such as ice and large logs in the water, to have excellent maneuverability, to be fuel efficient, land without piers, and to be easily maintained. Hovercraft use also allows travel in areas of the harbor that other types of ferries cannot go such as shallow, environmentally sensitive areas.[10] Somewhat disquieting, noise from the two large propellers may be a problem.

FUTURE FERRY LANDING SITE LOCATIONS

While the majority of commuters using ferry service will continue to be those destined for Manhattan, including those using new landing sites, service may also develop in a north/south direction along the New Jersey side of the Hudson River.[11] Still another projected growth area will be from Staten Island directly to the Jersey side of the Hudson River. Conservative estimates suggest the number of ferry routes could easily double in the next five years even if the present recession continues.

Several constraints that have inhibited private

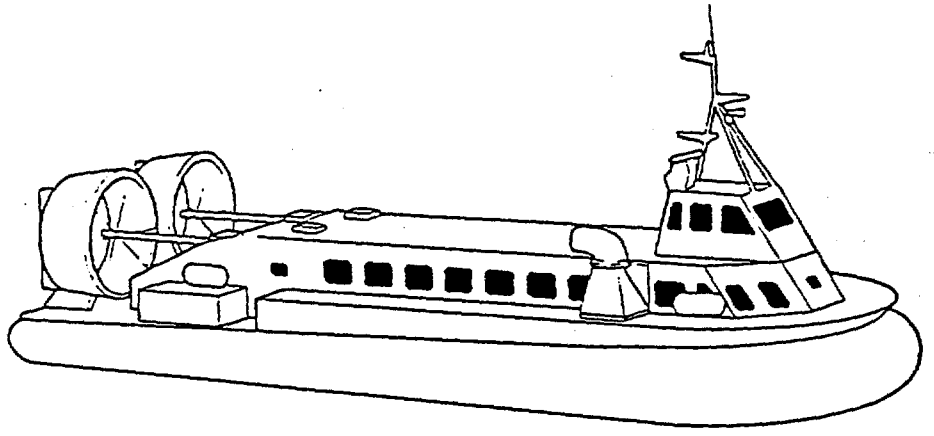


Fig. 5. An illustration of a British hovercraft which is currently used as a passenger ferry in the English Channel.

Source: "Hovercraft and Your Community," British Hovercraft Corporation, East Cowes, lsle of Wight, England, February 1990

ferry service will be eliminated thus allowing for even more ferry routes to be developed.[11] The operation of ferry service should become more cost effective as ridership increases on the shorter commuting routes and longer routes become economically feasible through the use of high speed ferries. Concurrently, numerous short distance routes will develop, especially along the Hudson, as piers are made available through the government improvements and through new waterfront development. Longer routes will become more attractive as automotive commuting times to Manhattan and throughout the region increase along with toll and fuel costs. This growth will be propelled as more fuel efficient faster vessels, such as high speed catamarans and hovercrafts, are incorporated into ferry operations.

The following list and maps (See Figs.4.6 - 4.8.) illustrate sites which could become a ferry landing site because of any combination of these factors: They serve an existing market; create a new market through development; and/or require little physical improvements to begin service immediately.

POSSIBLE FUTURE FERRY LOCATIONS[12]; NEW YORK CITY, WESTCHESTER, LONG ISLAND,[13] NEW JERSEY[14] AND SURROUNDING AREAS

Manhattan - Hudson River

- Battery Park City; Pier A
- West 30th Street Heliport
- 42nd Street Terminal
- Trump City (Proposed Development)

- 72nd Street
- 79th Street Boat Basin
- Harlem on the Hudson, 125th Street

Manhattan-East River

- Piers 9-13(Expansion of Pier 11 Terminal).
- East 28th Street Park
- East 63rd Street
- East 78th Street
- 107th Street Pier

Brooklyn

- Canarsie Pier
- Mill Basin
- Sheepshead Bay
- Toys-R-Us, Bay 44th Street
- Brooklyn Army Terminal, 65th Street
- Red Hook
- Brooklyn Piers and Fulton Landing
- North 5th to North 11th Street,Williamsburg

Bronx

- Orchard Beach
- Marina Del Ray, Shurz and East Tremont Ave.
- Ferry Point Park, Westchester Creek

Queens

- Point Little Bay adjacent to the Throgs Neck Bridge, Powell's Cove Blvd.(Proposed Development)
- Worlds Park Fair Marina/Shea Stadium, Flushing Meadow Park
- 44th Street Pier, Long Island City Hunters Point (Proposed Development)
- Breezy Point

- Arverne (Proposed Development)

Staten Island

- St. George Seaport (Proposed Development)
- Alice Austin Park Area
- Great Kills
- Prince's Point

Long Island-Nassau County

- Inwood
- Port Washington
- Glen Cove

New Jersey

- Old Ferry North, Edgewater
- Old Ferry South, Edgewater (Proposed Development)
- Renaissance Square Edgewater (Proposed Development)
- Stevens Castle Point Hoboken (Proposed Development)
- Exchange Place, Jersey City (Proposed Development)
- Elizabeth Port Marina, Elizabeth
- Harbortown, Perth Amboy
- South Amboy Redevelopment Parcel, South Amboy
- Keyport
- Point Atlantic, Keansburg

FUTURE FERRY LANDING OUTSIDE OF STUDY AREA WITH DESTINATIONS INSIDE STUDY AREA

- Greenwich, CT
- Norwalk, CT
- Stamford, CT
- Rye Playland, Rye, NY

- Mamaroneck, NY
- New Rochelle, NY
- Tarrytown, NY
- Rockland Lake State Park, NY
- Nyack, NY
- JFK Marina, Greenwood, NY
- Yonkers, NY

PROBLEMS\ CONFLICTS

As ferry operators attempt to meet demand they will be expanding their schedules. Maintaining these schedules will become increasingly difficult as operators provide more trips and\or faster service. Time pressures will continue to discourage ferry operators from slowing down or altering their course in heavily traveled shipping channels or densly populated recreational boating areas of the harbor. This may create problems resulting from ferries creating wakes and possibly cutting off other types of vessels when attempting to maintain their expanding schedules. With increased density of ferries at certain landing sites, crowding during peak commuting times may occur. Especially, when a delayed ferry creates a backlog at a pier preventing other ferries from docking their boats.

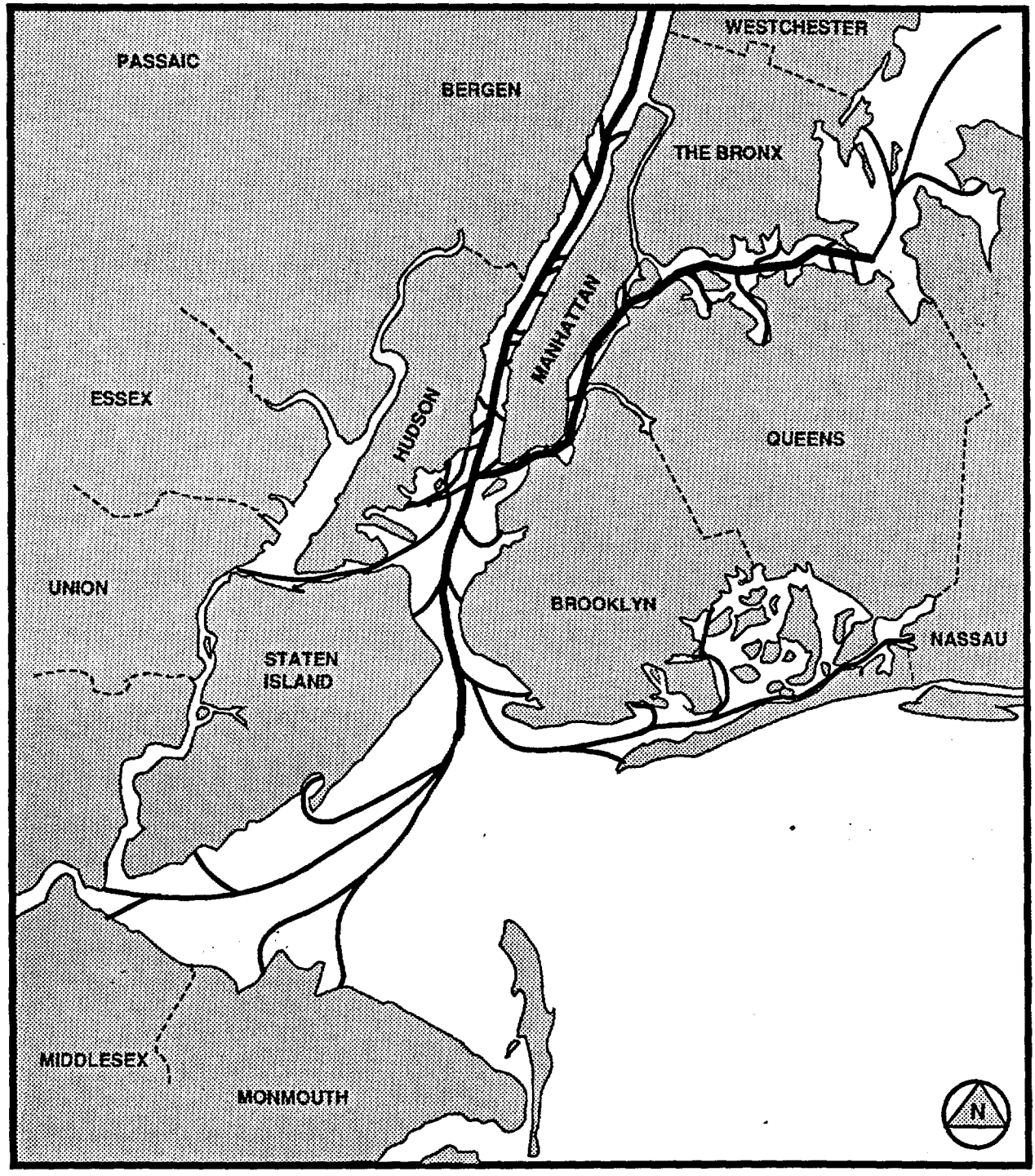
CONCLUSION

Private ferry service growth will be dependent on commuters and related government agencies perceiving service as not just an amenity for a few but a part of the mass transportation systems for areas surrounding the study area. How fast the number of new ferry routes grow depends on the kind of service ferry operators provide, available landside access, and integration of ferry service with other modes of transportation. Ferry service

FERRIES CHAPTER 4 FIG. 6

○ POTENTIAL /FUTURE FERRY DOCKING LOCATIONS

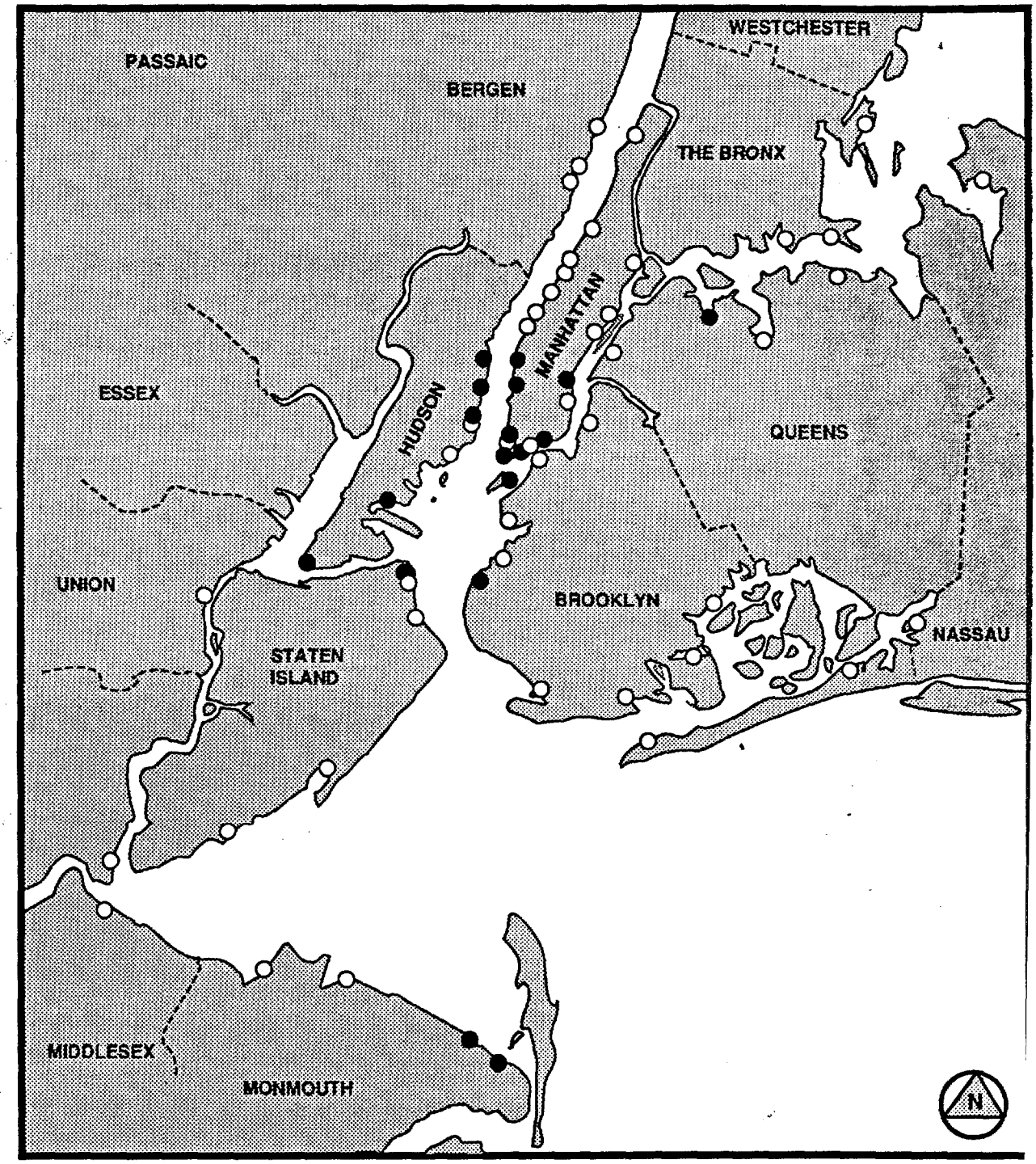
NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



FERRIES CHAPTER 4 FIG. 7

POTENTIAL/ FUTURE FERRY ROUTES

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



FERRIES CHAPTER 4 FIG. 8

- ○ POTENTIAL/ FUTURE FERRY DOCKING LOCATIONS
- ● EXISTING FERRY DOCKING LOCATIONS

NEW YORK / NEW JERSEY
HARBOR ESTUARY
WATER USE MANAGEMENT
STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL
PROTECTION

needs to be addressed in a comprehensive way by the communities in New Jersey. While ferry service has been considered for all of New York City through the New York City Waterborne Policy Statement this statement may have to be revised if ferry transportation systems are to prosper.

Despite existing constraints on ferry service passenger ferry service is expanding. Because of existing infrastructure deterioration and congestion, commuters have begun to seek alternative methods of transportation. Those used to traveling by automobile are finding ferry service a more reliable, comfortable and affordable alternative. Providing adequate parking, shelters for waiting, easy connections with other modes of transportation and convenient schedules, will all contribute to attracting sufficient numbers of commuters to operate a successful ferry service.

Acquiring capital to develop amenities probably has prohibited many potential operators from entering the ferry business. Providing some type of subsidy to create a nurturing environment should be studied and possibly provided. Adequate landside access is an essential part of ferry service growth. Since comprehensive ferry siting regulations do not exist in New Jersey ferry operators must rely on their ability to find and acquire landside access from individual municipalities. Meanwhile, New York City's primary facilitator of landside development of piers, the Department of Ports and Trade, seek to maximize profits when it develops piers for ferry landings. Ferry operators, who must lease space on these

piers to pick up and discharge passengers, are often competing with the express bus operator freed from paying a fee for every stop made.

The City can accelerate ferry service growth by allowing ferry operators to develop a sufficient customer base to start to generate a profit before requiring a fee at City owned piers. Granting a ferry operator a route permit for longer than the current legal lease limit of one year at a particular pier would provide ferry operators with the incentive to invest in new sites. This would prove to be a more realistic time frame in which to develop business and amortize debt. The investment amortization time frame must not be taken lightly. One private ferry service now operating, Arcorp, despite owning its landing sites and having sufficient capital from a real estate company had to operate at a deficit for two years even with large numbers of passengers.[15]

Without government subsidies, only those ferry operators who are supported usually by large corporations or real estate developers will continue to support ferry service. One result will be that ferry service will remain as an amenity instead of a part of the transportation network. How government subsidies should be spent on ferries needs to be studied to determine not only the most efficient way to promote service but also to determine how mass transportation money should be allocated for ferry service.

Formally integrating ferry service into the mass transportation system will directly affect the

number of ferries operating within the Harbor. At New York City Department of Transportation, ferry operations have been merged into the Division of Surface Transportation to better coordinate ferry service with connecting bus service operations. Concurrently, the Port Authority is attempting to develop a unified ticketing system for commuters to purchase one ticket for use on all types of mass transportation within control of the Port Authority.[16]

With these two recent changes, it becomes easier to measure any impact on the growth of ferry service. Interstate coordination between New York and New Jersey concerning ferry service will probably have to be established as well as a coordination of ferry service within New Jersey if ferry service is to be formally integrated into the mass transportation system. Meanwhile ferry service within New Jersey should be reviewed in a comprehensive manner. The New York City Waterborne Policy Statement may need to be altered not only to allow ferry service within New York City but to create a nurturing environment, thus enabling ferry service to grow at a rate needed to meet anticipated demand. These New York City Waterborne Policy Statement revisions are being considered by the New York City Council.

Chapter 4 - Endnotes

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CHAPTER 5 - COMMERCIAL BOATING

In recent years a growing interest in the New York and New Jersey waterfront for non-traditional uses has led to the resurgence of many water-related activities, including a variety of commercial boating operations. As areas on the waterfront formerly utilized for maritime or industrial activities, such as the South Street Seaport in Manhattan and the northern New Jersey waterfront are revitalized, opportunities to dock commercial craft and attract patrons are created. Four types of commercial boating activity will be examined in this chapter: commercial vacation cruises, excursion, sightseeing and similar vessels, commercial sport fishing and cultural/educational water-related activity.

TYPES OF COMMERCIAL BOATING ACTIVITIES

The commercial boating industry contains a variety of different operations ranging from regularly scheduled excursions leaving at a set time and location to vessels chartered by a group or individual for a party and having a flexible departure site and route tailored to the client's needs. The type of operation often determines the docking location, time of day and route. It is important to examine the characteristics of each activity to understand their impact on harbor traffic.

A second factor affecting the operations is the method of payment, which may take two forms; the first being an "open boat" or a "party boat" which may also be referred to as a "head boat" and the second being a "charter". An open boat or a party boat is a vessel which operates on a regular schedule for a specified purpose. Patrons pay as they board the vessel and are not necessarily associated with others on board. Commercial open or party vessels operate for a variety of activities including fishing, cruising, dining, entertainment or education, and may or may not include a destination. A commercial charter, on the other hand, is a vessel which is hired or leased for a specific purpose by an individual or a collective group. There is usually a set price for the "charter" and the group using the vessel is often associated in some way. Commercial charters can be for a variety of activities including parties and receptions, fishing, cruising, dining, entertainment, education or business, and may or may not include a destination.

HISTORY

Commercial Cruise Ships

Overseas shipborne visitors to the New York-New Jersey Harbor date back to the arrival of early European explorers such as Henry Hudson in the late 1500's and the early Dutch settlers in the early 1600's. All settlers and visitors to the "New World" continued to traverse the ocean by boat.

However, sailing from Europe to America or back purely for pleasure or vacation was not yet widely known.

The first oceangoing luxury liners arrived in New York Harbor in 1838. They were built by British companies and propelled by paddle wheels. 1843 brought the first transatlantic steamer to have an iron hull and be driven by propeller. These ships were later subsidized by carrying mail as well as passengers across the Atlantic to Europe. In the mid 1850's, these iron hulled, propeller driven vessels began carrying the first of the two large waves of European immigrants to America.[1]

In 1860, the "Great Eastern", launched near London, arrived in New York where over 140,000 people toured her paying one dollar apiece. The ship also took 2,000 people on a cruise to Cape May, New Jersey, thus expanding its use to an excursion vessel. Later this ship was used to strengthen the British military presence in Canada and then to lay a transatlantic telegraph cable.[2]

After the Civil War, the ships became larger, faster and more opulent. As ships increased in size and draft, New York Harbor's center of activity shifted from the East River to the Hudson River, where 800 foot piers were built below West 23rd Street to accommodate the great vessels.[3] At the same time, two large German ship companies developed piers in Hoboken, New Jersey, just north of the Erie-Lackawanna Ferry Terminal.[4]

During the 1920's and 1930's, the ships continued to grow larger and faster. The "United States" was launched in 1951 and set the transatlantic record of 3 days, 10 hours, and forty-five minutes.

Finally, in 1967, the Queen Elizabeth II was launched by the Cunard Line. At 887 feet, it was the last passenger ship built for transoceanic liner service and is the only one still maintaining a limited schedule of transatlantic crossings.[5]

The advent of the commercial jet, allowing travel to Europe in a matter of hours as opposed to days, helped bring about a decline in the transatlantic passenger ship industry. Another factor leading to a decline in the number of passenger ships docking in the harbor was the trend in the vacation cruise industry of cruises with an average length of 7 days, thus limiting the potential destination points accessible within that time frame. Many passenger ships are now located in Miami because of its proximity to the islands of the Caribbean and other popular destination points for travelers. Bermuda, as the closest island resort destination to New York, is by far the most common destination for cruise ships docking in the harbor. Although not frequenting the Harbor at levels equalling those during the period prior to trans-atlantic air travel, passenger ships continue to define the Port of New York and New Jersey in terms of grace and majesty.[6]

Excursion Sightseeing & Similar Vessels

The pleasure cruise or excursion vessel has a history in the New York/New Jersey Harbor closely associated with the need for transportation. The earliest "excursions" began soon after the Revolutionary War and operated to transport wealthy urban dwellers to summer resorts along the Hudson Valley north of Albany to destinations such as

Ballston Spa and Saratoga Springs. Because the journey was long, meals and sleeping arrangements were often provided on board. In the early 19th century, summer resorts appeared in the Catskills which attracted the likes of Thomas Cole, leader of the Hudson River School of Painting, as well as others interested in the beauty of the region. These vessels started as "sidewheelers" and were then converted to steam. In the late 19th century, a trip to the "shore" was seen as an alternative to the mountains, thus encouraging the development of Coney Island and the Rockaways, as well as Asbury Park and Point Pleasant along the New Jersey coast.[7]

In addition to transporting passengers to vacation resorts, "Coastwise Steamers" carried passengers from the East River Piers to New Haven, Providence and Boston and from Hudson River piers to Philadelphia. Travel by vessel to these East Coast cities declined as train service made the journey in less time.

Yachting also gained popularity in the 19th century but remained a private sport for the well-to-do. Until the early 1800's, recreational opportunities for the working class were limited and it was the excursion steamboat that provided the first inexpensive transportation for large numbers of people to escape the crowded city for day trips by boat. Steamboats transported passengers to picnic groves in Hoboken and upper Manhattan. Trips became longer as the century progressed and improved technology allowed increased speed. These

boats were usually less luxurious than the excursion vessels bound for the Hudson Valley and were characterized by a number of levels of largely unenclosed decks. The picnic groves soon developed into amusement parks and "beer gardens", conveniently accessible by excursion boat or ferry. They continued to thrive until the onset of Prohibition in the 1920's when many of the beer gardens were forced to close. Another major loss of a waterfront recreation area served by excursion vessels resulted from the construction of La Guardia Airport in the 1930's, in the North Beach area of Queens. The final event contributing to the decline of the excursion vessel came as competition with the automobile increased. As more people took to the roads to find an escape from the city, the excursion vessel became less profitable. With the loss of patrons brought by boat, waterside amusement parks experienced further decline.[8]

The history of excursion vessels is not without tragedy, the greatest of which occurred in 1904 when the General Slocum, one of New York's largest and most popular excursion boats, caught fire in the waters of Hell Gate. The Slocum was carrying 1,331 passengers, mainly residents of Little Germany on the Lower East Side of Manhattan. With little room to maneuver, the Captain tried to beach the vessel, but had to continue to North Brother Island, by which time the flames had engulfed most of the ship. There were life jackets on board, but due to age, they had rotted and proved useless. At least 1,021 people died in the disaster.[9]

Though the tragedy of the Slocum was not caused by conflict with another vessel, there have been many instances where this has been the case. In 1926, the Washington Irving of the Hudson River Day Line collided with a barge in tow by the Thomas E. Moran in the Hudson River. Another significant accident occurred in 1950 when the Excalibur, a passenger ship bound for the Mediterranean carrying 114 passengers, collided with the Columbia, a Danish freighter, off of Bay Ridge in Brooklyn. It is interesting to note that many of the mishaps occurred during heavy fog, which is still very much a factor in harbor safety.[10]

Trips to the Statue of Liberty survived the decline of excursion vessels and continue to be one of the harbor's major attractions. The first trip was made in 1884 and continues today with a second departure point added in Liberty State Park in Jersey City. By 1975, only three excursion/

sightseeing operations were still cruising the harbor: the Statue of Liberty Ferry, run by Circle Line Inc.; the Circle Line, making trips around Manhattan Island; and the Day Line, traveling up the Hudson to West Point.[11]

The 1980's have seen a revival of recreational boating including a variety of yachts available for charter or on an open boat basis. In addition to an expanded number of excursion and sightseeing vessels, a new category of dining and entertainment vessels now ply the local waters. For example, the

South Street Seaport now operates the Andrew Fletcher, a sidewheel vessel and the Dewitt Clinton, a propeller driven vessel, for a variety of excursions including moonlight cruises for dinner, dancing or music. Additionally, the large fleet of World Yacht Enterprises operates dinner cruises departing regularly from Pier 62 at the foot of West 21st Street in Manhattan. Some of this increased activity can be attributed to a law suit brought against Circle Line in the early 1980's which allowed for greater competition among commercial boating operators.

Commercial Sport Fishing

In addition to the commercial fishing industry, fishing for sport has long been a recreational pastime in the region. A wide variety of fish and shell fish were found in the harbor ranging from cod and mackerel in the port to shad and sturgeon in the Hudson. Until the late 1800's, sharks regularly frequented the Upper and Lower Bay and were caught for sport. The sharks have since disappeared due to pollution but are still spotted in the waters off Sandy Hook, New Jersey.[12]

Commercial sport fishing from larger vessels can be found on City Island in the Bronx, Sheepshead Bay in Brooklyn and the Atlantic Highlands/Keyport area in Monmouth County. This type of fishing originally got its start as the commercial fishing industry experienced decline due to a variety of factors, including depleted fishing grounds, pollution, waterfront development and higher fuel prices. As many of the commercial fishermen were forced out of

business, a few identified an opportunity to continue practicing their trade by taking groups of local fishing enthusiasts out to the open ocean to try their luck. In 1975, there was a fleet of 20 party fishing vessels, some converted from commercial use and others brand new, sailing from Sheepshead Bay in Brooklyn. A similar situation arose on City Island in the Bronx, with its proximity to the waters of Long Island Sound. The catch from these vessels was often so good that area residents and restauranteurs waited at dockside as the fleet returned with the catch of the day.[13] A similar situation exists in Raritan Bay where a once strong commercial fishing industry is now dominated by recreational anglers, many of whom choose to practice their sport aboard a head or party fishing boat.[14]

Commercial sport fishing continues to thrive today, though other problems, including insufficient parking and the absence of adequate docking space, especially in Sheepshead Bay, threaten to limit the success of the industry.

PRESENT CONDITIONS

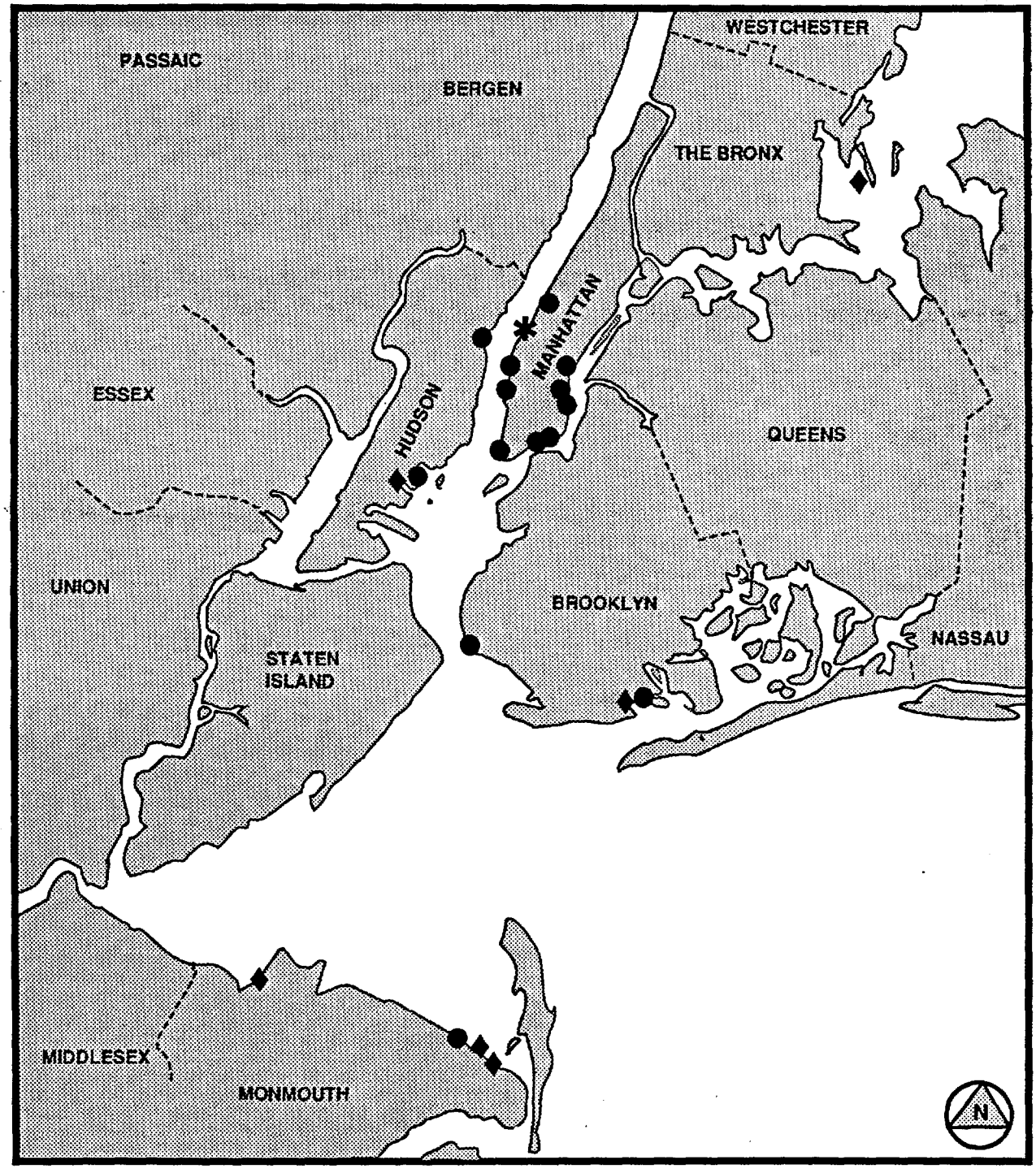
Tables 1-3 in Appendix 5.1 provide an inventory of the major commercial boating operations by activity/use category located within the study area. This data was gathered using commercial listings, telephone interviews and a mailed survey, and includes docking location(s), activity, number of vessels, route(s) and/or destination(s).[15] The following is a breakdown by category, as listed in Appendix 5.1, of operations and vessels involved in commercial activity within the harbor:

Commercial Cruise Ships
Total Number of Operations: 6
Total Number of Vessels: 14

Excursions, Sightseeing, Dining/Entertainment & Party/Reception Vessels (open boat and charter)
Total Number of Operations: 32
Total Number of Vessels: 65

Commercial Sport Fishing Vessels (open boat and charter)
Total Number of Operations: 30
Total Number of Vessels: 30

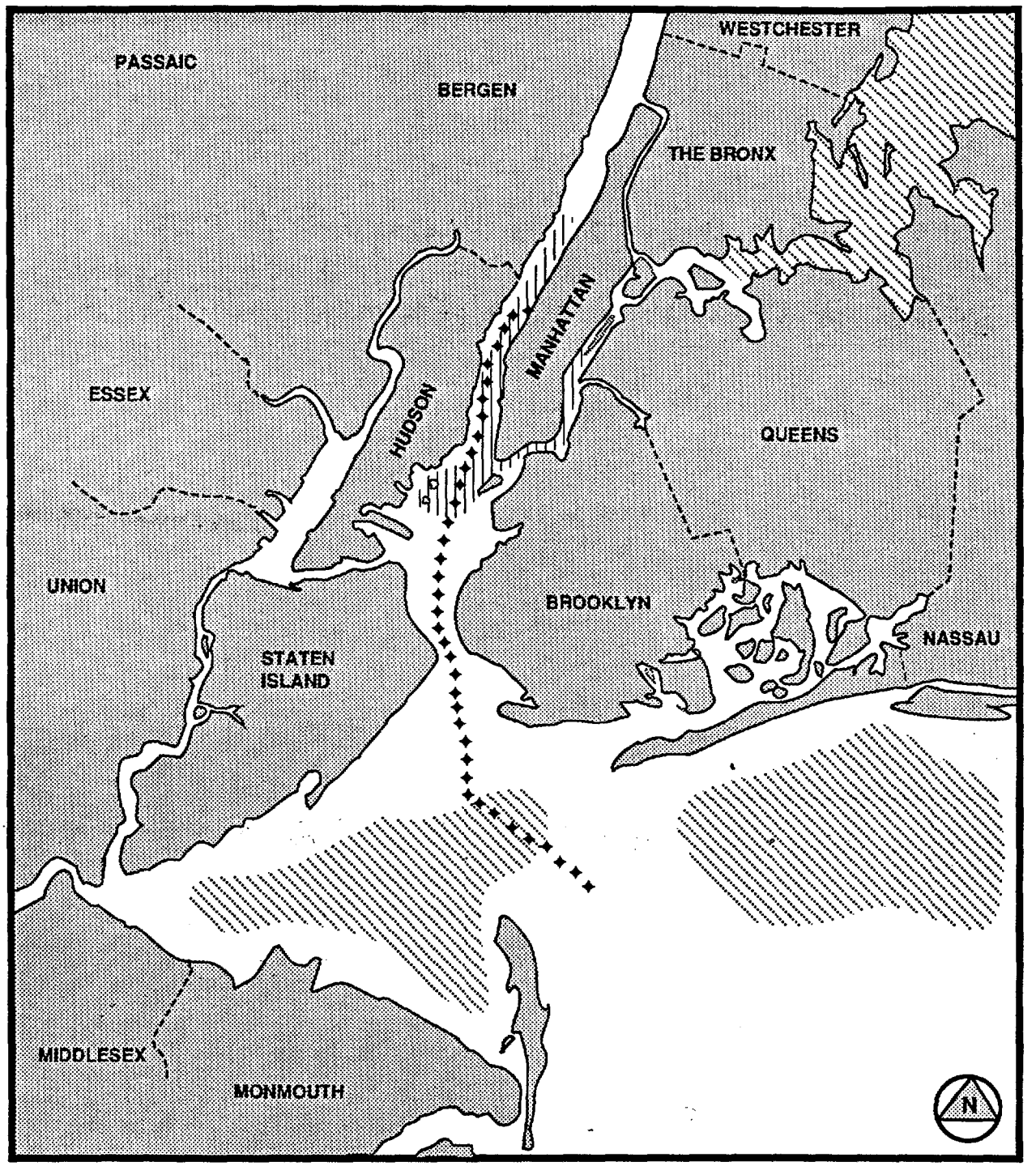
Two maps were prepared using the tables contained in Appendix 5.1. Figure 5.1 identifies docking sites used most frequently for passenger pick-up. These locations may or may not serve as the permanent home of the vessel. As illustrated, the



COMMERCIAL BOATING CHAPTER 5 FIG. 1

- ✱ COMMERCIAL CRUISE SHIP DOCKING: EXISTING
- ● EXCURSION, SIGHTSEEING AND SIMILAR VESSEL PASSANGER PICK UP LOCATIONS: EXISTING
- ◆ CONCENTRATIONS OF COMMERCIAL SPORT FISHING DOCKING LOCATIONS: EXISTING

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



COMMERCIAL BOATING CHAPTER 5 FIG. 2

✦✦✦ COMMERCIAL CRUISE SHIP ROUTE: EXISTING

ROUTES/DESTINATIONS OF EXCURSION, SIGHTSEEING AND SIMILAR VESSELS: EXISTING

ROUTES/DESTINATIONS OF COMMERCIAL SPORT FISHING VESSELS: EXISTING

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

southern tip of Manhattan near the Battery and the South Street Seaport area, as well as the West Side piers from 21st to 52nd Street and 23rd Street (Skyport Marina) and 34th Streets on the East River, are active docking sites for commercial boating operations, including commercial cruise ships, while Sheepshead Bay, Sandy Hook/Atlantic Highlands and City Island, are active areas for commercial sport fishing boat docking.

The second map, Figure 5.2, shows frequently traveled routes and/or waterbody destinations. As shown, the Hudson River, Upper Bay, Liberty and Ellis Islands and the East River, are popular for sight-seeing, excursion, party/reception and similar vessels, while popular fishing destinations are typically further out and do not pose a serious problem of conflict within the busiest sections of the harbor.

Time, Route and Activity

Because of the variety of activities included in the commercial category, it is important to look at each as it relates to time of day, season of year and route in order to have a better understanding of potential conflict. This also allows a comparison of commercial operations with the other categories included in this report.

In general, all commercial categories increase in activity during the summer months. The waters around Manhattan are favored by both open and chartered excursion, sightseeing, party/reception and dining/entertainment vessels, while coastal

waters are preferred by fishing vessels. Sightseeing and dining/entertainment vessels operate both during the day and at night with the most popular passenger pick up/drop off time being between 5 p.m. and 7 p.m.. Fishing, excursion, cruise ship loading and unloading, and cultural activities occur mainly during the day. These are important distinctions to consider when analyzing conflict in the harbor.

Commercial Cruise Ships

Vacation cruises are quite different from other types of commercial boating. Patrons board large ocean going vessels at the New York Passenger Terminal operated by the Port Authority of New York and New Jersey located at piers 88, 90 and 92 on Manhattan's West Side between 48th and 52nd Streets. The ships are generally bound for Bermuda, Florida or the Caribbean and are usually gone a minimum of three days with the average cruise being seven days before returning here to dock. This activity is most popular in the summer months. The Passenger Ship Terminal contains six berths and provides the only location within the study area for docking commercial cruise ships. Figures 5.1 and 5.2 illustrate the docking locations and routes.

Oceangoing cruise ships are the largest vessels in the commercial boating category and range from the 887 foot Queen Elizabeth II to approximately 60 feet. They have a deep vee-shaped hull drawing up to 30 feet of water which adds to their stability in rough ocean waters. Because of their size, these vessels, like the cargo vessels discussed

earlier, are difficult to maneuver and require the assistance of tugs to maneuver into and out of the berths at the Passenger Ship Terminal. Additional vessel characteristics are listed in Appendix 5.2.

As noted previously, there were six cruise ship "lines" calling on the Harbor in 1989 with a total of 14 vessels. Table 5.1. below, provides data on the total commercial cruise ship activity and number of round trip passengers in the port for the years 1980-1989, as recorded by the Port Authority of New York and New Jersey. These figures do not exhibit a general trend but rather illustrate an erratic pattern in both number of ships and number of passengers over the ten year period. The busiest year recorded occurred in 1983 with the highest number of trips at 262 and the highest number of passengers at 230,098.

TABLE 5.1

Total number of ships calling on the port and round trip passengers for the New York Passenger Ship Terminal as recorded by the Port Authority of New York and New Jersey

YEARS	TRIPS	PASSENGERS	PASS. PER SHIP
1980	204	171,260	839
1981	206	158,958	771
1982	235	168,025	715
1983	262	230,098	878
1984	222	168,579	759
1985	239	222,264	930
1986	255	204,607	802
1987	242	199,343	824
1988	228	201,576	884
1989	212	165,881	782
1990	N/A	N/A	N/A

The majority of passenger ships calling on the Port of New York and New Jersey offer cruises which average seven days in length and are primarily bound for Bermuda. This frequency of voyages to Bermuda is due in part to its proximity which provides the optimum combination of cruising time at sea and docking time in Bermuda. Cruises to other destinations including the Caribbean, Coastal U.S. and Canada are also available but tend to be

longer and are offered on a more limited basis. Cruises to nowhere, which are often as short as two to three days, are also offered and simply cruise in a large circle without having a destination or docking location. Table 5.2, below provides a break down of destinations as recorded by the Port Authority of New York and New Jersey for 1987.[16]

TABLE 5.2

DESTINATION	NUMBER OF CRUISES
Bermuda	140
Caribbean	18
Coastal U.S. and Canada	19
Transatlantic	26
Cruises to Nowhere	39
TOTAL	**242**

Cruise ship activity is heavily dependent on weather both at the point of departure as well as the point of destination. This is reflected in the Port Authority figures for 1987 which show no cruise ships calling on the Harbor between January and April and only one, the Queen Elizabeth II, calling in December. The Bermuda Bureau of Tourism lists May through October as their prime season. Given that the vast majority of cruises from the New York/New Jersey Harbor are bound for Bermuda this seasonal variation in activity is not expected to change.

As a possible result of the recent economic downturn in the region, commercial cruise ship operators report a decline in activity for 1990. Once a stronger economy returns, cruise ship activity is expected to rebound to 1987 levels but is not expected to experience a significant amount of growth.[17]

Sightseeing Excursion and Similar Vessels

This category of commercial boating activity contains a wide range of activities and vessel types. **Excursions** give patrons a chance to reach a recreational waterfront destination by boat. Destinations may be islands accessible only by boat, or waterfront locations where boat access provides an alternative transportation option. Examples of excursions include the ferries to the Statue of Liberty leaving from the Battery in Manhattan and Liberty State Park in Jersey City, and the ferry to Monmouth Race Track, which leaves from several points including the 69th Street Pier in Bay Ridge, Brooklyn. Excursions take place year round but greatly increase in the summer months. Excursion vessels such as these generally operate on an open boat basis but often supplement their business by offering group charters.

Sightseeing and moonlight cruises are similar to excursions but do not include a specific destination or stopping point as the primary objective. Examples include the Circle Line, which travels around the island of Manhattan, and the Seaport Line, which offers patrons views of the lower Manhattan skyline and the Statue of Liberty. Sightseeing can take place during the day or at

night which is often referred to as a "moonlight cruise". These vessels operate year round but greatly increase in number of vessels and trips in the summer months. Again, this type of activity can either be on an open boat or charter basis.

Dining and entertainment vessels vary in size and type of fee more than any of the other activities. These vessels serve meals and/or drinks to patrons while cruising around the harbor, generally on a regular schedule and from a steady docking site, and may include concert cruises with scheduled performances. There are regularly scheduled trips, such as those aboard the Andrew Fletcher leaving from the South Street Seaport or the dinner cruises offered by World Yacht, departing from 21st Street on the Hudson River in Manhattan.

Vessels chartered for **parties and receptions** also travel around the Harbor while serving food and drink to their patrons. These vessels differ from the dining and entertainment category in that they are almost exclusively run on a charter basis and sail at a time and from a location convenient to the patrons. There are numerous organizations who act as "brokers" or "agents" to facilitate arrangements between the boat owner and the group wishing to charter a vessel. Operations such as World Yacht maintain a fixed schedule and often supplement their operation by chartering boats for parties and receptions.

Sightseeing, Excursion and similar vessels fall primarily into two classes, the first being the large open and vessels, such as those run by Circle Line. These boats carry between 500 and 1,000 passengers and are up to 210 feet in length with a breadth of up to 33 feet. Their shallow hull design tends to generate a substantial wake at normal cruising speed. These vessels tend to have varying degrees of maneuverability depending on size and hull design.

The second class of vessels in the sightseeing/ excursion category can be described as the dinner boat or luxury yacht. These vessels are often smaller and more maneuverable than the large open boat vessels and range from 65 to 170 feet with a draft of between five and eight feet. Accommodations for food preparation, dining and dancing are provided on board. (See Appendix 5.2 for additional vessel design details.)

The Maritime Support Services Location Study found approximately 20 sightseeing, excursion and similar vessels in operation in 1985. This figure includes both party boats as well as chartered vessels. Based on the growth and demand for these services, they forecast that by 1990, 35 such vessels would be in operation and by 2000 the figure would reach 55.[18]

A review of commercial listings for excursion, sightseeing and similar vessels confirmed by telephone interviews and a mailed survey, revealed

approximately 32 such operations with a total of 65 vessels currently operating within the Harbor. A detailed break down of sightseeing, excursion and similar commercial vessel operations is provided in Appendix 5.1 Table 2. Of the 32 operations in this category six operate on an open or party boat basis with supplementing charter service, while 28 are hired exclusively for charter.[19]

These figures suggest a significant increase in these types of commercial boating operations within the Harbor at a growth rate far exceeding what was predicted just five years ago. Discussion with vessel operators and brokers revealed that the rapid rate of growth which occurred between 1980-1988 is beginning to level off. The current economic down-turn is cited as having a direct impact on charters which rely heavily on corporate-sponsored parties. Some operators also feel that the market is currently saturated and that any growth will be at the expense of less competitive operations resulting in a relatively stable number of vessels in the harbor. Other operators, however, see the lack of adequate docking space as limiting the growth of the industry and point to development along the Hudson River in New Jersey as possible sources of new markets as well as docking sites.[20]

Operations such as these depend heavily on docking locations which are both convenient to patrons as well as being relatively close to the desired harbor destinations. Data gathered and depicted in Figure 5.2 suggests the Lower East River, the Lower

Hudson River, the Upper Bay and the area around the Statue of Liberty and Ellis Island are most often cited as being the water destinations of excursion, sightseeing and similar types of vessels. Operators note that the most desirable locations for passenger pick-up are in Manhattan although many operators have relocated their vessels to other boroughs of New York City and to New Jersey to take advantage of less expensive docking (storage) space. Charter operations in Manhattan report using Pier 11, a NYC Department of Ports & Trade facility which is shared with commuter ferry operations. Piers 9 and 13 located adjacent to Pier 11 also provide excursion vessel docking. The Spirit of New York currently uses Pier 9 for over night berthing. In addition, Pier 13 was recently upgraded to accommodate excursion vessels both for pick up/drop off and overnight users. The Water Club located at East 28th Street on the East River, Skyport Marina at East 23rd Street and facilities at East 34th Street, in addition to the World Yacht pier located at 21st Street on the Hudson are also used by excursion vessels picking up passengers.

Transportation to the departure site and/or parking facilities at the site are also important to the success of the operation. The preferred docking sites provide sewer and electricity as well as on-land facilities for waiting and/or entertainment such as Battery Park City and the South Street Seaport. Discussion with vessel operators revealed a general dissatisfaction with many of the docking sites. Generally leased, they are described as

being in poor condition, expensive and often crowded due to the number of vessels trying to dock.

Commercial Sport Fishing

Commercial Sport Fishing can be done via charter or or on an open boat basis and affords patrons the opportunity of leaving the Harbor to fish off of New Jersey and Long Island. The most active areas for docking fishing boats are Sheepshead Bay in Brooklyn, City Island in the Bronx, and Atlantic Highland in Monmouth County. Currently, a fleet of 16 vessels sail from Sheepshead Bay in Brooklyn carrying patrons out to the waters off the New Jersey Coast, Sandy Hook and Raritan Bays. In addition to this site there are three operations on City Island in the Bronx, one on the Bronx River, one on the north shore of Queens, nine in the Keyport/Atlantic Highlands area off of Sandy Hook and five sailing out of nearby Leonardo, New Jersey State Marina. Fishing boats usually leave in the morning and return late afternoon, with summer being their busiest season. Telephone interviews confirmed listings for 30 commercial sport fishing operations with a total of 30 vessels. (See Appendix 5.1, Table 3)

Commercial sport fishing is common aboard cruisers and super cruisers. These vessels are fast and maneuverable and range from 25 to 50 feet for chartered fishing excursions to between 60 and 100 feet for party boats. They have a relatively shallow draft of between six and ten feet. The vessels are usually equipped with a heated cabin, rest rooms and fishing gear. (See Appendix 5.2)

Discussion with fishing captains suggests that as the waters of the Harbor become cleaner, fish are returning and being caught in large numbers. Their main complaint was general dissatisfaction with docking space, especially at Piers 1-10 in Sheepshead Bay, a number of which are currently being rebuilt, and insufficient parking space near their operations which limits the growth potential of the industry, especially in built-up urban areas. The Department of Ports and Trade along with the Public Development Corporation are currently examining strategies to provide additional parking in the area. The Department of Ports and Trade notes that use of Piers 1-9 in Sheepshead Bay is currently at 50% of capacity. The Market Opportunity Study to Expand Charter Fishing Boat Activities at the Westchester Avenue Bridge Waterfront Park Area (1988), prepared by E. L. Crow. Inc. for the NYC Department of City Planning, reported that there is disagreement on the future of the industry, while some fishing captains projected a slight increase, others felt interest in fishing in general was declining.[21]

Many of the same conditions important to sight-seeing and excursion vessels are also important to recreational fishing operations, the major difference being the destination of the fishing boats tends to be further out to sea, either in the waters off of New Jersey or the Long Island Sound as illustrated by Figure 5.2. Because of the desire to reduce travel time, recreational fishing operations are often located on the outer edges of the region closer to the Atlantic Ocean or Long Island Sound in locations such as Sheepshead Bay in

Brooklyn, Atlantic Highlands in Monmouth County and City Island in the Bronx. Though not generally posing a problem, some commercial sport fishing vessels docking in City Island travel through the East River in route to the Atlantic ocean. At times, this may cause a significant wake that can impact on other water users. Proximity to public transportation and adequate parking are also crucial to the success of these operations and the final destination of fishing vessels is influenced by the type of fish being caught, weather and currents. Figure 5.1 shows the present location of concentrations of recreational fishing operations.

Cultural/ Educational

Cultural/Educational is a unique category which includes a variety of different uses, all with the purpose of providing educational or cultural experiences related to the water. The sloop Clearwater sails up and down the Hudson River educating people about the environment. Also in this category, Harbor Park, though not a vessel, consists of five New York City waterfront park sites historically linked to the Harbor and proposed to be connected by waterborne transportation. The park will include the following existing New York City and New York State Parks: Battery Park and South Street Seaport in Manhattan, Fulton Ferry/Empire Stores State Park in Brooklyn, Snug Harbor Cultural Center on Staten Island and the Statue of Liberty and Ellis Island National Historic Sites. It is anticipated that the parks will be linked via water using passenger vessels in addition to the existing Statue of

Liberty and Ellis Island ferries and various vessels docking at the South Street Seaport.

Currently, the system of waterborne transportation has not been finalized. However, it is anticipated that within the next three to five years between one and three vessels will be added to the Harbor to serve the Harbor Park System. Eventually, the City hopes to expand the Harbor Park System to include sites in the Bronx and Queens.[22]

Circle Line vessels currently depart from Liberty State Park in Jersey City bound for the Statue of Liberty and around the island of Manhattan. The addition of new waterborne transportation modes linking these already popular sights, plus the recent opening of Ellis Island (September 1990) with ferry service from Battery Park and Liberty State Park via the Statue of Liberty provided by Circle Line, will increase the number of vessels in and around this area.

Based on the data collected, there appears to be a modest increase in all of the categories of commercial vessels over the past decade with a more significant increase in the category of excursion, sightseeing and similar vessels. The area around lower Manhattan, including the East River, Upper Bay, Statue of Liberty, Ellis Island and the Lower Hudson River is the most heavily traversed.

FUTURE CONDITIONS

Using a variety of data, including regional demographics, tourism trends, increased water quality/improved fishing and perhaps most importantly, proposed development within the study area (which presents opportunities for additional docking sites), it is possible to identify future growth patterns and locations in the industry. Having identified areas of potential growth and/or change, a better understanding of future areas of conflict will be gained and will subsequently lead to recommendations that respond to the changing conditions.

National Trends

A recent study entitled Marina Service Marketing Toward the 21st Century (1989); relates a variety of socio-economic changes relates to the marina industry, many of which can be adapted to the commercial boating category.[23] Among the trends relevant to this section of the report, are the growing service economy and an aging marine clientele.

The study envisions that as the large baby boom generation born between 1946 and 1964 enters their 50's, 60's and early retirement, there will be an increase in leisure time. The nation's coastal areas include some of the most densely populated counties in the country. The National Oceanographic and Atmospheric Agency (NOAA) projected that between 1960 and 2010 the coastal population will have grown from 80 million to more

than 127 million people, an increase of almost 60 percent. Given this trend, an overall increase in the number of potential commercial boating patrons can be anticipated, whether it be taking a dinner cruise or chartering a fishing boat with a group of friends. [24]

The marina marketing study also indicated that an increasingly service-driven economy is an important factor which will affect peak water use times. Over 90 percent of the new jobs created during the last twenty years have been in the service sector. Over 75 percent of U. S. jobs are now in the service sector, with this sector accounting for over two-thirds of the Gross National Product within the U.S.[25] These jobs often require working evenings, weekends and holidays to meet customer needs which are the impetus of a service economy, thus decreasing leisure time during traditionally heavy weekend and holiday periods and increasing the number of mid-week users. This change has a potentially positive impact on the commercial boating industry (i.e., it may hold use steady or reduce demand during traditionally heavy periods.) This in turn may translate into reduced risk of conflict and provide a more constant stream of patrons during traditionally slow weekdays. Greater constancy between the number of weekend and weekday users may also have the effect of increasing the viability of these types of operations, thus encouraging the start up of new operations.[26]

Regional Trends

Population trends affecting the Northeast are much the same as those predicted for other U.S. coastal areas. The NOAA report, "50 Years of Population Change along the Nation's Coasts, 1960-2010", predicted that the population of coastal counties from Maine to Virginia will have increased by 30 percent between 1960 and 2010, with the greatest amount of that increase having occurred during the 1960's. Projections for the next 20 years suggest population growth in the Northeast will be lower than the national coastal average. This is due in part to the fact that the region already accounts for more than one third of the nation's coastal population and to a general decline in environmental quality caused by this population concentration.[27]

The study noted that almost 63 percent of the region's coastal states' population resides within the narrow band of coastal counties that border the ocean and estuaries. Significantly, these coastal counties contain only one quarter of the land in the region. Overall population density currently reaches 750 persons per square mile in the coastal counties and is projected to increase to 830 persons per square mile by 2010. Of the 5 counties identified as "Hot Spots", defined as areas exhibiting the fastest rate of growth, highest density and greatest increase in density, one, Queens, NY is in the study area and another, Suffolk, NY is adjacent to and has an impact on the New York/New Jersey Harbor study area.[28]

These population projections affect each of the categories in this report, translating into a general growth of water related activities. The recent economic downturn in the Northeast will slow the rate of growth projected by these studies somewhat; however, in the long term, modest growth is anticipated to continue. While indicators associated with the economic downturn, including increasing taxes, decreasing job opportunities and less disposable income, all contribute to dampening the projected increase in the commercial and recreational boating industries, the recommendations put forth in this report are intended to address the long term increases in the industry.

Tourism

Data provided by the New York State Division of Tourism illustrated in Table 5.3 show a decline in total number of tourists visiting the New York City area from 1988 to 1989 with the decline resulting from fewer domestic visitors. International visitors increased by 400,000 in the same period.[29] Because the figures are only available for these two years, it is difficult to identify trends, however, the sheer number of people visiting the area has a major impact on the sightseeing and excursion vessel category. Chartered boats are less affected by tourism trends because they require pre-planning, however, increasingly, tours, seminars and conventions are chartering boats on which they host receptions.

TABLE 4: NEW YORK CITY VISITORS			
YEAR	INTERNATIONAL	DOMESTIC	TOTAL
1988	4,400,000	21,120,000	25,520,000
1989	4,800,000	20,520,000	25,320,000

Special Charters

With renewed interest in waterfront and maritime activities which has been documented over the past 10 years, corporations, institutions and individuals are recognizing the attraction of hosting parties, weddings, seminars, proms and receptions on chartered vessels. Discussions with charter boat captains revealed that approximately 40 percent of their business is corporate sponsored events, 40 percent weddings and 20 percent special occasion parties. The current economic downturn has temporarily slowed the growth in this segment of the industry, however, over the next 20 years the category of charted vessels is expected to grow.[30]

Improved Water Quality and Fishing

Discussion with recreational fishing boat captains cited an abundance of fish throughout the Harbor as a result of efforts to clean up the water. Both factors were identified as having a positive impact on the number of patrons seeking to go on chartered and open fishing boats.

Development and Additional Docking Opportunities

The major limitation to growth of the charter and excursion categories as cited overwhelmingly by various operators is the lack of adequate, affordable, conveniently located docking space in proximity to such desired water destinations as the Statue of Liberty/Ellis Island, downtown and midtown Manhattan in the Upper Bay. This has resulted in over-crowded docking locations near the South Street Seaport, lower Manhattan and the west side of Manhattan between 21st and 52nd Streets with few opportunities to embark at locations outside of Manhattan. Recent improvements by the Department of Ports and Trade at Piers 9, 11 and 13, have resulted in an increased number of berthing spaces in the lower East River. Future plans for these piers call for the addition of a number of new pick up/drop off spaces as well as over night berths.

A variety of recent developments with waterborne recreational components may significantly affect this existing limitation thus allowing further expansion of the industry as a whole and creating a different docking site pattern. A brief overview of the proposed developments likely to include provisions for larger vessel docking is discussed below. It should be recognized that these are proposals which may or may not be built as conceived or at all. Each acknowledged inclusion of commercial boating activity as both an acceptable and exciting way of adding life to a project and generating revenue. An example is the Port Imperial project on the Hudson River in Weehawken, New Jersey, which will combine office and retail space with the already functioning

marina and ferry/excursion boat docking at the water's edge.

Figure 5.3 accompanied by Table 5.4 lists projects which may provide docking space for excursion vessels. It should be noted that the following table does not include docking sites within parks unless they are associated with a larger development. Waterborne routes linking parks are listed in Table 5.5 and accompanied by Figure 5.5.

TABLE 5.4

PROPOSED DEVELOPMENT PROJECTS PROVIDING EXCURSION VESSEL DOCKING

HUDSON RIVER/UPPER BAY - NEW YORK SHORE

Dyckman Street Marina
RiverBank State Park
Harlem-on-the-Hudson
79th Street Boat Basin
West Side Waterfront (Pier 62-64, 79)

HUDSON RIVER/UPPER BAY - NEW JERSEY SHORE

Old Ferry North/South
Independence Harbor
Roc Harbor
Port Imperial (Arcorp existing docking location)
Lincoln Harbor
Stevens Institute/Castle Point
Hoboken Piers/Erie Lackawana Terminal
Newport (existing docking location)
Harsimus Cove
Harborside
Colgate-Palmolive
Liberty Harbor (existing docking location)
Liberty State Park
Port Elizabeth Marina

HARLEM/LOWER EAST RIVERS

Inwood Hill Ecology Center
Ball Park Ferry- Yankee Stadium
Roosevelt Island
Hunters Point
Brooklyn Heights Piers 1-5
Piers 9, 11 & 13 Improvements

LONG ISLAND SOUND/UPPER EAST RIVER

Flushing Meadows

LOWER BAY/JAMAICA BAY AND INLETS

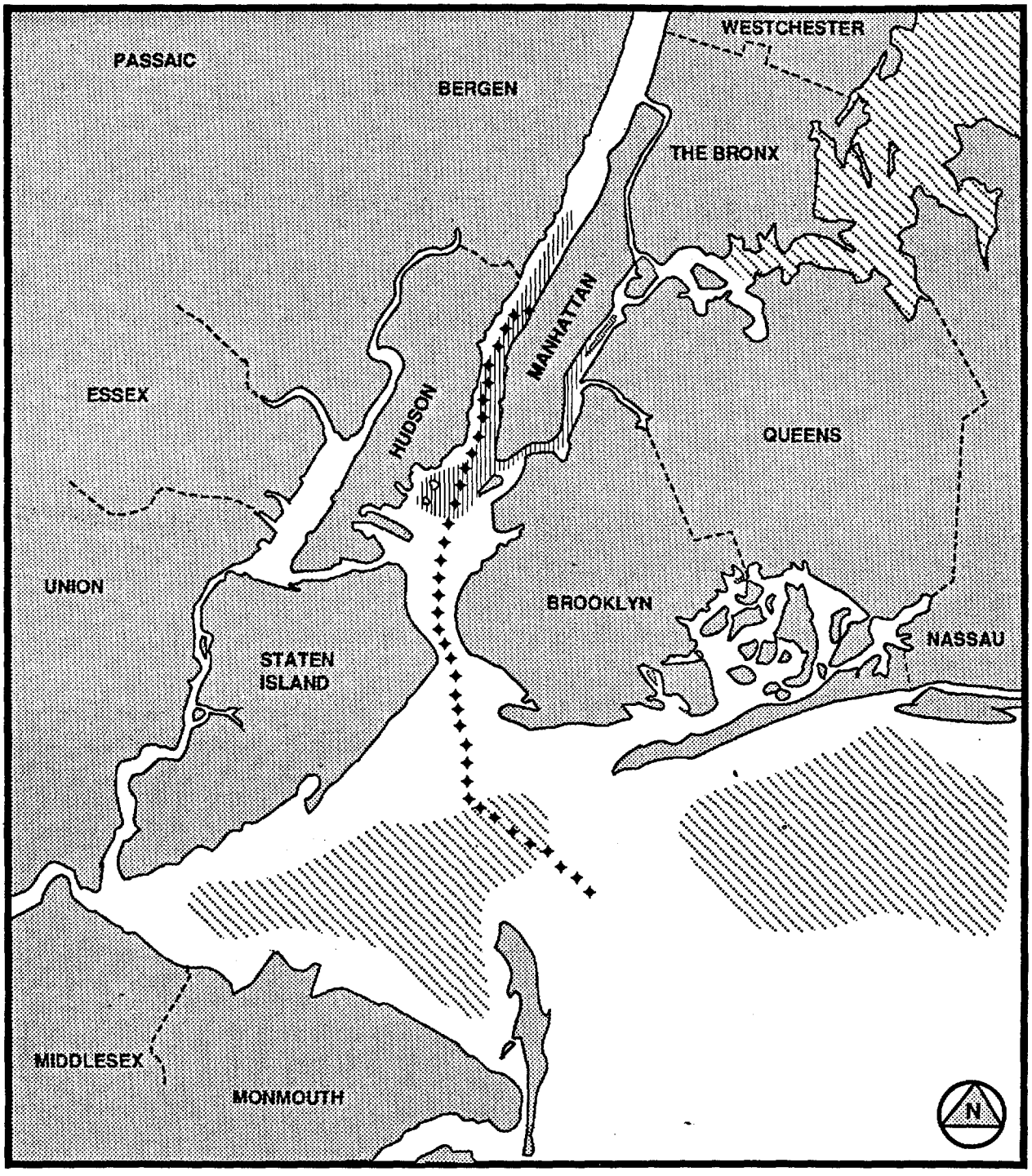
Sheepshead Landing/Park-n-Sail
Harbor Town, Perth Amboy, NJ
South Amboy Redevelopment
Point Atlantic, Keansburg, NJ

*** For additional Information, see Appendix 7.1 Proposed Facilities**

COMMERCIAL BOATING CHAPTER 5 FIG. 3

- ✱ COMMERCIAL CRUISE SHIP DOCKING: EXISTING
- ● EXCURSION, SIGHTSEEING AND SIMILAR VESSEL PASSENGER PICK UP LOCATIONS: EXISTING
- ◆ CONCENTRATIONS OF COMMERCIAL SPORT FISHING DOCKING LOCATIONS: FUTURE (SAME AS EXISTING)
- ○ POTENTIAL FUTURE EXCURSION, SIGHT-SEEING AND SIMILAR VESSEL PASSENGER PICK UP LOCATIONS

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



COMMERCIAL BOATING CHAPTER 5 FIG. 4

✦✦✦ COMMERCIAL CRUISE SHIP ROUTE: FUTURE (SAME AS EXISTING)

ROUTES/DESTINATIONS OF EXCURSION, SIGHTSEEING & SIMILAR VESSELS: FUTURE INCREASED CONCENTRATION

ROUTES/DESTINATIONS OF COMMERCIAL SPORT FISHING VESSELS: FUTURE (SAME AS EXISTING)

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

If docking space is provided at some or all of these locations a significant shift in the existing land-side location of excursion/charter vessels could occur, potentially having the following two impacts: Development would eliminate the major growth limitation of insufficient docking space which coupled with additional markets could lead to a significant overall increase in excursion and charter vessel use in the Harbor. Secondly, additional docking sites could redistribute the concentrations of vessels docking through reduction of congestion at existing overcrowded facilities. This could result in a reduction in the potential for conflict at landside docking locations. However, waterborne destinations are not anticipated to significantly change thus increasing the potential for conflict around the Statue of Liberty/Ellis Island and the Upper New York Bay.

In addition to these proposed developments, the Waterfront Management Plan prepared by the New York City Department of Parks and Recreation, along with the proposed Harbor Park System, suggest a number of waterborne linkages tying existing parks and/or expanding the Harbor Park System. The plan envisions 10 routes, each having from 2-10 stops, which are listed in Table 5.5 below and shown in Figure 5.5. If implemented, these routes will significantly increase the number of excursion vessels in the Harbor. In addition, a number of ferry docking sites have been projected around the Harbor, many of which could also function as excursion vessel stops. These are described in some detail in Chapter 4: Ferries.

TABLE 5.5: PROPOSED WATERBORNE PARK LINKAGES

ROUTE 1: HARBOR PARK

BATTERY
ELLIS ISLAND
LIBERTY ISLAND
SNUG HARBOR
CROMWELL CENTER
SHORE PARKWAY
COFFEY STREET
FULTON LANDING
PIER 11
BATTERY

ROUTE 2: BROOKLYN

69TH STREET PIER
BENSONHURST
CONEY ISLAND

ROUTE 3: MANHATTAN (HUDSON RIVER)

BATTERY
23RD STREET
79TH STREET
155-158TH STREET
SPUYTEN DUYVIL
RIVERDALE

ROUTE 4: MANHATTAN (EAST/HARLEM RIVER)

PIER 11
WILLIAMSBURG
34TH STREET
WARDS ISLAND
107TH STREET PIER
RANDALL'S ISLAND
YANKEE STADIUM
ROBERTO CLEMENTE STATE PARK
INWOOD HILL PARK

ROUTE 5: BRONX

WARDS ISLAND
SOUNDVIEW PARK
CLASON'S POINT
FERRY POINT

ROUTE 6: BRONX

FERRY POINT
FT. SCHUYLER
LOCUST POINT
PELHAM WEST
E. CITY ISLAND
ORCHARD BEACH

ROUTE 7: QUEENS

FLUSHING BAY
HERMON MACNEIL PARK
FERRY POINT
LITTLE BAY
CROSS ISLAND PARKWAY

ROUTE 8: BROOKLYN

CONEY ISLAND
BRIGHAM STREET
116TH STREET

ROUTE 9: BROOKLYN

CONEY ISLAND
FAR ROCKAWAY

ROUTE 10: STATEN ISLAND

CROMWELL CENTER
ALICE AUSTEN HOUSE
MIDLAND BEACH
GREAT KILLS
LEMON CREEK
CONFERENCE HOUSE PARK

COMMERCIAL BOATING CHAPTER 5 FIG. 5

DOCKING LOCATIONS AND ROUTES OF PROPOSED PARK WATER LINKAGES

○ DOCKING LOCATION

1-10 ROUTE NUMBER

SOURCE: DEPARTMENT OF PARKS AND RECREATION, WATER USE MANAGEMENT PLAN

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

CONCLUSION

Commercial Cruise Ships

In general, cruise ship activity will not experience significant growth due to a variety of factors discussed in the current conditions section. One important development, nevertheless, is the recommendation made in the "West Side Waterfront Panel Report" for consolidating cruise ship activity on two of the three piers currently used for loading and unloading passengers, thereby reducing the number of berths from six to four.

Sightseeing, Excursion, and Similar Vessels

This category over the past decade has shown an increase at a growth rate far exceeding what was predicted just 5 years ago.[31] This trend is expected to continue and is influenced by a variety of factors: the general trends in population, tourism, and most importantly, proposed expansion of docking sites associated with new waterfront developments. The majority of these facilities are along the Hudson River from the Battery to the George Washington Bridge. Docking locations are likely to disperse thus reducing conflict at specific docking locations while increasing total activity. Because the major impetus of these vessels is to provide patrons with a chance to view the Manhattan skyline, the East River bridges and the Statue of Liberty, there is an increased propensity for conflict in these areas. This is true for vessels that operate on both an open boat as well as a charter boat basis. Figure 5.3 illustrates proposed docking locations while Figure 5.4 shows the most likely routes and destinations of new excursion vessel activity.

Commercial Sport Fishing

As with other water related activities, recreational fishing has witnessed a modest increase over the past 10 years. Certain facilities within the study area especially Sheepshead Bay, have experienced a decline in number of vessels docking while other areas specifically Sandy Hook/ Raritan Bay have reported an increase in the number of vessels docking. Improved water quality has been identified as one factor resulting in an observed increased abundance of fish, which in turn may produce increased interest in fishing. Growth in this realm will, however, not have a significant impact on conflict in the heavily used Upper Bay, but will likely continue to be concentrated along the fringes of the study area including City Island and Sheepshead Bay in New York and Atlantic Highlands/Sandy Hook in New Jersey.

Cultural/ Educational

This type of activity will continue to be popular in the future as evidenced by the proposed Harbor Park and interconnecting water shuttles. In addition, a number of other proposals which include docking for excursion vessels, will offer landing sites for educational vessels such as the Clearwater.

Areas of Conflict

The trends explored in this section point to an overall increase in number of commercial vessels, especially in the sightseeing, excursion, dining/entertainment and charter segments of the industry. This, coupled with a proliferation of new docking sites proposed for the Hudson River, points to a potential risk of conflict in this waterway. This risk is increased as different types and sizes of vessels are docked near one

another, i.e. small recreational craft vs. large excursion and cruise vessels.

Given the aesthetic appeal and historic significance of the Statue of Liberty and the Lower Manhattan skyline, the lower East and Hudson Rivers, and the Upper Bay will continue to be the primary destination of excursion and chartered vessels both during daylight and evening hours. The total number of vessels is expected to increase. Coupled with expanded docking facilities, the potential for conflict in these waters will increase. The recent economic down-turn in the region will impact the rate of growth in all categories; however, over a longer period, modest growth is expected in all categories.

Chapter 5 - Endnotes

1. Norman Brouwer, "The Port of New York 1860-1985: The Passenger Ship Era", Seaport, Fall 1988, 36 - 41.

2. Ibid.

3. See Chapter 4 History.

4. Brouwer, "The Port of New York 1860-1985: The Passenger Ship Era", 41.

5. Ibid.

6. Ibid.

7. Norman Brouwer, "The Port of New York 1860- 1985: Recreation on New York Waters", Seaport, Summer 1989, 36-41.

8. Ibid.

9. John Steele Gordon, "The Wreck of the General Slocum", Seaport, Summer, 1989, 28-35.

10. Jeannette Edwards Rattray, The Perils of the Port of New York, 1973 (New York) 148-149.

11. Brouwer, "The Port of New York 1860-1985: Recreation on New York Waters", Seaport, Summer, 1989, 41.

12. William N. Zeisel, Jr., "Shark! and Other Sport Fish Once Abundant In New York Harbor", Seaport, Winter/Spring, 1990, 36-39.

13. Norman Brouwer, "The Port of New York 1860-1985:The New York Fisheries", Seaport, Winter/Spring, 1990, 14-17.

14. Michael Cohn, "The Final Years of the New York Fisheries", Seaport, Winter/Spring, 1990, 33-35.

15. Upwards of 70 commercial boating operations were gathered from sources such as the Yellow Pages, Maritime Association publications, etc. Many of these represent brokers or agents who arrange charters as well as operations which do a very small amount of business within the Harbor. Additionally, there are a significant number of operations listed outside of the study area

which occasionally or frequently navigate within the study area boundaries that are not included in the listing in Appendix 1.

16. Dravo Van Houten, Maritime Support Services Location Study: Task 2, prepared for NYC Dept. of City Planning, 1988, p.5.33.

17. Ibid.

18. Ibid p. 5.32.

19. See endnote 16.

20. Telephone interview with Nancy Meyer, owner, Yachts For All Seasons and Paul Mahoney, owner, Metropolitan Yacht, Charters, Dec. 1990.

21. E.L. Crow, Inc./Consultants The Market Opportunity to Expand Charter Fishing Boat Activity at the Westchester Avenue Bridge Waterfront Park Area, prepared for NYC Department of City Planning, 1988, 60.

22. Wendy Feuer, "Harbor Park New York City's Newest Park", Neighborhood, Summer 1985, 2-5.

23. Bruce DeYoung, Ph.D., Marina Marketing Service Toward the 21st Century, 1989, National Marina Research Conference, 224-45.

24. U. S. Dept. of Commerce, NOAA, National Ocean Service, 50 Years of Population Change Along the Nation's Coasts 1960-2010, 1990, 3.

25. Heskett, 1987 from DeYoung.

26. DeYoung, 248.

27. NOAA, 7-8.

28. Ibid, 10-11.

29. New York Division of Tourism.

30. see endnote 20.

31. Maritime Support Services Location Study; Task 2, p. 5.33.

CHAPTER 6: RECREATIONAL BOATING

Recreational boats include a wide variety of waterborne vessels owned and operated for personal use in leisure and sporting activities such as fishing, waterskiing, racing, day and overnight cruises. Since the Colonial period, the Harbor has been used for recreational boating with different types of boating rising and falling in popularity over time as the Harbor changed. After a period of gradual decline over the first half of this century, recreational boating began to increase steadily in the 1950's, with a marked upswing over the past decade. Several factors have contributed to this resurgence:

* Heavy maritime and industrial traffic in the harbor contributed to a decline in many types of recreational boating activity prior to the 1950's. Changes in technology and industrialization have caused maritime and industrial traffic to consolidate. [1]

* New waterfront residential and mixed use developments and public and visual access to the water have renewed the public's awareness of the waterfront and increased focus on the Harbor's potential for recreational use.

* Water quality improvements have increased the Harbor's appeal for recreational boating and associated activities such as fishing. These improvements are a result of the reduced industrial pollution and domestic sewage outfall and surface runoff, and of the Army

Corps of Engineers' Harbor Drift Program.

* A demographic shift, wherein `baby-boomers' are entering their peak earning years, coupled with an economic upturn, has increased the amount of disposable income available for purchase of boats and related equipment. In 1987 Americans spent approximately $7.74 billion on boat purchases and close to $10 billion more on such things as storage, accessories, fuel, maintenance and insurance.[2]

* Technological changes in boat building, such as the use of materials like fiberglass, and innovations in engine design have decreased the cost of owning a boat and made some boats easier to operate.

HISTORY

Boating as a sport in the New York-New Jersey Harbor began in a spontaneous and unorganized fashion. The rise of recreational boating was closely linked to the commercial and mercantile needs of the Harbor and started in the form of competition between working boats.

Rowing

The rowing boats of the Colonial Era served as the Harbor's first watertaxis. Competitive rowing was encouraged by passengers attempting to reach incoming ships first, for news and supplies. Watermen raced against each other trying to prove who was the fastest. The first reported rowing race in New York Harbor was in 1757 for a prize of $20.00.[3]

By the beginning of the 19th century, rowing competitions began to attract more rowers and observers. In 1820 a race between an English crew of Thames Watermen and the American New York Whitehallers attracted an estimated 20-50,000 spectators.[4] A newspaper report of a race between the Fulton Meat Market crew and the Whitehallers stated that "the harbor was magnificent. It appeared as if the city had poured forth all its inhabitants to witness some great contest on which their existence depended."[5]

By the mid-nineteenth century, sports and recreation began to be viewed as a way to establish order and improve the health and well being of city residents through physical activity and access to fresh air. Recreational boating was influenced by these changing attitudes and grew into an increasingly organized sport within the Harbor.

By the 1870s, 74 amateur rowing clubs were listed in New York, making it the national capital for rowing.[6] The National Association of Amateur Oarsmen was founded in 1872 in New York. One of its main goals was to establish a common set of rules and regulations for the sport.

By the late 1800's, the Harlem River was Manhattan's rowing center. It was "considered to be one of the premier rowing capitals of this country."[7] Approximately 16 boathouses stretched from Spuyten Duyvil to the Polo Grounds, with the major concentration between 149th and 159th Street.[8] Growing numbers of amateurs, representing a broad spectrum of the population, replaced

professionals, developing the sport to Olympic levels.

Changing demographics, increased industrialization, and the construction of the Harlem River Drive in the 1930s combined to bring an end to much of the rowing on the Harlem.[9] By 1950, only five boathouses remained on the Harlem, including Columbia University's at Spuyten Duyvil and four others in the area of Sherman Creek. Only Columbia continued to row competitively. By 1978 the only remaining boathouse was Columbia's.

The creation of Orchard Beach Lagoon during the 1930's, through Robert Moses' connection of Rodman's Neck and Hunters Island to form Orchard Beach, engendered a new area for rowing. In 1967, the lagoon was straightened and a 2000 meter course was created for Olympic rowing and canoeing trials.

Sailing

Yachts, defined as sailing boats used for pleasure cruising and racing, had their beginnings as work boats.[10] There are early reports of boats being specifically built for pleasure yachting in the Colonial era, but little happened in yacht development until the nineteenth century when two distinct groups of yachts emerged. The first were small open boats adapted from fishing and oyster boats.[11] The second group, schooner and sloop type cabin boats, were grander and larger in scale and size, well-staffed with both seamen and cabin servants, and owned by the wealthy.[12]

Large yachts, with a full crew and an anchor watch,

could anchor or moor in any deep water area in the harbor, including the same areas used for general shipping. Small craft, however, sought the shallow, protected mudflats suitable for the mooring of sloop boats, which required only two feet of water. Shoal coves were found on the Hudson, East and Harlem rivers, a large area at Hoboken, at Communipaw just below Jersey City, and farther south in Bayonne. Even the higher shores of Staten Island offered shelter in small bays, and there was almost unlimited mud along the Brooklyn and Long Island Sound shore.[13]

The establishment of the New York Yacht Club in 1844 marked the beginning of organized sailing in the New York-New Jersey Harbor. Three additional clubs were established by 1865. These were the Brooklyn Yacht Club, at the head of Gowanus Bay, the Jersey City Yacht Club, whose members sailed in Communipaw Bay, and the Hoboken Yacht Club.[14]

After the Civil War, interest in all types of sports increased, including yachting. By 1872, fifteen yacht clubs had been established in the area.[15] By 1900, Mannings Yacht Registry listed 24 clubs located around the Harbor in such areas as Gravesend Bay, Coney Island, Jersey City, Atlantic Highlands, Bowery Bay, College Point, Jamaica Bay and City Island.[16]

In the early part of the twentieth century, yachting began to move out of the Harbor to such places as Eastern Long Island and Narragansett Bay in Rhode Island, due to the gradual increase in commercial use of the Harbor. Increased water

pollution also contributed to the decline in yachting in the harbor. The Atlantic Yacht Club, situated at Seagate in Coney Island, was one of the major clubs in the New York area until commercial traffic and water pollution gradually ruined the Lower Bay area for sailing purposes. The club closed in the early 30's.[17]

Canoes

The first canoes used in New York Harbor in the Colonial era were probably the dugout canoes that the early settlers acquired from the Native Americans local to the Harbor.[18] The most common type of canoe in the New York Harbor was approximately 15 feet long with a beam of approximately four feet. It was well suited for oystering in protected waters.[19] Settlers developed enough skill to use the canoe in protected waters and at times it was adapted to carry a sail (the Periagua). However, the canoe was ill-equipped to carry heavy cargo, and thus shipbuilders from Europe were brought to the States to construct boats suitable for carrying loads.[20] The first recreational canoe was introduced to New York Harbor from Scotland in the late 1850's. The canoe that was introduced was different from the 'native' canoe. It was almost completely decked like a kayak, with two or more sails and was about 16 feet long.[21] By the 1870s it had become an extremely popular craft in the Harbor. Because it was relatively inexpensive, it was known as the "poor man's yacht".[22]

By the early 1900's, a canoe similar to today's was in use. Modeled after the birch bark canoe and constructed either of wood or canvas, it was wider

and therefore more stable than earlier models. Shortly after World War II, many of the city's waters, including the Hudson along upper Manhattan, City Island, Jamaica Bay and College Point, were filled with thousands of canoeists on any given Sunday. Clubs and societies had been formed which sponsored outings, events and races. Canoeing remained popular until the 1950's. Some canoe clubs became yacht clubs housing motor boats; others disappeared altogether. The Inwood section of northern Manhattan, for example, at one time had seven boathouses on the Hudson. The last one burned in 1989.[23]

Motorboats

The first motorized recreational boats were developed in the late 1880's, when an auxiliary engine was attached to sail and row boats that had previously been fitted with steam engines. As these engines became more reliable and capable of going longer distances, boats were covered to provide protection for cruising; the distinct saloon and the cabin boat, were developed.[24] The saloon boat had the engine placed toward the bow, in front of a glassed-in cabin that protected passengers from noise and fumes. Though luxurious, they functioned poorly in rough weather because excessive weight and openness in the forebody made them easy to swamp. The cabin boat, probably modeled after the torpedo boat, placed the cabin forward and was therefore sturdier and better suited for overnight use. These early boats moved relatively slowly obtaining speeds of approximately 7 to 12 knots.[25]

As interest in racing these boats grew, the

technology improved as well. Boat designers discovered how hulls could be built to plane at higher speeds and still be controlled by their operators. In the post World War I era, unused airplane engines from the war were modified for motorboats. Production techniques were borrowed from the auto industry allowing for the inexpensive mass production of lighter, more reliable engines for boats.

During World War II, fiberglass was invented. This material was strong, waterproof, resistant to shipworms, easily moldable for mass production and proved to be very useful for boat development. It continues to be the most popular material used in the manufacturing of boats.

After World War II, there was an enormous increase in pleasure boat construction. Fuel was inexpensive and people had the discretionary income to spend. During this time, boats were designed to achieve speeds of 20 to 30 knots, even with large and comfortable interiors and galleys.[26]

Prior to the 1950's, the inboard engine transmitted its power to the propeller shaft, running through the bottom of the boat or keel. In the 1950's the inboard/outboard engine was introduced, making the engine easier and quicker to install and providing more interior space in the boats. In addition, these engines were lighter, more efficient, and thus capable of obtaining high speeds. Because of their lower cost they became available to more people.

Another development during the 1950's was the introduction of the jet engine. By the 1960's, professional boat racers using these engines could obtain record speeds of up to 276 mph.[27] Today, the distinction between power racing boats and recreational motor boats is blurred, enabling the purchase of cruising type boats that can easily obtain speeds of approximately 85 mph.[28] As boats have become faster, the design community has become increasingly aware of the need to design safety features into boats.

EXISTING CONDITIONS

Throughout the country, the popularity of recreational boating and related activities (e.g. waterskiing, fishing, windsurfing) has grown explosively. Nationally it was estimated that 8.8 million pleasure boats were owned in 1970, by 1989 the number had increased by 77% to 15.6 million, with a midway increase from 1980 to 1989 of 32%.[29] The actual number of persons participating in recreational boating is far higher than the number of boats owned. It is conservatively estimated that for every boat registered at least ten different people participate one or more times a year in recreational boating.[30]

In the study area, the number of registered boats has also shown a dramatic rise. New York City boat registrations have increased by 24% from 18,328 in 1980 to 22,652 in 1989 and by 46% from 108,246 to 158,253 in the same period for New Jersey (Statewide). The actual number of boats owned in the area is higher as not all boats are required to

be registered.[31] (It should be noted that between 1988 and 1989 New Jersey boat registrations suffered their first decline in many years - close to 10% decrease from 173,208 to 158,253. It is unclear if this is a statewide or concentrated phenomena. Nevertheless, it can probably be attributed to a weakened economy which has hit much of the recreational boating industry in the last year.) (See Appendix 6.1).

A review follows of the types of recreational boating activity that occur in the Harbor, the problems and benefits of their particular use, facilities needed to serve different types of boats, and trends that have occurred in the Harbor in the recreational boating industry, concluding with an overview by water body of where recreational boating takes place in the Harbor.

Four basic groups of boats are used: motorboats, sailboats, canoes/kayaks and rowing shells. Within each of these categories there is considerable variety in size, design, maneuverability and stability. In combination with the above, different water and weather conditions, and the skill and judgement of the boater, affect where and how boats are used (See Appendix 6.2.)

Market studies of sales and the distribution of boating registrations both indicate well over 50% of boats in the Harbor are within the range of 16 to 26 feet (See Appendix 6.1). Although there are no exact figures for the study area, national data indicates that approximately 60% of all boats owned are outboard or inboard engine motor boats, with

the majority being outboard engines, 27% are canoes and rowboats and 8.5% are sailboats.[32] No national data exist concerning the percentage of boats that are rowing shells, probably because there are relatively few when compared with other recreational vessels. The percent of motorized boats in the New York/New Jersey Harbor is probably higher than the national figures, because canoes and rowboats are found in higher frequency in inland waters and lakes than in coastal waters.

Boating Activity

Aside from being in close proximity to a particular body of water, boaters choose areas where the water is suitable for the intended activity. Often these areas differ from one activity to another. Where different activities occur together, they may become incompatible with each other if the concentration is too high or if there are unsafe boating practices taking place. In a worst case scenario this equation can result in fatalities. Other events result in injury or vessel damage, perceived or real harassment between participants, or the forcing of one type of activity out of an area because the boater cannot or will not compete as the waters appear too dangerous or unappealing for a particular activity.

Boating activity may also be incompatible with a particular environment, either because it is a sensitive natural resource, the water quality is unacceptable for primary or secondary recreational contact with the water[33] or the water conditions (e.g. currents, waves/wakes, depths) are unsuitable for an activity. (See Appendix 6.2). The chapter on conflicts will expand this discussion to include

maritime and industrial port users, ferries and commercial vessels.

A motorboat, broadly speaking, is any boat with a mechanically driven means of propulsion. For the sake of discussion, sailboats, canoes or kayaks, though legally considered motorboats if they have any sort of mechanical propulsion, will be discussed separately.

There are four basic types of activity: Motorboating, cruising or racing in a motorboat, jet skiing, waterskiing and fishing from a boat.[34] Issues that pertain to the operation of all types of motorboat activities will be discussed first.

Motorboating can occur in most parts of the Harbor depending on the craft's capabilities and water depth. Motorboating generally does not involve primary contact with the water. Water quality is far more important to such activities as waterskiing. Nevertheless, floating debris in the water can cause damage to the boat hull and propellers. A jammed propeller can cause a boat to stop suddenly, potentially causing injury if the passengers are thrown forward. If noise, wakes and increased turbidity occur, environmentally sensitive areas may be disrupted.

Motorboats vary in size, maneuverability and stability. Smaller boats tend to have less stability and are better suited for protected waters. Their stability is reduced considerably if they are loaded improperly or passengers are standing. The degree of responsibility of the

operator has a lot to do with whether they will conflict with other types of vessels. At high speeds, they become incompatible with most types of water activity. Boats traveling too fast may lose control and may flip or sustain hull damage.

The generation of wakes occurs at different speeds and varies depending on hull design and size. If large enough, wakes can cause other boats to alter their course to avoid the full impact of the wake or can cause damage to another boat through capsizing or swamping.

Federal and State regulations prohibit the operation of a motorboat in a reckless or negligent manner so as to endanger the life or limb of any person. Powered vessel operators are responsible for their own wake or wash. In New York State speed is limited to 5 mph within 100 feet of shore, dock, raft, or pier. (The differences between New York and New Jersey regulations are detailed in Appendix 2.1.) In New Jersey, legislation is pending (S-1527) which would restrict vessels to idle speed or 5 mph when operating within 50 feet of any shoreline protected or not.

Waterskiing is subject to special regulations that include time of day, distance from shore and adequate observation (See Appendix 2.1). Waterskiing usually requires a motorboat of 12'-14' minimum and speeds of 10 to 36 mph. The speed attained depends on the type of skiing being done, the size of the ski being used and weight of the skier. Considerable distancing is needed for waterskiing, since the measurement from the bow of

the boat to the skier is approximately 90 to 100 feet.

Good water quality is desired for waterskiing because of primary contact with the water. Areas high in floating debris are to be avoided because of potential risk to the boat passengers and skiers. Hazards can also occur if other boats get in between the skier and the boat crossing the tow line. In addition, the skier, if down, is difficult to see and vulnerable in congested waters. Most waterskiing occurs in calm, quiet waters, where the boats' noise can interfere with other activities which seek out quiet places such as fishing or kayaking.[35] Wakes can be created by this activity, posing a problem for smaller boats, though often these boats when planing throw a smaller wake than a similar vessel moving slower. The tendency of wakes to reverberate in small, enclosed bodies of water makes these areas less than ideal for the sport.

Personal watercraft, frequently referred to as jet skis (a brand name), are the fastest growing boat type in the nation, having increased by 100% from 1987 to 1989.[36] They are some of the smallest craft in the motorboat family. Due to size, limited draft, instability, and limited fuel carrying capacity, these craft tend to stay close to shore. Because an operator can easily have direct contact with the water, areas with good water quality are desired for this sport.[37] Jet skis frequent the same type of areas as swimmers, small sailboats and motorboats, waterskiers and canoes/kayaks. Their speed and high maneuverability allow them to come

close to other boats, causing conflicts and potential danger if not operated responsibly.

Jet skiing is subject to special regulations (see Appendix 2.1) governing speed when close to the shoreline and the times of day they can be operated.

Fishing in small boats, which are usually less stable than larger ones, requires calmer waters. Wakes and strong weather conditions can increase the potential for accidents.[38] Fishing from boats occurs most often in areas where water quality is good although they can also be found in other waters. Fishing does not involve high speeds; instead, boats tend to move slowly, drift, or sit at anchor.

Fishing is incompatible with jet skiing, waterskiing and other high-speed boating which may cross lines or create wakes around the fishermen. Noise can also disturb the quiet frequently sought by fishermen. If the waters become too congested, the area becomes less attractive for fishing.

Ocean fishing differs from the majority of fishing activity that takes place in the Harbor. In this case, boats must be large enough to sustain wave action and heavier seas. Generally, larger fishing vessels ply the offshore waters while smaller boats are confined to the quieter waters of the harbor.

Sailboats are divided into two separate activities: sailing and windsurfing. Sailing is more dependent on weather than motorboating because wind is used

as the means of propulsion. Smaller sailboats lack stability to handle heavy weather or waters and tend to stay in protected bays whereas larger craft can be designed for larger, more volatile water bodies.

The deep draft of sailboats prevents them from going in shallow areas because of the risk of grounding. Larger sailboats have auxiliary power that enables them to move out of an area if the wind dies. These engines, along with sailboat hull design, usually allow for only minimum speeds when in use. Sailing usually occurs in an area where there is sufficient room to tack back and forth as the boat moves by catching the wind. This can be confusing to other boaters if the waters are congested. Accidents can occur if the operator isn't paying attention, especially when the sail blocks the field of vision. Furthermore, wakes from motorized boats can cause a sailboat to alter its course.[39]

Windsurfers (or sailboards) differ from other sailing craft in that the boats are similar to surfboards and maneuvered by operators shifting their weight and pivoting the mast to move the sail as they plane across the water. A beginner can drift while trying to maneuver the board. Even the most experienced windsurfer can tire especially in high winds. Strong offshore winds can easily carry a windsurfer out to sea and cause difficulty getting back to shore. Large wakes and fluctuating wind conditions can present difficulties. Windsurfers, therefore, tend to remain within a small area close to shore.

Given the strenuous nature of these sports, windsurfers, canoeists, kayakers and rowers all require higher degrees of physical fitness than most other types of boaters.

In windsurfing, direct contact with the water is inevitable and thus areas where the water quality is good and free from debris are sought out. The quality of the water's bottom is also important, especially near launching sites. The wakes and the potential for collision make them incompatible with high speed motorized vessels. The problem is compounded because, like waterskiers, the windsurfer is difficult to see when down. Larger vessels may also block the wind and effectively stop the windsurfer. Because many of the conditions that are ideal for windsurfing are also ideal for swimmers, they often compete for the same space. Unless care is taken there is a risk of collision near the shoreline.[40]

Canoes and kayaks are used for exploring areas along the shore or to venture into less protected waters. There are several types of boats in this class with varying degrees of stability. Canoes are highly unstable in strong wakes, heavy winds and sea conditions. It takes years of practice to venture out in canoes beyond very calm conditions. Kayaks are much more seaworthy. Winds, waves and wakes present less problems, except for the very narrow high performance (British) kayaks which amateurs tend to avoid due to their extreme lack of stability. One of the most commonly used in this area is the sea kayak. A large number of these are

of the folding variety, requiring few facilities for launching.

Because they ride close to the water these vessels are difficult to see. Good knowledge of weather, currents and boating areas is required for safe operation. Most accidents occur when these factors are misjudged. Going against currents or tides or in heavy winds decreases maneuverability, slows movement and increases physical strain.[41] Waves and wakes are a large problem for less skilled canoeist and kayakers. Wakes, noise and the dangers of being hit by high speed boats cause many to move out of waters heavily congested with motorboats. The tendency of many of these small vessels to be in protected shallow waters can cause conflicts with jet skiers who also have access to shallow water and can create wakes.[42]

Rowing shells are one of the most unstable and fragile boats found in the Harbor. Waves and wakes can cause shells to crack or be swamped. Areas where the water is relatively calm are desirable. Stability increases with the number of oars. Newer models of recreational rowing shells have increased stability and durability increasing the areas they can travel.

Rowing usually takes place in narrow protected waters that are not desirable to sailboats. The single or doubles row backward which makes it difficult to spot traffic. In collegiate or group club situations a motorized boat rides alongside for supervision and coaching.

Facilities Requirements

Recreational boating facilities include marinas, yacht clubs, moorings, wet and dry rack storage, boat trailer ramps, hand boat launches and boathouses (See Appendix 6.3). Their location depends on a variety of factors, including upland zoning, access to waters appropriate to a particular water sport, the ability to provide security for the facility, and shelter from wave/wake action. Sufficient in-water and upland area and services to provide for the needs of boaters are required.

Where areas of adequate depths are not available, dredging will be required to allow boats to pass freely. Dredging can add substantially to marina development costs. Bottom conditions are particularly important when piles must be driven. If the bottom is either very rocky or too soft, the cost of driving piles will significantly add to the expense of development.

Strong currents or heavy wave action can make it difficult to maneuver boats in and out of a facility. Wave and wake action can also damage bulkheads, docks and boats docked at a marina. Wave and wake actions are persistent problems in the study area.

Heavy commercial traffic too near a facility can create conflicts between recreational and commercial boats as they enter or exit the facility. In addition, ice can also create problems by heaving piles and fixed docks, or shearing piles as the ice flows with the tide. If there is inadequate natural protection, these problems can

sometimes be alleviated through the use of artificial structures such as breakwaters, which protect docked boats from wave/wake action. Ice breakers are used to protect marinas from ice damage.

Upland space requirements for marinas and other boating facilities include areas for parking, room for support services such as repair and maintenance, and storage and space for sale of food and supplies. Infrastructure considerations include road access for patrons, fire and sanitary services, potable water, and electricity.

Finally, existing natural areas such as shellfish beds, wetlands, extensive mudflats, or nesting areas may make an area unsuitable for boating facility development. Another problem prevalent in the Harbor is contaminated sediment, which may make dredging unadvisable. The awareness of the environmental impacts of coastal construction and stricter governmental regulations have significantly lengthened the planning and design time required before permits are secured and construction can begin on marina projects.[43]

Marina Trends Since 1970 the total number of marinas in the Harbor has decreased, while the average marina size has grown larger. Residential development with accessory slips have also been built on sites previously occupied by marinas. Overall, the total number of boat slips and boat registrations have both increased. These trends probably reflect the closing of the smaller, less economically viable facilities and the expansion and opening of new

marinas large enough to be profitable. Industry spokesmen observe that new marinas must have at least 200 slips to be profitable.

Marina operators interviewed in New York City have consistently reported waiting lists for slip space. Coast Guard regulated Special Anchorage areas in Sheepshead Bay and Great Kills Harbor, used predominately for boats under 40', have reported a steady increase in the length of waiting lists for the use of these facilities. Additionally, studies show that much of the demand for recreational boating from residents of the New York/New Jersey Harbor area is now met outside of the Harbor itself. Marina slips outside of the Harbor may be less expensive and more easily obtainable and waters perceived as cleaner and more accessible.[44]

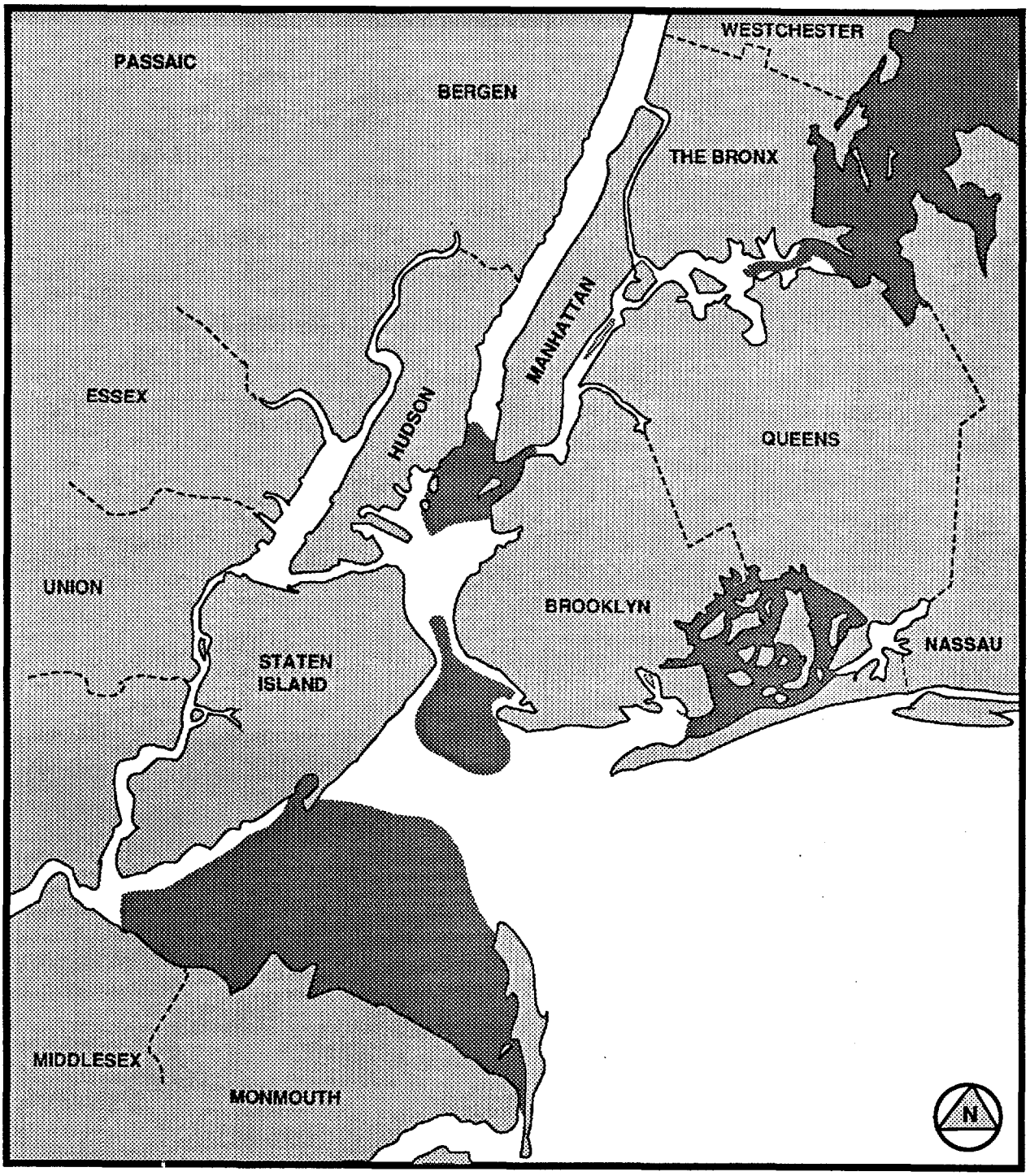
RECREATIONAL BOATING LOCATIONS

The study area contains fourteen major bodies of water and many smaller tributaries and bays. This section describes the areas where recreational boating takes place and the location of boating facilities. (Further detail on water conditions can be found in Appendix 1.1.) Figures 6.1 through 6.4 and Appendix 6.4 show the approximate number of marinas, yacht clubs, slips, moorings, boat trailer ramps, hand boat launches, and rowing sites throughout the harbor, by waterway. Boat slips at marinas located just outside the study area, numerous transients coming through the area, and an unknown number boats docked behind private residences and at yacht clubs, constitute sources of additional unquantifiable recreational boaters.

RECREATIONAL BOATING CHAPTER 6 FIG. 1

- **CONCENTRATIONS OF MARINAS AND YACHT CLUBS: EXISTING**

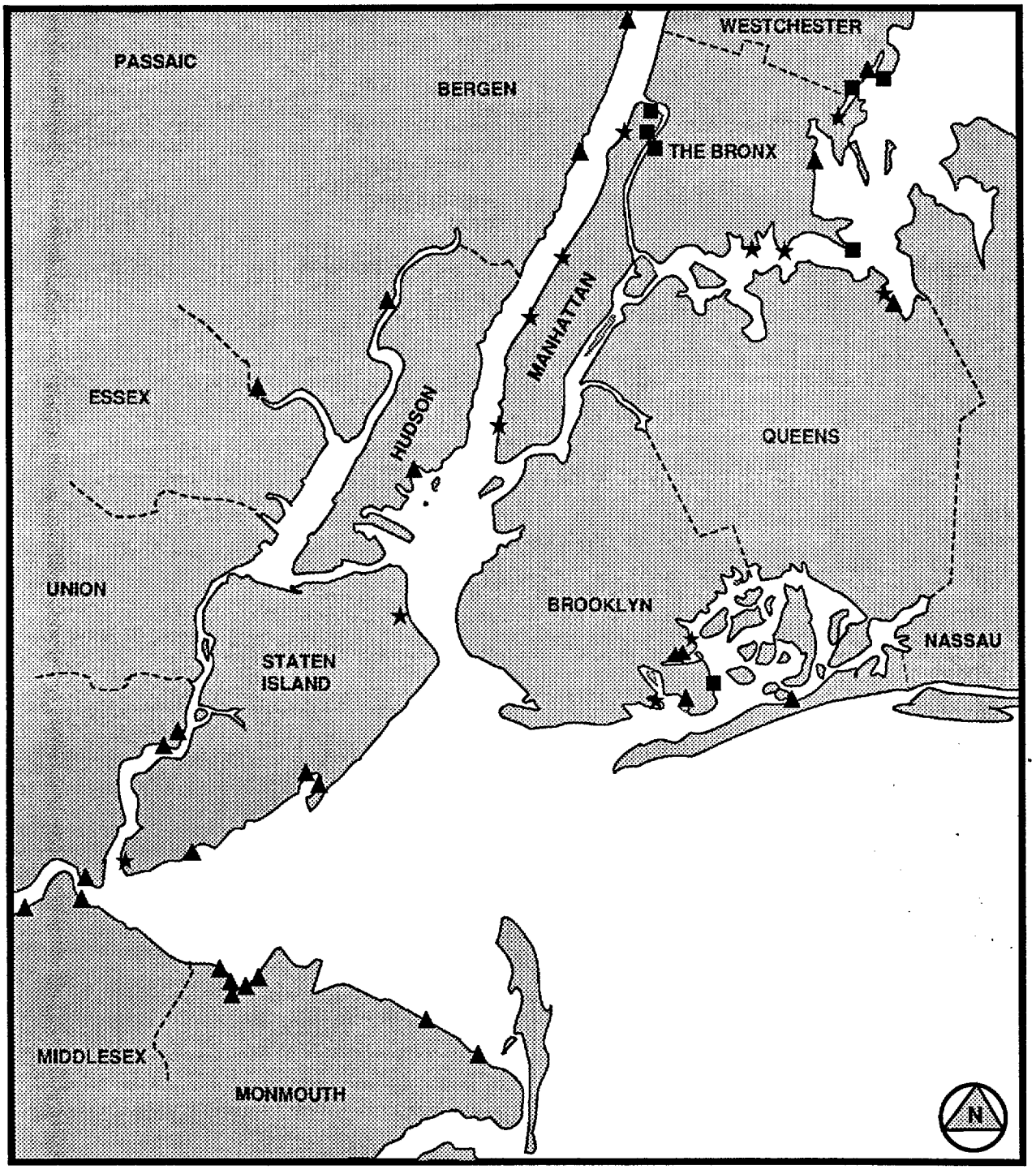
NEW YORK/NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 2

CONCENTRATION OF MOTORBOATING AND SAILBOATING: EXISTING

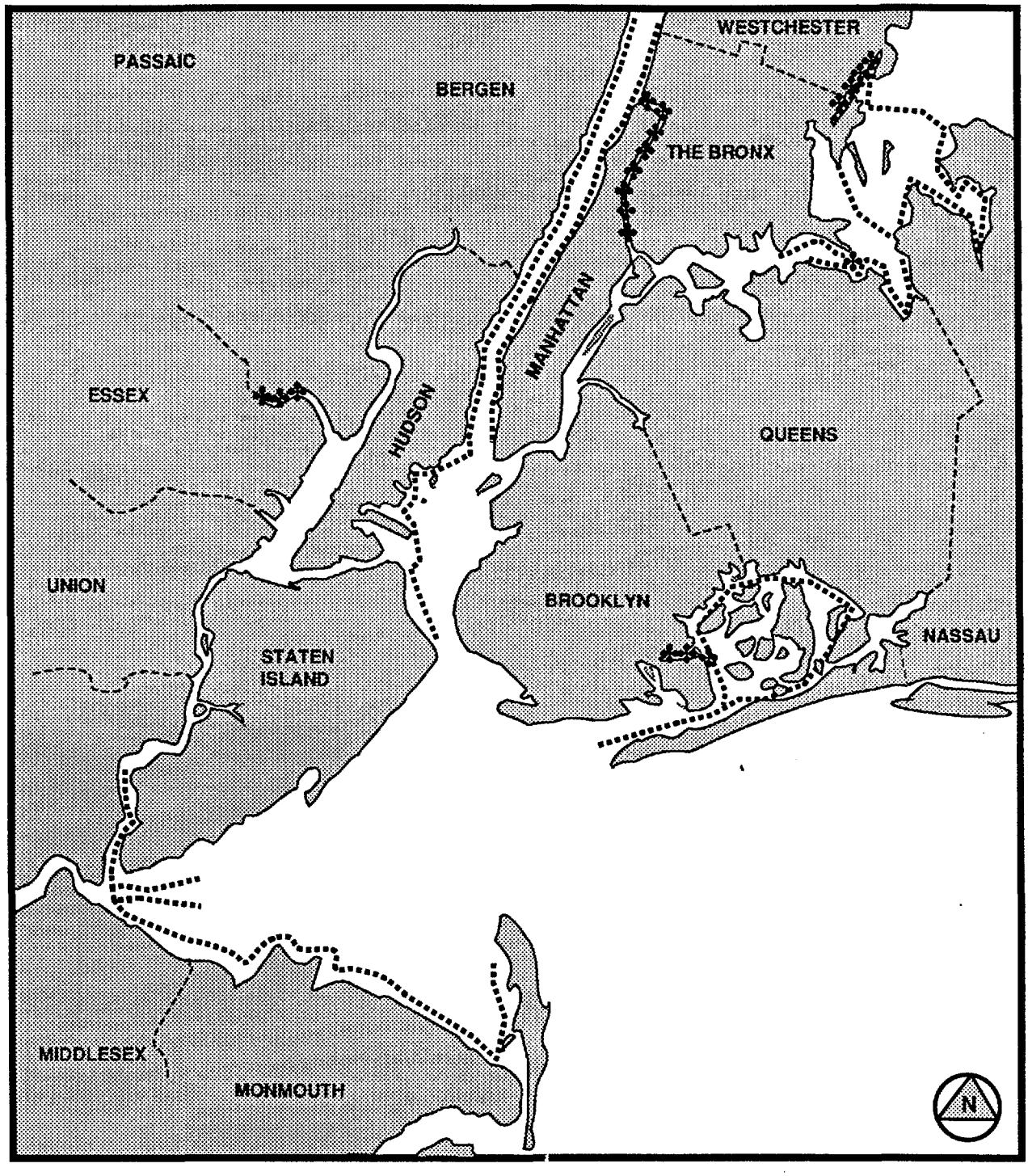
NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 3

★ HAND BOAT LAUNCH: EXISTING
■ ROWING SHELL/BOAT HOUSE: EXISTING
▲ BOAT TRAILER RAMP: EXISTING

NEW YORK/ NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 4

▪▪▪▪ CANOE/KAYAK ROUTES: EXISTING
✣ ✣ ROWING SHELL ROUTES: EXISTING

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION

Long Island Sound

Long Island Sound is in the northeastern portion of the study area. It is entered from the East River between Throgs Neck in the Bronx and Beechhurst in Queens, affording access to northern Long Island as well as Connecticut, Rhode Island and points beyond. The Sound offers some of the best boating waters in all of New York State and is used by all types of boats. It is excellent water for motor boating and fishing. Sailing is also good in this area. However, in mid-summer the winds can be variable and make it difficult for sailing at times. Smaller boats, such as windsurfers and personal watercraft, use the waters around City Island and Throgs Neck, even though the sailing can be difficult due to tides, wakes, fluctuating winds, few launching sites, poor water quality and floating debris. The area is also popular for fishing. In addition boats transiting into the East River wait in the Sound for tides and currents to be advantageous for their passage into the River. During peak boating season, crowded waters make it difficult for smaller boats to operate.

Pelham Bay Lagoon, in the northernmost part of the Sound, is located within Pelham Bay Park. The lagoon waters are calm, have minimal tidal currents and are protected from the wind. Although inadequate for long distance rowing, this is considered one of the best rowing sites in the city. Boat houses are located to the north in New Rochelle and rowers from the New York Athletic Club, Iona College, Iona Prep and Sarah Lawrence regularly row down to use the lagoon. A hand boat launch is also located here. Small boats using the

Park's ramp may remain in the lagoon or travel from here to Stepping Stone or Execution Rock lighthouses, Hart Island, City Island or David's Island in Westchester or across the sound to Little Neck Bay.[45]

Until the summer of 1990, the Lagoon was also used by powerboats, its calm waters especially popular among water-skiers. The lagoon had become very congested and conflicts occurred between motorized and non-motorized boats, with the former operating at unsafe speeds, creating damaging wakes and harassing other boaters. The major conflict appeared to be between rowers and water-skiers. Rowers complained that the speed and wakes from motorized boats had caused some shells to be swamped or cracked. Many water-skiers responded that it was the only place to ski for championship level skiing and that the waters could be shared. In addition, concerns arose that motorboat wake was eroding the shoreline and disturbing bird nesting areas. This led to the New York City Council passing a law restricting the speed limit in the lagoon to 4 mph. Because the law was not enacted until November of 1990, it is too early to tell what effect it will have.

In the Sound to the east of the Lagoon is **Orchard Beach**, whose waters are restricted to navigation to protect swimmers. A bridge connecting City Island with the mainland crosses at Rodman's Neck. There is a no wake zone in the channel between Rodman's Neck and City Island. The bridge is used for fishing and problems occur with boaters becoming fouled on fishermen's lines.

City Island, located east of Pelham Bay Park, lies between Long Island Sound and Eastchester Bay. It has long been considered one of New York City's major boating centers. It has deepwater facilities, especially along its eastern shore. There is a major concentration of marinas, marina support services and yacht clubs. Boat rentals are also available. It is also the City's major location for sailing schools. Classes range from beginners to cruising classes and run from April to October. The best times for sailing classes as well as sailing in general are reported to be from April to early July and then September and October as the wind in the area tends to be less dependable in the middle of the summer.

In **Eastchester Bay**, currents are minimal and depths sufficient for most boats. Depths decrease towards the mouth of the Hutchinson River at the head of the bay. Groundings occur on Big Tom and Cuban Ledge. The area offers easy access to the sound and is popular for sailing, motorboating, and fishing. As with the Sound, the winds can be variable in the mid-summer, sometimes causing difficulty for sailboats. The Bay's northeastern shore is parkland with tidal wetlands. City Island lies to the east. The western shore has six marinas and yacht clubs totalling approximately 900 slips. A private boat trailer ramp is located south of Pelham Bay Park and there are general and special anchorage areas.

A rowing facility used by the State University Maritime College and St. John's University is located south of Eastchester Bay, in the Sound

beneath the Throgs Neck Bridge at Fort Schuyler. This area is unusual for rowing because of its exposed location. To avoid difficulties presented by wind and choppy waters that come up later in the day, rowing takes place early in the morning. Conflicts with other recreational boaters are avoided because rowing occurs during the school year and not in the peak summer boating season. Some windsurfers also use the area, although they experience difficulty related to wakes when the waters become congested.

Little Neck Bay in northeast Queens opens onto the southern shore of Long Island Sound. It is approximately two miles long and has good depths for all kinds of boating. The waters are calm and sheltered, making it attractive to fishermen, water-skiers and paddlers. A private yacht club is located on the eastern shore of the bay. On the western shore there is a New York City Parks Department concessioned marina and a boat trailer ramp. Due to its construction, trailered boats must be launched and retrieved in or around high tide. Limited parking restricts access to the ramp. The ramp is also a Parks Department designated hand boat launch. Boaters either remain in the Bay or travel into the Sound and Eastchester Bay or towards Flushing Bay and the East River.

Upper East River

West of Long Island Sound is the entrance to the upper part of the East River which extends to Hell Gate. The currents increase as one heads towards Hell Gate. This portion of the river is used by sailboats, motorboats, canoes and kayaks, though not as heavily as the Sound. Many boats use the

waterway to transit either to the Hudson river via the Harlem River or to Long Island Sound, or to explore and fish in some of its bays.

There are restrictions for masts over 125' in the vicinity of La Guardia Airport and a 35' mast height restriction in Flushing Bay to avoid penetration of airplane flight paths. Harbor police have voiced security concerns about boats coming too close to Rikers Island where a correctional facility is located. No regulations restrict navigation around the Island except the above regulations related to La Guardia Airport. A reef off of College Point covered by 6' of water should be avoided by deep draft boats.

Little Bay contains the U.S. Army's Fort Totten, located on a peninsula jutting into the Bay's eastern shore. The Bay's western shore contains tidal wetlands. Depths range from 6' to 10'. The area is used for fishing and a general anchorage area. To the west is **Powells Cove**, between Whitestone and College Point, which is shallow and contains wetlands on all sides. No facilities are located within this cove; however, shallow draft boats can and do use these waters.

The area of College Point between Powells Cove and **Flushing Bay** has the largest concentration of boating facilities in northern Queens, centered on the west side of the College Point peninsula. Depths north of College Point range from 2' to 5', and 1/2' to 10' on the western side. Erosion of soil into the Bay from the adjacent upland has

diminished depths at some of the marinas in this area. The southern and part of the western shore of Flushing Bay is parkland with one marina. The channel depth within the bay ranges from 9' to 12'. The channel extends about 0.8 miles into Flushing Creek at the southern end of the bay. A restricted area in the southern part of the channel prevents conflict with airplane traffic. No vessels with height greater than 35' and no unnecessary delay of other vessels are permitted. The majority of recreational boats in the bay head out to the Sound. The water quality in the bay is acceptable for secondary contact but not recommended for primary contact recreation, nevertheless, there is a long history of complaints of strong odors emanating from the combined sewer outfalls which can make the bay highly unattractive at times.[46]

On the **north shore of the Upper East River** there are a few marinas. A Parks Department hand boat launch is located at Ferry Point where the East River meets Westchester Creek. A boat trailer ramp is located at Clason's Point. Because cars are often dumped off the ramp, its access is semi-restricted access, as a Parks Department employee must be contacted to open it. The ramp enters directly into the East River and currents can create difficulties for small boats.

Boaters use these waters for fishing and also head out to the Sound. Some head west toward the Hudson or Lower East River for other boating waters. Boating destinations from the hand boat launches for canoes/kayaks include the area's wetlands, Westchester Creek, and shipwrecks and lighthouses

in the area. Heading east from the launches, boats travel into the Sound and to the many islands around City Island including Hart and David's Island (Westchester). Heading south, boaters travel to Little Neck Bay and west to Flushing Bay and Hell Gate.[47]

Hell Gate

The Upper East River leads to the turbulent waters of Hell Gate. Randall's, Ward's and Mill Rock Islands are located there. This section of the East River is notorious for its strong tidal currents which can run at 4 knots. Whirlpools and standing waves can also be found. The waters are frequently less than ideal for recreational boats, not only because of the water conditions, but also due to heavy commercial traffic which itself must contend with the adverse conditions.

Hell Gate is part of a link from Long Island Sound to the Hudson or Lower East River which connects to other boating waters. Boaters usually wait outside Hell Gate for the currents to be advantageous before entering. Only one recreational boating facility is located in this portion of the river, a rowing facility at the Fire Boat Pier at about 91st Street in Manhattan, sited in a small cove which is somewhat protected from the prevailing conditions of this area. Although the pier is in need of renovation, a 15 member club continues to use it. Once outside of its protection, they must contend with currents and other adverse river conditions. Rowers travel from this site up into the Harlem River. They are generally on the water from 6:00 to 7:15 AM before heavy traffic begins. The site is attractive to rowers because of its proximity to

midtown and lower Manhattan. Kayakers also use the area. All boaters require considerable knowledge and experience to use this area safely.

Harlem River

The Harlem River links the East River at Hell Gate to the Hudson River through Spuyten Duyvil Creek. Due to its narrowness, it is generally not a destination for motorboats or sailboats, but is used as a thoroughfare between the Long Island Sound and the Hudson. Passage is problematic for boats needing a vertical clearance of greater than 24'. The River is spanned by over a dozen draw and fixed bridges, and passage of boats greater than 24' are subject to drawbridge regulations. There is one marina and yacht club in the river at Sherman Creek. Minimal depths make it difficult to enter or leave.

The narrowness of the river and numerous bridges allow for few areas where the speed limit can exceed 5 mph. Anecdotal information, however, indicates that boats frequently exceed this limit when transiting through it.

The river's most regular boaters are rowers. The Harlem River is considered one of the best locations for rowing in the city despite debris, poor water quality and objects being thrown from the bridges above. Columbia University has rowing facilities adjacent to its athletic field on Spuyten Duyvil Creek. Fordham and Manhattan College share a facility on the west side of the Harlem River near Sherman Creek. The Empire State Rowing Association's facilities are located at Roberto Clemente State Park. Only Columbia's

facility is a permanent structure. The lack of adequate facilities limits the number of participants.

Rowers tend to row in the early morning and evening, choosing their direction in accordance with the tide. When motorized recreational boat traffic becomes too heavy, usually from late spring to early fall, the river is less safe for rowers. Wakes from passing traffic are the major problem, hitting the bulkheaded shore and reverberating back into the river repeatedly. Rowers experience extended waiting periods, damage to rowing shells and swamping. Damage to piers is also attributed to the wake. Currently, reconstruction work at the landmarked University Heights Bridge has closed off half of the waterway, further narrowing the channel through which all boats must pass to about 75'.

Hudson River

Within the study area, the Hudson River runs between Manhattan and the Bronx on the east and Bergen and Hudson counties on the west. It is a narrow waterway with relatively strong currents. Waves occur naturally, and wakes develop from passing large boats and shipping traffic. Floating debris, especially when the tide changes, is also a problem.

Currents and unpredictable winds as well as commercial traffic, especially in the lower portion of the river make the Hudson better suited for larger engine powered boats. Sailing is difficult due to the narrowness of the waterway which causes variable winds and need for frequent tacking. A major amount of recreational traffic consists of

transient cruising boats which head either east/west to and from Long Island Sound via the Harlem or north/south toward Albany or to the Upper, Sandy Hook, Raritan and Jamaica Bays or to the Atlantic Ocean.

Occasionally, rowers come out of the Harlem River and use the area around Spuyten Duyvil. Canoe/kayakers travel along the river to view the Palisades and Manhattan skyline. There are some reports of waterskiing and windsurfing in the sheltered areas on the river, but these activities occur infrequently.

Above the George Washington Bridge there are two marina/yacht clubs, both in New Jersey. Two boat trailer ramps exist on the western shore and a hand boat launch is located on the Manhattan side at Inwood Park near Dyckman Street. In addition, the Inwood Canoe Club is located here. Until a recent fire, canoeing lessons were given here.

Below the George Washington Bridge, two marinas are located on the Manhattan shore. The first, the 79th Street Boat Basin, has serious problems with silting, making it difficult for many boats to leave or return except at or around high tide. In addition, there are frequent complaints about wakes from passing traffic causing damage to boats docked at the marina. The second marina is located at Battery Park City, with 26 slips for luxury yachts between 80' and 150'. On the western shore there are six existing marinas totaling approximately 1000 slips. Canoes and kayaks use three hand boat launches on the Manhattan shore located at 148th

Street, 79th Street, and Pier 26 in lower Manhattan for trips up and down the Hudson River or to the Upper Bay. As a rule they stay to the sides of the river except to cross.

Lower East River

The Lower East River extends from the Battery to Hell Gate and separates Manhattan from Brooklyn and Queens. Strong tidal currents, heavy shipping traffic, and ferries make its waters difficult for recreational boats. Boats generally wait for currents to be advantageous before entering the river. There are only two marina/yacht clubs on the river. One is a sailing school located at South Street Seaport with twelve 24' sailboats. The sailing school generally conducts classes and regattas in the Upper New York Bay. The other facility is a small marina on 23rd Street.

Boats generally use the river for transiting. While there are no designated hand boat launches, areas in lower Manhattan near the Brooklyn Bridge are reportedly used.

The Upper Bay

The Upper Bay is bounded by Hudson County to the west, Staten Island to the southwest, Brooklyn to the east and Manhattan to the north. Located within the bay are Liberty, Ellis and Governor's Islands. The East River, Hudson River, Kill Van Kull and Lower Bay all intersect with the bay. The Upper Bay is the busiest section of the harbor. A handful of marinas and yacht clubs are sited on the bay. Two are in Staten Island and one is in Hudson County. A boat trailer ramp, used by canoers and kayakers as well, is located at Liberty State Park in Jersey City. A hand boat launch is located at

Alice Austen Park in Staten Island. The site can be difficult in strong winds.[48] A general anchorage area fronts the site; small boats using this launch must take caution to avoid conflicts with large working vessels anchored and entering the anchorage area.

The skyline of Manhattan, the Statue of Liberty and Ellis Island all make the Upper Bay a destination for boaters. Boats also transit through the area to and from the Hudson or Lower Bay. From here, canoes and kayaks head to the above destinations, to Hoffman and Swinburne Islands in the Lower Bay or to Jamaica Bay.[49] In the southern part of the Upper Bay near the Narrows, sailing and motorboating can also be found. There are strong currents along these routes, variable winds, wave and wash from heavy commercial, maritime and ferry traffic, and floating debris. Concern that canoes and kayaks and other recreational vessels not get too close to these other port users has been voiced by larger vessel operators.

Kill Van Kull

The Arthur Kill, Kill Van Kull and Newark Bay are among the Harbor's most heavily travelled commercial waterways. Major containerports and oil terminals are located along their banks. These waterways, along with the tributary Hackensack and Passaic Rivers are heavily degraded. Water quality and heavy commercial traffic limit their attractiveness to recreational boating. The 1500 foot wide Kill Van Kull separates Staten Island from Hudson County. Shooters Island lies off Staten Island shore. Shoals, obstructions and numerous wrecks lie on both sides of the 800 foot to 1000

commercially travelled channel. One small yacht club is located on the Staten Island side which can be entered or exited only in or around high tide. Some power boats and canoes and kayaks traverse the area, usually remaining inland of the channel.

Newark Bay

Hudson, Essex and Union counties and the northwest shore of Staten Island surround Newark Bay. The Hackensack and Passaic rivers flow into the north end of the bay and the Kill Van Kull and Arthur Kill lie to the south. Outside the dredged channels the waters are shallow.

Recreational boats, especially motorboats, cross the waterway en route to the Upper Bay or Sandy Hook and Raritan Bays. Canoes and kayaks also explore the area. Only two yacht clubs are located in Hudson and Essex Counties on the east side of the bay. Recreational boats stay close to the eastern shore and out of the channel. Some fishing and crabbing does take place, despite poor water quality.

The Hackensack and Passaic Rivers

The Hackensack River is navigable for approximately 17.8 miles. It has six marinas with 213 slips, three yacht clubs and one boat trailer ramp. Boaters reach the Raritan, Sandy Hook, and Upper Bays via Newark Bay and the Kills. It receives little recreational traffic for reasons similar to Newark Bay.

The Passaic River flows into Newark Bay. It receives little recreational traffic due in part to river conditions and poor water quality similar to Newark Bay. There are two marinas with a total of

18 moorings and one boat trailer ramp on the portion of the river in the study area.

A rowing facility in Kearney is used by Kearney, Bellville and Nutley High Schools. Approximately 275 to 300 students participate in the rowing program from March until June. A few other people use the facility year round. There are few conflicts with barge traffic as the railroad bridges do not open during rush hours and the barges go upriver at night time. The main problem for the rowers is the amount of debris in the water which can damage the shells and break oars.

The Arthur Kill

The Arthur Kill separates Staten Island from Union and Middlesex Counties. It is a narrow waterway of approximately 1500' to 2000' breadth with a dredged channel of 500' to 800', characterized by numerous sunken vessels on both shores. Prall's Island, a wildlife sanctuary with restricted access, is located in the upper part of the Kill.

A small marina has been developed in Elizabeth, New Jersey on Arthur Kill near Newark Bay. Additionally, a sizable waterfront park exists in the same vicinity. Most pleasure boats docked at this marina travel down the Arthur Kill to Raritan Bay for fishing, skiing or sailing activity. Although this marina is protected by a wooden breakwater, wake problems from passing maritime vessels have been noted.

There is a concentration of marinas along Smith Creek in the lower part of the Arthur Kill and one boat trailer ramp. Here, sheltered waters make for

easy launching. A hand boat launch is located at Conference House Park at the southern end of Staten Island. Paddlers go from here to Sandy Hook and Raritan Bay as well as up the Arthur Kill to its ship graveyards.[50]

Lower Bay

The Lower Bay includes Raritan and Sandy Hook Bays and extends northward to the Narrows. It is bounded by Middlesex and Monmouth Counties to the south, Staten Island to the north and Brooklyn and the Rockaways to the northeast. The Atlantic Ocean lies east of Sandy Hook. It is one of the busiest sections of the study area being both the main entrance into New York Harbor and a major destination for recreational boats. Some of the best boating waters in the study area are located here. The bay is recommended for secondary recreational contact and in most areas it is alright for primary recreational contact as well.

Raritan Bay lies in the western end of the Lower Bay, west of Point Comfort and south of Staten Island. There are numerous shallow areas with depths of 7' to 18' until beyond the line of Sandy Hook. Tidal creeks, marshes, bluffs and sandy beaches are prevalent features of its shoreline. It is a popular spot for fishing and for a large variety of recreational boating. However, the tidal wetlands, shallow waters and at times degraded water quality can present limitations on recreational use of Raritan Bay.

Marinas, yacht clubs' and boat trailer ramps are concentrated in South Amboy, Morgan, Cheesequake and Keyport on the southwestern side of the bay.

Keyport has a several marinas on Matawan Creek above a low fixed bridge. Keansburg has a high concentration of boating facilities. Port Monmouth offers a well marked deep harbor on Compton Creek (known as Belford) which is widely used by commercial fishing boats. Leonardo has an almost landlocked manmade harbor with a five foot channel leading to a basin with seven foot depths where there is a state marina.[51]

The **Raritan River** navigable for approximately 11 miles to New Brunswick, flows into the Raritan Bay between Perth Amboy and South Amboy. There are two boat trailer ramps, one on either side of the mouth of the river and a yacht club. Most recreational traffic heads out into Raritan Bay. Rutgers University rows out of New Brunswick but rarely comes down into the lower part of the river (they usually stop about 5 miles up river).

Much of the **Staten Island shore** is inappropriate for siting of recreational facilities because it is unprotected from ocean wave action. Two exceptional concentrations of facilities are Lemon Creek, just off the Lower Bay, and Great Kills Harbor. Great Kills Harbor, protected from the open ocean by a barrier peninsula, houses the major concentration of marinas and yacht clubs in Staten Island as well as a boat trailer ramp. In the summer the area can become quite congested.

Sandy Hook Bay lies east of Point Comfort and west of the Sandy Hook peninsula. The Hook forms Horseshoe Cove and provides a sheltered waterbody. Atlantic Highlands is one of the busiest

recreational boating locations in the area. There is a large concentration of marinas and yacht clubs between Atlantic Highlands and Highland Beach. In addition, there are approximately 1600 slips at marinas located on the Navesink and Shrewsbury rivers just outside the study area . Many boats berthed in these rivers use Sandy Hook Bay to access the open ocean or recreate within Raritan and Sandy Hook Bays.

Currents and winds can be problematic for smaller boats beyond the protection of Sandy Hook. Many areas attract fishermen. The protected waters attract smaller boats, waterskiers, jet skiers and windsurfers while larger and deeper draft boats head further out. The waters of Sandy Hook and Raritan Bays can become congested in the summer.

Water quality in Raritan and Sandy Hook Bays is substantially better than that of the Kills, Newark Bay, and the Hackensack and Passaic Rivers. Bathing beaches are found at Keyport, Union Beach, and Keansburg. However, water quality in Raritan and Sandy Hook Bays can be degraded due to algae blooms, mainly in the summer months.

The Narrows

Heading northwest from Sandy Hook/Raritan Bays toward **the Narrows**, sailboats as well as other motorized boats, including fishing, use the waters. The openness of the waters makes it particularly desirable for sailboats. Congestion occurs as the width diminishes at the Narrows and shipping channels converge.

Heading southeast, smaller sail and motorboats tend

to concentrate in **Gravesend Bay**, and only larger cruiser type boats continue out into the ocean. Fishing is very popular in the area. There are a few marinas and yacht clubs in Gravesend Bay with approximately 200 slips.

Atlantic Ocean

Both the southwestern shore of Brooklyn and the southern shore of Rockaway Inlet are sandy public beaches along the Atlantic Ocean. No boating facilities are located along either stretch. Sailing, motorboating and fishing along this coastline is popular. Problems occur when fishing boats and jet skies get too close to the bathing beaches.

Jamaica Bay

Jamaica Bay is shared by Brooklyn and Queens. It is characterized by numerous meadows, small islands and marshes. There are approximately 4000 acres of tidal wetlands in the bay.

The waters of the Jamaica Bay receive pollutants from various sources and the water quality is poor to fair. Primary and secondary recreational contact is not recommended along its northwest shoreline. The waters become cleaner away from the shore. Despite poor water quality, it is a vital natural resource supporting birds in great number and variety and containing critical spawning grounds and nursery areas for fish and shellfish.

Most of the tidal creeks have been bulkheaded, dredged and channelized to depths of 12 to 20 feet. Depths in non-channelized portions of the bay are frequently extremely low ranging from 1 to 5 feet.[52]

The bay's many shallow areas outside of the dredged channels make it less than ideal for boats with deep drafts, especially sailboats. The shallowness of the area can be problematic. The Coast Guard estimates that approximately 60 - 70% of their calls in the bay are for groundings.

In addition, the bay suffers from frequent illegal dumping along the shore and in the water. One particular problem, abandoned derelict boats, causes hazards to navigation.

Jamaica Bay has one of the largest concentrations of recreational boating in the study area. It is well suited for most types of boating activities, but is most frequently used for motorboating and fishing.

Marinas and yacht clubs are clustered around Shell Bank Creek, Sheepshead Bay, Mill Basin and Shell Bank Basin. There are 48 marinas and yacht clubs and well over 3000 slips in the bay. There are four boat trailer ramps in the bay. The public ones are located at Floyd Bennett Field in Gateway National Recreational Area, and at Beach Channel High School on the Rockaway Peninsula. The other ramps are operated by private marinas in Mill Basin. Two Special Anchorage Areas are located in the bay, one on the westerly side in the vicinity of Paerdegat Basin and the other in the vicinity of Broad Channel north of the Shore Parkway Bridge abutment to the Rockaway Peninsula.

Canoers and kayakers usually paddle through the bay to explore the beaches, marshes and wildlife areas

of Gateway National Recreation Area. The New York City Parks Department has two designated hand boat launches in Jamaica Bay, one in Marine Park on Gerritsen Inlet, and the other, currently in disrepair, in Canarsie Park along Paerdegat Basin. The Sebago Canoe Club, also located on Paerdegat Basin, offers instruction in canoeing, kayaking and small boat sailing, and operates programs for Outward Bound and Boy Scout troops. Although the currents at the Marine Park site are not strong within the immediate area of the launch, they become swifter further south.[53]

Plumb Beach, adjacent to Sheepshead Bay in Brooklyn, is one of the most popular areas in New York City for windsurfing because of favorable tidal and wind conditions. Nonetheless, the water quality and bottom surface here is less than ideal for windsurfing and the area must be frequently cleared of debris by the windsurfers.

Some waterskiing occurs in the bay at Gerritsen Inlet, Dead Horse Bay, Barren Island and in the calmer waters of Jamaica Bay. The floating debris in the water can be hazardous to the skiers.

Beach Channel High School's rowing facility is located at Floyd Bennett Field. The crew rows in East Mill Basin. They are currently looking for a new site, because the existing facilities are located approximately 1/4 mile from shore and lack amenities and security. There are some reports that recreational rowing also occurs in the bay.

FUTURE CONDITIONS

Tremendous growth in recreational boating has occurred over the past two decades. In this section, future trends and the demand for recreational boating activity by water bodies will be examined. Methodologies used to predict future demand for recreational boating include an analysis of boater registration and examination of waiting lists for existing marinas and other boating facilities.

Boat registrations have been steadily increasing in New York City and New Jersey, consistent with national trends. This mirrors predictions of future national projections of growth. However, the dramatic rise in boating activity and registrations will probably taper off if the current weak economy persists as exemplified by the drop in New Jersey registrations from 1988 to 1989.

The length of waiting lists has changed for some marinas but those for Coast Guard regulated Special Anchorage Areas have been increasing and can be anticipated to continue doing so. The increase is probably related to the ease of permitting and lower costs associated with using these areas versus docking.

In recent years, studies of market demand for boat slips and other recreational boating facilities have found a high unmet demand for boating facilities in the study area.

The National Marine Manufacturers Association has

predicted a 4% to 6% annual increase in boat sales through the year 2000 based on demographics. Baby boomers, aged 35 - 55, are the primary segment of the boat sales market.[54] Recreational boating is a luxury, and as such, rises and falls according to the perceived health of the economy. While boat sales have dropped recently, an improved economic outlook in the future could herald a rebound. An adequate supply of slips or even a glut of vacant slips today may fall far short of future demand once the economy has turned around.

The Bayshore Waterfront Access Plan for Monmouth County's Raritan and Sandy Hook Bay waterfront, projects "an additional 1300 slips, 540 rental boats and 18 boat ramps are currently needed." The New Jersey State Comprehensive Outdoor Recreation Plan suggests that by the year 2000, an additional 1900 slips would be needed would be needed in the Bayshore area to satisfy demand.[55]

A report entitled "Perspectives on Marina Development in New York City" states: "The bottom line is that an estimated base latent demand totals 9,364 boats, of which 7,360 could be expected to require slips and moorings.[56]

The population in the study area is anticipated to grow, yielding an even greater number of boaters.[57] Furthermore, the proportion of the population which participates in boating is anticipated to increase. Participation in recreational boating is higher than the actual number of boats owned. Nationally, 23 percent of the population participated in 1950; by 1984, this

percent had increased to 27 percent. It is forecast to jump to 36 percent by the year 2000.[58] Promoters of recreational boating may increasingly look towards segments of the population that traditionally have had low involvement in the sport. One example is the recent growth of boating classes targeted for women.

The increasing proportion of participants over actual boat owners may be due in part to timesharing as expressed in increased community boat ownership,[59] (e.g., rowing facilities where a few rowing shells are used by many).[60] In New York City, Manhattan Yacht Club, based at South Street Seaport has twelve sailboats that are used by approximately 500 members. This factor will increase not only the number of people participating but may also spread the peak times of boating over a greater period of time during the week.

Economic conditions may effect the size of boats that will be purchased. The cost of boat ownership, including maintenance, fuel, insurance and storage, is rising. Some people may be driven out of the market altogether. There is disagreement about the types of boats people will purchase during this period of weakened economy. Sales of the 25' to 40' boats may be the hardest hit. Market research for the Mid-Atlantic region indicates the boats 40' and longer are the fastest growing segment of the boat industry. Continued sales in the over 40' category may be explained by the fact that owners of larger boats have higher incomes and are less affected by a weakened

economy. However, although sales of this size boat have grown fastest, they represent less than 1% of total registered boats. The largest percentage of boats is in the 16' to 26' range and will probably continue to be. Middle and lower middle income boat owners may purchase smaller boats in this range.[61] In all probability the size of boats purchased will fluctuate with the economy.

The spread of the peak boating hours will be affected by a growing service economy with anticipated changes in the work schedule including longer work hours and a change in the traditional work schedule from 9 to 5 Monday through Friday to weekends and evenings.[62]

A substantial amount of the demand for recreational boating is currently met outside of the study area, partially attributable to perceptions of poor water quality. The quality of the area water has improved and can be expected to continue to improve, thus increasing the appeal of boating.

Facilities

In order to meet boating demand, appropriate sites for recreational boating must be available. Boat ownership usually increases as boating waters become more accessible.[63] The development of marinas as well as other boating facilities is constrained by the amount of shoreline, adequacy of the upland space and infrastructure, zoning and environmental conditions and concerns.

Numerous potential sites have been identified for recreational boating facilities. Due to economic feasibility, not all will be built, while others

may face construction delay. However, if even a quarter of them were built, there would be a significant increase in facilities.

There are currently 13 proposed waterfront development projects with a marina component in New York City. If built, these would provide 1,246 new boat slips, representing a 17% increase from 1988. On the New Jersey side of the Harbor, proposals (as with New York City, many accessory to housing or mixed-use development) totalling nearly 8,000 proposed new slips, representing more than a 100% increase. In addition, numerous planning studies have indicated the desirability of a marina component or other recreational boating facilities. (See Figures 6. 5-8 and Appendix 6.5, Future proposals).

As traditional water dependent uses have declined, sites that are no longer needed for such purposes may see an increased amount of recreational use. Examples include Brooklyn Piers 1-5, Manhattan's West Side piers, and the entire New Jersey Hudson River waterfront.

Another factor that will influence the location of recreational facilities is the need to regularly dredge. Certain areas, such as College Point, are becoming less inviting for recreational boating as access to some facilities is curtailed by siltation. Fewer natural harbors remain undeveloped for the potential siting of new boating facilities, and development of such facilities in areas less amenable to facility siting may be prohibitively expensive. However, new technologies may be

developed to allow for less expensive development of marinas at difficult sites.[64]

Other elements affecting the planning and development of marinas will be the size of the boats to be served. If the trend continues toward serving the larger end of the market (boats over 35' to 40'), more space will be required for berthing, diminishing the number of slips available. In addition, the larger boats have a greater appeal for many developers; one 40' boat may yield the same return as two 20' boats while decreasing the amount of upland parking needed. Owners of larger boats generally spend more dollars at a marina on supplies, fuel, equipment and other items than do owners of smaller boats.

Rack storage will probably also become a more significant facility type as environmental concerns, costs of in-water development, and upkeep of boats increase. As small power boats become more popular, the demand for rack storage may increase.

Recreational Boating Activity

Almost all recreational boating activity can be expected to increase as the quality of water improves and the population grows. **Motorboating** will continue to grow, propelled by the aforementioned factors, increased demand for close-to-home recreation and relative affordability of smaller vessels. Popular boating waters will become more congested. This may exacerbate existing problems associated with speed and wake. If smaller boats are used this may increase the hazards related to less stable boats. **Fishing** will

probably increase as water quality improves. Some conflicts may occur between fishing and other motorboat activity as their concentration rises.

Currently, **waterskiing** does not have wide participation in the harbor. As water quality improves, waterskiing may become more appealing. Waterskiing is an activity where existing conflicts have been observed. Due to the relatively large area and calm waters needed for the sport, conflicts may be further exacerbated. The growth of **jet skis** will probably increase dramatically. The market for jet skis is one of the few areas where boat sales have increased. It is too early to predict trends for this relatively new sport, nevertheless, conflicts may occur between this activity and other activities that occur close to the shoreline. There is a widespread perception that jet skis are a potential future problem. Florida and other localities have developed legislation to control or prohibit their use in sensitive areas.

The overall percentage of the population that participates in **sailboating** is not anticipated to change markedly. However, there may be an increased number of participants as the population grows. Much of the current demand for **windsurfing** in New York City is met outside the city. There are no clubs or organizations that operate regularly within New York City waters. The appeal of windsurfing in the Harbor will probably increase as water quality improves. This may cause conflicts between windsurfers and other water activities that occur close to shore.

Although there are no specific numbers, anecdotal information points to an increase in **kayaking and canoeing** in the area over the last two years. This trend will probably continue as people become more interested in pursuing recreational alternatives of minimal environmental impact. A weakened regional economy may also contribute to the popularity of canoes and kayaks, which are relatively inexpensive boats with low maintenance, operation and storage costs.

Rowing is, similarly, a growing sport and likely to continue to increase in popularity. Increased interest in health and fitness enhanced by rowing machines for practice, greater participation by women and high school students, and increased durability of newer boats have contributed to rowing's rebirth. One of the major problems consistently associated with the growth of rowing in the harbor is the lack of safe and secure facilities for the storage of equipment close to the waters edge. In other cities such as Boston and Albany, community facilities have been developed. If rowing facilities become more available there will probably be an increased collegiate as well as community and high school participation in the sport.

FUTURE RECREATIONAL BOATING LOCATIONS

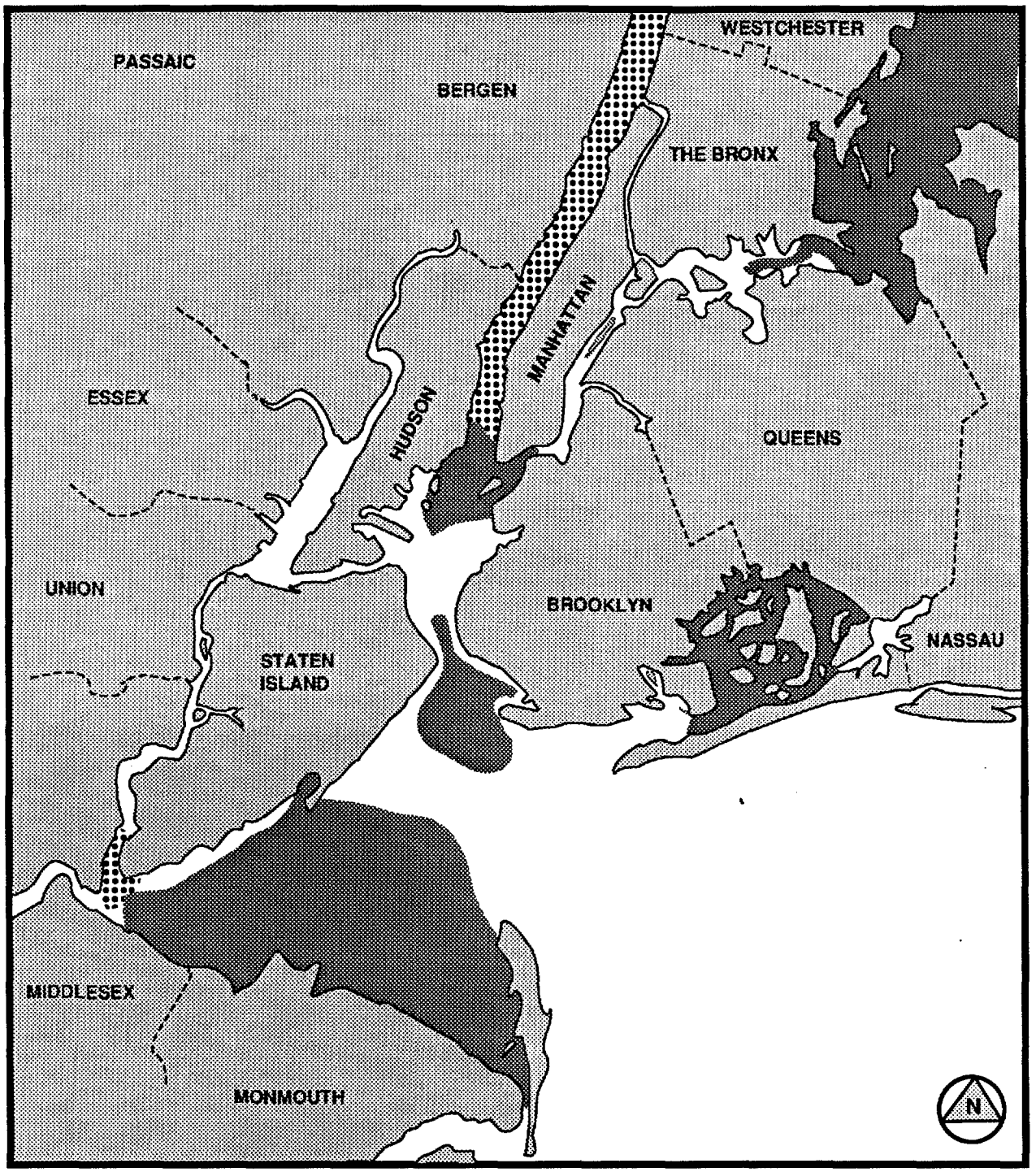
Long Island Sound

Long Island Sound will likely continue to be a major recreational boating area, and its attractiveness will increase as water quality improves. In turn, this will increase congestion in this waterway, especially on peak boating days.

RECREATIONAL BOATING CHAPTER 6 FIG. 5

- ● CONCENTRATIONS OF MARINAS AND YACHT CLUBS: EXISTING
- ○ CONCENTRATIONS OF MARINAS AND YACHT CLUBS: PROPOSED

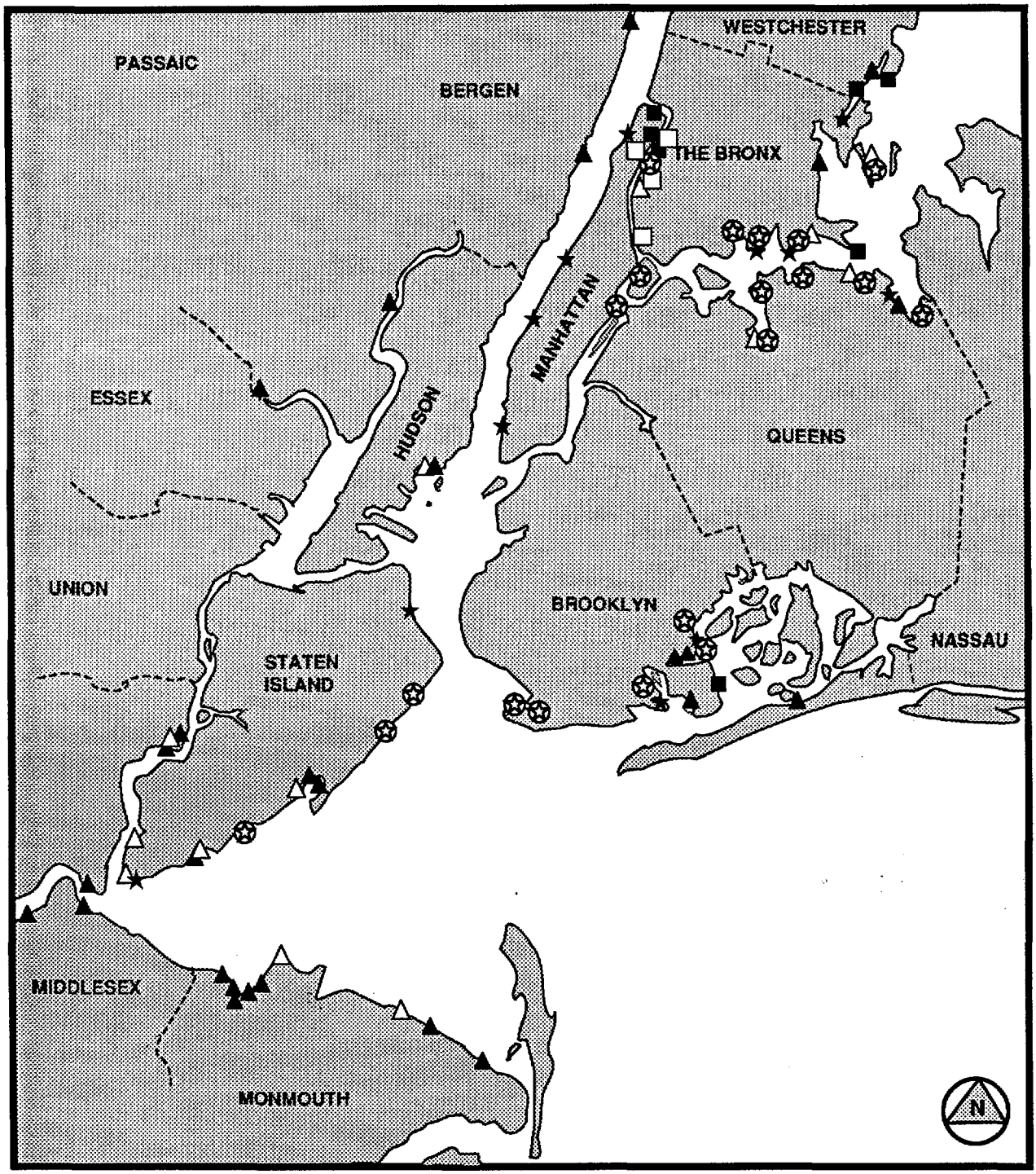
NEW YORK/NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 6

- CONCENTRATION OF MOTORBOATING AND SAILBOATING: EXISTING
- CONCENTRATION OF MOTORBOATING AND SAILBOATING: FUTURE

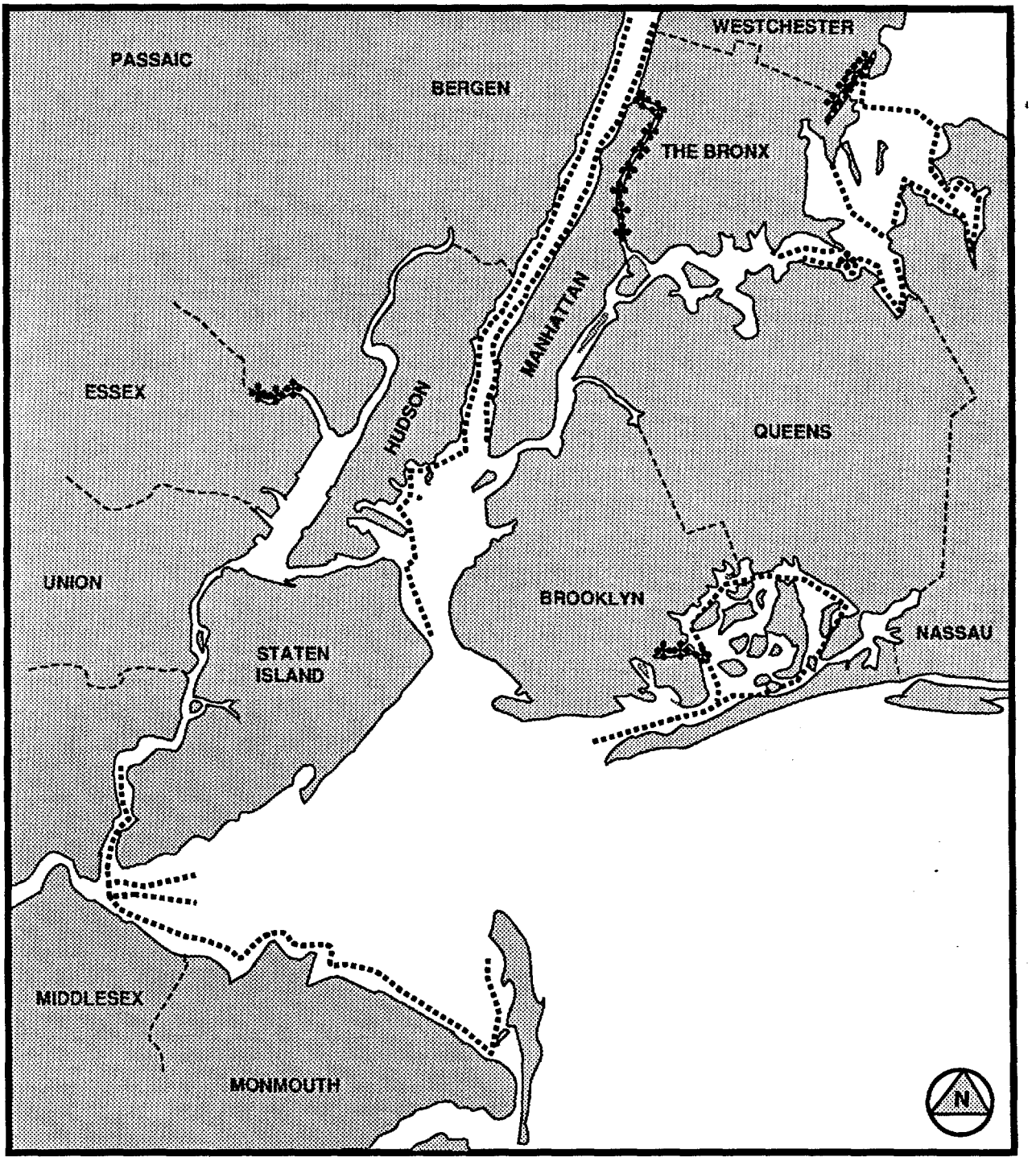
NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 7

★ HAND BOAT LAUNCH: EXISTING
■ ROWING SHELL/BOAT HOUSE: EXISTING
▲ BOAT TRAILER RAMP: EXISTING
⛤ PROPOSED
□ PROPOSED
△ PROPOSED

NEW YORK/ NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



RECREATIONAL BOATING CHAPTER 6 FIG. 8

···· CANOE/KAYAK ROUTES: FUTURE (SAME AS EXISTING)
✣ ✣ ROWING SHELL ROUTES: FUTURE (SAME AS EXISTING)

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It is too early to assess the outcome of the 4 mph speed limit in the **Pelham Bay Lagoon** as it was not enacted until after the end of the 1990 boating season. However, the restriction on motorized boats will probably increase the desirability of the area for all types of non-motorized boating activity and fishing and reduce potential conflicts.

Nearby, windsurfers have identified the northern tip of Orchard Beach as a desirable location for future increased windsurfing activity. If this occurs, caution will be needed to avoid conflict with the swimmers at the beach adjacent to this location.

To the east, **City Island** will continue to hold its place as one of the major boating centers in New York City. There are (currently in the pre-application phase) over 250 additional slips proposed here, most of them either expansion of existing facilities or associated with residential development. In addition, the Parks Department Waterfront Management Plan recommends a trailer boat ramp/hand boat launch facility at a pier under its jurisdiction. (However, the cost of renovating the pier is prohibitive.) There are no plans or applications that indicate further growth in facilities in **Eastchester Bay.** As water quality improves an overall increase in the number of boaters is probable.

The Parks Department Waterfront Management Plan has recommended the siting of a hand boat launch at Alley Pond Park at **Little Neck Bay** in Queens. The current launch site on the bay has limited parking.

If this were improved at the new site, more people might be encouraged to use it. Canoeists and Kayakers would probably travel to the same places they visited from the existing hand boat launch on the bay.

Due to its design, the existing boat trailer ramp can only be used at or near high tide. Although there are no proposals to remedy this problem (as well as the limited parking) there would probably be an increase in small boats if these problems could be remedied. A minimal increase in boating in the area therefore can be anticipated.

Upper East River

The largest factor affecting this body of water will probably be the increase in transiting recreational traffic. Improved water quality may also encourage an increase in fishing. There are plans to expand the number of hand boat launches in seven locations. As part of the Parks Waterfront Management Plan, **Little Bay** has been identified for a boat trailer/hand boat launch site which would increase the number of boats departing from this area.

The Parks Department has conducted a pilot study for the creation of a waterfront park in **Powells Cove.** Part of the plan is to create a "Blueway" which would have its center here or at Little Bay. The "Blueway" would be a hand launched boat course demarcated along the northern shore of Queens and connecting existing parks from Alley Pond Park in Little Neck Bay to Flushing Bay Marina at Flushing Meadows-Corona Park. The "Blueway" might be delineated by buoys and include signage identifying

each stopping point or hand boat launch site. A protected basin, either in Powells Cove or Little Bay, could serve as a center for the "Blueway" activities, including a concession offering boating instruction and rentals.[65]

Along the section of **the East River from just east of Little Bay to Flushing Bay**, two additional hand boat launch sites have been suggested as potential components of the "Blueway". Furthermore, a vacant site under study at Whitestone could be developed for residential development with a commercial marina. 175 slips located here have fallen into complete disrepair. To the west, in College Point, a residential complex has approvals for 28 accessory slips.

The existing Parks Department-concessioned marina at the southern end of **Flushing Bay** has a cap of 800 slips with an agreement to continue to build to this level if the demand should be there. In addition, the Parks Department Waterfront Management Plan cites this area as having potential for a boat trailer ramp/hand boat launch. Conflicts could occur between small motorized boats and hand boats if they become too congested in the area and operators do not act responsibly. Along the **northern shore of the Upper East River**, three sites have been identified in the Plan for hand boat launch sites, a boat trailer ramp and a marina. In addition, a privately owned 180 slip marina has been proposed.

Hell Gate

There are few plans for recreational boating facilities in **Hell Gate** due to its currents. Two

hand boat launch sites were identified on Randall's and Mill Rock Islands as part of the Parks Department Waterfront Management Plan. There has also been discussion of renovating and expanding the rowing facility at the Fire Boat Pier at East 91st Street in Manhattan; however, little progress has been made. The siting of facilities in this less than ideal location could be hazardous. Increased river traffic from transiting recreational boaters creates the potential for even greater conflict if amateurs should use these two sites.

Harlem River

A recent New York City Planning Department study for the Bronx shore of the Harlem River recommended alternatives for the siting of two different rowing facilities. There have also been discussions of making two of the temporary rowing facilities on the river permanent, as well as the siting of a boat trailer ramp, hand boat launch and marina in the area. The encouragement of both motorized vessels and rowing in the river could increase the potential for conflicts. Further conflicts may be created by increasing the number of recreational boats transiting through this very narrow waterway.

The reactivation of the Spuyten Duyvil Railroad Bridge may also effect boat traffic in the river. While the bridge would only be closed to allow Amtrak trains to pass, its closure would briefly block river traffic needing greater than a five foot vertical clearance. Although no plans exist at this time to introduce Metro-North commuter rail traffic, such a scenario could lead to closure all the time during rush hours. Most likely all vessels

would be discouraged from transiting during those hours.

Hudson River

The Hudson River waterfront is undergoing the **Harbor's** most rapid and dramatic transformation, especially on the New Jersey side. What was once a busy water-dependent working waterfront is being redeveloped for residential, office and commercial enterprises. Proposals for future waterfront development include over 6000 boat slips on the New Jersey shore. For the Manhattan side of the river, several planning studies recommend the siting of marinas with an undetermined amount of slips. There is a proposal for 127 slips and 100 dry racks as well as additional moorings at Dyckman Street in Inwood. The Inwood Canoe Club is also in the process of rebuilding its facilities. Further down river, a New York City Planning study recommended the expansion of the 79th Street Boat Basin in Riverside Park by approximately 100 slips. The greatest number of boating facilities recommended for Manhattan would be built in association with the development of a Greenway paralleling Route 9A from the Battery to 59th Street. Community facilities, marinas, a sailing school and the expansion of a hand boat launch facility are all proposed.

Along with an increase of boats transiting, the Hudson will need close monitoring to avoid conflicts if all of these facilities are built. Of particular concern will be small boats in the area of the Lower Hudson close to the Upper Bay. Increased traffic will also increase the potential for increased wake conditions.

Lower East River

Currently, the only proposal for the Lower East River is for Piers 1 - 5 beneath Brooklyn Heights. Strong public demand exists for a marina at this site, although plans for the piers have not been finalized. The boaters at this site will have to contend with the commercial traffic in the area and the site will need to be protected from wave and wake action of passing vessels. Whether a facility is constructed here or not, transiting recreational traffic will probably increase in the river.

Upper Bay

The Upper Bay will probably see additional activity, not so much because of an increased number of facilities but because of the overall increase in boating. The area will remain a major attraction for many boaters. The Parks Department Waterfront Management Plan has indicated the potential for siting a marina at Red Hook Park in Brooklyn and at the Cromwell Recreation Center (a port pier converted in 1936) in Tompkinsville, Staten Island. If a marina is built at the Cromwell Recreation Center, boaters will have to use caution so as not to interfere with the Staten Island Ferry or the general anchorage area. As with the lower portion of the Hudson, the increased congestion may create conflicts between all types of boats if they are not operated responsibly.

The restricted area around the Navy Homeport may be problematic for small boats, (especially kayaks launching from the Alice Austen site) because the restricted area forces boats traversing north along the Staten Island coast to travel 600' from the pierhead line into the general anchorage area where ships may be swinging on their anchors.

Kill Van Kull There are no recreational facility proposals for the Kill Van Kull. The only change that may occur in this area is an increase in transiting boats coming from Newark Bay, the Hackensack and Passaic rivers and the upper portion of the Arthur Kill.

Newark Bay The eastern shoreline of Newark Bay in Bayonne was the subject of a local coastal planning effort in 1984. The plan recommends reclaiming the length of the Bayfront for use as a public park, with the exception of industrial facilities located at the south end. The study also suggests the development of a public marina on the bay. No future development is anticipated on the northern or western shores for recreational boating.

The lower **Hackensack River** falls under the jurisdiction of the Hackensack Meadowlands Development Commission (HMDC). Approximately two miles of the lower river and nearly one mile of the upper river (just south of Overpeck Creek) are zoned for heavy industrial use. In the balance of the HMDC area, marinas and water-oriented recreation are encouraged at the water's edge, in addition to the zoned office park and residential uses. Currently, HMDC is reviewing four applications for marinas involving 173 recreational boat slips.

North of HMDC lands, it is unlikely that industrial facilities along the river will be able to expand. In fact, residential uses have been proposed adjacent to existing industrial uses. In the long term, the Hackensack waterfront may see a decrease

in industrial shipping and, as water quality improves, an increase in recreational traffic.

Recreational use of the **Passaic River** may expand if water quality continues to improve; however, the increase in traffic will be confined to craft using existing trailer ramps. No new marinas are proposed on the Passaic River.

Arthur Kill

The city of Elizabeth is contemplating a second municipal marina adjacent to an existing marina at the Elizabethport site. At the opposite end of the Arthur Kill, Perth Amboy has proposed expanding its 60 slip marina to 300 slips in conjunction with the development of a historic waterfront park. The southern end of the Kill is also witnessing some pressure to convert from industrial uses to residential and commercial uses. In particular, a 250 slip marina was proposed on a site adjacent to the Perth Amboy Dry Dock Company. A second large mixed-use development included 934 slips. The New Jersey Department of Environmental Protection has voiced concern that these developments are incompatible with the Kill's existing water-dependent industrial uses and may eventually force businesses such as the Perth Amboy Dry Dock Company out of the area.

On the Staten Island shore, a project with 250 slips and a 50-room boatel is currently under review. Several sites are under study for a boat trailer ramp although none has been chosen at this date. The increased number of facilities will add to the number of boats transiting through this

critical but narrow industrial waterway, usually to Sandy Hook and Raritan bays.

The Lower Bay Former industrial waterfront sites in the South Amboy area on **Raritan Bay** are proposed for mixed-use redevelopment that includes marinas. The increased number of facilities will probably increase congestion in the area especially on peak boating days. As previously indicated, Monmmouth County's Bayshore Plan suggests that the existing supply of boat slips in the Harbor will need to double to meet demand. The New Jersey Department of Environmental Protection is reviewing an application for 705 slips at Port Belford and has approved an application for 103 slips and 426 moorings at Point Atlantic which has yet to be built. Another 1637 slips at eight sites are on the drawing board for Bayshore along with an additional 266 dry storage slips. One other marina and one possible expansion has also been proposed in that area, but no specific information is available concerning the number of slips proposed.

There has also been a proposal for a renovation of a marina at Lemon Creek along Staten Island's eastern shore, but this will probably not increase the number of boats that are docked in the area. New York State Parks may site a boat trailer ramp here or on the Arthur Kill that would serve small boats. Recommendations have been made for a boat trailer ramp/hand boat launch site at Wolfe's Pond Park.

There are several proposals for marinas in **Gravesend Bay** that would increase the slips by over

300. This increase would probably not create a problem as there is easy access to the Lower Bay, which is a wide body of water. Use of these waters and the adjacent segment of the Lower Bay for sailing, motorboating and fishing will probably continue to increase.

Jamaica Bay

Four proposals or planning studies recommend the development of over 250 slips in Jamaica Bay. This relatively small number is related to much of the area having environmentally sensitive lands. There are four additional recommendations for hand boat launches. Improved water quality will probably increase the amount of all small boating activity. This increased activity may create conflict between different types of activities competing for the same close-to-shore water areas.

If Beach Channel High School builds new rowing facilities, their use could be expanded to include other high schools. Currently, no site has been designated for this purpose.

CHAPTER 6 - ENDNOTES

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CHAPTER 7: CONFLICTS AND RECOMMENDATIONS

Conflicts occur in the Harbor where one or more types of vessel activity impact negatively on the activity of other vessels. The existence of conflicts is represented by both reported accidents and estimates of unreported occurrences. When conflicts occur they disrupt the work or leisure activity of those using the Harbor. Factors contributing to the potential for vessel conflict include the characteristics of the vessels, their use, operators, and the nature of the waterways.

Vessel Use And Schedules

Each of the harbor user types discussed in the report has different characteristics. Of the four categories, maritime and industrial activity is the only one that does not generally depend on a specific time of day or season for operations. These vessels may wait for a change of tide or currents to allow them to travel efficiently or dock at one of the container ports or other destinations.

Commuter ferries are also a year-round activity. Although ridership tends to drop in the winter, the number of ferry routes usually remains constant. Ferries are largely active during peak commuting hours in the morning and evening and adhere to strict schedules.

Commercial and recreational boats are similar in that they are largely seasonal (late spring to early fall), with the greatest activity on weekends and holidays. Weekday evenings are also an

important time, especially for commercial boating activity. The seasonal operations characteristics for the different categories of vessels are not anticipated to change in the future.

The operating hours of maritime and industrial vessels and ferries are likewise not expected to change significantly except for the potential introduction of high speed time sensitive, cargo ferry operations. These operations, carrying cargo from airports, would have to operate on predictable schedules to make them competitive with over-land transportation. There may be some change in the peak water use hours in the commercial and recreational categories due to an anticipated altering of traditional work hours, decreasing leisure time during weekends and holiday periods and increasing mid week commercial and recreational users.

Vessel Design Vessel design, especially size and the ability to maneuver, is critical in how vessels are used and the potential for conflict. For example, maritime cargo and support service vessels are the largest ships using the waterways. Length, width and draft confine their movements to very specific navigable channels of the estuary. Some must travel at a certain rate of speed (even while under tow) to maintain proper steerage. These vessels are unable to respond quickly to alter their route or speed should another vessel come into their path. Their size and hull design cause them to create wakes of sufficient size to be a problem for other water users and docking facilities, such as marinas.

The anticipated increase in the size of containerships may further reduce their maneuverability. The accompanying deeper drafts may also increase the number of vessels requiring to lighter at the anchorage area in the Harbor, thus increasing the associated lightering vessel movements. Dredging of navigable channels needed to accommodate deeper draft vessels may add to congestion especially in narrow channels like the Kill Van Kull.

By comparison, ferries and commercial vessels are usually relatively maneuverable, although large craft, like the Staten Island Ferry require a considerable distance to stop. Ferries designed to achieve higher speeds are expected to become more common. Increased speed may decrease their ability to react to other vessels crossing their path. The introduction of the Hovercraft ferry with minimum depth requirements could increase the number of areas accessible to waterborne transportation. The minimal wakes and easy maneuverability of this craft might counterbalance some of the hazards associated with increased speed. In contrast, commercial boat design and technology for excursion type boats is not anticipated to change significantly. Luxury accommodations rather than high speed is the major design consideration for many of these types of vessels.

Recreational boats tend to be lighter and less powerful or stable than other vessel types. This makes them vulnerable not only in a collision situation but also to wakes, wash or suction current created by the propellers of larger

vessels. Most recreational boats found in the Harbor require relatively minimal depths allowing them to move more freely about the harbor than other vessels. The average recreational boat may decrease slightly in size and increase in speed capabilities. They will continue to be the most vulnerable in the harbor.

Vessel Operations

Of the factors involved in conflict situations for all vessels, the degree of good seamanship, and the knowledge and skill of the operator have perhaps the greatest influence on the frequency and severity of conflict situations. Conflicts due to operator error can occur anytime and anywhere. All vessel operators with the exception of recreational boaters, are required to be licensed. However, many recreational boating safety courses are available through the Coast Guard Auxiliary, Red Cross and a variety of other organizations.

Accidents

Recreational accident data is collected separately from all other harbor accident data unless a recreational boat is involved with a maritime or industrial, ferry or commercial vessel. The absence of recorded accidents does not necessarily imply the absence of a problem.

According to Coast Guard data the majority of accidents that occurred in the maritime, ferry and commercial categories were between vessels engaged in similar activities. Approximately 330 accidents attributable to conflict situations were reported between 1981 and 1989. (see Figure 7.1) This includes all collisions, groundings, capsizing, floodings, sinkings or being disabled.[1] Over the

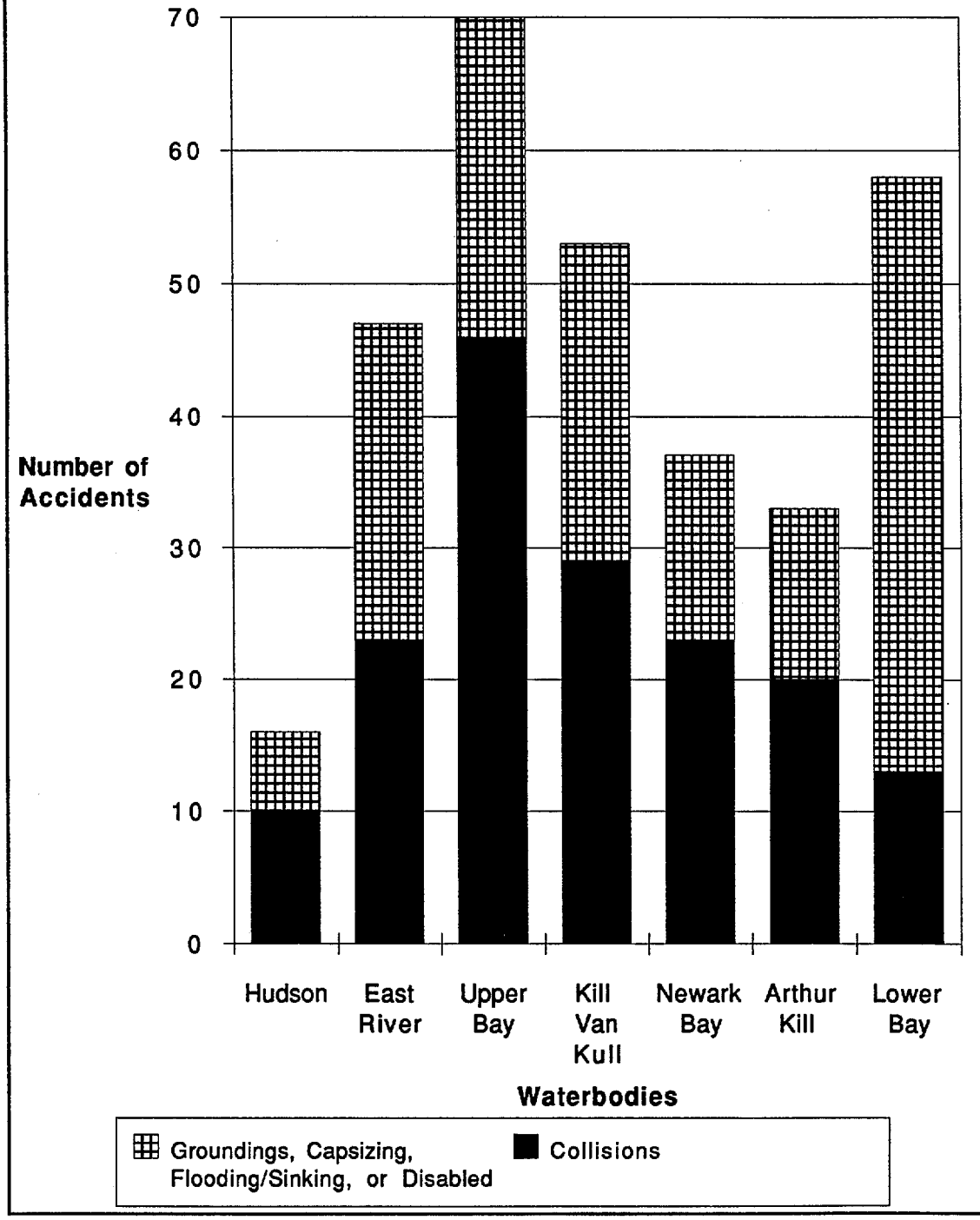
past ten years, only four accidents involving recreational boats were reported in this grouping. The Coast Guard states that this data is 95% accurate.

The largest number of accidents in the harbor occurred in the Upper Bay; the second highest occurred in the Lower Bay followed by the Kill Van Kull. The large number of collisions in the Upper Bay was probably due to the high volume of water use there. The majority of accidents that occurred in the Lower Bay were non-collision accidents especially groundings. This may be due to the numerous shallow areas in these waters. The number of collisions in the Kill Van Kull could be due to the narrowness of the channel and volume of traffic on the waterway.

Figure 7.2 graphically depicts recreational boating accidents which occur in higher frequency than maritime, ferry or commercial accidents. The Coast Guard believes that only one-tenth of all non-fatal boating accidents in the United States are reported to the Coast Guard or to local or state law enforcement agencies. However, they believe that nearly all fatal accidents are included in their files.[2] The Coast Guard is currently working to improve data they are receiving.[3]

The number of recreational accidents occurring shows no clear trend. This may be due to a variety of factors that vary from year to year, such as weather, water quality, special events, the economy, enforcement and reporting. Interestingly, while boating registrations went up, there was no

Fig. 7.1 Maritime, Ferry, and Commercial Accidents, New York/New Jersey Harbor, 1981 - 1989



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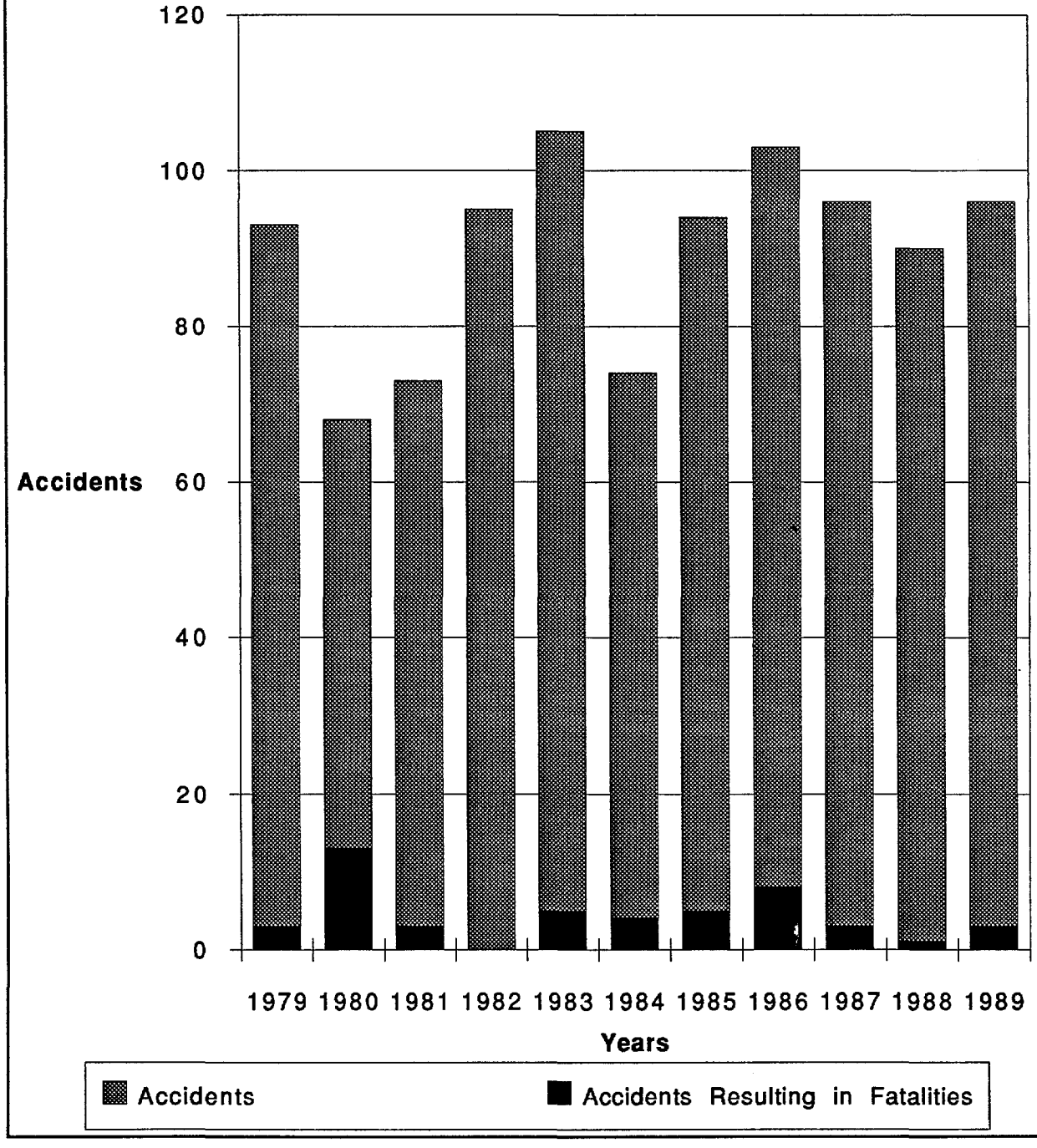
Source: U. S. Coast Guard, Marine Investigation Division,1990.

Fig.7.2. Recreational Boating Accidents, New York/New Jersey Harbor, 1979-1989



Source: U. S. Coast Guard, Office of Navigation Safety and Waterway Services,1990.

significant change in the number of accidents or fatalities. The New York State Office of Parks, Recreation and Historic Preservation attributes some of this to an increase in enforcement and smarter boaters.[4]

Overall, the majority of reported accidents were collisions with another vessel. It is unclear if this type of accident actually occurs more frequently or if it is just more likely to be reported. Groundings of recreational craft usually are less severe than groundings of larger vessels. When smaller craft run aground, they generally do not leave significant fuel spills and often do not require machinery to refloat them. Most often these types of minor accidents go unreported. Collision figures for the harbor are similar to New York State figures wherein 42% of all accidents were caused by collisions with another vessel while only 9% were due to capsizing. Fatalities are much more likely to be associated with capsizing. Statewide, 46% of the accidents resulting in fatalities were the result of capsizing. In 82% of the fatalities, no personal floatation device (PFD) was worn. The Coast Guard also estimates that 50% of all accidents are drug or alcohol related.[5] Boating while intoxicated (BWI) has been targeted by enforcement personnel to reduce accidents in the harbor. If successful this could greatly reduce the number of accidents in the harbor.

CONFLICTS BY WATERWAY

Each waterbody has its own set of characteristics that affect its use and potential for conflict situations. (See Appendix 1.1)

Long Island Sound

In Long Island Sound there are a limited number of vessels involved in cargo activity. They are found either in the anchorage areas or in transit in the navigable channels. There is currently no ferry service in this area. Commercial sport fishing is popular in this area, but the overall number of fishing vessels is relatively low. It is, however, one of the major boating waters for all types of recreational boating activity in the study area, and the majority of conflicts that arise in the Sound are between recreational boaters. As noted earlier, conflicts between motorized and non-motorized boats in Pelham Bay Lagoon led to the adoption of a local law restricting the speed in the area to 4 mph in November 1990.

In peak boating season, there is intense recreational boating activity. The waters can become sufficiently congested to encourage some small boaters to stay away from the area. There are complaints that some boaters do not operate safely, travelling too fast or too close to other users. There are also groundings in the area due to reefs and rocks. Figure 7.3 illustrates current conditions in the area.

Future, significant growth in the maritime or commercial categories is not anticipated in this area. There may be some increase in high speed ferry service for eastern Bronx and south western Queens. Recreational facilities and boating are expected to increase. As the water quality improves, more small craft such as fishing boats and windsurfers will be attracted to the area, which may increase problems between recreational boaters if good boating practices are not adhered to. Figure 7.4 illustrates future conditions in Long Island Sound.

Upper East River

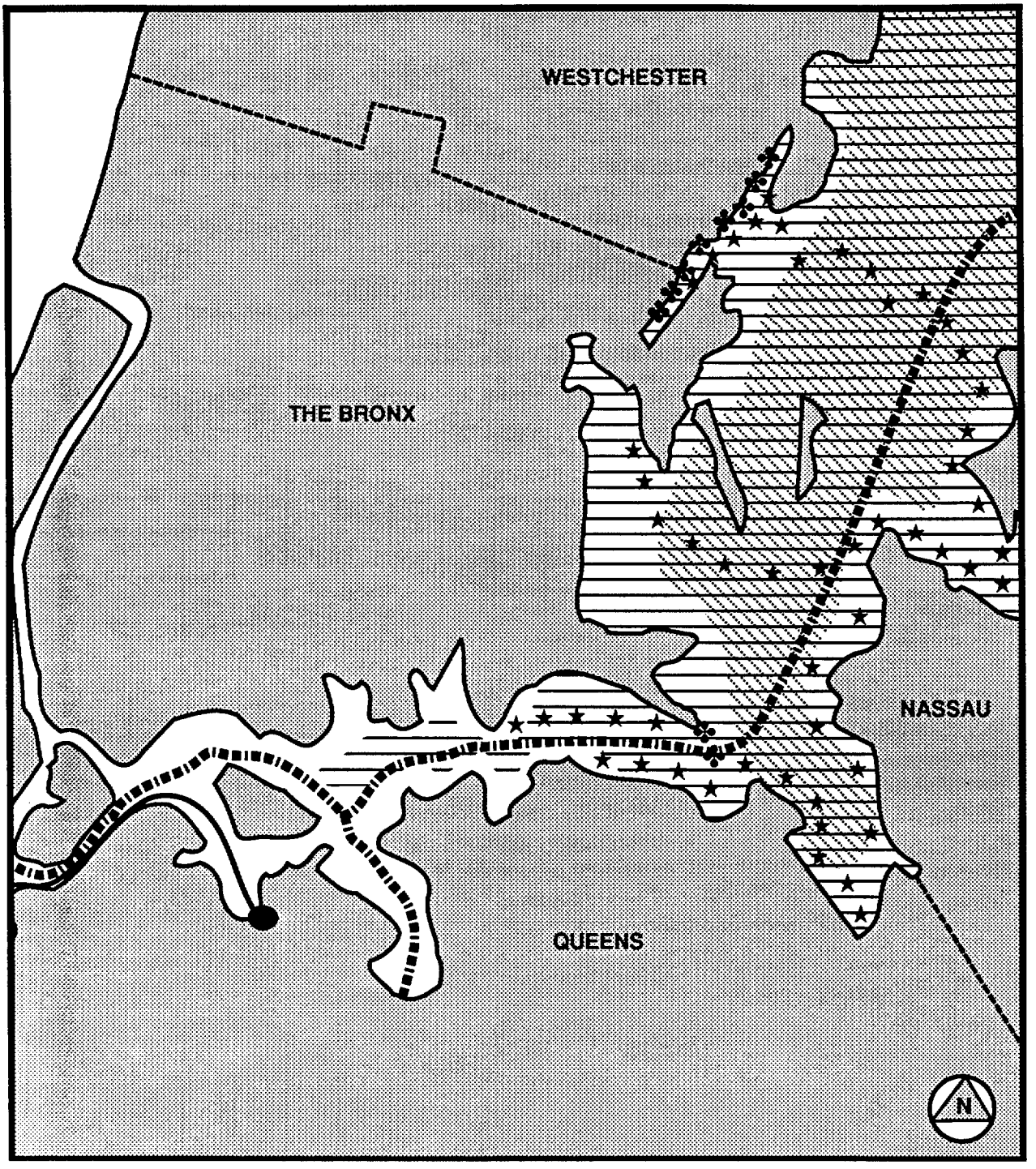
In the Upper East River currents begin to gain intensity in the western end of the waterbody near Hell Gate. This body of water begins to have high concentrations of maritime and industrial vessels. Flushing Bay accommodates oil tanker traffic serving petroleum storage tanks and sand and gravel barges. On both the northwestern edge of Queens, (Astoria) and the southern portion of the Bronx there are several large operations involving the transfer and delivery of oil to utilities.

The only existing ferry route in the area travels between La Guardia Airport to East 34th Street in Manhattan and Pier 11/Wall Street. Commercial sport fishing vessels occasionally use the waterway as a transit way heading north towards Long Island Sound or south from City Island to the Atlantic Ocean. Though not posing a significant problem, some commercial sport fishing vessels docking at City Island travel through the East River on route to the Atlantic Ocean. At times they can create

significant wakes that can disrupt ferry service transiting the area.

Recreational facilities are concentrated in Flushing Bay. This portion of the river is used by some sailboats, motorboats, canoes and kayaks, however, they tend to be found in higher concentrations in Long Island Sound. There appears to be no significant conflict between the users of this water body. There is, however, a security concern related to small boats coming too close to Rikers Island, a city correctional facility. Figure 7.3 depicts existing conditions in the area.

Maritime use is not anticipated to increase. A number of possible sites for ferry service have been identified as well as routes through the river connecting sites in Long Island Sound which would increase traffic. A significant increase in commercial boating is not anticipated. There are some proposals for increased recreational facilities along the river, however, the area especially around College Point has problems with diminishing depths due to the settling of soil. As noted earlier, the Parks Department Waterfront Management Plan has recommended a small boat trail ("Blueway") which would extend into Flushing Bay. No conflict should occur if the trail is kept well out of the channel used by the maritime vessels. Some problems in the summer between maritime traffic, high speed ferries and recreational boats could occur. Figure 7.4 illustrates future conditions in the area.

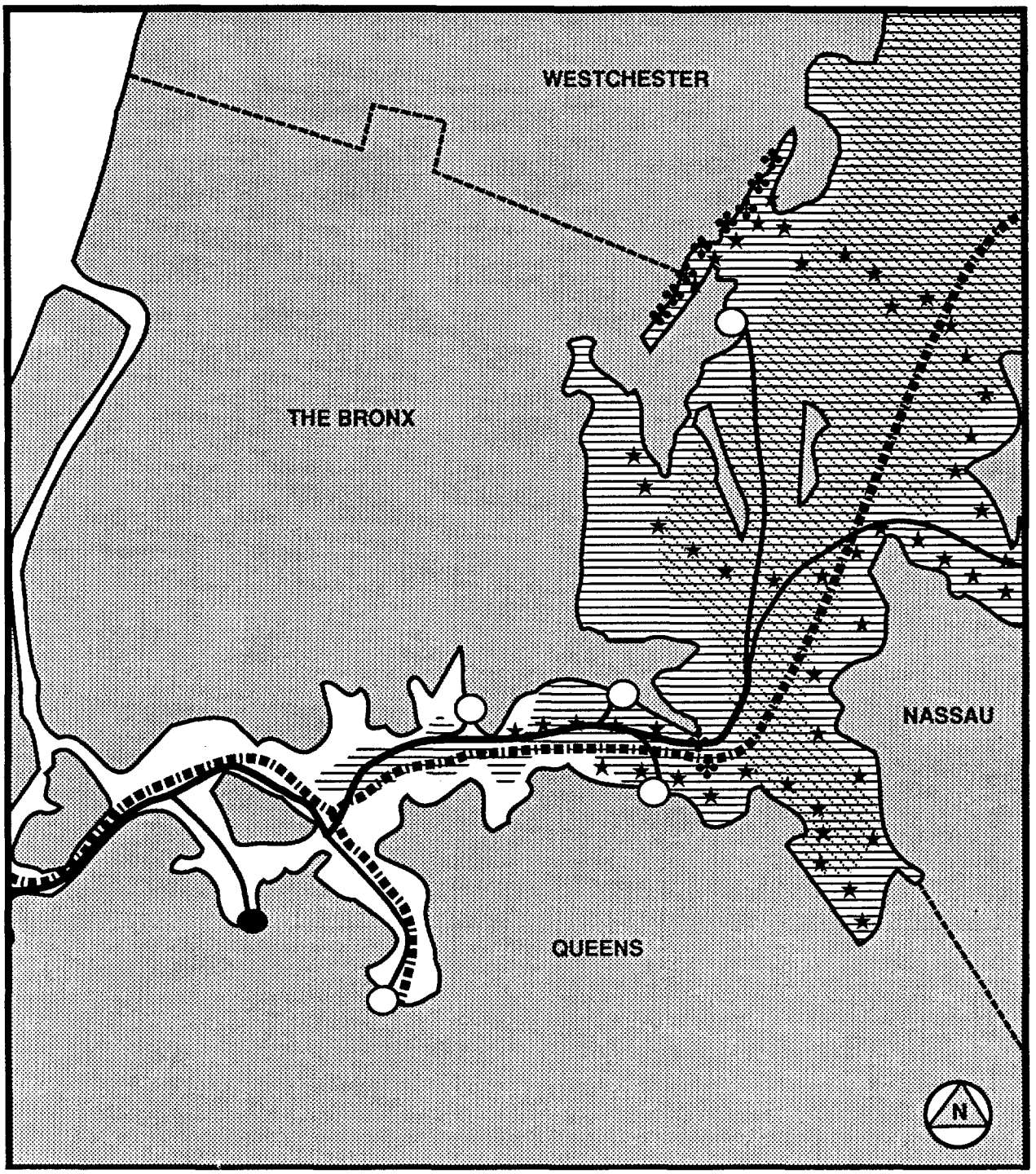


AREAS OF CONFLICT : EXISTING

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- ★ ★ ★ ★ CANOE/KAYAK ROUTES ✣ ✣ ✣ ROWING SHELL ROUTES

LONG ISLAND SOUND & THE UPPER EAST RIVER
FIG. 7.3

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



AREAS OF CONFLICT : FUTURE

LONG ISLAND SOUND & THE UPPER EAST RIVER

FIG. 7.4

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- FUTURE FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- FUTURE FERRY ROUTES
- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING: FUTURE INCREASED ACTIVITY
- CANOE/KAYAK ROUTES
- ROWING SHELL ROUTES

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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Hell Gate

Hell Gate, notorious for its strong tidal currents, requires all vessels passing through to take considerable caution. Even though currents at times are not hazardous, the area does pose potential risks to operators unaware of how to handle strong tides and currents especially in less powerful boats. A marine transfer station is located in this area, both maritime and industrial vessels and recreational boats transit through these waters. The primary source of commercial traffic is generated by the Circle Line which passes through Hell Gate on its way around Manhattan. The Pan Am ferry linking La Guardia Airport and Manhattan also passes through here. There is some rowing associated with a boat club located in the area. They head up into the Harlem River usually just after day break. Figure 7.5 illustrates existing conditions in the area.

Future proposals for the area include a ferry landing at 107th Street Pier and two potential hand boat launch sites identified on Randall's and Mill Rock Island. These facilities alone will not significantly alter the existing use pattern in the area. Transiting recreational traffic can be anticipated to increase. This may lead to vessel congestion which could increase the risk of collisions or groundings. Figure 7.6 details future conditions in Hell Gate.

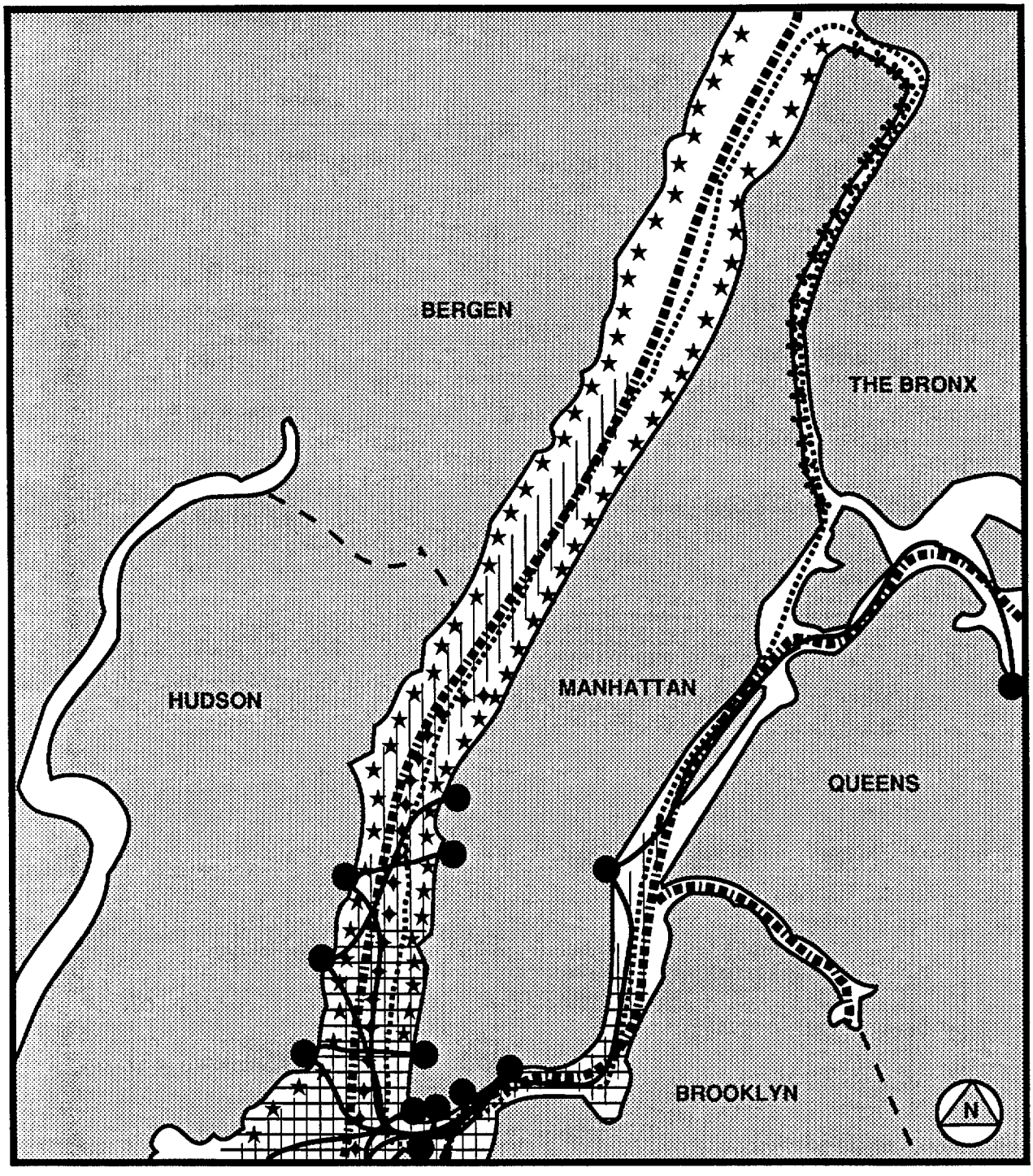
Harlem River

Due to the narrowness of the Harlem River and numerous bridges, the majority of the river is restricted to a 5 mph speed limit, although anecdotal information indicates that this is frequently ignored.

There are a limited number of sand and gravel barges traversing this waterway as well as the Circle Line which comes through approximately every 45 minutes in the summer and every one and a half hours in the off season. Motorboats using the waterway en route to other boating waters are less predictable. Rowing is the main recreational activity in the river.

One of the major problems in the Harlem River is the wakes of motorized vessels reverberating off the bulkheaded shore. The wakes can capsize or damage rowing shells or force them to stop until the water is calm. From May to October rowers must be off the water by about 10:00 a.m. to avoid motorized vessel traffic.

Reconstruction work currently being done on the University Heights and Broadway bridges has forced all waterborne traffic to pass under one side of this bridge. This has apparently caused some difficulties with boats having to pass in opposite directions through a narrow area of approximately 75 feet. Figure 7.5 illustrates existing use patterns.



AREAS OF CONFLICT: EXISTING

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- COMMERCIAL CRUISE SHIP ROUTE
- CONCENTRATION OF COMMERCIAL BOATING ACTIVITY
- CIRCLE LINE ROUTE
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- CANOE/KAYAK ROUTES
- ROWING SHELL ROUTES

THE HUDSON RIVER, HARLEM RIVER, HELL GATE & THE LOWER EAST RIVER
FIG. 7.5

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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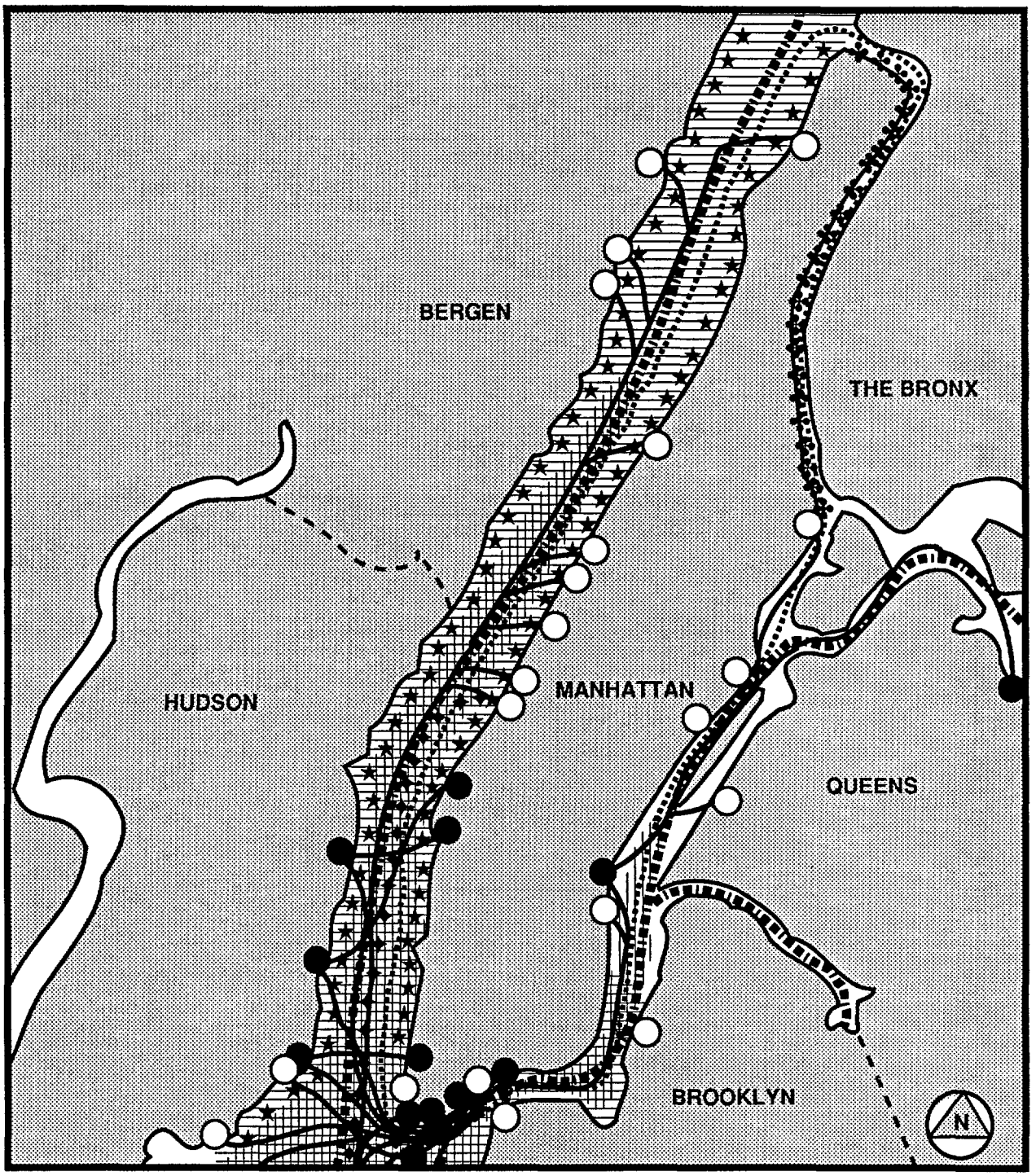

AREAS OF CONFLICT: FUTURE

THE HUDSON RIVER, HARLEM RIVER, HELL GATE & LOWER EAST RIVER

FIG. 7.6

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES: EXISTING
- COMMUTER FERRY ROUTES: EXISTING
- COMMERCIAL CRUISE SHIP ROUTE
- FUTURE
- FUTURE INCREASED ACTIVITY
- CIRCLE LINE ROUTE
- CONCENTRATION OF COMMERCIAL BOATING ACTIVITY: FUTURE INCREASED ACTIVITY
- CONCENTRATION OF MOTORBOATING & SAILBOATING: FUTURE INCREASED ACTIVITY
- CANOE/KAYAK ROUTES
- ROWING SHELL ROUTES

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No significant future increase is anticipated in maritime, ferry or commercial boating activity. There are several proposals for new facilities for rowing. If these facilities are built, they will add to the number of rowers on the river and probably encourage them to extend their hours of use. Discussions have also been held on developing a marina and boat trailer ramp as well as a hand boat launch. The introduction of motorized boating facilities, in addition to projected growth in recreational traffic, could further exacerbate the existing problems related to wakes in the area. Figure 7.6 depicts future use patterns in the Harlem River.

Hudson River

Over the last 20 years there has been a dramatic decrease in the number of traditional port uses in the Hudson. The majority of the remaining maritime/industrial traffic is either associated with the two Sanitation Department marine transfer stations located at 57th Street and 125th Street in Manhattan and vessels travelling to and from Albany and intermediate points. Several ferries cross the Hudson in an east-west direction with the northernmost docking facility at Pier 84 at 45th Street in Manhattan. Commercial vessels usually only come as far north as 52nd Street. Ocean liners with limited maneuverability dock at the Passenger Ship Terminal located between 48th and 52nd Street. Most recreational boats traverse the Hudson heading for other boating waters. Canoeing and Kayaking and some fishing takes place in the river also. There are a few marinas, hand boat launches and boat trailer ramps along its shores.

Figure 7.5 illustrates existing use patterns in the Hudson River.

The major problem appears to be wakes from passing vessels, especially as they affect recreational boating facilities.

Barring commencement of time-sensitive cargo operations using docking facilities along the Hudson, maritime and industrial activities will probably continue to have a limited impact. Ferry activities are expected to increase, with routes envisioned extending further north, possibly to Rockland or Westchester counties. There will also be an increase in the number of routes between New Jersey and New York and along the New Jersey coastline. Commercial vessel activity may also increase as dock sites close to office development are constructed.

Cruise ship activity is not likely to increase. Cruise ships currently dock at 48th and 52nd streets in Manhattan and will continue to be there. However, their six berths may be reduced to four. Other types of excursion vessels are expected to increase significantly.

Numerous facilities for recreational boating have been planned for the Hudson River which, if constructed, will generate a dramatic increase in the number of recreational vessels in the waterway.

The dramatic rise in ferries and recreational boating will expand the potential for conflict. Peak evening ferry commuting hours could conflict with recreational boats. As more close to home recreational facilities become available, operators will use them over a wider time frame. As ferries become faster and their numbers increase, the potential for conflict will grow. Figure 7.6 illustrates future use patterns in the area.

Lower East River

The Lower East River is used by all vessels mainly for passage to other parts of the Harbor. There are, however, concentrations of maritime support and industrial docking facilities at the former Brooklyn Navy Yard; Newtown Creek is heavily used by the water dependent industry.

Currently, there are only two active ferry landing sites on the river, one at East 34th Street and another located at Pier 11 adjoining South Street Seaport. Excursion vessel operators cite locations along the Lower East River at 34th Street, 23rd Street Pier, the Water Club and South Street Seaport as the most preferred docking sites in the Harbor. The vessels travel either up the river to look at the bridges and Manhattan Skyline or southward towards the Statue of Liberty and Ellis Island. There are only two small recreational boating facilities, a marina at 23rd Street and a sailing school at the South Street Seaport where sailors tend to head out to the Upper Bay. While recreational boaters also use the river for

passage, some linger around the Seaport, usually staying out of the channel, while looking closely at the landside activity.

Currents pose some risks but these do not appear to be significant. While the Lower East River has one of the higher reported maritime, ferry and commercial collision rates in the Harbor, this numbers only 23 over the past ten years and nine of those accidents were with piers and docks. Figure 7.5 illustrates existing use patterns in the lower East River

No significant change in maritime use is anticipated. While there are only a few ferry landing sites proposed, this number may increase in response to needed bridge repair work. There are few proposals for additional excursion vessel docking sites but activity may increase as excursion demand rises. Ports and Trade is currently working to expand and improve its facilities at Piers 9, 11 and 13. Pier 9, intended for long-term excursion vessel docking, will be expanded from one berthing space to four or five new berths by March, 1991. Pier 11, a ferry/excursion dock for pick-up and drop off service currently has the capacity for 20 ferry landings and 10 excursion landings an hour. While the capacity can be doubled, as ferries and excursion vessels increase there may be an increased competition for the 5:30 PM time slot, currently the time of greatest competition between ferries and excursion vessels for space. Pier 13, for pick-up and drop off excursion vessel service,

has been available since late fall, 1990. It can accommodate four excursion vessels an hour. It is currently not at capacity. Finally a layover area for ferries exists between piers 13 and 14. Currently there is no need to use the area but as demand increases for docking space, ferries that currently berth at the docks during layover periods may move over to this area. Piers on Roosevelt Island will have the capability of accommodating excursion vessels. However no such service is planned at this time. Only one additional recreational boating site has been discussed on the River, for Brooklyn Piers 1-5. If a marina of significant size were constructed and there was an increase in commercial and ferry routes, the current coexistence, especially below the Manhattan Bridge, could change. Figure 7.6 depicts future potential use patterns.

Upper Bay

The Upper Bay, the busiest section of the Harbor serves as a major crossroad for all types of vessels. The complexity of the activity differs between north and south. For discussion purposes, the northern section lies north of a line extending from Red Hook to Jersey City just below the Statue of Liberty and Ellis Island. The southern section extends southward to the Verrazano Narrows Bridge.

In the **northern Upper Bay** there are two traditional maritime activities. The first includes vessels passing through the waterway to points north along the Hudson and East Rivers. In relative numbers, this does not constitute a major source of traffic in the area. The second significant maritime

activity is generated by the containerports at Red Hook and South Brooklyn Marine Terminal. Vessels bound for Red Hook are sometimes under tow and travel along Buttermilk Channel.

The area is the primary hub of commuter ferry operations which approach from points north and south at both high and low speeds. These land either at South Ferry at the Battery or nearby in the East and Hudson rivers, especially at Pier 11 which is the major docking facility for private ferries. The Staten Island Ferry crosses every 15 minutes to and from South Ferry during rush hour and ever 30 minutes during off peak hours and hourly at late night. The Governor's Island Ferry, which is restricted to military personnel, provides regular service departing simultaneously every 15 minutes from Governor's Island and South Ferry from 6 AM to 7 PM during the weekdays.

The Upper Bay also serves as the premier site for excursion vessel docking. The majority of tours to the Statue of Liberty and Ellis Island leave from the Battery. Excursions also head to the lower Hudson and East rivers. Docking space in this area remains limited, resulting in congestion near docking facilities.

The Manhattan skyline near the Battery and the Statue of Liberty and Ellis Island also attract large numbers of recreational vessels. The sailing school at South Street Seaport uses the Upper Bay for classes and weekly regattas in the summer. The Upper Bay is the most sought after spot for special events, ranging from the Mayor's Cup sail boat race

to a recent windsurfing contest. Coast Guard Statistics show 75 special events occurred in 1990. Governor's Island is the headquarters for the Coast Guard.

Some of the traffic intensity is ameliorated by the bay's width. Where vessels converge, however, in particular, the vicinity of the Battery, the potential for conflicts increases. Conflicts in this area are particularly numerous due to the multitude of vessel types, intersections, schedules, routes and intent.

Congestion in the area of the landing sites for ferries and excursion vessels is a concern. Recreational boats cross the paths of these vessels creating increased potential for conflict.

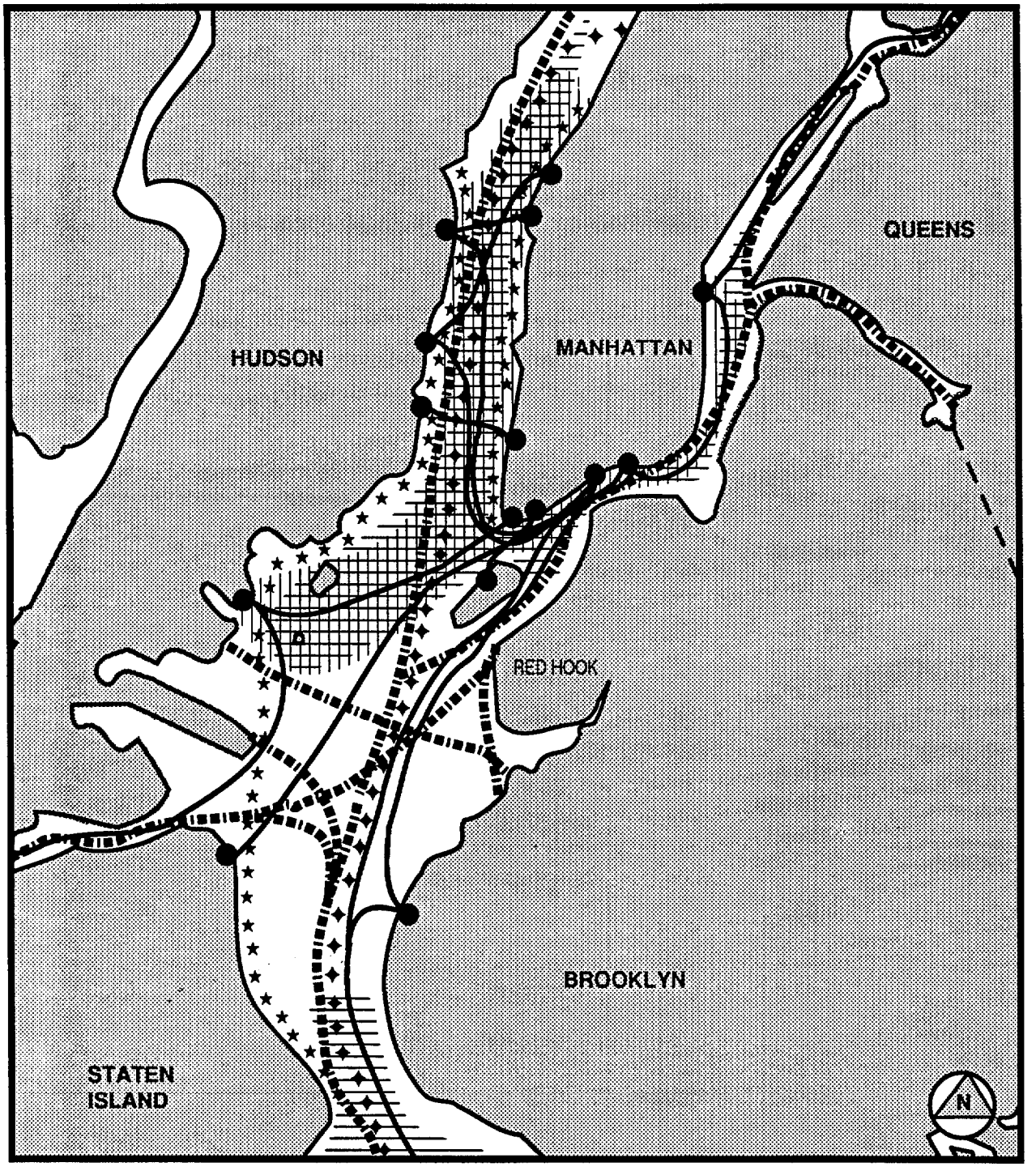
Coast Guard statistics for the past decade indicate that while the Upper Bay has experienced the highest number of maritime, ferry and commercial collisions, their number was limited (35), and the majority (20) were classified as collisions with a fixed objects. VTS regulations monitoring Harbor conditions, larger vessel movements and accidents, have just recently been reactivated and should reduce accidents. Figure 7.7 illustrates the intensity and variety of uses in the Upper Bay.

The anticipated expansion of the Red Hook Marine Terminal will result in vessels berthed in close proximity to the channel which could result in an increased risk of conflict. Future growth of ferry and commercial operations may exacerbate the

potential for conflicts not only near the docking sites but also along their routes. Tremendous growth in commuter ferry services is expected as vehicular infrastructure deteriorates and congestion on roadways and bridges increases. Should crowding occur at existing docking sites this would pose a problem.

Concentrations of recreational vessels in this area are expected to increase, the product of new developments with accessory marinas in Jersey City, Weehawken and Brooklyn Heights, as well as an overall increase in recreational boating. Weekday evening recreational use of the water may increase as there are more close-to-home recreational boating facilities that have access to the Bay. Conflicts associated with congestion of vessels and recreational boats coming too close to docking sites may increase. Figure 7.8 illustrates future use patterns in the Upper Bay.

The southern portion of the Upper Bay serves as a gateway to the Atlantic Ocean for the majority of ocean going vessels. There are a tremendous number of maritime vessels traversing this area. The vast majority are bound for the Kill Van Kull en route to Port Newark/Elizabeth or Howland Hook. Occasionally vessels calling on the Marine Terminals tie up in the anchorage area just north of the Narrows. Many of the large tankers must lighter their cargo because of inadequate depths both in the Kill Van Kull and at their cargo berths. This activity results in additional vessel and barge movements to and from the anchorage



AREAS OF CONFLICT : EXISTING

THE UPPER BAY
FIG. 7.7

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- COMMERCIAL CRUISE SHIP ROUTE
- CONCENTRATION OF COMMERCIAL BOATING ACTIVITY
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- CANOE/KAYAK ROUTES

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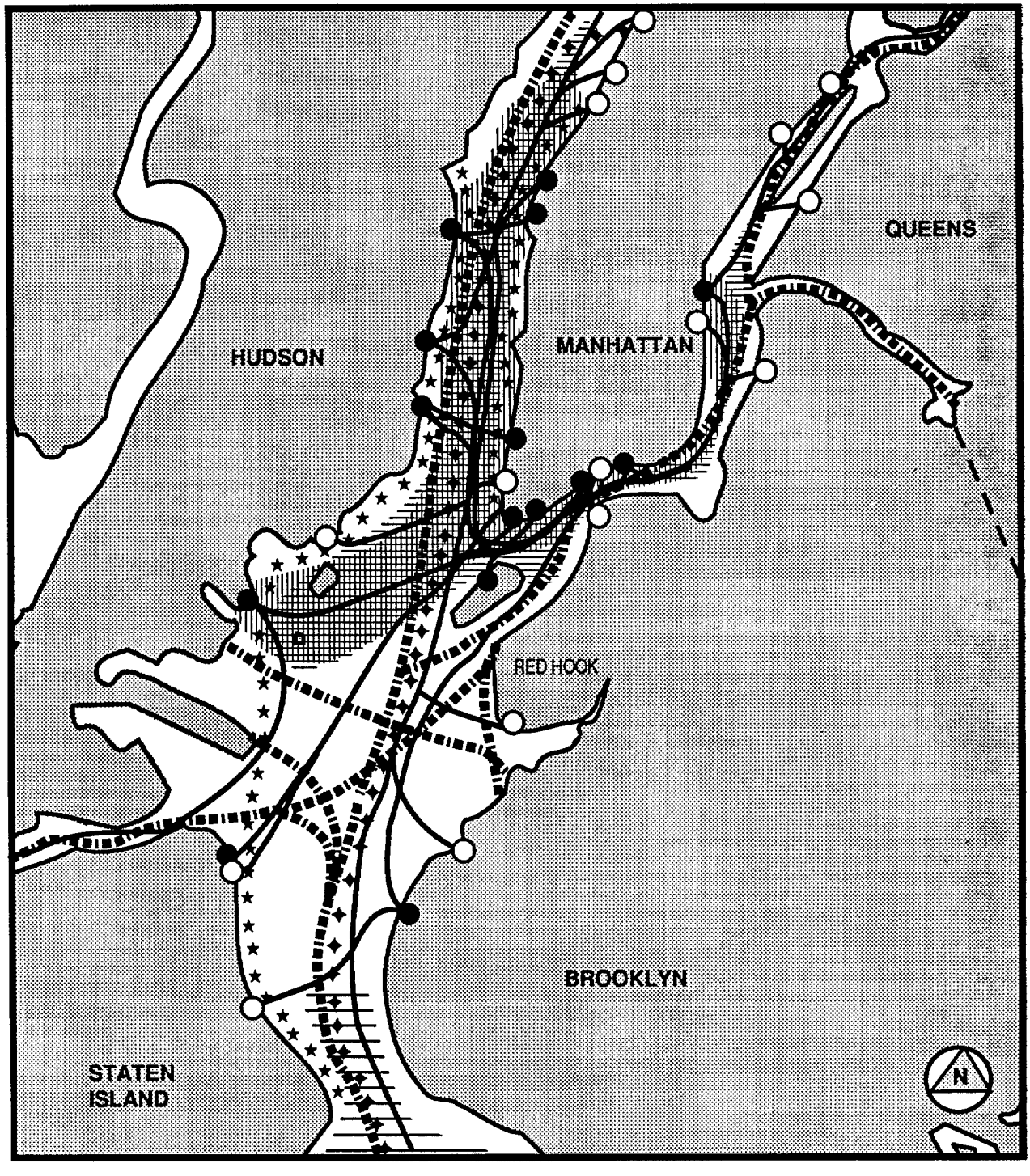

AREAS OF CONFLICT : FUTURE

THE UPPER BAY
FIG. 7.8

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES: EXISTING
- COMMUTER FERRY ROUTES: EXISTING
- COMMERCIAL CRUISE SHIP ROUTE
- CONCENTRATION OF COMMERCIAL BOATING ACTIVITY: FUTURE INCREASED ACTIVITY
- CONCENTRATION OF MOTORBOATING & SAILBOATING: FUTURE INCREASED ACTIVITY
- CANOE/KAYAK ROUTES
- FUTURE
- FUTURE INCREASED ACTIVITY

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areas. In some instances, customs officials or Harbor Pilots will board vessels, in Ambrose Channel in the Atlantic Ocean southeast of the demarcation line between Breezy Point Light and Sandy Hook.

A small number of maritime vessels travel northwest to the Port Authority Auto Marine Terminal, Global Marine or the Army depot along the eastern shore of Hudson County. Some vessels continue at reduced speed up through the Upper Bay into the Hudson or East River, at which time some are under tow. Barges carrying solid waste from New York City marine transfer stations head for the Kill Van Kull en route to Fresh Kills. Maritime support vessels, such as tugs and barges, abound. A number of water dependent industries are also located along the southwest Brooklyn waterfront, extending from Red Hook to Owls Heads. Currently, all sludge barges traverse the Narrows on route to the Ocean Dumping sites.

Two high speed ferries go through the Upper Bay during peak commuter time. With the exception of a few commercial fishing operations from Hudson County, commercial vessels do not go through the Narrows.

Recreational boats enjoy the lower portion of this area. Canoes and kayaks can launch from the shores of Staten Island near the anchorage area and head

up towards the Statue of Liberty or down into Sandy Hook, Raritan and Jamaica Bays. Figure 7.7 illustrates existing use patterns.

With the construction of Homeport there will be an increase in large naval ships transiting this area. Effective as of February 8, 1991 a restricted area has been placed around the Homeport. It is divided into two parts. The area extending 600 feet easterly or channelward of the U.S. Pierhead line is closed to all vessels and persons unless specifically authorized to enter. The remainder of the area is open to transiting vessels provided they proceed by the most direct route without unnecessary delay or stopping. A portion of the restricted area is within the general anchorage area. However, commercial vessels which are properly anchored within the anchorage area will be allowed to swing into the seaward portion of the restricted area.[6]

An increase in the number of vessels using the anchorage is not expected. The proximity of a hand boat launch at Alice Austen Park in Staten Island to the anchorage area raises several concerns. Small boats risk being run-over by maritime vessels unable to see them or stop if they cross their bow too closely. Furthermore, if navigating too close small boats might be caught in the vortex created by the propellers of the large ocean going vessels. This could be further exacerbated with the placement of the restricted area around Homeport which would force boats traveling north of the launch site out into the anchorage area.

Traffic from ocean dumping vessels is expected to decrease as New York and New Jersey conform to the federal ban on ocean dumping. The dredging of the Kill Van Kull (which will be discussed later) will result in additional congestion in this part of Upper Bay during of this project.

Although there is a concentration of vessel movement through the Narrows, for larger vessels, the VTS will monitor activities from the time of their entry in the Upper Bay until they exit the Harbor to avert potential conflicts.

Fifteen high speed ferries are projected to pass through the southern Upper Bay. A proposed ferry route from the St. George Ferry Terminal to Hudson County will cross the channel heading into the Kill Van Kull. Figure 7.8 illustrates future use patterns in the area.

Kill Van Kull

Seventy five percent of all maritime support services are located along the banks of the Kill Van Kull. Over 2000 maritime vessels traverse this waterway annually, bound to and from Howland Hook, Port Elizabeth and Port Newark. (See Figure 7.9) As the primary route to the Port's major cargo docks, the Kill Van Kull must be dredged periodically in order to accommodate deeper draft container ships. The Army Corps of Engineers is expected to begin dredging in 1991 and take approximately 4 1/2 years to complete the project. As a result, only one side of the channel will be available for vessel movement during the course of

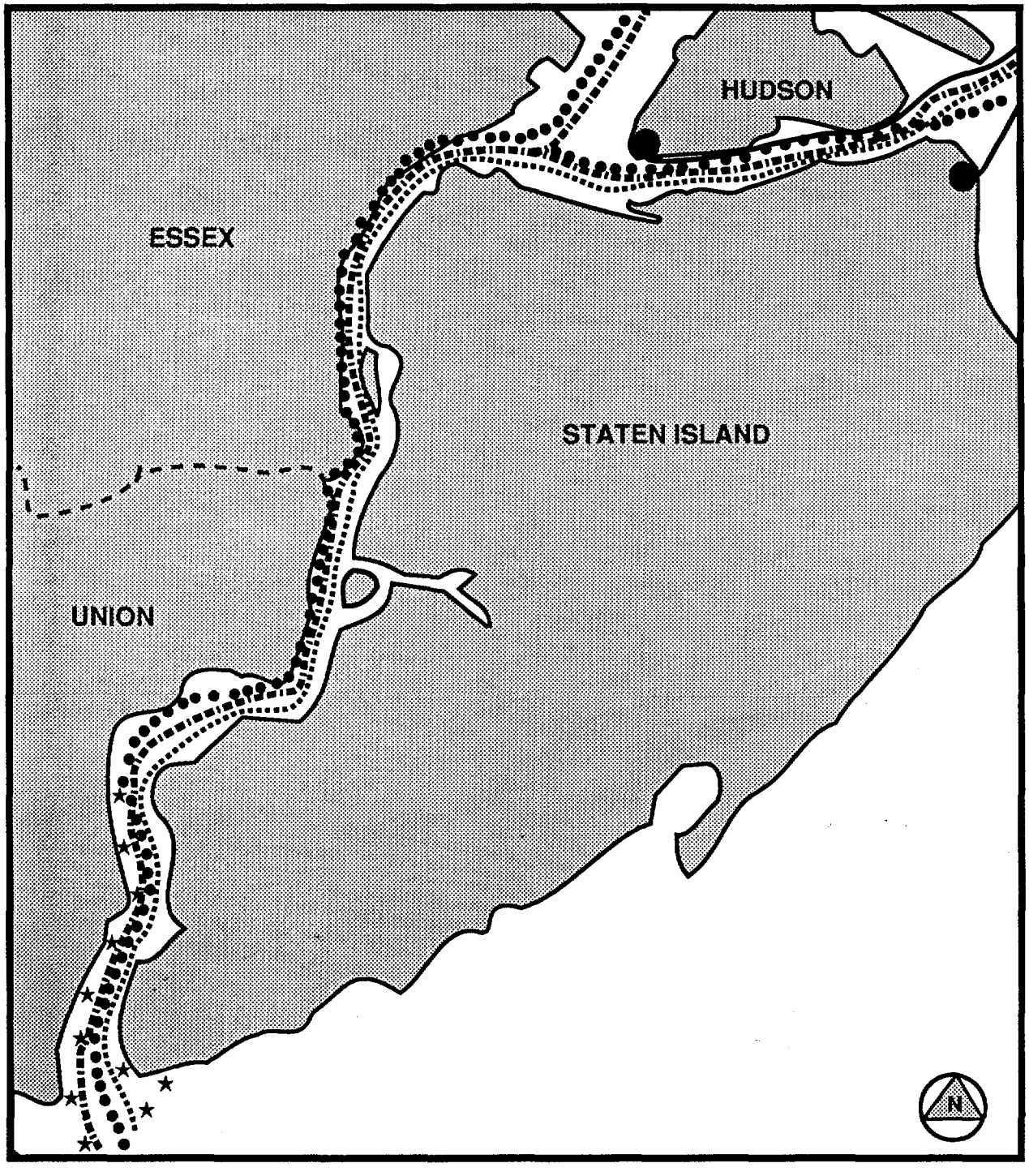
the project. After the project is complete a two way 40 foot deep channel will be available throughout the Kill. The VTS will be responsible for closely monitoring all movements of participating vessels in the Kill Van Kull.

A few water dependent uses, including sludge facilities and petroleum depots are interspersed among maritime support uses. Recent oil spills have necessitated closings of this waterway for clean up. Collisions and groundings of maritime vessels, which occur within this relatively narrow waterway, can also slow and inhibit vessel movements. While the total volume of maritime vessels is not expected to expand, vessel size will likely increase, resulting in reduced maneuverability. Traffic is also anticipated to increase with the revived and expanded use of the Howland Hook containerport in the Arthur Kill.

An additional ferry route is anticipated in the future connecting Elizabeth and the Battery area. With the exception of the proposed Harbor Park link to Sailors Snug Harbor, no other commercial boating activity is expected. No new recreational facilities are anticipated here. Figure 7.10 illustrates potential future use of this area.

Newark Bay/ Hackensack and Passaic Rivers

The western shore of Newark Bay accommodates the largest marine facilities in the Harbor, Port Newark and Elizabeth. The vast majority of the Port's container vessel movements are bound for these facilities. In addition, there are a number of



AREAS OF CONFLICT: EXISTING

THE ARTHUR KILL & KILL VAN KULL FIG. 7.9

MARITIME & INDUSTRIAL ACTIVITY ROUTES:

- PORT CARGO ROUTES
- WATER DEPENDANT USE ROUTES
- MARITIME SUPPORT SERVICE ROUTES

COMMUTER FERRY DOCKING SITES

COMMUTER FERRY ROUTES

★★★ CANOE/KAYAK ROUTES

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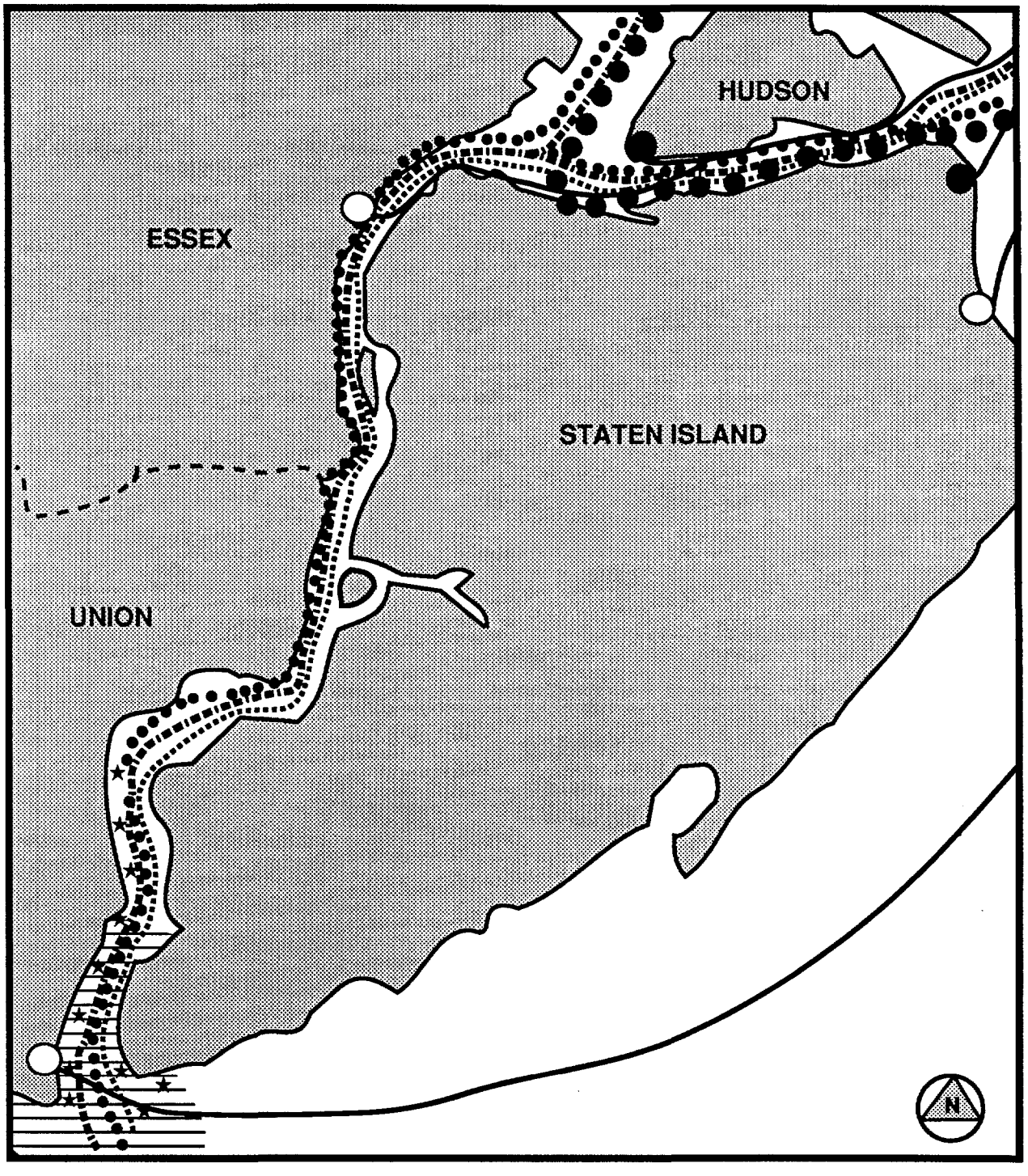

AREAS OF CONFLICT: FUTURE

MARITIME & INDUSTRIAL ACTIVITY ROUTES:

- PORT CARGO ROUTES
- WATER DEPENDANT USE ROUTES
- MARITIME SUPPORT SERVICE ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- CANOE/KAYAK ROUTES
- POTENTIAL TIME SENSITIVE CARGO FERRY ROUTE
- FUTURE FERRY DOCKING SITES
- FUTURE FERRY ROUTES
- FUTURE CONCENTRATIONS OF MOTORBOATING & SAILBOATING

THE ARTHUR KILL & KILL VAN KULL FIG. 7.10

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
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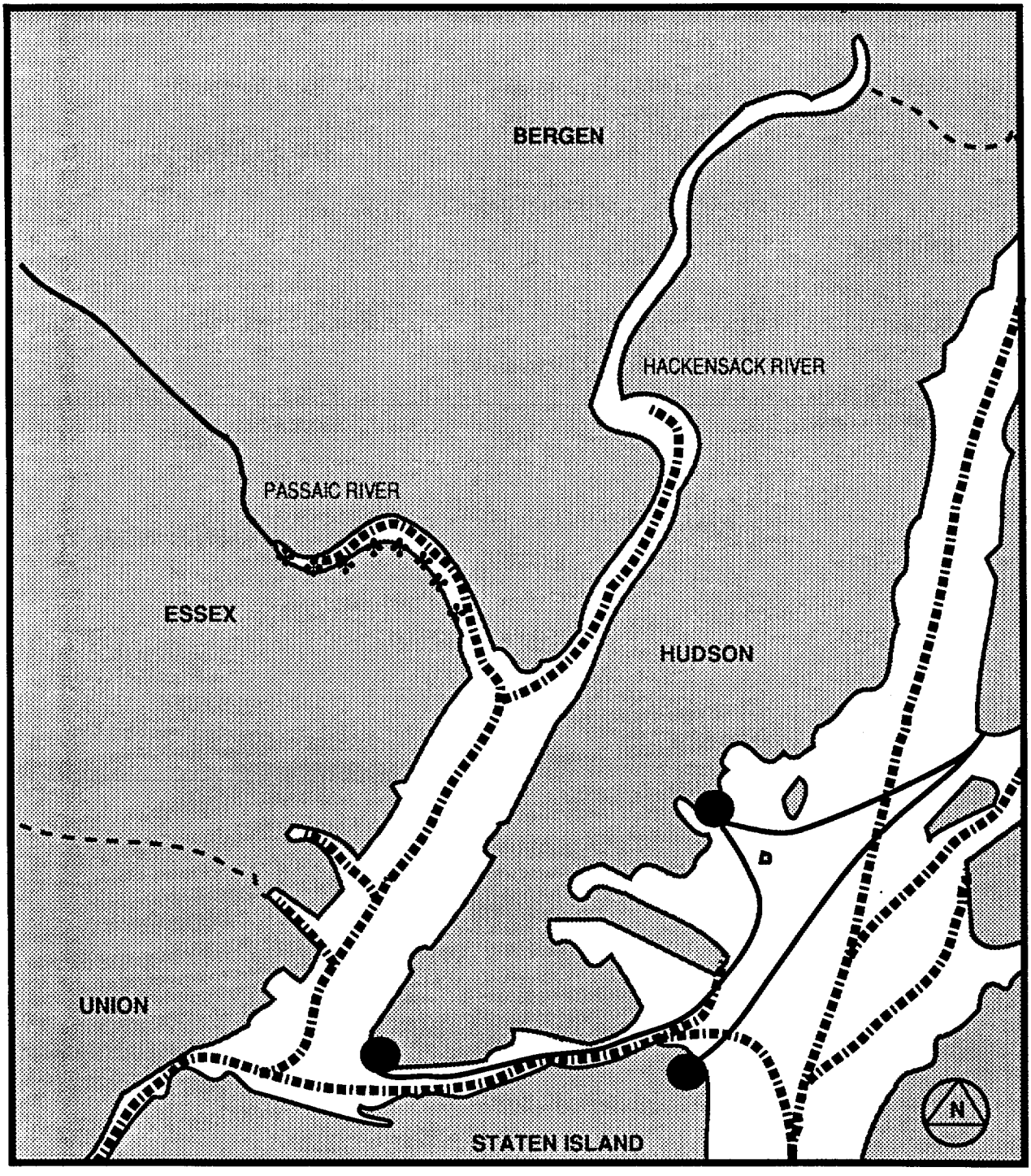
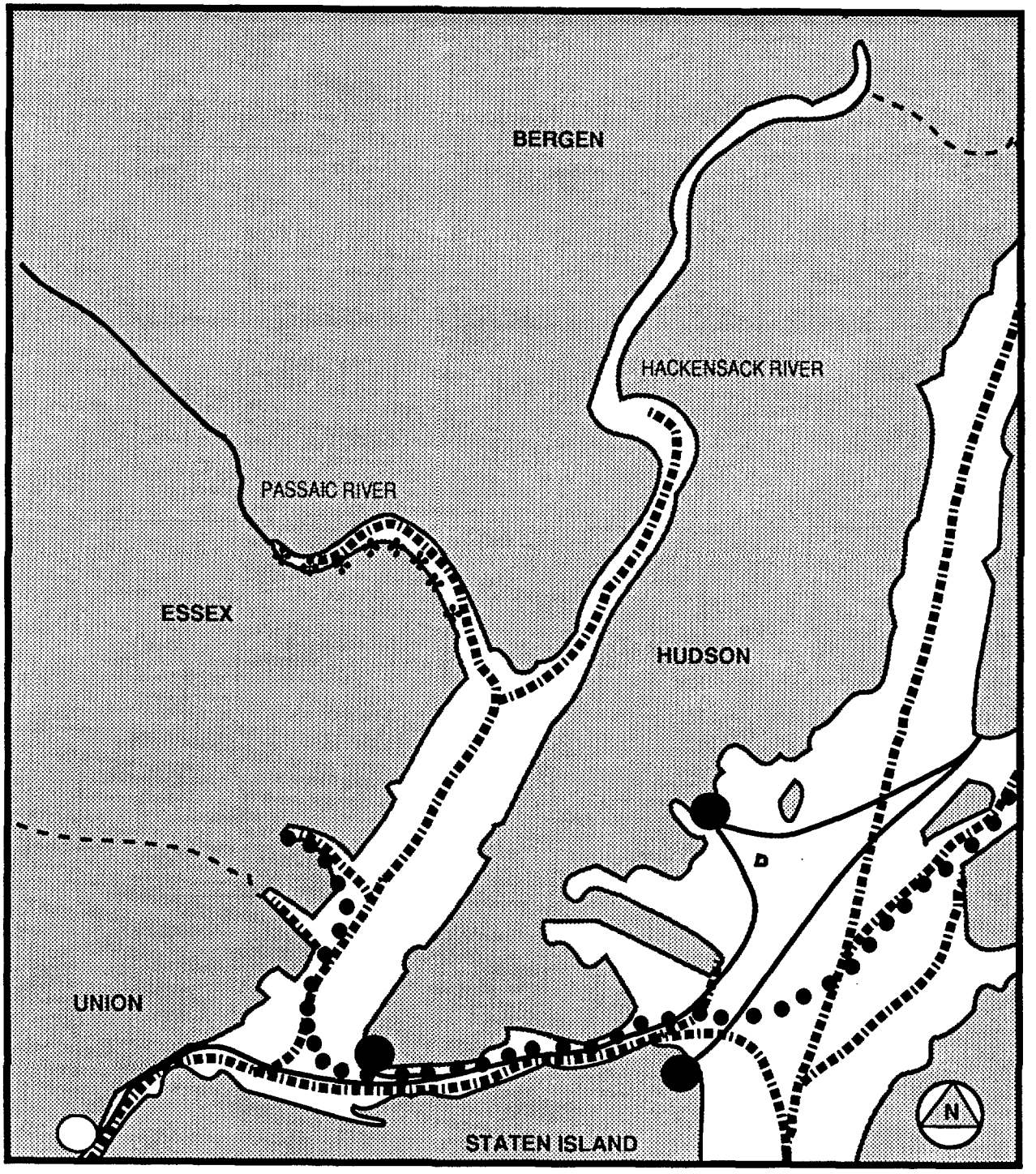


AREAS OF CONFLICT: EXISTING

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- ROWING SHELL ROUTES

NEWARK BAY, HACKENSACK & PASSAIC RIVERS
FIG. 7.11

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



AREAS OF CONFLICT: FUTURE

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- POTENTIAL TIME SENSITIVE CARGO FERRY ROUTE
- EXISTING FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- ROWING SHELL ROUTES
- FUTURE FERRY DOCKING

NEWARK BAY, HACKENSACK & PASSAIC RIVERS
FIG. 7.12

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
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water dependent industries especially oil and chemical storage facilities along the western shore of Newark Bay and the lower reaches of the Hackensack and Passaic Rivers. Because of the restrictions of railroad bridges crossing the Hackensack and Passaic Rivers most vessels servicing industrial uses operate at night. Sludge and solid waste barges serving northern New Jersey communities traverse Newark Bay on route to the Ocean Dump.

There is no ferry or commercial traffic in the Bay and little is anticipated. While industry is concentrated on the western shore of the Bay, some recreational boating facilities and activities are on the eastern shore where the depths are shallower. The lower reaches of the Hackensack and Passaic rivers also contribute a small amount of recreational traffic. There appear to be no significant conflicts in the area. Figure 7.11 illustrates existing uses in the area.

Maritime use will remain heavy in this area with some increase associated with barge movements lightering cargo ships in the anchorage areas. Recreational boating traffic will increase marginally with expected landside development on the Hackensack River and eastern shore of Newark Bay. Figure 7.12 illustrates potential future use patterns in the area.

Arthur Kill

The navigation channel in the Arthur Kill is narrow, allowing large maritime vessels little flexibility to maneuver. With the exception of

oil storage facilities, the New York side of the Kill is characterized by wetlands; the New Jersey side contains a number of water dependent uses. (See Figure 7.9). Collectively, the two shores house the largest oil storage facilities in the harbor, thus, much of the vessel traffic is oil tankers. At this time, most traffic enters the Arthur Kill via the Kill Van Kull. The Arthur Kill however, is more heavily used when movement along the Kill Van Kull is encumbered by oil spills or accidents. Some maritime support vessels transit the Arthur Kill en route to Newark Bay and other points in New Jersey. The Fresh Kills Landfill, situated off of the Arthur Kill on Fresh Kills Creek, is a destination point for New York City garbage scows. It is barred to navigation by all other vessels. Howland Hook, the largest containerport in New York City, is currently underutilized and does not presently generate much traffic. The Port Authority plans to restore the facilities and expects Howland Hook to be operating during the next decade at full capacity. Most vessels calling on Howland Hook will enter via the Kill Van Kull. Traffic to the oil storage facilities especially those at Port Mobil and northward is expected to remain constant. In addition, the Army Corps dredging of the Kill Van Kull may cause an increase in the number of vessels using the Arthur Kill. When the landfill at Fresh Kills closes sometime in the next century, barge traffic will be reduced considerably.

There are no ferry or regular excursion routes on this body of water and only one ferry route is currently proposed. Some recreational boats

transit the Arthur Kill. A few, especially smaller boats, explore the waterway's ship graveyards. A concentration of recreational facilities can be found in the lower reaches on Smith Creek in Woodbridge and at Perth Amboy and Tottenville. Vessels here head into Raritan and Sandy Hook Bays. Another marina, which could also be a potential ferry landing site, is located in the upper portion, in the city of Elizabeth. Although protected by a break water, wake problems from passing vessels have been reported here. The city is currently contemplating an additional marina adjacent to its existing marina. This could add to traffic that has to cross the channel of the Arthur Kill as well as contribute to traffic on the Kill Van Kull. In the southern end of the Arthur Kill there are several proposals that could potentially add a large number of slips. An additional boat trailer ramp is also being contemplated in the area which would serve small recreational motorboats. This could increase the potential for conflict between maritime vessels and recreational boats on this narrow stretch of water, adding pressure to traditional maritime users. Figure 7.10 illustrates potential future use patterns in the area.

Sandy Hook & Raritan Bays

Raritan and Sandy Hook Bays have relatively few maritime water dependent activities occurring. The majority of cargo vessels in this area transit to the Arthur Kill. Water dependent activities are limited to the shoreline of Middlesex and Monmouth County. There is a Naval Pier in Leonardo situated near the Sandy Hook peninsula, subject to some vessel movement restrictions. Two high speed ferry

routes cross through this section of the bay linking Atlantic Highlands and Highlands in Sandy Hook Bay with Pier 11 in on the East River in Manhattan and an intermediate stop at 69th Street Pier in Bay Ridge, Brooklyn.

Only one excursion vessel operates in this waterway, taking passengers from Brooklyn's 69th Street Pier to the Monmouth County racetrack. The area is also popular for commercial sport fishing.

The bays constitute some of the best recreational boating waters in the study area. Windsurfers, personal watercraft and waterskiers stay behind Sandy Hook for protection whereas larger boats go further out into the open water where the water is rougher. There are approximately 4000 slips with additional boat trailer ramps and hand boat launches proximate to the bays. An additional 1600 slips are located in the Navesink and Shrewsbury Rivers just outside the study area. In the summer, the waters become congested with recreational traffic and choppy due to recreational boat wakes. This seasonal activity sometimes produces conflicts between recreational and maritime vessels. On a few occasions, these waters can become sufficiently congested as to require the Coast Guard to warn recreational boats that have drifted into the Sandy Hook Channel to get out of it. Figure 7.13 illustrates existing activity in the area.

Maritime traffic is anticipated to remain at approximately the same level with a slight

reduction related to the eventual closing of the Fresh Kills Landfill. Additional ferry landing sites have been proposed for southeastern Staten Island, Middlesex and Monmouth countries, with routes between these locations and Manhattan. No significant increase in commercial boating activity is envisioned, except perhaps, commercial sport fishing attracted by improved water quality. Recreational boating is expected to increase. Proposals have been made for approximately 2500 slips and additional moorings and boat trailer ramps. Windsurfing and jet skiing may also increase. Figure 7.14 illustrates future use patterns.

Lower Bay

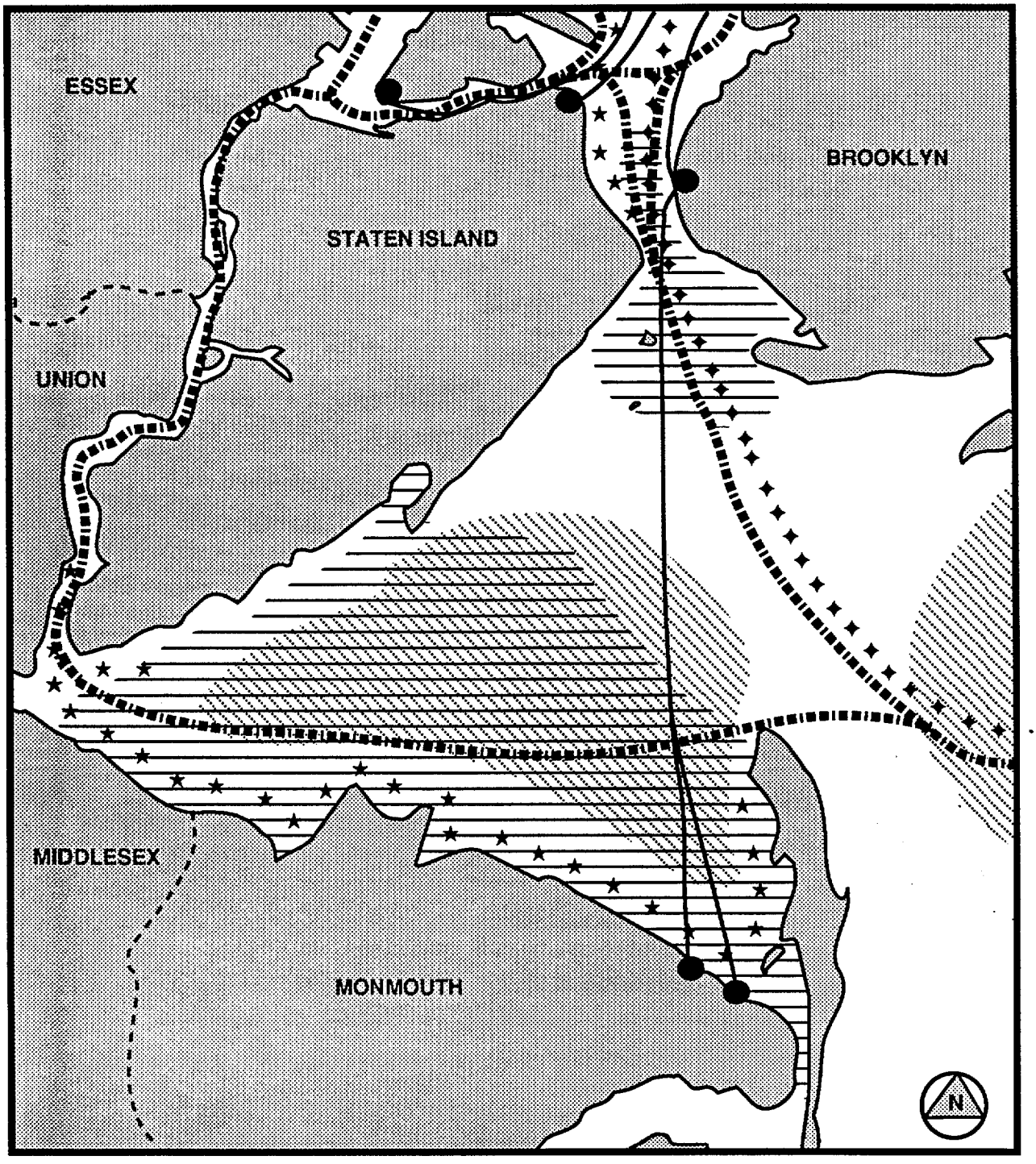
The Lower Bay is the main entrance to the Port. There are two main channels through which all oceangoing maritime vessels entering the Harbor must travel. Maritime vessels are usually travelling at optimal speed and on their own power when transiting the Lower Bay. A limited number of water dependent industrial and municipal users are located along Gravesend Bay.

The previously mentioned high speed ferries traverse through here going between Highlands, Atlantic Highlands and Manhattan. The sole excursion vessel using this waterway is the summer Monmouth Race Track-Bay Ridge service. The area is also used for commercial sport fishing and recreational boaters coming from Sheepshead Bay and Raritan and Sandy Hook Bays en route to deeper waters. Sailboats are especially attracted to the area, because of the openness and depth of the

water. Canoes, kayaks and some rowing shells can be found in the area. Fishing boats as well as other recreational boats can drift into the channel and it can become congested. However, conflicts between recreational and maritime vessels occur infrequently. When the larger ships sound their horn other vessels move out of the channel. As

with adjacent Raritan and Sandy Hook bays, the Coast Guard sometimes has to warn recreational vessels to clear the channel. Figure 7.13 depicts existing use in the area.

Maritime use of this portion of the Lower Bay is not anticipated to change significantly. Ships coming in from the Atlantic may be larger thus decreasing their maneuverability. High-speed, time-sensitive cargo ferries may transit through on their way from JFK Airport in Jamaica Bay to Manhattan and the region's core. Fourteen additional high speed ferries from Raritan, Sandy Hook and Jamaica Bays are envisioned traversing the Lower Bay en route to Manhattan. These will probably operate most often during peak commuter hours. The high speed ferries coming through may also create a problem moving through recreational boating areas, especially if ferries travel outside peak commuter times. Because of the limited projected increase of excursion vessels they are not anticipated to contribute significantly to future conflict problems, however, they will have to deal with those created by other users.

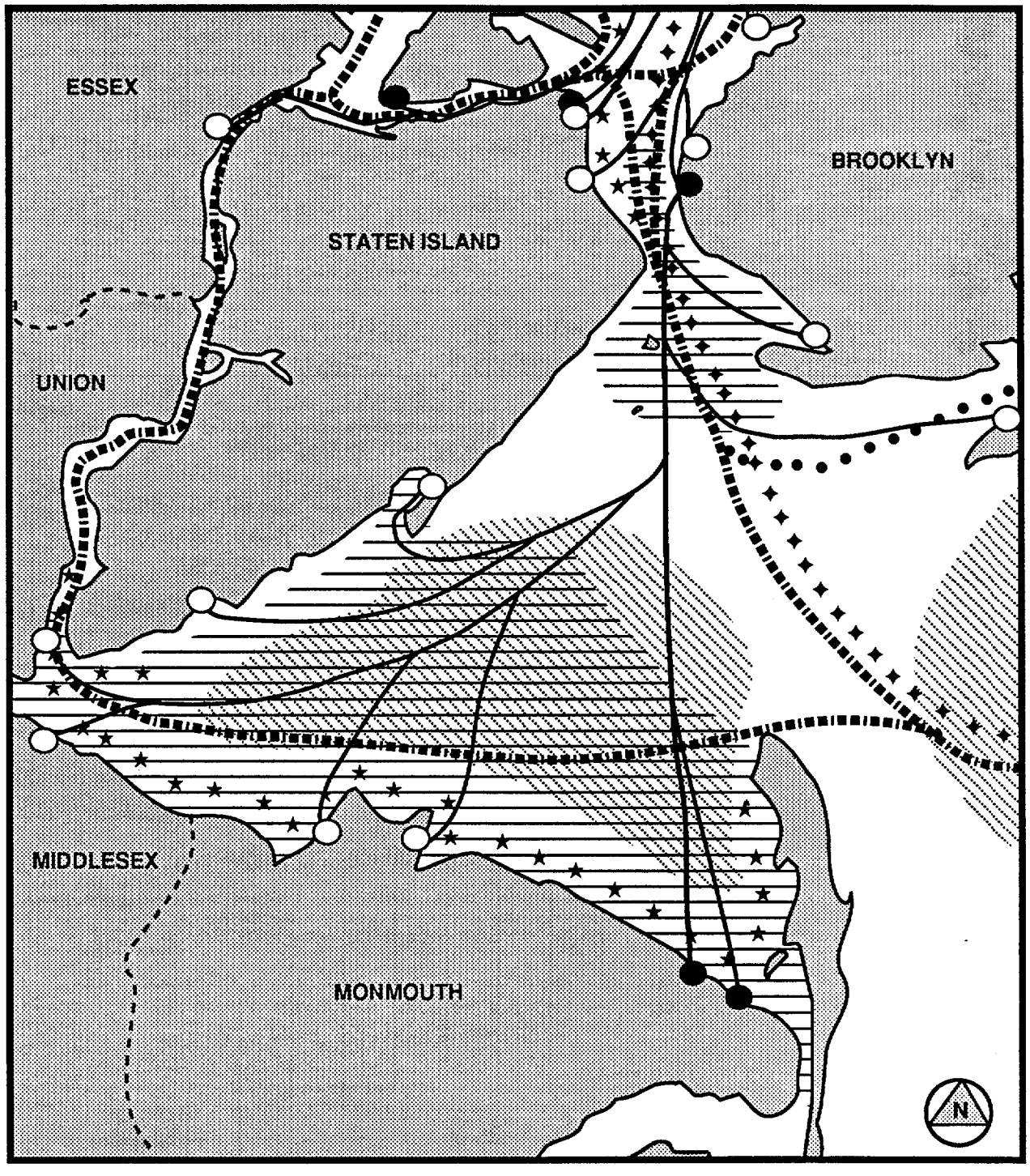


AREAS OF CONFLICT: EXISTING

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- COMMUTER FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- COMMERCIAL CRUISE SHIP ROUTE
- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- CANOE/KAYAK ROUTES

THE LOWER BAY, RARITAN BAY & SANDY HOOK BAY
FIG. 7.13

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
NJ DEPT. OF ENVIRONMENTAL PROTECTION



AREAS OF CONFLICT: FUTURE

THE LOWER BAY, RARITAN BAY & SANDY HOOK BAY

FIG. 7.14

- MARITIME & INDUSTRIAL ACTIVITY ROUTES
- POTENTIAL TIME SENSITIVE CARGO FERRY ROUTE
- COMMUTER FERRY DOCKING SITES
- FUTURE FERRY DOCKING SITES
- COMMUTER FERRY ROUTES
- FUTURE FERRY ROUTES
- COMMERCIAL CRUISE SHIP ROUTE
- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- CANOE/KAYAK ROUTES

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY

NYC DEPT. OF CITY PLANNING

NJ DEPT. OF ENVIRONMENTAL PROTECTION

A limited number of additional excursion boat routes through the Lower Bay have been proposed connecting the Jamaica Bay and Sandy Hook sectors of Gateway National Park. Recreational boating in the Lower Bay is anticipated to increase more from an overall increase in boats than from actual facility development. There are proposals for approximately 250 slips in Gravesend Bay as well as a boat trailer ramp. Figure 7.14 depicts the potential future uses in this area.

Jamaica Bay

The limited amount of traditional maritime activity in Jamaica Bay consists mainly of oil barges going to Mill Basin and Kennedy Airport and municipal sludge and solid waste barges. No ferry or excursion routes exist. There is a large concentration of commercial sport fishing vessels mainly from Sheepshead Bay heading for the Atlantic Ocean via the Rockaway Inlet.

Jamaica Bay is a major recreational boating area. It is used especially by shallow draft vessels due to the limited depths outside the channels. The bay is a unique and fragile ecosystem. There are currently over 3000 slips, as well as many boats docked behind private homes. Canoeists, kayakers, windsurfers and personal watercraft operators also use the area. A boat house for a city high school rowing program is also located here.

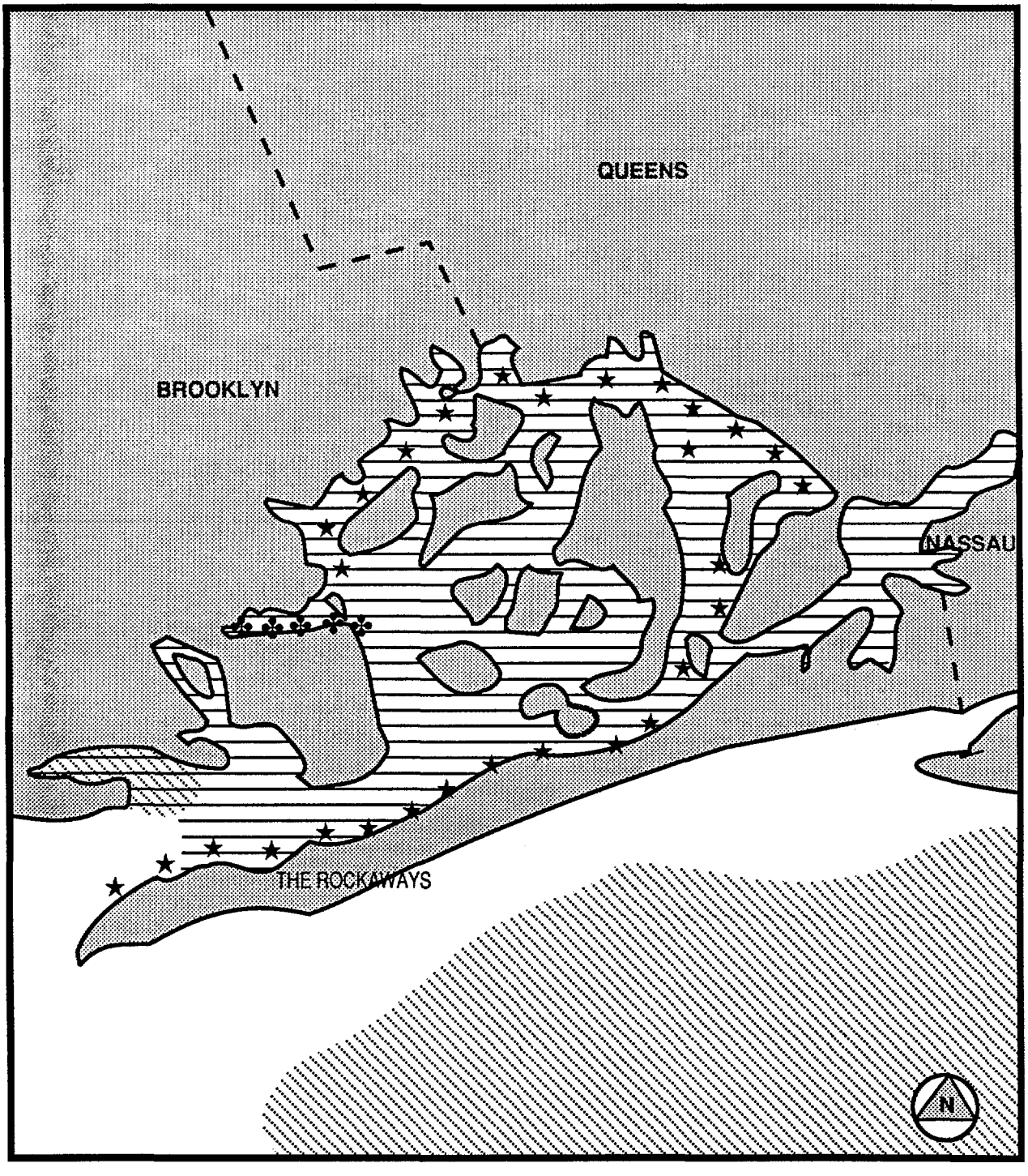
There are no significant conflicts at this time. The Coast Guard has indicated that the intensity of recreational boats is manageable. A major problem

is the high number of derelict boats that present hazards to navigation. There have also been some complaints concerning motorboats coming too close to other boats and weaving in and out. When the short-lived, high speed ferry came through, there were complaints about its wakes. The vessel itself suffered propeller damage from the dense vegetation. Figure 7.15 illustrates current conditions in the area.

High speed, time-sensitive, cargo ferries are a potential future activity linking JFK Airport with Manhattan via the southern part of the Bay. Any other significant change in maritime traffic is not anticipated.

Seven high speed passenger ferry routes have been projected, tying bay points with Manhattan. There are no excursion vessels proposed for this area; however, two water shuttles have been considered to connect waterfront parks in the Bay.

There are currently over 350 slips proposed as well as several hand boat launches. Like other parts of the Harbor, the Bay may see an increase in windsurfers, personal watercraft and fishing as the water quality improves. In addition, if the rowing program can find new facilities to expand, this activity will increase also. As recreational boating increases, there could be increased conflicts associated with congestion, especially smaller boats which tend to cluster in similar type of water.



AREAS OF CONFLICT: EXISTING **JAMAICA BAY FIG. 7.15**

- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- ★ ★ ★ ★ CANOE/KAYAK ROUTES
- ✣ ✣ ✣ ROWING SHELL ROUTES

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
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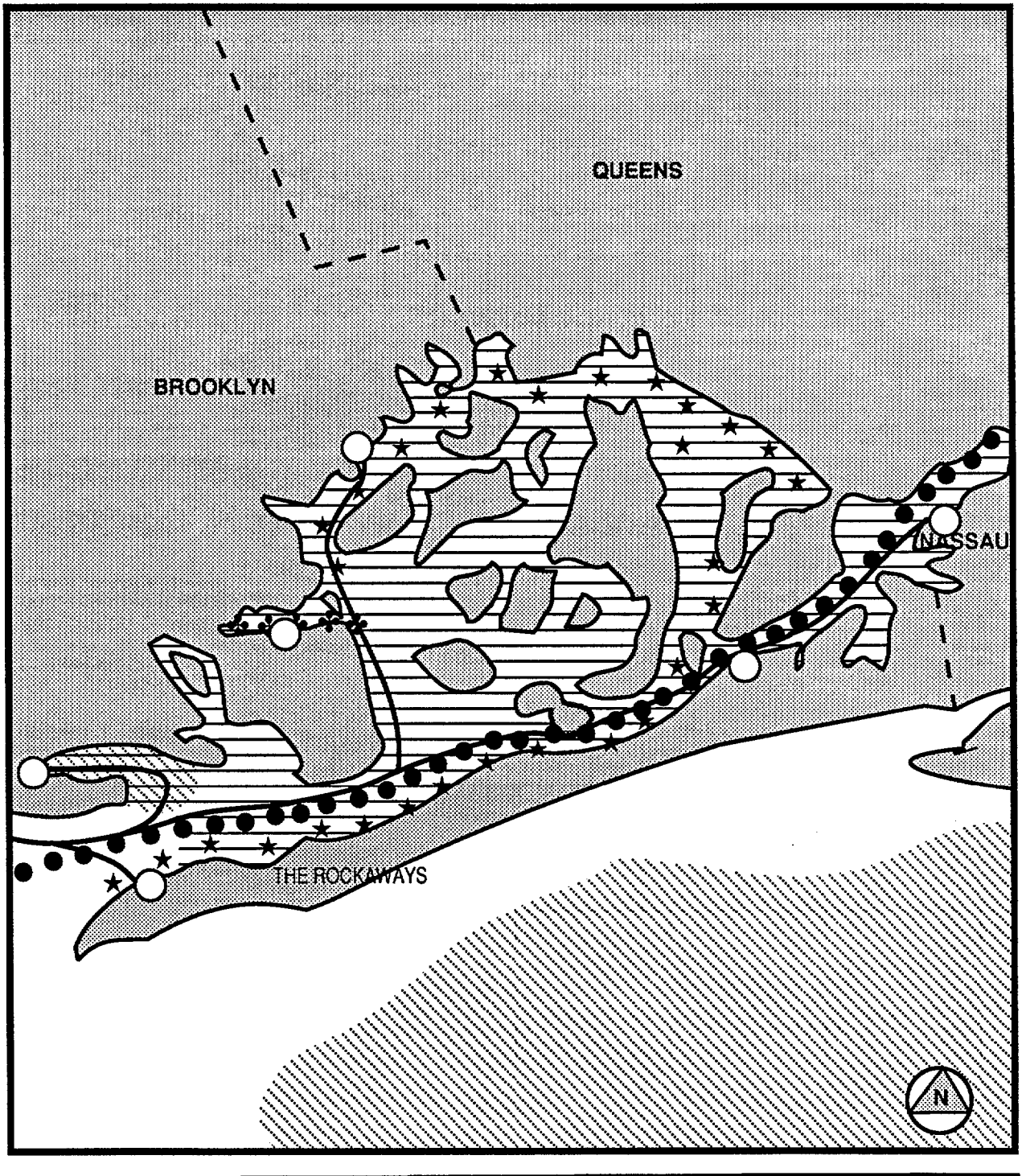

AREAS OF CONFLICT: FUTURE **JAMAICA BAY FIG. 7.16**

- ●●● POTENTIAL TIME SENSITIVE CARGO FERRY ROUTE
- ○ FUTURE FERRY DOCKING SITES
- ——— FUTURE FERRY ROUTES
- CONCENTRATION OF COMMERCIAL SPORT FISHING
- CONCENTRATION OF MOTORBOATING & SAILBOATING
- ★★★★ CANOE/KAYAK ROUTES
- ✣✣✣ ROWING SHELL ROUTES

NEW YORK / NEW JERSEY HARBOR ESTUARY WATER USE MANAGEMENT STUDY
NYC DEPT. OF CITY PLANNING
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The major conflict will probably come from wakes generated by high speed cargo and passenger ferries, causing problems for recreational boats in the summer months. In addition, conflict may occur in the evening peak ferry runs with recreational boats. Unlike the Upper Bay where there is limited access to facilities close to home, this is not the case in Jamaica Bay. Figure 7.16 illustrates future conditions in Jamaica Bay.

RECOMMENDATIONS

The following recommendations are intended to reduce risks in areas identified as having either present or future conflicts. Some are associated with general Harbor use whereas others are more site specific. They require further investigation, coordination or implementation strategies to be worked out by the agencies closest to the issue or having enforcement authority. They may also require bi-state coordination.

The study's recommendations include education and information, criteria for siting, physical improvements and specific regulatory issues. Details are provided where appropriate.

Education and Information

Education is perhaps the most critical recommendation and has the potential of being a very cost effective and implementable strategy for alerting boaters to the hazards, restrictions and limitations of other vessels sharing the Harbor. Many of the conflicts that occur harborwide are associated with the operator not following existing regulations. Knowledge and understanding of basic safe boating practices does much to reduce conflicts.

* **Require a boating safety certificate for all recreational boaters in New York and New Jersey Harbor.**

In terms of vessel numbers, recreational boats are projected to have the greatest increase in the harbor; however, these boaters have the least

required training in safe operation of their vessels. These newcomers will be confronted by a diversity of vessel types and sizes, each with its own particular navigational constraints, concentrated within the confines of the harbor.

Frequently, regulations that could be made on a site specific basis to reduce conflicts are either already existing or implied in the rules of the road. These cover excessive speed, coming too close to other vessels and harassment of other water users. As enforcement personnel cannot be everywhere, and current budget cuts may further affect their staffing ability, it is even more imperative that all boaters have the knowledge and understanding needed to operate their boats with good seamanship.

Certification would entail two components: a general boating safety course (applicable in both states) and a supplemental map and handbook listing hazards and regulations for the New York and New Jersey Harbor. This publication would be widely distributed locally as well as regionally in order to inform transients. The map and handbook would include navigable channels heavily used by maritime and industrial vessels, ferry landing locations and routes, reduced speed areas, natural hazards, characteristics of certain types of vessels that effect their operation, right-of-way rules, areas of heavy use and other existing regulations. In addition vessel specific informational pamphlets could be written. These would concentrate on letting each class of boat know of problems and conflicts they tend to have with other boating

interests as well as specific safety and operating requirements peculiar to their own class.

Further evaluation is needed to determine the most effective way to carry out the certification including determining what level of education, who would be qualified to provide the education, and proof of education.

Development of the handbook and implementation of the boating education certification would necessitate the cooperation of the Coast Guard, state legislators, state and local enforcement authorities and representatives from different vessel categories. As the regulations differ somewhat between New York and New Jersey, coordination of these regulations is needed or a clear representation of when what rules apply (see Appendix 2.1).

This type of education and certification program may have utility in the remainder of the states' waters; however, such a determination is beyond the scope of this study. If subsequent investigation reveals that a certification program is warranted statewide, the Harbor education should be integrated with the states' programs.

* **Require a safety plan to be posted at all recreational boating facilities adjacent to shipping channels.**

A marina safety plan will educate boaters to stay out of channels where practical and offer precautions to take when it is necessary to enter

or cross a channel. This is particularly relevant to the numerous marinas proposed for the Hudson River. Boaters would be advised of opportunities and hazards of boating in waters adjacent to these sites. The Coast Guard and/or state and local enforcement authorities would be responsible for reviewing and approving safety plans, setting minimum standards and criteria, and making the determination to require any additional warning devices.

Facility Siting & Physical Improvements

Vessel activity and facility development detrimental to the environment should be avoided. Certain environmentally sensitive areas cannot sustain any vessel activity whereas in others certain types of activities pose no harm. It is beyond the scope of this study to fully assess this issue. Analysis of environmental conflicts engendered by different types of activity, and ways to minimize these impacts is needed.

Facility siting guidelines are important to ensure the appropriate water-related landside development, thus avoiding or lessening the potential for conflicts arising when different vessel types compete for the same space. The following recommendations will require the cooperation of local planning authorities who review the siting of facilities as well as other agencies, where noted.

The criteria for determining appropriate siting of facilities and measures needed to avoid conflict vary according to vessel activity. In certain situations, different vessel types can coexist in the same area. There is a hierarchy of siting of

facilities starting with the largest, maritime and industrial vessels which are critical to the functioning of the port and are the most constrained in where they can be sited.

* Encourage appropriate types of facility siting to achieve the best use of the water and a minimum of conflicts between vessels.

Maritime and Industrial Criteria include:

- Encourage siting in areas adjacent to federal navigation channels where there is sufficient water depth to accommodate deep draft vessels.

- Encourage siting in areas of existing maritime and industrial activity;

- Encourage siting in areas that are in close proximity to cargo facilities and along waterways that provide access to water-dependent industrial uses.

- Encourage siting of maritime support activities in areas that are identified as critical to their support services and must be retained for their future needs.

- Use caution when siting facilities in areas with heavy recreational use.

Ferry Criteria include:

- Encourage facilities to be located in areas close

to commuting populations;

- Priority should be given to ferries for dock space which is near other modes of landside transportation such as subway and bus service or where there is adequate parking;

- Use caution when siting facilities in areas with heavy recreational use.

In areas like Long Island Sound and Jamaica, Sandy Hook and Raritan Bays, the vessels selected for ferry use should take into consideration minimization of wake generation. The speed at which they travel should be closely monitored by the Coast Guard, state and local officials in order to determine the maximum speed allowable for safe operation.

Commercial Criteria include:

Excursion, sightseeing and similar activities

- Siting should be encouraged in close proximity to major activity centers;

Commuter ferry and excursion vessel docking are uses that can coexist at shared docking facilities. Therefore the above criteria for ferry siting are also applicable to commercial docking. However, priority should be given to commuter ferries.

Recreational Criteria include:

- Discourage siting of facilities in waters having a heavy concentration of maritime and industrial, ferry and commercial vessel activity;

- Recreational boating facilities for vessels that have limited power and maneuverability should not be located in areas that require these boats to cross the paths of maritime, industrial, ferry or commercial traffic.

- Encourage siting recreational facilities accessible to waters appropriate to a particular water sport;

- Discourage siting in locations with strong currents or prone to heavy wave or wake action;

- Encourage siting in areas where there is adequate natural protection. Where this is not the case, adequate artificial protection should be required. Structurally adequate and environmentally sound breakwaters should be part of all marinas located adjacent to heavily traveled navigable channels.

The intent of this last criteria is to reduce conflicts created by wakes from passing vessel traffic, recognizing that large vessels will throw a sizeable wake regardless of speed. It is not intended to relieve the vessel operator causing the wake of responsibility but is rather to offer an additional means of protection for vessels docked at marinas. Details of breakwater design should be outlined and required by the Army Corps of Engineers.

- Encourage siting where there is adequate upland to provide for parking, security and infrastructure needs such fire, water and sanitary services.

Specific Waterways & Regulations

The following recommendations are intended to avoid different vessel facilities being located in areas where they will come into direct contact with incompatible water activity and to encourage their appropriate siting.

* Encourage ferry and commercial boat docking facilities in the Hudson River to relieve congestion in the Upper Bay (and improve access to ferry services).

* Establish temporary queuing area to accommodate vessels awaiting docking at Piers 9 and 11.

Piers 9 and 11 function as a major hub for both ferry and excursion vessel operations. Any plan for the development of these piers must recognize and accommodate these uses. If no new docking sites are developed, congestion will occur around these facilities as vessels wait for pier access. While improvements to the piers, including the construction of passenger waiting areas or ancillary retail services, should be encouraged, the primary function of the piers as docking space, should remain and be expanded. The plan should be developed in concert with the Coast Guard, state and local enforcement officials and ferry and commercial operators as well as planning officials.

* Encourage recreational boating facilities in environmentally appropriate areas along Long Island Sound, Sandy Hook, Raritan and Jamaica Bays.

These areas are excellent sites for recreational boating and facilities should be encouraged to locate here. Other types of vessel activities that do not exist, or are not needed to meet certain municipal needs, should be discouraged from locating here except for ferries and excursion boats.

* Encourage rowing along the Harlem River and enforce the speed limit in effect for many parts of the river, minimize wakes and discourage facilities for motorboating.

Despite our previous recommendation of discouraging the siting of recreational facilities in areas prone to heavy wake action, the Harlem River is one of the few good rowing locations in the Harbor. Consequently, all other vessels should proceed through the waterway with extreme caution. Signage indicating speed limits and cautioning against wakes should be clearly and frequently placed along the river.

* Do not site new recreational boating activities along Hell Gate.

Due to the strong currents and other adverse water conditions, Hell Gate should only be used as a

transit way for all vessels. The siting of new recreational facilities should not be encouraged here.

* **Do not site new recreational facilities along the Kill Van Kull**

Because of the existing and continued concentration of maritime and maritime support activity no new recreational facilities should be sited along the Kill Van Kull.

* **Discourage siting of new recreational boating facilities along the Arthur Kill north of Port Mobil in Staten Island and Smith Creek in Middlesex County.**

The northern section of the Arthur Kill is heavily trafficked by large maritime vessels, especially oil tankers servicing the largest oil storage facilities in the harbor. In addition, increased vessel activity is anticipated with the restoration of Howland Hook. The siting of new recreational facilities in this narrow waterway increases the potential for conflicts between recreational and maritime vessels, as well as wake problems at recreational facilities.

* **Recreational boating facilities sited along the lower East River should be targeted to activities that can handle the river conditions.**

Future development along the lower East River should be studied carefully. The proposals for

Piers 1-5 in Brooklyn may provide for both a marina and docking space for excursion vessels. Any new development especially below the Manhattan Bridge, should be carefully analyzed to ensure vessels served by the facility have adequate design, stability and power to handle water conditions. As there is a potential for a great deal of marina growth in this area it should be monitored carefully by the Coast Guard and state and local enforcement officials to ensure that they do not become unduly congested with recreational traffic.

* **Reexamine the siting of the Alice Austen Park hand boat launch in the Upper Bay.**

The newly enacted restricted area around the Navy Homeport will force boats launching from this site heading north to enter the General Anchorage area where large maritime vessels are located creating potential hazards. Reexamination might include warnings about traveling north from this site, advising only expert use or discontinuing the site.

Further discussions are needed with the Parks Department, Coast Guard, state and local enforcement official and the launch site users to determine the best way to ensure the safety of users of this site.

Site/Vessel Type Specific Regulations

Site or vessel type specific regulations are intended to reduce conflict in specific areas or between vessel types which require adoption of regulations in addition to education.

* **Establish a restricted area around major ferry docking locations to reduce the risk of conflict between commuter ferries and other types of vessels.**

Hoboken Terminal, Pier 11 on the East River in Lower Manhattan, South Ferry and St. George, are examples of landing sites heavily used by commuter ferries. The rules of the road do not directly lay out the rights of ferries but the courts have repeatedly ruled that ferries are entitled to a reasonable degree of freedom in entering and exiting from their slips.[7] The restricted areas would function as a safety zone keeping other vessels from crossing in front of ferries entering and exiting docking sites; the point at which ferries have limited ability to alter their course. These safety areas should not unduly encumber navigable channels.

Details of this recommendation should be worked out between the Coast Guard, state and local officials. Restrictions may encompass one specific distance for all docking facilities or be tailored to fit specific landing sites in accordance with the type of ferry being used.

* **Investigating the creation of a restricted area around Rikers Island.**

Concern has been expressed about security around Rikers Island from the standpoint of small boats coming too close to the correctional facility. The Coast Guard and state and local enforcement officials should investigate this further.

* **Programs that have been established in the Harbor to provide for safe navigation by all vessels should continue or increase in their activity.**

These include funding for the VTS, the Army Corp of Engineers Harbor Drift Program, and safe boating enforcement efforts by the Coast Guard and state and local authorities.

* **Continue phasing in the Coast Guard Vessel Traffic Service (VTS). Use VTS to provide information on the routes and schedules of ferries traveling through the Upper Bay.**

Because of the large number of vessels that use the Harbor as well as the number of oil spills that have recently occurred, VTS is critical in reducing the probability of collisions and groundings by providing up to date information on vessel movement, congestion, weather and other hazards to navigation.[8]

Given the importance of ferry operations all vessel types should be made aware of ferry routes and schedule requirements, and should be advised to remain out of ferry routes and away from ferry docking sites when possible.

Implementation As a follow-up to this report we recommend that the Coast Guard and New York and New Jersey enforcement personnel meet to:

- Carefully monitor areas of projected growth to ensure that they do not become unduly congested and continue to monitor frequency and types of conflicts that occur within the Harbor.

When many of the vessel facilities projected to occur in the harbor are actually built, additional measures such as specific activity use areas, speed limits or restrictions may be necessary to ensure safe vessel operation in the harbor. These areas should be continually monitored for this need.

- Discuss such issues as clarification and standardization of regulations and coordination of enforcement efforts.

Although many of the regulations of the two states (see Appendix 2.1) are similar and not in conflict with each other there could be a potential for a problem where these differ.

Finally, the New York City Waterfront Revitalization Program and the New Jersey Department of Coastal Resources should implement facility siting criteria through their existing permit programs.

Chapter 7 - Endnotes

1. U.S. Department of Transportation, United States Coast Guard, "Commercial Vessel Casualties, Post 1980," 11/15/90

Mechanical problems that did not result from a collision or other external cause were not included in our analysis. The types of collisions included meeting, overtaking, crossing, submerged objects, piers, docks, aids to navigation, bridges and other causes. Classified separately, where collisions were not involved, were groundings, flooding, sinking, capsizing or being disabled.

2. Letter from the U.S. Department of Transportation, U.S. Coast Guard, Richard Bergan Chief, Consumer Affairs and Analysis Branch, Auxiliary, Boating and Consumer Affairs Division, Office of Navigation, Safety and Waterway Services, December 21, 1990.

Data includes all accidents that are reported to the Coast Guard including groundings, capsizing, swamping-flooding, sinking, fire, vessel collision, collision with a fixed or floating object, falls overboard, falls in boat, struck by propeller or boat, waterskiing and other.

The data is compiled on a countywide level and not by waterbody, therefore some of the figures include accidents that took place outside of the study area, for example, all of Monmouth County, is included. As we do not have a way for determining the number of vessels that are registered in the study area, comparative analysis of data could not be made. Comparative analysis with national data also could not be made as it is based on an estimate of the number of boats that are in the country, including non-registered craft. There is no similar local data.

3. Captain Alan D. Rosebrook "Remarks of A.D. Rosebrook, Captain," Proceedings Fourth Annual conference of States Organization for Boating Access (Portland, Marine), September, 1990 pg 71.

4. Complied by the Bureau of Marine & Recreational Vehicles, New York State Office of Parks, Recreation and Historic Preservation, 1989 Boating Accident Statistics, (Albany, NY: 1989), pg. 2.

5. Compiled by the Bureau of Marine and Recreational Vehicles, 1989 Boating Accident Statistics, New York State Office of Parks, Recreation and Historic Preservation, (Albany: 1989), pg. 23-27.

6. Federal Register, Department of Defense, Corps of Engineers, Department of Army, 33 CFR Part 334, "Restricted Area, New York Harbor, Staten Island, NY", Vol 56, No 27, February 8, 1991, Rules and Regulations, pg. 5300.

7. Elbert S. Maloney, Chapman Piloting, Seamanship and Small Boat Handling (New York: 1985), pg. 99.)

8. Department of Transportation, U.S. Coast Guard, Vessel Traffic Service New York, Users Manual, (October 1990)pg. 1.

APPENDIX

APPENDIX

APPENDIX 1.1
WATERBODY CHARACTERISTICS

Appendix 1.1 WATERBODY CHARACTERISTICS[1]

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
LONG ISLAND SOUND						. Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes in the western portion	. Boulder reef South East from Stepping Stone light to Long Island Shore	. Restricted to navigation off Orchard Beach swimming area . Winds can be variable mid-summer
Pelham Bay Lagoon				10 - 15' mid-channel 1 - 2' on edges		. Tidal Wetlands . Bird Nesting Area . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes fishing alright with some restrictions		. 4 mph speed limit as of 11/90
City Island Area	7.2 '	Variable at bridge .3 - 1.5 knots. Can exceed 1.5 knots at bridge			General Special	. Predominately developed	. Some caution needed along shores due to boulders . 12' vertical clearance - bridge between City Island and Rodmans Neck . 11' vertical clearance - High Island bridge - 1' water depth under bridge	. No Wake Zone - Channel between Rodmans Neck and City Island . Hell Gate Pilot Station on City Island (board Execution Rock)

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Eastchester Bay	7'	0.4 - 0.8 knots		7' - 10 ' lower part 3' - 5' upper part Dredged Channel to Hutchinson River	General Special	. Landfill leachate on west shore . Tidal wetlands Palmer Inlet . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes. Fishing alright with some restrictions.	. Big Tom (Rock) . Cuban Ledge . Numerous Rocks and Shoals . Several wrecks	
Locust Point				5' at entrance 4' - 20' inside			. Rocks north side of approach	
Hutchinson River			2.8 miles to Pelham	3 - 5'		. Protected tidal wetlands & marsh bird nesting area (white heron) at Thomas Pell refuge	. Numerous Rocks and Shoals on both sides of the channel . Bridges - - Minimum 8' vertical clearance	Thomas Pell Wildlife refuge
Little Neck Bay			Approximately 2 miles in length	10 - 12' at entrance depth 2 1/2 - 7' at anchorage depth	General Special	. Tidal Wetlands . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes. Fishing alright with some restrictions		Fort Totten Coast Guard Station

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
UPPER EAST RIVER	7.1' at Willets Point 5.1' at Hell Gate	0.7 knots at Throgs Neck 1.6 knots at Port Morris 4 knots at Hell Gate	. 14 miles in total length . Entrance between Throgs Neck and Willets Point the Upper East River starts at Throgs Neck and Willet's Point and extends to approximately Port Morris in the Bronx and Berrian's Island (Con Edison Plant) in Queens. . Followed by Hell Gate then the Lower East River which extends to Upper Bay entrance at The Battery and Governors Island . Federal navigable channel 1000' wide	East River Channel from Throgs Neck to Brooklyn Navy Yard (35' depth) . Channel between North and South Brother 25', shoaling to 16' . South Brother Island Channel controlling depth 35' shoaling on the edges	General Anchorage 21 - 30' depths	Tidal Strait . Bird nesting areas (North & South Brother Island) . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions	. Rikers Island Channel between Rikers Island and mainland - obstructed by lighted runway at La Guardia Airport . North/South Brother Island channel - a ledge, partly bare at low water extends 0.2 miles southward from South Brother Island	. Restriction around Rikers Island for masts >125' for air penetration of La Guardia flight path . South Brother Channel - same as above . Direction and velocity of currents are affected by strong winds . College Point Reef - depth 1/2' to 10' - covered with 6' of water approximately 1000' offshore . Rikers Island occupied by correction facility . Channel between North and South Brother Island subject to strong current and should not be used by vessels of limited maneuverability

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Little Bay				9' Channel West of Willets Point depths of 6' - 10'	General	. Wetlands on a western shore . Recommended for primary and secondary recreational contact and any other use except shellfishing for market purposes. Fishing alright with some restrictions.	. Throgs Neck viaduct 30' vertical clearance	Fort Totten Coast Guard Station
Powells Cove				2' - 5'		. Wetlands on all sides . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. Pier ruins on east side of cove	
Old Ferry Point				15 - 35'	General		. Shoals abruptly from 18' to depths of approximately 4' - 5' 1500' from shore	. Located under Whitestone Bridge on the Bronx side
Westchester Creek			Runs between shallows between Old Ferry and Clason Point for 2.3 miles	6' except 3 1/2' shoaling in upper 60'		. Small tidal wetland on south west shore . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. Bruckner Expressway Bascule 14' vertical clearance . Fixed bridges, least hgt. 52'	
Pugsley Creek				Very shallow		. Tidal wetlands . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions		

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
College Point				Depths on west side of Point 1/2' to 10' North of College Point 2'-5'				. College Point Reef approximately 1000' offshore covered by 6' of water . NYC Harbor Police Unit
Flushing Bay				Channel from East River to .8 miles up Flushing Creek; 9 - 12' depth through bay, 1' - 11' through creek	General Special	. Waterfowl wintering area . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions	. Dike of approximately 3000' marked. Is covered by high water runs along west side of the channel to within about 1500' of the head of the bay . Depths less than 6' outside of the channel . Ice obstructs navigation in Bay and Creek generally in January and February . Whitestone Bridge .2 miles above into Creek - 35' vertical clearance	. Restricted Area in southern part of the channel - No unnecessary delay; no vessel with height greater 35'
Bowery Bay				Approach from East River Main Channel 10' depth	Special west of Bay General	. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.		

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Bronx River	6.9'		Dredged Channel for approximately 2.3 miles entered through a shallow bight between Clason Point and Hunts Point	. Depths 3' to Westchester Ave., then less than 1/2' . River being filled in above 172nd St. . Depths along Hunts Point 17' - 24' . Depths of 9'-17' on flats east of wharf at Hunts Point	. Mouth of river tidal wetlands (Soundview Lagoons) on east shore	. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. Bridge 27' vertical clearance (1.7 miles above the entrance) . Bascule 14' 2 miles from entrance	
Bronx Kill			.6 mile length			. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. Navigable for .2 miles from Harlem River to a Dam	
HELL GATE	5.1'	4 Knots		Depths variable, can range from 45' to 100' in a matter of yards		. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.		. Strong Tidal Currents . Direction and velocity of currents are effected by strong winds . Whirlpools and standing waves can be found . Mill Rock, Randalls and Wards Island located here . Harbor Police Station
HARLEM RIVER	5.1'	2 knots	7 miles long	11' - 14'		. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions	. 15 Bridges Minimum Clearance under lowest 24' (draw bridge)	. Bulkheaded shoreline causes wakes to reverberate back and forth off wall

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Spuyten Duyvil Creek	3.6'	2 knots - can exceed				. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. 5' vertical clearance - vertical lift span - Amtrak - NYC-Albany route	. Currents at mouth of creek swift and erratic . Occasionally there are large accumulations of ice at Spuyten Duyvil making it difficult for lower powered vessels or tows to make headway

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
HUDSON RIVER	4.5' at Battery 3.7' at Yonkers	1.4 knots northwest of Battery 2.2 knots at George Washington Bridge	Width: About 3500' for the first 5 miles from the Battery 3000' at the George Washington Bridge Length: 275 miles from The Battery to source in Adirondacks	Channel in Lower Hudson 43 feet or greater mid-channel from Upper Bay off Ellis Island Above 59th Street 30 - 32' depths to Albany Depths on New Jersey side in Basins 3 - 7' New York City side 12' to bare	General - Starts 5 miles above the Battery and extends for 10 miles	. Fish spawning area . Waterfowl wintering area . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions. . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes above the Harlem. . Below the Harlem recommended for secondary contact only.		. Wind generated waves 1' - 3' . Wakes natural and from passing vessel traffic . Floating debris . Fish traps from March to May for Shad run to spawning grounds in the Upper Hudson . Ice Floes - Open Channel maintained unless extremely severe winters when navigation can be interrupted for short periods of time During strong winds slips on the exposed side of channel become packed with ice . Currents around the mouth of Spuyten Duyvil Creek are swift and erratic . Tides and currents can be affected by winds, freshets and draughts . VTS activation planned for 1992

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
LOWER EAST RIVER	5.1' at Hells Gate 4.6' at The Battery	4 knots at Hell Gate 3 knots at Brooklyn Bridge 1.5 knots at Governors Island	14 miles long from entrance at Throgs Neck and Willets Point to Upper Bay entrance at The Battery and Governors Island . Lower East River starts at Hell Gate and continues to Upper Bay . Width: 600 - 4000' Federal navigable channel widths: . 1000' at Battery . 900' at Greenpoint . 550' at Western side of Roosevelt Island . Eastern side not a Federal Navigable channel . 880' at Hell Gate then 600' then 1000' in Upper East River	East River Channel from Throgs Neck to Brooklyn Naval Yard going west of Roosevelt Island 35' depth then 40' depth to the Upper Bay Channel east of Roosevelt Island controlling depth of 23'		. Tidal Strait . Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions	. 36th Avenue Bridge crossing eastern channel from Roosevelt Island to Long Island vertical lift span clearance of 40' down and 99' up . Roosevelt Island Reef with bare islets rocks awash, and submerged rocks extend about 1500' south west from Island. Belmont Island near southwest end of reef	. Currents in both channels off Roosevelt Island are strong and require caution . Channel between the Battery and Governors Island is very congested and subject to strong currents caution needed . Traffic in the western channel of the East River between Brooklyn Bridge and Poor House Flats Range - Shallow draft vessel keep to West (Manhattan side) whether heading north or south. Deep Draft vessels keep to the east (Brooklyn Side). Northbound shallow draft vessels cross from east to west in the vicinity of Colears Hook and from West to East in the vicinity of Newtown Creek . VTS activation planned for 1992

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Newtown Creek	4.1'	Tidal current weak to 125'-150' Federal navigable channel	3.3 miles long	23' Channel		. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions		

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
UPPER BAY	4.6'	1.5 knots	. Anchorage Channel from the Lower Bay to the Battery is about 5.7 miles . From 660' to 2000' wide opposite the anchorage . Buttermilk Channel - 1000' wide in easterly and westerly direction and goes into East River . Bay Ridge Channel 1200' - 1700' wide . Red Hook Channel 500' - 1200' wide	. Anchorage Channel - 45' depth . Bay Ridge, Red Hook and Buttermilk Channels follow the Brooklyn Piers have depths of 30 - 40', except for shoaling to 19' at the junction of Bay Ridge Channel and Red Hook Channel . Dredged channel of 23' depth from Main Channel to Ellis Island . Statue of Liberty in eastern part of Jersey Flats channel on west side of Island has a controlling depth of 15' except for shoaling to 11' along the east edge . Pierhead Channel leading from the main channel about 3500' south of Liberty Island and then along the New Jersey Pierhead line to Kill Van Kull has a controlling depth of about 16' with shoaling at about 11' . Channel through connecting branch		. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.	. Bay Ridge Flats shoal areas 5' - 20' depth east of Anchorage Channel . Gowanus Flats north end of Bay Ridge Flats . Jersey Flats the area on the New Jersey side west of Anchorage channel has depths up to 6', channels have been dredged through shoal . Obstruction covered by 28' of water at junction of Red Hook and Buttermilk Channel . Pierhead Channel has submerged obstruction and wreck (covered by 19' of water	. Caution needs to be exercised when docking and undocking vessels on south east side of Bay Ridge Channel because currents may run opposite direction to those found normally in channel especially at piers . Cross currents can set north in Hudson and west in East River ("the Spider) causing vessels to be pushed off course to shoals on Governors Island . Governors Island Coast Guard Station . Statue of Liberty/Ellis and Governors Island . Caution needed in immediate vicinity of Statue of Liberty where depths are as low as 2'-6' . Harbor Police located in Brooklyn . Anchorage Channel, an extension of Ambrose Channel from the Lower Bay is the main passage through the middle of the Bay . VTS reactivated January 1991

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Gowanus Bay/Canal			Dredged channel form Gowanus Bay to Gowanus Canal for about 1 mile	Dredged Channel form Gowanus Bay to Gowanus Canal with depth of 12 -16' mid-channel to above Hamilton Avenue then 8 -12'		. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions	. Bridge at 3rd St. - 3' vertical clearance	
Erie Basin						. Not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions.		. Entered through Red Hook Channel
KILL VAN KULL	4.5'	Eddy when current is at its strength	About 1500' wide 800'-1000' wide Federal navigable channel	35' depth form channel in Upper Bay through Kill Van Kull to Arthur Kill north of Shooters Island has a project depth of 30' . Dredged channel 23' depth leads easterly from end of Kill Van Kull to Constable Hook		. Tidal wetlands on Staten Island shore . Shooters Island is an important bird nesting area . New Jersey shoreline nearly entirely developed residential at western end Industrial uses at eastern end . Not recommended for primary or secondary recreational contact	. Shoals, obstructions and numerous wrecks are along both sides of dredged channel . Many sunken and visible wrecks are in the channel south of Shooters Island	. VTS reactivated January 1991 . Shooters island located in the south west part at the head of Newark Bay

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
NEWARK BAY	5'		4 miles in length from Kill Van Kull to Junction of Hackensack and Passaic Rivers . 500'-900' wide . Juncture of two navigable channels to rivers located here	. Large part of Bay very shallow but a dredged channel leads through bay to Rivers . Main Channel (35' depth) leading to Branch channels to Port Elizabeth and Port Newark Terminal and then to junction of Rivers with depth of 35' . Elizabeth and Pierhead Channels from main channel in the bay has depth of 35'	General Special	. Shoreline largely developed, the western shore for port activities and the eastern shore for residential and recreation . There are a few small tidal flats on the eastern shore . Least Tern nesting site reported near Port Newark . Water in Bay can become anoxic in summer . Not recommended for primary or secondary recreational contact	. Ice sometimes closes navigation during part of January and February . Railroad Bridge in Port Newark Channel has vertical lift span of 35' vertical clearance closed and 135' up	. New Jersey State Harbor Police Station . VTS reactivated for part of Bay in January 1991. Expansion of system is to occur in Summer of 1991 . Heavy maritime and industrial use on the western shore

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
HACKENSACK RIVER	5' at mouth of river 5.3' at Little Ferry 5.3' at Hacken-sack		Navigable for about 17.8 miles to draws at Milford 200'-400' wide federal navigable channel	30' depth channel from Newark Bay to 25' turning basin to Marion - above this point 11' to Hackensack		. Extensive tidal phragmites wetlands along river . Confirmed herring run . Includes Saw Mill Creek wildlife management area . Heron and Ibis nesting area, also Kearney Marsh an important migratory stop over . Impacted by modified hydrology, landfills and encroaching development north of the Meadowlands . North of Meadowlands recommended for primary and secondary recreational contact . From south of the Meadowlands to Route 9/1 not recommended for primary or secondary recreational contact	Minimum clearance of fixed Bridge 35' vertical clearance at Little Ferry Draw span 2' vertical clearance at Hackensack	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
PASSAIC RIVER		Can reach 3 knots due to freshets at Newark and at times the mouth of the river Destructive freshets occur rarely in spring and fall	13 miles from Newark Bay to Passaic 200'-300' wide Federal navigable channel	30' depth channel from Newark Bay to about 1/2 mile then 20' to Jackson Street Bridge then 16' to Arlington then 10' to Passaic		. Shoreline entirely modified and developed . Tidal watershed heavily developed . Water quality degraded little terrestrial habitat . Confirmed andromous species run for herring and American shad . From Paterson to Second River - not recommended for primary recreational activity . From Second River to Newark Bay not recommended for primary or secondary recreational activity	. Drawbridge at Arlington so restrictive use. Fixed span with 35' vertical clearance . Minimum clearance of bridges with draw spans 7' vertical clearance . Unused swing bridge in Newark kept open - fender system of bridge was in an advanced state of deterioration obstruction covered by 15' of water in east channel of swing bridge and caution needed	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
ARTHUR KILL	5'	1 - 1.5 knots	Federal Channel depth 35' Elizabeth Port depths along wharves 3 - 32' 500'-800' wide navigable channel		General	. Tidal wetlands, on New Jersey shores, bird nesting areas (Prall's Island & Isle of Meadows) . New Jersey shore largely developed with industrial uses some wetlands remain . Northern section not recommended for primary or secondary recreational contact . Southern section not recommended for primary contact	. Numerous sunken and visible wrecks are adjacent to both sides of the channel - caution is advised	. Safety Zone around loaded LPG vessels transiting between Scotland lighted buoy at the entrance of Sandy Hook Channel and the LPG facility immediately south of Morses Creek: 100 yard radius from boats loaded with LPG coming in or out. Safety Zone extends from Sandy Hook Channel, Raritan Bay East and West Reach and the Arthur Kill to LPG facility immediately south of Morses Creek . Ice rarely obstructs navigation but can in severe winters . Many factories, oil refineries and oil storage facilities especially on the western shore . Perth Amboy - Customs point of entry
Smith Creek			3' depth			. Impacted by shore development		
Port Sacony			35' channel depth 15 - 35' alongside of dock					. Bulk oil storage tank located here

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Port Reading			18' - 36' depth Depths alongside the coal pier 17' on south side 10' to bare on north side					
Fresh Kills						. Tidal wetlands		. Closed to navigation except for garbage skows transiting to landfill
Rahway River			Extends from mouth at Arthur Kill to Rahway about 4.5 miles	5' depth		. Developed watershed, tidal portion of river has undeveloped shoreline and wetlands mixed with industrial uses. Tidal flats on both sides	. East Rahway Bascule 6' vertical clearance . Fixed Bridge 3.8 miles up river 6' vertical clearance	
RARITAN RIVER	5' at South Amboy 5.8' at New Brunswick		11 miles from Raritan Bay to New Brunswick	Channel 20' depth Depths along wharves in South Amboy 6 - 30'		. Extensive tidal phragmites particularly at the mouth of South River. Several Sanitary Landfills flank the river. Confirmed Andaromous fin fish, herring . Recommended for primary and secondary contact	. Railroad Bascules . Victory Bridge 28' vertical clearance (swing span)	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
LOWER BAY	4.7' at Sandy Hook	2 - 2.2 knots at Ambrose Channel near outer extremities of Coney Island, Sandy Hook and the Narrows . Seaward end of Ambrose 1.7 to 2.3 knots	. Approximately 9 miles measured from the Narrows to the Atlantic Ocean . Ambrose Channel the principal entrance to New York Harbor extends from the sea for 10.2 miles to a point south of the Narrows where it meets Anchorage Channel	. Ambrose Channel 45' depth . Sandy Hook Channel 35' depth connecting to Raritan Bay Channel to the west Chapel Hill Channel (30' depth) to the north Terminal Channel to the south Swash Channel (18' depth) between Ambrose and Sandy Hook Channel. . Areas of 13' depth on the sides of Swash Channel and a spot of 14' in middle of channel . False Hook Channel along and close to eastern shore of Sandy Hook has depths from 9' to over 20'	General	. Hoffman Island important nesting area for gulls . Fish in Lower Bay include striped Bass, weakfish, summer Flounder, Bluefish, Hake and Skup . Northern portion not recommended for shellfishing for market purposes or primary or secondary contact recreation. Alright for fishing with some restrictions. . In southerly direction recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes with some areas similar in quality to above	. 5 shoal areas in the entrance to New York Harbor that are subject to change in depths: . False Hook off Northeastern side depths of 4' - 18' . Flyns Knoll between Swash, Sandy Hook and Chapel Hill Channel depths of 9' - 18' . Romner Shoal between Ambrose and Swash Channel depths of 4' - 15' . East Bank north and east of Ambrose Channel depths 5' - 15' . West Bank west of Ambrose Channel between West Bank and Fort Wadsworth has depths from bare to 20' . Tip of Sandy Hook is changeable and an area around it is subject to severe shoaling . Staten Island Flats extensive shoals along southeastern side of Staten Island includes West Bank shoal and Old Orchard Shoal . Depths between Hoffman and Swinburne Islands 1' - 7' . Coney Island Channel 11' to Rockaway Inlet	. When current strong in Ambrose and Swash Channel can push vessels off course onto Romer Shoal . Floating debris in harbor and channels . Pilots westward of Ambrose Light . Landing not permitted on Hoffman and Swinburne Island

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Raritan Bay	5'	Currents beyond protection of Sandy Hook can be Problematic		35' depth dredged channel to junction of Arthur Kill Bay full of shoals with depths of 7' - 18'	General Special	Shoreline features: . Tidal creeks; bluffs; sandy beaches: former dredge spoil disposal areas . Hard and soft clam beds; . Western: Prohibited for shellfish harvest . Eastern: Special Restrictions apply for shellfish harvest . Recommended for primary/secondary contact		. Safety Zone see Arthur Kill . In easterly winds drift Ice in the Lower Bay collects in Raritan Bay for short periods of time . Can become anoxic in summer due to algae blooms
Great Kills Harbor				Mid-channel depth 9' except 3' depths in northeast side of channel	Special	. Waterfowl wintering area . Great Kills - Crookes Point Adult Terns, gulls, concentrate on point along important migratory stopover for songbirds . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes. Alright for fishing with some restrictions		. Harbor Police summer substation
Sequine Point				2' depth				

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Lemon Creek				2' mid-channel narrow shallow becomes deeper inside creek		Tidal Creek and Wetlands	. Overhead power cables crossing Creek at 47' above	
Keyport Harbor				6 1/2' dredged depth		. Residential Shoreline development with narrow beach which widens toward Conaskonk Point		
Matawan Creek				Controlling depth 4' then to 2' to bare about 1.5 miles above mouth		. Tidal Creek surrounded by tidal wetlands of salt meadow cordgrass, meadow hay and spike rush. Tidal upstream to Lefferts Lake.		
Cheesequake Creek and Stump Creek	5'			4' depth for about 1500'		Extensive tidal meadows	. Sunken wrecks	Cheesequake State Park

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Sandy Hook Bay	4.7'	2 knots		30' depth form inside Sandy Hook to 15' near southern end of Bay, shoaling gradual . Horse shoe cove shallow depths . 14 - 17' down western side of Sandy Hook . Sandy Hook Channel 35' depth . Terminal Channel 35' depth . Raritan Bay Channel 35' depth . Atlantic Highlands 1/2' - 6' depth in basin . 6' controlling depth at channel in Leonardo to boat basin . 6' - 7' depth in Compton Creek . 3 1/2' depth at Pews Creek .	General	. Sandy beaches with low tidal creeks and wetland areas in the western area . No tidal creeks or wetlands in eastern area . Eastern area large coastal bluffs to 350' known as highlands. Area includes Sandy Hook, 1600 acres of Gateway National Recreation Area which includes sandy beach on the Atlantic Ocean side, a maritime forest and 71/2 miles of beach and wetlands on the Bay. The area is a recurved spit migrating north and west. . Near shore, bay is shallow . Important for Osprey, Great Blue Heron and Terns and Gull nesting area. Aquatic species include Striped Bass, Flounder, Bluefish, Weakfish, Hake, Skup and many hard and soft shell clam beds.	. Horseshoe Cove, the spit of land that forms cove is submerged in high water and can create a false navigable channel . Heavy Fish Trap Area on shoals on southwest side of Sandy Hook Bay between Atlantic Highlands and Point Comfort	. See Arthur Kill for Safety Zone . Sandy Hook Coast Guard Station . Security Zone in area of U.S Naval Ammunition depot at Leonardo and Terminal Channel: No vessel shall anchor, stop or drift without power into security zone. No vessel shall enter cross or otherwise navigate in the security zone when a public vessel or any other vessel that cannot safely navigate outside the Terminal Channel is approaching or leaving the Naval Ammunition Depot piers at Leonardo . New shellfish depuration plant proposed on Sandy Hook. . Can become anoxic during summer months due to algae blooms.

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
		Sandy Hook Bay				clam beds. . Special restrictions apply to shellfish harvest. . Recommended for primary and secondary recreational contact		
THE NARROWS		1.7 - 2 knots	Approximately 3500' wide	Depths vary from 45 - 100'		. Not recommended for primary or secondary recreational contact. Alright for fishing		
Gravesend Bay				11 - 50' southeasterly portion of bay 1 - 6'	general	. Not recommended for or primary or secondary recreational contact. Alright for fishing with some restrictions:		
Coney Island Creek				11' deep channel to about 200 yards below Cropsy Avenue Bridge then 11 - 2' to about 1/2 mile above bridge			. Obstruction and several wrecks in channel . Bascule bridges lowest 2' vertical clearance	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Jamaica Bay	5' at Rock-away Inlet	2.2 knots at Rockaway Point, can exceed 3 knots . South of Barren Island 2 knots	7 miles long approximately and 3 1/2 miles wide . 22.5 square miles	. 19' or more channel depths at Rockaway Inlet except for west side of channel with depths of 1' or less . Tidal creeks in Jamaica Bay channelized to depths of 12 - 20' depths in non-channelized creeks can be low (1 - 5') . Sheepshead Bay Channel entrance depth of 14' except for shoaling to 12' along east edge of channel, 6 -10' in Sheepshead Bay then 2' depth along shore		Numerous meadows, small Islands and marshes . about 4000 acres of tidal wetlands . Spawning ground and nursery for fish and shellfish . Atlantic Flyway (326 species of birds) . DEC significant habitat for waterfowl . Recommended for primary and secondary contact recreation and any other use except shellfishing for market purposes except near shore from Paerdegat Basin to the vicinity of Shell Bank Basin where it is not recommended for shellfishing for market purposes, primary or secondary recreational contact Alright for fishing with some restrictions.		. Ice in the tributaries in January through March is a problem . Derelict Boats and illegal dumping . Current in Rockaway Inlet can be of sufficient strength to cause vessels to veer suddenly off course at entrance and exit of Rockaway Inlet . Rockaway Coast Guard Station

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Jamaica Bay				. North (Island) Channel depth of 16' or more except 6' depth leads from Barren Island to Canarsie and Howard Beach . Pumpkin Patch Channel 24' depth along Southeast side of Barren Island (Floyd Bennet Field) . Beach Channel 18' depth from Rockaway inlet to 700 yards above Gil Hodges Bridge then 15' to Grass Hassock Channel . Winhole Channel expect except 11' shoaling of 4' in areas.	Special: . Vicinity of Paerdegat Basing . Broad Channel		Numerous bridges lowest on significant channels : Hammil Swing Bridge 26' vertical clearance -North Channel fixed Bridge 20' vertical clearance . Sunken wrecks in Rockaway Inlet . Bare shoal on north side of Beach Channel south of Little Egg Marsh at low water . Cross Bay Memorial Bridge across Beach Channel vertical clearance 26' . Railroad Bridge swing span over Beach Channel 26' vertical clearance . East Broad Channel is blocked off by Railroad bridge	
Sheepshead Bay				14' depth in entrance of channel except for shoaling to 12' on east edge of channel 6' - 10' inside bay except for shoaling to 2' on edges	Special			. Harbor Police summer substation
Gerritsen Inlet				12' depth in Plumb Beach Channel with some depths to 5'			. Submerged wrecks	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Shellbank Creek							. Dangerous pilings and remains of old barges	
Mill Creek							. Submerged wrecks . Fixed Highway Bridge over creek in ruins and some parts in ruins and causing obstructions to navigation in area	
Dead Horse Bay								
Mill Basin				13' depth			. Bridge with 34' vertical clearance crosses Mill Basin	
East Mill Basin				13' depth				
Paerdegat Basin				11' depth mid channel			. Bridge 29' vertical clearance	
Fresh Creek				8' depth mid channel			. Bridge 21' vertical clearance	
Old Mill Creek				Bare at low water				
Shellbank Basin				Controlling depth 5'				. Harbor Police Station
Hawtree Basin				11' depth			. Pedestrian Bridge 17' vertical clearance	
Sommerville Basin				27' - 40' depth in basin, 15' depth at approach			. Charted sunken wreck	

WATERWAY	MEAN TIDAL RANGE	CURRENT	LENGTH/WIDTH	DEPTH	ANCHORAGE	ENVIRONMENT	OBSTRUCTION	CONSTRAINTS/ATTRIBUTES
Motts Basin				Entered by Negro Bar Channel with depths of 15' at entrance to two branch channels 3' depth at junction of Negro Bar Channel with Grass Hassocks depths along wharves 1 - 14'			. Overhead power cables	. Ice may obstruct navigation
Thurston Basin				10' depth at entrance 2' depth at head				
Grassy Bay							. Blocked at southeastern end by JFK International Airport runway	
Bergan Basin				15' depths with less depth in eastern arm of basin			. Sunken wreck	

1.U.S. Army Corp Of Engineers, The Port of New York and New Jersey on Long Island, NY (Washington, D.C.:1988), pg. 1 - 28

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, United States Coast Pilot, Atlantic Coast: Cape Cod to Sandy Hook, (Washington, D.C.: 1989), pg, 193 - 201, 211 - 239.

New York State Department of Environmental Conservation, "Classifications in New York Harbor 1987"

APPENDIX 2.1
RECREATIONAL BOATING REGULATIONS

RECREATIONAL BOATING REGULATIONS[1]

Regulation	FEDERAL	NEW JERSEY	NEW YORK
REGISTRATION	All undocumented vessels equipped with propulsion machinery must be registered in the state of primary use. Exceptions include foreign boats temporarily in U.S. waters, ships lifeboats and governmental vessels other than recreational type craft.	Regulations are the same as federal and go further to include: All boats greater than 12 feet in length regardless of propulsion all documented boats normally on New Jersey waters. Pertinent exceptions: Vessels used exclusively for racing while competing in an authorized race. Non-motorized inflatable, surfboard, racing shell, or tender for direct transportation between vessel and shore and for no other purpose (i.e. dinghy), except power vessels, or non-motorized vessels 12 ft or less in length. A non-powered kayak or canoe.	Regulations are the Same As Federal. Also includes all documented boats used for non commercial purposes primarily in the state.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
EQUIPMENT	Recreational boats are divided into four classes, with graduating requirements for the different classes. Classifications are as follows: Class A: less than 16' Class 1: 16' and over, but less than 26' Class 2: 26' and over but less than 40' Class 3: 40' and over, but not more than 65' Requirements include carrying of Types of Personal Floatation devices, signalling equipment and safety devices.	Same As Federal	Same As Federal
PERSONAL FLOATATION DEVICE (PFD)	All boats, regardless of length must carry a PFD for each person aboard including canoes, kayaks and water skiers. Exceptions include: - racing shells - rowing skulls - racing kayaks	Same As Federal	Same as Federal

Regulation	FEDERAL	NEW JERSEY	NEW YORK
DISTRESS EQUIPMENT	All vessels used on coastal waters 16' or greater or carrying passengers for hire must be equipped with visual distress signals. The following vessels are not required to carry night signals when operating from sunrise to sunset: - Boats less than 16 ft. - Boats participating in organized events such as races, regattas or marine parades. - Open sailboats less than 26 ft. in length not equipped with propulsion equipment. Manually propelled boats.	Same As Federal	Same As Federal

Regulation	FEDERAL	NEW JERSEY	NEW YORK
SOUND SIGNALING	Regulations do not specifically require vessels less than 12 meters (39' 4") to carry a whistle, horn or bell. However, the navigation rules require sound signals to be made under certain circumstances, such as in meeting, crossing, and overtaking situations described in navigation rules, as well as to sound fog signals during periods of reduced visibility. Therefore, the vessel must have some means of making an efficient sound signal. - Vessels 12 meters or more are required to carry a powered whistle or power horn and a bell.	A mechanically operated (powered) whistle or horn as well as a bell must be carried on all vessels over 26', under 26' may carry a portable or mouth operated device.	A mechanically operated (powered) whistle or horn as well as a bell, must be carried on all vessels, over 26'. Vessels under 26' may carry a portable or mouth operated device in place of a mechanical horn.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
ANCHORS			All mechanically propelled vessels must carry an anchor and anchor line of sufficient weight and strength to provide safe anchorage.
NAVIGATIONAL LIGHTS	Recreational vessels are required to display navigation lights between sunset and sunrise and other periods of reduced visibility, including both mechanically and sail powered vessels. Vessels under oar may display the lights prescribed for sailing vessels, but if not, must have ready at hand an electric torch or lighted lantern showing a white light in sufficient time to prevent collision.	Same as Federal	Same as Federal

Regulation	FEDERAL	NEW JERSEY	NEW YORK
NAVIGATIONAL LIGHTS AT ANCHOR	Power driven vessels and sailing vessels at anchor must display anchor lights. Vessels less than 7 meters (22' 10") are not required to display anchor lights unless in a narrow channel, fairway or anchorage or where other vessels normally navigate. Anchor lights are not required on vessels less than 20 meters (65' 7"), anchored in special anchorages designated by the Secretary of Transportation in inland waters.	Same As Federal	Same As Federal
VESSEL OPERATION			

Regulation	FEDERAL	NEW JERSEY	NEW YORK
NEGLIGENT OR GROSSLY NEGLIGENT OPERATION	Negligent or grossly negligent operation of a vessel which endangers lives and property is prohibited by law. The Coast Guard may impose a civil penalty for negligent operation. Grossly negligent operation and an operator may be fined up to $500.00, imprisoned for one year or both. Examples of actions that may constitute negligent or grossly negligent operation are: - Operating a boat in a swimming area - Under the influence of alcohol or other drugs - Excessive speed in the vicinity of other boats or in dangerous waters - Hazardous skiing practices.	Same As Federal	Same As Federal

Regulation	FEDERAL	NEW JERSEY	NEW YORK
OPERATING WHILE INTOXICATED	Operating a vessel while intoxicated is a federal offense violators are subject to penalties not to exceed $1,000 or criminal penalty not to exceed $5000, 1 year imprisonment or both. Standard for determining when an individual is intoxicated is a BAC of .10% (.08% in UTAH).	No person shall operate a vessel while under the influence of an intoxicating liquor, a narcotic, hallucinogenic, or habit-producing drug, or with a blood alcohol concentration of 0.10% or more by weight of alcohol. No person shall permit another who is under the influence of intoxicating liquor, narcotic, hallucinogenic or habit-producing drug or who has a blood alcohol concentration of 0.10% or more by weight of alcohol to operate any vessel owned by the person or in his custody or control. For a first offense, a fine of not less than $250.00, nor more than $400.00; and the revocation of the right to operate a vessel on the waters of this State for a period of not less than six (6) months nor more than one (1) year from the date of conviction. For a second offense, a fine not less than $500.00 nor more than $1,000.00; to the performance of community service for a period of thirty (30) days in the form and on the terms as the court deems appropriate under circumstances imprisonment of not less than forty-eight (48) hours, nor more than ninety (90) days which shall not be suspended or served on probation and the revocation revocation of the right to operate a vessel on the waters of this State for a period of two (2) years after the date of conviction. For a third offense, a fine of$1,000.00; to the imprisonment for a term of not	An impaired operator, which includes but is not limited to a minimum of .07% but less than .1% blood alcohol level will have the following actions taken if caught: First offense violation is punishable by a fine not exceeding $150.00 Second offense within five years of the first shall be punishable by a fine not exceeding $500 and/or by imprisonment of not more than seven days. A Third offense within five years of the first two convictions shall be punished by a fine not exceeding$750 and/or by imprisonment of not more than fifteen days. Boating while intoxicated is punishable by a fine not exceeding $350. A Second offense within 5 years of a previous conviction is punishable by a fine not to exceed $150 and/or imprisonment of not more than 75 days. A third violation within 5 years of the previous convictions is punishable by a fine not to exceed $1000 and/or not more than 180 days in jail.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
		revocation of the right to operate a vessel on the waters of this State of two (2) years after the date of conviction. For a third offense, a fine of $1,000.00; to the imprisonment for a term of not less than one hundred eighty (180) days, except that the court may lower this term for each day not exceeding ninety (90) days during which the person performs community service, in the form and terms as the court deems appropriate under the circumstances; and the revocation of the right to operate a vessel on the waters of this State for a period of ten (10) years after the date of conviction. A person who operates a powered vessel which is twelve feet or greater shall be deemed to have given his consent to taking samples of his breath for the purpose of making chemical tests to determine the content of alcohol in his blood, except that the taking of samples shall be made in accordance with the provisions of the act and at the request of any law enforcement officer who has reasonable grounds to believe that the person has been operating a vessel in violation of the provisions of the act.	A police or peace officer may arrest without a warrant if a boater is operating a vessel while impaired or intoxicated and causes an accident or collision. An officer may only administer a chemical test for the purpose of determining alcohol or drug content with a court order which can be obtained over the phone, radio or other electronic communication.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
OPERATING A VESSEL WHILE INTOXICATED		A judge shall revoke the right of a person to operate a power vessel or a vessel which is twelve (12) feet or greater in length, if after being arrested for a violation of operating under the influence the person refuses to submit to the chemical test when requested to do so. The revocation shall be for six (6) months unless the refusal was in connection with a second offense. The fine shall be for not less than $250.00 or more than $500.00.	
SAFE OPERATION SPEED	Every vessel must operate at a safe speed at all times. Specific factors to be considered in determining 'safe speed include but are not limited to: The state of visibility, traffic density including concentration of fishing activity or other vessels, vessels maneuverability, at night the presence of background lights such as those from shore or from back scatter of vessels own lights, the state of wind, sea and current and the proximity of navigational hazards.	Same As Federal The speed of all power vessel shall be regulated at all times in order to avoid injury to any craft, whether in motion or anchored to any type of construction either directly or by the effect of wash or wake raised due to speed of such vessels. The operator of any vessel is responsible for any damage caused from the wake of this vessel.	Same As Federal Speed is limited to 5 mph when within 100 ft. of shore, dock, pier, raft, float or anchored boat. A skipper is responsible for damages caused by his wake. When encountering a marine regatta or parade transit of the area is to be made with an escort boat. If no escort is provided, the vessel may proceed at a safe no wake speed.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
PERSONAL WATERCRAFT (JET SKI)		In addition to all other requirements, the following rules apply to the use of personal watercraft on the waters of this State. A person shall not operate a personal watercraft during the hours between sunset and sunrise or during times of restricted visibility. A person shall not operate a personal watercraft in the Point Pleasant or Cape May canals. A personal watercraft shall at all times proceed at a safe speed so that it can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions. A person shall not operate a personal watercraft in such a manner so as to become airborne or completely leave the water while crossing the wake of another vessel within 100' of that vessel creating the wake. A person shall not operate a personal watercraft within 50 feet of a bathing beach that has its boundaries marked by buoys or signs.	No person shall operate a personal watercraft within 500 feet of any designated bathing area, except in bodies of water where the opposing shoreline is less than 500 feet from such designated area and in accordance with any local law or ordinance, but in no event at a speed in excess of 10 mph. (5 mph speed 100' from shore for all vessels applies to this exception) No operator shall operate a personal watercraft or specialty watercraft unless each person riding on or towed behind such vessel is wearing PFD. Any person operating a personal watercraft with a lanyard type engine shut off shall attach it to self. Every personal watercraft shall be operated in a reasonable and prudent manner including weaving through congested vessel traffic, jumping the wakes of another vessel unreasonably or unnecessarily close to it or when visibility is obstructed and swerving at the last moment shall constitute reckless operation of a vessel. No livery shall lease, hire or rent a personal watercraft to any person under sixteen.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
PERSONAL WATERCRAFT CONTINUED		A person shall not operate a personal watercraft above idle speed within 50 feet of shoreline or 50 feet from a person in the water. A person shall not tow a waterskier or any device with a personal watercraft. Any person operating a personal watercraft and any passenger shall at all times wear a PFD when in operation. The operator of a vessel with a lanyard cutoff switch shall wear the safety switch lanyard at all times when the vessel is in operation.	No person shall operate a personal watercraft at any time between the hours from one-half hour after sunset to one-half before sunrise

Regulation	FEDERAL	NEW JERSEY	NEW YORK
WATERSKIING	A waterskier while being towed is considered on board the vessel and a PFD is required for the purposes of compliance with the PFD carriage requirement.	All operators of power vessels towing ski or aquaplane riders must: a. Keep at least 100 feet from shore, wharf pier, bridge structure, abutment, other vessels or persons in the water. b. Have a competent observer on board (wide angle mirror not accepted.) c. Having tow line NOT EXCEEDING 75 FEET IN LENGTH, nor less than 50 feet. d. No tow skiers or aquaplanes after sunset and before sunrise. e. All skiers SHALL WEAR a United States Coast Guard approved type, I, II, III, or Type V Hybrid Person Floatation device. 2. The term, water skiing, shall be defined as anything with a rider being towed behind a powered vessel by means of a tow rope or line except another vessel.	. Must operate at a maximum of 5 mph 100' from shore, dock, pier, raft, float or anchored boat except for pick up and drop off when they must head directly in or out. Shall not operate during the period form sunset to one-half hour after sunrise. . Must have an observer at least 10 years of age.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
WATERCRAFT NOISE CONTROL		1. The following rules shall govern the emission of noise from vessels and watercraft operating on waters of New Jersey: a. No vessel or watercraft capable of emitting noise totaling in excess of 86 DBA measured at a distance of 50 feet from the vessel, shall be operated upon the waters of this State. For vessels manufactured on or after January 1, 1979, and before January 1, 1982, the noise level shall not exceed 84 DBA measured at a distance of 50 feet from the vessel. For vessels with engines manufactured on or after January 1, 1982, the noise level shall not exceed 82 DBA measured at a distance of 50 feet from the vessel. b. Measurements shall be made by a sound level meter which satisfies ASI-S 1.4, type 2 or equivalent, and is certified by the Department of Environmental Protection, Office of Noise Control, with reference, as applicable to standards of the New Jersey Office of Weights and Measures of the National Bureau of Standards, or both. c. Measurements shall be made with the sound level meter at a distance of not less than 50 feet from the closest point of the boat's hull amidships. Any Marine Police Officer or other law enforcement officer certified by the Office of Noise control, with a reason suspect that a boat is exceeding the noise limitation, may require the vessel operator to tranverse a noise emission	The law requires that engines on all boats be reasonably muffled while being operated anywhere in the state.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
WATERCRAFT NOISE CONTROL		of the boat's hull amidships. Any Marine Police Officer of other law enforcement officer certified by the Office of Noise Control, with a reason to suspect that a boat is exceeding the noise limitation, may require the vessel operator to traverse a noise emission test course. e. Any person who fails to comply with the directive to traverse the test course shall be subject to prosecution or, at the discretion of the law enforcement officer, such vessel or engine shall be ordered to immediately return to its mooring and cease operation. f. The noise limitation provisions of this section shall not apply to vessels registered and actually participating in racing events, or tune-up periods for such racing events, when authorized by the Bureau.	

Regulation	FEDERAL	NEW JERSEY	NEW YORK
BOATING ACCIDENTS/ DUTIES IN CASE OF ACCIDENT	All boating accidents or accidents from the use of related equipment, (which meet the criteria below) must be reported by the operator or owner of the vessel to the proper marine law enforcement authority for the state in which the accident occurred. Immediate notification is required for fatal accidents or disappearance. Accidents involving more than $200 damage or complete loss of vessel must be reported within 10 days. Rendering Assistance: The master or person in charge of a vessel is obligated by law to provide assistance that can be safely provided to any individual at sea in danger of being lost, and is subject to a fine and/or imprisonment for failure to do so.	Whenever any vessel upon the waters of the State of New Jersey is involved in an accident, the operator of said craft will render to all persons affected by the accident such assistance as may be necessary to save lives, administer first aid, or minimize any danger caused by the accident providing he can do so without serious danger to himself, his passengers, guests, crew or vessel. When an accident results in death, disappearance or injury of any person, or in property damage in excess of **$100**, the operator or operators shall file with the New Jersey State Police, Marine Law Enforcement Bureau, a full description of the accident, including such other information as the Bureau may require, on report forms provided by the NJ State Police, Marine Bureau. All boating accidents occurring on the water of this State, to include up to 3 miles off-shore, which result in death or disappearance must be reported without delay to the nearest New Jersey State Police, Marine Bureau Station. Written reports in such cases, and in cases of injury, shall be made within forty eight hours on the report form provided by the Bureau. All other reportable boating accidents that result in property damage in excess of $100 shall be reported within	A vessel operator involved in an accident should render all practical and necessary assistance possible to the victims without seriously endangering his own vessel. The operator of each vessel involved in an accident must submit an accident report if: 1. A person dies 2. A person disappears or is injured 3. Property damage exceeds **$100** In the case of personal injury or if the owner of damaged property is not at the scene, the accident is to be reported in 24 hours to the nearest police agency followed by written report within 7 days. If the accident results in a death or disappearance, the authorities must be notified by the quickest means possible, followed by a written report within 48 hours. For other accidents, written reports must be made within seven days. Report forms may be obtained from any marine patrol or OPRHP and submitted to: Office of Parks, Recreation and Historic Preservation.

Regulation	FEDERAL	NEW JERSEY	NEW YORK
ACCIDENT REPORTING CONTINUED		within five days on required forms. The operators report will not be used in judicial proceedings. Subject to those restrictions they must be made available to the United States Coast Guard.	
EDUCATION		a. No person 16 years of age or younger shall operate a power vessel on the tidal or non tidal waters of this State without having completed a boat safety course approved by the Superintendent of State Police in the Department of Law and Public Safety. b. A person 16 years of age or younger, when operating a power vessel on tidal or non-tidal waters of this State, shall have in possession a certificate certifying that person's successful completion of a boat safety course approved by the superintendent and shall, when requested to do so, exhibit the certificate to a law enforcement or peace officer of this State.	NY State law requires youngsters between the ages of 10 and 16 must obtain a safety certificate before they can operate a mechanically propelled boat alone (8 hours classroom instruction) Boating safety courses are offered throughout the state. Safety courses cover boat handling rules and regulations, navigation maintenance and other aspects of boating. New York State Office of Parks Recreation and Historic Preservation (NYSOPRHP) boating course designed for home study for adults. After completing the course the individual may take an open book exam which is forwarded to NYSOPRHP for grading. When passed the boater will get a discount on his/her insurance.

1. Elbert S. Maloney, Chapman Piloting: Seamanship & Small Boat Handling, (New York: 1989) pg. 93.
- New Jersey State Police, Boating Safety (new Jersey : 2/90)
- New York Navigation Law Section 49
- NYS Dept. of Parks, Recreation and Historic Preservation, The New York State Boaters Guide, (Albany:1/90).
- Senate, State of New York, Committee on Tourism, Recreation and Sports Development Section 2 of the Navigation Law A mended, Subdivision 30 and 31.
- Ibid, Section 1, Section 32-C.

APPENDIX 2.2
THE COMPACT OF 1834

sing, and after the passage of this act, shall be called and known by the name of Bradley Lansing, and the family of the said Bradley, shall be known by the family name of Lansing.

CHAP. 7.

AN ACT *to amend an act entitled, "An act to create a fund for the benefit of the creditors of certain monied corporations, and for other purposes," passed April 2d, 1829.*

Passed February 4, 1834.

The People of the State of New-York, represented in Senate and Assembly, do enact as follows:

§ 1. There shall be allowed to each of the bank commissioners of the state of New-York, the annual salary of two thousand dollars, to be paid quarterly out of the bank fund.

§ 2. The twenty-sixth section of the act entitled, "An act to create a fund for the benefit of the creditors of certain monied corporations, and for other purposes," passed April 2d, 1829, is hereby repealed.

CHAP. 8.

AN ACT *to confirm the agreement entered into by the commissioners appointed by this state, and commissioners appointed by the state of New-Jersey, to settle the boundary line between New-York and New-Jersey.*

Passed February 5, 1834.

The People of the State of New-York, represented in Senate and Assembly, do enact as follows:

The agreement entered into between the commissioners appointed by this state, and the commissioners appointed by the state of New-Jersey, to settle the boundary line between New-York and New-Jersey, in the words following, viz:

Agreement. "Agreement made between the commissioners on the part of the state of New-York, and the commissioners on the part of the state of New-Jersey, relative to the boundary line between the two states.

Agreement made and entered into by and between Benjamin F. Butler, Peter Augustus Jay and Henry Seymour, commissioners duly appointed on the part and behalf of the state of New-York, in pursuance of an act of the legislature of the said state, entitled, "An act concerning the territorial limits and jurisdiction of the state of New-York and the state of New-Jersey," passed January 18th, 1833, of the one part, and Theodore Frelinghuysen, James Parker and Lucius Q. C. Elmer, commissioners duly appointed on the part and behalf of the state of New-Jersey, in pursuance of an act of the legislature of the said state, entitled, "An act for the settlement of the territorial limits and jurisdiction between the states of New-Jersey and New-York," passed February 6th, 1833, of the other part.

Boundary line between the two states.

ARTICLE FIRST. The boundary line between the two states of New-York and New-Jersey, from a point in the middle of Hudson river opposite the point on the west shore thereof, in the forty-first degree of north latitude, as heretofore ascertained and marked, to the main sea, shall be the middle of the said river, of the bay of New-York, of the waters between Staten-Island and New-Jersey, and of Raritan bay, to the main sea, except as hereinafter otherwise particularly mentioned.

Jurisdiction of New-York.

ARTICLE SECOND. The state of New-York shall retain its present jurisdiction of and over Bedlow's and Ellis' islands, and shall also retain exclusive jurisdiction of and over the other islands lying in the waters above mentioned, and now under the jurisdiction of that state.

ARTICLE THIRD. The state of New-York shall have and enjoy exclusive jurisdiction of and over all the waters of the bay of New-York, and of and over all the waters of Hudson river lying west of Manhattan island and to the south of the mouth of Spuytenduyvel creek, and of and over the lands covered by the said waters to the low water mark on the westerly or New-Jersey side thereof; subject to the following rights of property and of jurisdiction of the state of New-Jersey, that is to say:

New-Jersey right of property.

1. The state of New-Jersey shall have the exclusive right of property in and to the land under water lying west of the middle of the bay of New-York and west of the middle of that part of the Hudson river which lies between Manhattan island and New-Jersey.

Exclusive jurisdiction.

2. The state of New-Jersey shall have the exclusive jurisdiction of and over the wharves, docks and improvements made, and to be made, on the shore of the said state, and of and over all vessels aground on said shore, or fastened to any such wharf or dock; except that the said vessels shall be subject to the quarantine or health laws,

and laws in relation to passengers, of the state of New-York, which now exist or which may hereafter be passed.

Fisheries. 3. The state of New-Jersey shall have the exclusive right of regulating the fisheries on the westerly side of the middle of the said waters, provided that the navigation be not obstructed or hindered.

Jurisdiction over Kill Van Kull. ARTICLE FOURTH. The state of New-York shall have exclusive jurisdiction of and over the waters of the Kill Van Kull, between Staten-Island and New-Jersey, to the westernmost end of Shooter's Island, in respect to such quarantine laws and laws relating to passengers as now exist, or may hereafter be passed under the authority of that state, and for executing the same; and the said state shall also have exclusive jurisdiction, for the like purposes, of and over the waters of the Sound, from the westernmost end of Shooter's island to Woodbridge creek, as to all vessels bound to any port in the said state of New-York.

Waters of the Sound. ARTICLE FIFTH. The state of New-Jersey shall have and enjoy exclusive jurisdiction of and over all the waters of the Sound between Staten-Island and New-Jersey, lying south of Woodbridge creek, and of and over all the waters of Raritan bay lying westward of a line drawn from the light-house at Prince's bay to the mouth of Mattavan creek, subject to the following rights of property and of jurisdiction of the state of New-York.

1. The state of New-York shall have the exclusive right of property in and to the land under water, lying between the middle of the said waters and Staten-Island.

Docks on Staten-Island 2. The state of New-York shall have the exclusive jurisdiction of and over the wharves, docks and improvements made and to be made, on the shore of Staten-Island; and of and over all vessels aground on said shore, or fastened to any such wharf or dock, except that the said vessel shall be subject to the quarantine or health laws, and laws in relation to passengers of the state of New-Jersey which now exist, or which may hereafter be passed.

Fisheries 3. The state of New-York shall have the exclusive right of regulating the fisheries between the shore of Staten-Island and the middle of the said waters, provided that the navigation of the said waters be not obstructed or hindered.

New-Jersey criminal process. ARTICLE SIXTH. Criminal process issued under the authority of the state of New-Jersey, against any person accused of an offence committed within that state; or committed on board of any vessel being under the exclusive jurisdiction of that state as aforesaid; or committed against the regulations made or to be made by that state, in relation to the fisheries mentioned in the third article; and also civil process issued under the authority of the state of New-Jersey against any person domiciled in that state, or against property taken out of that state to evade the laws thereof; may be served upon any of the said waters within the exclusive jurisdiction of the state of New-York, unless such person or property shall be on board a vessel aground upon, or fastened to the shore of the state of New-York, or fastened to a wharf adjoining thereto; or unless such person shall be under arrest, or such property shall be under seizure, by virtue of process or authority of the state of New-York.

New-York criminal process. ARTICLE SEVENTH. Criminal process issued under the authority of the state of New-York, against any person accused of an offence committed within that state; or committed on board of any vessel being under the exclusive jurisdiction of that state as aforesaid; or committed against the regulations made or to be made by that state, in relation to the fisheries mentioned in the fifth article; and also civil process issued under the authority of the state of New-York, against any person domiciled in that state, or against property taken out of that state to evade the laws thereof; may be served upon any of the said waters within the exclusive jurisdiction of the state of New-Jersey, unless such person or property shall be on board a vessel aground upon, or fastened to the shore of the state of New-Jersey, or fastened to a wharf adjoining thereto; or unless such person shall be under arrest, or such property shall be under seizure, by virtue of process or authority of the state of New-Jersey.

Agreement to become binding. ARTICLE EIGHTH. This agreement shall become binding on the two states when confirmed by the Legislatures thereof respectively, and when approved by the Congress of the United States.

Date of agreement. Done in four parts (two of which are retained by the commissioners of New-York, to be delivered to the governor of that state, and the other two of which are retained by the commissioners of New-Jersey, to be delivered to the governor of that state,) at the city of New-York, this sixteenth day of September, in the year of our Lord one thousand eight hundred and thirty-three, and of the independence of the United States, the fifty-eighth.

(Signed,)

B. F. BUTLER — THEO. FRELINGHUYSEN,
PETER AUGUSTUS JAY, — JAMES PARKER,
HENRY SEYMOUR, — LUCIUS Q. C. ELMER."

is hereby ratified and confirmed on the part of the state of New-York.

APPENDIX 3.1
MARITIME VESSEL TYPE AND SIZE

VESSEL SIZES

PORT AND INDUSTRIAL ACTIVITIES

	Length	Beam	Draft	Hull Design	Propulsion	Constraints
TUGS	50'-200'	25'-40'	6'-20'	Vee Hull or Deep Vee	Oil diesel engine	Need about 1.5 knots to maintain steerage, although 3.5 knots is needed if going against current Needs 3.5 - 4 knots if towing barge 4.5 - 5 knots is best speed for fuel efficiency
BARGES	100'- 400'	30'-100'	6'-30'	Either square bottom or "model" has Vee	No propulsion	Not maneouverable slow response and under tow
FREIGHT						
DRY CARGO	450'+	76'+	<30'	Vee	Oil diesel	
TANKERS	630'+	90'+	30'	Bow Vee, Hull Flat	Oil diesel	
CONTAINER-SHIPS						

CONVERSIONS	450'-650'	75'-90'	Up to 30'	Vee or Deep Vee	Steam diesel or oil diesel	4 knots if alone. Use tugs to slow down and maintain steerage at slow speed.
CELLULAR	860'+	90'+	33'	,,	,,	
PANAMAX	965 +	105' +	38'-41'	,,	,,	
POST PANAMAX	900'-1000'	135'+	38'-42'	,,	,,	

APPENDIX 5.1
TABLE 1:
COMMERCIAL CRUISE SHIPS

APPENDIX 5.1	TABLE 1	COMMERCIAL CRUISE SHIPS			
NAME	**PASSENGER BOARDING LOCATIONS**	**VESSEL NAME(S)**	**# OF PASSENGERS**	**SIZE**	**DESTINATION**
BERMUDA STAR LINES	NY PIERS 88, 90, 92 HUDSON RIVER 48TH & 52ND ST.	BERMUDA STAR BERMUDA QUEEN		600 FT. 23,395 TONS 23,500 TONS	BERMUDA
CHANDRIS FANTASY CRUISES	" "	SS AMERIDANIS SS GALILEO			BERMUDA, CRUISE TO NOWHERE
CUNARD LINE	" "	QUEEN ELIZABETH II VISTAFJORD SAGAFJORD CUNARD PRINCESS	736 589	887 FT.	TRANSATLANTIC, CARIBBEAN, NEW ENGLAND PANAMA, CANADA
PRINCESS CRUISES	" "	SKY PRINCESS	1,212	789 FT. 46,314 TONS	CANADA, NEW ENGLAND, BERMUDA
ROYAL CARIBBEAN	" "	NORDIC PRINCE	1,10		BERMUDA
ROYAL VIKING LINE	" "	ROYAL VIKING STAR ROYAL VIKING SUN	756 740	674 FT. 28,000 TONS	BERMUDA, CANADA, NEW ENGLAND, MEXICO

APPENDIX 5.1
TABLE 2:
EXCURSION, SIGHTSEEING AND SIMILAR VESSELS

APPENDIX 5.1 TABLE 2 EXCURSION, SIGHTSEEING AND SIMILAR VESSELS					
OPERATION NAME	**PASSENGER BOARDING LOCATION**	**ACTIVITY**	**NUMBER OF VESSELS/ NAMES**	**NUMBER OF PASSANGERS C= COAST GRUARD CERTIFIED**	**ROUTE/ DESTINATION**
AMBER JACK YACHT CHARTERS	PIER 11, WATER CLUB WEST 21ST	P/R D EN C	1 AMBER JACK	200	LHR, LER, S/E, UB
AMERICAN BOAT CHARTER & BUILDERS INC.	LIBERTY HARBOR MARINA, WATER CLUB & NORTH COVE MARINA (BATTERY PK. CITY)	P/R C	1		LER, LHR, S/E
AQUA FUN	PIER 11, SKYPORT MARINA	SS P/R C	1		LER, LHR, S/E, UB
BRING SAILING BACK, INC.	SOUTHEAST CORNER BATTERY PARK GANGWAY #1, MANH	E P ML SS P/C	1		UB, LB, LIS, SR, S/E (DEPENDS ON WIND & CURRENTS)

ACTIVITY CODES:
E=EXCURSION, EN=ENTERTAINMENT, SS=SIGHTSEEING, P/R=PARTIES & RECEPTIONS
D=DINING, F=FISHING, ML=MOON LIGHT CRUISES, SD=SCUBA DIVING,
P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
HAR=HARLEM R., UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
S/R=SANDY HOOK/RARITAN BAY, NJC=NEW JERSEY COAST

APPENDIX 5.1	TABLE 2	EXCURSION, SIGHTSEEING AND SIMILAR VESSELS			
CALIBER YACHTS	NY/PIER 11 & 84 E, & W 23, WORLDS FAIR MARINA: NJ/PORT IMPERIAL, LINCOLN HARBOR, PORT LIBERTE, NEWPORT	P SS ML P C	1 CLOUD NINE	149	S/E, HR, LER
CIRCLE LINE STATUE OF LIBERTY ELLIS ISLAND/FERRY	BATTERY PARK/SOUTH FERRY, MANH & LIBERTY STATE PARK, NEW JERSEY	SS EN ML P	4 MISS CIRCLE LINE, MISS LIBERTY, MISS FREEDOM, MISS GATEWAY	 C-1035 C-827 C-450 C-500	UB, S/E
CIRCLE LINE SIGHTSEEING YACHTS	PIER 83 WEST 42ND & HUDSON RIVER	SS	8 P/C		AROUND ISLAND OF MANHATTAN

ACTIVITY CODES:
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ROUTE CODES:
ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
HAR=HARLEM R., UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1	TABLE 2	EXCURSION, SIGHTSEEING AND SIMILAR VESSELS			
CARLETON CRUISES	EAST 23RD ST. (SKYPORT), WATER CLUB, PIER 11,	P/R SS ML D C	2 ENTREPRENEUR RACONTEUR	C-149 C-49	S/L, UB, LER, LHR
ELEGANTE'	PIER 11, WATER CLUB EAST 23	P/R, C	ELEGANTE'	60	S/E, UB, LER, LHR
ENTICER CORP.	PIER 62 12 & 23rd	D P/R C	1 ENTICER	C-60	S/E, LHR, LER
GALA YACHT PARTIES	PIER 11, WEST 21, E. 23 WATERCLUB, 84TH	D EN C	1 JUBILEE	C-149	UB, LER, HR, S/E
HARBOR COMMUTER SERVICE INC./DIRECT LINE	PIER 11 MANH, LIBERTY STATE PARK, NJ, CONNER'S HOTEL, ATLANTIC HIGHLANDS	P/R D EN C			

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P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
HAR=HARLEM R., UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1	TABLE 2	EXCURSION, SIGHTSEEING AND SIMILAR VESSELS			
KLONDIKE YACHT CHARTERS	WEST 21ST ST. PIER 11, EAST 34TH ST.	P/R D EN F C	2 KLONDIKE PRINCESS, KLONDIKE EIGHT (FISHING)	C-149	LER, LHR, UB, LB, S/E, S/R, LIS
LADY FRANCIS	PIER 11, WATER CLUB EAST 34TH	D P/R C	1 LADY FRANCIS	30	LER, LHR, UB, S/E
LADY WINDRIDGE	PIER 11, WATER CLUB EAST 34TH	D EN P/R C	1 LADY WINDRIDRIDGE	C-500	LER, LHR, UB, S/E
LEISURE YACHT CHARTERS INC.	PIER 11, WATER CLUB WEST 21, EAST 23	P/R SS C	3 CELEBRITY, DIPLOMAT, EVIVA	C-149 C-200 C-30	LHR, LER, S/E, UB
MARINER III	PIER 11, WATER CLUB, EAST 34TH	P/R SS, D KL, EN C	1 MARINER III	C-100	LER, LHR, S/E, UB

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ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
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APPENDIX 5.1	TABLE 2	EXCURSION, SIGHTSEEING AND SIMILAR VESSELS			
METROPOLITAN YACHT CHARTERS/ CRUISE LINES	PIER 11, WATER CLUB, EAST 34TH, EAST 23RD	PR D, EN S, E C	1 MYSTIQUE	C-350	HR, LER, S/E, UB
MOONRAKER FUN LINES LTD.	CITY ISLAND, 79TH BOAT, 23RD E.	ML P/R SS C	1		LIS, HR, ER, UB, LB, S/E
MUSICRUISE	PIER 81 W. 41 & HUDSON	EN D C	1		LER, LHR, UB, S/E
NEW YORK HEALTH RACQUET CLUB	WEST 23RD ST.	EN, D, SS, ML, C	1 NEW YORK HEALTH AND RAQUET	C-40	LER, LHR, UB, S/E
NEW YORK YACHT CHARTERS			NEW YORK		
PORT IMPERIAL	PORT IMPERIAL TERMINAL, WOHANTON PIER 78 & SLIP 5 MANH.	P/R D E SS ML C	4		S/E, UB, LER, LHR

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P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
HAR=HARLEM R., UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
S/R=SANDY HOOK/RARITAN BAY, NJC=NEW JERSEY COAST

APPENDIX 5.1 TABLE 2 EXCURSION, SIGHTSEEING AND SIMILAR VESSELS					
PRECIOUS MOMENTS	PIER 11, WATER CLUB EAST 34TH	P/R D EN C	PRECIOUS MOMENTS	40	LER, LHR, US, S/E
RELIABLE	WORLD'S FAIR MARINA PIER #1 FLUSHING, NY	F S ML C	1		LIS
SALISA M.CHARTER INC.	PIER 11, WEST 21, EAST 34TH	P/R SS C	1 SALISA M	60	LER, LHR, UB, S/E
SEAPORT LINE	PIER 16 SOUTH STREET SEAPORT	D EN SS P/C	2		LER, LHR, S/E, UB
SPIRIT OF NEW YORK CRUISES & SPIRIT OF NEW JERSEY	PIER 9 SOUTH STREET SEAPORT PIER 11	D E P/R ML SS P\C	2 SPIRIT OF NEW YORK, SPIRIT OF NEW JERSEY	 C-600 C-350	LER, LHR, S/E, UB
THOMAS JEFFERSON YACHT CHARTERS	PIER 11, EAST 34TH	P/R D, SS, C	THOMAS JEFFERSON	C-149	LER, LHR, S/E, UB

ACTIVITY CODES:
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D=DINING, F=FISHING, ML=MOON LIGHT CRUISES, SD=SCUBA DIVING,
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ROUTE CODES:
ER=EAST RIVER, LER=LOWER EAST R., HR=HUDSON R., LHR=LOWER HUDSON R.,
HAR=HARLEM R., UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1 TABLE 2 EXCURSION, SIGHTSEEING AND SIMILAR VESSELS					
VIP YACHT	PIER 11, PIER 84 WATERCLUB, SHEEPSHEAD BAY	P/R D, SS C	2 ROMANCE TAMPA VI	C-275 C-149	LER, LHR, UB, S/E
WORLD YACHT CRUISES	PIER 62 W. 23 & HUDSON RIVER	D, EN, P/R,SS ML P/C	5	C-UP TO 1500	HR, ER, S/E, UB
YSI - YACHT SVCES INTERNATIONAL	CONSOLIDATED YACHT MARINA CITY ISLAND, BRONX	 SS P/R ML C	7		S/E, UB, LER/LHR
DOVE YACHT CHARTERS	PIER 62, SKY PORT WATERCLUB	SS P/R, ML D, EN C	2 JABIRU JACANA	 C-30 C-119	S/E, LUR, LER

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ROUTE CODES:
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S/R=SANDY HOOK/RARITAN BAY, NJC=NEW JERSEY COAST

APPENDIX 5.1
TABLE 3:
COMMERCIAL SPORT FISHING

APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
OPERATION NAME	**PASSENGER BOARDING LOCATION**	**ACTIVITY**	**NUMBER OF VESSELS & NAMES**	**ROUTE/ DESTINATION**
APACHE FISHING & CHARTER BOAT		F S	1	
ATLANTIC STAR	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F S P	1 ATLANTIC STAR	S/R, NJC
BETTY W. IV	3030 EMMONS AVENUE, SHEEPSHEAD BAY, BKLYN	 F P	1 BETTY W. IV	LB, S/R, NJC
BIG HOLIDAY	EMMONS AVENUE SHEEPSHEAD BAY, BKLYN	F	1 BIG HOLIDAY	LB, S/R, NJC
BOB JAC	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F C	1 BOB JAC	S/R, NJC

ACTIVITY CODES:
F=FISHING, S=SIGHTSEEING, ML=MOON LIGHT CRUISE, SD=SCUBA DIVING
P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST R. LER=LOWER EAST RIVER, HR=HUDSON R. LHR=LOWER HUDSON R., HAR=HARLEM R.
UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
LIS=LONG ISLAND SOUND S/R=SANDY HOOK/RARITAN BAY, NJC=NEW JERSEY COAST

APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
CRACK-A-DAWN	LEONARDO - STATE MARINA	S F C	1 CRACK-A-DAWN	S/R, NJC
FISHERMAN	ATLANTIC HIGHLANDS - YACHT HARBOR	F P	1	S/R, NJC
FLAMINGO III WIEGAND MARINE CORP.	KNAPP STREET/BELT PARKWAY, BKLYN	F ML P/C	1	LB, S/R, NJC
FLEET ELISA K	SHEEPSHEAD BAY, BLKYN	F ML P	1	LB, S/R, NJC
FREDDY-C	LEONARDO - STATE MARINA	F S P/C	1	S/R, NJC
FRIENDSHIP III	EMMONS AVENUE, SHEEPSHEAD BAY, BLKYN	F F	1	L/B, S/R, NJC

ACTIVITY CODES:
F=FISHING, S=SIGHTSEEING, ML=MOON LIGHT CRUISE, SD=SCUBA DIVING
P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST R. LER=LOWER EAST RIVER, HR=HUDSON R. LHR=LOWER HUDSON R., HAR=HARLEM R.
UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
HELEN H.	EMMONS AVENUE, SHEEPSHEAD BAY, BKLYN	F F	1	L/B, S/R, NJC
HI HOOK II	PORT MONMOUTH GATEWAY: MARINA	F S ML C	1	S/R, NJC
JANET-C	HIGHLANDS-HIGHLAND MARINA	F C	1	S/R, NJC
JON PAUL	JERSEY CITY LIBERTY HARBOR	F S C	1	LB, S/R, NJC
KATIE'S MATE	LEONARDO-STATE MARINA	F S C	1	S/R, NJC
KELLY-ANN	JERSEY CITY ROOSEVELT MARINA	S SD F C	1	S/R, LB, NJC

ACTIVITY CODES:
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P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST R. LER=LOWER EAST RIVER, HR=HUDSON R. LHR=LOWER HUDSON R., HAR=HARLEM R.
UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
MARGE-E	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F S C	1	S/R, NJC
NORTH STAR	551 CITY ISLAND AVENUE CITY ISLAND, BRONX	F S ML C/P	1	LIS
NORTH STAR TWO FISHING AND CHARTER BOAT	CITY ISLAND	F ML P/C	1	LIS
OASIS	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F S P/C	1	S/R, NJC
PALACE II	HOBOKEN, NJ PIER 16	F P	1	LIS, LB, S/R, NJC

ACTIVITY CODES:
F=FISHING, S=SIGHTSEEING, ML=MOON LIGHT CRUISE, SD=SCUBA DIVING
P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST R. LER=LOWER EAST RIVER, HR=HUDSON R. LHR=LOWER HUDSON R., HAR=HARLEM R.
UB=UPPER BAY, LB=LOWER BAY, S/E=STATUE OF LIBERTY/ELLIS ISLAND,
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APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
PHANTOM II	LEONARDO - STATE MARINA	F S C	1	S/R, NJC
RIPTIDE II	JORGENSEN PIER, CITY ISLAND, BRONX	F S ML P/C	1	LIS
SEA FOX	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F P	1	S/R, NJC
SEA TIGER	ATLANTIC HIGHLANDS MUNICIPAL HARBOR, NJ	F S P/C	1	S/R, NJC
SHARI LYNN	ATLANTIC HIGHLANDS: MUNICIPAL HARBOR	F S C	1	S/R, NJC

ACTIVITY CODES:
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P=PARTY/OPEN BOAT, C=CHARTER, P/C=PARTY/OPEN BOAT & CHARTER
ROUTE CODES:
ER=EAST R. LER=LOWER EAST RIVER, HR=HUDSON R. LHR=LOWER HUDSON R., HAR=HARLEM R.
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APPENDIX 5.1	TABLE 3	COMMERCIAL SPORT FISHING		
WHITE CHIN II	EMMONS AVENUE SHEEPSHEAD BAY, BKLYN	F	1	LB, NJC, S/R
WHITE WATER II	EMMONS AVENUE SHEEPSHEAD BAY, BKLYN	F	1	LB, NJC, S/R
ZEPHYR V	PIER 1 SHEEPSHEAD BAY, BLKYN	F	1	LB, S/R, NJC

ACTIVITY CODES:
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ROUTE CODES:
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APPENDIX 5.2
COMMERCIAL VESSEL SIZE

APPENDIX 5.2	BOAT TYPES AND ATTRIBUTES OF COMMERCIAL VESSELS					
BOAT TYPE	**SIZE**	**HULL DESIGN**	**DRAFT**	**PROPULSION**	**USE**	**ATTRIBUTES CONSTRAINTS**
OCEAN GOING VESSEL	600 - 887 FEET	DEEP VEE	DEEP DRAFT UP TO 30 FEET	PROPELLER DRIVEN	OCEAN CRUISING	CARIES A LARGE NUMBER OF PASSENGERS; PROVIDES SLEEPING, EATING AND ENTERTAINMENT FACILITIES; DIFFICULT TO MANEUVER; MUST BE GUIDED INTO BERTHS BY TUGS
TOUR BOAT	100 - 140 FEET	DIS-PLACEMENT HULL	6 - 13 FEET	PROPELLER DRIVEN	EXCURSIONS WITHIN HARBOR	PROVIDES LIGHT FOOD AND BEVERAGE ON BOARD
LUXURY YACHT CHARTER	65 FT. TO 190 FT. 49 - 350 PASSENGER	DIS-PLACEMENT HULL	5 - 8 FT.	PROPELLER DRIVEN	EXCURSION WITHIN HARBOR AND LONG ISLAND SOUND	PROVIDES FOOD AND BEVERAGE ON BOARD, HIGHLY MANEUVERABLE
FISHING BOAT CRUISER AND SUPER CRUISER	60 - 100 FT. OPEN 25 - 50 FT. CHARTER	VEE/DIS-PLACEMENT HULL	6 - 10 FT.	PROPELLER DRIVEN	PARTY FISHING IN LONG ISLAND SOUND/NEW JERSEY COAST	PROVIDES FISHING EQUIPMENT ON BOARD, OFTEN FOOD AND BEVERAGE ON BOARD, AND EASY TO MANEUVER, CAPABLE OF TRAVELING AT HIGH SPEEDS
SAILING CHARTER						

APPENDIX 6.1
RECREATIONAL BOATING
REGISTRATION AND DISTRIBUTION

APPENDIX 6.1
RECREATIONAL BOAT REGISTRATIONS AND DISTRIBUTIONS

	New Jersey	New York City
1980	120,287	18,328
1981	129,886	12,328
1982	130,922	12,965
1983	138,367	18,452
1984	140,884	18,163
1985	141,196	11,958
1986	141,655	19,161
1987	150,121	20,538
1988	173,208	22,652

Information for New Jersey is available only on a statewide basis and not by county or municipality. Neither set of registration statistics includes canoes, kayaks, rowing shells or skulls. Non-motorized sailboats are not included in the New York's statistics; New Jersey's include only those sailboats over 12 feet in length.

Distribution of motorized boats in New York City by vessel length:[1]

Under 16 feet	26%
16 feet to 25 feet	56%
26 feet to 39 feet	15%
40 feet to 65 feet	1.2%
65'+	0.2%
Unknown	0.4%

The statewide distribution of boats by size for 1986 in New Jersey [2] is as follows:

Under 16 feet	41%
16 feet to under 26 feet	51%
26 feet to under 40 feet	7.2%
40 to 65 feet	0.4%

Statewide, New Jersey has a larger percentage of smaller boats (under 16 feet), but it is likely that the size distribution within the study area on the New Jersey side of the Harbor is similar to the distribution found in New York City. The higher percentage of boats under 16 feet in New Jersey is probably attributable to boats used on streams and lakes away from the Harbor, where smaller craft are found in higher frequency.

1. Compiled by the Bureau of Marine and recreational Vehicles, New York State Parks, Recreation and Historic Preservation, 1989 Boating Accident Statistics, (Albany, NY: 1989), p.5,6.

2. National Marine Manufacturers "Boating Statistics" (1986)

APPENDIX 6.2
HULL AND ENGINE DESIGN

APPENDIX 6.2 HULL AND ENGINE TYPES

This section covers pertinent features of different types of hulls and engines used in recreational boats. The accompanying chart describes features of the different types of boats used in the harbor.

HULLS

Displacement Hull

These displace water of equal volume to the weight of the boat and cause the hull to move through the water. As the propulsion system moves the hull forward, the drag of water and wave resistance moves against the forward motion.[1] A displacement hull requires very little power to move through the water. They ride smoothly across the water but cannot go very fast.[2] Large trawler yachts, fishing and large sailboats usually have them.

Planing Hull

When speed is obtained, this hull is lifted out of the water and skims over the top of water decreasing the amount of water drag and wave resistance.[3] They require considerably more power than displacement hulls to achieve planing so they are usually found in smaller boats.[4]

Flat Bottom Displacement

Flat bottom displacement hulls are usually under 18' and used for fishing or utility purposes. They are frequently heavy and slow and used in streams or protected waters. If they obtain high speeds to achieve planing, they tend to pound on the water excessively making an uncomfortable ride.[5]

Flat Bottom Planning These are the same size as above, but due to lighter weight, can move up into planing with adequate power allowing them to obtain higher speeds than flat bottom displacement.

Round Bottom These hulls, usually under 18' dinghies, tenders, car top boats and sometimes runabouts, often maneuver better than flat bottom hulls at slow speeds. Usually they are displacement hulls but if light enough will plane. They have a tendency to roll if they are not stabilized by a keel or other type of stabilizer. They are frequently found in sailboats, canoes and trawlers.[6]

Vee-Bottom The vee-bottom is frequently seen in runabouts, utility boats and cruisers. Speed will increase as the vee is deepened and provide a smoother ride than the flat bottom boat. Commonly a deep vee is seen towards the bow and flattens further aft. Flattened longitudinal planking assists lift for planing and lateral stability. Deep vee will provide a smoother ride at high speeds in rough water.[7]

Cathedral Usually found in motor boats these have two or three hull shapes in the same hull which increases their lateral stability.

Catamaran/ Trimaran Motorboats or sailboats may use two or three pontoon hulls of any of the above type hulls attached to each other. These have greater stability because of their increased width (beam).[8]

Hydroplanes Usually flat, these are divided in two levels at mid-hull reducing the amount of hull in the water, thereby increasing the speed of the boat generally used for racing.

ENGINE TYPES

The engine type effects maneuverability and in planing hulls, the speed. There are four basic types:

Outboard Engine An outboard engine is a detachable gasoline engine that contains a drive shaft and propeller. Though highly maneuverable, when reversed too quickly, the engine of some boats may tilt up if the operator has failed to lock it down. In low water, the engine might not be locked down enabling angling for operating. Frequently, newer engines over 100 HP have a 'power-trim' mechanism which lifts the engine automatically to a proper angle to operate. The fuel tank and operating controls are usually separate. On small boats, the steering mechanism is over the transom and steered by hand, whereas on larger boats it is often cabled and steered by using a directional mechanism such as a steering wheel.

Inboard Engine This engine is mounted inside the hull; power is transmitted to the propeller via a drive shaft which exits the hull beneath the water line. This design allows for the greatest power and reliability, but limits maneuverability, unless the vessel is twin engine. Although this design was standard through the 1950s, it is now reserved for larger and

heavier boats. Inboard powered boats can be steered the same way an outboard motor boat is, outside the transom. Alternatively, a steering mechanism can be under the boat and a directional mechanism be used to steer the boat. They can be either be gasoline or diesel powered.

Stern-Drive Engines

These engines are often called inboard-outboard, out drives or I-Os. They can be either gasoline or diesel powered. The engine is mounted inside the hull and bolted to the transom with a drive unit that closely resembles the lower section of an outboard motor. They generally allow for greater power because they are located inside the hull allowing for a larger engine. They are almost as maneuverable as outboards. Newer boats over 100 HP usually have a 'power trim', a tilt mechanism to properly angle the engine.

Jet Drive Drive

The major feature of this type of engine is its instantaneous response to accelerating, stopping and turning, made possible by a pump that draws water into the boat and ejects it out the stern.[9] The direction of the jet determines the direction of the vessel. They are highly maneuverable. Usually boats with this type of engine have a planing hull shaped in a deep vee.

1. Elbert S. Maloney, Chapman Piloting: Seamanship and Small Boat Handling, (New York: 1985) pg. 18.

2. New York State Office of Parks, Recreation and Historic Preservation, New York Boating Basics, (Albany, NY), pg. 7.

3. Maloney, pg. 18.

4. New York Boating Basics, pg. 7

5. Ibid

6. Ibid

7. New York Basics and Maloney, pg. 18.

8. New York Boating Basics, pg. 7.

9. Maloney, p.123.

Appendix 6.2: Recreational Boats[1]

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
MOTORBOAT:					. Minimum standard surface area of water required for power boat activity: . 6 - 8 acres/vessel can go as high as 20 acres/ vessel . Fishing from boat: 3 - 10 acres/vessel . Jet Ski - 2 acres/vessel . Waterskiing: 20 acres/vessel	
Utility Boats	Usually under 16'	. Usually flat or round bottom hull	. Shallow	Outboard engine	. Variety of uses including fishing and transporting to and from other recreational vessels . Motorized dinghies and prams can be classified here	. Can be put on Car top . Best suited to calm waters close to shore due to limited stability
Inflatables	Approx. 8-10'	. Neoprene coated fabric to protect from heat and salt water. Hulls are rigid and semi rigid . Usually flat, some are V-bottomed	. Shallow	. May be constructed with or without engine . Outboard engine used if there is an engine		. High maneuverability . Very buoyant and quite stable, the hard hull increases stability further. . Travels low and close to the water . Light weight and can be put on top of a car . With hard hull there is a decrease in pounding and a smoother ride
Personal Watercraft	.Generally less than 13', It is considered a Class A vessel . Usually can carry 1 to 3 persons depending on size	. Vee-Bottom	. 6" minimum usually 2' standard draft	. Jet engine: capable of speeds in excess of 20 knots . Rider sits, kneels or stands	. Recreation . Water skiing . Racing . Standard of spatial needs is a minimum of 2 acres/vessel	. Highly maneuverable . Stability dependant on size and design of craft . Relatively small with limited cargo area and fuel carrying capacity and therefore stay close to shore . Potential noise impacts on waterfowl and fishery resources especially in shallow water areas
Runabouts	. Usually under 26'	. Usually vee or deep vee		. Inboard . Outboard . I/O	. Fishing . Waterskiing . Day Cruises	. Inexpensive compared with other types of boats . Can achieve planing usually at or above 11 mph . Popular due to versatility

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
Motor Cruiser (Cabin Cruiser)	. Usually range from 18' to 50' or 60'	. Usually displacement hull, capable of planing at higher speeds but have to go at top speed to achieve this (approximately 20 - 25 mph)	. Deeper Draft . 65' boat can have a draft of about 5'		. Cruising - Day as well as overnight	. Usually have a cabin, galley, bunks and a head
SAILBOATS		. Usually displacement	. Approximate Drafts are as follows: . Less than 16' boat - 2 1/2' draft . 16' - 26' boat - 3 - 4' draft . 26' - 40' boat - 4 - 5' draft . 40 - 65' boat - 5 - 10' draft	. Wind over sail and water over the hull		. Sailboat is stabilized with either a centerboard or keel to prevent it from tipping or being pushed side ways in the wind . Centerboard can be brought up in shallow areas . Larger boats usually have a fixed keel which provides counter weight that adds to the stability of the boat . Considerable knowledge about sailing needed to operate boat . Some sail boats are fitted with combined keel/centerboard. The centerboard is attached to the keel and can be moved up and down draft still at least 4'.
Day Sailors	Small usually under 20'	. Flat or round bottomed . Planing or displacement hull . Catamaran		. sail . may or may not have auxiliary power . outboard engine used if has engine.	. Day Trips	. Designed for day trips . Can have small cockpit area . If wind dies the propulsion goes with it if engineless.
Sail Cruiser	. Usually over 20'	Usually Displacement Hull		Sail and auxiliary power	. Day trips . Overnight trips	. Have cabin with bunks, galley, head and can be used for overnight or long distance cruises . Auxiliary power allows more flexibility as they are not dependant solely on the wind

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
Motor Sailor	. Usually over 20'			Combination of sail and motor	. Day trips . Overnight trips	. Combination of motor boat and, sail boat. The sail is usually smaller than a standard sailboats and the engine has less power. They are less efficient than sail or motorboats, however, provide a compromise between the two types of boats . have cabin with bunks, galley head and can be used overnight or for long distance cruises.
Sailboard	12-14'			Sail and weight shift of operator and pivoting mast	. Windsurfing	. Can have problem getting back to shore if wind dies or sailor tires due to physical taxation of sport . Physically demanding. Requires above average physical condition. Stomach, leg, and arm muscles can tire in even the most experienced sailboarder, especially in high winds. . Falls in water are inevitable, which means exposure to cold and a strenuous job of raising mast and sail . Sailor can easily be carried out with offshore wind in large body of water . Sailboard has low profile when sail is down
CANOE/KAYAK				Main propulsion paddle; can have sail or small auxiliary engine		
Canoe	. Average 15-18' beam 35 - 37" width . Sits about 15" off the water	. Round bottom	. 3 - 4"	. Single blade paddle used	. Mainly day trips although can be used for camping . Fishing . Exploring	. Because the operator sits up the center of gravity is higher thus decreasing the stability
Kayak	. 15 - 17' long . Beam - 24 - 35" . sits about 6" off water	. Vee hull	. 3 - 4"	. Usually double bladed paddle used . Can be rigged with sail	. Mainly day trips although can be used for camping . Exploring	. Kayaker sits on bottom of the boat and thus reduces the center of gravity so increases the stability . The stability is dependant on the type of kayak used . Some fitted with stabilizing devices that make them very difficult to capsize

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
High Performance (British Kayak)	16 -18' long Beam: 20 - 22"		. 3 - 4"	. Usually double bladed paddle used . No sail rigging	. Exclusively for day trips	. Made of Fiberglass . Requires high skill level to operate. Highly unstable unless in expert hands.
General Purpose Kayak (northwest design)	15 - 17' long Beam: 24 - 28"		. 3 - 4"	. Usually double bladed paddle . Can be rigged with sail	. Used for day trips and camping	. Greater stability than British Kayak
Folding Kayak	15 - 17' long Beam: 26 - 35"		. 3 - 4"	. Usually double bladed paddle . Can be rigged with sail	. Can be used for day trips and camping	. Highly stable (of all the paddle craft one of the most stable) . Easy storage and carrying . 15 - 20 minute assembly
Rowing Shell			. Need approximately 7 - 10' depth for oars			. Lack of stability makes them vulnerable to wave/wake action . Rowers row backwards . Physically strenuous sport
Single	. 22 - 27' . Beam about 1' to less than 2' at widest point . Newer models 16' .Beam 24" . Sit about 3" off the water . 18 - 20' width with oars, allowing 1 - 2' of water on either side			Rower uses two oars (Sculls)		. Shell for one rower . Rower rows backward . Newer recreational rowing models are smaller and wider, not as quick but offering increased stability. . In lightest form, made of cedar and can break easily . Shells can be made out of fiberglass which increases their durability. Usually recreational shells are made out of fiberglass

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
Double	18 - 20' width with oars, allowing for 1 - 2' of water on either side			2 rowers each use 2 oars		. Second set of oars adds stability over shell . Some have a coxswain (individual who does not row but steers boat) who usually faces forward
Pair	30 - 32' long 26 - 28' width with oars allowing 1 - 2' of water on either side			2 rowers each rower uses 1 oar		. See above
Fours	40 - 45' long 26 - 28' width with oars allowing for 1 - 2' of water on either side			4 rowers one oar each		. Some coxed but most not . When no cox, control rudder through foot movement
Quads	40 - 45' long 26 - 28' width with oars allowing for 1 - 2 feet of water on either side			Four rowers each use two oars		. See above

BOAT TYPE	SIZE	HULL DESIGN	DRAFT	PROPULSION	USE/SURFACE AREA NEEDED	ATTRIBUTES/CONSTRAINTS
Eights	. About 58 - 62' long . 26 - 28' width with oars allowing for 1 - 2' on either side . Sits about 6 -8" off the water			8 rowers each use one oar		. Coxswain steers boat . Can achieve speeds of over 15 mph

APPENDIX 6.3
RECREATIONAL BOATING FACILITY TYPES

APPENDIX 6.3: RECREATIONAL BOATING FACILITIES

Recreational vessel storage can occur in water or on land. In-water storage takes place predominately in marinas, yacht clubs, or mooring areas.

Marinas A marina is an area with wet slips, or dry or wet rack storage, and possibly moorings. Marinas are for-profit commercial enterprises that usually provide a mix of services, boat storage, and repair.

Yacht Clubs The private boat club, or yacht club, is a not-for-profit organization that charges a membership fee. A yacht club membership usually includes a slip or more often, a mooring. Clubs seldom offer marina support services but do provide social spaces such as club houses for their members.

Moorings Moorings are semi-permanent or permanent installations located offshore, either fixed or attached to a mooring buoy, that move with the tide. Access from the boat to the dock is either via a private dinghy or a yacht club or marina service dinghy.

Land Storage A dry rack is an area where vessels are stored out of the water in an upland stack structure; a wet rack stores vessels in a stack structure built over water. The dry rack storage structure is typically made of metal and is best suited for smaller boats (less than 35') with low centers of gravity such as utility boats and runabouts. Rack systems reduce costs to about one half to one third of in-water

storage. They require less water area, are less environmentally problematic and have decreased boat maintenance costs.

Boat Trailer Ramps and Hand Boat Launches

Smaller boats can be stored outside of a marina or yacht club in a variety of locations ranging from closets for folding kayaks to back yards or driveways. These boats are divided into two groups: hand boats and trailerable boats.

Hand boats such as canoes, windsurfers and kayaks, can be transported in or on top of a car and placed in the water by hand. New York City has a number of designated hand boat launch areas, although these craft can essentially be placed in the water at any location where there is access. The preferred site for hand boat launching is a small, flat, upland area with access to calm water free from obstructions and offering a clean bottom surface.

A boat trailer ramp is an inclined, paved, surface that extends into the water. Hand boats can use these facilities, but they are mainly used to launch or retrieve trailerable boats.[1] Boats that can be launched at ramps are limited to those that can fit on trailers hauled by a car, van, or light truck. Generally, power boats 19 to 22 feet in length can be accommodated by boat ramps.

Sailboats greater than 18 feet in length usually have fixed keels, which for the most part prevent launching at a boat ramp; thus, sailboats less than 18 feet in length with "dagger board" type keels are those generally accommodated by boat ramps.[2]

Boat Houses

Rowing shells ideally require boat house facilities to protect boats and oars. Boats are launched from a platform into the water.

1. Neil W. Ross, editor, Marina Dictionary, (Wickford, R.I.: 1989) pg. 6.

2. Geismer & Calamari, P.C., Staten Island Small Boat Launching Feasibility Study, prepared for the New York State Office of Parks, Recreation and Historic Preservation, (Albany, NY: 1988) pg. 10.

APPENDIX 6.4
RECREATIONAL BOATING FACILITY LISTING

Appendix 6.4 Recreational Boating Facilities[1]

Location	Marinas *	Yacht Clubs	Slips *	* Dry Rack	* Moorings	Boat Trailer Ramp	Hand Boat Launch	Rowing Boat House	Special Anchorage Area
LONG ISLAND SOUND									2
Pelham Bay Lagoon							1		2
City Island	13		900	550	500				
Eastchester Bay	6		705	1388	180				1
Westchester Creek	1		50						1
Little Neck Bay	1	1	25		250	1	1		6
UPPER EAST RIVER	2	1	50		100		1		
Flushing Bay	6		905	100					
HELL GATE								1	
HARLEM RIVER								4	
HUDSON RIVER	8	2	1436			3	4 - + 1 canoe club		
LOWER EAST RIVER	1	1	46						
UPPER BAY		1				1	1		
KILL VAN KULL		1	20						
NEWARK BAY	2	1	330						1
HACKENSACK RIVER	6	3	193			1			
PASSAIC RIVER	2			18		1		1	
ARTHUR KILL	13	1	729			2	1		
RARITAN RIVER		1				2			

Location	Marinas *	Yacht Clubs	Slips *	* Dry Rack	* Moorings	Boat Trailer Ramp	Hand Boat Launch	Rowing Boat House	Special Anchorage Area
LOWER BAY									
Raritan Bay Middlesex	7		758	30		1			1
Raritan/Sandy Hook Bay Monmouth	21	4	2069 + 150 rental	555	350	8			
Great Kills Harbor	5	4	1119			2			1
Lemon Creek	1	2	15			1			
Gravesend Bay	3	2	310						5
JAMAICA BAY	32	16	3198	25	905	4	2 + 1 canoe club	1	
TOTAL	130	41	13,008	2666	2285	27	13	7	20

1.Boating Almanac, 1990, Volume 2 and 3, (Maryland: 1990)

Army Corps of Engineers, The Port of NY and NJ on Long Island, NYC, (Washington, D.C.: 1988), pg. 29-50.

* THESE NUMBERS ARE ESTIMATES

APPENDIX 6.5
FUTURE PROPOSALS FOR FERRIES, COMMERCIAL AND RECREATIONAL BOATING FACILITIES

Appendix 6.5: Future Proposals for Ferries, Commercial and Recreational Boating

Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
LONG ISLAND SOUND	Orchard Beach	Bronx	Public	Park			Excursion			4
	Pelham Bay Park West	Bronx	Public	Park			Excursion			4
City Island	Sailmaker	Bronx	Private	Residential	40 S					1
	Sea Breeze	Bronx	Private	Residential	76 S					4
	Consolidated Yacht	Bronx	Private	Marina	43 S expansion					3
	C.I. Slip	Bronx			75 S expansion					3
	Kretzers	Bronx	Private	Marina	35 S expansion					1
	East City Island Park/Pier	Bronx	Public	Park		Ramp/ Launch	Excursion			4
Eastchester Bay	Locust Point	Bronx	Public	Park			Excursion			4
	Fort Schuyler	Bronx	Public	Park			Excursion			4
Little Neck Bay	Alley Park	Queens	Public	Park		Launch				4
	Cross Island Parkway	Queens	Public	Park			Excursion			4
UPPER EAST RIVER	Catholic Charities Site	Queens			Yes					4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Marina Del Ray,Shurz and East Treamont Ave									4
	Point Little Bay,(Throgs Neck)	Queens	Private/ Public							4
	Frances Lewis Park	Queens	Public	Park		Launch				4
	East Point Condominiums	Queens	Private	Residential	28 S					2
	Herman McNeil Park	Queens	Public	Park		Launch	Excursion			4
	Schurz Avenue	Bronx	Private	Marina	180 S					3
	Ferry Point Park East	Bronx	Public	Park	Yes	Ramp/ Launch	Ferry			4
	Ferry Point Park West	Bronx	Public	Park			Excursion			4
	Clasons Point	Bronx	Public	Park		Launch	Excursion			4
	Soundview Park	Bronx	Public	Park		Launch	Excursion			4
Little Bay	Little Bay Park Clearview Beach	Queens	Public	Park	Yes	Ramp/ Launch				4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
Flushing Bay	Flushing Bay Promenade	Queens	Public	Park		Ramp/ Launch	Excursion			4
	Worlds Fair Marina	Queens	Public/ Private	Marina	up to 800 S		Ferry			3
HELLS GATE	Randalls Island	Manhattan	Public	Park		Launch	Excursion			4
	East 78th	Manhattan					Ferry			4
	107th Steet Pier	Manhattan					Ferry			4
	Mill Rock Island	Manhattan	Public	Park		Launch				4
HARLEM RIVER	Yankee Stadium Area	Bronx	Public				Excursion /Ferry	Yes		4
	Washington Bridge/ Highbridge Park	Bronx	Public	Park		Ramp/ Launch				4
	Sherman Creek	Manhattan			Yes			Yes		4
	Roberto Clemente State Park	Bronx						Yes		4
	Inwood Hill Park	Manhattan					Excursion			4
HUDSON RIVER	Dan Ro	Edgewater	Private	Residential	20 S					2

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Procida Organization	Edgewater	Private	Residential	62 S					4
	Roc Harbor Phase II	North Bergen	Private	Residential	210 S		Excursion			4
	Shelter Innovations	North Bergen	Private	Residential	101 S					4
	Hudson Landing	Gutenberg	Private	Residential	250 S					4
	Taed Corporation	West NY	Private	Residential	300 S					4
	Port Imperial	West NY	Private	Residential	1315 S					4
	Waterfront at Hoboken	Hoboken	Public/ Private	Mixed	300 S		Excursion			2
	Newport Marina	Jersey City	Private	Mixed	51 S expansion		Excursion			3
	Harasimus Cove	Jersey City	Private	Residential	150 S		Excursion			2
	Harborside Financial	Jersey City	Private	Mixed	250 S		Excursion			2
	Colgate	Jersey City	Private	Mixed	500 S		Excursion			3
	Liberty Harbor North	Jersey City	Private	Residential	350 S					4
	Liberty State Park	Jersey City	Public	Marina	660 S	Ramp				3

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Port Liberte	Jersey City	Private	Residential	740 S		Existing Ferry			2
	Droyers Point	Jersey City	Private	Residential	190 S					2
	North Side, Battery Park City	Manhattan			Yes				Sail School	4
	Pier 25/26	Manhattan				Launch				4
	Pier 34/40	Manhattan			Yes				Water Taxi	4
	Pier 45	Manhattan							Water Taxi	4
	Pier 51	Manhattan			Yes					4
	Pier 62 - 64	Manhattan					Excursion			4
	Huson River Center	Manhattan	Public/ Private	Mixed	200 + S					3
	Pier 79	Manhattan			200 S					4
	Pier 79	Manhattan					Ferry/ Excursion			3
	42nd St. Terminal (piers 81 -83)	Manhattan	Public/ Private				Ferry			4
	Pier 97	Manhattan							Water Taxi	4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	79th Street Boat Basin	Manhattan	Public/ Private	Marina	122 S expansion		Ferry/ Excursion			4
	Harlem On the Hudson	Manhattan			Yes		Ferry/ Excursion			4
	Riverbank State Park	Manhattan	Public	Park			Excursion			2
	Riverside Park North	Manhattan			Yes					4
	Dyckman Street Marina	Manhattan	Public/ Private	Marina	127 S M - Yes		Ferry/ Excursion		100 Dry Rack	3
	Riverdale Park	Bronx					Excursion			4
LOWER EAST RIVER	30th Street Heliport	Manhattan	Public				Ferry/ Excursion			4
	East 23rd Street Park	Manhattan					Ferry			4
	East 63rd Street	Manhattan					Ferry			4
	East 78th Street	Manhattan					Ferry			4
	Hunters Point	Queens	Public / Private	Mixed			Ferry			4
	Piers 1 - 5	Brooklyn			Yes		Excursion			4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Pier 9	Manhattan	Public	Dock			ExcursionExpansion			1
	Pier 11	Manhattan	Public				Ferry/ Excursion Expansion			4
UPPER BAY	Pier A	Manhattan		Dock			Ferry/ Excursion			4
	St. George Seaport	Staten Island	Private				Ferry to New Jersey			4
	Fulton Landing	Brooklyn					Ferry			4
	Red Hook Recreation Center	Brooklyn	Public	Park	Yes		Ferry			4
	Brooklyn Army Terminal	Brooklyn	Public				Ferry			4
	Shore Parkway	Brooklyn	Public	Park			Ferry			4
	Alice Austen Park	Staten Island	Public	Park			Excursion			4
	Wrigley Site	Staten Island	Private	Residential	Yes					3
	Cromwell Recreation Center	Staten Island	Public	Park	Yes	Launch	Excursion			4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
KILL VAN KULL	Sailor Snug Harbor	Staten Island	Public				Excursion			4
NEWARK BAY										
HACKENSACK RIVER	Sky Harbor Marina	Carlstadt	Private	Marina	45 S expansion					2
	Meadowlands Athletic Club	Lyndhurst	Private	Marina	110 S					4
	Rivermill Crescent	Secaucus	Private	Marina	8 S					2
	Luberto's Boat Yard	Little Ferry	Private	Marina	10 S expansion					3
PASSAIC RIVER										
ARTHUR KILL	City of Elizabeth	Elizabeth	Public	Marina	100 S expansion		Ferry		30 dry rack	4
	Harbortown	Perth Amboy	Private	Mixed	934 S		Ferry/ Excursion			4
	Rosegarten Property	Perth Amboy	Private	Marina	250 S					4
	Perth Amboy Municipal	Perth Amboy	Public	Marina	300 S expansion					4
	Harborview	Staten Island	Private	Mixed	250 S				Boatel	3

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Conferance House Park	Staten Island	Public	Park		Ramp/ Launch	Excursion			3
RARITAN RIVER	Pelican Watch	Woodbridge	Private	Mixed	96 S					4
RARITAN BAY	South Amboy Redevelopment	South Amboy	Private	Mixed	Yes		Excursion			4
	John Bene Marina	Sayreville	Private	Marina	266 S				266 dry rack	4
	La Mere Development	Sayreville	Private	Marina	80 S					4
	Margate Creek	Old Bridge	Private	Residential	142 S					4
	Browns Point Marina	Keyport	Private	Marina	55 S expansion					4
	Keyport Harbor	Keyport	Private	Marina	yes		Ferry			4
	Baywatch Marina	Keyport	Private	Marina	1000 S		Ferry			
	Gateway Marina	Keansburg	Private	Marina	200 S/ 50 M Expansion					4
	Point Atlantic Marina	Keansburg	Private	Marina	103 S/ 426 M		Excursion			2
	Point Atlantic	Keansburg					Ferry			4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Keansburg Marina	Keansburg	Private	Marina	145 S					4
	Spy House Harbor	Belford	Private	Marina	705 S					3
	Atlantic Highlands Marina	Atlantic Highlands	Private	Marina	300 S Expansion					4
	Ocean View Yacht Club	Highlands	Private	Club	Yes					4
	Highlands Development	Highlands	Private	Residential	20 S					4
	Bayfront Marina	Highlands	Private	Residential	14 S					4
	Princes Point	Staten Island					Ferry			4
	Great Kills Harbor	Staten Island	Public	Park			Ferry/ Excursion			4
Lower Bay	Midland/ South Beach	Staten Island	Public	Park		Launch	Excursion			4
Gravesend Bay	Toys-R-Us	Brooklyn					Ferry			4
	Drier Offerman	Brooklyn	Public	Park			Ferry			4
	White Sands	Brooklyn	Private	Residential	38 S					3
	Leon Kaiser	Brooklyn	Public	Park		Launch				4

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Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Marine Basin Marina	Brooklyn	Private	Marina	200 S Expansion					2
	Rose Cove	Brooklyn	Private	Residential	87 S					2
JAMAICA BAY	Park and Sail	Brooklyn	Public	Dock			Ferry/ Excursion			3
	Sheepshead Landing	Brooklyn	Private	Marina	39 S Expansion					3
	Breezy Point	Queens	Private				Ferry			4
	116th/Breezy Point	Queens					Ferry			4
	Brooklyn Marine Park	Brooklyn	Public	Park		Launch				4
	McGuire Park	Brooklyn	Public	Park		Launch				4
	McGuire Park - Paerdeget Basin	Brooklyn	Public	Park		Launch				4
	Canarsie Pier	Brooklyn	Public	Park		Launch	Ferry			4
	Inwood Ferry	Inwood	Private				Ferry			4
	John Martin Jr.	Queens	Private	Marina	50 S					3
	Mill Basin	Brooklyn			Yes		Ferry			4

STATUS CODE:
1 = IN CONSTRUCTION
2 = PERMIT APPROVALS RECEIVED
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4 = PLANNING RECOMMENDATION

Waterbody	Name	Location	Proposed Type	Development Type	Slip/ Mooring (S/M)	Ramp/ Launch	Ferry/ Excursion	Rowing	Other	Status
	Barren Island Marina	Brooklyn	Public/ Private	Marina	175 S Expansion					3
	Arverne	Queens	Public/ Private	Residential			Ferry			4
TOTAL					13,197 + S 476 + M	7 Ramps/ 20 Launch	41 Ferry/ 43 Excursion	3 +		4

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Con Howe, Executive Director

Waterfront and Open Space
Wilbur Woods - Director
Douglas Wehrle - Deputy Director
Barry Seymour - Former Deputy Director
Neil Baumler - Project Manager
Sheila Metcalf - Project Manager
Cathy Faughnan - Planner
Eva Hanhardt - Planner
Kieran Pape - Planner
Theresa Buckner - Word Processing
Wendy Niles - Word Processing

Planning Management and Support
Barbara Weisberg - Assistant Executive Director
Anne Pizzicara - Director, Policy and Project Management
Project Editor
Bruce Rosen

Reproduction
Antonio Mendez - Deputy Director of Operations
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Douglas Brooks - Director Queens Office
Michael Apiagyei
Pablo Vengoechea - Director Staten Island Office
Ronald Meyer

Transportation
Lawrence Lennon - Director
Nicolae Stossel

New Jersey Department of Environmental Protection

Division of Coastal Resources

John Weingart - Director
Steven Whitney - Assistant Director of Planning
Lawrence Baier - Principal Planner

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Ann Buttenweiser

NYC Department of Transportation
Peter Hallock

NYC Department of Parks and Recreation
Steven Whitehouse
Joseph Chu
Josh Laird
Martin Maher
Christopher Glaisek

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Lt. Charles Jennings
BMC J.J. Anastasia

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Steven Mars

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Joseph Birgeles
David Berkovitz
Lynn Knudson

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